Dear Friends,

We are delighted to welcome you to the 23rd V.M. Goldschmidt Conference, being held this year in the beautiful renaissance city of Florence, the capital city of the Italian region of Tuscany. Florence is the largest city in Tuscany, with approximately 1.5 million inhabitants in the metropolitan area and 370,000 in the city itself.

Florence is renowned for its history, architecture and culture. It was a centre of medieval European trade and finance and one of the wealthiest cities of the time. It is generally considered to be the birthplace of the Renaissance, the flowering of art, diplomacy and science which began here in the 14th century. Florence was a major scientific centre at that time, when a flowering of research (partly funded by families such as the Medicis) encouraged new interest in the natural sciences and culminated in the work of researchers such as Galileo. The telescopes he developed enabled him to discover the moons of Jupiter and disprove the Aristotelian theory of a solar system of perfect crystal spheres in unchanging circular motion around the earth. Some of his telescopes can be found in the Museo Galileo only a few minutes’ walk from the Conference Centre.

Florence attracts millions of visitors each year and was declared a World Heritage Site by UNESCO in 1982. The city contains a large number of museums and art galleries such as the Uffizi Gallery and the Pitti Palace. The city has had a vigorous and turbulent political history including periods of rule by the powerful Medici family, and numerous religious and republican revolutions. From 1865 to 1871 the city was also the capital of the then Kingdom of Italy.

Owing to the ongoing success of the Goldschmidt Conferences, we have for the first time been able to hire a major conference center purpose built for large multi-sessioned scientific conferences. We hope you will find that the size and convenience of the lecture theatres, as well as the ambiance in Florence’s 16th Century fortress, make it as easy as possible for the scientific and social exchange that the Goldschmidt Conferences exist to promote, and enhance your experience of the meeting and of Florence.

With best wishes

Bernard Wood

for the Goldschmidt2013 Organising Committee
Geochemical Perspectives is published by the European Association of Geochemistry, provided to EAG members and attendants of the Goldschmidt2013 conference.

For information, contact us at: office@geochemicalperspectives.org

www.geochemicalperspectives.org
Dear Colleagues,

Welcome to Florence and the 23rd Goldschmidt Conference. Established in 1988, the Goldschmidt Conferences have become the principal forum for the presentation and discussion of the best geochemistry in the world. The Goldschmidt Conference now not only provides a floor for our science and related fields but is attended by industry, funding agencies, national institute leaders, policy makers and also attracts significant media attention.

This conference is run by geochemists for geochemists. The largest global science team yet, 159 geochemists including the 42 theme chairs, constructed the initial Goldschmidt2013 science program. This was augmented by a huge response from our community in suggesting additional topics. The resulting program with over 200 sessions managed by over 600 conveners has attracted presentations with a breadth, depth and quality of science second to none. None of this would be possible without the science societies.

The European Association of Geochemistry and the Geochemical Society take it in turns to lead the Goldschmidt organisation. The Geochemical Society of Japan has supported the Goldschmidt meetings for many years. This year local societies (including the Società Italiana di Mineralogia e Petrologia, the Associazione Italiana di Vulcanologia, the Società Geochimica Italiana, the Società Geologica Italiana, and the Istituto Nazionale di Geofisica e Vulcanologia) and the Università degli Studi di Firenze have organised the field and social programs, budget accommodation and workshop facilities.

I would like to take this opportunity to thank everyone, but especially the Organising Committee and Cambridge Publications, who has contributed, little or large, to what will be a truly outstanding and memorable science meeting.

Chris Ballentine
President
The European Association of Geochemistry
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Table of Contents

Conference Information:
General Information ...........................................................ii
Presentation Instructions .....................................................iv
Committees ........................................................................vi
Exhibition ...........................................................................viii

Conference Timetable:
Program at a Glance ..........................................................x
Meetings and Events ..........................................................xii
Plenary Lectures and Awards .............................................xiv
Society Award Lectures .....................................................xvi
Social Events .......................................................................xviii
Tours and Excursions ..........................................................xxi

Societies and Sponsors:
Societies and Sponsors .......................................................xxii
The European Association of Geochemistry ........xxiv
The Geochemical Society ................................................xxv
The Geochemical Society of Japan ................................xxvi

Themes and Sessions:
Themes and Sessions .......................................................xxix

Session Details:
Monday ................................................................................1
Tuesday .............................................................................105
Wednesday .................................................................211
Thursday ...........................................................................313
Friday ................................................................................425

Maps:
Maps ..................................................................................501
Congress Center Rooms
Goldschmidt2013 is being held in the Florence, Italy. Registration, posters, talks, exhibition and refreshments are in the Spadolini Building in the Fortezza da Basso. Plenary sessions (13:15-14:15 each day) are in the Auditorium of the Palazzo dei Congressi, a short 5 minute walk away (see the maps in the inside rear cover).

Refreshments and Lunches
Refreshments: These will be available on the Ground Floor of the Spadolini Building during the times allocated for oral presentations. Refreshments will also be available between 17:30 and 19:30 during poster sessions.

Buffet Lunches: For delegates who have pre-purchased the buffet lunch package, these will be served in the Arsenale Building in the Fortezza da Basso.

Boxed Lunches: For those who have pre-purchased boxed lunches, these will be available to collect from the catering points on the Ground Floor of the Spadolini Building. Boxed lunches, for those who have pre-ordered them for a special diet, will be served from the catering station nearest to exhibition booth 18.

Wireless Internet Access
Please use the Conference App, USB or printed program wherever possible and use WiFi sparingly, especially for viewing graphic-rich material as bandwidth is finite and this will speed connection times for other delegates.

All delegates may access the wireless internet on all floors of the Congress Center, and in the courtyard outside. The network name is “Firenze Fiera WiFi”. Once you’ve connected, visit any web page and enter the username “Goldschmidt” and the password “Firenze”. If you have trouble connecting to the wireless network, please go to a less crowded part of the building, or go outside the building, as there is a limit to the number of simultaneous users on each of the 33 access points.

Registration & Information Desk Opening Times
Registration will be open from 15:00 - 20:00 on Sunday, 08:00 - 17:00 on Monday, 08:30 - 17:00 Tuesday-Thursday, and 08:30 - 12:00 on Friday.
Name Badges
Please be sure to wear your name badge at all times. Admission to the Fortezza da Basso and all sessions will require identification by your badge. If you lose your name badge please visit the Registration Desk.

Those with badges stating that they are Accompanying Guests will not be allowed access to the scientific sessions.

Lost & Found
All items found in the Congress Center should be brought to the Registration Desk.

Travel Grants
All enquiries related to US student travel grants and student support will be dealt with by the Geochemical Society at booth 19. Grants for non-US applicants will be available on Tuesday and Wednesday from the Registration Desk.

Insurance & Responsibility
Liability insurance is the responsibility of each individual delegate. Delegates should have their own medical coverage. The Organizing Committee assumes no responsibility for accident, losses, damage, delays, or any modifications to the program arising from unforeseeable circumstances. It accepts no responsibility for travel or accommodation arrangements. The participant acknowledges that he/she has no right to lodge damage claims against the EAG, the Organising Committee, Cambridge Publications or Firenze Fiera should the conference proceeding be hindered or prevented by unexpected political or economic events or generally by Acts of God, or should the non-appearance of speakers or other reasons necessitate program changes.

Smoking Policy
For the comfort of delegates, all rooms used by the conference have been designated as non-smoking areas, including the stairwell of the Spadolini Building. Delegates who wish to smoke may do so in the courtyard outside the buildings.
Oral Presentation Instructions

Oral Presentation Times
Sessions with oral presentations will take place from Monday to Friday from 09:00-12:00 and 14:30-17:30. There are 19 parallel sessions in the Spadolini Building: 6 in the Upper Floor (rooms U01 - U06) and 13 in the Lower Floor (rooms L01-L13).

Uploading your Talk
Presenting authors should visit the lecture room in which their talk is to be given between 17:30 and 18:30 on the day before their talk to upload their presentation. Those talking on Monday morning should go to their lecture room at 08:00 on Monday. Those speaking on Monday afternoon should go to their lecture room at 13:30.

Computer & Software Compatibility
Delegates making oral presentations should make sure that their files are compatible with Windows 7 and Microsoft Office 2010 or Acrobat 11.

Talk Timing
Speakers should arrive at their allocated room not less than 20 minutes before the start of the first presentation in order to meet with the chairperson. All presentations must be given in English, which is the official language of the Conference.

Oral presentations are allocated 15 minutes and keynote talks either 15 or 30 minutes. 15-minute talks should be finished after 12 minutes, and 30-minute keynotes after 25 minutes, to leave time for discussion. The chairperson will give a first signal after 10 minutes, a warning after 12 minutes and prevent further talking after 15 minutes. It is essential for the success of the conference that the speakers keep strictly to this scheme to ensure that all parallel sessions are synchronized.

Mobile Phones, Pagers, Cameras and Video Cameras
Delegates are required to mute or turn off their mobile (cell) phones and pagers during oral presentations. No photography or videoing is permitted in any of the oral sessions or at poster sessions without the permission of the relevant oral presenter or authors of the poster.
Poster Presentation Instructions

Poster Presentation Times
There will be afternoon poster sessions on Monday, Tuesday, Wednesday and Thursday of the conference from 17:30-20:00. There will be no poster session on Friday afternoon. Posters should be put up between 10:00 and 13:00 on the day of presentation. The materials required to attach each poster to the board will be supplied. Posters should be removed between 20:00-20:30 on the day of presentation. Posters not collected by these times will be removed by the conference organizers and recycled.

Poster Locations
The posters will be displayed in two areas on the Ground Floor of the Spadolini Building. Poster board numbers are given in the Program Volume and on the web site.

Poster Size
The poster boards are large enough to fit a size A0 poster in portrait orientation (approximately 90 cm wide by 120 cm high). Oversize posters will not be displayed.

Poster Etiquette
The poster sessions are from 17:30 to 20:00 on Monday, Tuesday, Wednesday and Thursday, and delegates should expect to be available by their poster for most of this time on the day of their presentation. If there will be any time during this period when no author can be present, a card should be left indicating when the author will next be present.

Cameras & Video Cameras
No photography or videoing is permitted at any of the poster sessions without the permission of the authors of the poster.
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(ENS Lyon) - Science Committee

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(CRPG Nancy) - EAG Goldschmidt Officer

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Martin Frank  
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Andreas Kappler  
(University Tübingen)

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Chiara Manetti  
(Bloom slr.)
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Sandro Conticelli
(Università di Firenze) - Local co-ordinator

Orlando Vaselli
(Università di Firenze) - Local co-ordinator

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Roberta Oberti
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Bernardo Cesare (Università Padova)

Costanza Bonadiman (Università Ferrara)

Riccardo Avanzinelli (Università Firenze)
The Exhibition is located on the ground floor of the Spadolini building and will be open during conference hours. 
The conference is grateful for support from:

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39 Consiglio Nazionale delle Ricerche-Istituto di Geoscienze e Georisorse
22 The European Association of Geochemistry
36 ECORD/IODP
12 Electro Scientific Industries, New Wave Research Div.
9 Elemental Scientific
28 Elements
21 Elsevier
43 Eurovector Spa
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20 The Geochemical Society of Japan
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1 Università degli Studi di Firenze
7 Wiley
### Conference Program at a Glance

<table>
<thead>
<tr>
<th>Time</th>
<th>Sunday 25&lt;sup&gt;th&lt;/sup&gt;</th>
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<td>Films: Chasing Ice/Thin Ice</td>
<td>ERC Funding Opportunities</td>
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<td>Italian Wine and Cheese Tasting Evening</td>
<td>Posters</td>
<td>EAG Cocktail Party</td>
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<td>Rock Band: Double Scotch</td>
<td>Films: Chasing Ice/Thin Ice</td>
<td>How to write a Scientific Paper</td>
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<td>Classical Concert</td>
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Meetings and Events

Sunday, August 25

09:00 - 13:00  Affari Adua 2  EAG Council Meeting
09:00 - 13:00  Affari Floor 4  GS Board Meeting
09:00 - 12:00  Affari 226  Springer Verlag meeting
13:00 - 18:00  Affari Floor 4  EAG / GS joint meeting
14:00 - 18:00  Affari 226  EMU Executive Committee
17:00 - 19:00  Spadolini  Ice Breaker Party

Monday, August 26

12:30 - 13:00  L08  EarthChem
               Town Hall Meeting
12:30 - 13:30  Lorenese 16  Goldschmidt2015: Organising Committee
17:00 - 19:30  Lorenese 16  GS PAC Meeting
18:30 - 19:30  L08  ERC Funding Opportunities
18:30 - 20:00  L11  Film: Chasing Ice
18:30 - 20:00  L12  Film: Thin Ice
18:30 - 20:00  L13  Critical Zone Observatory
               Open Forum
18:30 - 20:00  Scherma  G-cubed Happy Hour
20:00 - 21:30  Basilica  Wine and Cheese Evening

Tuesday, August 27

12:30 - 14:00  Lorenese 16  Elsevier Editorial Meeting
12:30 - 13:30  L08  BOGLS Community Forum
18:30 - 19:30  Scherma  EAG General Assembly
18:30 - 20:00  L08  SIMP General Assembly
20:00 - 23:00  Basilica  Thermo Scientific User Meeting
Meetings and Events

Wednesday, August 28

12:15 - 14:30 Lorenese 16 EMU Council Meeting
12:30 - 14:00 Scherma Goldschmidt2014: Science Committee and Theme Chairs
14:00 - 16:30 Scherma Goldschmidt2014: Organising Committee
14:00 - 16:30 Scherma Goldschmidt2014: Science Committee and Theme Chairs
18:30 - 20:30 Lorenese 16 EarthChem Editors’ Round Table
18:30 - 20:30 L08 How to Prepare and Publish a Scientific Paper
18:30 - 20:00 L11 Film: Chasing Ice
18:30 - 20:00 L12 Film: Thin Ice
18:30 - 20:00 Courtyard Double Scotch Gig
20:00 - 21:30 San Lorenzo Classical Concert

Thursday, August 29

11:00 - 12:00 Lorenese 16 Goldschmidt2013: Organisers’ Review Meeting
12:30 - 14:00 Lorenese 16 Goldschmidt2016: Organising Committee
19:30 - 24:00 Cavaniglia Conference Banquet

Friday, August 30

12:30 - 14:30 Belvedere CPL Organisers’ Lunch and Presidents’ Lunch

Events in bold are open to all delegates
Events in Italics are open to all who have obtained tickets
Events in plain text are for invited delegates only
Monday, August 26, 13:15 Auditorium

Richard Carlson
President of the Geochemical Society

Making Earth

Tuesday, August 27, 13:15 Auditorium

Francis Albarède
Ecole Normale Supérieure in Lyon

Isotopes of Disease

Wednesday, August 28, 13:15 Auditorium

Paolo Gasparini
University of Napoli Federico II

Natural Hazards and Scientific Advice: Interactions Among Scientists, Decision Makers and the Public

Thursday, August 29, 13:15 Auditorium

Robert M Hazen
Carnegie Institution of Washington’s Geophysical Laboratory and the Clarence Robinson Professor of Earth Science at George Mason University

Earth’s Carbon Through Deep Time

Friday, August 30, 13:15 Auditorium

Sujoy Mukhopadhyay
Department of Earth and Planetary Sciences, Harvard

Probing the Hadean World with Noble Gases
Plenary Awards

Wednesday, August 28, 13:15 Auditorium

Geochemical Fellows 2013 (EAG and GS)

Vickie Bennet
Jérôme Chappellaz
John Eiler
Kenneth A. Farley
Yingwei Fei
Guillaume Fiquet
Kilti Grice
Peter Kelemen
Richard Pancost
Frank Richter
Hisayoshi Yurimoto

Thursday, August 29, 13:15 Auditorium

Distinguished Service Awards (GS)

Klaus Peter Jochum
Kerstin Lehnert
Baerbel Sarbas
Doug Walker
Society Award Lectures

Shen-su Sun Award (Shen-su Sun Foundation)

Fang Huang
(Citation by Qing-Zhu Yin)

Silicon Isotope Fractionation between the Upper and Lower Mantle of the Earth
Monday, August 26: 10:45 in U02

Urey Medal (EAG)

Igor Tolstikhin
(Citation by Albrecht Hofmann)

Two Noble Families Display What Happened in their Early Days
Monday, August 26: 14:30 in U02

C.C. Patterson Award (GS)

Joel Blum
(Citation by Yigel Erel)

Mass Independent Isotope Fractionation of Mercury: Why it is Such a Useful Tool in Biogeochemistry and Ecology
Monday, August 26: 14:30 in L10

Houtermans Medal (EAG)

James Day
(Citation by Richard Walker)

Highly Siderophile Element Constraints on Intraplate Magmatism
Monday, August 26: 16:00 in U04

The Geochemical Journal Award (GSJ)

Yusuke Nakagawa in absentia
(Citation by Yurimoto Hisayoshi)

Yoshiki Sohrin

Stable Isotopes of Heavy Elements in the Modern Ocean
Tuesday, August 27: 16:45 in L06
F.W. Clarke Award (GS)

Blair Schoene
(Citation by Urs Schaltegger)

*From Date to Process: Integrating Geochemistry and Geochronology on Very Short and Very Long Timescales*

Wednesday, August 28: 09:00 in U06

Medal for Research Excellence 2012 (EMU)

Richard Harrison
(Citation by Simon Redfern)

*Magnetic Nanostructures in Meteorites: A Window on the Early Solar System*

Wednesday, August 28: 10:30 in L13

V.M. Goldschmidt Award (GS)

Harry Elderfield
(Citation by Ros Rickaby)

*Ocean Geochemistry and Paleoproxies: Deep Ocean Carbonate Ion Through Six Glacial-Interglacial Cycles*

Thursday, August 29: 14:30 in L07

The Gast Lecture (EAG and GS)

Sujoy Mukhopadhyay

*Probing the Hadean World with Noble Gase*

Friday, August 30: 13:15 in Auditorium

Science Innovation Award (EAG)

Jérôme Chappellaz
(Citation by Erik Kerstel)

*Trace-Gas Measurements in Firn and Ice Cores Using CRDS Instruments*

Friday, August 30: 14:30 in L10
We invite you to come to the
EAG COCKTAIL PARTY & AGM

on Tuesday 27 August
from 18:30
Scherma room

Connect with the geochemical community and hear about our initiatives while enjoying a drink.

Open to all delegates.
Films: Chasing Ice / Thin Ice
Monday 26th and Wednesday 28th August; 18:30-20:00
Location: L11 and L12

A free screening of two fantastic films telling the inside story of climate change. Chasing Ice was filmed in the Arctic by acclaimed environmental photographer James Balog. Thin Ice is a joint initiative between Oxford University and Victoria University of Wellington and London-based DOX Productions. The two films will be screened simultaneously in adjacent rooms. The films are free and no booking is required.

Italian Wine and Cheese Tasting Evening
Monday 26th August; 20:00-21:30
Location: Basilica

What could be more appropriate in Florence than spending an evening tasting local wines and cheeses? The wine industry in the area is thousands of years old and you will be able to sample the benefits of all that experience when attending this event held within the historic Basilica.

Music Event
Wednesday 28th August; 18:30-20:00
Location: Basilica Courtyard (Schermia if wet)

The band ‘Double Scotch’ will be performing rock ‘n’ roll, pop and blues. All delegates are welcome. A bar will be open to provide light refreshments for thirsty Goldschmidt rockers. Free entry.

Classical Concert
Wednesday 28th August; 20:00-21:30
Location: San Lorenzo Church

A concert of baroque and classical Italian music has been arranged in San Lorenzo’s Church in the centre of Florence. Within walking distance of the congress centre and seating 500 the church will make a wonderful back-drop for a beautiful evening of music.

Conference Banquet
Thursday 29th August; 19:30-24:00
Location: Cavaniglia

The social highlight of the conference will be the Conference Banquet held in the 16th century part of the Fortezza da Basso, the Cavaniglia. A limited number of tickets may be available from the Registration Desk from Monday lunchtime.
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Tours include; city centre tour, the Medici family tour, the Uffizi Gallery, Pitti Palace, the Academy Gallery, Masaccio and churches in the Oltrarno area, Santa Maria Novella and district and the Florentine hills.

Tours can be booked from the Tours, Excursions and Hotels Booth (Booth 11, Ground Floor of the Spadolini Building), which is open throughout the conference.
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The EAG is a proud co-host of the V.M. Goldschmidt Conferences.

Founded in 1985, the European Association of Geochemistry (EAG) is a non-profit organization dedicated to promoting geochemistry internationally. The society is an active and dynamic organization of over 1900 members that:

- Leads the biannual European Goldschmidt conference organization
- Publishes Geochemical Perspectives
- Is a participating society in Elements
- Recognizes scientific excellence through awards
- Organizes a Distinguished Lecture Program
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- Sponsors workshops and conferences in Europe
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- Print and online subscription to Elements
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- Sponsorship of member led workshops and conferences

During the Goldschmidt 2013 conference, the EAG will be happy to welcome you at Booth 22. We also invite you to a Cocktail Party / AGM on Tuesday 27 August at 18:30 (Scherma Room) for a brief presentation of our activities and the opportunity to meet council members, while enjoying a drink.

EAG Officers

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The Geochemical Society is honored to be a co-host of the 23rd annual V.M. Goldschmidt Conference. In 1988, 500 registrants participated in the first Goldschmidt Conference held in a small conference hotel just off the Baltimore beltway. Besides the much more beautiful and historic setting of Florence for this year’s Goldschmidt, with over 4,000 abstracts submitted, the Goldschmidt Conference continues its strong growth that reflects the expanding applications of geochemistry and related fields. The Geochemical Society is proud of its role in initiating the Goldschmidt Conference and partnering with EAG to transform the conference from a small, local gathering to the broad international forum for geochemistry that it has become.

Looking forward to Goldschmidt Conferences in California (2014), Prague (2015) and Yokohama (2016), GS and EAG invite you to be participants in the exposition of cutting-edge geochemical, cosmochemical and mineralogical research from the international community that addresses topics ranging from Earth formation to the origin of life.

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EXHIBIT BOOTH 19

Please visit our booth (Booth 19) for more information about the Geochemical Society and plans for Goldschmidt2014 in California.

www.geochemsoc.org
The Geochemical Society of Japan

Proud Co-Sponsor of the Goldschmidt Conference 2013, Florence

President: Naohiro Yoshida
Vice-President: Koshi Yamamoto

The Geochemical Society of Japan (GSJ) was established in 1953 for the advancement of research in geochemistry and related sciences. The GSJ is one of the oldest societies devoted to geochemistry in the world. Currently, the GSJ has a membership of about 1000 with diverse disciplines related to geochemistry from more than 10 countries. The primary missions of the GSJ are: to release the latest research results through a rapid and efficient circulation, to provide useful information for the society members, and to promote geochemical interests to the general public. To pursue these missions, the GSJ has been co-sponsoring the Goldschmidt Conferences since 2003 when we hosted the 13th Conference in Kurashiki, and will host the 26th in Yokohama, Japan, 2016.

The GSJ welcomes your participation. The privilege of the GSJ membership includes free subscription to the Geochemical Journal, discount on the Goldschmidt Conference fee and GSJ publications, and eligibility to apply for the Torii Endowment travel/meeting grant.

The GSJ would greatly appreciate your input and discussion as well as generous support through an involvement in GSJ. The GSJ cordially welcomes geochemists of wide generations and specialties from all over the world. For more information on the Geochemical Society of Japan and membership benefits, please visit our exhibit at Booth 20 (Spadolini Building, ground floor).

www.geochem.jp/english/index.html

Geochemical Journal

Executive Editor: Hisayoshi Yurimoto
Vice-Executive Editors: H. Kagi, T. Fagan, N. Ohkouchi, M. Satish-Kumar, and U. Tsunogai

The GSJ publishes a bimonthly international journal, the Geochemical Journal (GJ). The most outstanding paper published over the previous year receives the Geochemical Journal Award. The GJ publishes papers in five categories: Invited Reviews, Articles, Notes, Express Letters, and Critical Comments. Express Letter presents high quality short papers, which are published with minimal delay, less than four months in order to disseminate timely results to the geochemists and related scientists in the world.

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As a nonprofit initiative, the support of our collaborators BioOne, Dartmouth, the Georgia Institute of Technology, the University of Colorado Boulder, the University of Michigan, and the University of Washington ensures that we keep our focus on the publication of timely, high quality research to advance the intellectual agenda of science.
### Theme 01: Union Sessions

<table>
<thead>
<tr>
<th>Theme 01a</th>
<th>Origin and Application of Mass-Independent Isotope Fractionation in Solar System Evolution, Earth History, and Atmospheric and Environmental Chemistry (Thomas Röckmann, Shuhei Ono, James Lyons &amp; Joel Savarino)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orals:</td>
<td>Mon AM, Mon PM. Posters: Mon PM</td>
</tr>
<tr>
<td>Theme 01b</td>
<td>Frontiers in Nitrogen (BioGeoCosmo)Chemistry (Gray E Bebout, Marilyn L Fogel &amp; Pierre Cartigny)</td>
</tr>
<tr>
<td>Orals:</td>
<td>Wed AM. Posters: Tue PM</td>
</tr>
<tr>
<td>Theme 01c</td>
<td>Impacts of Geochemistry (John Ludden, Francis Albarède &amp; Max Coleman)</td>
</tr>
<tr>
<td>Orals:</td>
<td>Tue PM</td>
</tr>
<tr>
<td>Theme 01d</td>
<td>Symposium to Honor the Geochemical Legacies of H.D. Holland (1927-2012) (Hirosi OHMOTO, James I Drever, Philip Candela, James Kasting &amp; Mark Logsdon)</td>
</tr>
<tr>
<td>Orals:</td>
<td>Mon PM, Tue AM. Posters: Mon PM</td>
</tr>
<tr>
<td>Theme 01e</td>
<td>Causes of Phanerozoic Mass Extinctions: Impacts vs. Large Igneous Provinces vs. Others? (Fred Jourdan, Andrea Marzoli &amp; Simonetta Cirilli)</td>
</tr>
<tr>
<td>Orals:</td>
<td>Wed PM. Posters: Wed PM</td>
</tr>
<tr>
<td>Theme 01f</td>
<td>Deep Subsurface Fluids, Habitability and Microbial Ecosystems (Matt Schrenk, Barbara Sherwood Lollar &amp; Chris Ballentine)</td>
</tr>
<tr>
<td>Orals:</td>
<td>Fri AM. Posters: Thu PM</td>
</tr>
<tr>
<td>Theme 01g</td>
<td>Element Partitioning: A Universal Tool in Geochemistry (Jon Wade, Vincent Van Hinsberg, James Badro &amp; Guillaume Fiquet)</td>
</tr>
<tr>
<td>Orals:</td>
<td>Fri PM. Posters: Thu PM</td>
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<tr>
<td>Theme</td>
<td>Session</td>
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<tr>
<td>02a</td>
<td>Refractory Grains, Volatiles, and Organic Molecules Inherited from the Interstellar Medium</td>
</tr>
<tr>
<td>02b</td>
<td>Martian Evolution; Ancient Messengers and Modern Measurements</td>
</tr>
<tr>
<td>02c</td>
<td>Planet Formation and Bombardment</td>
</tr>
<tr>
<td>02d</td>
<td>Comparative Planetology of Crust Formation</td>
</tr>
<tr>
<td>02e</td>
<td>Accretion and Differentiation of Primitive Parent Bodies</td>
</tr>
<tr>
<td>02f</td>
<td>Chronology of Molecular Cloud Collapse, First Solids Formation, and Earliest Accretion</td>
</tr>
<tr>
<td>02g</td>
<td>Origins of Life: Environments, Mineral Surfaces, and Prebiotic</td>
</tr>
<tr>
<td>02h</td>
<td>Dynamics and Chemistry in Protoplanetary Disks</td>
</tr>
<tr>
<td>02i</td>
<td>The Volatile Inventory of the Moon and Mercury</td>
</tr>
<tr>
<td>02j</td>
<td>In Situ, High Spatial Resolution Isotopic Measurements Applied to Extraterrestrial Materials</td>
</tr>
</tbody>
</table>
### Theme 03: Early Earth

**Klaus Mezger & Vickie Bennett**

**03a** Continental Crust Formation in the Early Archean and the Emergence of Life (*Matthias Willbold & Stephen Mojzsis*)

Orals: Fri AM. Posters: Thu PM

**03b** Geodynamics and Crust Formation in the Archean – Palaeoproterozoic (*Elis Hoffmann, Jeroen van Hunen, Anders Scherstén & Martin van Kranendonk*)

Orals: Wed AM, Wed PM. Posters: Wed PM

**03c** Peering into the Cradle of Life (*David Wacey, Matt Kilbourn & Harald Strauss*)

Orals: Wed PM. Posters: Wed PM

**03d** Building and Differentiating the Early Earth (*Maria Schönbächler, Matt Jackson & Mark Jellinek*)

Orals: Thu AM, Thu PM. Posters: Wed PM

**03e** Earth’s Oxygenation and Associated Ocean Chemistry Before and after the Archaean-Proterozoic Boundary (*Mark van Zuilen, Ronny Schoenberg, Balz Kamber & James Farquhar*)

Orals: Fri AM, Fri PM. Posters: Thu PM

**03f** What do We Know About the Hadean after 30 Years? – Zircons, Extinct Nuclides – And More (*Vickie Bennett, Klaus Mezger & John Valley*)

Orals: Thu PM. Posters: Thu PM

**03g** Reconstructing Ancient Surface Environments from Modern (Near) Analogues (*Aubrey Zerkle & Sean Crowe*)

Orals: Fri AM. Posters: Thu PM

### Theme 04: Deep Earth

**George Helffrich & Eiichi Takahashi**

**04a** Composition of the Earth (*Bill White & William McDonough*)

Orals: Mon AM. Posters: Mon PM


Orals: Tue AM. Posters: Mon PM
04c Melts and Melting in the Basal Mantle (Guillaume Caro & Mike Walter)
Orals: Tue AM

04d Influence of Accretion on the Composition and Differentiation of the Earth (Thorsten Kleine & Richard Walker)
Orals: Mon PM. Posters: Mon PM

04e Geoneutrino: The Nexus of Particle Physics and Earth Science (Fabio Mantovani, Claude Jaupart, Giovanni Fiorentini, Aldo Ianni & Yu Huang)
Orals: Tue PM

Theme 05: Mantle Geochemistry
Marc Hirschmann & Helen Williams

05a Building the Oceanic Lithosphere: From Mantle Melting to Magma Chambers (Elisabetta Rampone, Marguerite Godard, Richard Katz & Riccardo Tribuzio)
Orals: Tue AM, Tue PM. Posters: Tue PM

05b Siderophile and Chalcophile Element Systematics in Terrestrial Processes (Akira Ishikawa, Ambre Luguet & Stephan Koenig)
Orals: Mon PM. Posters: Mon PM

05c Investigating the Origin and Modification of Cratonic Mantle over Time: The Role of Diamonds and Xenoliths (Gareth Davies, Dan Howell, Lucy Hunt, Maya Kopylova & Fabrizio Nestola)
Orals: Wed AM, Wed PM. Posters: Wed PM

05d Evolution of Mantle Geochemistry (Stephen Parman, Huw Davies & John Lassiter)
Orals: Mon AM, Mon PM. Posters: Mon PM

05e Volatiles in the Mantle: Origin, Evolution and Consequences for Earth’s Dynamics (Alberto Saal & Manuel Moreira)
Orals: Fri AM, Fri PM. Posters: Thu PM

05f Integrated Geophysical-Geochemical Constraints on Composition and Structure of the Lithosphere (Derek Schutt, Costanza Bonadiman, Sonja Aulbach & Gianluca Bianchini)
Orals: Thu PM. Posters: Thu PM
Themes and Sessions

05g  New Tracers in Mantle Geochemistry
(Sujoy Mukhopadhyay, Julie Prytulak & Nobumichi Shimizu)
Orals: Mon AM. Posters: Mon PM

05h  Origin of Mantle Heterogeneities Revealed from Oceanic and Continental Peridotites (James Day, Brian O’Driscoll, Richard Walker & J Stephen Daly)
Orals: Thu AM, Thu PM. Posters: Wed PM

Theme 06: Continental Crust
Mary Reid & Tony Kemp

06a  Understanding the Lower Continental Crust: Where are We Now? (Stacia Gordon, Tracy Rushmer & Oliver Jagoutz)
Orals: Wed PM. Posters: Wed PM

06b  Geochemical and Geodynamical Perspectives of Continent Formation Through Time (Anne Peslier & Bruno Dhuime)
Orals: Mon AM, Mon PM. Posters: Wed PM

06d  Delamination and Downwellings: The Secondary Convection Systems in Orogens and at Cratonic Peripheries (Alan Levander, Janne Blichert-Toft, Eugene Humphreys & Mary Reid)
Orals: Thu AM. Posters: Wed PM

06e  Advancements in Using Mineral Phases as Recorders of the Timing, Rates, and Processes of Continental Crustal Evolution (Massimo Tiepolo, Terrence Blackburn & John Hanchar)
Orals: Wed AM, Wed PM. Posters: Wed PM

06f  Continental Magmatic Pipeline: From Crustal Roots to the Surface (Kari Cooper, Jonathan Miller & Josef Dufek)
Orals: Tue AM, Tue PM. Posters: Tue PM

06g  Quantification of Metamorphic Processes and the Thermo-Tectonic Evolution of Orogens (Michael Brown, Bernardo Cesare, Sumit Chakraborty & Taras Gerya)
Orals: Thu PM, Fri AM, Fri PM. Posters: Thu PM
<table>
<thead>
<tr>
<th>Theme 07: Subduction</th>
</tr>
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<tbody>
<tr>
<td>Craig Manning &amp; Terry Plank</td>
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<thead>
<tr>
<th>07a</th>
<th>Deep Transport of Subducted Material: Escaping the Meat Grinder (Catherine Chauvel, Laura Hebert &amp; Eiji Ohtani)</th>
</tr>
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<td></td>
<td>Orals: Wed AM. Posters: Tue PM</td>
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<thead>
<tr>
<th>07b</th>
<th>Redox Processes in the Subducted Slab, Mantle and Crust (Stefano Poli, Robert Luth &amp; Liz Cottrell)</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>Orals: Tue AM. Posters: Tue PM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>07c</th>
<th>Fluid Composition and Pathways Leading to Melting at Subduction Zones (Horst Marschall, Timm John &amp; Joerg Hermann)</th>
</tr>
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<td>Orals: Tue PM. Posters: Tue PM</td>
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<thead>
<tr>
<th>07d</th>
<th>Non-Conventional Physical and Chemical Processes in Subduction Zones (Bradley Hacker &amp; Mark Behn)</th>
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<tbody>
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<td>Orals: Tue PM. Posters: Tue PM</td>
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<tr>
<th>07e</th>
<th>Vapor Phase Mobility in Arc Volcanic Systems (Adam Kent, Andreas Audetat &amp; Michael Rowe)</th>
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<td>Orals: Wed AM. Posters: Wed PM</td>
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<tr>
<th>07f</th>
<th>Magma Ascent from the Mantle to Eruption of Arc Volcanoes (Erik Hauri, Marie Edmonds &amp; Adam Kent)</th>
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<td>Orals: Mon AM. Posters: Mon PM</td>
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<thead>
<tr>
<th>07g</th>
<th>Carbon Cycling in Subduction Zones (Olivier Beyssac, Katy Evans &amp; Maria Luce Frezzotti)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Orals: Wed PM. Posters: Wed PM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>07h</th>
<th>Biogeochemical Cycling, Hydrogeology and Deformation in the Forearc of Subduction Zones (Evan Solomon, Marta Torres, Miriam Kastner &amp; Paola Vannucchi)</th>
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<tbody>
<tr>
<td></td>
<td>Posters: Mon PM</td>
</tr>
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<thead>
<tr>
<th>07i</th>
<th>ExTerra: Understanding Subduction Through the Study of Exhumed Terranes (Maureen Feineman &amp; Sarah Penniston-Dorland)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Orals: Mon PM. Posters: Mon PM</td>
</tr>
</tbody>
</table>
Theme 08: Melts, glasses, magmas: From properties to processes

Daniel Neuville & Roberto Moretti

08a Latest News on the Structure of Melts and Glasses
(Sung K Lee, Grant S Henderson & Daniel Neuville)
Orals: Fri PM. Posters: Thu PM

08b Advances in Transport Properties of Natural Melts, Glasses & Magmas
(Cristina De Campos, Kelly Russell & Alan Whittington)
Orals: Wed PM. Posters: Thu PM

08c Small Degree Partial Melts and a Deep Carbon Connection
(Francesco Soppa, Anatoly Zaitsev & Adrian Jones)
Orals: Thu AM. Posters: Wed PM

08d Gases and Degassing in Magmatic Systems: Physics and Chemistry
(Don Baker, Paolo Papale, Pete Burnard & Didier Laporte)
Orals: Thu PM. Posters: Thu PM

08e Glasses, Melts and Fluids as Tools for the Understanding of Volcanic Processes and Hazards
(Nicole Métrich, Roberto Moretti, Claudia Cannatelli, Rosario Esposito & Rita Klebesz)
Orals: Fri AM. Posters: Thu PM

08f Computational Modelling of Melts and Glasses
(Bertrand Guillot, Rudolphe Vuilleumier & Sandro Jahn)
Orals: Thu PM. Posters: Thu PM

08g Nuclear Waste Management and Glass Alteration
(David A McKeown)
Orals: Thu AM, Thu PM. Posters: Wed PM

08h Glasses in Art, Architecture and Industry
(Laurent Cormier)
. Posters: Mon PM

08j Glasses and Melts at High Pressure
(Chrystele Sanloup & Nobumasa Funamori)
Orals: Fri PM. Posters: Wed PM
Theme 09: Evolution of Earth’s Environment

Juraj Farkas & Elizabeth Griffith

09b Ocean Acidification: Processes, Time Scales and Biotic Response (Gavin L Foster & Appy Sluijs)
Orals: Thu PM. Posters: Wed PM

09c Patterns, Controls, and Consequences of the Earliest Rise of Atmospheric Oxygen (Timothy Lyons, Noah Planavsky & Ariel Anbar)
Orals: Fri AM. Posters: Thu PM

09d Global O₂ Levels in the Neoproterozoic and Paleozoic (Tais Dahl & Erik Sperling)
Orals: Tue PM. Posters: Tue PM

09e Life in Ferruginous Settings: Building the Bridge between Sedimentology and Geomicrobiology (Elizabeth Swanner, Bertus Smith & Nicole Posth)
Orals: Thu PM. Posters: Wed PM

09f Oceanic Volcanoes and Life (Paul Wignall, Robert Duncan & Elisabetta Erba)
Orals: Thu AM. Posters: Wed PM

09g Geochemical and Biological Consequences of Changes in the Biological Pump over Geological Time (Jonathan Payne, Katja M Meyer, Bas van de Schootbrugge & Elisabetta Erba)
Orals: Fri AM, Fri PM. Posters: Thu PM

09h Seawater Geochemical Evolution: Applications of Elemental and Isotopic Proxies (Anton Eisenhauer, Matthew S Fantle, Juraj Farkas, Elizabeth Griffith & Brad Opdyke)
Orals: Wed AM/PM, Thu AM. Posters: Wed PM

09i Alteration Processes and Geobiological Interactions at Mid-Ocean Ridges (Esther Schwarzenbach, Chiara Boschi, Tamara Baumberger & Benjamin Eickmann)
Orals: Fri PM. Posters: Thu PM
Themes and Sessions

Theme 10: Interfaces from the nano to macro scales

Karim Benzerara & Alexis Templeton

10a Geochemical Processes at Mineral-Water Interfaces: Insight from Macroscopic, Spectroscopic, and Computational Methods (Jeffrey Catalano, Jean-François Boily, Christian Mikutta, Sebastien Kerisit & Jordi Cama)
Orals: Mon AM, Mon PM, Tue AM, Tue PM.
Posters: Mon PM

10b Isotope Geochemistry Across Environmental and Redox Gradients: Tracing Biological and Geochemical Processes (David Fike, Sara B. Pruss & Matthew T. Hurtgen)
Orals: Fri AM. Posters: Thu PM

10c Interactions between Nanomaterials and the Living World (Mélanie Auffan & Cole W Matson)
Orals: Wed PM. Posters: Wed PM

10d Reactivity of Water-(Gas)-mineral Interfaces from the Nano to the Macroscopic Scale: Implications for Weathering, CO₂ Sequestration and Energy-Related Studies (Damien Daval, Alejandro Fernandez-Martinez & Kate Maher)
Orals: Thu AM, Thu PM. Posters: Wed PM

10e Computational/experimental Studies of Nanoscale Geochemical Phenomena (Jim Kubicki, Tue Hassenkam & Martin Andersson)
Orals: Fri PM. Posters: Thu PM

10f Microbe/Mineral Interfaces and their Role in Biomineralization Processes (Liane G. Benning, Lesley Warren, Dominique J Tobler & Karina K Sand)
Orals: Mon AM, Mon PM. Posters: Mon PM

10h Combining Experimental and Theoretical Approaches to Understand Biogeochemical Interfaces in Soil (Gabriele E Schaumann, Adelia Aquino, Kai Uwe Totsche & Daniel Tunega)
Orals: Wed PM, Thu AM. Posters: Wed PM
Themes and Sessions

Orals: Mon PM, Tue AM. Posters: Tue PM

10j  Mineral Surfaces as Microbial Habitat *(Katja Heister, Geertje J. Pronk, Ellen Kandeler & Christian Poll)*  
Orals: Thu PM. Posters: Tue PM

10k  Iron Redox Transformations and their Impact on Trace Elements in Natural and Engineered Systems *(Andreas Voegelin, Christopher Gorski, Thilo Behrends & Stephan Hug)*  
Orals: Wed AM. Posters: Tue PM

**Theme 11: Volcanoes and Hazards**

Mauro Rosi & Kathy Cashman

11a  Carbon Dioxide Earth Degassing from Volcanoes and from Non-Volcanic Areas *(Giovanni Chiodini, Patrick Allard, Clive Oppenheimer & David Hilton)*  
Orals: Mon AM. Posters: Mon PM

11b  Tephra Chemistry & Mediterranean Tephrochronology (<100ka) *(Martin Menzies & Roberto Sulpizio)*  
Orals: Tue PM. Posters: Tue PM

11c  Crustal Assimilation during Magma Emplacement *(Luigi Dallai & Valentin Troll)*  
Orals: Tue PM. Posters: Tue PM

11d  Chemical, Physical and Temporal Evolution of Magmatic Systems *(Luca Caricchi & Diego Perugini)*  
Orals: Mon PM. Posters: Mon PM

11e  Magma Storage Systems throughout the Crust *(Catherine Annen, Bruno Scaillet & Caroline Martel)*  
Orals: Wed AM. Posters: Wed PM

11f  Stromboli Volcano: Recent Advances and Open Questions *(Mike Burton, Maurizio Ripepe, Nicole Métrich, Lorella Francalanci & Marco Pistolesi)*  
Orals: Wed AM. Posters: Wed PM
11g  Mt. Etna from Source to Surface: Deciphering How a Complex Basaltic Magma Storage and Transport System Works (Marco Viccaro, Wendy Bohrson, Antonio Paonita & Giuseppe Puglisi)
Orals: Tue AM. Posters: Tue PM

**Themes and Sessions**

**Theme 12: Earth Resources: Energy**
Lori Summa & Andrew Aplin

12a  Unconventional Oil and Gas Resources: Exploration and Production Geochemistry (Andrew Aplin, Rolando di Primio, Ron Hill & Maowen Li)
Orals: Thu PM, Fri AM. Posters: Thu PM

12b  Water-Rock-Petroleum Interactions (Alexandra Hakala & Athanasios Karamalidis)
Orals: Fri AM. Posters: Thu PM

12c  Geothermal Energy (Angelo Minissale, Yuri Taran, Nic Spycher & Simona Regenspurg)
Orals: Thu AM. Posters: Wed PM

12d  Geochemistry of Nuclear Storage (Francis Claret & Claire Fialips)
Orals: Fri PM. Posters: Thu PM

12e  Hydrocarbon Seeps, Spills, Geochemical Prospecting, and Analytical Advances (Robert Pottorf, Rich Camilli & Tim Eglinton)
Orals: Thu AM. Posters: Wed PM

12f  Targeting Microbial Communities Associated with Fossil Fuel Deposits for Energy Applications (Casey Hubert, Martin Krüger, Hans Richnow & Sebastien Dreyfus)
Orals: Fri AM. Posters: Thu PM

12g  Carbon Capture, Utilization and Storage (Alexis Navarre-Sitchler, Scott Imbus & Susan Carroll)
Orals: Wed AM, Wed PM. Posters: Tue PM

12h  Geochemistry of Gas Hydrate Systems: From the Laboratory to Natural Deposits (Missy Feeley & Ray Boswell)
Orals: Mon AM.
Posters: Mon PM
<table>
<thead>
<tr>
<th>Theme 13</th>
<th>Title</th>
<th>Presenters</th>
<th>Orals</th>
<th>Posters</th>
</tr>
</thead>
<tbody>
<tr>
<td>13i</td>
<td>Geochemistry of Energy Storage (Axel Liebscher, Dieter Pudlo &amp; Reinhard Gaupp)</td>
<td>Posters: Mon PM</td>
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</tr>
<tr>
<td>13b</td>
<td>Metal Sources, Transport, Concentration, Precipitation and Timing of Ore-Forming Processes (Holly Stein, Marc Poujol &amp; Gleb Pokrovski)</td>
<td>Orals: Mon AM, Mon PM, Tue AM, Tue PM. Posters: Mon PM</td>
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<tr>
<td>13c</td>
<td>Ocean Chemistry, Politics, Resources and Mining (Chris Yeats, Tim McConachy &amp; Wolfgang Bach)</td>
<td>Orals: Fri AM. Posters: Thu PM</td>
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<tr>
<td>13d</td>
<td>Geochemistry and Mineralogy of Mine Wastes (Bernd Lottermoser &amp; Bernhard Dold)</td>
<td>Orals: Fri PM. Posters: Thu PM</td>
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<tr>
<td>13e</td>
<td>Rare Earths and Rare Metal Mineralization (Yasushi Watanabe, Frances Wall, Olivier Pourret &amp; Sophie Decrée)</td>
<td>Orals: Wed AM, Wed PM. Posters: Tue PM</td>
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<td>13g</td>
<td>Advances in the Geochemistry and Tectonic Understanding of Porphyry Deposits (Pete Hollings &amp; Mike Baker)</td>
<td>Orals: Thu PM. Posters: Wed PM</td>
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<tr>
<td>13h</td>
<td>Lithium Deposits in Evaporites: Element Sources, Extraction and Deposition (Simone Kasemann, Broder Merkel &amp; Friedrich Lucassen)</td>
<td>Orals: Fri AM. Posters: Thu PM</td>
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### Theme 14: Climate Change

**Ros Rickaby & John Higgins**

<table>
<thead>
<tr>
<th>14a</th>
<th>Geochemical Records and Models of Climate Change in Deep Time (<em>Galen Halverson &amp; Yves Godderis</em>)</th>
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</thead>
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<td>Orals: Mon AM, Mon PM. Posters: Mon PM</td>
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<thead>
<tr>
<th>14b</th>
<th>Reconstructing Terrestrial Hydrology: Proxies, Mechanisms, and Records (<em>Kathleen Johnson, Jessica Tierney &amp; Ian Fairchild</em>)</th>
</tr>
</thead>
<tbody>
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<td>Orals: Fri AM, Fri PM. Posters: Thu PM</td>
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<thead>
<tr>
<th>14c</th>
<th>Rates, Timings and Mechanisms of Pleistocene Sea Level Change (<em>Alex Thomas, Pierre Deschamps &amp; Bill Thompson</em>)</th>
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<td>Orals: Mon PM. Posters: Mon PM</td>
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<tr>
<th>14d</th>
<th>Quantifying the Transfer of Carbon between Oceanic, Atmospheric, Terrestrial and Geological Reservoirs over Glacial Cycles (<em>Kate Hendry, Eric Galbraith, Luke Skinner &amp; Andy Ridgwell</em>)</th>
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<td>Orals: Tue PM. Posters: Tue PM</td>
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<tr>
<th>14e</th>
<th>Linking Ice Core Records of the Recent Past to Global Climate (<em>Sarah M Aciego &amp; Paolo Gabrielli</em>)</th>
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<td>Orals: Tue AM. Posters: Tue PM</td>
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<tr>
<th>14g</th>
<th>Novel Climatic Proxies: Towards Realism (<em>Sambuddha Misra, Peter Swart &amp; Ann Pearson</em>)</th>
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<td>Orals: Thu PM, Fri AM. Posters: Wed PM</td>
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<table>
<thead>
<tr>
<th>14h</th>
<th>Geological Regulation, Feedbacks and Records of CO₂ (<em>Joshua West, Appy Sluijs &amp; Andy Ridgwell</em>)</th>
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</thead>
<tbody>
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<td>Orals: Tue AM. Posters: Tue PM</td>
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<thead>
<tr>
<th>14i</th>
<th>Marginal Basin Suboxic Sediments: Archives of High-Resolution Paleoclimate Marine and Terrestrial Records and Interactions (<em>Gert J De Lange, F. Martinez-Ruiz &amp; Stefano Bernasconi</em>)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Orals: Tue PM. Posters: Tue PM</td>
</tr>
</tbody>
</table>
Theme 15: Atmospheric Aerosol in Air Quality and Climate: the Science and Solutions

Cristina Facchini & Gordon McFiggans

15a Organics in the Mix: Multicomponent Aerosol Processes (Yinon Rudich, Neil Donahue & Satoshi Takahama)
Orals: Mon AM. Posters: Mon PM

15b Aerosols, Clouds and Precipitation (Athanasios Nenes & Ilan Koren)
Orals: Thu AM. Posters: Wed PM

15c Pollution – Climate Interactions and Energy Solutions (Surabi Menon & Mark Jacobson)
Orals: Tue AM. Posters: Tue PM

15d Biosphere-Atmosphere Interactions (Colette Heald & Christine Wiedinmyer)
Orals: Tue PM. Posters: Tue PM

15e Atmospheric Dust (Reto Gieré & Natalie Mahowald)
Orals: Wed AM, Wed PM. Posters: Tue PM

15f Combustion Aerosol (Cathy Liousse & William K.-M. Lau)
Orals: Mon PM. Posters: Mon PM

Theme 16: Weathering, Climate, Tectonics and Surface Processes

Jérôme Gaillardet & Kate Maher

16a New Geochemical and Isotopic Proxies for Weathering (Friedhelm von Blanckenburg & Kate Maher)
Orals: Mon AM, Mon PM. Posters: Mon PM

16b Probing the Critical Zone (Heather Buss, Corey Lawrence & Setareh Rad)
Orals: Tue AM. Posters: Mon PM

16c Weathering Processes in Glaciated and Permafrost Dominated Environments (Ruth Hindshaw, Andrew Jacobson, Emily Stevenson & Sarah M Aciego)
Orals: Thu PM. Posters: Wed PM
Organic Matter Export and the Sequestration of Atmospheric Carbon Dioxide (Valier Galy, Robert Hilton & Gerard Govers)
Orals: Mon PM. Posters: Mon PM

Modelling of Earth Surface Processes (Yves Godderis)
Orals: Tue AM

Large Rivers as Integrators of Landscape Dynamics (Jérôme Gaillardet & Jens Hartmann)
Orals: Mon PM. Posters: Mon PM

Rates, Fluxes and Coupling between Erosion and Weathering (Sean Willet, Jane Willenbring, Joshua West & Niels Hovius)
Orals: Fri AM. Posters: Thu PM

Chemical Weathering in Marginal Environments (Bernhard Peucker-Ehrenbrink & Morgan Jones)
Orals: Thu PM. Posters: Wed PM

Biotic Enhancement of Weathering (David Schwartzman, Roger Finlay & Steeve Bonneville)
Orals: Fri PM. Posters: Thu PM

Pedogenetic, Geomorphic Processes and Landscape Evolution with an Emphasis on Potential Input of Relative and Absolute Dating (Christian Mavris, Sophie Cornu & Thierry Allard)
Orals: Fri PM. Posters: Thu PM

The ins and Outs of Mud: Chemical Fluxes between Sediments and Seawater (Silke Severmann & Rachel Mills)
Orals: Mon AM, Mon PM. Posters: Mon PM

Constraining Rates of Ocean Processes (Laura Robinson & Matt Charette)
Orals: Tue AM. Posters: Tue PM

Changing Ocean Oxygen: Past, Present, Future (Curtis Deutsch)
Orals: Thu AM. Posters: Wed PM
<table>
<thead>
<tr>
<th>Theme</th>
<th>Title</th>
<th>Oral Dates</th>
<th>Poster Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>17d</td>
<td>Isotopic and Elemental Tracers of Marine Biogeochemistry and Circulation (Seth John, Julie Granger, Katharina Pahnke &amp; Gregory F. de Souza)</td>
<td>Tue PM, Wed AM, Wed PM</td>
<td>Tue PM</td>
</tr>
<tr>
<td>17e</td>
<td>Water Isotopes as Tracers of Convection, Microphysics, and Atmospheric Dynamics (Liz Moyer &amp; Vasileios Gkinis)</td>
<td>Thu AM</td>
<td>Wed PM</td>
</tr>
<tr>
<td>17f</td>
<td>Atmospheric Trace Gas and Aerosol Changes in the Recent Past and the Last 1000 Years: Observations and Modelling (Jérôme Chappellaz, Eric Salzman, Jim Butler &amp; Guido van der Werf)</td>
<td>Tue PM</td>
<td>Tue PM</td>
</tr>
<tr>
<td>17g</td>
<td>Metal-Biota Interactions in Seawater (Jay Cullen, Maeve Lohan &amp; Martha Gledhill)</td>
<td>Tue PM</td>
<td>Tue PM</td>
</tr>
<tr>
<td>17h</td>
<td>Atmospheric Deposition of Aerosols to the Land and Oceans and their Impact on Ecosystems and Climate (Nikos Mihalopoulos, Zongbo Shi &amp; Nicholas Meskhidze)</td>
<td>Mon PM</td>
<td>Mon PM</td>
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</table>

**Theme 18: Anthropogenic Impacts on Pollutant Dynamics**

Thomas Borch & Rizlan Bernier-Latmani

<table>
<thead>
<tr>
<th>Theme</th>
<th>Title</th>
<th>Oral Dates</th>
<th>Poster Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>18a</td>
<td>Contaminant Fate and Transport at the Groundwater-Surface Water Interface (Philippe Van Cappellen &amp; Joel Kostka)</td>
<td>Wed PM, Thu AM</td>
<td>Wed PM</td>
</tr>
<tr>
<td>18b</td>
<td>Climate Impacts on SOM Storage and Decomposition (Ingrid Kögel-Knabner &amp; Margaret Torn)</td>
<td>Fri PM</td>
<td>Thu PM</td>
</tr>
<tr>
<td>18c</td>
<td>Achievements and Future Challenges in Environmental and Soil Chemistry – A Symposium in Honor of Professor Willem van Riemsdijk (Walter Schenkeveld, Gerwin Koopmans &amp; Tjisse Hiemstra)</td>
<td>Wed AM</td>
<td>Tue PM</td>
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<tr>
<td>Session</td>
<td>Title</td>
<td>Authors</td>
<td>Oral/Poster Times</td>
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<td>18d</td>
<td>Trace Element Dynamics in Mining Impacted Environments and Integrated Remediation Solutions</td>
<td>William Burgos, Bernd Lottermoser, Richard Collins &amp; Scott Johnston</td>
<td>Orals: Tue AM, Tue PM. Posters: Tue PM</td>
</tr>
<tr>
<td>18e</td>
<td>Biogeochemical Processes Affecting Geologic Carbon Sequestration</td>
<td>Andrew Mitchell, Frederick Colwell &amp; Robin Gerlach</td>
<td>Orals: Wed PM</td>
</tr>
<tr>
<td>18f</td>
<td>Impacts of Soil, Air, and Water Geochemistry on Human Health</td>
<td>Alexander van Geen</td>
<td>Orals: Fri PM. Posters: Thu PM</td>
</tr>
<tr>
<td>18g</td>
<td>Geochemical Mechanisms of Mineral-Based Amendments for Soil and Sediment Remediation</td>
<td>Mario Villalobos &amp; Dimitri Vlassopoulos</td>
<td>Orals: Fri AM. Posters: Thu PM</td>
</tr>
<tr>
<td>18h</td>
<td>Application of Non-Traditional Isotopes for the Investigation of Contaminated Sites and Remediation Systems</td>
<td>Romy Matthies &amp; David W Blowes</td>
<td>Orals: Wed PM. Posters: Thu PM</td>
</tr>
<tr>
<td>18i</td>
<td>Interaction of Oxyanions with Mineral Phases: Sorption, Redox Transformation, and Structural Incorporation</td>
<td>Andreas C Scheinost, Thomas Neumann &amp; Laurent Charlet</td>
<td>Orals: Mon AM, Mon PM. Posters: Mon PM</td>
</tr>
<tr>
<td>18j</td>
<td>Geochemical and Biological Fate of Anthropogenic Radionuclides</td>
<td>Toshihiko Ohnuki, Satoshi Utsunomiya, Kazuya Tanaka &amp; Tomo Suzuki-Muresan</td>
<td>Orals: Thu AM, Thu PM. Posters: Wed PM</td>
</tr>
<tr>
<td>18k</td>
<td>Advances in the Studies of Oxyanions as the Transport Mechanism of Contaminants</td>
<td>Saugata Datta, Karen H Johannesson, Rudolph Hon &amp; Annette Johnson</td>
<td>Orals: Mon PM. Posters: Mon PM</td>
</tr>
<tr>
<td>18l</td>
<td>Environmental Application of Engineered Nanomaterials: Benefits and Risks</td>
<td>Thilo Hofmann, Gregory Lowry, Rald Kaegi, Armand Masion &amp; Mélanie Kah</td>
<td>Orals: Thu PM, Fri AM. Posters: Thu PM</td>
</tr>
</tbody>
</table>
18m  Biogeochemical Cycles in the Rhizosphere: Examining Carbon, Trace and Heavy Metal Cycling at the Plant-Soil Interface (Marco Keiluweit, Carla Rosenfeld & Eva Marie Muehe)
Orals: Tue PM. Posters: Wed PM

19a  Isotopes in Biogeochemistry and Ecology: New Tools and Insights (Brian Popp & Joel Blum)
Orals: Mon AM, Mon PM. Posters: Mon PM

19b  The Role of Reactive Intermediates in Biogeochemistry (Colleen Hansel, Adam Kustka & Bettina Voelker)
Orals: Tue AM, Tue PM. Posters: Tue PM

19c  Subsurface Porous Media as Biogeochemical Reactors: How Coupled Biogeochemical Processes Affect Material Fluxes from Molecular to Critical Zone Scales (Ruben Kretzschmar, Jon Chorover & Steve Banwart)
Orals: Wed PM. Posters: Wed PM

19d  From Parts to Processes: Progress and Challenges of Using Omics Data to Elucidate Novel Metabolic Pathways and Predict Geochemical Rates (Adam Kustka, Chris Bowler, Steve Giovannoni & Rizlan Bernier-Latmani)
Orals: Thu AM

19e  Phototrophic Life and Earth’s Redox Evolution (Jenn Macalady & Trinity Hamilton)
Orals: Mon PM. Posters: Mon PM

19f  A Celebration of the Contributions of Bo Barker Jørgensen: Microbial Transformations in Transition – New Views on the Coupling of Redox Processes in Nature (Carol Arnosti, Moritz Lehmann, Scott Wankel, Bo Thamdrup & Joel Kostka)
Orals: Fri AM, Fri PM. Posters: Thu PM

19g  Methane in the Marine and Terrestrial Realms: From Environmental Impacts and Climate to Microbial Metabolisms (Helge Niemann & Alina Stadnitskaia)
Orals: Thu PM. Posters: Wed PM
### Themes and Sessions

<table>
<thead>
<tr>
<th>19h</th>
<th>Biochar Interactions with Soil, Plant and Water – Processes and Fate (<em>Bruno Glaser &amp; Heike Knicker</em>)</th>
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<td>Orals: Thu AM. Posters: Wed PM</td>
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<tr>
<th>19i</th>
<th>Microbes and Minerals in Extreme Environments (<em>Mónica Sánchez-Román, Tanja Bosak, Tina Treude, Daniel Ariztegui &amp; Crisogono Vasconcelos</em>)</th>
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<tr>
<th>19j</th>
<th>The Role of Biominerals in Biogeochemical Cycling (<em>Emma Versteegh &amp; Mark Hodson</em>)</th>
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<td>Orals: Thu AM. Posters: Wed PM</td>
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<tr>
<th>19k</th>
<th>Life Below the Seafloor – How Alive and How Important? (<em>Kai-Uwe Hinrichs, Katrina Edwards &amp; Fumio Inagaki</em>)</th>
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<td>Orals: Mon AM, Mon PM. Posters: Mon PM</td>
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<th>19l</th>
<th>Iron and the Carbon Cycle: Linkages between Two Biogeochemical Cycles (<em>Thomas Riedel &amp; Harald Biester</em>)</th>
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<td>Orals: Tue AM. Posters: Tue PM</td>
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<th>19n</th>
<th>Biogeochemical and Geochemical Processes and Cycles in Wetlands (<em>Klaus-Holger Knorr &amp; Christian Blodau</em>)</th>
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<tr>
<th>19o</th>
<th>Geomicrobiology of Sulfur Cycling in Engineered Ecosystems (<em>Hans Carlson, John Coates &amp; Juergen Thieme</em>)</th>
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<td>Orals: Thu PM</td>
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<tr>
<th>19p</th>
<th>Biogeochemical Interactions in Thermal Ecosystems (<em>M Hope Lee &amp; Brent Peyton</em>)</th>
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<td>Orals: Wed AM. Posters: Tue PM</td>
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<tr>
<td>Theme 20: Frontiers in Analytical Techniques</td>
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<td><strong>Joel Baker &amp; Julie Bryce</strong></td>
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<tr>
<td><strong>20a</strong> Tuning the Torch with Innovative Applications in Multicollector Inductively Coupled Plasma Mass Spectrometry: A Tribute to Francis Albarède (Arnaud Agranier, Audrey Bouvier, Maud Boyet &amp; Fred Mynier)</td>
<td></td>
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<tr>
<td>Orals: Fri AM. Posters: Thu PM</td>
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<tr>
<td><strong>20b</strong> Biological Geochemistry: Advances in Biology and Medicine Realized Through Geochemical Analyses (Vincent Balter, Anders Meibom &amp; Nathalie Vigier)</td>
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<td>Orals: Wed PM. Posters: Wed PM</td>
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<tr>
<td><strong>20c</strong> Deviant Isotopologues: Theory, Processes and Measurements of Clumped Isotopes and Position-Specific Fractionations (Rosemarie Came, Mathieu Daëron, Cedric John &amp; Edwin Schauble)</td>
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<td>Orals: Fri AM, Fri PM. Posters: Thu PM</td>
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<td><strong>20d</strong> Innovations in Geochronology: Present Developments and a Vision for 2020 (Ethan Baxter, Randy Parrish, Blair Schoene &amp; Laura Webb)</td>
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<td>Orals: Mon AM, Mon PM, Tue AM. Posters: Mon PM</td>
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<tr>
<td><strong>20e</strong> Discoveries in Earth System Dynamics Driven by Emergent Cosmogenic Nuclide Techniques and Applications (Sarah M Aciego, Susan Ivy-Ochs &amp; Joe Licciardi)</td>
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<td>Orals: Tue PM. Posters: Tue PM</td>
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<tr>
<td><strong>20f</strong> New Developments in Analytical Techniques and Applications of Noble Gas Observations (Daniele Cherniak, Rebecca Flowers, David L Shuster &amp; Fin Stuart)</td>
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<td>Orals: Tue AM. Posters: Tue PM</td>
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<tr>
<td><strong>20g</strong> Advances in Accurate and Precise Chemical and Isotopic Analysis: Your Data are Only as Good as Your Standards and Methods! (Thomas D Bullen, Christophe Cloquet, Marc-Alban Millet &amp; Dominique Weis)</td>
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<tr>
<td>20h</td>
<td>Analytical Frontiers in High Spatially Resolved Analysis</td>
</tr>
<tr>
<td>20i</td>
<td>Understanding Microbes: Frontiers in Analytical Geomicrobiology</td>
</tr>
<tr>
<td>20j</td>
<td>Diffusive Kinetic Isotope Fractionation in Low and High Temperature Settings: A New Frontier for Geochemistry</td>
</tr>
<tr>
<td>20k</td>
<td>Laser Gas Analyzers and their Application In The Geochemical Sciences</td>
</tr>
<tr>
<td>20l</td>
<td>Modern Applications in Secondary Ion Mass Spectrometry</td>
</tr>
<tr>
<td>20m</td>
<td>Advanced Analytical Characterization of Natural Organic Matter</td>
</tr>
<tr>
<td>20n</td>
<td>Half Lives of Geochronologically Useful Nuclides</td>
</tr>
</tbody>
</table>

**Theme 21: Frontiers in Computational Geochemistry**

**John Brodholt & Sandro Scandolo**

<table>
<thead>
<tr>
<th>Code</th>
<th>Theme</th>
<th>Authors</th>
<th>Orals/Posters</th>
</tr>
</thead>
<tbody>
<tr>
<td>21a</td>
<td>Mineral Response to Extreme Conditions: Implications for the Nuclear Fuel Cycle</td>
<td>(Ram Devanathan, Chris Stanek, Nigel Marks &amp; Jianwei Wang)</td>
<td>Thu PM. Posters: Wed PM</td>
</tr>
<tr>
<td>21b</td>
<td>Both Sides Now: Melts Viewed from Experimental and Computational Perspectives</td>
<td>(Nico de Koker &amp; Mark Ghiorso)</td>
<td>Thu PM</td>
</tr>
</tbody>
</table>
| Theme 21: Transition Metals and Strongly Correlated Systems  
(Stephen Stackhouse, Dane Morgan & Vallerie Vallet)  
Orals: Fri PM. Posters: Thu PM |
|---|
| Theme 21: Transport Processes in the Earth’s Interior from Experiment and Simulation  
(Andrew Walker, Patrick Cordier, James Van Orman & David Dobson)  
Orals: Fri PM. Posters: Thu PM |
| Theme 21: Quantification and Mechanisms of Stable Isotope Fractionation – New Insights from Theory and Experiments  
(Sandro Jahn, Edwin Schauble & Helen Williams)  
Orals: Thu AM. Posters: Wed PM |
| Theme 21: Theoretical and Experimental Approaches to Geochemical Reactions, Including Solvation, Complexation, Adsorption, and Redox  
(Aurora Clark & Udo Becker)  
Orals: Fri AM, Fri PM. Posters: Thu PM |
| Theme 22: The Cutting Edge in Mineralogy and Mineral Physics  
Robert Oberti & Catherine McCammon |
| Theme 22: Thermodynamics of Minerals  
(Ali Bouhifd & Denis Andrault)  
Orals: Thu AM. Posters: Wed PM |
| Theme 22: Mineral Reactivity and Interface Processes  
(Encarnación Ruiz Agudo, Henry Teng & Christine Putnis)  
Orals: Fri AM, Fri PM. Posters: Thu PM |
| Theme 22: From Chemical Reactions to Fracturing in Rocks: Mechanisms and Physico-Chemical Feedbacks  
(Oliver Plümper, François Renard & Nicolas Brantut)  
Orals: Wed AM. Posters: Tue PM |
| Theme 22: High Pressure Mineral Physics: A Key to Study Earth’s Dynamics  
(Paola Comodi, Leonid Dubrovinsky, Tonci Balic-Zunic & Razvan Caracas)  
Orals: Wed PM. Posters: Wed PM |
Orals: Wed AM. Posters: Tue PM

22g GEOLIFE- Geomaterials for Environment, Technology and Human Activities (Roberta Oberti, Reto Gieré, Simona Quartieri & Roy Wogelius)
Orals: Thu AM, Thu PM. Posters: Thu PM

22h Recent Advances in Imaging Minerals and Rocks: Geochemical Processes at the Nanoscale (Georges Calas & Giancarlo Della Ventura)
Orals: Mon PM. Posters: Mon PM

22i Decoding Mechanisms, Rates and Timescales of Transport Processes in the Earth by Mineralogy and Geochemistry (Timm John, Thomas Müller, Ralf Milke & John Ferry)
Orals: Mon AM. Posters: Mon PM

22j Probing the Early Stages of Mineral Nucleation and Growth: From Prenucleation Clusters to Macrocrysals (Alexander Van Driessche, Matthias Kellermeier & Liane G. Benning)
Orals: Tue AM, Tue PM. Posters: Tue PM

22k Gemstones – From Genesis to Discovery (Lee Groat & Khin Zaw)
Orals: Tue PM. Posters: Tue PM

Theme 23: Hydrogeochemistry

Peter Grathwohl & Richelle Allen-King

23a Evolution and Interpretation of Contaminant Isotopic Data from Physical and Reactive Transport Processes: Experiments & Models (Massimo Rolle & Daniel Hunkeler)
Orals: Tue PM. Posters: Tue PM

Orals: Thu AM. Posters: Wed PM
Themes and Sessions

23c Urban Biogeochemistry (Philippe Van Cappellen, Ana Lima & Pasi Peltola)
Orals: Fri AM. Posters: Thu PM

23d Hazardous Waste in the Geosphere: Geochemistry for Risk Assessment (Lara Duro & Birgitta Kalinowski)
Orals: Wed AM, Wed PM. Posters: Tue PM

23e Geochemical Speciation Codes and Databases: Present Status and Future Needs (Dmitrii Kulik, Grégory Lefèvre & Johannes Lützenkirchen)
Orals: Thu PM. Posters: Wed PM

23f Mixing, Chemical Reactions and Biological Activity in Porous Media (Pietro de Anna, Tanguy Le Borgne & Marco Dentz)
Orals: Tue PM, Wed AM. Posters: Tue PM

23g Noble Gases and Other Transient Tracers in Terrestrial Waters and Gases: Bridging Established Science with Emerging Applications (Rolf Kipfer, Florent Barbecot, Matthias Brennwald & Axel Suckov)
Orals: Fri AM, Fri PM. Posters: Thu PM

23h Coprecipitation: Mechanisms and Quantitative Models (Peng Lu, Chen Zhu & Michael Kersten)
Orals: Thu AM. Posters: Wed PM

Theme 24: General Sessions

24a Continental and Regional Scale Geochemical Mapping (Benedetto De Vivo & Ilse Schoeters)
Orals: Fri AM, Fri PM. Posters: Thu PM

24b Isotope Source Tracing: A Session Dedicated to the Memory of Jean Carignan (Christophe Cloquet, Estrade Nicolas, Sandrine Baron, Maccali Jenny & Agnès Brenot)
Orals: Thu AM, Thu PM. Posters: Wed PM

24c High Temperature Geochemistry (Andrew Matzen)
Orals: Fri PM. Posters: Thu PM

24d Low Temperature Geochemistry (Martin Frank)
Orals: Mon AM/PM, Tue AM. Posters: Mon PM

24e Biogeochemistry (Aude Picard & James Byrne)
Orals: Wed AM. Posters: Tue PM
Goldschmidt 2013

Summary and Highlights
Monday 26th August, 2013

Timetable:

09:00 - 12:00 Oral Sessions
12:00 - 13:15 Lunch
13:15 - 14:15 Plenary
14:30 - 17:30 Oral Sessions
17:30 - 20:00 Poster Sessions

Highlights:

10:45 (U02) Fang Huang (Shen-su Sun Award)
13:15 (AUD) Richard Carlson (Plenary Lecture)
14:30 (U02) Igor Tolstikhin (Urey Medal)
14:30 (L10) Joel Blum (Patterson Award)
16:00 (U04) James Day (Houtermans Medal)

Other Events:

12:30 (L08) EarthChem Town Hall Meeting
18:30 (L08) ERC Funding Opportunities
18:30 (L11) Film: Chasing Ice
18:30 (L12) Film: Thin Ice
18:30 (L13) Critical Zone Observatory Open Forum
20:00 (BAS) Wine and Cheese Evening
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<tr>
<td>09:00</td>
<td>Bullen, Winkel, Mikutta</td>
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<td>Gruber, Robert, Rouff</td>
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## Oral Presentations Overview AM

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01a: Origin and Application of Mass-Independent Isotope Fractionation in Solar System Evolution, Earth History, and Atmospheric and Environmental Chemistry

Session chaired by Thomas Röckmann, Shuhei Ono, James Lyons & Joel Savarino

09:00  
Keynote: Advances in Mass Independent Isotopic Studies  
Thiemens M

09:30  
Mass Independent Isotope Fractionation in Ozone  
Robert F & Reinhardt P

09:45  
Non-Mass-Dependent Oxygen Isotope Enrichments in O₃ and CO₂: New Insights from Experiments, Observations, and Modeling  
Boering K

10:00  
New Insights into the Isotope Exchange Reaction between O₃ and CO₂ via O(1D) from Laboratory Experiments  
Shaheen R, Röckmann T, Tuzson B & Janssen C

10:15  
Oxygen Isotope Fractionation in Formation of CO₂  
Simone D, Joelsson MLT, Janssen C & Johnson MS

10:30  
CO₂ Photolysis Produces Mass Independent Fractionation and a ¹⁶O¹³C¹⁸O Clumped Isotope Anomaly  
Johnson MS, Schmidt JA, Schinke R, Meusinger C, Forecast R & Lyons JR

10:45  
Nitrogen and Oxygen Isotopic Composition of Atmospheric Nitrate Near the Highways  
Mukotaka A, Toyota S & Yoshida N

11:00  
Nitrate and its N and O Isotopes in a Tropical Marine Boundary Layer  

11:15  
Is Oxygen-17 of Atmospheric Nitrate a Tracer of Industrial Pollution?  
Proemse B, Mayer B, Fenn M & Ross C

11:30  
The Oxygen Isotope Excess Δ(¹⁷O) of Marine Nitrous Oxide  
Grefe I & Kaiser J

11:45  
Δ¹⁷O, δ¹⁵N, δ¹⁸O Variation in Precipitated Water at Jungfraujoch (3571 m) – Relation to Meteorological Parameters and Low Altitude Stations  
Ranjan S & Leuenberger M

(Session 01a continues on Monday 26th PM on p.30)
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<tr>
<td>09:00</td>
<td>The Genesis of Enstatite Chondrites and the Earth</td>
<td>Javoy M &amp; Connolly J</td>
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<td>09:15</td>
<td>Evidence Against a Chondritic Earth</td>
<td>Campbell I &amp; O’Neill H</td>
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<td>09:30</td>
<td>The Chemical Composition of the Earth</td>
<td>Palme H &amp; O’Neill H</td>
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<td>09:45</td>
<td>What are the $^{146}$Sm-$^{142}$Nd Reference Parameters for the Earth?</td>
<td>Boyet M, Bouvier A, Gannoun A &amp; Carlson R</td>
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<td>10:00</td>
<td>Chondritic Sm/Nd in the Earth, Moon and Mars</td>
<td>Kleine T, Burkhardt C &amp; Sprung P</td>
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<td>10:15</td>
<td>Sm/Nd Ratio of the Earth</td>
<td>Huang S, Jacobsen S &amp; Mukhopadhyay S</td>
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<td>10:30</td>
<td>Earth and Mars Building Blocks</td>
<td>Fitoussi C &amp; Bourdon B</td>
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<td>10:45</td>
<td>Medal: Silicon Isotope Fractionation between the Upper and Lower Mantle of the Earth</td>
<td>Huang F, Wu Z &amp; Huang S</td>
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<td>11:30</td>
<td>Composition of the Earth’s Core from Density Measurements of Liquid Iron Alloys at Megabar Pressure</td>
<td>Morard G, Antonangeli D, Siebert J, Andrault D, Guignot N &amp; Garbarino G</td>
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<td>11:45</td>
<td>Elasticity of Ferropericlase at Lower Mantle Conditions</td>
<td>Wu Z, Justo J &amp; Wentzcovitch R</td>
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(Session 04a continues on Monday 26th Posters on p.63)
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<th>Time</th>
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<tr>
<td>09:00</td>
<td>Temporal Change from Young HIMU to EM1 Source along the Pitcairn-Gambier Chain</td>
<td>Delavault H &amp; Chauvel C</td>
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<td>09:30</td>
<td>A New Hypothesis for the Origin of HIMU and FOZO Mantle End-Members</td>
<td>Castillo P</td>
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<td>09:45</td>
<td>FOZO-Himu Connection: Link to Chemical Heterogeneity of MORB and Variable Degree of Dehydration</td>
<td>Shimoda G &amp; Kogiso T</td>
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<td>10:00</td>
<td>Mixing and Progressive Melting of Deep and Shallow Mantle Sources in the NE Atlantic and Arctic</td>
<td>Tronnes RG, Debaille V, Erambert M, Stuart FM &amp; Waight T</td>
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<td>10:15</td>
<td>Novel Particle Method for Modelling Melt Generated Heterogeneity in Spherical Mantle Convection Models</td>
<td>van Heck H &amp; Davies JH</td>
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<td>10:30</td>
<td>Tracking Indian-Type Mantle at its Western Limit during the Closure of Neo-Tethys and Opening of the Indian Ocean</td>
<td>Barry T, Davies H &amp; Millar I</td>
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<td>Superchondritic Mantle is Partially Depleted MORB Mantle</td>
<td>Zhang Y</td>
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<td>Granite Compositions in a Veined-Lower Mantle, as Indicated by Mineral Inclusions in Diamonds from Juina Deposits, Brazil</td>
<td>Nardi L, Plá Cid J, Plá Cid C, Gisbert P &amp; Balzaretti N</td>
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<td>11:30</td>
<td>Investigation of Archean Mantle Plume Components from 2.7 Ga Komatiites (Abitibi, Canada)</td>
<td>Duchemin C, Mattielli N, Debaille V, Arndt N &amp; Chauvel C</td>
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<td>Archean Mantle Heterogeneities Revealed by Hf-Nd Isotope Systematics of the 3.33 Ga Commondale Komatiites</td>
<td>Hoffmann JE &amp; Wilson AH</td>
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(Session 05d continues on Monday 26th PM on p.35)
# 05g: New Tracers in Mantle Geochemistry

**Session chaired by Sujoy Mukhopadhyay, Julie Prytulak & Nobumichi Shimizu**

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| 09:00 | **Keynote:** Tracing Whole-Earth Carbon from the Hadean to Present  
         **Dasgupta R**                                            |
| 09:30 | Primordial Noble Gas in the Solar System  
         **Ozima M & Marty B**                                    |
| 09:45 | Insights into Mantle Processes from Water and Trace Elements in Olivine  
         **Tollan P, Hermann J, Arculus R, O'Neill H & Davidson J** |
| 10:00 | Potential Temperatures of Convecting Mantle Based on Al Partitioning between Olivine and Spinel  
         **Sobolev A, Batanova V, Kuzmin D & Arndt N** |
| 10:15 | **Invited:** Unradiogenic Lead in the Mantle Source of Mid-Ocean Ridge Basalts  
         **Burton K & Parkinson I**                                |
         **Freymuth H, Andersen M & Elliott T**                     |
| 10:45 | **Invited:** Mass Independently Fractionated Sulfur Isotopes in HIMU Lavas Reveal Archean Crust in their Mantle Source  
         **Cabral R, Jackson M, Rose-Koga E, Koga K, Whitehouse M,  
         Antonelli M, Farquhar J, Day J & Hauri E**                 |
| 11:00 | Coupled Radiogenic and Stable Sr Isotope Variations in Oceanic Basalts  
         **Sutcliffe C, Burton K, Parkinson I, Porcelli D & Halliday A** |
| 11:15 | Molybdenum Isotope Fractionation in the Mantle  
         **Liang Y-H, Siebert C, Fitton JG, Burton KW & Halliday AN** |
| 11:30 | Iron Isotope Geochemistry of the Balmuccia Peridotite Massif and the Composition of the Upper Mantle  
         **Sossi P, St. C. O’Neill H & Beltrando M**                 |
| 11:45 | Halogen Systematics of the Manus Spreading Center  
         **Ruzie L, Chavrit D, Burgess R, Clay P, Joachim B, Hilton DR,  
         Sinton JM & Ballentine CJ**                                 |

*(Session 05g continues on Monday 26th Posters on p.67)*
06b: Geochemical and Geodynamical Perspectives of Continent Formation Through Time

Session chaired by Anne Peslier & Bruno Dhuime

09:00 Global Lithium Deposits (Pegmatites and Brines) as Indicators of Plume-Tectonics

Vladimirov A, Zagorsky V & Volkova N

09:15 A Forward Modelling Approach to Understanding Continental Growth

Payne J, Barovich K, Pearson N & Hand M

09:30 Nd-Hf Isotopic Composition of the Upper Continental Crust

Chauvel C, Garçon M, Bureau S, Gallet S & Jahn B-M

09:45 Removing the “Heavy Mineral Effect” to Obtain a New Pb Isotopic Value for the Upper Continental Crust

Garçon M, Chauvel C, France-Lanord C, Limonta M & Garzanti E

10:00 Keynote: An Integrated Isotopic-Geologic View of Early Continental Crust Formation from the Oldest Rock Record

Bennett V & Nutman A

10:30 A Physicochemical Approach to the Early Generation of Continental Crust by Melting of Oceanic Crust

Massonne H-J

10:45 The Composition of the New Continental Crust Through Time

Dhuime B, Hawkesworth C & Cawood P

11:00 The Isotopic Artifacts of Enhanced Crustal Preservation in Collisional Orogenesis

Spencer CJ, Cawood PA, Hawkesworth C & Roberts NMW

11:15 Supercontinent Cycle and 2nd Continents

Kawai K, Ichikawa H, Yamamoto S, Tsuchiya T & Maruyama S

11:30 Episodic Growth of Continental Crust: A 3-D Geodynamic Model

Walzer U & Hendel R

11:45 Archean Andesites as Products of Plume/Crust Interaction?

Barnes S, Isaac C & Fiorentini M

(Session 06b continues on Monday 26th PM on p.36)
07f: Magma Ascent from the Mantle to Eruption of Arc Volcanoes
Session chaired by Erik Hauri, Marie Edmonds & Adam Kent

09:00  **Keynote:** Are Long-Lived Stratovolcanos Low-Pass Filters for Magma Transport?
       **Ruprecht P & Plank T**

09:30  Short Timescales of Magma Ascent Recorded in Melt Inclusion Diffusion Profiles
       **Plank T, Lloyd A, Ruprecht P, Hauri E & Zhang Y**

09:45  Timescale and Petrogenesis of 2009 and Older W. Mata Boninite Magmas

10:00  Melts in a Single Lava Flow from a Multiply Subduction-Modified Mantle Column Below Central Italy
       **Chaneva S, Nikogosian I, Van Bergen M, Mason P & Whithouse M**

10:15  Arc Lithosphere Imposes Segmented, Great Circle Volcano Distribution in the Central Sunda Arc, Indonesia
       **Macpherson C, Pacey A & McCaffrey K**

10:30  Effects of Carbonate Assimilation on Magma from Sumbing Volcano, Central Java, Indonesia and Implications for Merapi
       **Dempsey S, Macpherson C, Hall R & Davidson J**

10:45  Compositional Constraints on the Mantle Below Part of the Andes SVZ
       **Holm PM, Søager N & Dyhr CT**

11:00  Melt Evolution from the Mantle Wedge to the Crust: Insights from South Kamchatka and West Bismarck Arc Xenoliths
       **Bénard A, McAlpine SRB, Nebel O, Tollan PME, Arculus RJ & Ionov DA**

11:15  Adakite-Like Volcanism in Boyabat Region, Turkey: Geochemistry and Petrogenesis
       **Yesiloren-Gormus N & Temel A**

11:30  Late Mesozoic A-Type Magmatism in Hailar Basin, NE China: Constraints on the Evolution of the Mongol-Okhotsk Ocean
       **Li S-Q, Chen F, Hegner E & Wu J-D**

11:45  Isotopic and Geochemical Constraints on the Origin of Post-Collisional Mafic Tholeiites from Erkilet, Central Anatolia
       **Kurkcuoglu B, Furman T, Pickard M, Sen E, Hanan B, Sen P, Sayit K & Yürür T**

*(Session 07f continues on Monday 26th Posters on p.70)*
### 10a: Geochemical Processes at Mineral-Water Interfaces: Insight from Macroscopic, Spectroscopic, and Computational Methods

**Session chaired by Jeffrey Catalano, Jean-François Boily, Christian Mikutta, Sebastien Kerisit & Jordi Cama**

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>09:00</td>
<td>Water Vapor Interactions with FeOOH Particle Surfaces</td>
<td>Song X &amp; Boily J-F</td>
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<tr>
<td>09:15</td>
<td>Mineral Surface Hydroxyl Group Identity and Reactivity</td>
<td>Boily J-F</td>
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<td>09:30</td>
<td>Invited: Hematite/Water Interfaces Probed by Second Harmonic Generation</td>
<td>Geiger F</td>
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<td>09:45</td>
<td>Effect of Surface Heterogeneity and Interfacial Water on Surface Potential</td>
<td>Preocanin T, Namjesnik D, Sapunar M, Luetzenkirchen J &amp; Kallay N</td>
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<tr>
<td>10:00</td>
<td>Electrochemical Impedance Spectroscopic Study of the Hematite/Water Interface</td>
<td>Shimizu K &amp; Boily J-F</td>
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<tr>
<td>10:15</td>
<td>Invited: Computational Study of Rutile and Quartz Interfaces with Aqueous Solutions</td>
<td>Predota M, Kroutil O, Chval Z &amp; Perez S</td>
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<td>10:30</td>
<td>Prediction of Surface Organic Species at the Mineral-Water Interface vs. Spectroscopy</td>
<td>Sverjensky D</td>
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<td>10:45</td>
<td>Keynote: Molecular Properties of Anion-Mineral Surface Complexes Probed with Infrared Desorption and Temperature-Excursion Experiments</td>
<td>Persson P</td>
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<tr>
<td>11:30</td>
<td>Electrolyte Ion Binding at Iron Oxyhydroxide Surfaces</td>
<td>Kozin P, Shchukarev A &amp; Boily J-F</td>
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<td>11:45</td>
<td>Characterization of Ternary Surface Complexes of Lead Chloride on Hematite in Dependence of Temperature and Salinity – Experimental Versus Modeled Data</td>
<td>Driba D, Regenspurg S, De Lucia M &amp; Peiffer S</td>
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</table>

(Session 10a continues on Monday 26th PM on p.39)
10f: Microbe/Mineral Interfaces and their Role in Biomineralization Processes

Session chaired by Liane G. Benning, Lesley Warren, Dominique J Tobler & Karina K Sand

09:00 **Keynote**: Geochemical Windows on Coral Calcification: Cellular Mechanisms and Impacts of Climate Change
  Cohen A, DeCarlo T, Gaetani G & Holcomb M

09:30 Correlation between Crystallization Patterns and Diurnal Growth Bands in Scleractinian Corals

09:45 A New Model for Biomineralization and Trace-Element Signatures of Foraminifera Tests
  Nehrke G, Keul N, Langer G, de Noolijer L, Bijma J & Meibom A

10:00 Influence of Gelatin Hydrogel Porosity on the Formation of Calcite Mesocrystals
  Nindiyasary F, Fernández-Díaz L, Griesshaber E, Astilleros JM, Sánchez-Pastor N & Schmahl WW

10:15 Unraveling the CaCO$_3$/PSS Mesocrystal Formation Mechanism by *in situ* TEM and *in situ* AFM

10:30 Microbial Carbonate Precipitation Under High Alkaline Condition and its Implications in Concrete Restoration
  Zhu T, Paulo C & Dittrich M

10:45 Biogeochemical Controls on the Product of Microbial U(VI) Reduction

11:00 Photophysical Studies of Biologically Produced Macromolecules
  Belkasem E, Swanson L & Romero-Gonzalez M

11:15 Nanoscale Probing of the Reactivity of Biologically Versus Chemically Formed Green Rusts
  Zegeye A, Etique M, Schaaf P, Ruby C & Francius G

11:30 Mechanism and Crystallochemical Signature of Nano-Particle Formation by Microorganisms
  Shiotsu H, Jiang M, Nakamatsu Y, Ohnuki T & Utsunomiya S

11:45 Colloidal Properties of Biominalerized Nanoselenium: Implications for Bioremediation, Resource Recovery and Environmental Transport
  Bieler JM, Evangelou M, Winkel L & Lenz M

(Session 10f continues on Monday 26th PM on p.40)
11a: Carbon Dioxide Earth Degassing from Volcanoes and from Non-Volcanic Areas

Session chaired by Giovanni Chiodini, Patrick Allard, Clive Oppenheimer & David Hilton

09:00 Fluid Geochemistry of the Deep CO$_2$-Rich Caprese Reservoir (Northern Apennines, Italy)


09:15 Fluid Geochemistry and Natural Gas Hazard (CO$_2$, Rn) in the Urban Area of Rome (Central Italy)

- Pizzino L & Sciarra A

09:30 CO$_2$ Fluxes in the Submarine Hydrothermal System of Panarea

- Schipek M, Sieland R, Steinbrückner D, Ponepal M, Bauer K & Merkel B

09:45 A Global Volcanic CO$_2$ Flux Inventory

- Burton M, Sawyer G & Granieri D

10:00 CO$_2$ Emissions from Arc Volcanism: Sources, Rates and Uncertainties

- Allard P

10:15 Invited: DEep CArbon DEgassing: The Deep Carbon Observatory DECADE Initiative

- Fischer T

10:30 Transformational Science with a New Global Volcanic Gas Emissions Database

- McCormick B, Cottrell E, Fischer T, Chiodini G & Cardellini C

10:45 CO$_2$ and Advection Heat Fluxes in Central Apennine, Italy

- Chiodini G, Cardellini C, Caliro S, Frondini F & Chiarabba C

11:00 Gas Discharges for Continental Spain: Geochemical and Isotopic Features

- Vaselli O, Nisi B, Tassi F, Darrah T, Bruno J, Elio J, Grandia F & Del Villar LP

11:15 Mantle-Derived Fluids in Central Mediterranean: Geochemical and Geophysical Evidences on Fluids Sources and Migration

- Caracausi A, Grassa F, Pennino V, Rizzo A & Sulli A

11:30 Ancient Magmatic CO$_2$ Degassing from Non-Volcanic Area in West Taiwan: Helium and Carbon Isotopic Evidences

- Yang TF

11:45 Possible Link between CO$_2$ Degassing and Climate Change in SW Turkey

- Ünal-Imer E, Uysal IT, Shulmeister J & Zhao J-X

(Session 11a continues on Monday 26th Posters on p.76)
13b: Metal Sources, Transport, Concentration, Precipitation and Timing of Ore-Forming Processes

Session chaired by Holly Stein, Marc Poujol & Gleb Pokrovski

09:00 Invited: Fluid-Mediated Re-equilibration and Self-Irradiation in Complex U-Th-Rich Assemblages of Pegmatites: A Case from Norway and Implications for U-Th-Pb Dating of Ore Deposits

09:15 Fluid Evolution Recorded by Alteration Minerals along the P2 Reverse Fault and Associated with the McArthur River U-Deposit
Adlakha E, Hattori K & Potter E

09:30 Microthermometric and Raman Analysis of Fluids that Interacted with Variably Graphitic Pelitic Schist in the Dufferin Lake Zone, South-Central Athabasca Basin: Implications for Graphite Loss and Uranium Deposition
Pascal M, Ansdell K, Annesley I, Boiron M-C, Kotzer T, Jiricka D & Cuney M

09:45 The Uranium Mineralization of Pen Ar Ran (Armorican Massif), France: An Atypical “Vein Type” Deposit
Poujol M, Ballouard C, Boulvais P, Cuney M, Cathelineau M & Gapais D

10:00 Multiple Fluid Events and Metal Mobility Associated with Formation of IOCG-Type Mineralisation in Gawler Craton
Uvarova Y, Cleverley J & Hough R

10:15 The Rio Mundo Dolostones (Spain): Implications for MVT and Hydrocarbon Formation
Navarro-Ciurana D, Codina-Miquela R, Cardellach E, Vindel E, Gómez-Gras D, Griera A, Daniele L & Corbella M

10:30 Rhenium-Osmium Dating of Mississippi-Valley-Type Ore Deposits: The Robb Lake Pb-Zn Deposit, British Columbia
van Acken D, Hnatyshin D, Paradis S & Creaser RA

10:45 Metal Behaviour during Differentiation of Subducted-Related Lavas (Hunter Ridge, SW Pacific)
Cobenas G, Danyushevsky L & Falloon T

11:00 Mineral and Chemical Evolution of Fragmental Massive Sulfide Ores
Maslennikov V, Large R, Maslennikova S & Danyushevskiy L

11:15 Sources and Concentrations of Highly Siderophile Elements in VHMS Deposits Through Time
Tessalina S
11:30   Application of Portable XRF Analyzers in Au and PGE Exploration: An Example from the Bushveld Complex, South Africa

   Somarin A

11:45   New Tool for the Direct Isotopic Dating of PGM ($^{190}$Pt-$^4$He Method): New Constructions on the Timing of Pt Mineralization in Kondyor and Galmoenan Massifs, Russian Far East

   Mochalov A, Yakubovich O, Brauns M & Shukolyukov* Y

(Session 13b continues on Monday 26th PM on p.43)
### 14a: Geochemical Records and Models of Climate Change in Deep Time

**Session chaired by Galen Halverson & Yves Godderis**

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Authors</th>
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<tbody>
<tr>
<td>09:00</td>
<td>Back to Basics: Boron Isotopic Fractionation in Synthetic Calcite and Aragonite</td>
<td>Noireaux J, Mavromatis V, Schott J, Gaillardet J, Montouilout V, Louvat P &amp; Neuville D</td>
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<td>09:15</td>
<td>Reversibility of Calcium and Magnesium Isotopic Signatures during Ambient Temperature Fluid-Carbonate Mineral Interaction</td>
<td>Oelkers E, Pogge von Strandmann P, Bereninger N &amp; Movromatis V</td>
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<tr>
<td>09:30</td>
<td><strong>Keynote:</strong> Direct Atmospheric O\textsubscript{3} and O\textsubscript{2} Signatures from the Deep Past and their First-Order Pattern</td>
<td>Bao H</td>
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<td>10:00</td>
<td>Volcanic Degassing of the Gunbarrel Large Igneous Province and its Environmental Repercussions</td>
<td>Cox G, Halverson G, Hurtgen M, Poirier A, Theou-Hubert L &amp; Wing B</td>
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<tr>
<td>11:00</td>
<td>A New Conceptional Model: Reconstruction of Freshwater Incursions in Stratified Marine Paleoenviroments in Late Devonian Extinctions</td>
<td>Tulipani S, Grice K, Greenwood P, Schwark L &amp; Summons R</td>
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<td>11:15</td>
<td>Mo Isotope Signature of OAE 2</td>
<td>Westermann S, Vance D, Cameron V, Archer C &amp; Robinson S</td>
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<td>11:30</td>
<td>Preservation Potential of δ\textsuperscript{7}Li Values in Mesozoic Calcite Fossils</td>
<td>Ullmann CV, Campbell HJ, Frei R, Hesselbo SP, Pogge von Strandmann PAE &amp; Korte C</td>
</tr>
</tbody>
</table>
11:45  Geochemical Evidence for Volcanic Activity Prior to and Enhanced Terrestrial Weathering during the Paleocene Eocene Thermal Maximum

Fante M, Wieczorek R, Kump L & Ravizza G

(Session 14a continues on Monday 26th PM on p.45)
## 15a: Organics in the Mix: Multicomponent Aerosol Processes

**Session chaired by Yinon Rudich, Neil Donahue & Satoshi Takahama**

### 09:00  Keynote: Secondary Organic Aerosol Formation in Aerosol Water: Impact on Aerosol Physical Properties  
*McNeill VF*

### 09:15  A New Aqueous Phase Protocol for the Mechanism Generator GECKO-A Used for the CAPRAM Mechanism Extension  
*Brauer P, Mouchel-Vallon C, Tilgner A, Wolke R, Aumont B & Herrmann H*

### 09:30  Chemical Reactions at the Air-Water Interface in the Troposphere  
*Hoffmann M, Mishra H & Colussi A*

### 09:45  Organics in the Mix during SAPUSS  
*Dall'Osto M & Querol X*

### 10:00  Aerosol Ageing and Effect on their Optical Properties by a New Broadband Aerosols Spectrometer  
*Rudich Y, Flores M & Bluvshtein N*

### 10:15  Roles of NH₄NO₃ and Secondary Organics in Growing > 10 nm New Particles to Cloud Condensation Nuclei Size in Marine Atmosphere  
*Liu X, Zhu Y, Meng H, Gao H & Yao X*

### 10:30  Atmospheric Aerosol Nucleation in the Po Valley during the PEGASOS-Supersito Experiment  

### 10:45  Keynote: Organics in the Mix: How Important are They for the Uncertainty in Global Aerosol-Climate Effects?  
*Carslaw K, Lee L, Scott C, Pringle K, Reddington C, Mann G, Spracklen D, Riccobono F, Baltensperger U & Kirkby J*

(Session 15a continues on Monday 26th Posters on p.86)  
Session 24d follows this session in this room: see p.26.
16a: New Geochemical and Isotopic Proxies for Weathering

Session chaired by Friedhelm von Blanckenburg & Kate Maher

09:00  Keynote: A “Non-Chons” Stable Isotope View on Weathering and Hydrology

Bullen T

09:30  Resolving the Gap between Laboratory and Field Rates of Weathering

Gruber C, Zhu C, Georg B & Ganor J

09:45  Insights into U-Series Weathering Chronometers from Size Fraction Distribution of U and Th Nuclides in Himalayan Soils and Sediments

West AJ

10:00  Mg Isotope Fractionation during Hydrothermal Carbonation of Serpentines

Mavromatis V, Beinlich A, Austrheim H & Oelkers EH

10:15  Chromium Isotope Fractionation during Pedogenesis: Influence of Redox Recycling

McClain C, Maher K, Weaver K & Druhan J

10:30  Boron Behavior during Silicate Weathering: Clues from Bulk Mineral and Intracrystalline Investigations

Lemarchand D, Voinot A, Florian P, Neuvile DR & Turpault M-P

10:45  Si Isotope Systematics of Acidic Alteration of Fresh Kilauean Basalts

Chemtob S, Rossman G, Young E, Ziegler K, Eiler J & Hurowitz J

11:00  Lithium Isotope Variation in Rivers and Lakes on the Tibetan Plateau

Wiechert U, Weynell M, Barvencik S & Schuessler J

11:15  $^{40}$K-$^{40}$Ca Constraints on the Source of Dissolved Calcium in Himalayan Rivers

Caro G & France-Lanord C

11:30  River Denudational Transport to the Sea Using the Oceans $^{10}$Be(meteoric)/$^{9}$Be Ratio

von Blanckenburg F & Bouchez J

11:45  Invited: Atmospheric CF$_4$ Trapped in Polar Ice – A New Proxy for Granite Weathering

Schmitt J, Seth B, Köhler P, Willenbring J & Fischer H

(Session 16a continues on Monday 26th PM on p.49)
17a: The ins and Outs of Mud: Chemical Fluxes between Sediments and Seawater

Session chaired by Silke Severmann & Rachel Mills

09:00 AMERIGO: A New Benthic Lander for Dissolved Flux Measurements at Sediment-Water-Interface
Spagnoli F, Ciceri G, Giuliani G, Martinotti V & Penna P

09:15 Keynote: Oxygen Dynamics in Marine sediments: From Microbial to Global Scale
Glud RN

09:45 Artificially Induced Migration of Redox Layers in Adriatic Sediments

10:00 Benthic Nutrient Fluxes and Iron-Phosphorus Cycling in Sulfidic Estuarine Muds
Kraal P, Burton ED, Bush RT, Rose AL, Cheetham MD & Sullivan LA

10:15 Measuring the Isotope Fractionation of Denitrification in Permeable Sediments
Kessler AJ, Bristow LA, Cardenas MB, Glud RN, Thamdrup B & Cook PLM

10:30 Invited: Reconstructing Past Organic Matter Fluxes from δ¹⁵N Records
Möbius J, Gaye B, Lahajnar N & Emeis K-C

10:45 Mineralization Rates of Organic Carbon in Freshwater vs Marine Environments and Implications for Carbon Burial Efficiencies
Katsev S, Crowe S, Kistner M & Li J

11:00 Secular Variations in Seawater Chemistry Controlling Water-Rock Interaction in Shallow Reflux Systems
Gabellone T & Whitaker F

11:15 Assessing the Dissolution of Marine Sediment with ²³⁰Th, and the Impact of Dissolution on Sedimentary ²³¹Pa/²³⁰Th

11:30 ²²⁴Ra:²²⁸Th Disequilibrium in Coastal Sediments: Implications for the Transfer Across the Sediment-Water Interface

11:45 Using Radium Isotopes to Determine the Residence Time of Circulated Seawater in Coastal Sediments
Weinstein Y, Shalem Y, Brinberg B & Noimeir Y

(Session 17a continues on Monday 26th PM on p.52)
18i: Interaction of Oxyanions with Mineral Phases: Sorption, Redox Transformation, and Structural Incorporation

Session chaired by Andreas C Scheinost, Thomas Neumann & Laurent Charlet

09:00 Invited: Co-precipitation of Arsenate with Calcite – An Example from Greece
Winkel L, Casentini B, Bardelli F, Voegelin A, Nikolaidis N & Charlet L

09:15 Structure of Amorphous Ferric Arsenate from EXAFS Spectroscopy and Total X-Ray Scattering
Mikutta C, Michel FM, Mandaliev P & Kretzschmar R

09:30 Interactions of Arsenic and Chromium with Struvite during Mineralization
Rouff A & Ma N

09:45 Synergistic Arsenic and Pb Incorporation into Synthetic Jarosite
Aguilar-Carrillo J, Villalobos M & Romero FM

10:00 Structure of Fe(III) Precipitates Formed by Fe(0) Electrolysis in the Presence of Groundwater Ions
van Genuchten C, Amrose S, Gadgil A & Peña J

10:15 Oxynion Adsorption on Schwertmannite and Iron Precipitates from Acid Mine Drainage
Antelo J, Fiol S, Gondar D, Lopez R & Arce F

10:30 Competitive Adsorption/Desorption of Arsenate and Phosphate at the Ferric Hydroxide-Water Interface
Donahoe R & Neupane G

10:45 Release of Solid-Bound Phosphate during the Sulfidization of Lepidocrocite
van Riel KPGL, Behrends T, Bush RT & Burton ED

11:00 Arsenic Release from Red Mud Affected Soil-Water Systems
Lockwood C, Mortimer R, Stewart D, Mayes W & Burke I

11:15 Release of Antimony from Contaminated Soil Induced by Redox Changes
Hockmann K, Tandy S, Lenz M & Schulin R

11:30 Geochemical Processes of Soil and Groundwater Contamination by Cr(VI) from Natural Sources
Lee G, Namgung S & Lee Y

11:45 Vanadium Leaching from Converter Lime and Speciation in Soil: A Long-Term Field Study
Larsson MA, D’Amato M, Cubadda F, Raggi A, Öborn I & Gustafsson JP

(Session 18i continues on Monday 26th PM on p.54)

Session chaired by Brian Popp & Joel Blum

09:00 **Keynote:** Isotopic Anatomies of Organic Molecules  
*Eiler J & Krumwiede D*

09:30 Enhancing the Performance of GC-IRMS for Small Biomarker Samples  
*Juchelka D, Radke J & Hilkert A*

09:45 Variations in δD of Fatty Acids of Piezophilic Bacterium *Moritella japonica* DSK1 Reflect Biosynthetic Pathways  
*Fang J & Zhang L*

10:00 Isotope Fractionation by Alternative Nitrogenases and Oceanic Anoxic Events  
*Zhang X, Sigman D & Kraepiel A*

10:15 15N-Enrichment of Amino Acids for Studying Trophic Structure and Energy Flow in Food Webs  
*Chikaraishi Y, Ogawa N, Tsuchiya M & Ohkouchi N*

10:30 Deep-Sea Coral Amino Acids Illuminate Ecosystem Processes on South East Australia Seamounts  
*Strzepek K, Revill A, Thresher R, Smith C & Fallon S*

10:45 Nitrogen Isotopes of Coral Skeleton-Bound Organic Matter: Proxy Evaluation at Bermuda  
*Wang X, Cohen A & Sigman D*

11:00 Effects of Nutrients on Compound Specific Carbon Fixation in Phytoplankton  
*Grosse J & Boschker HTS*

11:15 Priming Effect and Isotope 13C Dynamics at Natural Abundance during the Biodegradation of Lignin in a Soil Environment  
*Fernandez I*

11:30 Determination of Sources and Flowpaths of Nitrate in a Karstic Watershed  
*Briand C, Sebilo M, Plagnes V, Louvat P & Chesnot T*

11:45 High Sensitivity of Ammonia and Nitrite Oxidation Rates to Nanomolar Oxygen Concentrations  
*Bristow LA, Dalsgaard T, Tiano L, Mills D, Ulloa O, Canfield D, Revsbech N-P & Thamdrup B*

(Session 19a continues on Monday 26th PM on p.56)
19k: Life Below the Seafloor – How Alive and How Important?

Session chaired by Kai-Uwe Hinrichs, Katrina Edwards & Fumio Inagaki

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Presenters</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00</td>
<td>Keynote: Mysteries of Subseafloor Sedimentary Life</td>
<td>D’Hondt S</td>
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<tr>
<td>09:30</td>
<td>Global Distribution of Sulfate Reduction Rates in Marine Sediments</td>
<td>Bowles M, Mogollón J, Kasten S, Zabel M &amp; Hinrichs K-U</td>
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<tr>
<td>10:00</td>
<td>Exploration of the Deep Coalbed Biosphere (IODP Expedition 337)</td>
<td>Inagaki F, Hinrichs K-U &amp; Kubo Y</td>
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<tr>
<td>10:30</td>
<td>Biogeochemistry of the Deep Mud-Volcano Biosphere in the Kumano Forearc Basin of the Nankai Trough</td>
<td>Ijiri A, Inagaki F &amp; Kubo Y</td>
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<tr>
<td>10:45</td>
<td>A Meta-Analysis Reveals Biases in Methods to Quantify Marine Microorganisms</td>
<td>Lloyd K, May M, Kevorkian R &amp; Steen A</td>
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<td>11:00</td>
<td>Invited: Gene Expression in the Deep Biosphere</td>
<td>Orsi W, Edgcomb V, Christmann G &amp; Biddle J</td>
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<td>11:30</td>
<td>The Future of Lipids as Tools to Study Microbes and Biogeochemical Processes in the Deep Biosphere</td>
<td>Hinrichs K-U, Lipp JS, Meador TB, Wegener G &amp; Xie S</td>
</tr>
</tbody>
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(Session 19k continues on Monday 26th PM on p.58)
20d: Innovations in Geochronology: Present Developments and a Vision for 2020

Session chaired by Ethan Baxter, Randy Parrish, Blair Schoene & Laura Webb

09:00 Invited: Lu-Hf and Sm-Nd Garnet Geochronology: Closure Revisited and New Applications in Lithosphere Studies
Smit M, Scherer E, Mezger K, Ratschbacher L, Kooijman E & Hacker B

09:15 The Chronology of Dehydration
Baxter E, Dragovic B & Caddick M

09:30 Laser $^{40}$Ar/$^{39}$Ar Dating of Supervolcanoes and Super Gold Deposits along the Trace of the Miocene Yellowstone Hotspot
Hames W, Brueseke M & Saunders J

09:45 Which Age is the True Age? Unravelling within-Flow Ar/Ar Age Variations in Faroe Islands Basalt Lavas

10:00 Internal $^{238}$U/$^{230}$Th Isochron Method for Dating Young Basaltic Eruptions
Tanaka R, Yokoyama T & Nakamura E

10:15 U-Bearing Hematite: A Tool for Dating Iron Oxide Copper Gold Systems?

10:30 Episodic Growth of Vein Calcite in a Stable Continental Setting: Potential Application of U-Pb Dating by LA-ICPMS and ID-TIMS
Davis D, Parmenter A & Cruden A

10:45 In situ U-Pb Dating of Carbonate by LA-ICP-(MC)-MS and ID-TIMS
Parrish R, Horstwood M, Austin-Giddings W, Roberts N, Condon D & Rasbury T

11:00 Invited: U-Pb Dating of Carbonates and Fluorite: Prospects for Understanding Fluids from Deposition Through Burial
Rasbury T, Parrish R, Austin-Giddings W, Lanzirotti T, Tomascak P & Kyle R

11:15 Adopting a Combined U-Th-Pb Strategy to Date Speleothems >200 ka

11:30 $^{238}$U/$^{234}$U/$^{230}$Th/$^{226}$Ra Systematics in Fossil Scleractinian Corals
Ghaleb B, Huot S & Hillaire-Marcel C
11:45 Probing Paleoeartquakes with *in situ* U-Pb SHRIMP-RG Analyses of Fault-Related Opals

*Nuriel P, Maher K & Miller D*

(Session 20d continues on Monday 26th PM on p.59)
22i: Decoding Mechanisms, Rates and Timescales of Transport Processes in the Earth by Mineralogy and Geochemistry

Session chaired by Timm John, Thomas Müller, Ralf Milke & John Ferry

09:00 Chemical Diffusion in the Deep Earth: Is it all About Grain Boundaries?  
*Hiscock M & Bromiley G*

09:15 Invited: Diffusive Fractionation of Lithium Isotopes in Polycrystalline Olivine  
*Homolova V & Watson EB*

09:30 Ni Diffusion in Small Angle Grain Boundaries of Forsterite  
*Marquardt K & Dohmen R*

09:45 Diffusion of Titanium in Forsterite  
*Jollands M, O’Neill H, Hermann J & Spandler C*

10:00 Keynote: Self-Organizing Reactive Porosity Waves Allow Large-Scale Fluid Escape from Subducting Oceanic Lithosphere  
*Plümper O, John T, Podladchikov YY & Scambelluri M*

10:15 Patterning in Stress: A New Insight into the Development of Phase Separation in Metamorphic Rocks  
*Burnley P*

10:30 An Apatite-Halogen Based Probe for Fluid-Rock Interaction Events  
*Kusebauch C, John T, Whitehouse M & Engvik A*

10:45 The Kinetic Effects of H$_2$O in Metasomatic and Xenolith Breakdown Reactions  
*Grant T, Milke R, Wunder B, Morales L & Wirth R*

11:00 Experimental Characterization of Replacement Symplectites: The Influence of Temperature and Small Amounts of Water on Microstructure Evolution  
*Remmert P, Wunder B, Morales L, Heinrich W & Abart R*

11:15 Cordierite Nucleation and Growth Rates in the Torres del Paine Contact Aureole  
*Bodner R, Baumgartner LP & Foster CT*

11:30 Oxygen Isotope Exchange (Dis)equilibrium at the Grain-Size Scale in Metamorphic Rocks  
*Ferry J, Kitajima K & Valley J*

11:45 Geometry of Carbon and Oxygen Isotope Exchange Fronts in the Alta Aureole, Utah: Records of Hydrodynamic Dispersion and Scale-Dependent Permeability during Infiltration-Driven Metamorphism  
*Bowman J*

(Session 22i continues on Monday 26th Posters on p.99)
24d: Low Temperature Geochemistry

Session chaired by Martin Frank

11:15  High-Grade Sperrylite Zone Reveals Mantle Contribution to Ore Metals in the Sudbury Impact Structure
      *Ames D, Hanley J, Tuba G & Jackson S*

11:30  O, Si, Fe Isotopes and Ge/Si Constraints on the Preservation of Signatures Inherited from the Formation of Isua BIFs
      *Sauvage L, Chaussidon M, Luais B & Rollion-Bard C*

11:45  Grain Size and REE Patterns as Tools to Identify Coastal Depositional Environments in Moreton Bay (Southeast Queensland, Australia)
      *Al-Kaabi F & Gasparon M*

(Session 24d continues on Monday 26th Posters on p.61)
<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>14:00</td>
<td>Blackbum</td>
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Oral Presentations Overview PM

L10

L11

L12

L13

L04

L03

L02

L01

04d 05d / 02a 05b 06b 07d 08d / 09e 19a 19k / 19e 20d 22h 04d / 05b 06b 07d 08d / 09e 19a 19k / 19e 20d 22h 04d / 05b 06b 07d 08d / 09e

MondayPMoverview.indd   29 25/07/2013   15:29
01a: Origin and Application of Mass-Independent Isotope Fractionation in Solar System Evolution, Earth History, and Atmospheric and Environmental Chemistry

Session chaired by Thomas Röckmann, Shuhei Ono, James Lyons & Joel Savarino

14:30 Variations of $\Delta^{17}$O in Terrestrial Rocks
Herwartz D, Pack A & Krylov D

14:45 O-Mif and S-Mif Effects in Photolysis of CO and SO$_2$
Lyons J, Stark G, Blackie D, Herde H & de Oliveira N

15:00 Production of S-Mif Signatures during Photochemistry of Biogenic Volatile Sulfur Compounds: A Potential Marker for Marine Stratospheric Sulfur Aerosol Layer
Oduro H & Ono S

15:15 Isotopic Composition of Sulfur in Enstatite Meteorites
Defouilloy C, Moynier F, Pringle E, Barrat J-A & Cartigny P

15:30 Mass-Independent Fractionation of Sulfur Isotopes for all S-Bearing Components of Archean Sediments
Naraoka H, Moriwaki E & Poulson S

15:45 Mass-Independent Sulfur Isotope Signature in Spherule Beds of the 3.4-3.2 Ga Barberton Greenstone Belt, South Africa
van Zuilen M, Philippot P, Whitehouse M & Lepland A

(Session 01a continues on Monday 26th Posters on p.62)

Session 01d follows this session in this room: see p.31.
01d: Symposium to Honor the Geochemical Legacies of H.D. Holland (1927-2012)

Session chaired by Hiroshi OHMOTO, James I Drever, Philip Candela, James Kasting & Mark Logsdon

16:00  Keynote: Heinrich Holland’s Big Event: The Great Oxidation  
       Kump L

16:30  A Framework for Understanding the First and Second Rises of  
       O₂  
       Catling D

16:45  Redox-Sensitive Metals and their Isotopes: The Holland Legacy of Early Ocean Exploration  
       Anbar A & Lyons T

17:00  Molybdenum in Ancient Glacial Tillites of Different Ages and its Bearing on Atmospheric Oxygenation  
       Gaschnig R, Rudnick R & McDonough W

17:15  Anomalous Isotope Fractionation of Sulfur (AIF-S) during Thermochemical Sulfate Reduction by Solid Organic Matter  
       Chorney A, Watanabe Y & Ohmoto H

(Session 01d continues on Monday 26th Posters on p.62)
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
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<tr>
<td>16:45</td>
<td>Keynote: Interstellar and Interplanetary Solids in the Laboratory</td>
<td>Dartois E</td>
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<tr>
<td>17:15</td>
<td>Isotope Effect in the Formation of Solid Water by Surface Reactions at 10 K</td>
<td>Oba Y, Watanabe N &amp; Kouchi A</td>
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</table>

(Session 02a continues on Tuesday 27th AM on p.109)
04d: Influence of Accretion on the Composition and Differentiation of the Earth

Session chaired by Thorsten Kleine & Richard Walker

14:30 Medal: Two Noble Families Display What Happened in their Early Days
Tolstikhin I

15:15 Keynote: Dynamical and Isotopic Perspectives on Accretion and Core Formation
Nimmo F

15:45 Invited: Experimental Study of Accretion and Early Differentiation of the Earth
Siebert J, Badro J, Antonangeli D & Ryerson F

16:00 Invited: Accretion and Chemical Evolution of the Terrestrial Planets
Rubie D, O’Brien D, Morbidelli A, Jacobson S & Young E

16:15 The Dependence of Siderophile Element Partitioning on Pressure, Temperature, $O_2$, and S-Content
Vogel AK, Rubie DC, Frost DJ, Audétat A & Palme H

16:30 Experimental Determination of the Si Isotope Fractionation Factor between Metal and Silicate Liquids
Hin RC, Fitoussi C, Schmidt MW & Bourdon B

16:45 Redox State during Core Formation on Planetesimals
Pringle E, Savage P, Badro J, Barrat J-A & Moynier F

17:00 Loss of Volatile Elements after the Moon-Forming Giant Impact
Pahlevan K, Karato S & Fegley B

17:15 δD in Lunar Volcanic Glasses and Melt Inclusions: A Carbonaceous Chondrite Heritage Revealed
Saal A, Hauri E, Van Orman J & Rutherford M

(Session 04d continues on Monday 26th Posters on p.63)
05b: Siderophile and Chalcophile Element Systematics in Terrestrial Processes

Session chaired by Akira Ishikawa, Ambre Luguet & Stephan Koenig

14:30 Keynote: Experimental Constraints on HSE Fractionation during Basalt Genesis  
*Brenan J*

15:00 Mantle-Crust Fractionation of the Platinum-Group Elements  
*Mungall J & Brenan J*

15:15 The Effects of Silicate Melt Composition and Sulfur on the Solubilities of PGEs in Silicate Melts  
*O’Neill H*

15:30 Re-evaluation of Digestion Methods for Accurate Re-Os Isotope and Highly Siderophile Element Analyses  
*Ishikawa A, Senda R, Suzuki K & Dale C*

15:45 Chalcophile and Highly Siderophile Element Systematics in Mid-Ocean Ridge Basalts  
*Lissner M, König S, Luguet A, le Roux P & Le Roex A*

16:00 Medal: Highly Siderophile Element Constraints on Intraplate Magmatism  
*Day J*

16:45 Peridotite-Derived Sulfides in Pyroxenites from the Lanzo and the Lherz Ultramafic Massifs?  
*Gawronski T, Becker H & Humayun M*

17:00 Testing Models for Continental Growth and Melt-Rock Interaction from $^{186}$Os-$^{187}$Os Isotopes in Southwest USA Mantle Xenoliths  
*Brandon A*

17:15 The Copper Isotope Composition of Bulk Earth: A New Paradox?  
*Savage P, Chen H, Shofner G, Badro J & Moynier F*

(Session 05b continues on Monday 26th Posters on p.64)
05d: Evolution of Mantle Geochemistry

Session chaired by Stephen Parman, Huw Davies & John Lassiter

14:30  Diffusion of Helium in the Mantle: An Explanation for MORB-Oib Patterns of $^{3}\text{He}/^{4}\text{He}$ Ratios
Morgan WJ & Morgan JP

14:45  Keynote: Combined Halogen (Cl, Br, I) and Noble Gas Mantle Geochemistry

15:15  Noble Gas Recycling and He-Ne-Ar Solubility in Ring Structure-Bearing Minerals
Jackson C, Parman S, Kelley S & Cooper R

15:30  Constraints on the Source of Mantle Plumes from the First Picrites Erupted Ethiopian Flood Basalt Province
Stuart F & Rogers N

15:45  Redox Heterogeneity in MORB as a Function of Mantle Source
Cottrell E & Kelley K

16:00  Effect of Variable CO$_2$ on Andesite-Lherzolite Reaction: Implications for Mantle Hybridization and Generation of Alkaline Basalts
Mallik A & Dasgupta R

16:15  Subduction Zones as Probes of Mantle Composition
Arculus R

16:30  Origin of the Orthopyroxene Fibrous in the Ultrarefractory Lithospheric Domains beneath Easternmost Canary Islands
Ali Abu El-Rus M

(Session 05d continues on Monday 26th Posters on p.64)

Session 02a follows this session in this room: see p.32.
06b: Geochemical and Geodynamical Perspectives of Continent Formation Through Time

Session chaired by Anne Peslier & Bruno Dhuime

14:30  Source Heterogeneities Deduced from Spatial and Temporal Geochemical Patterns in Continental Basalts
       Hart W & Brueseke M

14:45  Mafic Potassic Volcanics from the Altiplano, South America: Indication of a Dynamic A-Type Magma Source Under Construction?
       Pankhurst M, Schaefer B & Turner S

15:00  U-Pb-Hf – Isotopes of Zircon from the Eastern Part of the Sveconorwegian Orogen, SW Sweden: Implications for the Growth of Fennoscandia
       Petersson A, Schérsten A, Andersson J & Möller C

15:15  Polymetamorphic Complexes of the Urals as Indicators of Formation of the Ural Part of the East European Craton
       Pystin A

15:30  Evolution of the Lower Crust in the Point of View of Fluid-Rock Interaction Under the Bakony-Balaton Highland Volcanic Field
       Németh B, Török K, Kovács I & Szabó C

15:45  Petrology and Origin of Yozgat Intrusive Complex: Central Anatolia, Turkey
       Akçe MA & Kadioglu YK

16:00  The Late Ediacaran (605-580 Ma) Anorogenic Alkaline Magmatism in the Arabian–Nubian Shield: A Case Study of the Serbal Ring Complex, South Sinai, Egypt
       Azer M

16:15  Crust–Mantle Interaction of Late Jurassic Qianlishan Granites in South China: Constraints from Geochemistry and in situ Analyses of Zircon U–Pb–Hf–O Isotopes
       Guo CL, Yin B & Xu YM

16:30  Multiple Exsolutions in a Rare Clinopyroxene Megacryst from the Hannuoba Basalt, North China: Implications for Subducted Slab-Related Crustal Thickening and Recycling
       He D, Liu Y, Tong X, Zong K, Hu Z & Gao S

16:45  On the Hunt for a Gondwanan Suture Zone in South India
       Plavsa D, Collins A, Foden J, Clark C & Santosh M

17:00  Petrology and Geochemistry of Pyroxene Granulites of Somvarpet, South Western Dharwar Craton, Karnataka, India
       Anantha Murthy KS, Jayaram GN, Lingadevaru M & Govindaraju -
17:15 Geochemical Constrains and Tectonic Significance of Late Cretaceous Mafic Dykes from the Bhavani Shear Zone, South India

Pratheesh P & Prasannakumar V

(Session 06b continues on Monday 26th Posters on p.68)
07i: ExTerra: Understanding Subduction Through the Study of Exhumed Terranes

**Session chaired by Maureen Feineman & Sarah Penniston-Dorland**

<table>
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<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>14:30</td>
<td>Geodynamic Kinetics: Metamorphic Reaction Rates in Subduction Zones <em>Cruz-Uribe A &amp; Feineman M</em></td>
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<td>14:45</td>
<td>Lawsonite Veins in Eclogite as an Archive of Subduction Zone Fluids from 45-80 km Depth (Sivrihisar, Turkey) <em>Fornash K, Cosca M &amp; Whitney D</em></td>
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<td>15:00</td>
<td>Invited: A Cold Slab-Mantle Interface: Constraints from Exceptionally Well Preserved Lawsonite Eclogites <em>Zack T</em></td>
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<td>15:15</td>
<td>Analysis of Internal Dynamics in a Deep Subduction Channel <em>Engi M, Regis D &amp; Rubatto D</em></td>
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<td>15:30</td>
<td>Invited: Subduction Channel or Fossil Rifted Margin? Serpentinite Geochemistry of the Punta Rosa Unit, Western Alps <em>Barnes J, Beltrando M, Lee C-T, Loewy S &amp; Chin E</em></td>
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<td>15:45</td>
<td>Boron and Sulfur Isotopic Variations during Subduction of Hydrated Lithosphere: The Erro Tobbio Case <em>Shimizu N, Scambelluri M, Santiago Ramos D &amp; Tonarini S</em></td>
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<td>16:00</td>
<td>Heavy Boron Isotopes in Secondary Olivine from the HP Voltri Massif: Implications for the Boron Cycle in Subduction Zones <em>De Hoog J &amp; Hattori K</em></td>
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<td>16:15</td>
<td>Natural Type-C Olivine Fabrics in Garnet Peridotites in North Qaidam UHP Collision Belt, NW China <em>Jung H, Lee J, Ko B, Jung S, Park M, Cao Y &amp; Song S</em></td>
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<td>16:45</td>
<td>Evidence for North to South Progression of Pulsed Intrusion and Metamorphism in the Lower Crust of a Gondwana Arc, Fiordland NZ <em>Stowell H, Hout C, Tulloch A, Odom-Parker K, Schwartz J &amp; Klepeis K</em></td>
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<td>17:00</td>
<td>Pyroxenites and the Construction of Oceanic Arc Roots <em>Berger J, Caby R &amp; Burg J-P</em></td>
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<td>17:15</td>
<td>Formation and Geochemistry of Rutile from Garnet Gabbros of the Jijal Complex, Kohistan Island Arc <em>Ewing T &amp; Müntener O</em></td>
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(Session 07i continues on Monday 26th Posters on p.72)
10a: Geochemical Processes at Mineral-Water Interfaces: Insight from Macroscopic, Spectroscopic, and Computational Methods

Session chaired by Jeffrey Catalano, Jean-François Boily, Christian Mikutta, Sebastien Kerisit & Jordi Cama

14:30 Ni Sorption at the Particle Edges of Synthetic and Biogenic Birnessite
Simanova AA, Bone SE, Bargar JR, Sposito G & Pena J

14:45 Kinetics of Arsenic Sorption on Aquifer Sediment from Bangladesh Imaged by XRF Microprobe in Flowing Columns
Mihajlov I, Bostick BC, Stute M, Choudhury I, Ahmed KM & van Geen A

15:00 Invited: Structure and Reactivity of Nanocrystalline Iron Oxides in the Environment

15:15 Structures of Weakly Binding Anions at the Interfaces of Fe-Polymers and Fe-Oxides: Evidence from X-Ray and Infrared Spectroscopic Studies
Myneni S & Crompton N

15:30 Bioessential Metal Sorption at Ferricydrite-Bacteria Interfaces
Peacock C & Moon E

15:45 Effect of Phosphate and Sulfate on Fe(II)-Catalyzed Trace Metal Incorporation into and Release from Fe(III) Oxides
Hinkle MAG & Catalano JG

16:00 Keynote: Ultrafast Pump-Probe Studies of Geochemical Reactions
Gilbert B

16:30 Keynote: Thermodynamics and Kinetics of Fe(II)-Fe(III) Electron Transfer Across Interfaces
Chatman S, Zarzycki P, Kerisit S, Alexandrov V, Pearce C & Rosso K

16:45 Redox Characterization of Fe-Bearing Clay Minerals Using Electrochemical and Spectroscopic Techniques
Gorski C, Klüpfel L, Voegelin A, Sander M & Hofstetter T

17:00 Fe(II) Uptake Mechanisms on Montmorillonite Clay Minerals. A Multidisciplinary Approach
Soltermann D, Marques M, Baeyens B, Bradbury M & Daehn R

17:15 Alteration of Amorphous Fe-Silicate in Meteorites
Le Guillou C, Dohmen R, Müller T, Vollmer C, Rogalla D & Becker H-W

(Session 10a continues on Monday 26th Posters on p.74)
10f: Microbe/Mineral Interfaces and their Role in Biomineralization Processes

Session chaired by Liane G. Benning, Lesley Warren, Dominique J Tobler & Karina K Sand

14:30 Invited: Simulating the Role of Extra-Cellular DNA in Cellular Adhesion
Harding J, Freeman C, Walton R, Banwart S, Rolfe S & Geoghegan M

14:45 Controlled Bio-Inspired Synthesis of Composites: A Close Simulation of Biomineralization Process
Li XQ & Sommerdijk N

15:00 Microbial Extracellular Polymeric Substances Modulate the Product of Uranium Biomineralization
Bernier-Latmani R, Shao PP, Comolli LR, Stylo M, Alessi DS & Bargar JR

15:15 Competition between Microbial and Abiotic Fe(II) Oxidation: A Kinetic Modeling Approach
Seto M & Van Cappellen P

15:30 Biomineralization and Biomimetic Synthesis of Magnetite Nanoparticles
Tompa É, Nyirő-Kósa I, Uebe R, Schüler D & Pósfai M

15:45 Towards Understanding Magnetite Biomineralisation: The Effect of Short Chain Peptides on the {100} and {111} Magnetite Surfaces
Monnington A & Cooke D

16:00 Textural Control over Electron Transfer and Reaction with Li⁺ of Biomineralized Fe-Oxides
Miot J, Recham N, Larcher D, Guyot F & Tarascon J-M

(Session 10f continues on Monday 26th Posters on p.76)
Session 10i follows this session in this room: see p.41

Session chaired by Patricia Maurice & Frank von der Kammer

16:15 Effects of Sediment Porosity and Particulate Organic Carbon on Fe, S and U Cycling in Naturally Reduced Zones (NRZs) of a Contaminated Aquifer

Jones M, Janot N, Bargar J & Fendorf S

16:30 Bacterial Mineral-Metaloid Redox Transformations in Anaerobic Environments

Weisener C, Loick N & Franzblau R

16:45 Size-Dependent Reactivity of Magnetite Nanoparticles: A Bridge between Lab and Field Investigations

Swindle A, Madden A & Cozzarelli I

17:00 Interaction of Nanoparticles with Microorganisms

Masaki S, Shiotsu H, Sakamoto F, Ohnuki T & Utsunomiya S

17:15 Adsorption of MS2 Virus to Natural Organic Matter and Model Surfaces

Armanious A, Sigstam T, Kohn T & Sander M

(Session 10i continues on Tuesday 27th AM on p.119)
11d: Chemical, Physical and Temporal Evolution of Magmatic Systems

Session chaired by Luca Caricchi & Diego Perugini

14:30 Temporal Evolution of Subduction Signatures in a Continental Back-Arc

Espanon V, Dosseto A & Chivas A

14:45 Geochemical Characteristics of Volcanic and Plutonic Rocks in the 36 Ma Organ Mountains Caldera, USA: Are They Telling the Same Story?

Memeti V & Davidson J

15:00 Two Neo-Tethyan Magmatic Suites of Distinctive Geochemical Features in Burma and Southern Tibet: Zircon U-Pb and Hf Constraints with Regional Tectonic Implications


15:15 Residence Time Analysis of Active Volcanic Systems: Rb-Sr Isotope Study of Ischia and Pantelleria

Casalini M, Avanzinelli R & Tommasini S

15:30 Effect of Magma Mixing on the Evolution of the Intermediate Members of Süphan Volcanics: Eastern Turkey

Özdemir Y, Gülçe N & Blundy J

15:45 Mixing, Mingling and Enclave Crumbling in the post-Minoan Dacitic Magmas of Santorini Volcano, Greece

Petrone CM, Francalanci L & Vougiokalakis GE

16:00 Invited: Evolution of Chemical and Physical Properties of Mixed Arc Magmas

Humphreys M, Edmonds M, Christopher T & Brooker R

16:15 New Insights into the Evolution of a Stagnant Magma Chamber – Magma Loss and Liquid Evolution in the Upper Zone of the Bushveld Complex

Roberts J

16:30 Correlated Chemical and Temporal Evolution of Cenozoic Magmatism in SE-Germany (Heldburg Region)

Pfänder J, Klügel A, Jung S & Rohrmüller J

16:45 Petrological Constraints on Magma Plumbing Dynamics of the 2011 El Hierro Eruption (Canary Islands)

Klügel A, Longpré M-A & Stix J

17:00 Mantle Control on Eruption Style at Kilauea Volcano, Hawai‘i

Edmonds M, Sides I, Maclennan J, Swanson D & Houghton B

17:15 Insights into the Magmatic Processes Leading to the Holocene Caldera Eruption of Rinjani, Indonesia

Vidal CM, Metrich N, Komorowski J-C, Pratomo I, Lavigne F & Surono

(Session 11d continues on Monday 26th Posters on p.77)
<table>
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<td>14:30</td>
<td>PGE-Au Potential of Sulphide-Saturated Melts from the Subcontinental Lithosphere</td>
<td>Kamenetsky V, Maas R, Fonseca R, Ballhaus C &amp; Heuser A</td>
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<td>15:00</td>
<td>Preliminary Evaluation of Trace Hydrocarbon Speciation and Abundance as an Exploration Tool for Footwall-Style Sulfide Ore, Sudbury Igneous Complex, Ontario, Canada</td>
<td>Kerr M &amp; Hanley J</td>
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<td>15:15</td>
<td>Hypersaline Volatiles in a Palladium-Enriched Mafic Pegmatoid from the 2.48 Ga East Bull Lake Intrusion, Sudbury District, Ontario, Canada</td>
<td>Boucher B, Hanley J &amp; James R</td>
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<td>15:30</td>
<td>First Melt Inclusion Study of the Sudbury Igneous Complex (Ontario Canada): Evidence for Two-Liquid Immiscibility and Contraints on Trace Element Distribution</td>
<td>Watts K, Hanley J, Kontak D &amp; Ames D</td>
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<td>16:00</td>
<td>Downward Injection of Sulfide Slurries: Their Role in the Formation of Ni Sulfide Deposits</td>
<td>Arndt N, Barnes S, Robertson J, Lesher M &amp; Cruden S</td>
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<td>16:15</td>
<td>Source Controls on the Metal Contents of Mantle-Derived Magmas</td>
<td>Tonnelier N, Lesher M, Arndt N, Keays R &amp; Viljoen F</td>
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<td>16:30</td>
<td>Volcanostratigraphic Controls on the Occurrence of Massive Sulfide (VMS) Deposits in the Oman Ophiolite</td>
<td>Gilgen S, Diamond L &amp; Mercalli I</td>
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</table>
17:00 Mineralogical Pathways Involved in the Formation of Hydrous Mg/Ni Silicate Ores (New Caledonia)

*Fritsch E, Juillot F, Auzende A-L, Dublet G, Caner L & Beaufort D*

17:15 Geochemical Evidence for Multiple Gold Mineralisation Events in the Witwatersrand Basin

*Dixon R*

*(Session 13b continues on Monday 26th Posters on p.80)*
14a: Geochemical Records and Models of Climate Change in Deep Time

Session chaired by Galen Halverson & Yves Godderis

14:30 Terrestrial Temperature Response during Early Eocene Hyperthermals
Snell K, Fricke H, Clyde W & Eiler J

14:45 Oligocene – Early Miocene North Pacific Temperatures Based in Clumped Isotopes in Kamchatka Bivalves

(Session 14a continues on Monday 26th Posters on p.85)
Session 14c follows this session in this room: see p.46
14c: Rates, Timings and Mechanisms of Pleistocene Sea Level Change

Session chaired by Alex Thomas, Pierre Deschamps & Bill Thompson

15:15 Keynote: Exploring the Spatial and Temporal Complexity of the Last Interglacial Sea Level Highstand
   Dutton A

15:45 Keynote: Field Evidence, Modeling Results, and New Investigative Strategies Shed Light on the Timing and Amplitude of Sea Level Change during Past Interglacials
   Raymo M, Rovere A, Mitrovica J, O’Leary M, Hearty P & Inglis J

16:00 Speleothem Reconstruction of Sea Level at Bermuda over the Last Climatic Cycles

16:15 A Second Rapid Sea-Level Fluctuation during Termination II at Barbados
   Esat T & Bekaroglu E

(Session 14c continues on Monday 26th Posters on p.86)

Session 14f follows this session in this room: see p.47.)
14f: Pumping Down the Greenhouse: Sensitivity and Structure of the Biological Carbon Pump in Warm Climates

Session chaired by Kyle William Robert Taylor, Sandra Arndt & Sandra Kirtland Turner

<table>
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<th>Time</th>
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<tr>
<td>16:30</td>
<td>Keynote: The Ocean’s Biological Pump in Deep Time</td>
<td>Kump L</td>
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<tr>
<td>16:45</td>
<td>Organic Matter Oxidation and Authigenic Rhenium in Late Eocene Pelagic Sediments</td>
<td>Paquay F &amp; Ravizza G</td>
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<td>17:00</td>
<td>Carbon Isotope Gradients in the Eocene as a Constraint on the Biological Pump, Atmospheric CO₂ and the Ocean’s Major Ion Composition</td>
<td>Hain M, Sigman D, Higgins J &amp; Haug G</td>
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<td>17:15</td>
<td>Decreased Export Productivity at Onset of Eocene Hyperthermal Events</td>
<td>Kirtland Turner S</td>
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15f: Combustion Aerosol

Session chaired by Cathy Liousse & William K.-M. Lau

14:30  Keynote: Atmospheric Evolution and Chemical Aging of Combustion Organic Particulate Matter
        Pandis S, Donahue N & Robinson A

15:00  Keynote: Combustion Carbonaceous Particles: Evolution of their Impacts
        Cachier H & Liousse C

15:30  Invited: Primary and Secondary Biomass Burning Aerosols Determined by Factor Analysis of H-Nmr Spectra
        Paglione M, Decesari S, Giulianelli L, Tagliavini E, Hillamo R, Carbone S, Saarikoski S, Swietlicki E, Fuzzi S & Facchini MC

15:45  Invited: Rethinking Primary Organic Aerosol Emission Inventories with a Focus on Wood Combustion in Europe

16:00  Invited: Allergic and Respiratory Health Effects of Combustion Aerosols
        Annesi-Maesano I & Hassani Y

16:15  Light-Absorbing Aerosol Radiative Forcing in the Kathmandu Valley during Suskat-Abc Field Campaign

16:30  Invited: BC/OC Ratios: A New Metrics to Mitigate Emissions, Health and Radiative Impacts. Focus on African Megacities

(Session 15f continues on Monday 26th Posters on p.87)

Session 24d follows this session in this room: see p.61.
### 16a: New Geochemical and Isotopic Proxies for Weathering

**Session chaired by Friedhelm von Blanckenburg & Kate Maher**

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:30</td>
<td>How Mass Balance Affects Isotope Ratios in the Weathering Zone</td>
<td>Schuessler JA, Bouchez J &amp; von Blanckenburg F</td>
</tr>
<tr>
<td>14:45</td>
<td>Seawater $\delta^{7}$Li: A Tracer for Global CO$_2$ Consumption by Continental Silicate Weathering?</td>
<td>Wanner C &amp; Sonnenthal E</td>
</tr>
<tr>
<td>15:00</td>
<td>Lithium Isotopic Composition of the Dissolved Load in the Amazon River Basin</td>
<td>Dellinger M, Gaillardet J, Bouchez J, Calmels D, Louvat P, Gorge C &amp; Maurice L</td>
</tr>
</tbody>
</table>

(Session 16a continues on Monday 26th Posters on p.88)

Session 16f follows this session in this room: see p.51.
16d: Organic Matter Export and the Sequestration of Atmospheric Carbon Dioxide

Session chaired by Valier Galy, Robert Hilton & Gerard Govers

16:00  Western Oregon as a Low-Sediment End Member of Particulate Organic Carbon Export from Temperate Forested Uplands

*Smith J, Galy A, Hovius N & Tye A*


*Galy A, Hilton R, Smith J, Sparkes R & Hovius N*

16:30  Particulate Organic Carbon Age Spectra: Evaluating Different Spectra from Different Basin Types

*Rosenheim B, Galy V, Williams E, Roberts B, Allison M, Schreiner K & Bianchi T*

16:45  Invited: The Fate of Small Active Margin River POC in the Marine Environment

*Blair N, Childress L, Ginnane C & Leithold L*

17:00  Organic Carbon Export in Taiwan: Insights from Marine Sediments

*Beyssac O, Galy V & Su C-C*

17:15  The Role of Tephra Diagenesis in the Carbon Cycle

*Palmer M & Gernon T*

(Session 16d continues on Monday 26th Posters on p.90)
16f: Large Rivers as Integrators of Landscape Dynamics

**Session chaired by Jérôme Gaillardet & Jens Hartmann**

15:15 Balancing Chemical and Physical Erosion in the Ganga Basin

*France-Lanord C, Galy V, Gajurel A, Lavé J, Lupker M & Morin G*

15:30 Chemical Weathering and Sediment Source-To-Sink Processes within the Changjiang (Yangtze River) and Mountainous River Basins (Taiwan)

*Yang S, Li C, Wang X & Guo Y*

15:45 The Chemical and Isotopic Characters of Suspended Particulate Materials in the Yangtze River and their Environmental Implications

*Ding T, Gao J, Shi G, Chen F, Wang C & Luo X*

(Session 16f continues on Monday 26th Posters on p.90)

Session 16d follows this session in this room: see p.50.
### 17a: The ins and Outs of Mud: Chemical Fluxes between Sediments and Seawater

**Session chaired by Silke Severmann & Rachel Mills**

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:30</td>
<td>Suboxic Sediments as an Oceanic Sink of Isotopically-Light Cadmium</td>
<td>Horner TJ, Homoky WB, Georgiev SV, Stein HJ, Hannah JL, Mills RA, Rehkämper M &amp; Henderson GM</td>
</tr>
<tr>
<td>14:45</td>
<td>Diagenetic Mobilisation of Fe and Mn in Hydrothermal Sediments</td>
<td>Aquilina A, Homoky WB, Hepburn LE, John SG, Conway TM, Lyons T &amp; Mills RA</td>
</tr>
<tr>
<td>15:00</td>
<td>Cr Isotope Fractionation in Reducing Continental Margin Sediments</td>
<td>Pearce C, James R, Parkinson I, Connelly D &amp; Planquette H</td>
</tr>
</tbody>
</table>

(Session 17a continues on Monday 26th Posters on p.91)

Session 17h follows this session in this room: see p.53.
17h: Atmospheric Deposition of Aerosols to the Land and Oceans and their Impact on Ecosystems and Climate

Session chaired by Nikos Mihalopoulos, Zongbo Shi & Nicholas Meskhidze


15:30 Bioavailability of Nanoparticulate Iron Derived from Atmospheric Mineral Dusts
Kadar E, Powell J & Shi Z

15:45 Keynote: Can Saharan Dust Explain Extensive Clay Deposits in the Amazon Basin? Radiogenic Isotopes as Tracers of Transatlantic Transport

16:15 Role of Acid Mobilization in Projected Response of Soluble Iron Supply to Improvement of Air Quality in the Future
Ito A, Xu L & Penner J

16:30 Invited: Temporal Variability of Coastal Rainwater Fe(II) Concentration and Wet Deposition to Surface Seawater

16:45 Phosphorous Speciation in Atmospheric Deposition Samples in the East Mediterranean
Violaki K, Kanakidou M & Mihalopoulos N

17:00 Indirect Evidence for the Presence of Secondary Phosphorus in Continental Fine Aerosol
Krassován K, Kertész Z, Imre K & Gelencsér A

17:15 Iron Mobilisation from Volcanic Ash/Glass by Atmospheric Processing

(Session 17h continues on Monday 26th Posters on p.92)
18i: Interaction of Oxyanions with Mineral Phases: Sorption, Redox Transformation, and Structural Incorporation  

**Session chaired by Andreas C Scheinost, Thomas Neumann & Laurent Charlet**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Topic</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:30</td>
<td><strong>Keynote:</strong> Picking Apart Paleoredox Proxies; What Regulates Them?</td>
<td>Helz G</td>
</tr>
<tr>
<td>15:00</td>
<td>Attenuated Total Reflection-Infrared Spectroscopy: A Tool of Choice for Investigation of the Sorption of Oxyanions</td>
<td>Lefevre G</td>
</tr>
<tr>
<td>15:15</td>
<td>A Thermodynamic Entrapment Model for the Quantitative Description of Selenite Coprecipitation with Calcite</td>
<td>Heberling F, Vinograd V &amp; Polly R</td>
</tr>
<tr>
<td>15:30</td>
<td>Limited Releases of U and Tc from Hanford Tank Residual Wastes</td>
<td>Um W &amp; Cantrell K</td>
</tr>
<tr>
<td>16:00</td>
<td>Interaction of Eu(III) with Calcite Surfaces in Presence of NaNO₃</td>
<td>Hofmann S &amp; Stumpf T</td>
</tr>
</tbody>
</table>

(Session 18i continues on Monday 26th Posters on p.92)  
Session 18k follows this session in this room: see p.55.)
18k: Advances in the Studies of Oxyanions as the Transport Mechanism of Contaminants

Session chaired by Saugata Datta, Karen H Johannesson, Rudolph Hon & Annette Johnson

16:15 Chromium Chemistry in Natural Waters, Iceland
Kaasalainen H, Stefánsson A, Gunnarsson I & Arnórsson S

16:30 Different Diagenetic Behaviors of As, Mo and Sb in Lake Biwa, Japan
Itai T, Hyobu Y, Kumagai M & Tanabe S

16:45 Polyoxometalates and their Effect on Tungsten Speciation and Transport
Bostick B & Sun J

17:00 Invited: Role of Climatic Factors on the Terrestrial Distribution of Selenium
Winkel L, Vriens B, Blazina T, Schubert R & Johnson A

17:15 Investigation of Sediment Geochemistry in Areas with Elevated Arsenic in Groundwater of Matlab, Bangladesh and Murshidabad, India

(Session 18k continues on Monday 26th Posters on p.93)

Session chaired by Brian Popp & Joel Blum

14:30 Medal: Mass Independent Isotope Fractionation of Mercury: Why it is Such a Useful Tool in Biogeochemistry and Ecology
   Blum J

15:15 A Stable Isotope Perspective on Tracing Natural and Anthropogenic Hg Emissions at the Global Scale
   Sonke J

15:30 Biological Fractionation of Molybdenum Isotopes: Lake Mývatn, Iceland
   Neely R, Siebert C, Burton K, Eiriksdottir E & Einarsson A

15:45 Cr Isotopic Evidence of Enzymatic Reduction of Cr(VI) Catalyzed by a Sulfate-Reducing Bacterium
   Qin L, Han R, Chakraborty R, Christensen J & Beller H

16:00 A Multi-Isotope (H, O, C, S, B, Mg, Ca, Ba) Approach to Study Diagenesis in Black SeA-Type Sediments

16:15 Isotopic Fractionation of Cu in Biofilms from a Historic Mining Site
   Pérez Rodríguez N, Adlassnig W, Rodushkin I, Alakangas L & Öhlander B

16:30 Calcium Isotope Fractionations from Roots to Shoots

16:45 High-Precision Collision-Cell MC-ICPMS Analysis of Ca Isotopic Ratios (Including $^{40}Ca$)
   Li Q, Thirlwall M & Muller W

17:00 Ni availability/Ni Solid Phases in Soils and Waters from Ultramafic Complexes in Brazil: A Narrow Relationship

(Session 19a continues on Monday 26th Posters on p.94)
19e: Phototrophic Life and Earth’s Redox Evolution

Session chaired by Jenn Macalady & Trinity Hamilton

15:45  The Bacterial C-Isotope Archive: Modern Anoxygenic Phototrophs Elucidate Past Processes in S and Fe-Rich Systems
  
  Posth NR, Bristow LA, Habicht KS, Cox RP & Canfield DE

16:00  Methylated Hopanoid Biosynthesis and Function in Modern Bacteria
  
  Welander PV, Ricci JN, Newman DK & Summons RE

16:15  2-Methyl Hopanoid Production and Anoxygenic Photosynthesis: A Model Cyanobacteria Isolated from a Proterozoic Ocean Analog
  
  Hamilton T, Bird L, Freeman K & Macalady J

16:30  Availability of Light and Chemical Energy Determines the Structure of Natural Sulfide Oxidizing Biofilms
  
  Klatt J, Meyer S, de Beer D & Polerecky L

16:45  The Quantitative Contribution of Oxygenic Photosynthesis to Fe(II) Oxidation in Precambrian Oceans
  
  Swanner E, Wu W, Voelker B, Schoenberg R & Kappler A

17:00  Microbial and Redox Evolution in the Neoproterozoic of Australia
  
  Jarrett A, Poulton S, Giorgioni M & Brocks J

17:15  Manganese-Oxidizing Photosynthesis Before the Rise of Cyanobacteria
  

(Session 19e continues on Monday 26th Posters on p.96)
19k: Life Below the Seafloor – How Alive and How Important?

Session chaired by Kai-Uwe Hinrichs, Katrina Edwards & Fumio Inagaki

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:30</td>
<td>Viruses Outnumber Prokaryotes in Marine Subsurface Sediments</td>
<td>Engelhardt T, Kallmeyer J, Cypionka H &amp; Engelen B</td>
</tr>
<tr>
<td>14:45</td>
<td>Microbial Transformations of Dissolved Organic Matter in Crustal Aquifer Fluids at North Pond</td>
<td>Jaekel U, Meyer J, Huber J, Dittmar T &amp; Girguis P</td>
</tr>
<tr>
<td>15:00</td>
<td>Microbial Activity Below the Iheya North Deep Sea Vent Constrained by Quadruple Sulfur Isotope</td>
<td>Aoyama S, Nishizawa M, Takai K &amp; Ueno Y</td>
</tr>
<tr>
<td>15:30</td>
<td>Putting Age into the Equation: A New Look at Microbial Distribution in Subseafloor Sediments</td>
<td>Kallmeyer J</td>
</tr>
</tbody>
</table>

(Session 19k continues on Monday 26th Posters on p.96)

Session 19e follows this session in this room: see p.57
20d: Innovations in Geochronology: Present Developments and a Vision for 2020

Session chaired by Ethan Baxter, Randy Parrish, Blair Schoene & Laura Webb

14:30 **Keynote:** U-Pb Thermochronology and the Thermal History of Planetary Crusts
*Blackburn T*

15:00 **Invited:** Frontiers in Laser Ablation U-Th/Pb Petrochronology
*Cottle J*

15:15 Titanite Geochronology by LA-ICPMS: Advantages and Future Objectives
*Kylander-Clark A, Hacker B, Renne P & Stearns M*

15:30 Combined Accessory Mineral Micro-Analysis: The Strength of a Multi-Phase Approach
*Kooijman E, Hacker B, Kylander-Clark A, Ratschbacher L & Minaev V*

15:45 **Invited:** Integration of U-Pb Dating, Trace Elements and Oxygen Isotopes at the Microscale
*Rubatto D, Gauthiez-Putallaz L & Boston K*

16:00 Dating Deposition and Low-Grade Metamorphism by *in situ* U-Pb Geochronology of Titanite
*Muhling J, Rasmussen B & Fletcher I*

16:15 Visualisation of Detrital Zircon Age Data Relative to Deposition Age and Identification of Potential Provenance Regions
*Eglington B, Pehrsson S & Evans D*

16:30 Coupled LA U-Pb Chronology of Detrital Zircon and Rutile: A Powerful Provenance Tracer
*Bracciali L, Parrish RR, Horstwood MSA & Najman Y*

16:45 Date Them All: Re-Os Ages for Upper Jurassic-Lower Cretaceous Shales, Ammonite Zones and Chrons
*Georgiev S, Xu G, Stein H, Hannah J & Weiss H*

17:00 Additional Insight into Natural ^{185}Re/^{187}Re of Various Materials
*Zimmerman A, Stein H & Hannah J*

17:15 Re-Os Analyses for Ag Ores from the Kongsberg Mines, Southeast Norway
*Yang G, Stein H & Zimmerman A*

(Session 20d continues on Monday 26th Posters on p.97)
### 22h: Recent Advances in Imaging Minerals and Rocks: Geochemical Processes at the Nanoscale

**Session chaired by Georges Calas & Giancarlo Della Ventura**

<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
</tr>
</thead>
</table>
| 14:30 | **Keynote:** Multimodal and Multiscale Microscopies to Study Biomineralization and Crystallization Processes  
**Menguy N, Benzerara K, Li J, Cormier L, Dargaud O & Radtke G** |
| 15:00 | The Relationship of Goethite Surface Structure, Habit and Adsorption Capacity  
**Livi K, Villalobos M, Varela M, Villacis-Garcia M, Vaca-Escobar K & Sverjensky D** |
| 15:15 | FTIR Imaging of Carbon Dioxide Diffusion in Cordierite-Like Structures  
**Radica F, Bellatreccia F, Della Ventura G, Freda C, Cinque G & Cestelli Guidi M** |
| 15:30 | Submicrometer Exsolution Lamellae in Volcanic Pyroxenes as Indicators of Magma Residence Times  
**Herrin J, Costa F, Tay YY, Liu H & Pramana S** |
| 15:45 | Micromorphology Investigations by Imaging Alteration, Supergene and Anthropogenic Processes in Regoliths  
**Gerard M, Trombino L, Boekhout F, Kanzari A, Parisot J & Stoops G** |
| 16:00 | Ion Imaging of Biogenic and Abiogenic Mineral Surfaces  
**Fayek M** |
| 16:15 | Isotopic Tomography of Monazite  
**Snoeyenbos D, Peterman E, Jercinovic M, Williams M & Reinhard D** |
| 16:30 | Raman Hyperspectral Imaging of Carbonaceous Materials and Hematite: Potential Misinterpretations  
**Marshall C & Olcott Marshall A** |
**Sutton S, Newville M, Lanzilotti A, Rivers M & Wirick S** |
| 17:00 | Geochemical Proxy Nanostructure of Foraminifera by X-Ray Imaging: STXM and Tomography  
**Redfern S, Branson O, Elderfield H, Tyliszczak T & Rau C** |
| 17:15 | *In situ* Monitoring of Reaction Band Formation Using Synchrotron Radiation  
**Götzte LC, Milke R, Schorr S, Dohmen R & Wirth R**  
(Session 22h continues on Monday 26th Posters on p.99)**

(Session 22h continues on Monday 26th Posters on p.99)
24d: Low Temperature Geochemistry

Session chaired by Martin Frank

16:45 Influence of Kinetics on the Oxygen Isotope Composition of Calcite
  **Watkins J, Nielsen L, Ryerson F & DePaolo D**

17:00 Redox Control on the Water Column Distribution of Ra in a Stratified Lake – Lake Kinneret, Israel
  **Sharabi G, Lazar B, Kolodny Y, Halicz L & Nishri A**

17:15 Paleo-Methane Emission Events in Krishna-Godavari Basin, Bay of Bengal: Geochemical Signatures
  **Mazumdar A**

(Session 24d continues on Monday 26th Posters on p.100)
### 01a: Origin and Application of Mass-Independent Isotope Fractionation in Solar System Evolution, Earth History, and Atmospheric and Environmental Chemistry

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Experimental Research on Isotope Effects in Photodissociation of O₃</td>
<td>Früchtl M, Röckmann T &amp; Janssen C</td>
</tr>
<tr>
<td>2</td>
<td>SO₂ Photoexcitation Links Polar Sulfate and Climate-Impacting Volcanism</td>
<td>Hattori S, Schmidt J, Johnson M, Danielache S, Yamada A, Ueno Y &amp; Yoshida N</td>
</tr>
<tr>
<td>3</td>
<td>Kinetic Isotope Effect in the Atmospheric Reaction of the Methane Clumped Isotopologue ¹³CH₃D with OH and Cl</td>
<td>Joelsson L, Forecast R, Ono S &amp; Johnson M</td>
</tr>
<tr>
<td>4</td>
<td>Laboratory Study of Nitrate Photolysis in Antarctic Snow: Quantum Yield, Mechanism, Isotope Effects and Wavelength Dependence</td>
<td>Meusinger C, Berhanu TA, Erbland J, Savarino J &amp; Johnson MS</td>
</tr>
<tr>
<td>5</td>
<td>The Stable Isotopic Composition of Carbon Monoxide from Greenland Fir Air Samples Collected at NEEM</td>
<td>Pathirana S, Martinerie P, Witrant E, Kaiser J, van der Veen C &amp; Röckmann T</td>
</tr>
<tr>
<td>6</td>
<td>Quantification of the Role of Orbital and Millennial Timescale Processes on δ¹⁸O and 17Δ Signals</td>
<td>Reutenauer C, Landais A, Woillez M-N, Risi C, Braconnot P, Blunier T, Mariotti V &amp; Kageyama M</td>
</tr>
<tr>
<td>7</td>
<td>Triple Oxygen Isotope Composition of Photosynthetic Oxygen and Dissolved Oxygen at Saturation</td>
<td>van der Meer A &amp; Kaiser J</td>
</tr>
</tbody>
</table>

### 01d: Symposium to Honor the Geochemical Legacies of H.D. Holland (1927-2012)

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Dynamic Carbon Cycle in the Ediacaran Yangtze Basin</td>
<td>Chu X</td>
</tr>
<tr>
<td>9</td>
<td>Evidence from Fluid Inclusions Extends the Record of Seawater Chemistry by ~300 Million Years, from ~544 Ma to ~830 Ma</td>
<td>Spear N, Holland H, Garcia-Veigas J, Lowenstein T &amp; Giegengack R</td>
</tr>
<tr>
<td>10</td>
<td>Mo-W-Re-au-cu Partitioning between Vapor, Brine and Felsic Melt: Super-Solidus to Sub-Solidus</td>
<td>Tattitch B, Blundy J, Candela P &amp; Piccoli P</td>
</tr>
</tbody>
</table>
11 Applications of Neutron Beam Analysis to Study the Origins of Carboneceous Matter in Terrestrial and Planetary Rocks: A New Approach

**Watanabe Y, Furukawa Y, Kakegawa T & Ohmoto H**

12 Ge/Si Atomic Ratio of Siliceous Deposit Formed from Geothermal Water: As an Indicator of Silica Source of BIF

**Yokoyama T & Ohmoto H**

(Session 01d continues on Tuesday 27th AM on p.108)

04a: Composition of the Earth

13 The Earth and its Building Blocks

**McDonough W**

14 An Extraterrestrial Cause for the Silicate Earth’s Nb Paradox?

**Münker C, Fonseca R & Schulz T**

04b: Earth’s Heat: Where, Why, Whence, and How Much?

15 Seismic Anisotropy Changes Across Upper Mantle Phase Transitions

**Beghein C & Yuan K**

(Session 04b continues on Tuesday 27th AM on p.111)

04d: Influence of Accretion on the Composition and Differentiation of the Earth

16 3D Visualisation of Core Formation in Deforming Planetesimals

**Berg M, Butler I, Redfern S, Le Godec Y & Bromiley G**

17 Nb/Ta Decoupling Under Low Fo<Sub>2</Sub>

**Cartier C, Hammouda T, Bouhifd MA, Boyet M & Devidal J-L**

18 Timing and Nature of Late Accretion

**Day J**

19 Origin of the Late Veneer Inferred from Ru Isotope Systematics

**Fischer-Gödde M, Burkhardt C & Kleine T**

20 Metal-Silicate Partitioning of the HSE at High Pressures and Temperatures in S-Bearing Systems

**Laurenz V, Rubie DC & Frost DJ**

21 Extraterrestrial Mechanism of Kimberlite Emplacement

**Paszkowski M & Mietelski JW**

22 Silicon Diffusion in Liquid Iron: Kinetic Implications for Metal-Silicate Equilibration

**Posner ES, Frost DJ & Rubie DC**
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>New Constraints on the Magnitude and Timing of Late Accretion</td>
<td>Walker R, Touboul M, Puchtel I &amp; Liu J</td>
</tr>
<tr>
<td>24</td>
<td>Accretion of a Volatile Rich Late Veneer Recorded by CI Chondrite-Like S/Se and Se/Te in the Earth’s Mantle</td>
<td>Wang Z &amp; Becker H</td>
</tr>
<tr>
<td>25</td>
<td>Ancient Fragments in the Subcontinental Lithospheric Mantle beneath the Carpathian-Pannonian Region</td>
<td>Aradi LE, Szabó C, Gonzalez-Jimenez JM, Griffin W, O’Reilly SY &amp; Hattori K</td>
</tr>
<tr>
<td>26</td>
<td>Searching for Evidence for Mo Isotope Fractionation in the Mantle</td>
<td>Hibbert K, Willbold M, Andersen M &amp; Elliott T</td>
</tr>
<tr>
<td>27</td>
<td>The Competing Roles of Sulfide Saturation, Magma Mixing and Degassing during the Petrogenesis of Convergent Margin Magmas</td>
<td>Jenner F, Hauri E, Arculus R, Mavrogenes J, O’Neill H &amp; Whan T</td>
</tr>
<tr>
<td>30</td>
<td>Re-Os Isotope and Platinum Group Element Composition of Louisville Seamounts Chain, Pacific Ocean</td>
<td>Tejada ML, Hanyu T, Ishikawa A, Senda R &amp; Suzuki K</td>
</tr>
<tr>
<td>31</td>
<td>Molybdenum Isotopes during Magmatic Differentiation</td>
<td>Yang J, Siebert C, Barling J, Savage P, Liang Y-H &amp; Halliday A</td>
</tr>
<tr>
<td>32</td>
<td>Reconstructing the Rheic: Geochemical Analysis of Ocean Lithosphere from the Variscides</td>
<td>Band A, Barry T, Saunders A &amp; Murphy B</td>
</tr>
<tr>
<td>33</td>
<td>Mantle Potential Temperature Trend for the Central Atlantic Magmatic Province</td>
<td>Benimoff A &amp; Puffer J</td>
</tr>
<tr>
<td>Page</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>34</td>
<td>Recycling of Subducted Crust in the Source of Within-Plate CAMP Basalts from Southeastern North America</td>
<td>Callegaro S, Bertrand H, Marzoli A, Chiaradia M, Reisberg L, Meyzen C &amp; Bellieni G</td>
</tr>
<tr>
<td>35</td>
<td>Pb Isotope Evidence from the Oka Carbonatite Complex for a Distinct Mantle Reservoir</td>
<td>Chen W &amp; Simonetti A</td>
</tr>
<tr>
<td>36</td>
<td>Mafic Lavas Constrain the Chemical Variability of the Society Plume</td>
<td>Cordier C, Chauvel C &amp; Guillet M</td>
</tr>
<tr>
<td>38</td>
<td>Mantle Source Heterogeneity beneath the Garrotxa Volcanic Field (NE Spain)</td>
<td>Gasperini D, Gisbert G, Gimeno D, Aulinas M, Macera P &amp; Bosch D</td>
</tr>
<tr>
<td>39</td>
<td>Lower Continental Crust Residue in Mesozoic EM1-type Basalts from the North China Craton</td>
<td>Geng X-L, Liu Y-S &amp; Gao S</td>
</tr>
<tr>
<td>40</td>
<td>Experimental Study of Melting, Texture, and Phase Relations of Basalt (Eclogite)-Peridotite-Fluid System at Sub- and Supercritical P-T</td>
<td>Gorbachev N, Nekrasov A, Kostyuk A &amp; Sultanov D</td>
</tr>
<tr>
<td>41</td>
<td>The sub-Arctic Upper Mantle, from Jan Mayen to Molloy Fracture Zone</td>
<td>Hamelin C &amp; Pedersen RB</td>
</tr>
<tr>
<td>42</td>
<td>The Central Indian Upper Mantle 50 MY Ago: Continental Crust Versus Oceanic Crust Recycling Contributions within the Central Indian Basin MORB</td>
<td>Hemond C, Delavault H, Janin M, Das P &amp; Iyer S</td>
</tr>
<tr>
<td>43</td>
<td>The Paleoproterozoic Rooiberg Group, Kaapvaal Craton, South Africa: New Insights into the Formation of Silicic Large Igneous Provinces (SLIPs)</td>
<td>Jolayemi O, Roberts J &amp; Lenhardt N</td>
</tr>
<tr>
<td>44</td>
<td>Geochemical and Mineralogical Properties of Harzburgite and Dunite in Margi (NE Eskisehir) Area</td>
<td>Kahya A &amp; Kuscu M</td>
</tr>
<tr>
<td>45</td>
<td>Pb, Sr, Nd, Hf Isotope Geochemistry of South Arch Lavas: Origin of the Upstream Side Hawaiian Arch Volcanism</td>
<td>Kani T, Hanan B, Kingsley R &amp; Schilling J-G</td>
</tr>
</tbody>
</table>
47 New Sr-Nd-Pb Isotopic Data on Graciosa Island Lavas (Azores)
   Larrea P, Widom E, Galé C, Ubide T, Lago M & França Z

48 Geochemical Variations of Basalts from Petit-Spot Volcanoes in the Northwestern Pacific

49 Sr-Nd and Pb Isotopic Portray of the Crozet Plume
   Meyzen C, Marzoli A, Bellieni G & Levresse G

50 Geochemical Stratigraphy and Correlation within the Faroe Islands Basalt Group: Temporal and Spatial Evolution of Mantle Sources during Continental Rupture
   Millett J, Hole M, Jolley D & Passey S

51 Wohrlitization Processes within the Upper Mantle beneath the Northern Pannonian Basin (Hungary)

52 Petrology and Geochemistry of the Mesozoic Potassic and Sodic Volcanic Rocks in the Yishu Deep Fault Zone, Shandong Province, Eastern China: Petrogenesis and Inferences on the Evolution of the Mantle Sources
   Qiu J-S, Liu L & Li Y-L

53 Melting History of the Pozanti-Karsanti Ophiolite, Turkey: Implications from Whole-Rock and Mineral Compositions
   Saka S, Uysal I, Akmaz RM & Kaliwoda M

54 The Role of Ultramafic Veins in Mafic Alkaline Magmatism: Contrary Evidence from Continental Intra-Plate Settings
   Smart K, Tappe S, Stracke A, Romer R & Prelevic D

55 Geochemical Evolution of Prehistoric Magma Sources beneath Mt. Etna
   Spence A, Downes H, Blichert-Toft J, Bryce J & Hegner E

56 Lower Crustal Metasomatism of the NE-Japan Arc Inferred from Crustal Xenoliths from Ichinomegata Crater
   Takeuchi M & Arai S

57 Constraints on the Creation of a HIMU-Like Isotopic Reservoir beneath New Zealand
   van der Meer QHA, Waight TE & Scott JM

58 Magma Droplets in Coexisting Olivine and Spinel Phenocrysts Hosted in the Pohang Basalt (South Korea)
   Vetlényi EJ, Aradi LE, Szabó C, Zajacz Z & Yang K

59 Tectonic Implications for Mid-Late-Neoproterozoic Rift-Related Volcanic Rocks in China
   Xu X-Y, Xia L-Q, Xia Z-C, Li X-M & Ma Z-P
<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>The Nature of Crustal Components in Mantle Sources for Cenozoic Continent Basalts in Southeastern North China Craton</td>
<td>Xu Z, Zheng Y-F &amp; Zhao Z-F</td>
</tr>
<tr>
<td>62</td>
<td>LOMU Geochemical Signature of the Cenozoic Ultrapotassic Volcanic Rocks in NE China: Implications for a Relic Ancient Mantle Segment beneath the Eastern CAOB</td>
<td>Zhou X, Ying J, Sun Y &amp; Shao J</td>
</tr>
</tbody>
</table>

### 05g: New Tracers in Mantle Geochemistry

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td>Development of the La-Ce Systematics: Application to Arc Magmas</td>
<td>Bellot N, Boyet M, Pin C, Chauvel C, Doucelance R &amp; Auclair D</td>
</tr>
<tr>
<td>64</td>
<td>Partitioning of Trace Elements between Na-Bearing Majoritic Garnet and Melt at 8.5 GPa and 1500-1900°C</td>
<td>Bobrov A, Litvin Y, Kuzyura A, Dymshits A &amp; Jeffries T</td>
</tr>
<tr>
<td>65</td>
<td>New Tricks with Old Tracers: Sr Stable Isotope Variations in an Evolved Volcanic System Investigated Using an $^{84}$Sr-$^{87}$Sr Double Spike</td>
<td>Charlier B, Parkinson I &amp; Wilson C</td>
</tr>
<tr>
<td>66</td>
<td>Petrology and Raman Characterization of Leucitites within the Ultrapotassic Rocks: Afyon, NW Turkey</td>
<td>Deniz K, Kadioğlu YK, Koralay T, Gullu B, Akce MA &amp; Kilic CO</td>
</tr>
<tr>
<td>67</td>
<td>Cerium Isotope Systematics of Oceanic Carbonatites</td>
<td>Doucelance R, Bellot N, Boyet M &amp; Hammouda T</td>
</tr>
<tr>
<td>68</td>
<td>Noble Gas Isotope Studies of Ningwu Ore District, Middle-Lower Yangtze River Polymetallic Ore Belt, East China</td>
<td>Han D</td>
</tr>
<tr>
<td>71</td>
<td>Halogen Ratios in Kimberlites and their Xenoliths Related to their Origin</td>
<td>Toyama C, Muramatsu Y, Sumino H, Yamamoto J &amp; Kaneoka I</td>
</tr>
</tbody>
</table>
06b: Geochemical and Geodynamical Perspectives of Continent Formation Through Time

72 Trace Element Composition in a Migmatite-Granite Complex (NW Portugal): Protolith and Melting Process Constraints
*Areias M, Ribeiro MA & Dória A*

73 Insights on the Protracted Evolution of the Deep Crust of the Arabo-Nubian Shield
*Bosch D*

74 Exploring the Preservation of Alkaline-Carbonatitic Extrusive Rocks in Relation to Continent Formation
*Campbell L, Dyer A, Williams C & Lythgoe P*

75 Late-Variscan Fayalite-Bearing Granites in Sardinia: The Lower Crust Connection
*Casini L, Puccioni A, Cuccuru S, Oggiano G & Secchi F*

76 Origin of Highly Differentiated Granites from South China: Implications for W-Sn Deposits
*Chen B, Ma X & Wang Z*

77 SHRIMP U-Pb Detrital Zircon Ages for Metasedimentary Rocks from the Seosan Group at Western Margin of the Gyeonggi Massif, Korea, and their Tectonic Implications
*Cho D-L*

78 Igniting Flare-Up Events in Sistan Suture Zone, Iran
*Rezaei-Kakhkhai M & Corfu F*

79 Geochemistry and Significance of Carboniferous-Permian Volcanic Rocks in the Western of Inner Mongolia, China
*Dang B, Zhao H, Lin L-J, Gao Q-Q & Liu M*

80 Petrology, Mineral Chemistry and Sr–Nd–Pb Isotopic Compositions of Granitoids in the Central Menderes Metamorphic Core Complex: Constraints on the Evolution of Aegean Lithosphere Slab
*Erkül F, Erkül ST, Ersoy EY, Uysal İ & Klötzli U*

81 The Pedregal Granitoid: A Peculiar Diatexitic Rock (?) in a Granite-Migmatite Complex
*Ferreira J, Martins HCB, Ribeiro MA & Ferreira P*

82 U-Pb Geochronology and Geochemistry of the Granulite-Amphibolite Complex in the Asinara Island (Italy)
*Gaggero L, Oggiano G, Casini L & Tiepolo M*

83 Determination of the Early Palaeozoic Strata in Eastern Heilongjiang Province, NE China: Constraints from Geology and Detrital Zircon U-Pb Ages
*Gao F, Yang Y, Wang F & Feng H*

84 Neoproterozoic Granites of Sharm El-Sheikh Area, Egypt: Mineralogical and Geobarometric Variations
*Ghoneim M, El Dosuky BT, Heikel MT, Abu-Alam T & Sherif M*
85 Geochemical Characteristics and Tectonic Environment of Basement Granite in Weiyuan Structure, Sichuan Basin, Southwest China
   **Gu Z**, **Zhai X** & **Wang Z**

86 Zircon U-Pb, Lu-Hf and REE Composition of Sorocaba and São Francisco Granites, São Paulo State, SE Brazil
   **Hoeger Luque T** & **Vlach SRF**

87 Meso- to Neo-Proterozoic Magmatic Events and their Geological Significance: Evidences from Detrital Zircon U-Pb Ages of the Jurassic and Cambrian Sedimentary Rocks in Xishan Area, Beijing City, China
   **Hu B**, **Zhai M**, **Peng P** & **Liu F**

88 Origin of the Neoproterozoic Zircon Inheritance in the Arabian Shield
   **Jeon H**, **Whitehouse M** & **Kadi K**

89 U-Pb, Ar-Ar Isotopic Dating of Kalba-Narym Polychronic Batholith (East Kazakhstan)
   **Kotler P**, **Vladimirov A**, **Khromykh S**, **Travin A** & **Navozov O**

90 The Early Paleozoic Magmatic Arc of the Central Tianshan, NW China
   **Lei R** & **Wu C**

91 The Composition of Zircon in Peraluminous Variscan Granites from Northern Portugal
   **Martins H** & **Abreu J**

92 Geochemistry and Petrogenesis of Hassan Salaran Granitoid Complex in SE Saqez, Western Iran
   **Mohammad F**, **Sepahi AA** & **Saeed S**

93 Radiogenic Heat Production of the Sardinian Variscan Crust
   **Puccini A**, **Xhixha G**, **Cuccuru S**, **Oggiano G**, **Kaceli Xhixha M**, **Mantovani F**, **Rossi Alvarez C** & **Casini L**

94 Contact-Metamorphic Effects of the Santa Eulália Plutonic Complex (Southern Portugal): Lithological and Structural Constraints
   **Ribeiro MA**, **Helena S** & **Cruz C**

95 Magnetic Susceptibility and δ¹⁸O Characterization of Granites Related with W, Sn, Mo and Bi (Au) Hydrothermal Vein Deposits
   **Sant’Ovaia H**, **Martins H** & **Noronha F**

96 What Caused Mongolian Mesozoic Magmatism: Was it Crustal or Mantle Driven?
   **Sheldrick T**, **Barry T** & **Saunders A**

97 Evolution of Rhyolite Magmas in the Halle Volcanic Complex – A Record from Hf and O Isotope and Hf Concentrations in Zircon
   **Słodczyk E**, **Pietranik A**, **Breitkreuz C** & **Fanning M**
The Neoproterozoic Magmatic Evolution in Northern Guangxi, China

Song H & Xu Z

The Triassic Igneous Rocks in the Northeastern Part of the South Korea

Song K-Y

U-Pb, Nd-Sr and Geochemical Fingerprints of Granitic Magmatism Inside the Paleoproterozoic Mineiro Belt, Southern São Francisco Craton: Evidence from the Ritápolis Batholith

Teixeira W, Ávila CÁ, Bongiolo E, Hollanda MH & Barbosa N

Neoproterozoic Accretion along the Southeastern Margin of the Eastern Dharwar Craton, India: Evidence from Zircon U-Pb Ages and their Hf Isotopic Composition

Vadlamani R, Chatterjee C, Ji W-Q & Wu F-Y

Anomalous Lithospheric and Geodynamical Evolution of the Southern Part of Vindhyan Basin, Central India

Pandey OP, Vedanti N & Srivastava RP

Neoproterozoic Terranes in the NE China and its Tectonic Implications

Wang F, Xu W, Gao F, Tang J & Hao W

Boron Isotopic Fractionation during Magmatic Differentiation: A Case Study of Tourmalines from the Nyalam Leucogranite-Pegmatite System, South Tibetan Himalaya

Yang S-Y & Jiang S-Y

Petrogenesis of the Syenite Granites in Kuluketage Block: Constraints from Petro-Geochemistry, Zircon U-Pb Dating and Hf Isotope

Yuan Q, Lü X-B, Cao X-F, Wang X-D & Yang E-L

Geochemistry and Tectonic Significance of Neopaleozoic Granitoid in Alxa Area, Inner Mongolia, China

Zhao H, Dang B, Liang B, Lin L-J & Ren J

07f: Magma Ascent from the Mantle to Eruption of Arc Volcanoes

SHRIMP U–Pb Zircon Dating, Geochemical and Petrographical Characteristics of Calc-Alkaline Early Miocene Şapçı Volcanics Around Balikesir (W Turkey)

Kaplan D, Aslan Z & Chen B

Petrological and Geochemical Constraints on the Origin and Evolution of the Early Campanian Porphyritic Rocks from the Eastern Pontide Magmatic Arc, NE-Turkey

Aydin F
109 Pyroxyenites from Mantle Section of Voykar Ophiolite (Polar Urals) – Pathways for Melt and Fluid Migration
Belousov I, Batanova V, Sobolev A & Savelieva G

110 Late Neoproterozoic Nuqara Dokhan Volcanics, Central Eastern Desert, Egypt: Geochemistry and Petrogenesis
Hassan A, Ntaflos T, Amron T, Hassan T & Al Taky M

111 Changing Mantle Wedge Geometry and Magma Generation Processes in the Central Andes
Heistek R & Wörner G

112 Petrogenesis and Tectonic Setting of the Nasrand Granitoid Pluton, Southeast of Ardestan
Kananian A, Hamzehie Z, Sarjoughian F & Ahmadian J

113 Los Morros Olivine Basalts from the Domeyko Cordillera in the Antofagasta Region, Northern Chile
Rabbia O, Jara C, Hernández L & Aragón E

114 Sr and Nd Isotope Data for Arc-Related (Meta) Volcanics (SW Iberia)
Santos JF, Mata J, Ribeiro S, Fernandes J & Silva J

115 Dual Sources for Early Taranaki Magmas; The Sr Isotope Story
Stewart R, Price R, Smith I & Zernack A

116 Tectonic Setting of the Xigaze Ophiolite Complex in Tibet Based on the Characteristics of Boninite
Su L, Bao P, Song S & Niu Y

117 Spatial-Temporal Extent of the Influence of the Mongol-Okhotsk Tectonic Regime on China during Mesozoic: Evidence from Mesozoic Igneous Rocks

118 Early Sulfide Precipitation in Basaltic Magma Intruding into Felsic Reservoir beneath the Summit of Asama Volcano: A Melt Inclusion Study for the 2004 Eruption
Yamaguchi Y, Kawasaki T, Yamaguchi T & Ohta Y

119 Geochronological and Geochemical Constraints on Sequences of the Cangshuipu Group and their Implications for the Amalgamation between the Yangtze and Cathaysian Blocks

07h: Biogeochemical Cycling, Hydrogeology and Deformation in the Forearc of Subduction Zones

120 Fluid Migration along a Dense, Intersecting Array of Faults on the Outer-Shelf of Southern Costa Rica: Insights from 3D Seismic Attributes and Multibeam Data
Kluesner J, Silver E, Nale S, Bangs N & McIntosh K

121 Bend-Faulting, Serpentinization, and Mantle Recarbonization at Oceanic Trenches
<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>122</td>
<td>Fluid-Rock Interaction along Plate Boundary Shear Zones: Insights from Modern and Ancient Examples</td>
<td>Morgan JP</td>
</tr>
<tr>
<td>123</td>
<td>High Pressure Fluid Evolution Derived from Veins in UHP Eclogites (Dabieshan, China)</td>
<td>Vannucchi P</td>
</tr>
<tr>
<td>071: ExTerra: Understanding Subduction Through the Study of Exhumed Terranes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>124</td>
<td>U-Pb and Hf Isotope Characteristics of Zircon from Chromitites at Finero</td>
<td>Albrecht N, Wörner G, Xiao Y &amp; van den Kerkhof AM</td>
</tr>
<tr>
<td>125</td>
<td>Boninite-Derived Mafic-Ultramafic Intrusives from Northern Victoria Land (Antarctica): Implications for Mantle Source Metasomatism</td>
<td>Badanina I, Malitch K &amp; Belousova E</td>
</tr>
<tr>
<td>126</td>
<td>Eclogitized Serpentinites from the Rhodope Massif: Exploring the Fate of Serpentinites in the Deep Mantle</td>
<td>Tribuzio R, Henjes-Kunst F, Braga R &amp; Tiepolo M</td>
</tr>
<tr>
<td>127</td>
<td>Episodic Fluid Flow in a Subduction Zone</td>
<td>Collings D, Savov I, Bonev N &amp; Eccles K</td>
</tr>
<tr>
<td>128</td>
<td>Sub-Continental Nb/Ta and Zr/Hf Amphibolites: Implications on Subduction Metamorphism</td>
<td>Ding X &amp; Sun W</td>
</tr>
<tr>
<td>129</td>
<td>Deep Subduction of Hot Young Oceanic Slab Required by the Syros Eclogites</td>
<td>Flemetakis S, Moulos E, Kostopoulos D &amp; Chatzitheodoridis E</td>
</tr>
<tr>
<td>130</td>
<td>Metasomatism in the Dora Maira Whiteschists Investigated by SHRIMP Oxygen Isotopes and U-Pb Geochronology</td>
<td>Gauthiez Putallaz L, Rubatto D &amp; Hermann J</td>
</tr>
<tr>
<td>132</td>
<td>Progress of Serpentinization Reactions Triggered by Silica Addition: Petrological Evidence from Iwanai-Dake Ultramafic Body, Hokkaido, Japan</td>
<td>Miyoshi A &amp; Kogiso T</td>
</tr>
<tr>
<td>133</td>
<td>Age of the Kelameili Ophiolite in East Tianshan: LA-ICP-MS U-Pb Zircon Dating</td>
<td>Liu J &amp; Li Y</td>
</tr>
<tr>
<td>No.</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>-----</td>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>134</td>
<td>A Potential Geothermometer for Antigorite Serpentinite</td>
<td>López Sánchez-Vizcaíno V, Padrón-Navarta JA, Hermann J, Connolly JA, Garrido CJ, Gómez-Pugnaire MT &amp; Marchesi C</td>
</tr>
<tr>
<td>135</td>
<td>Geochemistry of the Salma Eclogites (Belomorian Mobile Belt, Baltic Shield)</td>
<td>Meyer M</td>
</tr>
<tr>
<td>136</td>
<td>Metamorphic Evolution and Tectonic Implications of Carbonate-Bearing Mafic Boudins and Surrounding Metasediments of the Tianshan Mountains (NW China)</td>
<td>Melnik A</td>
</tr>
<tr>
<td>137</td>
<td>Multiphase Inclusions with Kokchetavite and K-Cymrite in UHP Calc-Silicate Rocks from Kokchetav Massif</td>
<td>Mikhno A &amp; Korsakov A</td>
</tr>
<tr>
<td>138</td>
<td>Fluorine, Cl, Br &amp; I in Serpentinites</td>
<td>Page L &amp; Hattori K</td>
</tr>
<tr>
<td>139</td>
<td>Bimetasomatism in the Eclogite Facies: Evidence from the Tauern Window, Austria</td>
<td>Assbichler D &amp; Proyer A</td>
</tr>
<tr>
<td>143</td>
<td>On the Evolution of the Western Alpine Orogen: U-Pb Geochronology and Hf Isotopic Ratios in Zircons from Adamello and Bergell Amph-Rich Mafic and Ultramafic Rocks</td>
<td>Tiepolo M, Tribuzio R, Lustrino M &amp; Wu F-Y</td>
</tr>
<tr>
<td>145</td>
<td>Source of Fluid during Continental Subduction and Exhumation: In situ LA-ICP-MS Analysis of Sr-Isotope in Barite of Eclogite from the Sulu Terrane, China</td>
<td>Yang H, Gerdes A, Zhang L &amp; Liu F</td>
</tr>
<tr>
<td>146</td>
<td>The Heat Relaxation P-T-T Path of HP-UHP Eclogites from Chinese Southwestern Tianshan: Constraints from P-T Pseudosections, Lu-Hf and Sm-Nd Isochron Dating</td>
<td>Du J, Zhang L, Shen X &amp; Bader T</td>
</tr>
</tbody>
</table>
08h: Glasses in Art, Architecture and Industry

147  The Browning Phenomenon of Medieval Stained Glass Windows

148  Green Color Chemical Recipes in Stained Glass Windows of NE Spain and N Italy (XIIIth to XVth Centuries)

149  Study of Archaeological Glass Based on Elemental Imaging by Laser Ablation ICP-MS
    van Elteren JT, Panighello S, Šelih VS, Tennent NH, Orsega EF, Izmer A, Šala M & Vanhaecke F

10a: Geochemical Processes at Mineral-Water Interfaces: Insight from Macroscopic, Spectroscopic, and Computational Methods

150  In situ Monitoring of Water-Rock Interaction by Micro FT-IR – An Example of Calcium Silicate Hydrate Formation

151  Titration Curves, Column Experiments, and Reactive Transport Models
    Britz S, Noseck U, Stockmann M & Brendler V

152  Experimentally Quantifying Metabasalt Dissolution Kinetics at 25°C and pH 2-12
    Critelli T, Saldi GD, Daval D, Apollaro C, Oelkers EH, Schott J, De Rosa R, Knauss KG & Mariní L

153  Dissolution of Amorphous Silica in the Presence of Ca²⁺ and Mg²⁺ at pH 6 and 9
    Otsu E, Etou M, Okaue Y & Yokoyama T

154  Kinetic of H₂O₂ Generation and Decay during Pyrite Water Reactions
    Gil Lozano C, Fernandez-Dávila A, Losa Adams E, Gonzalez Fairen A & Gago-Dupont L

155  Perturbing a Field Diffusion Experiment: First Results of the DR-A Test in the Mont Terri Rock Laboratory (Switzerland)
    Gimmi T, Leupin OX, Soler JM & Van Loon LR

156  Crystallization of Hydroxide Cobalt Carbonate CO₃CO₃(OH)₂, Precursor of Co₃O₄, at Room Temperature
    Gonzalez-Lopez J, Fernandez-Gonzalez MA & Jimenez A

157  IR Spectra of Thin Film Water Sandwiched between Two Mineral Plates
    Hamamoto M, Katsura M & Nakashima S
| 158 | Using Model Mineral-Organic Matter-Water Interfaces as a Step Towards Determining the Fate of Pollutants in the Environment  
*Kolić PE, Subramanian B, Spivak DA & Cook RL* |
|---|---|
| 159 | Role of Polysaccharides in Calcite (Re)crystallisation  
*Lakshitanov LZ & Stipp SLS* |
| 160 | Influence of Surface Conductivity on the Apparent Zeta Potential of Amorphous Silica Nanoparticles  
*Leroy P, Devau N, Revil A & Bizi M* |
| 161 | Uranium Transport and Deposition in Iron Oxide Copper Gold Deposits (IOCG’s): An Experimental Approach  
*Li K, Brugger J, Pring A, Nogthai Y, Etschmann B, Macmillan E & Zhao J* |
| 162 | H$_2$O-Adsorption at the (100)-Pyrite Surface: Forcefield Simulation Studies Supporting GIXRD-Experiments  
*Meis S, Magdans U, Torrelles X & Gies H* |
| 163 | Do Amino Acids Inhibit Calcite Growth?  
*Montanari G, Bovet N & Stipp SLS* |
| 164 | How Sandstone Mineral Surfaces Interact with Ca$^{2+}$ and Cl$^{-}$ Ions  
*Nielsen AR, Dalby KN, Bovet N & Stipp SLS* |
| 165 | Calcite Scaling: Growth Inhibition by Mg$^{2+}$, SO$_4^{2-}$ and Mg$^{2+}$ + SO$_4^{2-}$  
*Nielsen MR, Sand KK & Stipp SLS* |
| 166 | Quantitative Color Mapping of a Brown Altered Granite by Means of Dark Field Reflection Visible Micro-Spectroscopy  
*Onga C & Nakashima S* |
| 167 | Calcium Carbonate Precipitation by CO$_2$ Uptake in Alkaline Solutions  
*Purgstaller B, Niedermayr A & Dietzel M* |
| 168 | Caprock’s Nanoporous Structure Modification by Supercritical CO$_2$/Water Interaction: A Contribution of Adsorption Techniques  
*Rhenals Garrido DR, Lafortune S, Souli H & Dubujet P* |
| 169 | Formation Mechanism of Hematite-Rutile Pseudomorphs from Mwinilunga (Zambia)  
*Stanković N, Daneu N & Rečnik A* |
| 170 | Modification of Synthetic Zeolites and Characteristics of their Properties  
*Szala B, Turek P & Bajda T* |
| 171 | A Study on Adsorption Mechanism of Organoarsenic Compounds onto Ferrihydrite  
*Tanaka M & Takahashi Y* |
| 172 | BTX Sorption by Surfactant-Modified Synthetic Zeolite  
*Turek P, Szala B, Czerwiński J, Bajda T & Matusik J* |
<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>173</td>
<td>Thermal Evolution of Surface Silanols and Nanopores in Silica Particles</td>
<td>Wan Q, Li S, Qin Z &amp; Xiao Y</td>
</tr>
<tr>
<td>174</td>
<td>Cerium Sequestration in Fractures in the Upper Kilometer of Granitoids, SE, Sweden</td>
<td>Yu C, Drake H, Åström M &amp; Mathurin F</td>
</tr>
<tr>
<td>176</td>
<td>Molecular Simulation Study of Rectorite</td>
<td>Zhou J, Lu X, Zhu J, Sprik M, Boek E &amp; He H</td>
</tr>
<tr>
<td></td>
<td>(Session 10a continues on Tuesday 27th AM on p.117)</td>
<td></td>
</tr>
<tr>
<td>177</td>
<td>Earthworms Produce Highly Stable Amorphous Calcium Carbonate</td>
<td>Demarchi B, Benning LG, Brown A, Harding J, Freeman C, Penkman K &amp; Hodson ME</td>
</tr>
<tr>
<td>179</td>
<td>Formation of Hydroxylapatite with Different Morphologies and Implication for Biomineralization</td>
<td>Jiang S-D, Yao Q-Z &amp; Zhou G-T</td>
</tr>
</tbody>
</table>

10f: Microbe/Mineral Interfaces and their Role in Biomineralization Processes

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>177</td>
<td>Earthworms Produce Highly Stable Amorphous Calcium Carbonate</td>
<td>Demarchi B, Benning LG, Brown A, Harding J, Freeman C, Penkman K &amp; Hodson ME</td>
</tr>
<tr>
<td>179</td>
<td>Formation of Hydroxylapatite with Different Morphologies and Implication for Biomineralization</td>
<td>Jiang S-D, Yao Q-Z &amp; Zhou G-T</td>
</tr>
</tbody>
</table>

11a: Carbon Dioxide Earth Degassing from Volcanoes and from Non-Volcanic Areas

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>Carbon Isotopic Composition and Flux Variations of CO₂ Emitted from the Soil of Mt Etna</td>
<td>Camarda M, De Gregorio S, Favara R, Grassa F &amp; Gurrieri S</td>
</tr>
<tr>
<td>181</td>
<td>Continuous Soil CO₂ Flux Measurements in a Fumarole Field of Mt Etna</td>
<td>De Gregorio S, Camarda M, Cappuzzo S &amp; Gurrieri S</td>
</tr>
<tr>
<td>183</td>
<td>Contribution and Effects of the Volcanic Carbon Dioxide over the Urban Area of Naples</td>
<td>Granieri D, Costa A, Macedonio G, Bisson M &amp; Chiodini G</td>
</tr>
<tr>
<td>Poster Number</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>184</td>
<td>Effects of Volcanic CO$_2$ Vents on a Freshwater Environment, the Laacher See</td>
<td>Gwosdz S, Möller I, Richnow HH &amp; Krüger M</td>
</tr>
<tr>
<td>185</td>
<td>Volcanic CO$_2$ Flux Measurements by Tunable Diode Laser Absorption Spectroscopy</td>
<td>Pedone M, Aiuppa A, Giudice G, Grassa F &amp; Chiodini G</td>
</tr>
<tr>
<td>186</td>
<td>Anomalous CO$_2$ Contents in a Shallow Aquifer of the Mt. Amiata Geothermal Area, Italy</td>
<td>Pierotti L, Cortecci G, Facca G &amp; Gherardi F</td>
</tr>
<tr>
<td>187</td>
<td>Gas Geochemistry and Soil CO$_2$ Flux in Active Volcanic Areas, China</td>
<td>Wen H-Y, Yang T, Guo Z, Fu C-C, Chen A-T &amp; Zhang M</td>
</tr>
<tr>
<td>188</td>
<td>New Experimental Data on TiO$_2$ Solubility in Hydrous Rhyolite Melts: Implications for Titanium-in-Quartz Thermobarometry</td>
<td>Kularatne K &amp; Audétat A</td>
</tr>
<tr>
<td>189</td>
<td>Melting of an Hybryd Source Below the Danakil Region</td>
<td>Barbieri E, Cipriani A, Brunelli D &amp; Paganeli E</td>
</tr>
<tr>
<td>190</td>
<td>Precise U–Pb Zircon CA-ID-TIMS Ages and Sr Isotopes for the Plana Pluton, Srednogorie, Bulgaria</td>
<td>Bidzhoval, Nedialkov R, Ovtcharova M &amp; von Quadt A</td>
</tr>
<tr>
<td>191</td>
<td>Control of Magma Recharge and Buoyancy on the Frequency and Magnitude of Volcanic Eruptions</td>
<td>Caricchi L, Annen C &amp; Blundy J</td>
</tr>
<tr>
<td>192</td>
<td>Combined Diffusion Studies in Sanidine, Quartz and Orthopyroxene: Timescales of Magma Mixing in the Bishop Tuff</td>
<td>Chamberlain KJ, Morgan DJ &amp; Wilson CJN</td>
</tr>
<tr>
<td>194</td>
<td>Petrochemical Characterization of the Basalts and Rhyolites Erupted along the Central Axis of the Main Ethiopian Rift</td>
<td>De Rosa R, Ferlito C, Nicotra E &amp; Donato P</td>
</tr>
<tr>
<td>195</td>
<td>Precise U-Pb ID-TIMS Baddeleyite and Zircon Ages for the Florianópolis Dyke Swarm and its Correlation to Paraná-Etendeka Mafic to Intermediate Magmatism</td>
<td>Florisbal L, Janasi V, Bitencourt MDF &amp; Heaman L</td>
</tr>
<tr>
<td>196</td>
<td>Experimental Investigations on Halogen-Rich Agpaitic Phase Equilibria</td>
<td>Giehl C, Marks M &amp; Nowak M</td>
</tr>
<tr>
<td>Posters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 197 | Magmatic Processes beneath Furnas Volcano, São Miguel, Azores  
| 198 | Marine Sediments as an Archive of the Evolution of Volcanism on Montserrat  
  **Johnson P, Inglis E, Marchant I, Cassidy M, Palmer M, Talling P, Gernon T & Watt S** |
| 199 | Vertical Lithofacies Changes of the Jeonchong Tuff Cone in the Miocene Eoil Basin, SE Korea: Implication of a Series of Eruptive and Depositional Processes  
  **Kwon CW** |
| 200 | Age and Geochemical Constraints on the Genesis of Late Cenozoic Volcanic Rocks in Central Myanmar  
| 201 | Temporal Variation of Compositions of Volcanic Gas and Hot Springs in the Tatun Volcano Group, Taiwan  
  **Lee H-F, Yang TF, Wen H-Y & Lin C-H** |
| 202 | Age, Geochemistry and Sr-Nd-Pb Isotopes of Alkaline Lavas from Northern Victoria Land and Ross Sea Region, Antarctica  
  **Lee MJ, Lee JI, Kim T & Lee J** |
| 203 | Gaussberg Leicitites – New Data on Mineralogical and Geochemical Composition  
  **Migdisova N, Sushchevskaya N, Belyatsky B & Kuzmin D** |
| 204 | Time Scales of Mingling in Shallow Reservoirs  
  **Montagna CP, Papale P & Longo A** |
| 205 | Geochemistry and Petrology of the Timar Basaltic Volcanism in the Northeast of Lake Van  
  **Oyan V, Keskin M & Özdemir Y** |
| 206 | The Geological Evolution of Lateral and Vertical Direction of Delihalil Volcano (Yumurtalık, Turkey)  
  **Özvan A & Oyan V** |
| 207 | The Space and Time Complexity of Chaotic Mixing of Silicate Melts: Implications for Igneous Petrology  
  **Perugini D, De Campos C, Ertel-Ingrisch W & Dingwell D** |
| 208 | Mineral and Melt Inclusion Geochemistry of the Nea Kameni Dacites, Santorini, Greece  
  **Rowe M, Ellis B & Kyriakopoulos K** |
| 209 | Origin of Grande Ronde Basalts, Columbia River Basalt Group  
  **Rodriguez S & Sen G** |
| 210 | Magmatic Processes Revealed by Heterogeneous Crystal Populations in a Lamprophyre System  
  **Ubide T, Galé C, Larrea P, Arranz E, Lago M & Wijbrans JR** |
Petrological Implications of Temporal and Spatial Variations in Magma Chemistry of the Quaternary Tendurek Shield Volcano, Eastern Anatolian Collision Zone, Turkey

Ünal E, Keskin M, Lebedev VA, Chugaev AV & Sharkov EV

Geology and Geochemistry of Basic Intrusive Rocks in the Eastern Fault Depression of Liaohé Basin

Zhang Y, Bian W, Huang Y, Yu X, Gao Y & Tang H

12h: Geochemistry of Gas Hydrate Systems: From the Laboratory to Natural Deposits

CO$_2$ Injection into Submarine, CH$_4$-Hydrate Bearing Sediments: Geochemical Implications of a Hydrate Conversion Technology

Deusner C, Kossel E, Bigalke N, Gharasoo MG & Haeckel M

The Study of Polymorphs of Wordian Amb Formation, Salt Range of Western Pakistan in Relation to Geochemistry

Khan S & Haider N

Depressurization-Induced Gas Production from Methane Hydrate Sediment Formed in a Giant Cell

Konno Y, Jin Y & Nagao J

Precision Mapping and Towcam Aided Study over Geochemical Anomalies of the Goodweather Ridge, Southwestern Taiwan


Development of Large-Scale Apparatus for Gas Production from Methane Hydrate Layer

Nagao J, Jin Y & Konno Y

Direct Observation of Gas Hydrate Formation in a Sedimentary Matrix on the Microscale

Sell K, Chaouachi M, Enzmann F, Kuhs WF, Kersten M, Pinzer B & Saenger EH

12i: Geochemistry of Energy Storage

Organic Facies Variation from Well Data on the Bituminous Miocene Units, Northwestern Anatolia (Sevinç/Ağapinar-Eskişehir), Turkey

Altunsoy M, Şengüler İ, Ünal N, Hökerek S & Özçelik O

Interrelation between Tuffs and Organic Rich Source Rock in Chang7 Formation, Triassic, Ordos Basin, Central China

Cui J, Zhu R, Wu S & Bai B

The Characteristics of an Old Gas Reservoir in Sinian Strata, Central Sichuan Basin, South China

Li L, Wang Z, Wang T & Jiang H
<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>225</td>
<td>A Prediction Model of Oil Cracked Gas Resources and Its Application in NE Sichuan Basin, SW China</td>
<td>Wang T &amp; Hu SY</td>
</tr>
<tr>
<td>227</td>
<td>Mineralogy and Elemental Geochemistry of Coal in Southeast Chongqing, Southwest China</td>
<td>Zhu Z</td>
</tr>
<tr>
<td>228</td>
<td>Geochemical Exploration for Platinum-Group Elements in Mafic/Ultramafic Complexes from the Arabian Shield</td>
<td>Al-Saleh A</td>
</tr>
<tr>
<td>229</td>
<td>Carbonate Mineralisation in the Supergiant Olympic Dam Deposit</td>
<td>Apukhtina OB, Kamenetsky VS &amp; Ehrig K</td>
</tr>
<tr>
<td>230</td>
<td>Geochemistry and Mineralogy of Philippine Nickel Laterite Deposits</td>
<td>Arcilla C, Ong R, Calibo M &amp; Ferrer C</td>
</tr>
<tr>
<td>231</td>
<td>Geological and Geochemical Features of The Saricayır (Yenice/Canakkale) Skarn Deposits</td>
<td>Arik F &amp; Akis I</td>
</tr>
<tr>
<td>232</td>
<td>Petrochemical Typification of the Oolitic Iron Ores from the Bakchar Deposit (Westen Siberia)</td>
<td>Asochakova E</td>
</tr>
<tr>
<td>233</td>
<td>U-Pb Dating of Hydrothermal Zircon and its Implications for the Metallogeny of the Donping Gold Deposit in North China</td>
<td>Bao Z, Sun W &amp; Li C</td>
</tr>
</tbody>
</table>
234 Ge, Related Trace Elements, and Ge Isotopes in Sphalerite from the Saint-Salvy Deposit (France) by LA-ICP-MS and MC-ICP-MS

Belissont R, Boiron M-C, Luais B & Cathelineau M

235 Re–Os Age and Gold Source for Mayskoe Quartz-Vein Deposit (Northern Karelia, Baltic Shield)

Krymsky R, Belyatsky B, Goltsin N, Sergeev S & Bushmin S

236 $^{97/95}$Mo in Molybdenites from the Azegour Skarn (Morocco)

Breillat N, Guerrot C, Negrel P & Marcoux E

237 A Contribution from Radiogenic Isotope Study to Metal Source and Timing of Gold Orogenic Deposits: A Case of Nezhdaninsky Deposit, Yakutia, Russia

Chugaev A, Chernyshev I, Bortnikov N & Gamyanin G

238 Mineralogical, Geochemical Characteristics and Mass Changes in the Alteration Zone at the Elmaalan (Trabzon) VMS Mineralization in NE Turkey

Col L & Tuysuz N

239 Origin of Heterogenite (CoOOH) as Illustrated by Rare Earth Element Fractionation

Decrée S & Pourret O

240 Metal Mobility in Hydrothermal Fluids: Experimental Investigations

Derrey IT, Botcharnikov RE, Albrecht M, Horn I, Weyer S & Holtz F

241 Sulfosalt Melts from Low-Grade Metamorphic Terrains: The Case of the Monte Arsiccio Mine (Tuscany, Italy)

Vezzoni S, D’Orazio M, Biagioni C, Dini A & Orlandi P

242 Mg and Fe Isotope Constraints on the Genesis of Paleoproterozoic Magnesite Deposits, NE China

Dong A, Zhu X, Li S, Wang Y & Li Z

243 Geochemical Modelling of Sn and W in Granites from Central Iberian Zone (Spain)

Ruiz C & Fernandez C

244 $^{238}$U/$^{235}$U Variations in High- and Low-Temperature Uranium Deposits

Chernyshev I, Golubev V, Chugaev A & Baranova A

245 Multi-Element PedoGeochemical Prospecting in the Agrochão-Murçós Area (NE Portugal)

Gomes E & Favas P

246 Metals Zonal Distribution in Old Ore Deposits. Egypt: A Pathfinder for Site of Chief Metal Accumulation

Hassaan M
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>248</td>
<td>Raduzhnoe – Epithermal Breccia-Hosted Deposit (Northern Caucasus, Russia)</td>
<td>Kaigorodova E</td>
</tr>
<tr>
<td>249</td>
<td>The Platinum Group and Precious Metals Contents of Mugla-Ortaca (Turkey) Area Chromites</td>
<td>Karabel B, Gumus L, Kiran Yildirim D, Uzasci Sultanyan S, Budakoglu M &amp; Kumral M</td>
</tr>
<tr>
<td>250</td>
<td>Trace Element Systematics of Pyrite from Submarine Hydrothermal Vents</td>
<td>Keith M, Häckel F, Haase K, Schwarz-Schampera U, Klemd R &amp; Petersen S</td>
</tr>
<tr>
<td>252</td>
<td>Geochemical and Petrographical Investigation of Chromite Occurrences in Burdur-Salda, Turkey</td>
<td>Kiran Yildirim D, Uzasci Sultanyan S, Karabel SB, Kan Bostanci A &amp; Kumral M</td>
</tr>
<tr>
<td>254</td>
<td>A Cyano-Bacterial Community as a Possible Agent of Ge Accumulation in Coal</td>
<td>Lazarova E, Bryanskaya A, Morozova V, Babkin I, Tikunova N, Taran O, Shuvaeva O &amp; Zhmodik S</td>
</tr>
<tr>
<td>255</td>
<td>In situ Measurements of Cu Isotopes in Cu Sulphides</td>
<td>Lazarov M, Horn I, Weyer S &amp; Pacevski A</td>
</tr>
<tr>
<td>257</td>
<td>The Study of Metallogenic Model of Super-Thin Alteration-Type Gold Deposit on XiongEr Mountains in Western Henan Province, China</td>
<td>Liu Y, Chen Y &amp; Lei W</td>
</tr>
<tr>
<td>258</td>
<td>Mineralization Characteristics and Enrichment Regularity of Alteration-Type Gold Deposit In Eastern Qinling, China</td>
<td>Lei W &amp; Liu Y</td>
</tr>
</tbody>
</table>
259 Metal Zoning Feature and its Genesis of Bairendaba Vein Type Ore Forming System in Inner Mongolia, China
   Li Z, Cai Y & Liu Y

260 An XPS Study on the Valence States of Arsenic in Arsenian Pyrite: Implications for Au Deposition Mechanism of the Yangshan Gold Deposit, Western Qinling Belt, Central China
   Liang J & Sun W

261 Phases of Gold and Silver in The Sediments in The Jidong Gold Ore Concentration Area, China
   Lu J, Shi H, Hao L, Zhao Y & Liu H

262 Iron Isotope Systematics of the Baima Magmatic Fe-Ti-(V) Oxide Deposit, SW China

263 Petrography and Geochronology of the Xianshi Uranium Deposit in Xiazhuang Ore Field of South China
   Luo J, Hu R, Bi X, Chen Y & Jiang X

264 The Conditions of Formation of the Castro de Rei Reduced W-Skarn
   Martínez Abad I & Cepedal Hernández A

265 Whether Graphites is Able to Reflect an Economical Aspect of Metalliferous Strata
   Ponomarchuk V, Moroz T, Pyryaev A, Ponomarchuk A & Semenova D

266 Re-Os Isotope Systematics of Sulfides from Olympiada Gold Deposit (Yenisei Rige, Russia)
   Naumov E, Tossalina S, Borisenko A, Nevolko P & Kovalev K

267 The Thrym Complex of Southeastern Greenland: Evolution of Ni-Cu-Sulfide Mineralization in the Lower Crust
   Owen J, Bagas L, Kolb J, Fiorentini M, Stensgaard B & Thebaud N

268 Ore Genesis of the Longshan Sb-Au Deposit, Hunan, China: Evidence from Fluid Inclusions

269 Mineralogy and Distribution of Indium and Selenium Metals within Zinc-Rich Ore Types of the Neves Corvo Deposit, Portugal
   Pinto A, Relvas J, Carvalho J, Pacheco N & Liu Y

270 Gas-Solutions Interaction in Hydrothermal Ore Forming Processes
   Prokofiev V, Selector S & Akinfiev N

271 Carbon Isotopes and Microelements Distribution in Fractions of Brown Coals
   Pyryaev A, Ponomarchuk V & Semenova D
<table>
<thead>
<tr>
<th>272</th>
<th>Geochemistry of Cassiterite and Wolframite from Quartz Veins in Central Iberian Zone (Spain)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Ruiz C &amp; Fernandez C</strong></td>
</tr>
<tr>
<td>273</td>
<td>Hydrothermal-Sedimentary Lithogenesis</td>
</tr>
<tr>
<td></td>
<td><strong>Rusakov V</strong></td>
</tr>
<tr>
<td>274</td>
<td>The Differentiation Mechanism of W and Sn of Qitianling Granite in Hunan Province, South China</td>
</tr>
<tr>
<td></td>
<td><strong>Shuang Y &amp; Xiang X</strong></td>
</tr>
<tr>
<td>275</td>
<td>Evidences of Paleoproterozoic Metamorphism in the NW Region of the Quadrilatero Ferrifero Area, Minas Gerais, Brazil: Implications for Gold Mineralizations</td>
</tr>
<tr>
<td></td>
<td><strong>Tassinari C, Velaskez M, Munha J, Lobato L, Mateus A &amp; Campos W</strong></td>
</tr>
<tr>
<td>276</td>
<td>Platinum Deposits in Hardrock of the Konder Massif</td>
</tr>
<tr>
<td></td>
<td><strong>Tolstykh N</strong></td>
</tr>
<tr>
<td>277</td>
<td>Petrogenesis of Late Permian Picritic Porphyries Associated with Pingchuan Iron Ores, Emeishan Large Igneous Province, Southwest China</td>
</tr>
<tr>
<td></td>
<td><strong>Wang M &amp; Zhang Z</strong></td>
</tr>
<tr>
<td>278</td>
<td>Formation and Metamorphism of the Upper Sulfide Zone of the Salt River VMS Deposit (South Africa)</td>
</tr>
<tr>
<td></td>
<td><strong>Wohlgemuth-Ueberwasser CC, Viljoen F &amp; McClung CR</strong></td>
</tr>
<tr>
<td>279</td>
<td>Petrographical Features of the Shilu Fe-Polymetallic Ore Deposit in Hainan Province, South China: Implication for Ore-Deposit Type</td>
</tr>
<tr>
<td></td>
<td><strong>Xu D, Chen H, Li C &amp; Wang Z</strong></td>
</tr>
<tr>
<td>280</td>
<td>Fluid and Melt Inclusions in the Wulaga Gold Deposit, Heilongjiang, China</td>
</tr>
<tr>
<td>281</td>
<td>Evidence for the Hydrothermal Fluid Origin of Sanqisian Uranium Deposit in China</td>
</tr>
<tr>
<td></td>
<td><strong>Xu Z &amp; Song H</strong></td>
</tr>
<tr>
<td>282</td>
<td>Geochemical Characteristics of Granites and their Relationship to Gold Mineralization in Yangshan Gold Deposit, Gansu Province, China</td>
</tr>
<tr>
<td></td>
<td><strong>Yang G, Yuan S, Qi J &amp; Ge L</strong></td>
</tr>
<tr>
<td>283</td>
<td>Research on the Au Transport of Lannigou Gold Deposit in Guizhou Province, China</td>
</tr>
<tr>
<td></td>
<td><strong>Yang YP</strong></td>
</tr>
<tr>
<td>284</td>
<td>Mineralogical Evidence of High-Fluoride Oxidizing Fluid in Baiyanghe U-Be-Mo Deposit, Xinjiang, China</td>
</tr>
<tr>
<td>285</td>
<td>Geochonology of Ore-Bearing Granites in the Baishan Mo Deposit, Eastern Tianshan, Xinjiang</td>
</tr>
<tr>
<td></td>
<td><strong>Zhang D</strong></td>
</tr>
</tbody>
</table>
New Dating Result of the Caledonian Granitoids and Related Mineralization of Miaoershan-Yuechengling Area, South China  
**Zhang W, Zhang D & Wang R**

Iron Deposits in China: Distribution, Types and Tectonic Setting  
**Zhang Z & Hou T**

Zircon U-Pb Geochronology of Hosting Rhyolites and Mineralized Quartz Veins at the Tiemurt Pb-Zn-Cu Deposit: Insights for Ore Genesis  
**Zheng Y, Zhang L & Chen Y**

Carbon-13 and Uranothorianite Age Dating in the Botogol Alkaline Massif Graphites (Eastern Sayan, Russia)  
**Zhmodik S, Mironov A, Karmanov N, Ponomarchuk V, Belyanin D, Kirichenko I & Zhmodik A**

(14a: Geochemical Records and Models of Climate Change in Deep Time)

δ¹³C Record of Black Carbon in Daihai Lake Sediments, Northern China: An Indicator of Terrestrial Environmental Changes  
**Cui L, Wang X, Xiao J & Ding Z**

Evidence from N-Alkanes for Ancient Organic Matter Sources in Lake Superior  
**Dildar N & Longstaffe F**

A Record of Paleoproterozoic Surface Ocean Redox from Iodine-To-Calcium Ratios  
**Hardisty D, Lu Z, Planavsky N, Bekker A, Zhou X & Lyons T**

Carbon and Oxygen Isotopic Compositions: How to Respond the Lacustrine Environmental Factors in Northwestern and Northeastern China  
**Hu X & Zhao Q**

Change in Water Circulation of the Bering Sea Recorded by Authigenic Neodymium Isotopes in Sediments from the Bering Slope over 500 ka BP  
**Jang K & Huh Y**

C4 Plants Expansion and the Enhanced Aridity from the Late Miocene to Pliocene on the Chinese Loess Plateau  
**He T, Chen Y & Ji J**

Sr and Mg Isotopes of Marinoan Cap Dolostones: Implication for Glacial Lake Harland?  
**Liu C, Macdonald F, Wang Z & Raub T**

Rates of Natural Silica Precipitation Through Time  
**Merle R, Nemchin A, Simons S, Geisler T & Tomaschek F**
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>298</td>
<td>Evolution of Neodymium Isotopic Signature of Seawater during the Late Cretaceous: New Insights on Oceanic Circulation Changes</td>
<td>Moiroud M, Pucétat E, Donnadieu Y, Bayon G &amp; Deconinck J-F</td>
</tr>
<tr>
<td>300</td>
<td>Fe, Al and Ti Variations in Marine Sediment: Implications in Provenance and Paleoclimatic Analyses</td>
<td>Peketi A &amp; Mazumdar A</td>
</tr>
<tr>
<td>301</td>
<td>Mg Isotope Evidence for Early Dolomite Formation in a Marinoan Cap Carbonate</td>
<td>Shen B, Wimpenny J, Yin Q-Z, Lee C-T, Xiao S &amp; Zhou C</td>
</tr>
<tr>
<td>302</td>
<td>Holocene Changes in Fire Frequency in the Daihai Lake Region (North-Central China): Indications and Implications for an Important Role of Human Activity</td>
<td>Wang X, Xiao J, Cui L &amp; Ding Z</td>
</tr>
<tr>
<td>303</td>
<td>Novel Calcite-Aragonite Sea Transition in the Terminal Proterozoic</td>
<td>Wang Z, Ries J &amp; Liu C</td>
</tr>
<tr>
<td>304</td>
<td>Towards Better Greenland Source Attribution for IRD via Pb-Pb in Feldspar and Ar-Ar in Amphibole</td>
<td>White L, Storey C, Bailey I &amp; Foster G</td>
</tr>
<tr>
<td>305</td>
<td>Paleoclimate Reconstruct of Late Triassic Xujiahe Formation Sichuan Basin in Southwest China</td>
<td>Xu Z, Wang Z &amp; Hu S</td>
</tr>
<tr>
<td>306</td>
<td>An Insight into Negative Feedback Mechanisms in a Recovery Phase of the PETM</td>
<td>Yasukawa K &amp; Kato Y</td>
</tr>
<tr>
<td>307</td>
<td>14c: Rates, Timings and Mechanisms of Pleistocene Sea Level Change</td>
<td>Tokarev I</td>
</tr>
<tr>
<td>308</td>
<td>Fingerprint of Last Glaciation on $^2$H and $^{18}$O in Groundwater of North-East Part of Baltic Artesian Basin</td>
<td>Tokarev I</td>
</tr>
<tr>
<td>308</td>
<td>Light Absorbing Products from Aqueous Processing of α-Dicarbonyls: Matrix Effects and Atmospheric Implications</td>
<td>Finessi E, Hamilton JF, Baeza-Romero MT, Rickard AR, Healy RM, Peppe S, Adams TJ, Daniels MJS, Ball SM, Goodall ICA, Monks PS, Borras E &amp; Munoz A</td>
</tr>
</tbody>
</table>
Temperature Dependence of Water Activity in Organic Aerosols
Ganbavale G, Marcolli C, Zuend A, Krieger U & Peter T

Properties and Processing of Organic Aerosol in the Po Valley

Regional Scale OA Oxidation Observed over the Po Valley Basin (Italy), at Mt. Cimone (2165 M Asl)

Microphysical Properties of BC in Anthropogenic and Biomass Burning Plumes
Sahu L, Kondo Y, Moteki N, Takegawa N & Zhao Y

Particulate Matter in São Paulo City: Comparison between Industrial and Urban Area
Bourrotte C, Fornaro A, Forti MC, Cavicchioli A & Miranda R

BIOCOMBUST – Biomass, Energy, Health

A Study of Combustion Aerosols in Japan Using a Nonhydrostatic Icosahedral Atmospheric Model
Goto D & Suzuki K

Characterization of Woody Biomass Ashes and their Utilization Potential
Maschowski C, Gieré R & Trouvé G

An Investigation of Transboundary Particulate Matter over Northeast Asia
Park ME, Song CH, Park RS, Lee J, Lee SJ & Kim J

Diurnal Chemical Characteristics of PM$_{2.5}$ over a Source Region of Biomass Burning Emissions in the Indo-Gangetic Plain
Rastogi N, Singh A & Singh D

Toxic Element Balances in Small Scale Wood Combustion Systems
Ruppert H & Seidel T

Power Stations as a Source of Atmospheric Particulate Matter in Southern Poland
Wilczynska-Michalik W, Moryl R, Suder B & Michalik M
Sensitivity of Carbonaceous Aerosol Simulations to Aging Schemes

Wu S, Huang Y, Dubey M & French N

High-Precision Nd Isotope and HFSE Analysis of Deccan Traps Weathering Profiles

Babechuk M, Widdowson M, Murphy M & Kamber B

Oxygen and Hydrogen Stable Isotopes in Alpine Waters and Fine-Grained Soils Near Saas Fee, Switzerland

Bauer K, Adatte T & Vennemann T

The Variation of Sr Isotopes ($^{87}$Sr/$^{86}$Sr and $^{88}$Sr) in River Waters after Typhoon Morakot at a Small Catchment, Southwestern Taiwan

Chao H-C, You C-F, Liu H-C & Chung C-H

Li and Sr Constraints on Biogeochemical Processes in a Tropical Andesitic Watershed

Clergue C, Dessert C, Buss H, Dellinger M, Crispi O, Rousteau A, Gaillardet J & Benedetti M

Insight into the Use of U- and Th-Series Nuclides for Soil-Production Rates Determination

Gontier A, Rihs S, Pelt E, Turpault M-P, Lemarchand D & Chabaux F

Metal Stable Isotopes in Lake Baikal Sediments

Lee D-C, Liu H-T & Yang S-C

Li Isotope Geochemical Study on Weathering of Granite in Longnan, Jiangxi Province, South China


Developing the Commination Age Technique: Isolating the Detrital Minerals

Martin A & Dosseto A

Nd-Sr Isotopic Constraints on the Source of the Hexi Corridor Loess

Pan Y, Rao W & Wu W

Impact of Basalt Weathering and Plant Recycling on Mg Transport from the Soil to the River Under Permafrost Environment: A Stable Mg Isotope Study in Central Siberia

Prokushin A, Mavromatis V, Pokrovsky O & Viers J

Molybdenum Isotope Fractionation in the Great Artesian Basin, Australia

Siebert C, von Strandmann P & Burton K

Provenance of Eolian Deposits in Desert-Loess Transition, North China by Using Nd-Sr Isotopic Tracers

Wang X & Rao W
Lithium Isotope Variation in Waters and Sediments from Lake Donggi Cona and its Catchment, China
*Weynell M, Wiechert U & Schüssler JA*

Early Diagenesis How to Impact C/N and Organic Isotopic Compositions in the Lacustrine Sediments
*Zhang C & Fan R*

Silicon Isotopes as a New Tool to Identify the Main Cause of the Field-Lab Apparent Discrepancy of Feldspar Dissolution Rates
*Zhu C, Wang C & Georg B*

### 16b: Probing the Critical Zone

**Hymenoptera Pollinator Effect on Environment**
*Anjos O, Gonçalves O & Nunes L*

**Mg Isotopes: Insights into Weathering in a Tropical Volcaniclastic Regolith**
*Chapela Lara M, Buss HL, Pogge von Strandmann PAE, Dessert C & Gaillardet J*

**Factors Affecting Fractionation of Ni and Cr in Ultrabasic Soils from Southwestern Poland**
*Kierczak J, Pędziewiatr A, Waroszewski J & Tyszka R*

**Chemical Evolution of Perched Groundwater Flowing Through Weathered Bedrock Underlying a Steep Forested Hillslope, Northern California**
*Kim H, Bishop JJK, Dietrich WE & Fung I*

**The Link between Biotic and Abiotic Systems: How and Why Does Gold Accumulate in Calcrete (Caliche)?**
*Lintern M*

**Climate and Topographic Controls on Soil Organic Carbon Cycling in Southern Arizona, USA**
*Lybrand R, Heckman K & Rasmussen C*

**U-Series Isotope Composition of Primary Minerals to Determine Regolith Production Rates on Three Different Lithologies**
*Menozzi D & Dosseto A*

**Using WITCH to Quantify Landscape and Hydrologic Controls on Solute Fluxes in the Critical Zone (Susquehanna Shale Hills Observatory, PA)**
*Sullivan P, Goddéris Y, Shi Y, Schott J, Duffy C & Brantley S*

**Response of Epikarst Hydrochemical Changes to Soil CO₂ and Weather Conditions in Chenqi, SW China**
*Yang R, Liu Z, Zeng C & Zhao M*

(Session 16b continues on Tuesday 27th AM on p.125)
16d: Organic Matter Export and the Sequestration of Atmospheric Carbon Dioxide

346 Dynamic of Organic Carbon in Small Volcanic Mountainous Tropical Watersheds (Guadeloupe, FWI)
*Dessert C, Lilloret E, Benedetti M, Lajeunesse E, Crispi O & Gaillardet J*

347 REE and Neodymium Isotopes in Sedimentary Organic Matter

348 Changes in Biological Pump by $^{230}$Th-Normalized Flux of Biogenic Components Recorded in the Chilean Margin Sediment during the Past 22kyr
*Fukuda M, Harada N, Sato M, Lange CB, Kawakami H, Pantoja S, Matsumoto T & Motoyama I*

349 Efficient Preservation of Terrestrial Organic Carbon Offshore Taiwan: Implications for the Global Carbon Cycle
*Hilton R & Kao S-J*

350 Variations of Soil C and N along a South-North Transect in East Central Asia: Implications for Climate Change

351 Temporal Variations in the Composition and Age of Terrestrial Organic Carbon Transported by the Yellow River
*Tao S, Eglinton TI, Montlucon D, McIntyre C & Zhao M*

16f: Large Rivers as Integrators of Landscape Dynamics

352 Chemical Composition of Changjiang River Sediments: Climate or Lithology Control?
*Chetelat B, Liu C-Q, Wang QL & Zhang GP*

353 Change of Water Cycle in the Changjiang (Yangtze River) Catchment Based on H/O Isotopes
*Li C, Yang S, Deng K, Wei H, Yang C & Lian E*

354 Spatial and Temporal Variability in Clay Mineral and Iron (Oxy)hydrate Minerals of the Changjiang (Yangtze) River Suspended Sediment: Monsoon Controlling Weathering
*Mao C, Chen J, Yuan X, Song Y & Ji J*

355 The River Po: Geochemical Fluxes and Related Insights on Weathering Processes and Erosion Rates
*Bianchini G, Marchina C, Knöller K & Pennisi M*
17a: The ins and Outs of Mud: Chemical Fluxes between Sediments and Seawater

356 Fluvial Sediments: Assessment of Contamination by Trace Metals Respecting Natural Variability
Novakova T, Matys Grygar T, Mihaljevic M & Strnad L

357 Rare Earth Elements in Marine Sedimentary Pore Fluids
Abbott A, Haley B, McManus J & Reimers C

358 Geochemistry of Ancient Estuarine Deposits on the Example of Pokurskaya Suit Sediments (West Siberia)
Afonin I, Tishin P & Tatyatin G

359 Silica and Germanium Cycling in a Coastal Shelf Environment: Insights from Northern Gulf of Mexico
Baronas JJ, Hammond DE, Berelson WM, McManus J & Severmann S

360 Origin and Burial of Organic Carbon Depending Upon the Environmental Setting in the Southwestern East/Japan Sea
Cha HJ & Choi MS

361 Effect of Increased Glacier Melt on Diagenetic Fe Cycling in Marine Sediments at King George Island (Antarctica)
Henkel S, Kasten S, Sala H, Busso A & Staubwasser M

362 Parallel Budgets of Excess Thorium and Protactinium in Grain-Size Separates of Marine Sediments from the North Atlantic over the Past 20,000 Years
Henry L & McManus J

363 Trace Metal Inputs from River-Fed and River-Starved Margin Sediments of the South Atlantic Ocean
Homoky WB, Mills RA, Hsieh Y-T, Hembury DJ, Woodward EMS & Henderson GM

364 The Relative Contribution of Sedimentation and Diagenesis in Colour Formation of Quaternary Bottom Sediments from the Southern Part of Mendeleev Rise and the Continental Slope of the East Siberian Sea
Levitan M, Syromyatnikov K, Roshchina I & Stein R

365 Linking Reactive Silica to Organic Matter Burial in Mississippi Delta Sediments
Michalopoulos P & Parinos K

366 Fluid Flow and Redox Metal Cycling in Cayman Trough Hydrothermal Sediments
Mills RA & Homoky WB

367 Use of Homogenized Sediment in Experimental Setup: Re-stabilization of Redox Fronts and Artifacts due to Sieving Methods
Nardelli MP, Metzger E, Barras C, Jorissen F & Geslin E
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>368</td>
<td>The Selective Sorption of K⁺ from Water Solutions by Ca-Zeolites</td>
<td>Rashchenko S &amp; Kazantseva L</td>
</tr>
<tr>
<td>369</td>
<td>Dissolved Mo, W, V in Atlantic Surface Water</td>
<td>Rimskaya-Korsakova M, Berezhnaya E &amp; Dubinin A</td>
</tr>
<tr>
<td>370</td>
<td>²⁴¹Am Supporting ²¹⁰Pb and ¹³⁷Cs Dating</td>
<td>Schnetger B, Häusler K &amp; Dellwig O</td>
</tr>
<tr>
<td>371</td>
<td>Benthic Fluxes and Early Diagenesis Processes in Adriatic Sea</td>
<td>Spagnoli F, Bartolini G &amp; Giordano P</td>
</tr>
<tr>
<td>372</td>
<td>Fe Isotopic Composition of Sequentially Extracted Reactive Fe from Marine Sediments</td>
<td>Staubwasser M, Henkel S, Kasten S &amp; Poulton S</td>
</tr>
<tr>
<td>373</td>
<td>A Novel Approach for Determining the Rate of Organic Carbon Remineralization in Bioturbated Marine Sediments at the Global Scale</td>
<td>Stolpovsky K, Dale A &amp; Wallmann K</td>
</tr>
<tr>
<td>374</td>
<td>The Global Flux of Calcium into and out of Marine Sediments</td>
<td>Sun X &amp; Turchyn AV</td>
</tr>
</tbody>
</table>

17h: Atmospheric Deposition of Aerosols to the Land and Oceans and their Impact on Ecosystems and Climate

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>376</td>
<td>Invited: Impact of Crustal Elements on Global Atmospheric Deposition of Nitrogen</td>
<td>Myriokefalitakis S, Daskalakis N &amp; Kanakidou M</td>
</tr>
<tr>
<td>378</td>
<td>Iron Dissolution Kinetics in Mineral Dust Under More Realistic Aerosol Conditions: Re-considering pH Scale</td>
<td>Shi Z</td>
</tr>
</tbody>
</table>

18i: Interaction of Oxyanions with Mineral Phases: Sorption, Redox Transformation, and Structural Incorporation

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>380</td>
<td>Effect of Fe(II) Ions on the Sorption of Selenite onto Chlorite</td>
<td>Baik MH &amp; Jeong JT</td>
</tr>
<tr>
<td>381</td>
<td><em>In situ</em> Real Time Infrared Spectroscopy Study of (Poly)molybdate Ions Sorption into Layered Double Hydroxides</td>
<td>Davantès A, Ardau C &amp; Lefèvre G</td>
</tr>
<tr>
<td>382</td>
<td>Incorporation of a Pertechnetate Analog – Perrhenate – by Sodalite in Competition with Other Anions</td>
<td>Dickson J, Harsh J &amp; Pierce E</td>
</tr>
<tr>
<td>383</td>
<td>Selenate Sorption onto Bacteria-Mineral Composites during the Progressive Addition of Fe(II)</td>
<td>Franzblau R, Weisener C &amp; Daughney C</td>
</tr>
<tr>
<td>384</td>
<td>Retention of Selenate at the Water-Mineral Interface in the Context of Salt Dome Repositories</td>
<td>Franzen C, Hering D &amp; Jordan N</td>
</tr>
<tr>
<td>385</td>
<td>Reduction Process of Cr(VI) by Fe(II) and Humic Acid Using High-Time Resolution XAFS Analysis</td>
<td>Hori M, Shozugawa K &amp; Matsuo M</td>
</tr>
<tr>
<td>386</td>
<td>Arsenate Adsorption by Akaganeite</td>
<td>Kersten M &amp; Vlasova N</td>
</tr>
<tr>
<td>387</td>
<td>Formation of Se(0) Nanoparticles by Azospirillum brasiliense</td>
<td>Steudtner R, Maffert A, Vogel M, Franzen C &amp; Scheinost AC</td>
</tr>
<tr>
<td>388</td>
<td>Modeling Non-Equilibrium Uptake of Se(IV) Upon Calcite Precipitation</td>
<td>Thien B, Heberling F &amp; Kulik D</td>
</tr>
<tr>
<td>389</td>
<td>Immobilization of Long-Lived Iodine after Incorporation into Apatite Matrice</td>
<td>Torapava N &amp; Walther C</td>
</tr>
<tr>
<td>390</td>
<td>Speciation and Fate of As in Calcite Formed Under Anoxic Condition</td>
<td>Yokoyama Y, Iwatsuki T &amp; Takahashi Y</td>
</tr>
<tr>
<td>391</td>
<td>Bioreduction of Sb-Substituted Goethite: A Mechanism of Sb Mobility and Bioavailability?</td>
<td>Zegeye A, Billard P &amp; Mustin C</td>
</tr>
</tbody>
</table>

18k: Advances in the Studies of Oxyanions as the Transport Mechanism of Contaminants

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>393</td>
<td>Selenium Distribution Linked to Monsoon Climate in the Chinese Loess Plateau</td>
<td>Blazina T, Sun Y, Berg M &amp; Winkel LHE</td>
</tr>
<tr>
<td>Page</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>394</td>
<td>Complexation of Oxyanions by Diatom Cells</td>
<td><em>Gelabert A, Pokrovsky OS, Schott J &amp; Feurtet-Mazel A</em></td>
</tr>
<tr>
<td>395</td>
<td>Measurement of δ³⁴S and δ³³S Values in Wild Animal Hair Samples by MC-ICP-MS</td>
<td><em>Alfayfi Y, Wieser M, Dubesky C &amp; Musiani M</em></td>
</tr>
<tr>
<td>396</td>
<td>Contribution of Fungi and Bacteria to the Mg Biogeochemical Cycle in Podzolic Soils</td>
<td><em>Balland-Bolou-Bi C, Bolou-Bi EB, Holmström SJM &amp; Holm NG</em></td>
</tr>
<tr>
<td>397</td>
<td>Changes in Amino Acid Nitrogen Isotopic Composition patterns during Phytoplankton Degradation</td>
<td><em>Carstens D, Schubert CJ, Deek A &amp; Lehmann MF</em></td>
</tr>
<tr>
<td>398</td>
<td>Niche Partitioning in Early Eocene Mammalian Faunas: New Insights into a C3 Ecosystem from Tooth Morphology, Microwear, and Stable Isotopes</td>
<td><em>Christensen H</em></td>
</tr>
<tr>
<td>399</td>
<td>Nickel Isotope Fractionation in the Soil to Hyper-Accumulating Plant System</td>
<td><em>Estrade N, Cloquet C, Deng T, Echevarria G, Sterckeman T &amp; Morel JL</em></td>
</tr>
<tr>
<td>401</td>
<td>Nitrogen Isotopic Fractionation during Enzymatic Transamination of Glutamic Acid to Form Aspartic Acid</td>
<td><em>Goto A, Miura K &amp; Chikaraishi Y</em></td>
</tr>
<tr>
<td>402</td>
<td>Stable Sr Isotope Fractionation in Synthetic Barite</td>
<td><em>Widanagamage I, Griffith E &amp; Scher H</em></td>
</tr>
<tr>
<td>403</td>
<td>The Zinc Isotopic Composition of Siliceous Marine Sponges: Investigating Nature’s Sediment Traps</td>
<td><em>Hendry K &amp; Andersen M</em></td>
</tr>
<tr>
<td>404</td>
<td>Effect of Trace Metals and Light Intensity on Biomarker Isotopic Fractionation</td>
<td><em>Hernandez Sanchez MT, Stoll HM, Piotrowski A, Milne A, Lohan M &amp; Pancost RD</em></td>
</tr>
<tr>
<td>405</td>
<td>Holocene Records of Chlorin N Isotopes</td>
<td><em>Higgins M, Robinson R &amp; Pearson A</em></td>
</tr>
<tr>
<td>406</td>
<td>Distribution, Fluxes in the Water Column and Early Diagenesis in the Bottom Sediments of ²¹⁰Po and ²¹⁰Pb in the Sea</td>
<td><em>Hong GH, Lee HM, Baskaran M, Kim SH, Kim YI &amp; Kim CJ</em></td>
</tr>
</tbody>
</table>
Simultaneous Determination of Carbon and Hydrogen Isotope Enrichment Factors of Methane during Microbial Oxidation in a Natural Water Environment

Komatsu D, Tsunogai U, Sato S, Nakagawa F & Tanaka A

Sulfur Cycling in a Karstic Catchment: Constraints from Isotopes of Dissolved Sulfates

Lang Y-C, Ding H, Liu C-Q & Zhao Z-Q

Multiple Sulfur Isotopic Evaluation of Porewater Sulfate Profiles

Masterson A, Berelson W & Johnston D

Identifying the Sources of Iron in Reservoir Fluids at a CO$_2$ Injection Pilot in Alberta, Canada

McKiernan B, Wieser M, Nightingale M & Mayer B

B Content and $\delta^{11}$B from Cultured Diatoms (Thalassiosira weissflogii & T. pseudonana): Relationship to pH$_{\text{seawater}}$ and Diatom C Acquisition


Significant Observed Copper Isotopic Abundance Variations in Biological Materials

Miller K, Coplen T & Wieser M

Nickel and Methanogens

Neubeck A & Ivarsson M

Isotopic Signatures in a Tropical Transitional Estuarine/Marine Ecosystem Influenced by the Largest Agricultural and Aquiculture Activities in Mexico

Aguíniga S, Rodríguez GM, Sánchez A & Romo JA

Stable C and O Isotope Ranges of African Land Snail Shells

Sawada Y, Dettman D & Pickford M

New Insights into Simultaneous Determination of Mass-Dependent Isotopic Fractionation and Radiogenic Isotope Variations of Strontium by Multi-Collector ICPMS

Scher H, Griffith E & Buckley W

Ontogenetic Stable Isotope Records of Modern Planktic Foraminifers from Sagami Bay, Japan

Takagi H, Moriya K, Ishimura T, Suzuki A, Kawahata H & Hirano H

Are Molybdenum Concentrations and Isotopes a Tracer for Anthropogenic Pollution in the Atmosphere?

Tennant A, Lane S, Proemse B & Wieser M

Stable Nitrogen Isotope Analysis of Amino Acids by GC/C/IRMS

Xiao H-Y, Zhu R-G & Yin Z-Y
<table>
<thead>
<tr>
<th>Posters</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>420</td>
<td>Eliminate the Organic Nitrogen Fraction to Perform $\delta^{15}N_{\text{tot}}$-$\delta^{15}N_{\text{bnd}}$ Analyses in Bulk Rocks: Application for Iguanodon-bearing Wealden Facies of Bernissart (Belgium)</td>
<td><em>Storme J-Y, Iacumin P, Rochez G &amp; Yans J</em></td>
</tr>
<tr>
<td>421</td>
<td>Concentration and Isotopic Analysis of Soil Gas N$_2$O in a Japanese Tea Field</td>
<td><em>Zou Y, Hirono Y, Yanai Y, Hattori S, Toyoda S &amp; Yoshida N</em></td>
</tr>
<tr>
<td>19e:</td>
<td><strong>Phototrophic Life and Earth’s Redox Evolution</strong></td>
<td></td>
</tr>
<tr>
<td>422</td>
<td>Iron Oxidation and Reverse Electron Flow In a Photoferrotroph</td>
<td><em>Bird L, Nitschke W &amp; Newman D</em></td>
</tr>
<tr>
<td>423</td>
<td>Phototrophs and Ore Formation</td>
<td><em>Brocks J, Bruisten B, Pagès A &amp; Grice K</em></td>
</tr>
<tr>
<td>424</td>
<td>Evolution of Photosynthesis</td>
<td><em>Hemp J, Pace L, Johnson J &amp; Fischer W</em></td>
</tr>
<tr>
<td>425</td>
<td>Snow and Ice Algae Rock – Cryo-Life Habitability in an Extreme Environment</td>
<td><em>Lutz S, Anesio AM &amp; Benning LG</em></td>
</tr>
<tr>
<td>426</td>
<td>Giving Microbial Communities a Solar Supercharge: Does the Transition to Photosynthesis in Extreme Environments Drive Taxonomic, Biochemical, and Metabolic Novelty?</td>
<td><em>Raymond J, Alsop E &amp; Kellom M</em></td>
</tr>
<tr>
<td>428</td>
<td>The Distribution of DBT and DBF in Mesoproterozoic (1.36 Ga) Sediments</td>
<td><em>Wang X, Wang H &amp; Zhang S</em></td>
</tr>
<tr>
<td>19k:</td>
<td><strong>Life Below the Seafloor – How Alive and How Important?</strong></td>
<td></td>
</tr>
<tr>
<td>429</td>
<td>Characterization of Metabolically Active Microorganisms in an Hydrothermal Active Field in the Okinawa Trough (IODP Exp. 331)</td>
<td><em>Bloethe M, Breuker A &amp; Schippers A</em></td>
</tr>
<tr>
<td>431</td>
<td>A Global Molecular Ecological Survey of Subseafloor Microbial Communities</td>
<td><em>Hoshino T, Tsutsumi M, Morono Y &amp; Inagaki F</em></td>
</tr>
</tbody>
</table>
Subseafloor Basalts as Fungal Habitats
Ivarsson M & Bengtson S

A Molecular View of the Reductive Dehalogenase-Homologous Gene in Subseafloor Sediments

Hybrid Pressure Coring System of D/V Chikyu
Kubo Y, Mizuguchi Y & Inagaki F

Insights into Potential Metabolisms of the Cosmopolitan Miscellaneous Crenarchaeotal Group (MCG) from Estuarine Sediments Using Metagenomics
Lazar C, Baker B, Dick G, Hinrichs K-U & Teske A

Bacterial Populations (First Record) at Two Shallow Submarine Hydrothermal Vents off West Mexico

Active and Total Microbial Community Structure in Relation to Metal Availability within Subsurface Sediments
Reese B, Zinke L, Mills H & Edwards K

Tectonically Enhanced Deep Subsurface Microbial Carbon Cycling in the Nankai Trough, Japan
Riedinger N, Strasser M & Lyons TW

Intact Polar Lipids and Diagenetic Processes in Sub-Seaﬂoor Sediments in the Black Sea
Schröder J, Aiello I, Goldhammer T, Heuer V, Elvert M, Zabel M & Hinrichs K-U

An Improved Hot-Alkaline DNA Extraction Method for High Cell-Lysis Efficiency of Subseafloor Microbial Communities
Terada T, Morono Y, Hoshino T & Inagaki F

Understanding the Sub-Surface Metabolic Activity and Pathways of Microbial Mediated C/N Cycling in North Pond, Western Flank of Mid-Atlantic Ridge
Wang F, Zhang X & Zhou Y

Cell Alive System (CAS); A New Method of Core Sample Freezing for Shore-Based Biological Analyses and Sample Storage
Xiao N, Morono Y, Terada T, Yamamoto Y, Hihose T & Inagaki F

20d: Innovations in Geochronology: Present Developments and a Vision for 2020

Invited: Performance of Pb Multi Ion Counting Array in Triton Plus TIMS
Amelin Y & Huyskens M

Evaluation of the Lu-Hf-in-Lawsonite Geochronometer
Budde G & Scherer EE
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>446</td>
<td>U-Pb LA-ICP-MS Dating of Common Pb-Bearing Accessory Minerals Using VizualAge/Iolite</td>
<td>Chew D, Petrus J &amp; Kamber B</td>
</tr>
<tr>
<td>447</td>
<td>EARLYTIME: An Initiative to Evaluate and Improve U-Pb and Pb-Pb Dating of Meteorites</td>
<td>Connelly J, Amelin Y, Blackburn T &amp; Condon D</td>
</tr>
<tr>
<td>448</td>
<td>Invited: Noise is Now Signal: Capturing the Relevant from the Distraction</td>
<td>Heizler M</td>
</tr>
<tr>
<td>450</td>
<td>$^{40}\text{Ar}/^{39}\text{Ar}$ Phenocryst-Matrix Isochron Dating on Quaternary Volcanic Rocks</td>
<td>Li W-R, Ji J-Q &amp; Zhou J</td>
</tr>
<tr>
<td>452</td>
<td>Monitoring the $^{40}\text{Ar}^{39}\text{Ar}$ Irradiation Parameter 'J' Without Using Geological Age Standards</td>
<td>Rutte D, Unterricker S, Pfänder J &amp; Jonckheere R</td>
</tr>
<tr>
<td>453</td>
<td>Correction of Initial-Disequilibrium on U-Th-Pb System for Dating of Young Zircons</td>
<td>Sakata S, Hirakawa S, Iwano H, Danhara T &amp; Hirata T</td>
</tr>
<tr>
<td>454</td>
<td>Thermochronological Investigation of Seismogenic Fault Zones: An Overview and Examples from Japanese Islands</td>
<td>Tagami T</td>
</tr>
<tr>
<td>455</td>
<td>The U-Pb in Speleothem Chronometer: Current Progress and Future Prospects</td>
<td>Woodhead J &amp; Pickering R</td>
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<td>456</td>
<td>From Zircon Date to Process Rate: Interpreting Zircon U-Pb Dates in Igneous Petrology and Stratigraphy</td>
<td>Wotzlaw J-F &amp; Schaltegger U</td>
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<td>457</td>
<td>A Novel $^{190}\text{Pt}^{-4}\text{He}$ Method of Isotope Geochronology for the Direct Dating of Native Minerals of Platinum</td>
<td>Shukolyukov Y, Yakubovich O, Mochalov A &amp; Kotov A</td>
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<td>458</td>
<td>Exposed Pleistocene Kurobegawa Granite (0.8 Ma): LA-ICP-MS and SHRIMP Analysis</td>
<td>Yamada R, Ito H, Tamura A, Arai S, Horie K &amp; Hokada T</td>
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<tr>
<td>459</td>
<td>Intermethod Comparison for K-Ar Dating of Clay Gouge</td>
<td>Yamasaki S, Zwingmann H &amp; Tagami T</td>
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<td>460</td>
<td>Clay Mineral Argon Release during Frictional Shear Experiments – Implications for Brittle Fault Dating</td>
<td>Zwingmann H, Den Hartog S &amp; Todd A</td>
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<td>(Session 20d continues on Tuesday 27th AM on p.132)</td>
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<td><strong>22h: Recent Advances in Imaging Minerals and Rocks: Geochemical Processes at the Nanoscale</strong></td>
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<tr>
<td>461</td>
<td>Molybdenum Speciation and Distribution in Ancient Euxinic Shales by μXRF and μXANES Spectroscopy</td>
<td>Chappaz A, Fitts JP &amp; Dahl TW</td>
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<tr>
<td>463</td>
<td>Orientation-Dependent REE$^{3+}$ Luminescence: A Possible Artifact in Luminescence Imaging</td>
<td>Lenz C, Reissner C, Talla D &amp; Nasdala L</td>
</tr>
<tr>
<td>466</td>
<td>The Influence the Stoichiometry of Arsenopyrite on the Impurity Density</td>
<td>Onufrienok V, Sazonov A &amp; Nikiforov A</td>
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<tr>
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<td><strong>22i: Decoding Mechanisms, Rates and Timescales of Transport Processes in the Earth by Mineralogy and Geochemistry</strong></td>
<td></td>
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<td>468</td>
<td>The Behaviour of Submicron Inclusions during Host Deformation</td>
<td>Griffiths TA, Habler G, Abart R &amp; Rhede D</td>
</tr>
<tr>
<td>469</td>
<td>Grain Boundaries and Transient Porosity as Fluid Pathways for Reaction Front Propagation</td>
<td>Jonas L, John T, King H, Geisler T &amp; Putnis A</td>
</tr>
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<td>470</td>
<td>Mineralogical and Geochemical Zoning at High-Temperature Contacts as a Function of CO₂ Pressure: An Example from Romanian Skarns</td>
<td><em>Marincea S, Dumitras D-G, Anason AM, Ghinet C &amp; Iancu AM</em></td>
</tr>
<tr>
<td>471</td>
<td>Unraveling Cooling Histories Using Fe-Mg Zoning of Exsolution Lamellae in a Garnet Pyroxenite from the Granulitegirbe, Saxony, Germany</td>
<td><em>Mueller T, Massonne H-J &amp; Willner A</em></td>
</tr>
<tr>
<td>472</td>
<td>Chromium Mobility in Tuscan Serpentinite Bodies: Inferences from Rodingitization and Carbonation</td>
<td><em>Natali C, Boschi C, Baneschi I, Dini A &amp; Chiarantini L</em></td>
</tr>
<tr>
<td>473</td>
<td>Modeling Fluid Migration in Deep Crust with Modeled Permeability Based on Wettability and Energy Consideration</td>
<td><em>Ohta J &amp; Tokunaga T</em></td>
</tr>
<tr>
<td>474</td>
<td>Composition-Dependent Anisotropic Interdiffusion Tensor Obtained from Cation Exchange between Alkali Feldspar and NaCl-Kcl Salt Melt</td>
<td><em>Petrishcheva E, Abart R &amp; Schaeffer A-K</em></td>
</tr>
<tr>
<td>475</td>
<td>New Data on Anisotropy and Composition Dependence of Na/K-Interdiffusion in Alkali Feldspar</td>
<td><em>Schaeffer A-K, Petrishcheva E, Habler G, Abart R &amp; Rhede D</em></td>
</tr>
<tr>
<td>476</td>
<td>Non-Linear Rates of Fluid-Mineral Reaction in Metamorphic Fluid Flow</td>
<td><em>Zhao Z &amp; Skelton A</em></td>
</tr>
<tr>
<td>477</td>
<td>Characterization of CaCO₃ Poly-Morphs Grown in Silica Hydrogel in the Presence SO₄²⁻ or CrO₄²⁻ by XAS</td>
<td><em>Astilleros JM, Göttlicher J, Sánchez-Pastor N, Steiniger R &amp; Fernández-Diaz ML</em></td>
</tr>
<tr>
<td>478</td>
<td>The Effect of 1, 10-Phenanthroline on the Oxidative Dissolution of Iron Monosulfide (FeS)</td>
<td><em>Badica C &amp; Chirita P</em></td>
</tr>
<tr>
<td>479</td>
<td>U Behaviour Under Acid Mine Drainage Conditions: Preliminary Results from an Experimental Approach in Río Tinto Area (Spain)</td>
<td><em>Barbero L, Ketterer M, Baskaran M, Hierro A, Bolivar JP &amp; Casas-Ruiz M</em></td>
</tr>
<tr>
<td>480</td>
<td>Delineation of Groundwater Zones Using Weighted Overlay Analysis of Hydrochemical and Multiple Isotopic Data, Ulaanbaatar, Mongolia</td>
<td><em>Batsaikhan B, Yun S-T, Kim K-H, Mayer B &amp; Kim S-T</em></td>
</tr>
<tr>
<td>481</td>
<td>Fluoride in Groundwaters of Regolith and Bedrock (0-900 Meters Depth) in a Granitoidic Setting, SE Sweden</td>
<td><em>Berger T, Mathurin F, Drake H &amp; Åström M</em></td>
</tr>
</tbody>
</table>

24d: Low Temperature Geochemistry
482  Luminescence of Products of Hypergenesis Ore Deposits  
   Boroznovskaya NN, Zyr'yanova L, Nebera T & Pavlovskaya A

483  Heavy Metals of the Santiago Island (Cape Verde) Topsoils  
   Cabral Pinto M, Ferreira da Silva E, Vinha Silva MM & Sousa Brito J

484  The Effect of Zinc, Nickel and Cobalt on Fluoride Removal by Low Cost Materials: Zeolite and Calcite  
   Cai Q, Turner B, Sheng D, Krabbenhoft K & Sloan S

485  Electrochemical Investigation of Iron Monosulfide Oxidation by Hydrogen Peroxide  
   Chirita P, Constantin C & Schlegel M

486  The Effect of Some New Organic Inhibitors on the Oxidative Dissolution of Iron Monosulfide (FeS)  
   Constantin C, Chirita P, Badica C, Birsa L, Matei E, Baltog I & Schlegel M

487  KINETIC14: A PHREEQC Compatible Mineral Kinetic Database  
   Declercq J & Oelkers E

488  Geochemistry Surveying of Kooh Kaftari Metamorphism Area (Iran_ Shahrood )  
   Divan Y, Hassannezhad AA & Zahiri R

489  Hydrochemical and Isotopic Study of CO₂ Rich Groundwater in the Gyeongsang Sedimentary Basin, South Korea  
   Do H-K, Yun S-T, Kim K-H & Mayer B

490  Rate Dependence of $^{44}$Ca/$^{40}$Ca Fractionation during Inorganic Aragonite Precipitation from Seawater  

491  Thermodynamics of Hydration of MX80 Smectite Derived from Hydration Isotherms  

492  Evidence for Elevated Iron Flux to the Early Phanerozoic Ocean  
   Gaines R, Havranek R, Metcalfe K & Peters S

493  Pre-Seismic Hydro-Chemical Anomalies in Water of Well Liaogu-1 in Shandong Province, China  
   Gen J

494  Establishing the Magnesium Isotope ($^{26}$Mg) Signature of Early and Late Diagenetic Dolomite Types  
   Geske A, Goldstein R, Richter D, Buhl D, Kluge T, John C & Immenhauser A

495  Experimental Determination of Chlorine Isotope Fractionation in Cl₂ versus Cl⁻ and ClOH vs Cl⁻  
   Giunta T, Labidi J & Eggenkamp HGM
496 The pH of the Dead Sea Brine: Calibrating the Combination Electrode Measurements
*Golan R, Gavrieli I, Lazar B & Ganor J*

497 Linkage between Gold Mineralization and Hydrocarbon Accumulation in the Youjiang Basin, South China: Petrographic Evidence
*Gu XX, Zhang YM, Wu CY, Li BH, Dong SY & Xue CJ*

498 Model-Predicted and Satellite-Retrieved Tropospheric NO₂ Columns over East Asia
*Han KM, Song CH & Lee S*

499 Abnormal K-Feldspars from the Lower Cambrian Hetang Formation in the Lower Yangtze Area: Implications for Hydrothermal Activities
*Chang C, Hu W & Wang X*

500 Hydrogeochemical and Isotopic Signatures of Carboneras-Palomares Fault Area Aquifers (SE Spain)
*Hernandez-Puentes P, Jimenez-Espinosa R & Jimenez-Millan J*

501 Clay-Rich Sediments Injected into Clastic Dykes during Earthquakes in the Galera Fault Zone (Guadix-Baza Basin, Central Betic Cordillera)
*Sanchez-Roa C, Jimenez-Millan J, Nieto F, Garcia-Tortosa FJ, Abad I & Jimenez-Espinosa R*

502 Geologic Control of Groundwater Contamination in a Basaltic Aquifer beneath an Agricultural Field, South Korea
*Jung H-W, Yun S-T, Kim K-H, Oh S-S & Kang K-G*

503 Mineralogy and Origin of Uranium Deposits from Central Jordan
*Khoury H*

504 Can Radioactive Cesium be Used as a Hydrological Tracer for Crater Lake Study?
*Kikawada Y, Okawa A, Nakamachi K, Honda T, Oi T & Hirose K*

505 Interpretation of Hydrochemistry Data Using Bayesian Statistical Approaches to Delineate Groundwater Contamination Vulnerability

506 Ship-Plume Sulfur Chemistry: ITCT 2K2 Case Study
*Kim HS, Kim YH & Song CH*

507 Geochemistry of Organic Matter from Triassic U-Bearing Sandstones of Peribaltic Synclise (N Poland)
*Klimuszko E, Wołkowicz S & Miecznik J*

508 Geochemistry of Uranium in Lakes of West Mongolia
*Kolpakova M*
Provenance and Metamorphic Conditions of Very Low-Grade Metasedimentary Rocks of the Variscan Accretionary Prism of the Kaczawa Mts. (SW Poland): Geochemical and Mineralogical Evidence

Kostylew J, Kryza R & Zalasiewicz J

Hydrogeochemical Characterization of Urban Groundwater in Seoul (South Korea) Using Self-Organizing-Map Technique

Lee K-J, Kim K-H & Yun S-T

Organic Biomarkers in Sediment from Admiralty Bay, Antarctica

Leonel J, Araújo L & Bícego M

Alunite-Turquoise Occurrence from Ali-Abad Porphyry Copper Deposit, Central Iran

Mackizadeh MA, Taghipour B & Gorji L

Hematite Scalenohedra – Ancient Jewelry and a Problem of Sedimentary Mineralogy

Makovicky E, Parisatto M & Højlund F

Early Diagenetic Quartz Formation at a Deep Iron Oxidation Front in the Eastern Equatorial Pacific


Hydrothermal Magnetite from the Grasberg Porphyry and Ertsberg East Skarn Cu-Au Deposits

Nadoll P, Walshe J, French D & Leys C

The Study on the Solubility of the Vanadium System Focused on Panzhīhua, China

Peng Y, Zeng Y, Li JJ, Feng S & Yu XD

Assessment of a Gold Absorbing Resin in Natural Groundwaters for Mineral Exploration

Reid N, Gray D & Lucas A

Buried Lava Paleosol in NW Fogo Island (Cape Verde) – Chemical and Mineralogical Evolution


Hg Isotope Fractionation Among Atmospheric Mercury Species Above a Coastal Suburban Environment (Pensacola, Florida, USA)

Perrot V, Eller V, Landing W & Salters V

Experimental Modeling of Silicates Phosphatization in the Hypergenesis Zone

Savenko A

Carbon Stable Isotope Composition in Modern Snail Shell Aragonite and It’s Climatic Significance

Sheng X, Zhu L & Liu L
A Review of Radionuclides Impact in South Sinai, Egypt: Case Study of Sharm El Sheikh Area
Sherif MI, Ghoneim MF, Heikal MTS, El Dousky BT & El Galy MM

Composition of Serpentine after Olivine and Orthopyroxene: Serpentinitized Peridotites of Nain Ophiolite (Isfahan Province, Iran)
Shirdashtzadeh N, Torabi G & Samadi R

Study of the Granitoid Rocks in Shear Zone (SE-Qorveh, Kurdistan, Iran): with Emphasis on Geochemical Behavior of Whole-Rock and Mineral Chemistry of Biotite and Feldspar
Torkian A & Rezaie M

Non-Complexing Anions for Raman Microprobes Under Hydrothermal Conditions
Tremaine P, Applegarth L, Alcorn C & Bissonette K

Cokriging Estimation of Soil Heavy-Metal Data Obtained from Portable X-Ray Fluorescence Spectrometry

Historical Trends of Heavy Metal Pollution Recorded in Sediments from Lake Qinghai, China
Xu W, Shi Z-M, Ni S-J & Gao Y

Analysis of the Turquoise Color Alteration Based on the FTIR Studies
Divan Y, Zahiri R & Hassnnezhad A

The Isothermal Evaporation Phase Equilibria for Salt – Water System Focused on Zabuye Salt Lake

Iron and Sulfur Speciation of Sliding Mud from Xieliupo Landslide in South Gansu Province, NW China
Zheng G, Liang S & Zhang N

Mineral Characteristics of Tungsten-Bearing Granite In The Jiangnan Orogenic Belt: A Case Study of The Qingyang Pluton
Zhou J

(Session 24d continues on Tuesday 27th AM on p.135)
Goldschmidt 2013

Summary and Highlights

Tuesday 27th August, 2013

Timetable:

09:00 - 12:00 Oral Sessions
12:00 - 13:15 Lunch
13:15 - 14:15 Plenary
14:30 - 17:30 Oral Sessions
17:30 - 20:00 Poster Sessions

Highlights:

13:15 (AUD) Francis Albarède (Plenary Lecture)
16:45 (L06) Yusuke Nakagawa / Yoshiki Sohrin (Geochemical Journal Award)

Other Events:

12:30 (L08) BOGLS Community Forum
18:30 (SCH) EAG General Assembly
18:30 (L08) SIMP General Assembly
20:00 (BAS) Thermo Scientific User Meeting
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<tr>
<th>Time</th>
<th>Authors</th>
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<tr>
<td>09:00</td>
<td>Chorover, Shikazono, Ewing, Wang, Sánchez-Castro, Feln, Borch, Schmidt, Weyburns, Casauberta, Donnadieu, Klimont, Guo, Raveggí, Xu, Lecumberri-Sánchez, Popova, Xie, Qu, Ozturk</td>
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Tuesday AM Overview
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<thead>
<tr>
<th>Time</th>
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<th>Authors</th>
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<tbody>
<tr>
<td>09:00</td>
<td>The Effect of Nuclear Radiation on the Structure of Zircon</td>
<td>Ewing R</td>
</tr>
<tr>
<td>09:15</td>
<td>Estimate of Residence Time of Groundwater in Mt Fuji Area, Central Japan</td>
<td>Shikazono N, Umemura T &amp; Arakawa T</td>
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<td>09:30</td>
<td>Transport in Active Margins: Comparison of Results from $^{129}$I and $^{10}$Be Studies</td>
<td>Fehn U</td>
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<td>09:45</td>
<td>Partitioning of Sulfur between Silicate Melts and Volatile Phases as Function of fO$_2$: Clues from Old Models for a New Reference Framework</td>
<td>Jugo P</td>
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<td>10:00</td>
<td>The Effect of Silicate Melt Composition on the Volatile/Melt Partitioning of Oxidized Sulfur</td>
<td>Zajacz Z</td>
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<td>10:15</td>
<td>Magmas, Solutions and Metals</td>
<td>Bell A, Simon A, Tanis E &amp; Bilenker L</td>
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<td>11:00</td>
<td>Carbon Isotope Biosignatures: A Surface-Deep Earth Abiotic Connection</td>
<td>Horita J</td>
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<td>11:15</td>
<td>Reduced Gas Flux from Precambrian Cratons – Implications for Subsurface Microbiology</td>
<td>Sherwood Lollar B, Holland G, Li L, Lacrampe-Couloume G, Slater GF, Onstott TC &amp; Ballentine C</td>
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<td>11:30</td>
<td>The Biological Control on the Atmospheric pCO$_2$ Level Through Geologic Time</td>
<td>Ohmoto H &amp; Lasaga A</td>
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<td>11:45</td>
<td>Co-evolution of the Ocean-Atmosphere-Sediment System Through Phanerozoic Time</td>
<td>Mackenzie F, Arvidson R &amp; Guidry M</td>
</tr>
</tbody>
</table>
02a: Refractory Grains, Volatiles, and Organic Molecules Inherited from the Interstellar Medium

Session chaired by Lydie Bonal, Shogo Tachibana & Henner Busemann

09:00 Invited: The Ortho-Para Ratio of H$_2$O Desorbed from Ice: Implications for Cometary Coma
   Hama T, Kouchi A & Watanabe N

09:15 Highly Variable $^{15}$N-Enrichments in Solar System Reflect Different Routes of Interstellar N Isotopic Fractionation
   Bonal L, Hily-Blant P, Faure A & Quirico E

09:30 The Link between the Origin of Organic Matter and GEMS in Extraterrestrial Materials
   Alexander C, Nittler L & Stroud R

09:45 Ordering of Isotope Composition for H, N and O between Planets
   Yurimoto H

10:00 Invited: Origin of Refractory Organics in Chondrites: An Experimental Study
   Kuga M, Marty B & Marrocchi Y

10:15 Multi-Wavelength Raman Survey of IOM from Primitive Meteorites

10:30 Different D-Rich Organic Reservoirs in Unequilibrated Ordinary and Carbonaceous Chondrites
   Remusat L, Bernard S, Piani L, Bonnet J-Y & Quirico E

10:45 Lack of Isotopic Exchange between Organics and Clays in Semarkona Chondrite: Submicrometer Scale Heterogeneity of the D/H Ratio
   Piani L, Robert F & Remusat L

(Session 02a continues on Tuesday 27th Posters on p.167)

Session 02c follows this session in this room: see p.110.
02c: Planet Formation and Bombardment

Session chaired by Nancy Chabot & Bill Bottke

11:00 High Velocity Collisions Recorded in Asteroidal Meteorites: New Ways to Constrain Planet Formation
Bottke W & Marchi S

11:15 Chemical and Hf/W Isotopic Consequences of Lossy Accretion
Dwyer C, Nimmo F & Chambers J

11:30 An Isotopically Homogeneous Inner Terrestrial Planet Region
Jacobsen S, Petaev M, Huang S & Sasselov D

11:45 Water on the Primordial Earth
Mojzsis S, Morbidelli A, Pahlevan K & Frank E

(Session 02c continues on Tuesday 27th PM on p.139)
04b: Earth’s Heat: Where, Why, Whence, and How Much?

Session chaired by George Helffrich

09:00 **Keynote:** Core Cooling and Lower Mantle Crystallisation in the Thermal Evolution of the Earth  
*Labrosse S*

09:15 **Invited:** The Energy Budget of the Mantle  
*Mareschal J-C, Jaupart C, Labrosse S & Lucazeau F*

09:30 **Invited:** Thermal History Energy Balance Compared with Convection Modeling  
*King S*

09:45 **Invited:** Anisotropy: A Cause of Heat Flux Variation at the CMB?  
*Walker A, Ammann M, Stackhouse S, Wookey J, Brodholt J & Dobson D*

10:00 First-Principles Calculations of the Lattice Thermal Conductivity of the Lower Mantle  
*Stackhouse S, Stixrude L & Karki B*

*Session 04c follows this session in this room: see p.112*
### 04c: Melts and Melting in the Basal Mantle

**Session chaired by Guillaume Caro & Mike Walter**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>10:15</td>
<td><strong>Keynote:</strong> Petrological Evidence for Lower Mantle Melting</td>
<td><em>Herzberg C</em></td>
</tr>
<tr>
<td>10:45</td>
<td>Low Core-Mantle Boundary Temperature Inferred from the Solidus of Pyrolite</td>
<td><em>Nomura R, Hirose K, Uesugi K, Ohishi Y &amp; Tsuchiyama A</em></td>
</tr>
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<td>11:00</td>
<td>Spin Transition of Iron in Amorphous Mg-Silicates at Mantle-Related Pressures</td>
<td><em>Shim S-H, Gu C, Catali K, Grocholski B, Gao L, Alp E, Chow P, Xiao Y, Cynn H &amp; Evans W</em></td>
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<td>11:15</td>
<td>Melting of FeO-SiO$_2$ System at High Pressure and the Fate of Subducted Banded Iron Formations</td>
<td><em>Kato C, Nomura R &amp; Hirose K</em></td>
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<td>11:30</td>
<td>Electrical Conductivity of Partially Molten CI-Chondritic Mantle at High Pressures</td>
<td><em>Pesce G, Manthilake G &amp; Andrault D</em></td>
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<td>11:45</td>
<td><strong>Invited:</strong> Modes of Formation of the Basal Magma Ocean</td>
<td><em>Labrosse S, Hernlund J &amp; Coltice N</em></td>
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05a: Building the Oceanic Lithosphere: From Mantle Melting to Magma Chambers

Session chaired by Elisabetta Rampone, Marguerite Godard, Richard Katz & Riccardo Tribuzio

09:00  **Keynote:** Global Abyssal Peridotite Constraints on the Upper Mantle  
*Warren J*

09:30  Evidence for Melt Accumulation in the Subridge Melting Region: A Mantle Residua Perspective  
*Brunelli D, Seyler M & Paganelli E*

09:45  Focused Mantle Melting  
*Dick H & Zhou H*

10:00  Geochemistry of Spinel-Hosted Amphibole Inclusions in Abyssal Peridotite: Embedded Evidence for Melt-Peridotite Reaction Process?  
*Tamura A, Morishita T, Arai S & Ishimaru S*

10:15  Evolution of Basaltic Melt during Mantle Refertilisation at Shallow Depths of Spreading Ridges, Through Experimental Studies of Liquid Compositions in Equilibrium with Plagioclase + Spinell Lherzolite at Low Pressures (0.75 and 0.5 GPa)  
*Chalot-Prat F, Fallon T, Green D & Hibberson W*

10:30  Re-Os-pge Constraints on the Evolution of Backarc Oceanic Mantle  
*Nelson W, Snow J, Brandon A, Ohara Y & Lee C-T*

10:45  Diversity of Melts Migration Process within the Uppermost Mantle along a Mid-Ocean Ridge: An Example from the Northern Oman Ophiolite  
*Akizawa N, Arai S, Tamura A & Ozawa K*

11:00  The Composition of the Lower Crust of the Oman Ophiolite  
*VanTongeren JA & Kelemen PB*

11:15  Mantle-Crust Interactions in the Oceanic Lithosphere: Constraints from Minor and Trace Elements in Olivine  
*Sanfilippo A, Tribuzio R & Tiepolo M*

11:30  Melt-Rock Reaction in Oceanic Troctolites (Ligurian Ophiolites, Italy) as Revealed by Trace Element Chemistry of Olivine  
*Rampone E, Borghini G, Crispini L, Godard M, Ildefonse B & Fumagalli P*

11:45  Geochemistry of Fast-Spreading Lower Crust: Results from IODP Expedition 345 at the Hess Deep Rift  

(Session 05a continues on Tuesday 27th PM on p.142)
06f: Continental Magmatic Pipeline: From Crustal Roots to the Surface

Session chaired by Kari Cooper, Jonathan Miller & Josef Dufek

09:00 A-Type Granites of Prydz Bay, Antarctica: Products of Melting of a Two-Component Granulite Crust? 
Grew E, Maas R, Christy A, Carson C, Yates M & Boger S

09:15 Mesoproterozoic and Paleoproterozoic Igneous Crust of Central East Antarctica: Age and Origins Revealed from Glacial Clasts 
Goode J, Fanning M, Vervoort J & Fisher C

09:30 U-Pb Zircon Ages from Granites in the Iapetus Suture Zone in Ireland and the Isle of Man 
Fritschle T, Daly JS, Whitehouse MJ & McConnell B

09:45 Initiation and 35 Myr Duration of S-Type Granitic Magmatism in an Accretionary Orogen 
McKibbin S, Landenberger B, Collins B & Fanning M

10:00 Pyroxene Megacrysts in Anorthosites: Revealing Continental Crust-Forming Processes at Moho Depths 
Bybee G, Ashwal L & Shirey S

10:15 Invited: Plutons are Texturally Modified Primary Igneous Liquids, not Cumulates 
Coleman D, Frazer R, Mills R, Glazner A & Bartley J

10:30 A Role for Liquid Immiscibility in Granites and Granodiorites 
Glazner A & Bartley J

10:45 The Halogen (F, Cl, Br) Budget of Continental Granitoid Plutonic Rocks 
Teiber H, Marks M, Wenzel T, Siebel W, Altherr R & Markl G

11:00 The H2O-CO2-(K, Na)Cl Fluids, Melting of the Tonalite Gneiss, and the A-Type Granitic Magmas: Experimental Evidence for Connection 
Safonov O

11:15 A Statistical Approach to the Volcanic – Plutonic Connection 
Keller B, Schoene B, Samperton K, Barboni M, Gronewold J & Husson J

11:30 Keynote: Hot/Cold, Wet/Dry, Big/Small, Erupt/Stall, Juvenile/Anatectic? – Multiple Personalities of Felsic Magmatism 

(Session 06f continues on Tuesday 27th PM on p.143)
07b: Redox Processes in the Subducted Slab, Mantle and Crust

Session chaired by Stefano Poli, Robert Luth & Liz Cottrell

09:00 Keynote: Redox Processes in the Earth’s Mantle
Rohrbach A

09:30 The Stability of Carbonate Melt in Eclogite Rocks with Respect to Oxygen Fugacity
Frost D, Stagno V, McCammon C & Fei Y

09:45 The Relationship between $fO_2$ and Calc-Alkaline Affinity of Arc Magmas
Kelley K, Cottrell E & Brounce M

10:00 Global Variation in Fe-Isotopic Composition of Arc Basalts Indicate a Varibly Oxidised and Metasomatised Mantle Wedge Source?
Foden J, Sossi P & Halverson G

10:15 The Role of Crustal Assimilation on the Oxidation State of Arc Magmas
Grocke S, Cottrell E, de Silva S, Andrews B & Kelley K

10:30 Evaluating Proxies for Oxygen Fugacity at the Mariana Arc
Brounce M, Kelley K & Cottrell E

10:45 The Oxidation States of Cerium and Europium in Silicate Melts as a Function of Oxygen Fugacity, Composition and Temperature
Berry AJ, Burnham AD, Halse HR, Cibin G & Mosselmans JFW

11:00 Invited: Sources of Sulfur and Sulfur Preservation in Subducted Rocks: An in situ Sulfur Isotope Study
Evans K, Tomkins A & Cliff J

11:15 Iron Oxidation State in Serpentine during Subduction: Implications on the Nature of the Released Fluids at Depth
Debret B, Andreani M, Munoz M, Bolfan-Casanova N, Julie C, Nicollet C & Schwartz S

11:30 Oxygen Fugacity vs. Mineralogical Control on Transition Metal (Fe, Cr, V) Stable Isotope Compositions of Mariana Forearc Peridotites
Prytulak J, Bonnard P & Parkinson I

11:45 Fluid-Induced Redox Processes at the Slab-Mantle Interface: Insights from Ultrahigh-Pressure Garnet Peridotites
Malaspina N, Langenhorst F & Poli S

(Session 07b continues on Tuesday 27th Posters on p.172)
10a: Geochemical Processes at Mineral-Water Interfaces: Insight from Macroscopic, Spectroscopic, and Computational Methods

Session chaired by Jeffrey Catalano, Jean-François Boily, Christian Mikutta, Sebastien Kerisit & Jordi Cama

09:00 Interaction of Eu(III) with Calcium Carbonate: Spectroscopic Characterization

09:15 Competitive Effect of Al(III) on Eu(III) Sorption to Illite

09:30 Invited: Spectroscopic Studies of Radionuclide Adsorption and Diffusion

09:45 The Influence of Perchlorate (ClO$_4^-$) on the Sorption Behavior of Th(IV) on the Muscovite (001) Basal Plane
Schmidt M, Lee SS, Wilson R, Knope K, Fenter P & Soderholm L

10:00 Sorption and Desorption Processes of U(VI) on Iron (Hydr) oxide Phases
Foerstendorf H, Heim K & Jordan N

10:15 Effects of Aqueous Phosphate on U(VI) Sorption
Maillot F, Mehta V, Catalano J, Giammar D & Wang Z

10:30 Invited: Actinide Redox Processes on Iron Sulfides: An Electrochemical, Microscopic, and Computational Approach
Becker U, Yuan K & Renock D

10:45 Reduction of Aqueous U(VI) by Fe(II): Effect of Ti(IV) on the Speciation of U(IV)
Latta D, Pearce C, Rosko K, O’Loughlin E, Kemner K & Boyanov M

11:00 Invited: Reaction Mechanisms, Pathways, and Transport in Anaerobic Abiotic and Microbial U(IV)-Oxide Dissolution Studies
O’Day P, Asta M, Kanematsu M, Steefel C & Beller H

11:15 Oxidative Corrosion of Uraninite (UO$_2$) Surfaces
11:30  Characterisation of Depleted Uranium Munitions Residues by Synchrotron X-Ray Microanalysis  
**Crean D, Livens F, Stennett M, Grolimund D, Borca C & Hyatt N**  

11:45  The Disposal of Spent Nuclear Fuel: The Effect of High Energy Surface Sites on Dissolution Rate  
**Corkhill C, Bailey D, Thornber S, Stennett M & Hyatt N**  

(Session 10a continues on Tuesday 27th PM on p.146)

Session chaired by Patricia Maurice & Frank von der Kammer

09:00 Attachment of Aspartic Acid at the Brucite [Mg(OH)_2]-Water Interface

*Estrada C, Sverjensky D & Hazen R*

09:15 Adsorption and Surface Complexation Study of Nucleotides on Aluminum Oxide Surfaces

*Feuillie C, Sverjensky D & Hazen R*

09:30 Adsorption of Natural Organic Matter at the Water/Gibbsite Interface

*Andersson K, Kenney J, Persson P & Karlsson T*

09:45 Invited: Amino Acid Binding on Oxide Surfaces: Results from CTR and Surface X-Ray Anomalous Scattering

*Waychunas G, Stubbs J & Eng P*

10:00 Cooperative and Competitive Adsorption of Amino Acids with Ca^{2+} on Rutile

*Lee N, Sverjensky D & Hazen R*

10:15 Plutonium Immobilization and Re-mobilization by Soil Mineral-Organic Matter Matrix Compounds in the Far-Field of the Savannah River Site (SRS), USA

*Xu C, Athon M, Ho Y-F, Schwehr KA, Kaplan DI, Roberts KA, Dinato N, Hatcher PG & Santschi PH*

10:30 Colloid-Associated Iron and Arsenic Transport in Streams

*Neubauer E, von der Kammer F, Knorr K-H, Peiffer S, Reichert M, Köhler SJ, Laudon H & Hofmann T*

10:45 Bioavailability of Metals Associated with Aquatic Natural Organic Matter

*Maurice P, Kuhn K, Neubauer L, Hofmann T & von der Kammer F*

11:00 Impact of Organic Acids and Siderophores on Dissolution of Basaltic Glasses in Ultrapure Water at 25°C and pH 6.3

*Perez A, Rossano S, Trcera N, Huguenot D, Van Hullebusch E, Verney-Caron A & Sarrasin L*


*Reiller P, Janot N & Benedetti M*

11:30 Invited: The Role of Natural Organic Matter in Membrane Perturbation: A Model Biomembrane System Approach

*Cook R & Ojwang’ L*
11:45  **Invited:** Interactions between As(V), Fe(III) and Natural Organic Matter

*Sundman A, Karlsson T & Persson P*

*(Session 10i continues on Tuesday 27th Posters on p.175)*
11g: Mt. Etna from Source to Surface: Deciphering How a Complex Basaltic Magma Storage and Transport System Works

Session chaired by Marco Viccaro, Wendy Bohrson, Antonio Paonita & Giuseppe Puglisi

09:00  Keynote: Mount Etna: Storyboard of an Exceptional Basaltic Volcano
       Allard P

09:30  A Two-Component Mantle Below Mt Etna Volcano: Evidences from Noble Gas and Trace Element Geochemistry of Primitive Products

09:45  Changes of Magma Geochemistry at Mt. Etna during the Last 45ka due to Sampling of a Variegated Mantle
       Nicotra E, Viccaro M, Cristofolini R & Conticelli S

10:00  A Lithospheric Mantle Source for Etna Magmatism
       Young HP, Wang Z & Brandon M

10:15  Characterizing Magma Migration Dynamics beneath Mt. Etna Using Combined Kinetic and Thermodynamic (MELTS) Modelling
       Kahl M, Chakraborty S, Costa F & Pompilio M

10:30  Magma Dynamics at Etna Before the 122BC Plinian Eruption: Constraints from Plagioclase Zoning Profiles
       Pompilio M & Del Carlo P

10:45  The Summit Activity at Mt. Etna from 1995 to 2001: A Multidisciplinary Approach to Investigate the Long-Term Processes of the Magmatic Plumbing System
       Carbone D, Corsaro RA, Guglielmino F & Puglisi G

11:00  Magma Dynamics at Mount Etna (Italy) Inferred from Geochemistry of Gas Emissions
       Caracausi A, Martelli M, Paonita A & Rizzo AL

11:15  Processed Controlling Recent Lava Fountaining Activity on Mt. Etna, Revealed Using Remote Sensing Measurements of Volcanic Gases
       La Spina A, Salerno G & Burton M

11:30  Reconciling Ground Deformation and Degassing Activity at Mt. Etna
       Burton M, Allard P & Puglisi G

11:45  Sulfur and Chlorine Isotopes in Volcanic Products at Mt. Etna, Italy
       Liotta M, Rizzo AL, Paonita A, Barnes JD, Caracausi A, Corsaro R & Martelli M

(Session 11g continues on Tuesday 27th Posters on p.178)
13b: Metal Sources, Transport, Concentration, Precipitation and Timing of Ore-Forming Processes

Session chaired by Holly Stein, Marc Poujol & Gleb Pokrovski

09:00 **Keynote:** Alteration and Fluid Flow in Large Continental Hydrothermal Systems
Larson P

09:30 Magma Emplacement and Sulfide Deposition after Skarn Formation at Campiglia Marittima, Tuscany
Vezzoni S, Dini A & Rocchi S

09:45 Geologic Evolution of the Cerro Quema Au-Cu Deposit, Azuero Peninsula (Panama)
Corral I, Corbella M, Canals À, Gómez-Gras D, Navarro-Ciurana D & Cardellach E

10:00 Multi-Stage Gold Mineralization at the Hollinger-McIntyre Deposit: A LA-ICPMS Mapping Study
Gao J-F, Jackson S & Dube B

10:15 Isotopic Evidence for a Crustal Pb Source in the Giant Broken Hill Pb-Zn-Ag Deposit, NSW, Australia
Raveggi M, Giles D, Foden J, Meffre S, Raetz M & Nicholls I

10:30 Relationships between Porphyry Cu–Mo Mineralization in the Jinshajiang–Red River Metallogenic Belt and Tectonic Activity: Constraints from Zircon U–Pb and Molybdenite Re–Os Geochronology
Xu L

10:45 Genetic Relationship between Ag-(Pb-Zn) Mineralization and W-Specific Mesozoic Magmatism in the Nanling Belt (China) Based on Data from the Wutong Deposit
Lecumberri-Sanchez P, Romer RL, Lüders V & Bodnar RJ

11:00 Estimates of REE Distribution in the Hydrothermal Ore Forming Fluid of the Iul”Tin and Svetloe Deposits
Popova J, Bychkov A, Matveeva S & Sushchevskaia T

11:15 Skarn Cu-Fe-Au Deposits in the East Hubei Ore Cluster, Middle–Lower Yangtze River Metallogenic Belt
Xie G, Zhu Q & Li W

11:30 Geology and Geochemistry of the Fenghuangshan Skarn Cu Deposit at Tongling Area, Anhui Province, East China
Qu HY, Pei RF, Fei HC, Li JW, Wang YL & Wang HL

11:45 Heavy and Precious Metal Prospecting Using with Geophysical Methods in The Ophiolitic Rocks Exposed Bozkır (Konya-Turkiye) and Hatıp-Çayırbağı Regions
Ozturk A & Baykal A

(Session 13b continues on Tuesday 27th PM on p.149)
## 14e: Linking Ice Core Records of the Recent Past to Global Climate

**Session chaired by Sarah M Aciego & Paolo Gabrielli**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>11:00</td>
<td><strong>Keynote:</strong> CF$_4$ and CO$_2$ – Coupling Weathering and Carbon Cycle</td>
<td>Schmitt J, Seth B, Köhler P, Willenbring J &amp; Fischer H</td>
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<td>11:15</td>
<td>Characteristics of the Eemian from the Greenland Ice Sheet at GISP2</td>
<td>Yau A</td>
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<td>11:30</td>
<td>Radiometric $^{81}$Kr Dating Reveals 120, 000 Year Old Ice at Taylor Glacier, Antarctica</td>
<td>Buizert C, Baggenstos D, Jiang W, Purtschert R, Petrenko V, Brook E, Lu Z-T, Mueller P &amp; Severinghaus J</td>
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<td>11:45</td>
<td>Stable Isotopic Record of a Himalayan Ice Core during the Last Millennium</td>
<td>Hou S</td>
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*(Session 14e continues on Tuesday 27th Posters on p.183)*
14h: Geological Regulation, Feedbacks and Records of CO$_2$

Session chaired by Joshua West, Appy Sluijs & Andy Ridgwell

09:00 Keynote: The Forcing of Climate by CO$_2$ on Geological Timescales
Foster G & Martinez-Boti M

09:30 Multiple Pools of Reduced Carbon can be Released during Hyperthermals

09:45 A Phanerozoic CO$_2$ History Driven by Tectonics
Donnadieu Y, Godderis Y, le hir G, Lefebvre V & Nardin E

10:00 Invited: Seesaw Balance of Cenozoic Carbon Cycle
Li G

10:15 Potential Significance of Sulfide Mineral Oxidation for the Cenozoic Carbon Cycle
Torres M, West AJ & Li G

10:30 Invited: Global Silicate Weathering: Not Always in Control of Climate, and Not Required to Balance Global Degassing
Mills B, Watson A & Lenton T

10:45 Triple Oxygen Isotope Compositions of Late Cretaceous Dinosaur Eggshells and Implications for Atmospheric Carbon Dioxide
Passey B, Hu H, Montanari S, Li S & Levin N

(Session 14h continues on Tuesday 27th Posters on p.184)
Session 14e follows this session in this room: see p.122.
15c: Pollution – Climate Interactions and Energy Solutions

**Session chaired by Surabi Menon & Mark Jacobson**

09:00  **Keynote:** Why Wind Energy?
       *Archer C*

09:30  **Invited:** Smart Air Quality Policies for a Better Climate: A Regional Analysis
       *Van Dingenen R, Dentener F, Janssens-Maenhout G, Muntean M, Klimont Z & Hoglund L*

09:45  **Invited:** Exploring Synergies of Aerosol and Climate Mitigation Strategies
       *Klimont Z, Amann M, Rao S & Dentener F*

10:00  **Invited:** Co-benefits of Tackling Poor Air Quality and Regional Climate: A Focus on Ecosystems
       *Embson L, Hicks K & Bueker P*

10:15  **Invited:** Best Practices for Reducing Energy Poverty and (as a Result) Emissions of Methane, Carbon Dioxide, and Black Carbon/Aerosols
       *Sovacool B*

10:30  **Invited:** Sectoral Contributions to Black Carbon Concentrations and Radiative Forcing in Delhi

10:45  **Invited:** A 100% Renewable Power System in Europe – Let the Weather Decide!
       *Greiner M, Andresen G, Rodriguez R, Becker S, Soendergaard A, Jensen T & Zeyer T*

11:00  **Invited:** Roadmaps for Powering the World, U.S., and Individual States for all Purposes with Wind, Water, and Sunlight
       *Jacobson M*

*(Session 15c continues on Tuesday 27th Posters on p.185)*

Session 24d follows this session in this room: see p.135.
16b: Probing the Critical Zone

Session chaired by Heather Buss, Corey Lawrence & Setareh Rad

09:00  **Keynote:** Critical Zone Evolution by Jerks  

09:30  Results of an Interdisciplinary Research Project on Soil Aggregate Formation in CZO’s  

09:45  Pace of Soil Formation Based on Soil Structure Indices  
*Schiefer J, Lair GJ & Blum WEH*

10:00  **Invited:** Rapid Regolith Formation over Volcanic Bedrock and Implications for Landscape Evolution  
*Dosseto A, Buss H & Suresh PO*

10:15  **Invited:** Drainage Water Chemistry Reflects Monolithologic Critical Zones  
*Kram P, Curik J, Veselovsky F, Myska O, Stedra V, Blaude V & Hruska J*

10:30  Differences in Shale Weathering on Ridgetops and Slopes along a Latitudinal Climosequence  
*Dere A, White T, Leidel L & Brantley S*

10:45  Rates of Consumption of Atmospheric CO$_2$ Through the Weathering of Loess during the Next 100 Years of Climate Change  
*Godderis Y, Brantley S, Francois L, Schott J, Pollard D, Deque M & Dury M*

11:00  **Invited:** Origin of the Chemical and U-Sr Isotopic Variations of Soil Solutions, Stream and Source Waters at a Small Catchment Scale (the Strengbach Case; France)  
*Pierret M-C, Prunier J, Chabaux F & Stille P*

*Session 16e follows this session in this room: see p.126.*
16e: Modelling of Earth Surface Processes

Session chaired by Yves Godderis

11:15 Alpine Weathering and Carbon Cycle
Donnini M, Probst J-L, Probst A, Frondini F, Marchesini I & Guzzetti F

11:30 Determination the Step of Karst Formation Using GPR and Raman Spectroscopy Methods, South East Anatolia, Turkey
Kadioglu S & Kadioglu YK

11:45 Geochemical Processes during Weathering of Natural Volcanic Glasses: Comparison with Experimental Alteration
Liotta A, Dubois M & Gauthier A
17b: Constraining Rates of Ocean Processes
Session chaired by Laura Robinson & Matt Charette

09:00  **Keynote:** Constraining Rates of Ocean Processes Using Tracers  
*Jenkins WJ*

*Emerson S, Bushinsky S & Riser S*

09:45  The First Comprehensive Dataset of $^{236}$U in the North Atlantic Ocean  
*Casacuberta N, Christl M, Lachner J, van der Loeff M, Masqué P & Synal HA*

10:00  Water Mass Mixing in the Drake Passage during the Last 40 Kyrs  
*Struve T, van de Flierdt T, Robinson LF, Burke A, Crocket KC, Lambelet M & Auro M*

10:15  Timing of Northern Hemisphere Climate Transitions during the Last Glacial Period from Precisely-Dated Speleothem Data  
*Asmerom Y, Polyak V & Lachniet M*

10:30  **Invited:** Study of the Natural Iron Fertilization off Crozet and Kerguelen Islands (Southern Ocean) Using Radium Isotopes as Tracers  
*van Beek P, Sanial V, Lansard B, Souhaut M, Kestenare E, D’Ovidio F, Zhou M & Blain S*

10:45  The Role of the Mid-Atlantic Ridge for Chemical Fluxes in the Atlantic: Clues from Ra and Ac Isotopes  
*Geibert W, Hsieh Y-T & Henderson GM*

11:00  Observations and Modeling of Sinking Particle Speeds in the Twilight Zone Using $^{210}$Po-$^{210}$Pb Deficit  
*Villa-Alfageme M, de Soto F, Le Moigne F, Giering S, Sanders R & Garcia-Tenorio R*

11:15  Comparison of $^{228}$Ra and Microstructure Derived Ocean Mixing Rates and Chemical Fluxes in the Cape Basin  
*Hsieh Y-T, Geibert W, Palmer MR, Woodward EMS & Henderson GM*

11:30  **Invited:** Constraining Rates of Trace Element Supply and Removal Using Long-Lived Thorium Isotopes  

11:45  Distribution of $^{230}$Th and $^{232}$Th along the Bonus GoodHope Section in the SouthEast Atlantic Ocean  
*Roy-Barman M, Marchandise S, Thil F, Bordier L, Ayrault S, Garcia-Solsane E & Jeandel C*

(Session 17b continues on Tuesday 27th Posters on p.188)
18d: Trace Element Dynamics in Mining Impacted Environments and Integrated Remediation Solutions

Session chaired by William Burgos, Bernd Lottermoser, Richard Collins & Scott Johnston

09:00 Speciation of Uranium Products Formed during in situ Biostimulation of the Old Rifle, CO Aquifer

09:15 Uranium(IV) Mobility in a Mining-Impacted Wetland

09:30 Changes in Bacterial Diversity and Community Structure within a Geochemically Variable Uranium-Mine Water Treatment Plant

09:45 Impact of As(V) on Abiotic Reduction of U(VI) by Mackinawite
Troyer L, Stone J & Borch T

10:00 Keynote: Plant Establishment in Sulfide Ore-Derived Mine Tailings Stabilizes Arsenic in situ Despite Promoting Arsenopyrite Oxidation
Hammond C, Root R, Maier R & Chorover J

10:30 Energy Crop Production on Mining and Smelting Impacted Arable Land – A Non-Phytoremediation Approach
Fahlbusch W, Sauer B & Ruppert H

10:45 Interactions between Glassy Materials and Metallophyte Plants: Application to the Remediation of Polluted Soils
Gauthier A & Dubois M

11:00 An Integrated Geochemical, Hydrological and Hydrodynamic Approach to Model Arsenic at a Fluvial Confluence

11:15 Isotope Geochemistry in Waters Affected by Mining Activities in Portman Bay (Spain)
Martinez-Sanchez MJ, Garcia- Lorenzo M, Perez-Sirvent C & Hernandez-Cordoba M

11:30 Indium’s Aqueous Behavior in a Stream Influenced by Acid Mine Drainage
White SJ, Hussain F, Hemond H, Runkel R, Walton-Day K & Kimball B
11:45  Metal Fluxes at the Sediment-Water Interface in a Reservoir Affected by AMD
Torres E, Ayora C, Arias JL, García-Robledo E, Papaspyrou S & Corzo A

(Session 18d continues on Tuesday 27th PM on p.156)
19b: The Role of Reactive Intermediates in Biogeochemistry

Session chaired by Colleen Hansel, Adam Kustka & Bettina Voelker

09:00 Post Depositional Transformation of Ni-Rich Birnessite
**Atkins A, Peacock C & Shaw S**

09:15 *In situ* Immobilization of Pb Using a Natural Mn Oxide By-Product Amended to Contaminated Soil

09:30 **Keynote**: Soluble Manganese(III) and a Revised Sedimentary Redox Cycle
**Madison A, Mucci A, Sundby B, Tebo B & Luther G**

10:00 **Invited**: Characterization of a Novel Multicopper Oxidase that Oxidizes Mn(II)
**Butterfield C, Soldatova A, Spiro T & Tebo B**

10:15 **Invited**: Connecting Bacterial ROS Cycling to the Production of Mn Oxides
**Learman D, Zhang T, Andeer P & Hansel C**

10:30 **Invited**: Reactive Oxygen Species (O₂, O₂⁻ and H₂O₂) Control Manganese Redox Cycling in the Euphotic Zone: Role of Reactive Intermediates
**Croot P, Heller M & Wuttig K**

10:45 Iodine Speciation Change by a Mn-Oxidizing Marine Bacteria, *Roseobacter* sp. Azw-3 k, Through the Production of Reactive Oxygen Species

11:00 Widespread Production of Extracellular Superoxide by Heterotrophic Bacteria
**Hansel C, Diaz J, Voelker T, Andeer P & Zhang T**

11:15 Dark Production of Reactive Oxygen Species in Freshwaters
**Voelker B, Marsico R, Schneider R, Hansel C & Zhang T**

11:30 Dynamics of Hydrogen Peroxide in the External Milieu of Corals – From Single Organism to the Reef
**Shaked Y & Armoza-Zvuloni R**

11:45 **Invited**: Photochemistry of Dissolved Combined Amino Acids
**Lundeen RA, Schaelchli J & McNeill K**

(Session 19b continues on Tuesday 27th PM on p.158)
19l: Iron and the Carbon Cycle: Linkages between Two Biogeochemical Cycles

Session chaired by Thomas Riedel & Harald Biester

09:00 Coupling Magnetic and Molecular Techniques to Study Microbial-Mediated Iron and Carbon Cycling
   *Atekwana E, Rossbach S, Beaver C, Mewafy F & Slater L*

09:15 *Gallionella*-Like Microorganisms Involved in Iron Oxide Formation in Groundwater Wells Across a Broad pH Range
   *Wang J, Sickinger M & Küsel K*

09:30 Probing the Interactions between Iron Oxides and Sediment Organic Matter Using X-Ray Absorption Spectroscopy
   *Barber A, Lalonde K & Gélinas Y*

09:45 Characterizing the Mechanisms of Soil Organic Matter Stabilization as Organo Mineral Complexes
   *Adam N*

10:00 The Role of Iron in the Diagenesis of Organic Carbon and Nitrogen in Sediments: A Long-Term Incubation Experiment
   *Barber A, Lalonde K, Mucci A & Gélinas Y*

10:15 The Association between Iron and Carbon in Freshwater Colloids
   *Baken S, Gustafsson JP & Smolders E*

10:30 Acid Rock Drainage in Antarctica – Importance for Global Iron Cycling in the Southern Ocean
   *Dold B, Gonzalez-Toril E, Aguilera A, Lopez-Pamo E, Cisternas ME & Amils R*

10:45 Iron Supply and Cycling on the Oregon-California Shelf: Comparisons with the Gulf of Mexico Hypoxic Zone

11:00 The Effect of Hydrothermal Iron on Marine Dissolved Organic Carbon
   *Hawkes J, Connelly D, Djurhuus A & Achterberg E*

11:15 Coupled Cycling of Fe and $C_{org}$ in Submarine Hydrothermal Systems: An Ocean Biogeochemistry Perspective
   *German C, Legendre L, Sander S & le Bris N*

11:30 Coupled Cycling of Fe and $C_{org}$ in Submarine Hydrothermal Systems: Modeling Approach
   *Legendre L, German CR & Sander SG*

(Session 19l continues on Tuesday 27th Posters on p.198)
### 20d: Innovations in Geochronology: Present Developments and a Vision for 2020

**Session chaired by Ethan Baxter, Randy Parrish, Blair Schoene & Laura Webb**

<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation topic</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00</td>
<td>The LA-ICP-MS U-Th-Pb Network: Improving Data Standards in Laser Ablation Geochronology</td>
<td>Horstwood M, Kosier J, Gehrels G, Jackson S, Pearson N &amp; Sylvester P</td>
</tr>
<tr>
<td>09:15</td>
<td>New Generation Multi-Collector Mass Spectrometers Require New $^{40}$Ar/$^{39}$Ar Standards</td>
<td>Phillips D &amp; Matchan E</td>
</tr>
<tr>
<td>09:30</td>
<td>Age Calibration of Geomagnetic Polarity Reversals Around the Cretaceous-Paleogene Boundary</td>
<td>Sprain C, Renne P &amp; Wilson G</td>
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<tr>
<td>09:45</td>
<td>EARTHTIME: Past, Present, and Future</td>
<td>McLean N</td>
</tr>
</tbody>
</table>

*Session 20f follows this session in this room: see p.133.*
20f: New Developments in Analytical Techniques and Applications of Noble Gas Observations

**Session chaired by Daniele Cherniak, Rebecca Flowers, David L Shuster & Fin Stuart**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</thead>
</table>
| 10:00  | **Keynote:** Of Ancient Reservoirs and Recycled Noble Gases  
*Mukhopadhayay S, Parai R, Tucker J & Peto M*                                          |
| 10:30  | Nucleogenic Neon-21 Production Rates for Geochronology  
*Cox S, Farley K & Cherniak D*                                                        |
| 10:45  | Quantifying the Open-System Behavior of Cosmogenic Noble Gases in Quartz  
*Tremblay M, Shuster D & Balco G*                                                      |
| 11:00  | Chemical Influence on Recoil Damage Annealing and Impact on (U-Th)/He Age in Apatite  
| 11:15  | K-Feldspar Geochronology: Not Just $^{39}$Ar  
*Chafe AN, Hanchar JM & Villa IM*                                                        |
| 11:30  | **Invited:** A New Radiation Damage Based Model for He Diffusion in Zircon  
*Guenthner W, Reiners P, Ketcham R, Nasdala L & Giester G*                                |
| 11:45  | *In situ* U-Th-He Dating by $^4$He/$^3$He Laser Microprobe Analysis  
*Vermeesch P & Schwanethal J*                                                          |

(Session 20f continues on Tuesday 27th Posters on p.200)
22j: Probing the Early Stages of Mineral Nucleation and Growth: From Prenucleation Clusters to Macrocrystals

Session chaired by Alexander Van Driessche, Matthias Kellermeier & Liane G. Benning

09:00 Keynote: Classical vs. Non-Classical Pathways of Crystallization
De Yoreo J, Li D, Nielsen M, Hamm L & Dove P

09:30 Non-Classical Nucleation of Minerals and the Multiple Roles of Additives
Berg JK, Kellermeier M, Rao A, Cölfen H & Gebauer D

09:45 The Discovery and Role of Non-Stoichiometric Complexes of Calcium Carbonate in the Solution Precipitation of Vaterite
Smeets P, Habraken W, Bertinetti L, Nudelman F & Sommerdijk N

10:00 Liquid-Liquid Separation at the Onset of CaCO₃ Formation

10:15 The Structure of Mg-Stabilised Amorphous Calcium Carbonate

10:30 Pressure-Induced Polyamorphism in Amorphous Calcium Carbonate: Insights into Biomineral Polymorph Selection Mechanisms
Fernandez-Martinez A, Kalkan B, Clark SM & Waychunas GA

10:45 The Role and Effect of Mg on the Formation of Carbonates
Rodriguez-Blanco JD, Shaw S, Bots P & Benning LG

11:00 The Multiple Structures of Vaterite
Demichelis R, Raiteri P & Gale JD

11:15 Sequence of Phase Transitions in Calcite Biominerals, Mapped with 20 nm Resolution, and their Energetics
Gilbert P

11:30 Inert Nano-Reactors or Dynamic Micelle Interfaces? CaCO₃ Precipitation from Microemulsions
Stawski TM & Benning LG

11:45 Formation and Transformation of Nanocrystalline Iron Carbonate Precursors
Dideriksen K, Frandsen C, Bovet N, Wallace AF, Arbour T, DeYoreo J, Stipp SLS & Banfield JF

(Session 22j continues on Tuesday 27th PM on p.163)
24d: Low Temperature Geochemistry

**Session chaired by Martin Frank**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:15</td>
<td>Effects of Heating on the Leaching and Recoil of U-Th Series Radionuclides in a Suite of Natural Minerals</td>
<td>Baskaran M &amp; Garver E</td>
</tr>
<tr>
<td>11:30</td>
<td>Anomalous Abundances of He and Mobile Metals in Surface Media over the Deeply Buried Millennium U Deposit, Athabasca Basin, Canada</td>
<td>Power M, Hattori K, Pinti D &amp; Potter E</td>
</tr>
<tr>
<td>11:45</td>
<td>Diffusive Heavy Metal Fluxes in Bottom River Sediments</td>
<td>Bourg ACM &amp; Mouvet C</td>
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### Oral Presentations Overview

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>14:30</td>
<td>Hofstetter</td>
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<td>14:45</td>
<td>Brown</td>
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<td>15:00</td>
<td>Campbell</td>
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<td>15:15</td>
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<td>15:30</td>
<td>Larson</td>
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<td>15:45</td>
<td>Martínez-Sánchez</td>
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<td>16:00</td>
<td>Alakangas</td>
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<td>16:15</td>
<td>Druhan</td>
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<td>16:30</td>
<td>Rodriguez-Scalas</td>
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<td>16:45</td>
<td>Thullner</td>
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<tr>
<td>19:00</td>
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*Note: PM denotes the afternoon session.*
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<td>Guerbois, Thaler</td>
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<td>Buchwald, Lifton</td>
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<td>Klungelih, Blard</td>
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<td>Methet, Harauka, Damhaus</td>
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<td>Yuan, Sanz, Liu</td>
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<td>Planer, -Montiero, Liu</td>
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<td>Winkel, Schmidt, Zaw</td>
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<td>Berg, Thorne, Nayak</td>
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<td>Flynn, Reid, Orphan</td>
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<td>Hesk, Kelemen, Sailer</td>
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<td>14:30</td>
<td>Keynote: Geochemistry and Mineral Exploration</td>
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<td>14:45</td>
<td>Invited: Impact of Curiosity-Driven Research on Oil Production Through “Problem Awareness”</td>
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<td>15:00</td>
<td>Invited: Geochemistry and Carbon Management</td>
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<td>15:15</td>
<td>Invited: Novel Applications of Geochemistry to Mineral Exploration and Remediation</td>
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<td>15:30</td>
<td>Invited: Broader Impacts of Geochronology</td>
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<td>15:45</td>
<td>Invited: Environmental Mineralogy: Bridging the Gap from Microscopic to Macroscopic</td>
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<td>16:00</td>
<td>Invited: Materials from Geochemically Inspired Studies: From Titan's Tholins to Extremophile Bacteria</td>
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<td>16:15</td>
<td>Invited: Geochemistry and the Spatial Patterns of Water Management are Reflected in Human Hair</td>
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<td>16:30</td>
<td>Invited: The Societal Impact of Urban and Environmental Geochemistry: Pathways to Success</td>
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<td>16:45</td>
<td>Invited: Geochemistry of European Bottled Water</td>
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<td>17:00</td>
<td>Invited: How to Protect Geochemists Working on Environmental Issues from Litigation?</td>
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<td>17:15</td>
<td>Invited: The Geochemistry of London</td>
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Session chaired by John Ludden, Francis Albarède & Max Coleman
02c: Planet Formation and Bombardment

Session chaired by Nancy Chabot & Bill Bottke

14:30  **Keynote:** The Formation of the Core of the Giant Planets

*Levison H, Kretke K, Duncan M & Ngo H*

15:00  Making the Planet Mercury: Constraining Mercury’s Core Formation and Composition Through Laboratory Experiments

*Chabot NL, Wollack EA, Klima RL & Minitti ME*

15:15  A Second Lunar Magma Ocean?

*Grange M & Nemchin A*

15:30  Did the Moon Form at 4.36 Ga?

*McLeod C & Brandon A*

(Session 02c continues on Tuesday 27th Posters on p.168)

Session 02i follows this session in this room: see p.140.)
02i: The Volatile Inventory of the Moon and Mercury

**Session chaired by Romain Tartese, Mahesh Anand & David Rothery**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</table>
| 15:45 | **Keynote:** Origin and Evolution of Volatiles in Rocky Airless Bodies  
*Elkins-Tanton L*                                                                 |
| 16:00 | Dark Organic Matter in Permanently Shadowed Craters on Mercury  
*Harju E, Paige D, Siegler M, Delitsky M & Schriver D*                                    |
| 16:15 | Evidence for Volatiles on Mercury  
*Rothery D, Thomas R & Kerber L*                                                           |
| 16:30 | Petrologic and Metasomatic Controls on H and Cl Abundances and Isotopes in Lunar Rocks  
| 16:45 | A Common Origin for Terrestrial and Lunar Indigenous Water  
*Anand M, Tartèse R, Barnes J, Franchi I & Starkey N*                                       |
| 17:00 | Evidence for Chondritic Lunar Water and Nitrogen Trapped in Apollo 17 Volcanic Glasses  
*Füri E, Marty B, Deloule E & Gurenko A*                                                  |
| 17:15 | Reduced C-O-H Volatiles Dissolved in Lunar Picritic Glasses  
*Wetzel DT, Rutherford MJ, Jacobsen SD, Hauri EH, Saal AE & Thomas S-M*                   |

(Session 02i continues on Tuesday 27th Posters on p.169)
04e: Geoneutrino: The Nexus of Particle Physics and Earth Science

Session chaired by Fabio Mantovani, Claude Jaupart, Giovanni Fiorentini, Aldo Ianni & Yu Huang

14:30 Keynote: Geoneutrinos and the Interior of the Earth
Fiorentini G

14:45 Geo-Neutrino Measurements with KamLAND
Ishidoshiro K

15:00 Observation of Geoneutrinos in Borexino
Ianni A & Suvorov Y

15:15 A Reference Earth Model for the Heat Producing Elements and Associated Geoneutrino Flux
Huang Y, Chubakov V, Mantovani F, Rudnick R & McDonough W

15:30 Crustal Thickness Estimation from GOCE Satellite Mission Gravity Data
Reguzzoni M & Sampietro D

15:45 Glacial Tillites Reveal Temporal Evolution of Upper Continental Crust
Rudnick R, Gaschnig R & McDonough W

16:00 Radioactivity and Neutrino Production in the Oceanic Crust
White W

16:15 Noise in Heat Flow Data
Gosnold W

16:30 Geoneutrino Detection in the Future Low-Energy Neutrino Observatory LENA
Wurm M

16:45 Advanced Antineutrino Estimation
Jocher G, Usman S, Dye S & Learned J
05a: Building the Oceanic Lithosphere: From Mantle Melting to Magma Chambers

Session chaired by Elisabetta Rampone, Marguerite Godard, Richard Katz & Riccardo Tribuzio

14:30 Composition of the Oceanic Crust: Where Have all the Noble Metals Gone?
  Becker H & Meyer C

14:45 A New Model for the Formation of Podiform Chromitites in Ophiolites
  Robinson PT, Yang J, Zhou M-F & Xiong F

15:00 Geochemical Characteristics and Tectonic Significance of Mafic Cumulates in Kuluncak Ophiolite (Malatya), SE Turkey
  Camuzcuoglu M, Bagci U, Koepke J & Wolff PE

15:15 The Main MORB Crustal Contaminant: Geochemistry of Magma Chamber Roof Experimental Anatectic Melts, and Residues
  France L, Koepke J, Ildefonse B, MacLeod CJ, Godard M & Deloule E

15:30 New Insights into the History of an Ophiolite from Zircons
  Belousova E, Gonzalez-Jimenez J, Graham I, Griffin W & O'Reilly S

15:45 Differentiating Magma Sources from Conglomerate and Breccia Clasts, IODP Site U1349, Ori Massif, Shatsky Rise Oceanic Plateau
  Romanova I & Murphy D

16:00 Ocean Drilling: MORB Geochemistry in the Third (and Fourth) Dimension
  Brandl PA, Regelous M, Beier C & Haase KM

16:15 Origins of Anomalous Ridge Magmatism Near Jan Mayen
  Elkins LJ, Rivers ER, Sims KWW, Blichert-Toft J, Devey C, Chernow R, Davis R & Meisenhelder K

16:30 Mantle Structure Below the Petit-Spot
  Hirano N, Yamamoto J & Okumura S

16:45 The Eastern Rift Zone Through Time: A Record of Plume Pulsing or Magma Plumbing Evolution?
  Manning C & Thirlwall M

17:00 The Oxidation State of Uranium in Basaltic Magmas
  Halse H, Berry A, Schofield P, Mosselmans F, Kvashnina K & Cibin G

17:15 Ocean Ridge Magma Generation Rates at Slow-Spreading Ridges Favour Hess-Type Oceanic Crust
  van Calsteren P, Murton B & Searle R

(Session 05a continues on Tuesday 27th Posters on p.169)
# 06f: Continental Magmatic Pipeline: From Crustal Roots to the Surface

**Session chaired by Kari Cooper, Jonathan Miller & Josef Dufek**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speakers</th>
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</thead>
<tbody>
<tr>
<td>14:30</td>
<td>High-Silica Rhyolites and Granites: Products of the Shallow Crust</td>
<td><strong>Gualda GAR &amp; Ghiorso MS</strong></td>
</tr>
<tr>
<td>14:45</td>
<td>Contrasting Origins of an Intermediate Pluton and a Highly Silicic Pluton, Never Summer Mountains, Colorado, USA</td>
<td><strong>Jacob KH &amp; Farmer GL</strong></td>
</tr>
<tr>
<td>15:00</td>
<td>Compositional Gaps and Melt Segregation in Magmatic Systems: A Multiphase Dynamics Approach</td>
<td><strong>Dufek J &amp; Bachmann O</strong></td>
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<tr>
<td>15:15</td>
<td><strong>Invited:</strong> The Geochronological Signal of a Dying Magma System</td>
<td><strong>Schaltegger U, Broderick C &amp; Wotzlaw J</strong></td>
</tr>
<tr>
<td>15:30</td>
<td>The Inheritance of Source Hf Isotopic Diversity in S-Type Granites</td>
<td><strong>Farina F, Stevens G, Gerdes A &amp; Frei D</strong></td>
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<tr>
<td>15:45</td>
<td>Magmatic Evolution at Yellowstone: The Role of Isotopically Juvenile Magma Inferred from Zircon Age, Trace-Element, and Hf Isotope Data</td>
<td><strong>Stelten M, Cooper K, Vazquez J, Wimpenny J &amp; Yin Q-Z</strong></td>
</tr>
<tr>
<td>16:00</td>
<td>The Disparate Crystal Records of the Youngest Toba Tuff, Indonesia</td>
<td><strong>Reid M &amp; Vazquez J</strong></td>
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<tr>
<td>16:15</td>
<td><strong>Invited:</strong> Quantification of the Magma Fluxes Feeding the Growth of a Shallow Magma Reservoir (Soufrière Hills, Montserrrat)</td>
<td><strong>Annen C, Paulatto M, Sparks S, Minshull T &amp; Kiddle E</strong></td>
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<tr>
<td>16:30</td>
<td>Thermal Histories from Crystal Records</td>
<td><strong>Cooper K &amp; Kent A</strong></td>
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<td>17:00</td>
<td>Why do Some Andesite Stratovolcanoes Evolve to Erupt Rhyolite and/Or Rhyodacite and Others do Not?</td>
<td><strong>Lange R, Frey H &amp; Hall C</strong></td>
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<td>17:15</td>
<td>Magmas Going Through Icelandic Crustal Filter</td>
<td><strong>Bindeman I, Gurenko A &amp; Sobolev A</strong></td>
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(Session 06f continues on Tuesday 27th Posters on p.170)
07c: Fluid Composition and Pathways Leading to Melting at Subduction Zones

Session chaired by Horst Marschall, Timm John & Joerg Hermann

14:30 Element Mobility from Seafloor Serpentinization to High-Pressure Dehydration of Antigorite in Subducted Serpentinite: Insights from Cerro del Almirez (Southern Spain)
Marchesi C, Garrido CJ, Padrón-Navarta JA, López Sánchez-Vizcaino V & Gómez-Pugnaire MT

14:45 B, Pb, Sr Isotopic Imprint of Crustal and Mantle Rocks from the Slab-Mantle Interface: The Cima di Gagnone Example (Central Alps)
Cannaò E, Agostini S, Scambelluri M & Tonarini S

15:00 Keynote: Volatiles Released in Subduction Zones and their Role in Sustaining Magmatism
Tumiati S

15:30 Experimental Partitioning Behavior of MORB in Subduction Zones at 2 and 3 GPa
Luginbuehl S, Ulmer P & Pettke T

15:45 Rare Earth Element Behavior in Subduction-Zone Fluids: The Effect of T and Ligands
Tsay A, Zajacz Z & Sanchez-Valle C

16:00 Synchrotron Radiation X-Ray Fluorescence Analysis of Aqueous Fluids and High-Mg Andesite Melt Under High-Temperature and High-Pressure Conditions
Kawamoto T, Mibe K, Kuroiwa K-I & Kogiso T

16:15 Estimating Fluid Fluxes from Equilibrium Properties and Transport Theory: Pitfalls and Solutions
Dolejs D

16:30 Geodynamic Implications from Element Fluxes in the Tonga-Lau System
Beier C, Regelous M & Haase KM

16:45 Boron Isotopes in Boninites from the Izu-Bonin-Mariana Arc System: Insights into Subduction Initiation
Savov I & Agostini S

17:00 Volatile Behavior in an Immature Subduction Zone Inferred from Boninitic Melt Inclusions in Cr-Spinel
Shimizu K & Shimizu N

17:15 Composition of the Shallow Aqueous Fluids Released beneath the SE Mariana Forearc Rift
Ribeiro J, Stern R, Kelley K, Shaw A, Martinez F & Ohara Y

(Session 07c continues on Tuesday 27th Posters on p.173)
<table>
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<th>Time</th>
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| 14:30 | **Keynote**: Biological Controls on Oxygenation in the Neoproterozoic and Paleozoic  
*Lenton T*  |
| 14:45 | Resolving Inconsistent Sedimentary Carbon Mass Balances: Implications for Ancient C and S Cycles  
*Derry L*  |
| 15:00 | **Invited**: Experimentally Verifying the Low Oxygen Demands of Primitive Animals  
*Mills D, Ward L, Jones C, Forth M, Sweeten B, Treusch A & Canfield D*  |
| 15:15 | Conditions for Proterozoic Anoxic and Non-Sulfidic Ocean: Constraints from a Marine Biogeochemical Cycle Model  
*Ozaki K & Tajika E*  |
| 15:30 | The Global Record of Local Iron Geochemical Data from Proterozoic Through Paleozoic Basins  
*Sperling E, Wolock C, Knoll A & Johnston D*  |
| 15:45 | **Keynote**: Neoproterozoic Ocean Chemistry and Redox Evolution as Inferred Through Sulfur Isotope Records  
*Johnston DT*  |
| 16:00 | **Invited**: A Bioturbation-Induced Decrease in Atmospheric Oxygen Across the Precambrian-Cambrian Boundary  
*Boyle R*  |
| 16:15 | An Abrupt Change in the Nitrogen Cycle and Redox Conditions of Surface Environments in Ediacaran-Cambrian as Recorded in Carbonate Associated Nitrate (CAN)  
*Prokopenko M, Corsetti F, Gaines R, Loyd S, Kaufman J & Berelson W*  |
| 16:30 | Oxygen Minimum-Zone-Like Conditions from the Early Cambrian of Chengjiang, South China  
*Hammarlund E, Gaines R, Qi C & Canfield D*  |
| 16:45 | Four Cycles of Oxygenation in the Phanerozoic  
*Large R, Halpin J, Danyushevsky L, Maslennikov V, Bull S, Gregory D, Lyons T & Lounjeva E*  |
| 17:00 | Palaeozoic Biosphere and Climate: Modes of Marine Primary Production and Methane Cycling Feedbacks  
*Rohrssen M, Love GD & Reinhard CT*  |
| 17:15 | Molybdenum and Uranium Isotope Dynamics in a Paleozoic Epicontinental Black Shale  
*Herrmann A, Algeo T, Romaniello S, Gordon G & Anbar A*  |

*(Session 09d continues on Tuesday 27th Posters on p.175)*
10a: Geochemical Processes at Mineral-Water Interfaces: Insight from Macroscopic, Spectroscopic, and Computational Methods

Session chaired by Jeffrey Catalano, Jean-François Boily, Christian Mikutta, Sebastien Kerisit & Jordi Cama

14:30 Ion Concentration at the Kaolinite – Water Interface
Bovet N, Baur T, Clausen T, Olsson M, Lorenz B & Stipp SLS

14:45 Addressing the Nanoscale Complexity of Mineral-Water Interfaces in MD Simulations: Effects of the Substrate Compositional Disorder on the Properties of Surface Species
Kalinichev A, Loganathan N & Ngouana W. BF

15:00 Nucleation and Growth of Chrysotile Nanotubes: Complementary Insight from Macroscopic to Nanoscopic Measurements
Lafay R, Montes-Hernandez G & Janots E

15:15 Keynote: Coupled Dissolution and Precipitation at Mineral – Fluid Interfaces
Putnis A, Putnis C & Ruiz-Agudo E

15:45 Invited: DFT Studies of the Interaction of Water with (Fe, Ni)-Sulfide Surfaces and Clusters
de Leeuw NH, Roldan A, Haider S, Santos Carballal D & Terranova U

16:00 Calcite Step Growth Velocities; A Function of Saturation Index and the Ca\(^{2+}\) to CO\(_3^{2-}\) Activity Ratio
Sand KK, Tobler DJ, Larsen KK, Makovicky E & Stipp SLS

16:15 Invited: Computer Simulations of Carbonates in Water
Raiteri P, Demichelis R & Gale J

16:30 Monomeric and Polymeric Silica Sorption on Calcite
Belova D, Karasava ON, Lakshtanov NZ & Stipp SL

16:45 Kinetic Study of Syenite-Water Interactions at Temperatures from 20°C to 435°C and at Pressures up to 36MPa
Zhang X, Zhang R & Hu S

17:00 Computer Modeling of Pb Apatites and their Potential for Reducing Pb Levels in Drinking Water
Cooke D & Hopwood J

17:15 Sorption Behavior of Mercury (Hg) on Hydroxylapatite
Kim Y & Lee YJ
11b: Tephra Chemistry & Mediterranean Tephrochronology (<100ka)

Session chaired by Martin Menzies & Roberto Sulpizio

14:30  **Keynote:** Tephrostratigraphy and Tephrochronology of the Last 130 ka in the Mediterranean Basin for Synchronizing Past Climatic Events  
*Zanchetta G*

14:45  **Invited:** Tephra from Ischia: Dating Eruptions and Geochemical Changes  

15:00  **Invited:** Using Tephra Layers to Provide Absolute and Relative Chronologies for Sedimentary Archives: An Example from the Lake Suigetsu SG06 Record from Japan  
*Smith V, Staff R, Mark D, Blockley S, Bronk Ramsey C & Nakagawa T*

15:15  Testing Accuracy of Combined Zircon ($^{238}$U/$^{230}$Th) and (U-Th)/He Dating Against Radiocarbon Dating  

(Session 11b continues on Tuesday 27th Posters on p.177)  
Session 11c follows this session in this room: see p.148.
11c: Crustal Assimilation during Magma Emplacement

Session chaired by Luigi Dallai & Valentin Troll

15:30 Assimilation of Sediments Embedded in the Oceanic Arc Crust: Myth or Reality?
Bezard R, Davidson J, Turner S, Macpherson C, Lindsay J & Boyce A

15:45 Along-Arc Geochemical and Isotopic Variations in Javanese Volcanic Rocks: ‘Crustal’ Versus ‘Source’ Contamination at the Sunda Arc, Indonesia
Handley H, Blichert-Toft J, Turner S, Macpherson C & Gertisser R

16:00 Sr-Nd Isotopic Study of Papandayan Area, West Java: Mapping the Extent of Argoland beneath Java, Indonesia
Abdurrachman M & Masatsugu Y

16:15 Keynote: Rhyolites – Hard to Produce, Easy to Recycle: Isotopic Diversity in Zircons as Petrogenetic Tool
Bindeman I, Simakin A, Drew D & Colon D

16:30 Voluminous Outburst of Silicic Low δ18O Magma in NE-Iceland Inferred from Zircon δ18O and U-Pb Geochronology
Berg SE, Troll VR, Riishuus MS, Burchardt S, Deegan FM & Harris C

16:45 Invited: The Geochemical Evolution of Clinopyroxene in the Roman Province: A Window on Decarbonation from Wall-Rocks to Magma
Mollo S & Vona A

17:00 Contamination of DM-Sourced Magmas Produced Diverse Flood Basalts in the Karoo Province?
Luttinen A & Heinonen J

17:15 Crustal Versus Source Processes on the Northeast Volcanic Rift Zone of Tenerife, Canary Islands
Deegan FM, Troll VR, Barker AK, Harris C, Chadwick JP, Carracedo JC & Delcamp A

(Session 11c continues on Tuesday 27th Posters on p.177)
13b: Metal Sources, Transport, Concentration, Precipitation and Timing of Ore-Forming Processes

Session chaired by Holly Stein, Marc Poujol & Gleb Pokrovski

14:30 The Vapour-Brine Partitioning of Uranium in Boiling Ore Systems
Rempel K, Heinrich W, Liebscher A & Dulsik P

14:45 Reactivity of U(VI) with $H_2$, $CH_4$ and C Under Hydrothermal Conditions
Dargent M, Truche L & Dubessy J

15:00 The Effect of Carbon Dioxide on Metal Transport by Geological Fluids
Kokh M, Pokrovski G, Guillaume D & Salvi S

15:15 Crystallization Temperatures of Carbonate Phases at Kennecott, Alaska Based on Clumped Isotope Thermometry
Price JB & Eiler JM

15:30 Invited: The Importance of Iron Mobility in Magmatic-Hydrothermal Systems
Simon A, Bilenker L & Bell A

15:45 PTX Properties of FeCl$_2$-bearing Fluids at Elevated PT Conditions
Steele-MacInnis M, Lecumberri-Sanchez P & Bodnar R

16:00 Effect of Magma Oxidation State on Stable Iron Isotope Composition of Magmatic-Hydrothermal Minerals
Wawryk C & Foden J

16:15 Experimental Constraints on Fe Isotope Fractionation in Fluid-Melt-Oxide-Sulfide Assemblages
Bilenker L, Simon A, Lundstrom C, Gajos N & Zajacz Z

16:30 The Role of Groundwater in the Formation of the Giant Nitrate Deposits of Atacama: Iodine-129 and Stable Chromium Isotopic Evidence
Perez Fodich A, Alvarez F, Snyder GT, Schoenberg R & Reich M

16:45 Which Ligand is the most Import for Gold Transport in Hydrothermal Fluids? An in situ XAS Study in Mixed-Ligand Solutions

17:00 Geochemistry of Trace Elements in Gas Phase of Thermal Springs
Bychkov A, Nikolaeva I & Nekrasov S

17:15 Formation of Arsenic Bearing Apatites from Calcite. Chemistry and Microstructures
Borg S, Liu W, Pearce M, Cleverley J & MacRae C
14d: Quantifying the Transfer of Carbon between Oceanic, Atmospheric, Terrestrial and Geological Reservoirs over Glacial Cycles

Session chaired by Kate Hendry, Eric Galbraith, Luke Skinner & Andy Ridgwell

14:30 A Precise Climatic Sequencing of the Penultimate Glacial Termination

14:45 Deglacial Change in Terrestrial Carbon Storage Estimated by Benthic $^{13}$C
Peterson C & Lisiecki L

15:00 The Role of Mesoscale Ocean Eddies in the Glacial Cycle of Atmospheric $pCO_2$
Munday D, Johnson H & Marshall D

15:15 Keynote: Two Modes of Change in Southern Ocean Export Production over the Past Million Years

15:45 Ice Age Carbon Dynamics of the Interior Atlantic Ocean Inferred from a Highly Resolved Sedimentary Depth Transect
Foreman A, Charles C, Rae J, Slowey N & Adkins J

16:00 Complete Simulation of Deglacial Changes in Atmospheric $^{14}$C/C: Implications for Ocean Circulation Changes and $CO_2$ Release
Hain M, Sigman D & Haug G

16:15 Deep Ocean Circulation and its Link to Carbon Storage Through Glacial Cycles
Wilson D, Piotrowski A, Galy A & Banakar V

(Session 14d continues on Tuesday 27th Posters on p.183)

Session 14i follows this session in this room: see p.151.
14i: Marginal Basin Suboxic Sediments: Archives of High-Resolution Paleoclimate Marine and Terrestrial Records and Interactions

Session chaired by Gert J De Lange, F. Martinez-Ruiz & Stefano Bernasconi

16:30 Elemental Ratios as Proxies for Paleoclimate Reconstruction in the Western Mediterranean
Martinez-Ruiz F, Rodrigo-Gamiz M, Nieto-Moreno V, Jimenez-Espejo FJ, Gallego-Torres D & Ortega-Huertas M

16:45 Mediterranean Sapropel S1: Synchronous Basin-Wide Preservation Versus Productivity Signals
De Lange GJ, Slomp C, Corselli C, Erba E, Thomson J & Reitz A

17:00 Keynote: 2000 yrs of Central Mediterranean Change – What do Proxies Tell us?

(Session 14i continues on Tuesday 27th Posters on p.185)
# 15d: Biosphere-Atmosphere Interactions

**Session chaired by Colette Heald & Christine Wiedinmyer**

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| 14:30  | **Keynote:** Effects of Climate Change and Changes in Atmospheric CO₂ Levels on Sources of Terrestrial Aerosol Precursors  
*Arneth A, Knorr W & Wu M*  |
| 14:45  | **Invited:** Primary and Secondary Biogenic Aerosols  
*Pöschl U*  |
| 15:00  | **Invited:** Bioaerosols in ECHAM5-HAM  
*Sesartic A, Lohmann U & Storelvmo T*  |
| 15:15  | **Invited:** Near-Field Measurements of Volcanogenic Sulfur: Emissions, Oxidation, and Neutralization  
| 15:30  | **Invited:** Biomass Burning as a Major Source of Aerosols  
*van der Werf G & Aouizerats B*  |
| 15:45  | Comparing Properties of Natural Biogenic with Biomass Burning Particles in Amazonia  
*Artaxo P, Rizzo L, Barbosa H, Sena E, Cirino G, Arana A & Serrano AM*  |
| 16:00  | **Invited:** The Coupling of Particle Acidity and Gas Phase Ammonia in the Biosphere-Atmosphere System  
*Murphy J & Tevlin A*  |
| 16:15  | **Keynote:** Biogenic Influence on Sea-Spray Aerosol and its Impacts  
*O'Dowd C, Vaishya A, Ovdenevaite J, Bialek J, Jennings G & Ceburnis D*  |
| 16:30  | **Invited:** The Effect of Marine Biological Activity on Aerosol Generation and Cold Cloud Formation  
*Knopp D, Alpert P, Kilthau W, Radway J & Aller J*  |
| 16:45  | **Invited:** Biogenic New Particle Formation and its Potential Impacts on Climate  
*Smith J, Lawler M, Winkler P, Zhao J & McMurry P*  |
| 17:00  | **Invited:** The Influence of Functional Groups on Organic Aerosol Hygroscopicity  
*Petters M, Suda S, Yeh G, Matsunaga A, Strollo C, Ziemann P & Kreidenweis S*  |
| 17:15  | **Invited:** The Climate Impacts of Natural Aerosol  
*Spracklen D, Scott C & Rap A*  |

*(Session 15d continues on Tuesday 27th Posters on p.186)*
17d: Isotopic and Elemental Tracers of Marine Biogeochemistry and Circulation

Session chaired by Seth John, Julie Granger, Katharina Pahnke & Gregory F. de Souza

16:45 Medal: Stable Isotopes of Heavy Elements in the Modern Ocean

Nakagawa Y, Takano S & Sohrin Y

(Session 17d continues on Tuesday 27th Posters on p.189)
17f: Atmospheric Trace Gas and Aerosol Changes in the Recent Past and the Last 1000 Years: Observations and Modelling

Session chaired by Jérôme Chappellaz, Eric Salzman, Jim Butler & Guido van der Werf

15:45 Keynote: Black Carbon Concentrations and Fluxes during Recent Millennia from a Developing Array of Arctic Ice Cores
McConnell J, Dahl-Jensen D, Fritzschke D, Nolan M & Sigl M

16:00 Can Modern Methane Events and δ¹³CH₄ Measurements say Anything About Glacial/Interglacial Transitions?
Nisbet E, Lowry D, Fisher R, France J & Brownlow R

16:15 Constraining Current Oceanic Nitrous Oxide (N₂O) Emissions and Reducing Uncertainty for Future Emissions
Zamora LM, Kock A, Oschlies A & Bange HW

16:30 Continuous Carbon Monoxide Measurements along the NEEM-2011-S1 Ice Core: In situ Production and Potential for Atmospheric Reconstruction

(Session 17f continues on Tuesday 27th Posters on p.192)

Session 17d follows this session in this room: see p.153.
17g: Metal-Biota Interactions in Seawater

Session chaired by Jay Cullen, Maeve Lohan & Martha Gledhill

14:30  **Keynote:** Distribution of Metalloenzymes in Pacific Ocean Environments as Detected by Proteomic Analysis  
  *Saito M*

14:45  Impact of Iron Limitation on Marine Unicellular Diazotrophic Cyanobacteria  
  *Jacq V, Ridame C, L’Helguen S, Kaczmar F & Saliot A*

15:00  Iron Availability Controls Phytoplankton Ecophysiology in the South Atlantic Subtropical Convergence Zone  
  *Browning TJ, Bouman HA, Henderson GM, Moore CM, Schlosser C, Tarran GA & Woodward EMS*

15:15  Dissolved Iron and the Co-limitation of Phytoplankton Growth in the Beaufort Sea, Arctic Ocean  
  *Cullen J, Zhou J, Taylor R, Semeniuk D & Maldonado M*

15:30  Quantification and Speciation Study of the Marine Solid-Phase Iron Pool  
  *von der Heyden B, Roychoudhury A & Myneni S*

(Session 17g continues on Tuesday 27th Posters on p.193)

Session 17f follows this session in this room: see p.154.
18d: Trace Element Dynamics in Mining Impacted Environments and Integrated Remediation Solutions

Session chaired by William Burgos, Bernd Lottermoser, Richard Collins & Scott Johnston

14:30 Keynote: Mining, Microbes, and Models: Integrating Microbial Fe(II) Oxidation, Hydrolysis, Precipitation, and Biogeochemical Modeling, with Application to Acid Mine Drainage at Iron Mountain
Campbell K, Alpers C, Nordstrom K, Blum A & Hay M

15:00 Rates of Low-Ph Biological Fe(II) Oxidation in the Appalachian Coal Basin and the Iberian Pyrite Belt
Larson L, Sanchez-Espana J & Burgos W

15:15 Limestone-Based Technosols. A Remediation Technique for Sediments Contaminated by Heavy Metals

15:30 Trace Element Distribution in an Extremely Basic Environment in Mine Tailings
Alakangas L & Lu J

15:45 Retention and Mobility of Heavy Metals in the Carbonate-Rich Sulfide Tailings in Dachang Mine (Guangxi, China)
Lei L, Song C & Yang L

16:00 Mobility of Inorganic and Organic Compounds from Black Shales during Unconventional Gas Production
Wilke FDH, Vieth-Hillebrand A, Naumann R, Horsfield B & Erzinger J

(Session 18d continues on Tuesday 27th Posters on p.194)

Session 18m follows this session in this room: see p.157.
18m: Biogeochemical Cycles in the Rhizosphere: Examining Carbon, Trace and Heavy Metal Cycling at the Plant-Soil Interface

Session chaired by Marco Keiluweit, Carla Rosenfeld & Eva Marie Muehe

16:15 Keynote: Rhizogenic C-Fe Redox Cycling: A Sleeping Couple No Longer

Richter D, Bacon A, Mobley M, Oelze M & von Blankenburg F

16:30 Invited: Role of Carboxylates Released by Microorganisms and Roots of Alpine Pioneer Plants in Mobilising Phosphorus and Metal Cations during Early Soil Formation

Luster J, Göransson H, Olde Venterink H, Brunner I & Frey B

16:45 Invited: Basalt, Granite, Rhyolite, and Schist Weathering as Affected by Plants and Microorganisms

Dontsova K, Zaharescu D, Burghelea C, Chorover J, Maier R & Huxman T

17:00 Invited: Mapping Soil Carbon from Cradle to Grave: C Transformations from Roots to Organo-Mineral Associations


17:15 Invited: Structure, Evolution and Function of the Root Bacterial Microbiota of Arabisopsis species

Schlaeppi K, Dombrowski N, Ver Loren Van Themaat E & Schulze-Lefert P

(Session 18m continues on Wednesday 28th Posters on p.301)
19b: The Role of Reactive Intermediates in Biogeochemistry

Session chaired by Colleen Hansel, Adam Kustka & Bettina Voelker

14:30 Invited: The Role of Reactive Intermediates in Redox Transformations of Iron in Photolyzed Acidic Natural Organic Matter Solutions

Waite D, Garg S, Bligh M & Rose A

14:45 Ferrous Denitrification by Biogenic Hydroxycarbonate Green-Rust


15:00 Invited: The $^{15}$N and $^{18}$O Isotopic Signature of Abiotic Reduction of Nitrite by Iron

Buchwald C, Hansel C, Johnston D & Wankel S

15:15 Invited: Abiotic Reactions of Nitrite during Microbial Fe(II) Oxidation and their Influence on Cell-Encrustation of Nitrate-Reducers

Klueglein N, Zeitvogel F, Obst M & Kappler A

15:30 Effect of the Isotopic Composition of Nitrite on the Enrichment Factor during Benthic Denitrification

Mothet A, Sebilo M, Laverman AM, Vaury V & Mariotti A

15:45 Kinetic Parameters of Pelagic Nitrifying Communities: Consequences on Nitrite Dynamics in the Seine River Downstream of Paris

Raimonet M, Vilmin L, Flipo N, Cazier T, Rocher V & Laverman AM

16:00 Copper-Mediated Oxidation of Hydroquinone Under Conditions Typical of Natural Saline Waters

Yuan X, Pham AN, Miller C & Waite TD

16:15 Did Thioarsenates Start off the Early Arsenic Cycle?

Planer-Friedrich B

16:30 Invited: Oxygen Isotope Equilibrium between Sulfite and Water

Wankel S, Bradley A, Eldridge D & Johnston D

16:45 Polysulfides as Intermediates in the Bacterial Metabolism of Stored Sulfur

Berg J, Milucka J, Schwedt A, Kreutzmann A-C & Kuypers M

17:00 The Reduction of Elemental Sulfur by Metal-Reducing Bacteria Under Alkaline Conditions

Flynn T, O’Loughlin E & Kemner K

17:15 Investigating the Physicochemical Gradients in Oil Sands Wastes

Reid T, Boudens R & Weisener C

(Session 19b continues on Tuesday 27th Posters on p.197)
**19i: Microbes and Minerals in Extreme Environments**

Session chaired by Mónica Sánchez-Román, Tanja Bosak, Tina Treude, Daniel Ariztegui & Crisogono Vasconcelos

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<td><strong>Intracellular Calcification by Cyanobacteria: A Significant Controlled Biomineralization Process</strong></td>
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<td><strong>Discovery of a “Vital” Bacterial Effect in the Formation of Biogenic Carbonates</strong></td>
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<td><strong>Thaler C, Ader M, Ménez B &amp; Guyot F</strong></td>
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<td><strong>Dolomite in Microbial Mats from Sabkha (Qatar): Insights from Combined Raman-Atomic Force Microscopy Study</strong></td>
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<td><strong>Paulo C &amp; Dittrich M</strong></td>
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<td><strong>Role of Exopolymeric Substances in Dolomite Biomineralization by Coastal Sabkha Sulfate-Reducing Bacteria: An ex situ Study of Microbial Community-Mineral Interactions Using Solid-Support Imaging</strong></td>
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<td><strong>Wan A-M, Mansoor B &amp; Ahmad F</strong></td>
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<td><strong>Using Isotopic and Morphological Evidence to Determine Biogenicity of Gypsum Precipitates in the Frasassi Caves, Italy</strong></td>
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<td><strong>Harouaka K, Gonzales M, Eisenhauer A &amp; Fantle M</strong></td>
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<td><strong>Enhanced Calcite Dissolution in the Presence of Aerobic Methanotrophic Bacteria</strong></td>
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<td><strong>Krause S, Aloisi G, Engel A, Liebetrau V &amp; Treude T</strong></td>
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<td><strong>Hydromagnesite Precipitation in Microbial Mats from a Highly Alkaline Lake, Central Spain</strong></td>
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<td><strong>Sanz-Montero ME, Cabestrero Ó &amp; Rodríguez-Aranda JP</strong></td>
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<td><strong>Oxidization of Chalcopyrite Mediated by Acidithiobacillus ferrooxidans and Secondary Minerals</strong></td>
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<td><strong>Elemental Sulfur Biomineralization and Preservation in Glacial Sulfide Springs</strong></td>
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<td><strong>Bacterial Communities Inside Soil Iron Nodules</strong></td>
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<td><strong>Thorne R, Kaksonen A &amp; Anand R</strong></td>
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<td><strong>Bio-Influence on the Metal Precipitation in Ferromanganese Nodules of the Central Indian Ocean Basin</strong></td>
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<td><strong>Nayak B, Das S &amp; Munda P</strong></td>
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17:15  Authigenic Carbonates as Dynamic Microbial Ecosystems: Expanding Views of Methane Cycling in the Deep Sea

*Orphan V*

(Session 19i continues on Tuesday 27th Posters on p.197)
20e: Discoveries in Earth System Dynamics Driven by Emergent Cosmogenic Nuclide Techniques and Applications

Session chaired by Sarah M Aciego, Susan Ivy-Ochs & Joe Licciardi

14:30 Keynote: Standing on Lal's Shoulders: A Look Back and Ahead at \textit{in situ} Cosmogenic Nuclide Production Rate Scaling

\textit{Lifton N}

15:00 Cosmogenic $^3\text{He}$ and $^{10}\text{Be}$ Production Rates at High Elevation (> 3800 m)

\textit{Blard P-H, Braucher R, Bourles D & Lave J}

15:15 High-Precision $^{10}\text{Be}$-Dating and Little Ice Age Glacier Advances at Steingletscher (Swiss Alps)


15:30 Measuring Denudation Rates with the $^{10}\text{Be}$(meteoric)/$^{9}\text{Be}$ Isotope Ratio in Catchments with Different Lithologies

\textit{Dannhaus N, von Blanckenburg F, Wittmann H, Kram P & Christl M}

15:45 Invited: Temporal Evolution of Detrital Cosmogenic Denudation Rates in Transient Landscapes from \textit{in situ} Produced and Meteoric $^{10}\text{Be}$

\textit{Willenbring J, Gasparini N, Crosby B, Brocard G, Occhi M & Belmont P}

16:00 Production and Diffusion of Cosmogenic Noble Gases: Using Open-System Behavior to Study Surface Processes

\textit{Shuster D, Tremblay M & Balco G}

(Session 20e continues on Tuesday 27th Posters on p.200)

Session 20m follows this session in this room: see p.162.
20m: Advanced Analytical Characterization of Natural Organic Matter

Session chaired by Bill Cooper, Norbert Hertkorn & Heike Knicker

16:15 Natural Organic Matter and our Current Capacity to Depict Molecular Dissimilarity in Complex Mixtures
   *Hertkorn N, Harir M & Schmitz-Kopplin P*

16:30 Molecular-Level Comparison of Water-Soluble Sedimentary Organic Matter Extracted by Two Methods
   *Schmidt F, Koch B, Witt M & Hinrichs K-U*

16:45 Comparison of LDI and ESI to Study Natural Organic Matter on the Molecular Level by FT-ICR Mass Spectrometry
   *Witt M*

17:00 Established and Advanced Solid-State NMR Spectroscopy for a Better Understanding of the Structure and Function of Natural Organic Matter in Soils, Water and Sediments
   *Knicker H, Lange S, van Rossum B & Oschkinat H*

17:15 Analytical Chemistry, Natural Organic Matter and Climate Change: Linking Chemical Signatures and Microbial Communities that Affect Carbon Cycling in Northern Peatlands
   *Cooper W, Tfaily M, Chanton J, Lin X, Chanton P, Steinweg J, Schadt C & Kostka J*

(Session 20m continues on Tuesday 27th Posters on p.202)
22j: Probing the Early Stages of Mineral Nucleation and Growth: From Prenucleation Clusters to Macrocrystals

Session chaired by Alexander Van Driessche, Matthias Kellermeier & Liane G. Benning

14:30 Invited: Total Scattering Techniques: A Powerful Tool to Investigate Size, Shape and Growth Mechanisms of Minerals at the Nanoscale

Guagliardi A, Cervellino A, Frison R, Delgado López JM, Gómez-Morales J & Masciocchi N

14:45 Crystallization Kinetics of Apatite Nanocrystals from Amorphous Calcium Phosphate in Water by in situ Synchrotron Powder Diffraction

Birkedal H, Leemreize H & Ibsen C

15:00 Ca\(^{2+}\) and Phosphate Ion Transport to and Calcium Phosphate Cluster Nucleation within Collagen Fibrils In Bone Biomineralization

Xu Z, Zhao W, Yang Y, Cui Q & Sahai N

15:15 Influence of Osteopontin on Apatite Formation

Ibsen C, Olsen J, Gebauer D & Birkedal H

15:30 Pre-Nucleation Clustering of Noble Metals in High-Temperature Magmatic Liquids

Helmy H, Ballhaus C, Fonseca R, Wirth R, Nagel T & Tredoux M

(Session 22j continues on Tuesday 27th Posters on p.204)

Session 22k follows this session in this room: see p.164.
22k: Gemstones – From Genesis to Discovery

Session chaired by Lee Groat & Khin Zaw

15:45  Keynote: A New Model for Emerald Mineralisation and Boiling as a Mechanism for Emerald Zoning and Colouration
Marshall D, Loughrey L, Hewton M & Xue G

16:15  Emerald Mineralization at the Anuri Prospect, Nunavut, Canada
Groat L, Brand A & Kleespies P

16:30  LA-ICP-MS Trace Element and Oxygen Isotope Variation of Vanadium-Rich Ruby and Sapphire within Mogok Gemfield, Myanmar
Zaw K, Sutherland L, Yui T-F, Meffre S & Thu K

16:45  Geochemical Fingerprinting of Corundum from Fiskenæsset, Greenland
Keulen N & Kalvig P

17:00  Characterization of Natural Gem Diamonds and UV Light Sources Using Fluorescence Spectroscopy
Breeding C & Luo Y

17:15  Nanomineralogy of Gemstones: From Genesis to Discovery
Ma C & Rossman G

(Session 22k continues on Tuesday 27th Posters on p.204)
23a: Evolution and Interpretation of Contaminant Isotopic Data from Physical and Reactive Transport Processes: Experiments & Models

Session chaired by Massimo Rolle & Daniel Hunkeler

14:30  Keynote: Using Compound-Specific Isotope Analysis to Assess Biodegradation of Nitroaromatic Explosives in the Subsurface

Hofstetter TB, Wijker RS, Bolotin J, Nishino SF & Spain JC

15:00  Anaerobic Activity of Nitrite-Oxidizing Microorganisms Affects the $\delta^{18}$O of Dissolved Nitrate during Microbial Denitrification

Wunderlich A, Meckenstock R & Einsiedl F

15:15  Integrated C and Cl Isotope Modeling of Chlorinated Ethenes Degradation

Jin B, Haderlein S & Rolle M

15:30  Relevance of Mass Transfer Processes for the Interpretation of Stable Isotope Fractionation

Thullner M, Centler F, Fischer A, Hesse F, Richnow H-H & Wick LY

15:45  Invited: The Influence of Flow Field Heterogeneity on the Observed $\delta^{53}$Cr Fractionation Factor during Abiotic Chromate Reduction

Druhan J, Maher K, Weaver K & McClain C

16:00  Modeling of Enhanced in situ Biodenitrification in Fractured Aquifer: Biogeochemical Interactions and Isotope Fractionation

Rodríguez-Escales P, vanBreukelen BM, Vidal-Gavilan G, Soler A & Folch A

16:15  Keynote: Application of CSIA for Evaluating the Fate of Chlorinated Compounds in Low Permeability Sediments


(Session 23a continues on Tuesday 27th Posters on p.205)

Session 23f follows this session in this room: see p.166.
23f: Mixing, Chemical Reactions and Biological Activity in Porous Media

Session chaired by Pietro de Anna, Tanguy Le Borgne & Marco Dentz

16:45 Entropy and Reactive Solute Transport in Porous Media
Chiogna G, Hochstetler DL, Bellin A, Kitanidis PK & Rolle M

17:00 Geochemical Investigations of Saltwater Intrusion into the Coastal Carbonate Aquifer of Mallorca, Spain
Garing C, Luquot L & Gouze P

17:15 Stretching, Coalescence and Mixing in Porous Media
Le Borgne T, Dentz M & Villermaux E

(Session 23f continues on Tuesday 27th Posters on p.207)
01b: Frontiers in Nitrogen (BioGeoCosmo)Chemistry

1. Ancient Recycled Nitrogen Isotope Signatures in Siberian Xenoliths
   **Barry P, Hilton D & Taylor L**

2. Storage of Initially Organic Nitrogen in Silicate Minerals and Volcanic Glasses

3. N₂O and δ¹⁵N-N₂O Data in Ice Cores: Atmospheric Versus in situ Signal
   **Seth B, Schmitt J, Bock M & Fischer H**

(Session 01b continues on Wednesday 28th AM on p.214)

02a: Refractory Grains, Volatiles, and Organic Molecules Inherited from the Interstellar Medium

4. Isotope Anomalies of Hf and W in Chondrite Leachates and Residues Isotope Anomalies of Hf and W in Chondrite Leachates and Residues
   **Elfers B-M, Peters STM, Wombacher F & Muenker C**

5. Hydrogen Isotope Exchange between Insoluble Organic Matter and Water in Chondrite Parent Bodies
   **Kebukawa Y & Cody G**

6. Fractionation of Cd Isotopes during Evaporation and Recondensation
   **Kremser V, Wombacher F, Ertel-Ingrisch W, Dingwell DB & Münker C**

7. Evaporation of Mg- and Si-Rich Melts: Evolution of Chemical and Isotopic Compositions of FUN CAIs
   **Mendybaev R, Richter F, Teng F, Georg B & Fedkin A**

8. Evaporation Behavior of Forsterite (Mg₂SiO₄) in a H₂O-H₂ Gas
   **Tachibana S & Takigawa A**

9. Two Sources of Water and Pre-Biotic Molecules in the Inner Solar Nebula
   **Tornow C, Gast P, Kupper S, Pelivan I, Kührt E & Motschmann U**

02b: Martian Evolution; Ancient Messengers and Modern Measurements

11 MgSO$_4$ Phases: Hydration, Spectroscopy and S Isotope Partitioning
Bobociiu E & Caracas R

12 Halogen Abundances of the Martian Mantle
Burgess R, Cartwright J & Filiberto J

13 Ion Microprobe U-Pb Dating of Individual Phosphate Grains in Martian Meteorite
Koike M, Ota Y, Takahata N, Sano Y & Sugiura N

14 Basalt Weathering on Mars: Insights from Li-Isotope Fractionation Models
Losa Adams E, Gil Lozano C, Diz P, Gago Duport L, Fernandez Dávila A & Gonzalez Fairen A

15 Oxidation State of Iron in a Primary Martian Basaltic Melt
Matzen A, Beckett J, Woodland A & Wood B

16 Crystal-Chemical Analyses of Soil and Drilled Rock in Gale Crater, Mars

17 Crystal-Melt Partitioning of REE and Evolution of Martian Melts
Nash W & Wood B

18 Exploring Fractionation Models for Some Martian Primary Magmas
Udry A, McSween H & Balta B

(Session 02b continues on Wednesday 28th AM on p.215)

02c: Planet Formation and Bombardment

19 The Stable Chromium Isotopic Composition of Lunar Basalts
Bonnand P, Parkinso n I & Anand M

20 A Comparison of Shocked Zircon and Quartz from the Reis Impact Structure, Germany
Erickson T, Reddy S, Timms N & Nemchim A

21 Ancient Thermal Events on 4 Vesta Recorded in Zircon U-Th-Pb-Ti Depth Profiles from a Brecciated Eucrite
Hopkins M, Mojzsis S, Bottke W & Abramov O

22 Early Solar System $^{87}$Rb-$^{87}$Sr Chronology
Parai R, Huang S & Jacobsen SB

23 Isotopes of Elemental Carbon in the Chelyabinsk Meteorite
Ponomarchuk V, Podgornykh N, Pyryaev A & Ponomarchuk A
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>Mineralogy of the Chelyabinsk Meteorite, Russia</td>
<td>Sharygin V, Timina T, Karmanov N, Tomilenko A &amp; Podgornykh N</td>
</tr>
<tr>
<td>25</td>
<td>Sieve Textures in Impact Zircon from Vredefort, South Africa:</td>
<td>Wielicki M &amp; Harrison M</td>
</tr>
<tr>
<td></td>
<td>Implications to Impact Geochronology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Planetary Surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>02i: The Volatile Inventory of the Moon and Mercury</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Contrasting Volatile Contents in the Lunar Mantle and Anorthosites</td>
<td>Albalat E, Luffi P, Lee C-TA &amp; Francis A</td>
</tr>
<tr>
<td>28</td>
<td>Geophysical Constraints on the Water Content of the Lunar Mantle</td>
<td>Karato S-I</td>
</tr>
<tr>
<td></td>
<td>and its Implications for the Origin of the Moon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>05a: Building the Oceanic Lithosphere: From Magma Melting to Magma</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chambers</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Magmatic and Hydrothermal History of Felsic Rocks within</td>
<td>Ageeva O, Pertsev A &amp; Zhilicheva O</td>
</tr>
<tr>
<td></td>
<td>Oceanic Core Complex (MAR, 13°31'-13°35' N)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>within the Oman Ophiolite – Petrological and Geochemical</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Investigations</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Geochemistry and Petrology of the Khantaishir Ophiolite</td>
<td>Gianola O, Schmidt MW, Jagoutz O &amp; Oyungerel S</td>
</tr>
<tr>
<td></td>
<td>(Central Mongolia)</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Magma Signatures in the Terceira Rift Azores: A Melt Inclusion Study</td>
<td>Marques AFA, Zajacz Z, Madureira P &amp; Scott S</td>
</tr>
<tr>
<td>33</td>
<td>Major and Trace Elements Composition of Basalts from</td>
<td>Pacquet M, Hamelin C, Moreira M &amp; Cannat M</td>
</tr>
<tr>
<td></td>
<td>Ultramafic and Volcanic Seafloor. Southwest Indian Ridge (61 to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>67°E)</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Trace Element Composition of Clinopyroxenes from the</td>
<td>Sen AD, Uysal I, Godard M, Saka S, Akmaz RM, Kaliwoda M &amp; Bağci U</td>
</tr>
<tr>
<td></td>
<td>Kızıldağ Ophiolite (S-Turkey): Implication for Multi-Stage</td>
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<td></td>
<td>Fractionational Melting in a SSZ Setting</td>
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<td>No.</td>
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<td>Authors</td>
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<td>----------------------------------------------</td>
</tr>
<tr>
<td>35</td>
<td>Source and Sinks of Iodine in the Hyperarid Atacama Desert of Northern Chile</td>
<td>Alvarez F, Perez A, Snyder GT, Vargas G, Muramatsu Y &amp; Reich M</td>
</tr>
<tr>
<td>36</td>
<td>Petrogenesis of Peraluminous Granites from Deep Crustal Sources</td>
<td>Brown C, Brown M &amp; Piccoli P</td>
</tr>
<tr>
<td>37</td>
<td>Disequilibrium Melting Recorded in Isotopic and Trace Element Compositions of a Pulsed Granitoid, Mt Kinabalu, Borneo</td>
<td>Burton-Johnson A, Macpherson C, Hall R &amp; Nowell G</td>
</tr>
<tr>
<td>38</td>
<td>U-Pb Geochronology and Source Constraints for Late S-Type Variscan Magmatism Related to Sn-W Metallogeny: The Logrosán Granite Pluton (Central Iberian Zone)</td>
<td>Chicharro E, Villaseca C, Valverde-Vaquero P, Beloussova E &amp; López-Garcia JÁ</td>
</tr>
<tr>
<td>39</td>
<td>Archaean TTG Discriminant Criteria Applied to Phanerozoic Granitoids – Significance from a Study Case in the Getic Basement, South Carpathians</td>
<td>Dobrescu A</td>
</tr>
<tr>
<td>40</td>
<td>Syn-Variscan Anorogenic Volcanism in Northern Gondwana: SIMS U-Pb Ages and REE Patterns of Zircon from Deep Borehole in Coastal Israel</td>
<td>Golan T, Katzir Y &amp; Coble M</td>
</tr>
<tr>
<td>41</td>
<td>Petrology and Geochemistry of Mafic and Ultramafic Metamagmatic Rocks Emplaced within the Anatectic Series of the Middle Crust of the Variscan Pyrenees: Example of the Gavarnie-Heas Dome, West Pyrenees</td>
<td>Kilzi M, Gregoire M, Benoit M, Debat P, de St Blanquat M &amp; Driouch Y</td>
</tr>
<tr>
<td>42</td>
<td>Geochemical Characteristic of Felsic Dykes within the Karakaya (Kaymaz) Granite Eskişehir, Turkey</td>
<td>Gullu B, Kadioglu YK, Zoroglu O, Koralay T, Deniz K &amp; Kilic CO</td>
</tr>
<tr>
<td>43</td>
<td>Internal Structure of a Mid-Crustal Magmatic Conduit: The Punta Falcone Mafic Pluton (Sardinia, Italy)</td>
<td>Hauser A-C &amp; Bussy F</td>
</tr>
<tr>
<td>44</td>
<td>Tawlah Specialized Alkaline Granite Prospect, Midyan Region, Arabian Shield, Kingdom of Saudi Arabia: Petrology. Structural Implications and REEs-Rm Characterization</td>
<td>Heikal M &amp; Ammawy M</td>
</tr>
</tbody>
</table>
Structural and Geochemical Evidence for the Origin of Felsic Microgranular Enclaves and Porphyry Granite, Itu Rapakivi Batholith, SE Brazil

**Janasi VA, Pereira GS & Alves A**

Granite Compositions: Source vs. Process, Revisited. An Isotopic Traverse Across SE Australia

**Maas R & Nicholls I**

Timing and Distinct Magma Sources in Ultramafic-Mafic Intrusions of the Taimyr Peninsula (Russia)

**Malitch K, Badanina I & Romanov A**

Crustal Sources of Peraluminous Granites: The Montes de Toledo Batholith, Iberian Hercynian Belt

**Merino E, Villaseca C, Pérez-Soba C, Orejana D, Belousova E & Andersen T**

New U-Pb Ages for Syn-Orogenic Magmatism in the SW Sector of the Ossa Morena Zone (Portugal)

**Moita P, Santos JF, Costa MM & Corfu F**

Newly Revealed NNW Shift of Granitic Magmatism during Mid-Miocene Period, Kyushu, Japan

**Orihashi Y, Shinjoe H & Anma R**

Intrusion Mechanisms of Mafic Plutons in the Middle Crust: Insights from the Permian Sondalo Gabbroic Complex (Central Alps)

**Petri B, Mateeva T, Mohn G, Manatschal G, Schulmann K & Skrzypek E**

The Results of Preliminary Study of Magnetic Fabric in the Panj-Kuh Granitoid, SE Damghan – Iran

**Pooralizadeh M, Sheibi M & Ghasemi H**

The Architecture of the Intermediate-Sized Quizapu Magma System

**Ruprecht P, Bergantz G, Cooper K & Bachmann O**

Sr-Nd Isotope Geochemistry of the Troctolitic-Gabbroic Bell Rock Range, Giles Complex, Central Australia

**Seubert R, Keays R, Jowitt S & Tomkins A**

Effect of Hydrothermal Alteration on Magnetic Susceptibility of Challu Pluton, SE Damghan- Iran

**Sheibi M, Majidi P & Rezaei M**

Geochemistry and Petrogenesis of a Nested Granite Intrusion – The Sedmihofi Composite Stock (Bohemian Massif)

**Trubac J, Janoušek V, Žák J & Gerdes A**

Thermal History of a Neoproterozoic Orogen and A-Type Leucogranites Formation (Yenisey Ridge, Western Margin of the Siberian Craton)

58 Late Triassic Adakitic Rocks Formed by Partial Melting of Ancient Mafic Lower Crust in the North China Craton

Wang C & Song S

59 Geochronology and Geochemistry of Two Triassic A-Type Granites in South China: Implication for Petrogenesis and Indosinian Transtentional Extension

Zhao K-D, Jiang S-Y & Pu W

07a: Deep Transport of Subducted Material: Escaping the Meat Grinder

60 Chromium Solubility in Chlorite and Implications for Subduction Zone Dynamics: An Experimental Study in the CrMASH System up to 6.5 GPa, 900°C

Fumagalli P, Fischer J, Gemmi M, Merlini M & Poli S

61 Are Mafic Microgranular Enclaves in Durbachites Plutonic Equivalents of Common Minettes?

Krmíček L & Romer R

62 Deep Melting of Subducted Carbonate and Carbonatite Melt Diapirs in the Earth’s Mantle

Litasov K, Shatskiy A & Ohtani E

63 Reconstructing Subducted Sediment Fluxes Using Ancient Arc Lavas

Regelous M, Beier C & Haase K

64 The Fate and Behaviour of Volatiles during Subduction of Oceanic Crustal Material Towards the Deep Mantle

Rosenthal A & Frost DJ

65 Orogenic Eclogites, Rutile and Trace Element Flux in the Subduction Zone

Wilkinson D, Fitton G & Harley S

(Session 07a continues on Wednesday 28th AM on p.219)

07b: Redox Processes in the Subducted Slab, Mantle and Crust

66 Going up or Going Down? Diamonds and Super-Reducing UHP Assemblages in Ophiolitic Mantle

Griffin W, Yang J, Robinson P, Howell D, Shi R-D, O’Reilly S & Pearson N

67 Fe³⁺ Determination in Garnet: A Crystal Chemical Test with the EPMA Flank Method

Hoefer HE, Hoefer CE, Matjuschkin V, Yaxley GM & Brey GP

68 Control of Oxygen Fugacity in Piston Cylinder Experiments

Matjuschkin V, Tattitch B & Blundy JD
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td>The Effect of AFC Processes and Source Oxidation on Fe Isotopes in Evolved Banda Arc Lavas</td>
<td>Nebel O, Arculus R, Wille M &amp; Vroon P</td>
</tr>
<tr>
<td>70</td>
<td>Phase Relations of Carbonate Eclogite during Subduction and the Effect of Redox Conditions on Diamond–carbonate Reactions</td>
<td>Vasilyev P, Yaxley G, Hermann J, O’Neill H &amp; Berry A</td>
</tr>
<tr>
<td>71</td>
<td>07c: Fluid Composition and Pathways Leading to Melting at Subduction Zones</td>
<td></td>
</tr>
<tr>
<td>72</td>
<td>Across-Arc Geochemical Variations in Central America Subduction Zone: Evidences from Honduras Basalts</td>
<td>Mattioli M, Agostini S &amp; Renzulli A</td>
</tr>
<tr>
<td>73</td>
<td>Experimental Investigation of K Incorporation into Tourmaline at High Temperature and Pressure</td>
<td>Berryman E, Wunder B &amp; Franz G</td>
</tr>
<tr>
<td>74</td>
<td>Lithium Isotopic Composition of the Tonga-Kermadec Arc and its Constraints on Subduction Recycling</td>
<td>Brens R, Liu X, Rudnick R, Tuner S &amp; Rushmer T</td>
</tr>
<tr>
<td>75</td>
<td>K- and La- Doped Smectite Under High Pressure and Temperature Conditions: Implication on Mantle Metasomatism</td>
<td>Conceicao RV, Carniel L, Stefani V, Schenato F, Alabarse F, Balaretti N &amp; Xavier AM</td>
</tr>
<tr>
<td>76</td>
<td>Helium Isotope Map of Japan</td>
<td></td>
</tr>
<tr>
<td>78</td>
<td>Mélange Formation, Mantle-Wedge Diapirs and Subduction Zone Magmatism</td>
<td>Marschall H &amp; Schumacher J</td>
</tr>
<tr>
<td>79</td>
<td>Cyclic Submission of the Aeolian Arc: Evidence from Salina</td>
<td>Moretti H, Gottsmann J, Blundy J &amp; Sulpizio R</td>
</tr>
<tr>
<td>80</td>
<td>In situ Observation of Dehydration and Incongruent Dissolution of Serpentine (Antigorite) into Aqueous Fluids</td>
<td>Nishizaki R &amp; Kawamoto T</td>
</tr>
</tbody>
</table>
81 Boron and Other Trace Element Constraints on the Slab-Derived Component in Miocene Volcanic Rocks from the Setouchi Volcanic Belt in SW Japan
   Shinjoe H, Orihashi Y & Sumii T

82 New Experimental Constraints on Slab Top Conditions

   Sulak M & Dolejs D

84 Partitioning of Nb between Rutile and NaAlSi$_3$O$_8$, NaCl- and NaF- Aqueous Fluids at 1-5 GPa and 300-600°C
   Tanis E, Simon A, Tschauner O, Chow P, Xiao Y, Hanchar J, Shen G & Zhao Y

85 The Nature of Pyroxenite Xenoliths of Mantle Wedge beneath the Avacha Volcano (Kamchatka, Russia)
   Timina T & Tomilenko A

86 Composition of COH Fluids up to 2.4 GPa: A Multi-Method Approach
   Tiraboschi C, Tumiati S, Ulmer P, Recchia S, Pettke T, Fumagalli P & Poli S

87 Magma Formation in Hot-Slab Subduction Zones: Insights from Volatile Contents of Melt Inclusions from the Southern Cascade Arc
   Walowski K, Wallace P, Clynne M, Wada I & Rasmussen D

88 Zircon U-Pb-Hf-O Isotopes and REE Constrains on the Origin of Mesozoic Ore-Bearing High Mg# Adakitic Rocks from Ningzhen Area of East China: Petrogenesis and Tectonic Implications
   Wang F, Liu S, Li S & Akhtara S

07e: Vapor Phase Mobility in Arc Volcanic Systems

89 IBA Quartz Chemistry to Track Phase Separation in Intrusive Rock
   Chambefort I, Trompetter W & Begue F

90 Element Outgassing in BABB: An Example from the Havre Trough
   Hergt J

91 Ions, vapors and/or Nanoparticles Penetrating Volcanic Edifices
   Obenholzner JH, Parks J, Edwards M & Fulignati P

92 Invisible Gold in Arc Volcanic Glasses

(Session 07e continues on Wednesday 28th AM on p.220)
| 93 | Regional Deep Water Anoxic Conditions during the Hirnantian Extinction Event | Ahm A, Bjerrum C & Hammarlund E |
| 94 | U Isotopes Disentangle Atmosphere-Ocean Oxygenation Dynamics | Dahl TW, Connelly JN, Gill BC, Canfield DE & Bizzarro M |
| 95 | Evaluating the Sulfur Cycles in the Early Cambrian Ocean: An Example from the Yanjiahe Formation, Yangtze Gorges Area, South China | Feng L |
| 96 | Reconstruction of Nutrient Redox Cycling in the Early Neoproterozoic | Guilbaud R & Poulton S |
| 97 | REE and Trace Element Patterns Across the Ediacaran-Cambrian Transition, South China | Guo Q, Deng Y, Strauss H, Hippler D, Franz G & Zhu G |
| 98 | Higher Oxygenation Level after Sturtian Glaciation Meltdown Despite Varying Local Redox in Nanhua Basin | Ling H-F, Chen X, Li D, Shields G, Vance D & Och L |
| 99 | Chromium Isotope Record of the Otavi Group, Namibia | Rodler A, Frei R, Gaucher C, Voegelin A, Ullmann CV & Korte C |


<p>| 102 | Sorption of Dissolved Organic Matter on Boom Clay | Durce D, Bruggeman C &amp; Maes N |
| 103 | Influence of Bacterial Biomass on Transport Kinetics of Phenanthrene | Hachicho N, Miltner A, Wick L &amp; Kästner M |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>104</td>
<td>Migration of Hydrocarbons Recorded in Calcite-Hosted Inclusions, Dead Sea Area: Trace Elements and Isotopic Evidence</td>
<td>Kozmenko O, Sokol E &amp; Reutsky V</td>
</tr>
<tr>
<td>106</td>
<td>Modelling of Rare Earth Element Sorption to Bacillus subtilis Bacteria</td>
<td>Martinez R, Pourret O &amp; Takahashi Y</td>
</tr>
<tr>
<td>107</td>
<td>Interaction of Ions at the Surface of Soil Components</td>
<td>Minofar B</td>
</tr>
<tr>
<td>109</td>
<td>The Early Cambrian Microbial-Like Fossils: New Insights from their Potential for Hydrocarbon-Generation</td>
<td>Zhang T, Guoan Z &amp; Zcheng L</td>
</tr>
<tr>
<td></td>
<td><strong>10k: Iron Redox Transformations and their Impact on Trace Elements in Natural and Engineered Systems</strong></td>
<td></td>
</tr>
<tr>
<td>111</td>
<td>Microbial Redox Cycling of Surface Fe Ions in Magnetite Nanoparticles</td>
<td>Byrne J, Klüglein N &amp; Kappler A</td>
</tr>
</tbody>
</table>

*(Session 10k continues on Wednesday 28th AM on p.222)*
11b: Tephra Chemistry & Mediterranean Tephrochronology (<100ka)

The Y-3 Tephra: New Insights

*Albert P.*, *Hardiman M.*, *Keller J.*, *Tomlinson E.*, *Müller U.*, *Smith V* & *Menzies M*

115 Outcrops of x-5 and x-6 Tephra Markers along the Southern Tyrrenian Coast of Italy

*Donato P.*, *Albert P.*, *Crocitti M.*, *De Rosa R* & *Menzies M*

11c: Crustal Assimilation during Magma Emplacement

A Tool for Exploring the Impact of Crustal Contamination: The Magma Chamber Simulator

*Bohrson W.*, *Spera F.*, *Ghiorso M* & *Creamer J*

117 Andesitic Dyke Swarms in the Araç-Boyali Foreduep Basin, N Anatolia: Evidence for Eocene Extension

*Çakıroğlu RE, Gönçüoğlu MC, Marroni M* & *Pandolfi L*

118 Multiple Controls on the Geochemistry of Early Cenozoic Volcanism in Victoria, Australia

*Chang T-J*, *Hergt J*, *Holdgate G* & *Phillips D*

119 Magma Components of the Gangdese Batholith, Southern Tibet: Decoded by Zircon Hf and O Isotopes

*Chu M-F*, *Chung S-L, Li X-H, Lee H-Y* & *O’Reilly SY*

120 The Opening Phase of the 2010 Summit Eruption of Eyjafjallajökull Volcano, Iceland: Contributions from Morpho-Textural and Geochemical Characterization of Tephra

*Cioni R.*, *Pistolesi M.*, *Francalanci L.*, *Bertagnini A, D’Oriano C* & *Braschi E*

121 O and Hf Isotopic Evidence in Zircons for Crustal Recycling in Caldera Complexes and Rifts, Picabo Volcanic Field, Yellowstone Hotspot Track

*Drew D, Bindeman I, Watts K, Schmitt AK, Fu B* & *McCury M*

122 Magmatic Digestion of the Crust and the Origin of Silicic Magmas in Iceland: Insights from Partially Melted Crustal Xenoliths

*Gurenko A, Bindeman I* & *Sigurdsson I*

123 Os Isotope Constraints on Crustal Contamination in Auckland Volcanic Field Basalts, New Zealand


124 Origin of High-K Ignimbrite in the Miocene Volcanism Surrounding Uşak Region (Western Turkey): Rb-Sr, Sm-Nd Isotopic Evidence

*Koralay T, Kadioglu YK, Jiang SY, Deniz K* & *Güllü B*
125 Ageing of the Thetyan Crust Documented by Xenoliths from Hyblaean Diatremes (Sicily): Implication for Crustal Assimilation during Magma Emplacement
Scribano V & Viccaro M

126 Shallow-Level Magma-Sediment Interaction and Explosive Behaviour at Anak Krakatau

127 Assimilation of Hydrothermally Altered Crust at Slow Spreading Ridges
van der Zwan F, Devey C, Augustin N, Basaham A, Bantan R, Fietzke J & Almeev R

11g: Mt. Etna from Source to Surface: Deciphering How a Complex Basaltic Magma Storage and Transport System Works

128 Primary Magmas, Fractionation Modelling and Mantle Source of Etnean Lavas
Alesci G, Giacomoni PP, Coltorti M & Ferlito C

129 Paroxysmal Degasging at Mt. Etna in 2011-12
Bonny E, Mandon C, Carn S, Prata F, Coltellli M & Donnadieu F

130 Bromine in Basaltic Volcanic Systems: Experimental Study on Fluid/Melt Partitioning Coefficient
Costa M, Aiuppa A, Iacono Marziano G & Paonita A

131 Magma Migration at Mt. Etna in 2012-2013 Detected by Gas Emissions and Plume Temperature

132 High-Precision Atmospheric Helium Isotope Measurement in Volcanic Areas
Lan TF, Mabry JC, Marty B, Burnard P, Furi E, de Moor JM, Fischer TP & McMurtry GM

133 Synchrotron FTIR on Melt Inclusions, Clinopyroxene and Olivine from Mt Etna Recent Explosive Eruptions
Nazzareni S, Pompilio M, Skogby H, Perucchi A & Dumas P

134 Evidence for Crustal Contribution to Recent Compositional Changes at Mt. Etna Volcano
Pitcher B, Bohrson W & Viccaro M

135 GMS2 Type Station for Geochemical Continuous Multi-Parametric Monitoring on Etna Volcano
Galli G, Quattrocchi F, Di Stefano G, Giammanco S, Longo V & Pongetti F
136 Insights of the Mt. Etna Volcanic Activity Through Multiparametric Data Recorded by the NEMO-Sn1 Seafloor Observatory
Sgroi T, De Caro M, Lo Bue N & Favali P

137 Influence of Tectonics on Magma Residence Times at Mt. Etna Volcano
Viccaro M, Barca D, Bohrson W, Giuffrida M, Nicotra E & Pitcher B

12g: Carbon Capture, Utilization and Storage

138 Reactivity of Acid Gases in Gas-Brine-Mineral Systems
Alpermann T & Ostertag-Henning C

139 Numerical Simulation of fluid–Rock Interaction Upon CO₂ Injection into a Carbonate-Hosted Saline Aquifer
Alt-Epping P & Diamond LW

140 Predictive Bayesian Models for Risk Modeling of Geologic Carbon Capture and Storage Leaks Using Natural Analogues
Augustin C, Swart P & Broad K

141 CO₂ Dissolution Rates during CO₂ Injection: A Consequence and Measure of Reservoir Heterogeneities

142 Comparison of PFLOTRAN and TOUGHREACT Numerical Codes for Reactive Transport Modelling of CO₂ Storage in Saline Aquifers
Cantucci B, Orsini P & Quattrocchi F

143 Modelling the Propagation and Dissolution of Carbon Dioxide into Reservoir Brines: Implications for Carbon Dioxide Sequestration

144 Berea Sandstone Permeability Pre and Post Reaction with Supercritical CO₂ in 1% NaCl Brine
Dawson G, Biddle D, Khan C, Jiang X, Golding S & Rudolph V

145 Reactivity of Cement and Steel Interfaces in Geological Carbon Storage
Dupraz S, Fabbri A & Grataloup S

146 Experimental Investigation of CO₂-Water-Rock Interactions Under Simulated Fresh-Water Aquifer Conditions
Farquhar S, Dawson G, Pearce J & Golding S

147 Effects of SO₂-NO₂ Impurities in the CO₂ Stream on Mineral Solubility
Fischer S & Liebscher A
<table>
<thead>
<tr>
<th>Posters</th>
</tr>
</thead>
</table>
| **148** | Nano Iron Sulfides for Carbon Dioxide Reduction  
*Goodall J, Hollingsworth N, Roffey A, Hogarth G, Holt K & Darr J* |
| **149** | Dissolution Rates of Plagioclase Feldspars at 22°C as a Function of pH and Plagioclase Composition  
*Gudbrandsson S, Wolff-Boenisch D, Gislason SR & Oelkers EH* |
| **150** | Dissolution of Arsenic and Iron from Reservoir and Cap-Rocks of Geologic Carbon Dioxide Storage Sites  
*Parthasarathy H, Lopano C, Hakala A, Dzombak D & Karamalidis A* |
| **151** | Experimental Study of Mineral-Microbial Interaction to Investigate the Effects of CO$_2$ Storage  
*Kasina M, Morozova D, Pellizzari L, Kassahun A & Wuerdemann H* |
| **152** | Reactive Transport Modelling of Mineral Trapping of CO$_2$ Revised by Water Sampling Data at Nagaoka CO$_2$ Storage Site  
*Kawata Y, Xue Z & Mito S* |
| **153** | Investigating the Role of Noble Gases as Tracers for CO$_2$ Storage  
*Kilgallon R, Gilfillan S, McDermott C & Edlmann K* |
| **154** | Long-Term Effects of CO$_2$-Charged Brine on Caprock Integrity and Existing Heterogeneities within the Entrada Sandstone, Green River, Utah  
*Maskell A, Kampman N, Bickle M, Chapman H, Daniels K, Busch A, Schaller M & Evans J* |
| **155** | Tracing the Movement and Fate of Injected CO$_2$ in a Mature Oil Field Using Geochemical, Isotopic and Modeling Approaches  
*Mayer B, Johnson G, Daikhaa C, Shevalier M, Nightingale M & Hutcheon I* |
| **156** | Leakage Behavior of Gases to Bottom Water Through Sediment Layers with Gas-Hydrate Stable Conditions  
*Ohsumi T* |
| **157** | Isotopic Studies of Rapid Carbonate Precipitates  
*Boles JR, Omelon S & Garven G* |
| **158** | Reactive Transport Modeling to Assess Geological CO$_2$ Storage via Mineral Carbonation in Peridotite  
*Paukert A, Matter J, Kelemen P & Sonnenthal E* |
| **159** | CO$_2$-Olivine Interaction in Porous Media – An Experimental Study  
*Pikryl J, Stefánsson A & Sigfússon B* |
| **160** | In situ pH and Carbon Dioxide Solubility in NaCl Fluids  
*Purser G, Rochelle C & Jones L* |
161 Experimental Study of the Reaction Kinetics between CO₂-Bearing Solution and Olivine

162 Elevated Pressure of Carbon Dioxide Affects Growth of Thermophilic Petrotoga sp
   Rakoczy J, Gniess C, Schippers A, Schlömann M & Krüger M

163 Green River CO₂ Natural Analogue, Utah: Insights into Fe Mobilisation from Jarosite Fracture Mineralisation
   Rushton J, Wagner D, Purser G, Pearce J & Rochelle C

164 Continuous Soil Gas Monitoring Related to CCS – Lessons Learned from a 5-Year Case Study
   Schoeimer S, Möller I & Furche M

165 Inverse Modeling in a CO₂ Natural Analogue – Long Term Processes in Carbon Dioxide Storage
   Király C, Sendula E, Szamosfalvy Á, Falus G, Szabó C & Forray V

166 Geochemical and Isotopic Monitoring of Dissolved Carbon Dynamic in a Karst Aquifer, Located Above the Rousse Site Test for CO₂ Geological Storage
   Staniszewski Y, Groleau A, Jézéquel D & Agrinier P

167 Long-Term CO₂ Induced Reactivity, Observations on Natural CO₂ Analogues and Geochemical Model Predictions
   Wasch L, Koenen M & Nelskamp S

168 Modelling Gas-Fluid-Mineral Interactions in a CO₂ Injection Analogue Site with Noble Gases

(Session 12g continues on Wednesday 28th AM on p.225)

13e: Rare Earths and Rare Metal Mineralization

169 Distribution of Rare Earth Elements in Marine Co-rich Ferromanganese Crusts of the South Atlantic
   Barandas A, Duarte MA & Enzweiler J

170 Rare Earth Elements as Indicators of Hydrothermal Processes within the East Scotia Subduction System
   Cole C, James R, Connelly D & Hathorne E

171 Origin of REE Patterns in AMD-Impacted Areas
   Grawunder A, Meißner S, Merten D, Pašalić S, Karlsson S, Allard B & Büchel G

172 REE Content of Phosphogypsum from Romania
   Iancu AM, Dumitras DG, Bilal E, Marinea S, Ghinet C, Calin N & Anason AM

173 Rare Earth Element Signatures of Metal-Rich Hydrothermal Ferromanganese Deposit in the South-West Pacific

174 Mineralogical, Petrographical and Geochemical Investigation of Tefenni-Burdur Chromite Occurrences, Turkey

Kan Bostanci A, Kiran Yildirim D, Karaman M, Sert AS & Budakoglu M

175 Niobium Mineralization in a Magnetite-Rich Carbonatite, Elk Creek, Nebraska (USA)

Blessington M, Kettler R, Verplanck P & Farmer L

176 Influence of Long-Term Diagenesis on the REE Content in Marine Reptile Remains from the Middle Triassic Bonebed (S Poland)

Kowal-Linka M, Jochum KP & Surmik D

177 Indium from the Lagoa Salgada Orebody, Portugal

Lima A, Rodrigues B, Oliveira A & Guimaraes F

178 Ore Mineralization Processes in the Greater Caucasus Kakheti Segment, Georgia

Okrostsvardize A, Aqimidze K & Gagnidze N

179 LREE-Rich Beach Sands from Sithonia Peninsula (Chalkidiki, Greece)

Papadopoulos A, Christofides G, Pe-Piper G & Koroneos A

180 Formation of Monazite-(MREE) from Paleozoic Shales: Role of Host Rock Chemical Composition and Organic Material


181 Ge and Ge-Bearing Mineral Phases in Gabbrodolerites of Mt. Ozernaya Trap Intrusion (Siberian Platform)

Ryabov V & Agafonov L

182 Telluride-Gold-Sulfide Mineralization in Silicification Zones of Gabbro-Dolerite Bodies of Hengursk Complex (Russia, Pay-Khoy)

Shaybekov R

183 Biomorphic Structure of Rich Ores at the Tomtor REE Deposit

Lazareva E, Zhmodik S, Tolstov A, Sherbov B & Karmanov N

184 The Distribution of LILE and HFSE in the Magmatic Hydrothermal Systems of Mylonites on the Example of the Detachment-Closed Metamorphic Block (Eastern Trans-Baikalian Region, Russia)

Tishin P, Bukharova O & Kremer I

185 Rare Earth Elements in Hydrothermal Fluids from Kueishantao, off Northeastern Taiwan

Wang XY & Zeng ZG
Trace Elements in Catanda Carbonatitic Massif (SW Angola)

Wołkowicz S, Bojakowska I, Wołkowicz K & Smakowski T

.Session 13e continues on Wednesday 28th AM on p.226

14d: Quantifying the Transfer of Carbon between Oceanic, Atmospheric, Terrestrial and Geological Reservoirs over Glacial Cycles

Surface Ocean δ¹¹B-pH Reconstructions and Insights into the Ocean-Atmosphere Carbon Exchange during the Last Deglaciation


Southern Hemisphere Orbital Forcing and its Effects on CO₂ and Tropical Pacific Climate

Tachikawa K, Timmermann A, Vidal L, Sonzogni C & Elison Timm O

Sedimentary Organic Matter Variations in the Chukchi Borderland over the Last 155 kyr

Uchida M & Rella S

14e: Linking Ice Core Records of the Recent Past to Global Climate

Development of the U-Series Dating Technique for the EDML Ice Core

Aciego S

Improvements of the Coherent and Precise Ice Core Dating Tool Datice: New Data and Parameterization

Bazin L, Landais A, Durand G, Ritz C, Montagnat M, Lemieux-Dudon B & Raynaud D

Expanding Potential Source Area Studies of Dust in East Antarctica by Integrating Trace Element Chemistry and Radiogenic Isotopes

Blakowski M, Aciego S, Delmonte B & Baroni C

Location of Cation Impurities in NGRIP Deep Ice Revealed by Cryo-Cell UV-Laser-Ablation ICPMS

Della Lunga D, Müller W, Rasmussen SO & Svensson A

Revealing a High Altitude Paleoclimate Record from a Southern Europe Ice Core

<table>
<thead>
<tr>
<th>195</th>
<th>Inferring a West Antarctica Firn Temperature History from a Shallow Ice Core Using a New Proxy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gkinis V, Jones T, White J, Vaughn B, Steig E, Markle B &amp; Schoenemann S</td>
</tr>
<tr>
<td>196</td>
<td>Preliminary U-Series Dating Results from the GISP2 Ice Core</td>
</tr>
<tr>
<td></td>
<td>Meyer K &amp; Aciego S</td>
</tr>
<tr>
<td>197</td>
<td>Temperature Reconstruction for the Last 1000 Years at WAIS-Divide, Antarctica, from Inert Gas Isotopes and Borehole Temperature</td>
</tr>
<tr>
<td></td>
<td>Orsi A &amp; Severinghaus J</td>
</tr>
<tr>
<td>198</td>
<td>Chemical Compositions of Soluble Aerosols Around the Last Termination in the NEEM (Greenland) Ice Core</td>
</tr>
<tr>
<td>199</td>
<td>Detailed History of Atmospheric Pollution in South America as Recorded by Trace Elements in the Quelccaya Ice Core</td>
</tr>
<tr>
<td></td>
<td>Uglietti C, Gabrielli P &amp; Thompson L</td>
</tr>
<tr>
<td>200</td>
<td>First Results from the Northeast Greenland Ice Stream Drilling Site</td>
</tr>
</tbody>
</table>

14h: Geological Regulation, Feedbacks and Records of CO₂

| 201 | Eocene pCO₂ Reconstructions Using Boron Isotopes in “Glassy” Planktonic Foraminifera |
|     | Anagnostou E, John EH, Edgar KM, Pearson PN, Lear CH, Pancost RD & Foster GL |
| 202 | Simulating the Climatic Impact of Large Igneous Provinces Using a Mid-Miocene Case-Study |
|     | Armstrong McKay DI, Tyrrell T, Wilson PA & Foster GL |
| 203 | Early Eocene Climatic Optimum: Numerical Modelling of the Impact of the Neo-Tethys Closure |
|     | Bomou B, Hoareau G, Donnadieu Y, Le Hir G & Marquer D |
| 204 | C-Isotope Evidence for pCO₂ and Volcanic Forcing during the Early Aptian OAE 1a – The Cau Section (SE Spain) |
|     | Castro JM, De Gea GA, Pancost RD, Quijano ML & Naafs BDA |
| 205 | Reconstruction of pH and Partial Pressure of Carbon Dioxide by Boron Isotopes of Unaltered Ammonoids & Nautiloids and the Expected High Alkalinity during the Cretaceous Period |
|     | Kawahata H, Fukushima A, Moriya K, Suzuki A & Ishikawa T |
| 206 | Evaluating the Role of Arc Volcanism on Neoproterozoic to Early Paleozoic Climate |
|     | McKenzie R, Hughes N, Gill B & Myrow P |
207  A First Look at Boron Isotope Based pCO$_2$ Values from the Eastern Arabian Sea for the Last 22 kyr

Naik S, Naidu D, Naik S & Foster G

208  On the Reliability of Paired Carbon Isotope as a pCO$_2$ Proxy in the Ediacarian Araras Platform, Brazil

Sansjofre P, Ader M, Trindade R & Nogueira A

209  A Review of CO$_2$ and O$_2$ Gas Dynamics within the Sub-Surface Critical Zone and Implications for Early-Atmosphere Studies Using Paleosols

Stinchcomb G & Brantley S

210  Isotopic Fingerprint of Ice-Rafted Debris from the Antarctic Margin: A Spatial Record of Initial Ice Growth

van de Flierdtt T, Kim S-E, Cook C, Hemming S, Williams T, Pierce E, Bohaty S, Passchier S, Roehl U & Houben S

14i: Marginal Basin Suboxic Sediments: Archives of High-Resolution Paleoclimate Marine and Terrestrial Records and Interactions

211  Underestimation of the Authigenic Fraction of Cu and Ni in Organic-Rich Sediments and Particles

Böning P, Fröljje H & Brumsack H-J

212  Evidences for a Persistent Link between Greenland Climate and Northeastern Pacific Oxygen Minimum Zone on Millennial Timescales Under Interglacial Conditions

Cartapanis O, Tachikawa K, Romero OE & Bard E

213  A Half Million Years of Suborbital Variability from the Cariaco Basin: A Proxy for Greenland “Ice Core” Records?

Gibson KA & Peterson L

15c: Pollution – Climate Interactions and Energy Solutions

214  The Effect of the Inclusion of Online Aerosol-Cloud Feedbacks on Solar Radiation Feedback

Curci G & Tuccella P

215  Silver Enrichment in Rain Under Different Cloud Conditions

Zipori A, Rosenfeld D & Erel Y

216  Observations of Atmospheric Hg Species and Depositions in Remote Areas of China

Feng X, Fu X & Zhang H

217  Contribution of Ammonium Nitrate to Aerosol Optical Depth and Direct Radiative Forcing by Aerosols over East Asia

Park RS, Lee SJ, Shin S-K & Song CH
218 Salt Lakes of Western Australia – Emissions of Natural Volatile Organic Compounds
*Sattler T*, *Krause T*, *Schöler HF*, *Kamilli K*, *Held A*, *Zetsch C*, *Ofner J*, *Junkermann W* & *Atlas E*  

219 Traffic-Associated Heavy Metal Pollution and Source Discrimination in Jiangxi Province, China
*Shao L*, *Xiao H-Y* & *Wu D-S*  

220 Hydrocarbon Source Appraisal in PM$_{2.5}$ in Rio de Janeiro
*Massone C*, *Wagener A*, *Gioda A* & *Scofield A*  

15d: Biosphere-Atmosphere Interactions  

221 Simulation of Physical and Chemical Processes of Polluted Air Masses during the Aegean-Game Airborne Campaign Using WRF-Chem Model
*Bossioli E*, *Tombrou M*, *Kalogiros J*, *Allan J*, *Bacak A*, *Bezentakos S*, *Biskos G*, *Coe H*, *Kouvarakis G* & *Mihalopoulos N*  

222 Source Apportionment of Organic Matter by Isotope Analysis, AMS PMF and HNMR Techniques
*Ceburnis D*, *Ovadnevaite J*, *Garbaras A*, *Szidat S*, *Rinaldi M*, *Decesari S*, *Yttri KE*, *Remeikis V*, *Facchini MC* & *O’Dowd C*  

223 Temperature Driven Stable Carbon Isotope Ratio in Marine Aerosols
*Garbaras A*, *Ceburnis D*, *Masalaite A*, *Maenhaut W*, *Ovadnevaite J*, *O’Dowd CD* & *Remeikis V*  

224 Studies on the Characteristics and Mechanism of a Heavy Haze Episode in Jiangsu Province, China
*Huang X*, *Wang T* & *Zhu J*  

225 Fluxes of Fine Particles over a Semi Arid Pine Forest: Possible Effects of a Complex Terrain
*Lavi A*, *Farmer DK*, *Segre E*, *Moise T*, *Rotenberg E*, *Jimenez JL* & *Rudich Y*  

226 Secondary Organic Aerosols in the Coupled Climate Aerosol Model ECHAM-Ham: Insights into Production Dependencies and Climate Impacts
*Sousa Santos G*, *Stanelle T*, *Bey I* & *Lohmann U*  

227 Seasonal Change of Iron Species and Concentration of Soluble Iron in the Atmosphere in Northwest Pacific Region Based on the Analysis of Aerosols Collected in Tsukuba, Japan
*Takahashi Y* & *Furukawa T*  

228 Air-Sea Fluxes of Dimethyl Sulfide and Acetone in the Subtropical and Equatorial Pacific Ocean
15e: Atmospheric Dust

<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>229</td>
<td>Seasonal and Interannual Evolution of the Monoacids Organics in the Atmosphere of the Humid Savanna of Lamto (Ivory Coast)</td>
<td>Toure PR</td>
</tr>
<tr>
<td>231</td>
<td>Studies of Air Quality Index of Industrial Area of Jamshedpur, East India</td>
<td>Ambade B</td>
</tr>
<tr>
<td>232</td>
<td>Unravelling Sources of Ground-Level Ozone in the Intermountain Western U.S. Through Pb Isotopes</td>
<td>Christensen JN, Weiss-Penzias P, Brown ST, McDade C, Jaffe D &amp; Gustin M</td>
</tr>
<tr>
<td>233</td>
<td>Uptake of SO$_2$, HCl and O$_3$ on Volcanic Ash</td>
<td>Delmelle P &amp; Rossi M</td>
</tr>
<tr>
<td>234</td>
<td>Aerosol Trace Metal Fractional Solubility and Chemical Composition of Marine Aerosols at the CVAO</td>
<td>Fomba KW, Müller K &amp; Herrmann H</td>
</tr>
<tr>
<td>235</td>
<td>Photochemistry of Airborne Dust Produces Nucleation Events in the Troposphere</td>
<td>George C</td>
</tr>
<tr>
<td>236</td>
<td>Vertical Differentiation of PM$_{10}$ Concentration and Mineral Composition in the First 100 M of Troposphere Related to Meteorological Conditions in the Sosnowiec Urban Area, S Poland</td>
<td>Jablonska M, Janeczek J &amp; Lesniok M</td>
</tr>
<tr>
<td>237</td>
<td>Modelling the Atmospheric Transport Distance of PAHs at Remote Cold Regions</td>
<td>Li C, Li M &amp; Yu C</td>
</tr>
<tr>
<td>239</td>
<td>Dust Direct Radiative Forcing and the Complex Refractive Index of Hematite</td>
<td>Moosmüller H &amp; Engelbrecht J</td>
</tr>
<tr>
<td>240</td>
<td>Constraining the Mineral and Elemental Composition of Dust Aerosol</td>
<td>Pérez C, Miller R, Perlwitz JP &amp; Rodríguez S</td>
</tr>
</tbody>
</table>
### Posters

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>241</td>
<td>Combined Use of ED-Epma and ATR-FTIR Imaging for Characterization of Individual Aged Asian Dust Particles</td>
<td>Kim H, Jung H-J, Eom H-J, Li X &amp; Ro C-U</td>
</tr>
<tr>
<td>242</td>
<td>Origin of Atmospheric Dust and the Associated Anthropogenic Lead Around Omura Bay, West Japan</td>
<td>Saitoh Y, Umezawa Y, Kawamoto K, Tanimizu M &amp; Ishikawa T</td>
</tr>
<tr>
<td>243</td>
<td>Wild Rats as Sentinel Animals in the Assessment of Asbestos Pollution: A Pilot Study</td>
<td>Vigliaturo R, Ardizzone M, Vizio C, Capella S &amp; Belluso E</td>
</tr>
<tr>
<td>244</td>
<td>Geochemical Characterization of Tire-Wear Particles</td>
<td>Wenzel M, Dietze V, Stille P &amp; Gieré R</td>
</tr>
<tr>
<td>245</td>
<td>Absorbing Aerosol Radiative Effects in the Limb-Scatter Viewing Geometry</td>
<td>Wiacek A, Martin R, Bourassa A, Degenstein D &amp; Lloyd N</td>
</tr>
<tr>
<td>246</td>
<td>Nd-Sr Isotopic Evolution of Asian Dust: Tectonic and Climatic Implications</td>
<td>Zhang W, Li G, Chen Z &amp; Chen J</td>
</tr>
</tbody>
</table>

(Session 15e continues on Wednesday 28th AM on p.227)

### 17b: Constraining Rates of Ocean Processes

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>247</td>
<td>New Sedimentary Pa/Th Records from the Northern Brazilian Margin over MIS3</td>
<td>Burckel P, Waelbroeck C, Gherardi J &amp; Pichat S</td>
</tr>
<tr>
<td>248</td>
<td>Radium Isotopes as Tracers of Boundary Exchange Processes along the US GEOTRACES North Atlantic Zonal Transect</td>
<td>Charette M, Morris P, Jenkins W, Henderson P &amp; Moore W</td>
</tr>
<tr>
<td>249</td>
<td>A Statistical Approach to the Nd Isotopes Distribution in the Oceans</td>
<td>Cogez A, Allègre C, Meynadier L &amp; Lewin E</td>
</tr>
<tr>
<td>250</td>
<td>Characterization of the Primary Productivity Using a Year-Long High Resolution Sediment Trap Experiment in the Southwestern Part of the East/Japan Sea</td>
<td>Kim SH, Hong GH, Kim Yi, Chung CS, Choi KY &amp; Kim YH</td>
</tr>
<tr>
<td>251</td>
<td>U-Series Isotopes as Tracers of Particles Fluxes and Deposition Rates of Heinrich Layers H$_2$ and H1 from a Core Raised off Hudson Strait</td>
<td>Nuttin L &amp; Hillaire-Marcel C</td>
</tr>
<tr>
<td>252</td>
<td>Pu Isotope in Water Column of the Sea of Okhotsk</td>
<td>Yamada M, Zheng J &amp; Aono T</td>
</tr>
</tbody>
</table>
17d: Isotopic and Elemental Tracers of Marine Biogeochemistry and Circulation

253 Dissolved and Particulate Iron Concentrations and Isotopic Compositions in the South Atlantic and Southern Ocean
*Abadie C, Lacan F, Radic A & Poitrasson F*

254 Enhanced Subsidence and Sediment Dynamics in Galveston Bay- Implications for Geochemical Processes and Fate and Transport of Contaminants
*Al Mukaimi M & Dellapenna T*

255 Holocene Marine Reservoir Correction (ΔR) Variability in the Eastern Bay of Bengal
*Chiang H-W, Wang Y, Shyu JBH, Wang C-C, Lin Thu Aung, Phyo Maung Maung, Oo Than, Soe Thura Tun & Shen C-C*

256 The Silicon Isotopic Composition (δ_{30}Si) of Water Masses in the Atlantic
*Coffineau N, De La Rocha C, Schlosser C & Wolf-Gladrow D*

257 Geochemical and Isotopic Studies of the Hooghly River Estuary, India: Natural vs. Anthropogenic Sources of Organic Carbon
*Samanta S, Dalai T & Pattanaik J*

258 Interpreting Molybdenum Isotopes as a Proxy for the Spatial Distribution and Intensity of Ocean De-Oxygenation Events in an Earth System Model
*Death R, Ridgwell A, Arndt S, Monteiro F, Sherman D & Vance D*

259 Stable Silicon Isotopes in Porewaters off Peru – Diatom Dissolution Versus Authigenic Clay Mineral Formation
*Ehlert C, Doering K, Wallmann K, Grasse P & Frank M*

260 Modeling of Modern δ_{30}Si Distributions in the Oceans and in Marine Sediments
*Gao S, Wolf-Gladrow D & Völker C*

261 Sr and Nd Isotopes of Modern Cold Seep Carbonates from the Northern South China Sea
*Ge L, Chen J, Jiang S & Yang T*

262 Controls on the Uptake of Mg, Sr and Li in Benthic Foraminifera *Uvigerina peregrina*
*Gray W, Wolthers M & Holmes J*

263 Rare Earth Element Distributions as Tracers of Micronutrient Input and Nd Cycling in the South Atlantic
264 Ge/Si Variations in the Deep Sea Deduced from Microanalyses of Giant Spicules of the Sponge Monorhaphis chuni
   

265 Provenance Tracing of Aerosols into the South Atlantic Ocean Using Pb and Nd Isotopes and Select Trace and Rare Earth Elements
   

266 Estimation of POC and Biogenic Silica Export Fluxes Using $^{234}$Th/$^{238}$U Disequilibrium in the Amundsen Sea, Antarctic
   
   **Kim MS, Choi MS & Lee SH**

267 Distribution and Migration of Americium-241 in the East Pacific
   
   **Kinoshita N, Nagaoka M, Sumi T, Takimoto K, Yokoyama A & Nakanishi T**

268 A Low Blank Technique for the Measurement of Iron Isotopes in Seawater and Results from the Tropical Atlantic Ocean
   
   **Klar JK, James RH, Parkinson IP, Achterberg EP & Schloesser C**

269 Zinc Isotopes as a Tool to Study Zinc Uptake by Marine Phytoplankton
   
   **Köbberich M, Cox A & Vance D**

270 Ocean Sections and Stoichiometry of Dissolved Bioactive Trace Metals in the North Pacific Ocean
   
   **Konagaya W, Zheng L, Minami T & Sohrin Y**

271 Geochemistry of Sediments from the Khai River – Nha Trang Bay Estuarine System, South China Sea
   
   **Koukina S, Lobus N, Peresypkin V, Baturin G & Stotskaia A**

272 Precise Determination of B Isotopic Compositions in Low Concentration Carbonates and Fluids Using Micro-Sublimation MC-ICPMS
   
   **Lin Y-P, You C-F & Chung C-H**

273 The Platinum Behavior in the North Atlantic Ocean
   
   **López Sánchez DE & Cobelo Garcia A**

274 $^{129}$I Concentrations in Surface and Deep Seawater from the Irish Sea and the Atlantic Ocean
   

275 New Applications of Dissolved Gallium in the Oceans: Promoting Increasingly Routine Measurement
   
   **McAlister J & Orians K**
<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>276</td>
<td>Record of Bacterial Sulfate Reduction during 50–210 kyr ago in the Submarine Hypersaline Meedee Lake, off Crete Island, Eastern Mediterranean Sea</td>
<td>Minami H, Yamaguchi KE, Naraoka H, Murayama M, Ikehara M &amp; Tokuyama H</td>
</tr>
<tr>
<td>277</td>
<td>Laboratory Experiments on the Effect of Microbial Activities on Iodine Speciation in Seawater</td>
<td>Okabe N, Muramatsu Y &amp; Amachi S</td>
</tr>
<tr>
<td>278</td>
<td>Distribution of Dissolved Neodymium Isotopes Across the Southern South Pacific</td>
<td>Pahnke K &amp; Basak C</td>
</tr>
<tr>
<td>279</td>
<td>Pb and Stable Pb Isotopes in Sediments of the Eastern Coast of the Yellow Sea</td>
<td>Park J-K, Choi M-S, Chang D, Park S &amp; Lim D-I</td>
</tr>
<tr>
<td>280</td>
<td>Lead Isotopes and Concentrations in the South Atlantic from the UK GEOTRACES Transect along 40°S</td>
<td>Paul M, van de Flierdt T, Rehkamper M, Weiss D, Lohan M &amp; Henderson G</td>
</tr>
<tr>
<td>281</td>
<td>Rocas Atoll, a Promising Site of Climate Oscillation Record in the South Atlantic: ENSO Event Register in C and O-Isotopes from Corals</td>
<td>Pereira NS, Sial AN, Kikuchi RKP &amp; Ferreira VP</td>
</tr>
<tr>
<td>282</td>
<td>Constraining the Nd Isotopic Composition of Antarctic Bottom Water Formed in the Weddell Sea</td>
<td>Piotrowski A, Hillenbrand C-D, Allen C, Domack E &amp; Mackenesen A</td>
</tr>
<tr>
<td>283</td>
<td>Evidence for Increased Southern Ocean Waters in the Tropical Intermediate Indian Ocean during the Last Deglaciation</td>
<td>Rashid H, Elderfield H, Gourlan A &amp; Smith M</td>
</tr>
<tr>
<td>284</td>
<td>Dissolved Gallium and gallium/Aluminum Ratios in the US GEOTRACES North Atlantic Zonal Section</td>
<td>Shiller A, Hatta M &amp; Measures C</td>
</tr>
<tr>
<td>286</td>
<td>Dissolved Barium Distribution and Cycling in the Bay of Bengal</td>
<td>Singh SP &amp; Singh SK</td>
</tr>
<tr>
<td>287</td>
<td>Extraction of Paleo Seawater Nd Isotope Compositions: A Case Study from the Indonesian Throughflow</td>
<td>Stumpf R, Frank M, Haley BA, Kraft S &amp; Kuhnt W</td>
</tr>
</tbody>
</table>
Posters

288 A New Database for Nd Isotopes in Marine Environments

289 Vertical Profiles of Copper Isotopic Composition in the Ocean
Takano S, Tanimizu M, Hirata T & Sohrin Y

290 Selenium Coprecipitated with Barite as a New Redox Indicator
Tokunaga K, Yokoyama Y & Takahashi Y

291 Factors Influencing Methane-Derived Authigenic Carbonate Formation at Cold Seep from Southwestern Dongsha Area in the Northern South China Sea
Wang S, Yan W, Magalhães VH, Chen Z, Pinheiro LM & Gussone N

292 Geochemistry and Isotope Geochemistry of Upper Cretaceous Chalk as Equivalent for Reservoir Chalk of the North Sea Basin for EOR
Wang W, Madland M, Zimmermann U, Bertolino SAR, Hildebrand-Habel T & Kornes RI

293 Distribution of Cadmium and its Main Influencing Factors in the Surface Sediments from Five Typical Bays in Eastern Coastal Areas of Guangdong Province, South China
Yan W, Zhang X, Zhong L & Zhang N

294 100% Decomposition of Diatomous Organic Carbon during Settlement Through Ocean Columns
Yasuda S, Hara Y, Naraoka H, Takahashi K & Akagi T

(Session 17d continues on Wednesday 28th AM on p.228)

17f: Atmospheric Trace Gas and Aerosol Changes in the Recent Past and the Last 1000 Years: Observations and Modelling

295 A Record of Carbonyl Sulfide from Antarctic Ice over the Last 1000 Years

296 Isotopic Constraints for Sources and Sinks of NO in the City of Berlin
Friebel M & Wiechert U

297 Temporal Variations of Atmospheric Helium Isotopes
Mabry J, Lan T, Burnard P & Marty B
17g: Metal-Biota Interactions in Seawater

298 Seawater Trace Metals in Acidified Condition: An Accumulation Study in the Blue Mussel Mytilus galloprovincialis off Vulcano Island Submarine Vents (Italy)
Boatta F, D’Alessandro W, Gagliano A, Federico C, Calabrese S, Liotta M, Milazzo M & Parello F

299 Heme B in Particulate Material from the Atlantic and Southern Ocean
Gledhill M, Honey DJ, Rijkenberg MJ, Nielsdottir MN & Achterberg EP

300 Determination of Picomolar Zn in Seawater of the North and South Pacific with Clean Sampling Methods
Kim T, Gamo T & Obata H

301 Biogeochemical Cycle of Dissolved Zinc and Cobalt in the South Atlantic
Lohan M, Wyatt N, Milne A & Woodward M

302 Structure, Dynamics, and Spectroscopy of Metalloproteins from Methanogenic and Hydrocarbonoclastic Microbes
Magyar J, Chen WT, Cleveland C, Harvilla P & Oswald V

303 Distribution of Iron (II) in the Northwestern Pacific
Obata H, Takahashi S, Gamo T & Nishioka J

18c: Achievements and Future Challenges in Environmental and Soil Chemistry – A Symposium in Honor of Professor Willem van Riemsdijk

304 Characteristic Elements of Products of Designations of Origin Selected from Yangchun in Guangdong Province, China

305 Phosphorus Availability in Agricultural Soils of Wallonia (Belgium) – A Modeling Approach
Cobert F, Pourret O, Renneson M & Colinet G

306 A Generic Approach to Geochemical Multi-Surface Modelling of the Leaching of Contaminated Materials
Comans R, Dijkstra J & van Zomeren A

307 Modelling Metal Cation-Phosphate Competitive Interactions on Iron Oxides
Fiol S, Antelo J, López R, Gondar D & Arce F

308 An Application of Multivariate Statistical Analysis Using SAS Programme to Identify Heavy Metal Sources between Cebeci (Kocaeli)-Eregli (Zonguldak), Turkey
Yalcin F, Kaya E & Ilbeyli N
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>309</td>
<td>Peat and Sapropel as the Sources of Humus for the Restoration of Degraded Lands of the Amur Region (Far East, Russia)</td>
<td>Kichanova V &amp; Kichanov V</td>
</tr>
<tr>
<td>310</td>
<td>Using DMT and AF4-HR-ICP-MS to Characterize Trace Metal Speciation in Soil Water Extracts</td>
<td>Koopmans GF, Regelink IC &amp; Comans RNJ</td>
</tr>
<tr>
<td>311</td>
<td>Anthropogenic Impact on Forest Soil – Pollution with PAH, PCB and OCP in Germany</td>
<td>Lehnik-Habrink P, Aichner B, Bussian B, Hein S &amp; Piechotta C</td>
</tr>
<tr>
<td>312</td>
<td>Monodentate Inner–sphere Coordination of Arsenate and Phosphate Anions, Stabilized by Hydrogen Bonding, at the Goethite/Water Interface</td>
<td>Lövgren L, Nelson H &amp; Sjöberg S</td>
</tr>
<tr>
<td>313</td>
<td>Essential Aqueous Geochemistry of Pb(II) Solid Formation</td>
<td>Mendoza-Flores A &amp; Villalobos M</td>
</tr>
<tr>
<td>314</td>
<td>Biomass Combustion – A Possible Source of Environmental Pollution?</td>
<td>Michalik M, Pogrzeba M &amp; Wilczynska-Michalik W</td>
</tr>
<tr>
<td>315</td>
<td>Heavy Metal Availability in Contaminated Soils: Complementary Insights from Isotopic Exchange, DMT, and Sequential Extractions</td>
<td>Ren ZL, Dai J, Sivry Y &amp; Benedetti M</td>
</tr>
<tr>
<td>316</td>
<td>The Role of Soil Cu in Chelate Mediated Fe Acquisition by Plants</td>
<td>Schenkeveld W &amp; Kraemer S</td>
</tr>
<tr>
<td>317</td>
<td>Characterization and Surface Reactivity of Natural and Synthetic Magnetites</td>
<td>Salazar-Camacho C, Villalobos M &amp; Rivas-Sánchez MDLL</td>
</tr>
<tr>
<td>318</td>
<td>Statistical Approach and Heavy Metal Analyses of Konyaalti (Antalya, Turkey) Coast Water</td>
<td>Kilic S, Yalcin F &amp; Yalcin MG</td>
</tr>
<tr>
<td>319</td>
<td>Tracing the Sources of Sulfur in Beijing Rain Water with Stable Isotopes</td>
<td>Zhu G, Guo Q, Strauss H &amp; Peters M</td>
</tr>
</tbody>
</table>

(Session 18c continues on Wednesday 28th AM on p.229)

18d: Trace Element Dynamics in Mining Impacted Environments and Integrated Remediation Solutions

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>320</td>
<td>Heavy Metals Characteristics in the Gold and Iron Mine Soils in the Upstream Area of Miyun Reservoir</td>
<td>Briki M, Huang X, Ju P, Li C &amp; Ji H</td>
</tr>
</tbody>
</table>
321 Mineralogical and Geochemical Properties of a Water Dam Receiving Historic AMD Contamination by Sulfide Tailings in the RioTinto Mine SW Spain
Grande Gil JA, Valente T, de la Torre ML, Borrego J, Sequeira Braga MA, Gomes P, Santisteban M & Fernandez JP

322 Long-Time Alteration of Iron Slags Inferred from Paleometallurgical Heaps
Dubois M & Gauthier A

323 Sequential Extraction of Arsenic in Sediments of Paracatu, MG, Brazil
Ferreira M, Patchineelam S, Castilhos Z & Calmano W

324 Microorganisms in Flooded Underground Uranium Mines of East Germany
Gagell C & Arnold T

325 Spatial Dispersion at a Watershed Scale of Some Mining-Originated Metals in Various Solid Materials
Ghorbel S, Courtin-Nomade A, Poaty B, Grosbois C & Soubrand M

326 Definition of a Clean Energy System for Decontamination of Acid Mine Waters and Recovering their Metal Load
Grande Gil JA, de la Torre ML, Andujar JM, Valente T & Santisteban M

327 Vanadium Distribution in Environmental Samples Surrounding the Slag Dump in Panzhihua, Sichuan Province, P. R. China
Huang Y, Zhang W, Ni S, Chen Y & Zhong L

328 Characterization of the White Precipitates found in Acid Mine Drainage
Kim Y, Lee C-M & Gwak H-Y

329 Trace Metals in Plants of Chadak Gold Ore Field, Uzbekistan
Kodirov O, Martin F & Shukurov N

330 Understanding Biogeochemical Transformation and Mobilization of Hg from River Bank Soils: South River, Virginia
Lazareva O, Sparks DL, Landis RC, Grosso NR, Collins J, Dyer JA, Ptacek C, Hicks S & Montgomery D

331 Biogeochemical Control on the Dissolution/Precipitation of Fine Suspended Solids from Mine Drainage
Lee S, Oh M, Lee J & Kim D

332 Use of Sulfur Isotopes to Quantify Biological and Abiotic Processes Contributing to Sulfur Cycling in an AMD Treatment System
Walters ER, Pugh CW, Bender KS & Lefticariu L

333 Mercury Emission from Coal Fire and Spontaneously-Ignited Gangue Hill and Distribution in Local Near-Surface Air in North China
Liang H & Liang Y
<table>
<thead>
<tr>
<th>334</th>
<th>Spontaneously-Ignited Gangue Hill – A Potential Source for Global Mercury Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Liang Y &amp; Liang H</td>
</tr>
<tr>
<td>335</td>
<td>Behaviors of Pb, As and Cd in the Mining Impacted Farmlands</td>
</tr>
<tr>
<td></td>
<td>Luo L, Chu B, Liu Y, Wang X, Xu T, Bo Y &amp; Sun J</td>
</tr>
<tr>
<td>336</td>
<td>Open-Pit Coal Mining Effects on Rice Paddy Soil Composition and Metal Bioavailability to Oryza sativa L. Plants in Cam Pha, Northeastern Vietnam</td>
</tr>
<tr>
<td></td>
<td>Marquez JE, Martínez R, Hoàng TBH &amp; Gieré R</td>
</tr>
<tr>
<td>337</td>
<td>Potential of Uranium Removal from Post-Uranium Mining Heaps by Indigenous Bacteria</td>
</tr>
<tr>
<td></td>
<td>Mielnicki S, Drewniak L, Szymkiewicz M, Rewerski B &amp; Skłodowska A</td>
</tr>
<tr>
<td>338</td>
<td>Copper and Lead Isotope Ratios as Tracers of Soils Pollution from the Kombat Mining Area, Namibia</td>
</tr>
<tr>
<td></td>
<td>Mihaljevic M, Etlinger V, Kribek B, Chrastny V, Vanek A &amp; Penízek V</td>
</tr>
<tr>
<td>339</td>
<td>Pb, Zn and Cd Dynamics in Mining Areas Under Mediterranean Climate and Carbonated Geologic Context: Northern Tunisia Example</td>
</tr>
<tr>
<td></td>
<td>Munoz M &amp; Ghorbel M</td>
</tr>
<tr>
<td>340</td>
<td>The Transport of Toxic Elements in River Affected by Acid Thermal Water and Effect of Dam Against Elemental Distributions</td>
</tr>
<tr>
<td></td>
<td>Ogawa Y, Ishiyama D, Shikazono N &amp; Tsuchiya N</td>
</tr>
<tr>
<td>341</td>
<td>Mercury Speciation in a Historic Hg-Mining and Smelting Area, Apuseni Mts., Romania</td>
</tr>
<tr>
<td></td>
<td>Petrescu L, Jianu D &amp; Milu C</td>
</tr>
<tr>
<td>342</td>
<td>Toward an in situ Bioremediation Strategy for Acidic in situ Leach Uranium Mining</td>
</tr>
<tr>
<td></td>
<td>Reinsch B, Descoste M, Bernier-Latmani R &amp; Rossi P</td>
</tr>
<tr>
<td>343</td>
<td>Past and Present Impact of Mining Activity on Metal and Metalloid Contamination in Sediments of the Gardon River Watershed (France)</td>
</tr>
<tr>
<td></td>
<td>Resongles E, Casiot C, Freydier R, Dezileau L, Viers J &amp; Elbaz-Poulilhct F</td>
</tr>
<tr>
<td>344</td>
<td>Adsorption Experiments of Arsenic and Lead onto Barite</td>
</tr>
<tr>
<td></td>
<td>Villanueva-Estrada RE, Samperio-Jiménez F, Villanueva-González P, Canet C &amp; Martin-Romero F</td>
</tr>
<tr>
<td>345</td>
<td>Microbial Response on Siderophores of Heavy Metal Resistant Streptomycetes</td>
</tr>
<tr>
<td></td>
<td>Voit A, Greyer M, Kraüße T, Gube M &amp; Kothe E</td>
</tr>
<tr>
<td>346</td>
<td>Vanadium Dynamics in Soils Impacted by Vanadiferous Titanomagnetite Ore Mining</td>
</tr>
<tr>
<td></td>
<td>Xu Y-H, Brandl H &amp; Huang J-H</td>
</tr>
</tbody>
</table>
19b: The Role of Reactive Intermediates in Biogeochemistry

347 Phosphorus Retention in Sediments of a Eutrophied Lake: Role of Organic Phosphorus
Ansems N, O’Connell D, Wiklund J, Behrends T & Van Cappellen P

348 Nitrifying Potential in Beggiatoa Mats from Marine Mangroves
Boc A, Gros O, Laverman AM & Sebilo M

349 Effect of Hydroxycarbonate Green-Rust Particle Size on Ferrous Denitrification
Ona-Nguema G, Guerbois D, Maffioli P, Noel V, Brest J & Morin G

350 Volatilization of Hg from HgS Minerals Mediated by the Coupled Activity of Thiosulfate and a Sulfur-Oxidizing Bacterium

351 Organic Carbon Proxies in Black Shales: Strontium
Wang H, Wang X & Zhang S

19i: Microbes and Minerals in Extreme Environments

352 The Microbe-Mineral Interactions in the Acidic Podzol Soil
Ahmed E & Holmström S

353 Biogeochemistry of Manmade Lake Nearby Industrial City, Riyadh, Saudi Arabia
Albokari M & Mashhour I

354 Arsenic Dissolution from Japanese Paddy Soil by a Dissimilatory Arsenate-Reducing Bacterium Geobacter sp. OR-1
Amachi S, Dong DT & Yamaguchi N

355 Dolomite Formation within Microbial Mats from the Dohat Faishakh Sabkha, Qatar
Brauchli M, Bontognali T, McKenzie J, Strohmenger C, Jameson J, Sadooni F & Vasconcelos C

356 Biomineralization of Strontianite (SrCO₃) by Proteus mirabilis
Kang S, Kim Y & Roh Y

357 Geomicrobiology of Ancient Polymetallic Kupferschiefer Black Shale – Minireview
Matlakowska R & Sklodowska A
<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>359</td>
<td>Searching Radiation-Resistant Microorganisms in High-Mn Sites</td>
<td>Paulino Lima IG, Fujishima K, Navarrete J &amp; Rothschild L</td>
</tr>
<tr>
<td>361</td>
<td>Biomineralization of Mg-Rich Calcite (Mg$<em>{x}$Ca$</em>{1-x}$CO$_3$) by <em>Proteus mirabilis</em></td>
<td>Rohe Y &amp; Kang S</td>
</tr>
<tr>
<td>363</td>
<td>Chemical and Bacteria Leaching of a Low-Grade and High-Fluorine Uranium Ore in Column Reactors</td>
<td>Sun Z</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>


<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>366</td>
<td>Evaluation of Atmospheric Flows of Mineral Substances in the South-Eastern Coast of Baikal Lake during the Last 200 Years</td>
<td>Budashkina V &amp; Bobrov V</td>
</tr>
<tr>
<td>367</td>
<td>Modelling the Migration of Mercury in a Column Experiment: Biotic Against Abiotic Mechanisms</td>
<td>Blanc P, Burnol A, Harris-Hellal J &amp; Laperche V</td>
</tr>
<tr>
<td>368</td>
<td>Molecular and Micro Element Remote Analysis of Leaves of the Green Plants</td>
<td>Iglakova A, Klimkin A &amp; Prokopiev V</td>
</tr>
<tr>
<td>Page</td>
<td>Title and Authors</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>369</td>
<td>The Biogeochemical System of Chemical Elements Distribution in the Hydroshere&lt;br&gt;<strong>Korzh V</strong></td>
<td></td>
</tr>
<tr>
<td>370</td>
<td>The Heavy Metals in <em>Halocynthia aurantium</em> Tissues of the Japan Sea&lt;br&gt;<strong>Kosjanenko A &amp; Kosjanenko D</strong></td>
<td></td>
</tr>
<tr>
<td>371</td>
<td>Trace Elements in Ectomycorrhizae Determined by Neutron Activation Analysis&lt;br&gt;<strong>Kubrová J &amp; Borovička J</strong></td>
<td></td>
</tr>
<tr>
<td>373</td>
<td>Modeling of Copper and Cobalt Fractionation in Soils: A Useful Tool to Predict Edaphic Factors Influence Upon Cu and Co Accumulation in Two Metallophytes&lt;br&gt;<strong>Lange B, Faucon M-P, Mahy G, Jitaru P &amp; Pourret O</strong></td>
<td></td>
</tr>
<tr>
<td>374</td>
<td>Biogeochemical Types of Lake Sapropels in Siberia&lt;br&gt;<strong>Leonova G, Bobrov V, Krivonogov S, Bogush A, Maltsev A &amp; Bogush G</strong></td>
<td></td>
</tr>
<tr>
<td>375</td>
<td>Graphic Mehtod for Estimating the Biological Absorbtion Coefficient&lt;br&gt;<strong>Litvinenko Y</strong></td>
<td></td>
</tr>
<tr>
<td>376</td>
<td>Biogeochemistry of the Big Toroki Sapropel Lake, Western Siberia&lt;br&gt;<strong>Maltsev A, Leonova G, Krivonogov S &amp; Bobrov V</strong></td>
<td></td>
</tr>
<tr>
<td>378</td>
<td>Trace Elements in the Environment at the Site of Probable Underground Building in the Nizhnekansky Rock Massif (Siberian Craton)&lt;br&gt;<strong>Ozerskiy A &amp; Ozerskiy D</strong></td>
<td></td>
</tr>
<tr>
<td>379</td>
<td>Uranium Accumulation by Plants Covering Piles and Dumps in Uranium Post-Mining Area in SW Poland&lt;br&gt;<strong>Sklodowska A, Lech D &amp; Ruszkowski D</strong></td>
<td></td>
</tr>
<tr>
<td>380</td>
<td>Role of <em>Bacillus mucilaginosus</em> at Silicon Biogeochemical Cycle in a System “Soil – Plant”&lt;br&gt;<strong>Vaishlya O, Amyago D &amp; Guseva N</strong></td>
<td></td>
</tr>
<tr>
<td>381</td>
<td>Relation between Diatom Communities and the Degree of AMD Affection in Selected Water Dams in Iberian Pyrite Belt&lt;br&gt;<strong>Valente T, Almeida S, Rivera MJ, Delgado C, Gomes P, de la Torre ML, Santiesteban M &amp; Grande Gil JA</strong></td>
<td></td>
</tr>
</tbody>
</table>
382 Interaction of Bioavailability of Soil Heavy Metals in Black Soil Region of Central Jilin Province

Wang D, Li Y, Yang Y & Yang X

383 Biogeochemical Poly-Barrier Qualities in Plants

Zakharihkina L & Litvinenko Y

(Session 19q continues on Wednesday 28th AM on p.230)

20e: Discoveries in Earth System Dynamics Driven by Emergent Cosmogenic Nuclide Techniques and Applications

384 The Behavior of Beryllium in Soils and Aquatic Environments

Boschi V & Willenbring J

385 The Uplift History of the Western Andes, North Chile, Constrained by Cosmogenic $^{3}$He in Alluvial Boulders

Evenstar L, Stuart F & Hartley A

386 Dunefield Chronology in the Simpson Desert, Central Australia, Revealed by Cosmogenic Nuclide and Luminescence Dating


20f: New Developments in Analytical Techniques and Applications of Noble Gas Observations

387 In situ RESOchron Helium Dating: Progress, Pitfalls and Prospects

Evans N, Mclnnes B, McDonald B, Vermeesch P, Shelley M & Marillo Sialer E

388 He Diffusion on Apatite Viewed by Microbeam ERDA and RBS Experiments

Gerin C, Oliviero E, Bachelet C, Tassan-Got L & Gautheron C

389 RESOChron: ELA-Icp-He-Ms Instrument for in situ U-Th-Pb-He Geothermochronology

Mclnnes B, Evans N, Shelley M, McDonald B, Gibbs D, Norris A, Roberts E, Gabay C & Patterson D

390 Back to the Future: High-Sensitivity, Low Blank Noble Gas Mass Spectrometers with Modern Electronics

Pieronek J, Hames W, Becker T, Renne P, Billor Z & Illies A

391 (U-Th)/He Dating of Native Gold: Problems and Perspectives

Yakubovich O, Shukolyukov Y, Salnikova K, Yakovleva S, Gorokhovsky B & Kotov A
<table>
<thead>
<tr>
<th>392</th>
<th>The Determination of Homogeneity of Geological Reference Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Bokhari SNH &amp; Meisel T</strong></td>
</tr>
<tr>
<td>393</td>
<td>A Comprehensive Separation Procedure for Precise Determination of Re, Ir, Ru, Pt and Pd in Geological Samples</td>
</tr>
<tr>
<td></td>
<td><strong>Chu Z, Walker R, Guo J, Yan Y, Yang Y &amp; Zhang Y</strong></td>
</tr>
<tr>
<td>394</td>
<td>Calibration of the Raman Technique to Determine Water Contents in Lunar Silicate Glasses</td>
</tr>
<tr>
<td>395</td>
<td>Geochemical Sample Analysis by Microwave Plasma Atomic Emission Spectrometry</td>
</tr>
<tr>
<td></td>
<td><strong>Lener J-P, Hettipathirana T &amp; Darrouzés J</strong></td>
</tr>
<tr>
<td>396</td>
<td>Syringe Based Flow Injection MC-ICPMS: Total Sample Consumption and Rapid Sample Standard Bracketing</td>
</tr>
<tr>
<td></td>
<td><strong>Field P, Watson P &amp; Wiederin D</strong></td>
</tr>
<tr>
<td>397</td>
<td>Sensitivity Boost for ICP-MS to Enhance Isotope Ratio Determinations</td>
</tr>
<tr>
<td></td>
<td><strong>Hamester M &amp; Chemnitzer R</strong></td>
</tr>
<tr>
<td>398</td>
<td>Rapid Bulk Rock Decomposition by Ammonium Fluoride (NH₄F) in Open-Vessels by an Elevated Digestion Temperature</td>
</tr>
<tr>
<td>399</td>
<td>High Throughput Analysis of Mining Samples by LA-ICP-MS</td>
</tr>
<tr>
<td></td>
<td><strong>Hutchinson R, Price D &amp; Christ A</strong></td>
</tr>
<tr>
<td>400</td>
<td>Don’t Forget the Salty Soup: Calculations for Bulk Marine Geochemistry and Radionuclide Geochronology</td>
</tr>
<tr>
<td></td>
<td><strong>Kuhn G</strong></td>
</tr>
<tr>
<td>401</td>
<td>Stable Isotope Analysis of Carbonates Using Isoprime MultiFlow-Irms</td>
</tr>
<tr>
<td></td>
<td><strong>Liu Y, Tuo J, Wu C &amp; Chen R</strong></td>
</tr>
<tr>
<td>402</td>
<td>²⁰⁶Pb/²³⁸U Matrix Induced Bias in LA-ICP-MS: A Multivariate Study</td>
</tr>
<tr>
<td></td>
<td><strong>Marillo Sialer E, Woodhead J &amp; Hergt J</strong></td>
</tr>
<tr>
<td>403</td>
<td>Interlaboratory Calibration of Zn Elemental and Isotopic Compositions for Organic and Inorganic Reference Materials</td>
</tr>
<tr>
<td>404</td>
<td>Power of a New ICP-MS, ICP-Qqq: Application of the MS/MS Reaction Cell to Two Challenging Analysis</td>
</tr>
<tr>
<td></td>
<td><strong>Lener J-P, Sugiyama N &amp; Noetzel U</strong></td>
</tr>
</tbody>
</table>
Quantifying Trace Element Distributions in Agate Banding by LA-ICP-MS

**Park C-S, Kim Y, Shin HS, Yi K & Oh H**

Approaching Real Uncertainty Estimates for δ¹¹B Data

**Rosner M & Vogl J**

Itrax Core Scanner as a Quick Screening Tool for Polluted Coastal Sediments

**Rubio B, Rey D, Rodriguez-Germade I, Álvarez-Iglesias P & Bernabeu A**

Quantitative Analysis with the CAMECA SXFiveFE at High Lateral Resolution. Applications to Geochronology and Mineralogy

**Saliot P, Hombourger C & Outrequin M**

Determination of Boron Using Isotope Dilution MC-ICP-MS

**Shin HS, Choi MS, Ryu J-S & Hong KS**

High-Precision LA-ICP-MS Analysis of Microanalytical Reference Materials for Environmental Research

**Stoll B, Jochum K, Weis U & Andreae M**

Assessing Iron and Oxygen Isotope Homogeneity in Garnets

**Urosevic M, Nebel O, Peterson E, Padrón-Navarta JA & Rubatto D**

Production and Certification of Pd and Pt Single Spikes

**Vogl J**

Matrix-Independent Calibration of LA-ICP-MS Using Femtosecond-Uv-Lasers?

**Weis U, Jochum KP, Stoll B, Jacob D, Mertz-Kraus R & Andreae MO**

LA-Icpms2: Laser Ablation Sampling with Combined ICP-Q-Ms and MC-ICP-MS Detection for Simultaneous Trace Elemental and Isotope Ration Analyses

**Wills J, Lloyd NS, Rottmann L, Bouman C & Shuttleworth S**

Oxygen Isotopes as an Indicator of Corundums Origin

**Yakovenko V, Vysotskly S & Ignatiev A**

NH₄HF₂ – Assisted Digestion of Silicate Rocks for Multi-Element Analysis by ICP-MS: A New Development in Open Vessel Digestion


(Session 20g continues on Wednesday 28th AM on p.231)

20m: Advanced Analytical Characterization of Natural Organic Matter

**Dvorski S, Harir M, Hertkorn N, Hinman N, Gonsior M, Cooper W & Schmitt-Kopplin P**

Ultrahigh-Resolution Mass Spectrometry of Natural Organic Matter from Hydrothermal Springs
Influence of Depth on Soil Organic Matter Characteristics: An Ultrahigh Resolution Mass Spectrometry Study

**Ohno T, Fernandez I, Sleighter R & Hatcher P**

STXM Characterization of Fossil Organic Matter from the Montceau-Les-Mines Lagerstätte (France)

**Recanati A, Bernard S, Germain D, Charbonnier S & Robert F**

Identifying Carbon Pools in Heterogeneous Materials: Use of Peak Fitting and TGA-Dsc-Ms Data

**Robertson S, Lopez-Capel E, Manning D, Finlay N & Johnson K**

22d: From Chemical Reactions to Fracturing in Rocks: Mechanisms and Physico-Chemical Feedbacks

High-Cr Minerals from the Matoush Uranium Deposit in the Otish Basin, Quebec, Canada


Micro-Fracturing Induced by Radioactivity of Minerals: Consequences on the Permeability of Rocks

**Boschero V, Seydou-Guillaume A-M, Marcoux M, Noiriel C & Orgogozo L**

Dolomite Reaction Rim Growth Under Non-Isostatic Stress

**Helpa V, Rybacki E, Dresen G, Heinrich W, Abart R & Morales L**

Sealing Time: Numerical Simulation of Water-Rock Interaction in Volcanic Systems

**Jasim A, Whitaker F, Rust A & Scott T**

An EBSD Study of Textural Evolution Across a Shear Zone in the Bergen Arcs, Western Norway

**Mukai H, Austrheim H & Putnis A**

Effect of Fluid Salinity on Subcritical Crack Propagation in Calcite

**Rostom F, Røyne A, Dysthe D & Renard F**

Mg-Aenigmatite from the Tazheran Massif (East Siberia, Russia)

**Starikova A, Sklyarov E & Kanakin S**

(Session 22d continues on Wednesday 28th AM on p.233)

428 Crystal Chemistry and Magnetism of Fe-Serpentines Based on XMCD

429 The Influence of the Elemental Composition on the Cubanite Mineralization
Mashukov A, Mikheev V & Mashukova A

(Session 22f continues on Wednesday 28th AM on p.234)

22j: Probing the Early Stages of Mineral Nucleation and Growth: From Prenucleation Clusters to Macrocrystals

430 Prenucleation Nanoclusters as Building Units in the Crystal Growth
Askhabov A

431 A Bimodal Crystallite Size Distribution for Mackinawite (FeS)
Bone S, Sposito G & Bargar J

432 Replacement of Authigenic and Detrital Pyrrhotites by Marcasite and Pyrite in Cold-SEep Sediments Offshore SW Taiwan
Huang K-C & Jiang W-T

433 Possible PGE Nano Structures, in Magmatic Systems
Kennedy B, Tredoux M, Ballhaus C, Coetsee E & Steyl G

434 Protein-Silica Interactions: The Effect of Lysozyme on the Structure of Amorphous Silica
Meier DB, Tobler DJ, Peacock CL & Benning LG

435 New Insights on the Nucleation and Growth of Chrysotile, Magnesite, Goethite and Calcite
Montes-Hernandez G

436 The Role of pH and Simple Organic Molecules in Amorphous Calcium Carbonate (ACC) Structure
Tobler DJ, Sand KK, Dideriksen K, Rodriguez-Blanco JD, Sorensen HO & Stipp SLS

22k: Gemstones – From Genesis to Discovery

437 Amber and Amber-Like Materials on the Romanian Market
Neacsu A, Dumitras D-G, Cioaca ME & Anason AM

438 Classification of Gemstone Tourmalines from Central Brazil by Chemistry Nomenclature
Queiroz H & Botelho N
The Genesis of Jadeite: A Viewpoint from Zirconology

Yui T-F

23a: Evolution and Interpretation of Contaminant Isotopic Data from Physical and Reactive Transport Processes: Experiments & Models

Water in Na Montmorillonite – A Neutron Scattering Study

Bestel M, Juranyi F, Gimmi T, Glaus MA, Van Loon LR, Zamponi M & Diamond LW

Quantitative Analysis of High Resolution Isotope and Concentration Data from a Toluene-Pulse Experiment by Reactive Transport Modeling

Eckert D, Qiu S, Elsner M & Cirpka O

N and S Isotope Fractionation in the Terminal Electron Acceptors during Biodegradation of BTEX Compounds

Jackson C, Mayer B & Stehmeier L

Isotopes of Oxygen and Hydrogen in Natural Waters from NE of Asia

Khartonova N, Chelnokov G & Bragin I

Characteristics and Driving Factors of Surface Water Chemistry of Wujiang Watershed

Tang C-G & Liu C-Q

Reactive Transport Modeling of Carbon, Chlorine, and Hydrogen CSIA Data to Improve Monitored Natural Attenuation for Chlorinated Ethenes

Thouement HAA, Vanderford M, Kuder T, Philp P & van Breukelen BM

23d: Hazardous Waste in the Geosphere: Geochemistry for Risk Assessment

Investigation of Ancient Fluid Migration in Ordovician Carbonates in the Michigan Basin Using Secondary Minerals

Saso J, Caldas R, Diamond L, Parmenter A & Al T

Development of in situ Measurements of REE in Deep Groundwater Using Diffusive Gradient in Thin Film

Alakangas L, Åström M, Mathurin F, Faarinen M & Wallin B

Se(IV) Uptake by Äspö Diorite: Micro-Scale Distribution

Alonso U, Missana T, Patelli A, Ceccato D, García-Gutiérrez M & Rigato V

Groundwater Contamination Potential – Vulnerability Assessment

Antunes I, Albuquerque T & Oliveira S
<table>
<thead>
<tr>
<th>Posters</th>
</tr>
</thead>
</table>
| **450** Contaminant Geochemistry and Migration in Three Different Mine Sites in Finland – Comparison of Anthropogenic and Geogenic Contamination for Risk Assessment  
*Backnäs S, Turunen K, Pasanen A, Karlsson T & Solismaa L* |
| **451** An Absorption Method for Porewater Characterization in Low-Permeability Sedimentary Rocks  
*Celejewski M & Al T* |
| **452** Human Health Risk Assessment of a Closed Landfill Based on Direct Gas Measurements  
*Jubany I, Gallego E, Giménez J, Martí V, Perales JF, Roca FJ & de Pablo J* |
| **453** Relevance of Model Complexity for Assessing Contaminant Leaching from a Fractured Degrading Concrete Structure  
*Govaerts J, Perko J, Jacques D & Seetharam S* |
| **454** Raman and IR Spectroscopy of Monazite-Type Ceramics for the Nuclear Waste Management  
| **455** Future Calamity of Arsenic Poisoning in the Groundwater of Thoubal and Bishnupur Districts of Manipur (India)  
*Kashyap CSA, Syed HF, Chandrasekharam D & P. T* |
| **456** Variation of As-Leaching from Coal Ashes According to Extractant pH, Reaction Time, and Shaking Methods  
| **457** Mineralogical and Geochemical Characteristics of the Korean Coal Ashes from the Perspective of the Coal and Combustion Types  
*Kim K, Jeong G-Y & Lee J-C* |
| **458** Characteristics of Metal Bearing Phases in MSWI Residues from Poland  
*Kowalski P & Michalik M* |
| **459** Analysis of Anion Adsorption and its Effects on Alumina Nanoparticles Stability  
*Missana T, Benedicto A, Mayordomo N & Alonso U* |
| **460** Adsorption of $^{109}$Cd onto Metaloxide Nanoparticles  
*Mayordomo N, Lopez-Gomez J-L, Alonso U & Missana T* |
| **461** Modelling of Cs Adsorption in Natural Mixed Clays and the Effects of Ion Competition  
*Garcia-Gutierrez M, Missana T, Benedicto A, Ayora C & De-Pourcq K* |
| **462** Geochemical Characterization of Uranium Mill Tailings  
*Nos J, Boizard A, Peiffert C, Phrommavanh V, Cathelineau M & Descostes M* |
Determination of Probabilistic Kd Values for Radionuclides in French Rivers Using a Speciation Code
Pastor L, Marang L & Ciffroy P

Environmental Parameters that Determine Distribution Coefficients of Radionuclides for Repositories
Stockmann M, Brendler V, Flüge J, Britz S & Noseck U

Study on Uranium Speciation in the Water of a River Near Phosphate Mining Area
Wang X, Shi Z & Ni S

Automated Gamma-Ray Spectrometer for Monitoring Wastes Made by Non-Nuclear Industries

Hydrogeochemistry Technogenesis Zone Gold Deposits Baley Ore Field (Eastern Transbaikalia, Russia)
Zamana LV

(Session 23d continues on Wednesday 28th AM on p.235)

Modelling Single Phase Bimolecular Reactive Transport Directly on Pore-Scale Images
Alhashmi Z, Bijeljic B & Blunt M

Dissolved Iron Behavior in the Estuarine Waters; Irt and Esk River, West Cumbria, UK
Daneshvar E & Worden R

Anomalous Kinetics of Reactive Fronts in Porous Media
de Anna P, Le Borgne T, Dentz M & Tartakovsky A

Chemical Continuous Time Random Walks
Dentz M

Sources of Arsenic in Groundwater Based on Geological and Hydrogeochemical Properties of an Arid/Semi-Arid Area in Yinchuan Plain, China
Dong Y, Ma T, Tian C, Zhang J, Liu L & Zhang F

Evolution of Hydrogeochemical Problems in Merzifon (Amasya, Turkey) Aquifer with GIS
Firat Ersoy A & Gültekin F

Water Geochemistry of the Thermal Waters in the Eastern Black Sea Section (Ordu, Rize and Artvin), Turkey
Gültekin F, Hatipoglu E & Firat Ersoy A
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>475</td>
<td>Arsenic in Surface Sediments of a Harbor Sludge Dumping Site and a Natural Deposition Site in the Helgoland Mud Area, North Sea</td>
<td>Hartmann JF, Kasten S, Krengel T &amp; Isenbeck-Schröter M</td>
</tr>
<tr>
<td>476</td>
<td>Hydrogeochemical Assessement of Pasinler (Erzurum- Turkey) Geothermal Fluids</td>
<td>Hatipoglu E, Gultekin F &amp; Firat Ersoy A</td>
</tr>
<tr>
<td>477</td>
<td>Low Thermal Northern Dvina Iodine Water Field: Hystory of Prospection and Perspectives of Development</td>
<td>Kharkhordin I, Atroschenko F &amp; Nazima V</td>
</tr>
<tr>
<td>478</td>
<td>Using Noble Gases for Real-Time Tracing of Oxygen Turnover in Aquatic Systems</td>
<td>Mächler L, Brennwald M &amp; Kipfer R</td>
</tr>
<tr>
<td>479</td>
<td>Microflora of Native Biofilm on Activated Carbon Under Filtration of Fulvic Acids</td>
<td>Samsoni-Todorova O, Klymenko N &amp; Chekhovskaia T</td>
</tr>
</tbody>
</table>

*Session 23f continues on Wednesday 28th AM on p.236*

### 24e: Biogeochemistry

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>481</td>
<td>Petrography and Diagenesis of Pab Sandstone, Implications for Hydrocarbon Exploration in Southern Pakistan</td>
<td>Ahmad S</td>
</tr>
<tr>
<td>482</td>
<td>Distribution of Cu, Pb and Zn in Astragalus Pycnocephalus Fischer and Verbascum Euphraticum L. Plants on Pb-Zn Mining Area in Akdagmadeni, Yozgat, Turkey</td>
<td>Aydin N, Kirat G &amp; Bölücek C</td>
</tr>
<tr>
<td>483</td>
<td>The Effect of Copper in the Oxidation of Fe(II) in Seawater</td>
<td>Gonzalez-Davila M, Santana-Casiano JM, Gonzalez AG, Perez-Almeida N &amp; Samperio G</td>
</tr>
<tr>
<td>484</td>
<td>Alkenone Record of the 19 Years Long Time-Series Sediment Trap Samples Collected at Central Subarctic North Pacific and Bering Sea</td>
<td>Harada N, Takahashi K, Sato M, Onodera J &amp; Onishi H</td>
</tr>
<tr>
<td>485</td>
<td>Soil Microbial Species Selection and Activity Influenced by Semiconducting Minerals</td>
<td>Li Y &amp; Lu A</td>
</tr>
</tbody>
</table>
Nd and Sr Isotope Geochemistry of Sediments and Associated Biota from Tagus and Sado Estuaries (Portugal)

Moreira S, Freitas MC, Munhã J, Andrade C & Tassinari C

Microbially Mediated Redox Processes in Lactate Stimulation with Sedimentary Rock and Groundwater

Nagaoka T, Nakamura T, Sasaki Y, Asano T, Ito T, Amano Y, Iwatsuki T & Yoshikawa H

Historical Deposition of Polycyclic Aromatic Hydrocarbons in an Amazon Estuary

Neves P, Taniguchi S & Bicego M

Research on Heavy Metal Environmental Geochemistry in Urban Soils in Haikou, China

Ni Q, Bao Z & Wang C

Micro-Scale Sensor Array-Enabled Hot Spring Mapping

Oiler J, Shock E, Hartnett H & Yu H

Theory on Thermodynamic Constraints on Biogeochemical Diversity

Okie J, Canovas P & Shock E

Molecular Level Characterization of Methyl Sugars and Other Carbohydrate Compounds in Marine High Molecular Weight Dissolved Organic Matter (HMWDOM)

Panagiotopoulos C, Repeta D, Mathieu L, Rontani J-F & Sempéré R

Oxidation of Cu(I) in Seawater at Low Oxygen Concentrations

Perez-Almeida N, Gonzalez-Davila M, Santana-Casiano JM, Gonzalez AG & Suarez De Tangil M

Application of Geochemical and Statistical Approach to Assess Metal Contamination in Marine Sediments

Sakellariadou F

Sediment Traps in Lake Baikal Reveal Strong Changes in Productivity over the Last Decade

Schubert C, Niggemann J & Sturm M

Hydrogeochemical Radiation Burden in the Ambience of Natural Radioactivity in the Hills of Vrsac

Spasic Jokic V, Gordanic V, Vidovic M & Jovanovic D

Detrital Zircon U/Pb Ages on Sedimentary Rocks from the South Carpathians, Romania, and Implications for Regional Tectonic Provenance

Stoica A, Ducea MN & Jianu D

Geobotany and Biogeochemistry of Sungun Copper Deposit, Northern Iran: An Implication to Mineral Exploration

Taghipour B & Hemati M

Eco-Geochemistry and Kashin-Beck Disease – A Case Study in Aba, Sichuan

Yu T, Yang Z, Hou Q, Ma W & Jin L
<table>
<thead>
<tr>
<th>Posters</th>
</tr>
</thead>
</table>
| **501** | Large Perturbations of the Carbon Cycle during the Middle-Late Ordovician in Southeastern Poland  
**Zhang T, Shen Y & Trela W**  
| **502** | Lipid Biomarkers in the Sediments of Lake El Junco and their Possible Sources  
**Zhang Z, Metzger P & Sachs J**  

(Session 24e continues on Wednesday 28th AM on p.237)
Goldschmidt 2013

Summary and Highlights

Wednesday 28th August, 2013

Timetable:
09:00 - 12:00     Oral Sessions
12:00 - 13:15     Lunch
13:15 - 14:15     Plenary
14:30 - 17:30     Oral Sessions
17:30 - 20:00     Poster Sessions

Highlights:
09:00   (U06) Blair Schoene (Clarke Award)
10:30   (L13) Richard Harrison (EMU Medal)
13:15   (AUD) Admission of EAG/GS Geochemistry Fellows
13:15   (AUD) Paolo Gasparini (Plenary)

Other Events:
18:30   (L08) How to Publish a Scientific Paper
18:30   (L11) Film: Chasing Ice
18:30   (L12) Film: Thin Ice
18:30   (Courtyard) Double Scotch Gig
20:00   (Church) Classical Concert
## Oral Presentations Overview

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>09:00</td>
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**Wednesday AM Overview**

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01b: Frontiers in Nitrogen (BioGeoCosmo)Chemistry

Session chaired by Gray E Bebout, Marilyn L Fogel & Pierre Cartigny

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<th>Time</th>
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<tr>
<td>09:00</td>
<td>Invited: The Biogeochemical Ice Core Record: A New Perspective on Nitrate</td>
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<td>09:15</td>
<td>Invited: Biogeochemical Cycling of Nitrogen on the Early Earth</td>
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<td>Thomazo C, Papineau D &amp; Ader M</td>
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<td>09:30</td>
<td>Origin of Laminations in BIF Deciphered from N and Fe Isotopes</td>
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<td>Hashizume K, Pinti D, Orberger B, Cloquet C, Jayananda M &amp; Soyama H</td>
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<td>09:45</td>
<td>Physiological and Isotopic Characteristics of Nitrogen Fixation by Hyperthermophilic Methanogens: Implication for Nitrogen Anabolism of the Subseafloor Microbial Communities on the Early Earth</td>
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<td>Nishizawa M, Miyazaki J, Makabe A, Koba K &amp; Takai K</td>
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<td>10:00</td>
<td>Nitrogen Cycle in the Late Archean Ferruginous Ocean</td>
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<td>Busigny V, Lebeau O, Ader M, Krapez B &amp; Bekker A</td>
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<td>10:15</td>
<td>N Isotope Geochemistry during Low Grade Metamorphism of Coal and Coal-Related Rocks: Case Study of the Anthracite Field of Pennsylvania</td>
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<td>Ader M, Boudou J-P &amp; Daniels E</td>
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<td>Re-investigating the Nitrogen Budget in the Upper Continental Crust</td>
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<td>Cartigny P, Busigny V &amp; Rudnick R</td>
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<td>Invited: Nitrogen Recycling Through Arc Volcanism</td>
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<td>Fischer T, Li L, Sharp Z &amp; Hilton D</td>
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<td>11:00</td>
<td>Keynote: Nitrogen Isotopes in Lunar Soils: A Record of Contributions to Planetary Surfaces in the Inner Solar System</td>
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<td>Isotopically Light (Solar?) Nitrogen Associated with the Planetary Noble Gas Carrier (Q)</td>
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<td>Verchovsky A, Sapton M &amp; Wight I</td>
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<td>11:45</td>
<td>Organic Nitrogen Cosmochemistry of Ultracarbonaceous Micrometeorite</td>
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# 02b: Martian Evolution; Ancient Messengers and Modern Measurements

**Session chaired by Audrey Bouvier & Desmond Moser**

### 09:00 Keynote: Postcards from Mars: Insights into Martian Geochemical Processes from the Curiosity Rover

*Leshin L, Grotzinger J, Blake D, Gellert R, Mahaffy P, Wiens R & Maurice S*

### 09:30 Invited: Geochemical Diversity and K-Rich Compositions found by the MSL APXS in Gale Crater, Mars


### 09:45 The Petrochemistry of Jake_M: A Martian Mugearite


### 10:00 Volcanic Acid-Sulfate Analogs for Early Mars

*Hynek B, McCollom T, Rogers K & Marcucci E*

### 10:15 Mojave Crater, Mars: One Meteorite Source Crater

*Werner SC, Ody A & Poulet F*

### 10:30 Deformation Mechanisms in Martian Shergottites

*Kaczmarek M-A, Grange M, Reddy S & Nemchin A*

### 10:45 Atomic Views of Martian Evolution


### 11:00 Volcanism on Mars Controlled by Early Oxidation of the Upper Mantle

*Tuff J, Wade J & Wood B*

### 11:15 Invited: Abundance and Ubiquity of H₂O in the Martian Interior

*McCubbin F*

### 11:30 Organic Carbon Inventory of the Tissint Meteorite


### 11:45 Invited: Organic Carbon from the Tissint Martian Meteorite: Hints for Biogenic Origin

03b: Geodynamics and Crust Formation in the Archean – Palaeoproterozoic

Session chaired by Elis Hoffmann, Anders Scherstén, Martin van Kranendonk & Jeroen van Hunen

09:00 **Keynote:** The Evolving Nature of Terrestrial Crust from the Hadean, Through the Archaean, into the Proterozoic  
*Kamber B*

09:30 Storage of Hadean Oceanic Crust in the Kaapvaal Subcratonic Mantle  
*Brey GP, Shu Q, Gerdes A & Hoefer HE*

09:45 Eoarchaean Crust in the Dniestr-Bug Region, Ukrainian Shield – Pb-Hf-O Isotope Constraints  
* Claesson S, Shumlyansky L, Bibikova E, Billström K, Whitehouse M & Andersen T*

10:00 Persistence of Early Archaean Style of Crustal Growth and Near-Chondritic Mantle into the Late Archaean  
*Whitehouse M & Kemp T*

10:15 **Invited:** Archaean Granites: Classification, Origin and Tectonic Implications  
*Moyen J-F*

10:30 Stabilising a Craton: The 3.1 Ga Mpuluzi Batholith (Swaziland / South Africa)  
*Murphy R, Griffin B, Pearson N & O’Reilly S*

10:45 Paleaoarchean Felsic Magmatism: A Melt Inclusion Study of 3.45 Ga Volcanic Rocks from the Barberton Greenstone Belt  
*Agangi A, Hofmann A & Kamenetsky VS*

11:00 Juvenile Crustal Growth during the Palaeoproterozoic: U-Pb-O-Hf Isotopes of Detrital Zircon from Ghana  
*Kristinsdóttir B, Scherstén A, Kemp A & Petersson A*

11:15 Petrogenesis of Andesites in Mesoarchaean Supracrustal Belts of SW Greenland: Geodynamic Implications  
*Szilas K & Hoffmann JE*

11:30 Were Ancient Granitoid Compositions Influenced by Contemporaneous Atmospheric and Hydrosphere Oxidation States?  
*Jagoutz O*

11:45 Time-Related Changes in the Si Isotopic Composition of Palaeo- to Mesoarchaean Granitoids  
*Abraham K, Foley S, Hofmann A, Cardinal D & André L*

(Session 03b continues on Wednesday 28th PM on p.242)
05c: Investigating the Origin and Modification of Cratonic Mantle over Time: The Role of Diamonds and Xenoliths

Session chaired by Gareth Davies, Dan Howell, Lucy Hunt, Maya Kopylova & Fabrizio Nestola

09:00 New Minerals in the Primary, Deep-Seated Carbonatitic Association
   Kaminsky F & Wirth R

09:15 Platelet Degradation in Diamonds. Insights from Infrared Microscopy and Implications for the Thermal Evolution of Cratonic Mantle
   Kohn S, Wibberley E, Smith C, Bulanova G & Walter M

09:30 Crystallographic Relationships between Diamond and its Olivine Inclusions. An Update
   Nestola F, Nimis P, Milani S, Angel RJ, Bruno M & Harris JW

09:45 Parental Growth Media of Siberian Diamonds – Relation to Kimberlites
   Zedgenizov D, Ragozin A, Shatsky V & Griffin W

10:00 Linking Kimberlite Magmatism, Transition Zone Diamonds, and Subduction Processes
   Tappe S, Pearson G, Kjarsgaard B, Nowell G & Dowall D

10:15 Diamond-Forming Fluids: The Trace-Element Perspective
   Weiss Y, Griffin W & Navon O

10:30 Invited: Diamond Inclusions Reveal Fugitive Mantle Nitrogen
   Smith E, Kopylova M, Frezzotti ML & Afanasiev V

10:45 Discussion Break
   Davies G, Howell D, Hunt L, Kopylova M & Nestola F

11:00 Experimental Study of Majorite Stability in Chromium Rich Garnets
   Wijbrans I, Klemme S & Rohrbach A

11:15 SCLM Super-Si Garnet Traces the Archaean
   Spengler D

11:30 Fe³⁺ Partitioning Systematics between Orthopyroxene and Garnet in Well-Equilibrated Mantle Xenoliths
   Nimis P, Goncharov A & Ionov D

11:45 Oxygen Fugacity in the Kaapvaal Cratonic Lithosphere – Evidence from Fe XANES Measurements of Fe³⁺ in Garnet from the Kimberley Pipe
   Hanger B, Yaxley G, Berry A, Kamenetsky V, Paterson D & Howard D

(Session 05c continues on Wednesday 28th PM on p.244)
06e: Advancements in Using Mineral Phases as Recorders of the Timing, Rates, and Processes of Continental Crustal Evolution

Session chaired by Massimo Tiepolo, Terrence Blackburn & John Hanchar

09:00 Medal: From Date to Process: Integrating Geochemistry and Geochronology on Very Short and Very Long Timescales
Schoene B

09:45 Sulphides and Ti-Minerals in Granulite Xenoliths: Tracers of Cratonic Crust Formation
Aulbach S, Förster B & Chacko T

10:00 A Mineralogical Record of Metallogeny Associated with Supercontinent Assembly

10:15 Crustal Evolution during Granite Emplacement: Inheritance and Development of Heat-Producing Element Enrichment

10:30 Crustal Evolution of the Intracontinental Warburton–Cooper–Eromanga Basin System, Central Australia
Middleton A, Uysal T & Golding S

10:45 Heat Producing Element Enrichment in Granitic Rocks & Zircon Hf Isotopic Constraints on Crustal Evolution in NE Queensland, Australia
Siégel C, Bryan SE, Allen CM, Purdy DJ & Gust DA

11:00 Zircon U-Pb Age and Hf Isotope Constraints on the Petrogenesis of the Alpine Periadriatic Intrusions

11:15 ‘Kimberlitic’ Zircons from Paleoproterozoic Kimozero Kimberlites (Karelia): Mineralogy, Geochemistry and U-Pb Geochronology
Griban J, Samsonov A, Salnikiva C & Lepehina C

11:30 Hydrothermal Origin of the Paleoproterozoic Xenotime from the King Leopold Sandstone of the Kimberley Group, Kimberley, NW Australia: Implications for a ca 1.7 Ga Far-Field Hydrothermal Event
Lan Z, Chen Z, Li X, Li B & Adams D

11:45 Timing and Sources of Pre-Collisional Neoproterozoic Sedimentation along the SW Margin of the Congo Craton (Kaoko Belt, NW Namibia)
Konopásek J, Košler J, Sláma J & Janoušek V

(Session 06e continues on Wednesday 28th PM on p.246)
07a: Deep Transport of Subducted Material: Escaping the Meat Grinder  

Session chaired by Catherine Chauvel, Laura Hebert & Eiji Ohtani

09:00 Keynote: Deep Subduction of Carbon and Sulfur Constrained by Laboratory Experiments
   Dasgupta R, Duncan M, Jégo S & Tsuno K

09:15 A New Mechanism for Transport of Water into CMB
   Ohtani E, Ohira I, Sakai T, Miyahara M, Ohishi Y, Hirao N & Nishijima M

09:30 3D Fluid Distribution in Subducted Slabs: New Constraints on H_2O Cycling
   Le Roux V, Gaetani G, Slaugenwhite J & Miller K

09:45 Spatial and Temporal Variation in Provenance of Eastern Mediterranean Sediment: Implications for Aegean Volcanism
   Klaver M, Djuly T & Vroon P

10:00 Lawsonite as a Potential Repository of Th and REE in Subduction Zones: Blueschists from Tavşanlı (Turkey)
   Wang Y, Prelević D, Foley S, Buhre S, Johnson T & Häger T

10:15 Mantle Compositional Gradients in a Hot Subduction Setting, the Garibaldi Volcanic Belt, Northern Cascade Arc
   Mullen E & Weis D

Session 07e follows this session in this room: see p.220.
### 07e: Vapor Phase Mobility in Arc Volcanic Systems

**Session chaired by Adam Kent, Andreas Audetat & Michael Rowe**

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| 10:30 | **Keynote:** Controls on the Composition of Magmatic Volatiles in the Crust: Implications for Ore Genesis and Volcanic Degassing  
Zajacz Z, Candela P, Piccoli P & Sanchez-Valle C |
| 11:00 | Petro-Geochemical Evidence for Vapour Transport in Andesite Shear Fractures  
Plail M, Edmonds M, Barclay J, Humphreys M & Herd R |
| 11:15 | A High T Cell for the *in situ* Study of Flux-Driven Magmatic Processes  
Louvel M, Testemale D, Lahera E & Hazemann J-L |
| 11:30 | Analogue Experiments on Volatile Escape from Crystal-Rich Magmas  
Rust A, Cashman K, Oppenheimer J & Belien I |
| 11:45 | Volatile Distribution in the Taupo Volcanic Zone, New Zealand  
Bégué F, Gravley D, Chambefort I, Deering C & Kennedy B |
09h: Seawater Geochemical Evolution: Applications of Elemental and Isotopic Proxies

Session chaired by Anton Eisenhauer, Matthew S Fantle, Juraj Farkas, Elizabeth Griffith & Brad Opdyke

09:00 The Oceanic Cycles of the Transition Metals and their Isotopes
Vance D, Cameron V, Little S & Archer C

09:15 Calculation of Mass (Im-)balance in the Oceanic Cycling of Cu and Zn Isotopes
Little S, Vance D, Lyons T & McManus J

09:30 Tracing Perturbations in the Oxygenation of the Cenozoic Ocean Using Molybdenum Isotopes
Archer C, Nielsen S, Burton K & Hein J

09:45 Uranium Isotopes in Anoxic Sediments
Andersen M, Vance D, Little S, Herdsman R, Matthews A, Lyons T & Romaniello S

10:00 Ca, Mo and U Isotopes Suggest Neoproterozoic-Like Ocean Conditions during the Late Permian Mass Extinction

10:15 Tungsten Species in Natural Ferromanganese Oxdies Related to its Different Behavior from Molybdenum in Oxic Ocean
Kashiwabara T & Takahashi Y

10:30 Invited: Tracing the Rise of Atmospheric Oxygen Using Cr Isotopes in Carbonates as a Paleoredox Proxy
Holmden C & Bekker A

10:45 Tracking Changes in Ocean Redox during the PETM Using Cr Isotopes
Parkinson I, Dixon S, Sexton P, Fehr M, James R & Peacock C

11:00 Diagenesis Affects Carbonate $\delta^{53}$Cr: Evidence from the K-Pg Boundary Section at Stevns Klint (Denmark)
Voegelin AR, Frei R, Thibault N, Ullmann CV & Korte C

11:15 $\delta^{30}$Si in Early Archean Cherts and Implications for the Silica Cycle
Stefurak EJT, Fischer WW & Lowe DR

11:30 Seawater as the Common Si Source for Both Archean BIF and Cherts: Insights from Silicon Isotopes
Delvigne C, Hofmann A, Cardinal D & André L

11:45 The Silicon Isotope Record of Early Silica Diagenesis
Tatzel M, von Blanckenburg F, Schuessler J & Bohrmann G

(Session 09h continues on Wednesday 28th PM on p.251)
10k: Iron Redox Transformations and their Impact on Trace Elements in Natural and Engineered Systems

Session chaired by Andreas Voegelin, Christopher Gorski, Thilo Behrends & Stephan Hug

09:00  **Keynote:** Iron Geochemistry in Redox-Dynamic Coastal Wetlands: Consequences for Trace Element Cycling in the Environment

  **Johnston S**

09:30  Fe and S Redox Cycling during a Biostimulation Episode at the Old Rifle, CO Aquifer


09:45  Fate of Ni in Local Reduced Environments Developed on Lateritic Ni Ores from New Caledonia

  **Dublet G, Juillot F, Morin G, Fritsch E, Brest J & Brown GE,J**

10:00  Interaction of Corroding Iron with Bentonite at Repository Conditions

  **Wersin P, Jenni A & Maeder U**

10:15  **Invited:** Arsenic Immobilization and Transformation by Zerovalent Iron

  **Su C**

10:30  **Invited:** Trace Element and Contaminant Fate during Fe(II)-Catalyzed Iron Oxide Surface Transformations

  **Catalano JG, Becker KG, Friedich AJ, Hinkle MAG, Luo Y & Otemuyiwa B**

10:45  **Invited:** Interactions between Fe(II) and Arsenic Species during Co-sorption onto Aluminum Oxide and Clay Mineral Substrates Under Anoxic Conditions

  **Elzinga E & Zhu Y**

11:00  Photochemistry of Arsenite and Chromate on Iron Oxyhydroxide

  **Strongin D, Bhandari N, Cerkez E & Reeder R**

11:15  Composition and Structure of Fresh and Aged Fe Oxidation Products

  **Senn A-C, Kaegi R, Hug S, Herig J & Voegelin A**

11:30  **Invited:** Cd Mobility in Anoxic Fe-Mineral-Rich Environments – Potential Use of Fe(III)-Reducing Bacteria for Soil Remediation

  **Muehe EM, Adaktylou IJ, Obst M, Schröder C, Behrens S, Hitchcock AP, Tyliszczak T, Krämer U & Kappler A**

11:45  Theoretical Calculations on the Thermodynamics and Kinetics of U(VI) Homogeneous Reduction by Fe(II)

  **Collins R & Rosso K**
11e: Magma Storage Systems throughout the Crust

Session chaired by Catherine Annen, Bruno Scaillet & Caroline Martel

10:45 Keynote: Density Control on Formation of Crustal Magma Storage System
Taisne B

11:15 Magma Feeding System of Fuji Volcano, Japan
Takahashi E, Asano K & Nakajima J

11:30 Shiveluch Volcano: Mineralogical Records of Geodynamic Complexity
Simakin A, Salova T, Boris G & Tatyana C

11:45 Reconstructing the Magma Feeding System of the Cappadocian Ignimbrites (Turkey) Through Amphibole Thermobarometry

(Session 11e continues on Wednesday 28th Posters on p.290)
**11f: Stromboli Volcano: Recent Advances and Open Questions**

Session chaired by Mike Burton, Maurizio Ripepe, Nicole Métrich, Lorella Francalanci & Marco Pistolesi

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<tr>
<td>09:00</td>
<td><strong>Keynote:</strong> Challenges in Constraining and Understanding Strombolian Volcanism</td>
<td><strong>Houghton B, Taddeucci J &amp; Edmonds M</strong></td>
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<td>09:30</td>
<td>Linking Mantle Melting and Eruption Rates at Stromboli Volcano: A U-Series Perspective</td>
<td><strong>Avanzinelli R, Bragagni A, Francalanci L, Freymuth H &amp; Elliott T</strong></td>
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<td>Helium Isotopes Signature of Mafic Volcanics at Stromboli (Italy) during its Magmatic Evolution</td>
<td><strong>Martelli M, Rizzo A, Renzulli A, Ridolfi F, Arienzo I &amp; Rosciglione A</strong></td>
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<td>10:00</td>
<td>Crystals Modulate Non-Explosive Gas Transfer at Stromboli Volcano, Italy</td>
<td><strong>Cashman K, Rust A, Belien I, Oppenheimer J &amp; Soldati A</strong></td>
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<tr>
<td>10:15</td>
<td>SO$_2$ Camera Measurements on Stromboli</td>
<td><strong>Salerno G, Sawyer G &amp; Burton M</strong></td>
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<td>10:30</td>
<td>Ten Years of Ground Deformations Monitored by the Ground-Based SAR System on Stromboli Volcano and its Use in Forecasting Intense Volcanic Activity</td>
<td><strong>Nolesini T, Di Traglia F, Intrieri E, Bardi F, Ferrigno F, Frodella W, Tacconi Stefanelli C, Tanteri L, Del Ventisette C &amp; Casagli N</strong></td>
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</tbody>
</table>

(Session 11f continues on Wednesday 28th Posters on p.290)

Session 11e follows this session in this room: see p.223.
12g: Carbon Capture, Utilization and Storage

Session chaired by Alexis Navarre-Sitchler, Scott Imbus & Susan Carroll

09:00  SO$_2$ and O$_2$ Co-injection with Potential Carbon Storage Target Sandstone from a Fresh-Water Aquifer

**Pearce J, Dawson G, Farquhar S & Golding S**

09:15  Reaction Path Geochemical Modelling of CO$_2$-SO$_2$-Water-Rock Experiments

**Kirste D, Pearce J, Golding S & Frank A**

09:30  Keynote: Solubility and Mineral Storage of CO$_2$ in Basalt


10:00  Fluid-Mineral Interactions of CO$_2$/O$_2$, NaCl-Brines and Siderite-Ankerite-Mixtures at Geological CO$_2$ Storage Conditions

**Gröger-Trampe J, Waldmann S, Nowak T & Ostertag-Henning C**

10:15  Tracer Applications to Verify Carbon Mineralization in Icelandic Basalts


10:30  Impact of Calcite Precipitation on Flow Alteration in Porous Media

**Noiriel C, Steefel C, Yang L & Bernard D**

10:45  An Experimental Study of the Geochemical Impact of CO$_2$ Leakage in Siliciclastic Aquifers

**Kirsch K, Navarre-Sitchler A, Wunsch A & McCray J**

11:00  Effects of CO$_2$ Leakage on Benthic Biogeochemistry – Results from a Large Scale Field Experiment

**Lichtschlag A, Connelly D, Stahl H, Taylor P & James RH**

11:15  Dissolution of Arsenopyrite Under Geologic Carbon Storage Conditions

**Parthasarathy H, Dzombak D & Karamalidis A**

11:30  Invited: Geochemical Impacts of Carbon Dioxide Leakage into Carbonate Aquifer Rocks

**Wunsch A, Sitchler A, Moore J & McCray J**

11:45  Carbon Isotope Fractionation of Injected CO$_2$ in Carbonate Reservoirs: Comparison of Results from the Laboratory and Enhanced Oil Recovery Field Sites in Alberta, Canada

**Nightingale M, Mayer B, Shevalier M, Dalkhaa C & Becker V**

(Session 12g continues on Wednesday 28th PM on p.254)
13e: Rare Earths and Rare Metal Mineralization

Session chaired by Yasushi Watanabe, Frances Wall, Olivier Pourret & Sophie Decrée

09:00 Keynote: Rare-Earth Deposits in Igneous Rocks: A Mineralogist’s Perspective
Chakhmouradian A, Zaitsev A & Reguir E

09:30 REE Fractionation at the Bear Lodge REE+Au Deposit, USA: Evidence from Mineral Chemistry
Andersen A, Larson P & Rowe M

09:45 C and O Isotope Compositions of the Matongo Carbonatite (Burundi): New Insights into Alteration and REE Mineralization Processes

10:00 Petrosomatic Evolution of Montviel Alkaline System and Rare Earth Carbonatites, Abitibi, Canada
Nadeau O, Stevenson R & Jébrak M

10:15 Compositions and Zoning of Coexisting Minerals in Alkaline-Ultrabasic Rocks, Phoscorites, and Carbonatites from the Kovdor Complex, Kola Peninsula
Rass I & Kovalchuk E

10:30 REE Mobility in Carbonatites: Insights from the Trace-Element Composition of Dolomite
Reguir E & Chakhmouradian A

10:45 Mg and Fe Isotope Constraints on the Genesis of Bayan Obo Ore Deposits, Inner Mongolia, China
Zhu X, Sun J & Li S

11:00 B-Isotope Variations in Tourmaline in the Varuträsk Rare-Element Pegmatite: The Role of Mica
Wagner T, Trumbull R, Siegel K, Jonson E & Heinrich C

11:15 Niobium and Tantalum Mineralization in the Nechalacho REE Deposit, NWT, Canada
Timofeev A & Williams-Jones AE

11:30 Rare Earth Element Ore Genesis – The Great Unknown
Williams-Jones A

11:45 The Geochemistry and Mineralogy of Responsible Mining of Rare Earths
Wall F

(Session 13e continues on Wednesday 28th PM on p.256)
15e: Atmospheric Dust

Session chaired by Reto Gieré & Natalie Mahowald

09:00 Invited: Dusts from Metal Smelters in Africa: Mineralogy, Leaching and Contaminant Bioaccessibility
Ettler V, Vitkova M, Mihaljevic M & Kribek B

09:15 Invited: Iron Speciation in Natural and Industrial Dust: What can We Learn from Individual Particle Analysis?
Flament P, Deboudt K, Marris H & Gieré R

09:30 Complex Urban Geochemical Analysis of Attic Dust Samples in an Industrial Area, Ajka, Hungary
Völgyesi P, Jordan G, Zacháry D & Szabó C

09:45 Authigenic and Exogenic Mineral Particles in Lung Tissues
Jablonska M, Janeczek J & Lesniok M

10:15 Invited: Volcanic Ash and Aerosol
Mather T

10:30 Keynote: Long Range Transport of Volcanic Aerosols: The Eyjafjallajökull Plume 2010

11:00 Aerosol Modifications Observed at Mt. Cimone (Italy) during the Eyjafjallajökull Eruption in 2010

11:15 Ambient Aerosol Measurements and Particle Characterization at Highly Frequentied Motorways in Germany
Dietze V, Baum A, Kaminski U, Surkus B, Stille P, Wenzel M & Gieré R

11:30 Geochemical and Mineralogical Characteristic of Current Roadside Pollution from Experimental Monitoring Plots Located in Different Countries
Magiera T, Jabłońska M, Rachwał M & Wawer M

11:45 Aerosols and Plant Leaf Surfaces
Burkhardt J, Hunsche M & Pariyar S

(Session 15e continues on Wednesday 28th PM on p.257)
17d: Isotopic and Elemental Tracers of Marine Biogeochemistry and Circulation

Session chaired by Seth John, Julie Granger, Katharina Pahnke & Gregory F. de Souza

09:00 Keynote: Isotopic and Stoichiometric Constraints on Marine Denitrification from a Global Inverse Circulation Model
Deutsch C, DeVries T, Rafter P & Primeau F

09:30 Quantifying Nitrogen Fixation in the North Atlantic Using Paired Analyses of Cd and N Stable Isotopes
John S, Conway T, Casciotti K, Sigman D, Rafter P & Marconi D

09:45 Interactions of Dissolved CO$_2$ with Cadmium Isotopes in the Southern Ocean

10:00 Invited: Revealing Pacific Ocean Organic Matter Remineralization and Circulation Using the Dual Isotopic Composition of Nitrate
Rafter P & Sigman D

10:15 Nitrogen Isotope Biogeochemistry of the South Atlantic

10:30 Wintertime Nitrate Isotope Dynamics in the Atlantic Sector of the Southern Ocean
Smart S, Sigman D, Fawcett S, Thomalla S, Weigand A & Reason C

10:45 Cycling of Silicic Acid and Nitrate in the Eastern Equatorial Pacific: Insights from Stable Silicon and Nitrogen Isotopes
Grasse P, Ryabenko E, Altabet M & Frank M

11:00 Silicon Stable Isotope Constraints on the Pathways of Thermocline Nutrient Replenishment
de Souza G, Slater R & Sarmiento J

11:15 A 30ka Sponge-Diatom Silicon Isotope Record of Dissolved Silicon Concentration in Subantarctic Mode Water
Rousseau J, Ellwood M, Neil H, Bostock H & Fallon S

11:30 A 150-Year Variation of Kuroshio Transport Detected by the Nitrate $\delta^{15}N$ Records in Coral Skeletons
Yamazaki A, Watanabe T, Tsunogai U, Iwase F & Yamano H

11:45 Consumption-Regeneration Cycle of Micronutrients and their Isotopes in Seawater
Galer S & Abouchami W

(Session 17d continues on Wednesday 28th PM on p.258)
### 18c: Achievements and Future Challenges in Environmental and Soil Chemistry – A Symposium in Honor of Professor Willem van Riemsdijk

**Session chaired by Walter Schenkeveld, Gerwin Koopmans & Tjisse Hiemstra**

<table>
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<tr>
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| 09:00 | **Keynote:** Speciation and Mobility of Trace Elements in Wetland Soils  
*Kretzschmar R* |
| 09:30 | **Invited:** The MUSIC Model over the Years from a Personal Point of View  
*Lützenkirchen J* |
| 09:45 | **Invited:** CD-MUSIC to Interpret Drifting Primary Charge of Ferrihydrite  
*Hofmann A, Hiemstra T & Lützenkirchen J* |
| 10:00 | **Invited:** Surface Complexation Modeling of Cation Adsorption by TiO₂ Nanoparticles  
*Ridley M, Machesky M & Kubicki J* |
| 10:15 | **Invited:** Hot CD-MUSIC  
*Machesky M, Wesolowski D, Ridley M, Predota M, Zhang Z, Fenter P & Kubicki J* |
| 10:30 | Fulvic and Humic Acid Interaction with Phosphate at Synthetic and Natural Oxide Surfaces  
*Hiemstra T, Mia S, Duhaut P-B & Molleman B* |
| 10:45 | **Invited:** Non-Traditional Stable Isotopes and Surface Complexation Models for Ion Binding to Humic Substances (NICA-Donnan) and Oxide Mineral Surfaces (CD-MUSIC)  
*Benedetti M* |
| 11:00 | **Invited:** Chromium(III) and Bismuth(III) Complexation to Organic Matter: EXAFS Spectroscopy and Equilibrium Modelling  
*Gustafsson JP, Geranmayeh Odomieh A, Sjöstedt C, Persson I & Berggren Kleja D* |
| 11:15 | **Invited:** Reactivity of Natural Heterogeneous Nanoparticles  
*Town R* |
| 11:30 | **Invited:** WHAM-Ftox: An Aquatic Cation Mixture Toxicity Model  
*Tipping E, Lofts S & Stockdale A* |
| 11:45 | **Invited:** From Small-Scale Chemical Processes to Long-Term (Radioactive) Contaminant Migration Predictions  
*Meeussen J, Schroder T & Dijkstra J* |
### Session: Biosphere: The Role of Living Matter in Element Accumulation in Natural and Contaminated Systems. A Celebration of the 150th Anniversary of V.I. Vernadsky’s Birth

**Session chaired by Anna Bogush, Aleksey Yaroshesvky, Gennady Anoshin & Galina Leonova**

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<tr>
<td>09:00</td>
<td>Invited: V I Vernadsky</td>
<td>Holistic Thinker and Geochemical Pioneer</td>
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<td>09:15</td>
<td>Demina L</td>
<td>Comparison of Trace Metal Bioaccumulation Potential in the Three Different Ocean’s Zones</td>
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<td>09:30</td>
<td>Vetrov V</td>
<td>Accumulation of Trace Elements in the Lake Baikal Biota</td>
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<td>09:45</td>
<td>Baranovskaya N</td>
<td>On Regularities in Accumulation and Distribution of Elements in Living Matter of Natural and Technogenic Ecosystems</td>
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<tr>
<td>10:00</td>
<td>Cangemi M &amp; Censi P</td>
<td>Geochemical Signature of Microbial Activity during the Deposition Silica-Stromatolite According to REE Behaviour and Zr-Hf Relationship</td>
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<tr>
<td>10:15</td>
<td>Moiseenko T, Gashkina N &amp; Migorsky V</td>
<td>Water Quality and Human Health in Relation to Aquatic Environment Pollution by Metals</td>
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<tr>
<td>10:30</td>
<td>Schijf J &amp; Garvin MC</td>
<td>Using Increment Cores of Eastern Cottonwood Trees (Populus deltoides) to Assess the Timing of Cd Pollution</td>
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<td>10:45</td>
<td>Shuvaeva O, Belchenko L &amp; Romanova T</td>
<td>The Study of Cadmium Accumulation by Floating Macrophytes Using Natural Modeling Approach</td>
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<td>11:00</td>
<td>Maguffin SC &amp; Jin Q</td>
<td>Arsenic Methylation in the Bedrock Aquifer of the Willamette Basin, Oregon, USA</td>
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<td>11:30</td>
<td>Solodukhina M &amp; Yurgenson G</td>
<td>Zn-Pb-Fe Sulfide Formation in Grieves Siding Peat, Tasmania</td>
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20g: Advances in Accurate and Precise Chemical and Isotopic Analysis: Your Data are Only as Good as Your Standards and Methods!

Session chaired by Thomas D Bullen, Christophe Cloquet, Marc-Alban Millet & Dominique Weis

09:00 **Keynote:** Quality Control for Novel Isotope Analyses


09:30 Quantifying More Than Half the Periodic Table of Elements in Uranium Ore Concentrates: Results of the IAEA’s Interlaboratory Comparison 2011-2012, and Two New Quality Control Materials

*Buerger S, Boulyga S & Penkin M*

09:45 Osmium Isotope and PGE Reference Materials OKUM and MUH-1

*Meisel T, Burnham M, Kriete C, Bokhari SNH & Schulz T*

10:00 ‘Freiberg Strategy’ for Obtaining Matrix-Matched Reference Materials for Resource-Related Microanalytical Methods Technology


10:15 Invited: Importance of Reference Materials and of the Determination of Matrix Effects for Precise and Accurate Measurements by SIMS

*Rollion-Bard C & Nancy Ion Microprobe Team*

10:30 Investigation on Neodymium Isotopic Fractionation Occurring during HPLC Separation

*Guéguen F, Isnard H, Nonell A, Stadelmann G, Aubert M & Chartier F*

10:45 Introducing PT-Hplc

*Tissot F, Ireland T, Yokochi R & Dauphas N*

11:00 High-Precision Neodymium Isotope Analyses by MC-Ti-Ms

*Trinquier A, Bouman C & Schwieters JB*

11:15 Use of 10^{12} and 10^{13} Ohm Resistors in TIMS Analysis of Sr and Nd Isotopes in Sub-Nanogram Geological and Environmental Samples

*Koornneef J, Bouman C, Schwieters J & Davies G*

11:30 High Precision Measurements of sub Nanogram Levels of Neodymium Measured as NdO^+ Using Phoenix X62 Thermal Ionization Mass Spectrometer

*Palacz Z, Burgess D & Inglis J*
Development of ETV-Mc-ICPMS Technique for W Isotope Analysis

Okabayashi S, Sakata S & Hirata T

(Session 20g continues on Wednesday 28th PM on p.267)
**22d: From Chemical Reactions to Fracturing in Rocks: Mechanisms and Physico-Chemical Feedbacks**

**Session chaired by Oliver Plümper, François Renard & Nicolas Brantut**

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<th>Time</th>
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<tr>
<td>09:00</td>
<td><strong>Keynote:</strong> Reaction-Driven Cracking</td>
<td>Kelemen P</td>
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<td>09:15</td>
<td><strong>Invited:</strong> Fracture Propagation Driven by Crystal Growth and the Role of Interfacial Fluid Chemistry</td>
<td>Røyne A, Meakin P, Malthe-Sørensen A, Jamtveit B &amp; Dysthe DK</td>
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<td>09:30</td>
<td>Forceful Carbonation of Serpentine</td>
<td>Ulven OI, Austrheim H &amp; Malthe-Sørensen A</td>
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<td>09:45</td>
<td><strong>Invited:</strong> Transformational Faulting in High Pressure Polymorphs – Two Case Studies in Quartz and Olivine</td>
<td>Schubnel A, Brunet F, Hilairet N, Gasc J, Wang Y &amp; Green HWI</td>
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<tr>
<td>10:00</td>
<td>Microstructural Constraints on Porosity Evolution during Carbonate Replacement Reactions</td>
<td>Pearce M, Timms N, Hough R &amp; Cleverley J</td>
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<td>10:15</td>
<td>Structural-Diagenetic Evolution of Fractures in Folds: A TGS Example from the Alberta Foothills, Canada</td>
<td>Ukar E, Eichhubl P &amp; Fall A</td>
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*Session 22f follows this session in this room: see p.234.*
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<th>Time</th>
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<tr>
<td>11:15</td>
<td>Spectroscopy and Magnetic Imaging at the Nanoscale for the Study of Magnetic Minerals</td>
<td>Herrero-Albillos J</td>
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23d: Hazardous Waste in the Geosphere:
Geochemistry for Risk Assessment

Session chaired by Lara Duro & Birgitta Kalinowski

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| 10:15 | **Keynote:** Nuclear Waste Disposal: From Geosciences to Multigenerational Safety and Society  
                  *Grambow B & Bretesché S* |
| 10:45 | A Microscopic and TOF-SIMS Study on the Ra Uptake by Barite  
                  *Klinkenberg M, Brandt F, Breuer U & Bosbach D* |
| 11:00 | Dissolution Kinetics of ZrO$_2$ Based Innovative Waste Forms  
                  *Finkeldei S, Brandt F, Bukaemskiy A, Neumeier S, Modolo G & Bosbach D* |
                  *Deissmann G, Brandt F, Neumeier S, Modolo G & Bosbach D* |
| 11:30 | Solid Solution Formation and Uptake of Radium in the Presence of Barite  
                  *Brandt F, Klinkenberg M, Vinograd V, Rozov K & Bosbach D* |
| 11:45 | Solubility and TRLFS Studies on Nd(III)/Cm(III) Complexation with Gluconate in NaCl and CaCl$_2$ Media  
                  *Rojo H, Gaona X, Rabung T, García M, Missana T & Altmairer M* |

*(Session 23d continues on Wednesday 28th PM on p.269)*
23f: Mixing, Chemical Reactions and Biological Activity in Porous Media

**Session chaired by Pietro de Anna, Tanguy Le Borgne & Marco Dentz**

09:00 **Keynote:** Division by Fluid Incision: Biofilm Patch Development in Porous Media

*Durham WM, Tranzer O, Leombruni A, Coyte KZ & Stocker R*

09:30 Reaction Chain Modeling of Denitrification Reactions during a push–Pull Test

*Boisson A, de Anna P, Bour O, Le Borgne T, Labasque T & Aquilina L*

09:45 Pore-Scale Simulation of Calcite Dissolution and Precipitation Using Lattice-Boltzmann Method

*Shafei B, Huber C & Parmigiani A*

10:00 Challenges Connected with Experimental Upscaling of Flow and Transport in Porous Media

*Englert A, Vaitl T, Frank S & Goekpinar T*

*Session 23d follows this session in this room: see p.235.*
24e: Biogeochemistry
Session chaired by Aude Picard & James Byrne

09:00 The Anthropogenic Contribution to Carbon Dioxide Dissolved in Seawater
 Gab F, Ballhaus C & Siemens J

09:15 Biostimulation of Silica and Sulfur on Crude Oil Biodegradation
 Chaerun SK & Wu X-L

09:30 Geochemical Changes in Wet Dune Slacks: Natural or Anthropic Driven?

09:45 Distribution and Sources of Organic Matter (OM) in a Tropical Intertidal Mud Bank of French Guiana
 Gontharet S, Mathieu O, Lévêque J, Milloux M-J, Lesourd S, Philippe S, Caillaud J & Gardel A

10:00 Speciation of Phosphorus in Soils Peripheral to Meltwater Ponds in Victoria Land, Antarctica
 Christenson H, Webster-Brown J & Hawes I

10:15 On-Site Porewater Measurements of Lake Baikal Sediments
 Torres N, Och L, Müller B, Sturm M & Vologina E

10:30 Mass Specific Magnetic Susceptibility as a Proxy to Differentiate Soils within the Tropical Region
 Costa AC

10:45 Metal Adsorption on Mosses: Towards a Universal Adsorption Model
 González AG & Pokrovsky OS

11:00 A Newly Identified Microorganism Affecting the N Cycle: Ammonium Oxidation in Iron Reducing Soils
 Huang S & Jaffe PR

11:15 Sorption of Cobalt and Nickel by Biogenic Birnessite
 Pena J, Simanova AA, Bargar JR & Sposito G

11:30 The Role of Organic Matter in Genesis of Sedimentary-Hosted Stratiform Copper Deposits in Nahand-Ivand Area, NW Iran
 Sadati N, Yazdi M, Behzadi M, Adabi MH & Mokhtari MAA

11:45 Photoelectrons from Minerals and Microbial World
 Lu A & Li Y
 Oral Presentations Overview

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PM Overview

Wednesday PM Overview
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<td>17:15</td>
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**01e: Causes of Phanerozoic Mass Extinctions: Impacts vs. Large Igneous Provinces vs. Others?**

Session chaired by Fred Jourdan, Andrea Marzoli & Simonetta Cirilli

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<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tr>
<td>14:30</td>
<td>Volcanoes, Asteroid Impacts and Mass Extinctions: A Matter of Timing</td>
<td>Jourdan F</td>
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<tr>
<td>15:00</td>
<td>Sulfur Isotopic Evidence for Sources of Volatiles in Siberian Traps Magmas</td>
<td>Black B, Hauri E, Brown S &amp; Elkins-Tanton L</td>
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<tr>
<td>15:30</td>
<td>Keynote: The End-Permian Mass Extinction and its Aftermath</td>
<td>Wignall P</td>
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<tr>
<td>16:00</td>
<td>The Carnian Pluvial Event Negative CIE at Cave del Predil</td>
<td>Dal Corso J, Roghi G, Rigo M, Gianolla P, Caggiati M, Gattolin G, Newton RJ, Jenkyns HC &amp; Preto N</td>
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<tr>
<td>16:30</td>
<td>Direct Link between End-Triassic CAMP Volcanism, C-Cycle Perturbation and Mass Extinction</td>
<td>Marzoli A, Dal Corso J, Tateo F, Jenkyns H, Bertrand H &amp; Youbi N</td>
</tr>
<tr>
<td>16:45</td>
<td>Impacts and LIPs: $^{187}$Os/$^{188}$Os Signatures Across the K-Pg Boundary</td>
<td>Zaiss J, Ravizza G &amp; Schmitz B</td>
</tr>
<tr>
<td>17:00</td>
<td>New Constraints on K-Pg Boundary Environmental Changes with Li Isotopes</td>
<td>Vigier N, Ravizza G, Nagashima K, Norris R, Petit S, Beaufort D &amp; Karpoff A-M</td>
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<tr>
<td>17:15</td>
<td>U/Pb Zircon Age of Mistastin Lake Crater, Labrador, Canada – Implications for High-Precision Dating of Small Impact Melt Sheets and the End Eocene Extinction</td>
<td>Sylvester P, Crowley J &amp; Schmitz M</td>
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</tbody>
</table>

(Session 01e continues on Wednesday 28th Posters on p.270)
02f: Chronology of Molecular Cloud Collapse, First Solids Formation, and Earliest Accretion

Session chaired by Yuri Amelin

14:30 **Keynote:** Micro-Chronology of the Earliest Solar System: Challenges for the Future  
*MacPherson G*

15:00 Origin of Water on the Chondrite Asteroids: Evidence from Oxygen-Isotope Compositions of Aqueously-Formed Minerals  
*Krot A, Doyle P, Nagashima K, Jogo K, Wakita S, Ciesla F & Hutcheon I*

15:15 Mineralogy, Petrology, O and Mg-Isotope Compositions of AOAs from CH Carbonaceous Chondrites  
*Nagashima K, Krot A & Park C*

15:30 Allende Chondrule Chronology Revisited: Eroding Age Gap between CAIs and Chondrules  
*Yin Q-Z, Yamakawa A, Sanborn M & Yamashita K*

15:45 $^{54}$Cr Isotope Anomalies and Mn/Cr Chronology in Chondrites  
*Göpel C, Birck J-L, Zipfel J, Galy A & Zanda B*

16:00 Nucleosynthetic W Isotope Anomalies in CAI: Implications for Hf-W Chronology  
*Kruijer TS, Kleine T, Burkhardt C & Wieler R*

16:15 The Hf-W Chronology of FUN CAIs  

16:30 Gujba Age Formation Revisited: A Possible Use as Time Anchor  
*Bollard J, Connelly JN & Bizzarro M*

16:45 Internal Lu-Hf Isotope Systematics of the Quenched Angrite D’Orbigny and Two Plutonic Angrites  
*Bast R, Scherer EE, Mezger K, Fischer-Gödde M & Sprung P*

17:00 Can Diffusion Cause Discrepant Lu-Hf Isochrons in Meteorites?  
*Debaille V, Yin Q-Z & Amelin Y*

17:15 Evidence for Supernova Injection into the Solar Nebula and the Decoupling of R-Process Nucleosynthesis  
*Brennecka G, Borg L & Wadhwa M*

(Session 02f continues on Wednesday 28th Posters on p.271)
03b: Geodynamics and Crust Formation in the Archean – Palaeoproterozoic

Session chaired by Elis Hoffmann & Anders Scherstén

14:30  The Fate of Archean Primary Crust and the Transition to Subduction

  Brown M, Johnson T & VanTongeren J

14:45  Archean Geodynamic: Fingerprinting Sagduction vs Subduction Processes

  François C, Philippot P, Rey P, Rubatto D & Moyen JF

15:00  Venus Crustal Plateaus as an Analog for Archean Cratons and SCLM

  Hansen V

(Session 03b continues on Wednesday 28th Posters on p 272)
Session 03c follows this session in this room: see p. 243.
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>15:15</td>
<td>Keynote: Application of Multiple S-Isotope Studies to Understanding Early Earth Environments and Biology</td>
<td>Farquhar J, Cliff J &amp; Zerkle A</td>
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<tr>
<td>15:45</td>
<td>Peering into the Cradle of Life: Multiple Sulfur Isotopes Reveal Insights into Environmental Conditions and Early Sulfur Metabolism Some 3.5 Ga</td>
<td>Montinaro A, Strauss H, Mason P &amp; Galić A</td>
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<tr>
<td>16:00</td>
<td>Determination of Microbial Consortia and its Adaptation to Environmental Changes in the Neo-Archaean Environment</td>
<td>Grassineau N &amp; Nisbet E</td>
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<tr>
<td>16:15</td>
<td>Microbially-Induced Carbonate Precipitation, Moodies Group (3.2 Ga, BGB, South Africa)</td>
<td>Homann M, Heubeck C, Airo A, Tice M &amp; Nabhan S</td>
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<tr>
<td>16:30</td>
<td>High-Spatial Resolution Imaging of the Distribution and Inter-Element Correlation of Metals in Modern and Ancient Stromatolites</td>
<td>Sforna MC, Philippot P, van Zuilen M, Somogyi A, Medjoubi K, Visscher PT &amp; Dupraz C</td>
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<tr>
<td>17:00</td>
<td>Delineating Biotic and Abiotic Carbonaceous Material in the Apex Chert</td>
<td>Olcott Marshall A, Jehlicka J, Rouzaud J-N &amp; Marshall C</td>
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<tr>
<td>17:15</td>
<td>Poorly-Crystalline Fe(Mg) Silicates Involved in Early Fossilization of Microbes in Modern Microbialites</td>
<td>Li J, Zeyen N, Benzerara K, Bernard S &amp; Beyssac O</td>
</tr>
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(Session 03c continues on Wednesday 28th Posters on p.273)
05c: Investigating the Origin and Modification of Cratonic Mantle over Time: The Role of Diamonds and Xenoliths

Session chaired by Gareth Davies, Dan Howell, Lucy Hunt, Maya Kopylova & Fabrizio Nestola

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</table>
| 14:30 | **Keynote:** Xenoliths, XANES and Redox-Related Processes in the Cratonic Lithosphere  
*Yaxley G, Berry A, Woodland A, Hanger B & Kamenetsky V* |
| 15:00 | Experimental Calibration of a Garnet-Clinopyroxene Geobarometer for Mantle Eclogites  
*Beyer C & Frost DJ* |
| 15:15 | Unmasking Enigmatic Xenolithic Eclogites: Progressive Metasomatism on a Key Roberts Victor Sample  
*Huang J-X, Griffin W, Greau Y, Pearson N & O’Reilly S* |
| 15:30 | *In situ* Trace Elements and Li, Sr Isotopes in Peridotite Xenoliths from Kuandian, North China Craton: Insights into Pacific Slab Subduction-Related Mantle Modification  
*Xu R, Liu Y, Tong X, Hu Z, Zong K, Li H & Gao S* |
| 15:45 | The Origin of Garnet Peridotites in the Siberian Cratonic Mantle from Chemical, Modal and Textural Data  
*Ionov D, Doucet L-S & Golovin A* |
| 16:00 | Simultaneous Mantle Metasomatism, Diamond Growth and Crustal Events in the Archean and Proterozoic of South Africa  
*Shu Q, Brey G, Gerdes A & Hoefer H* |
| 16:15 | Invited: Melt Injections and Metasomatism in the Continental Mantle Lithosphere beneath Southern Africa  
*Harte B* |
| 16:30 | Dating Mantle Metasomatism: A New Tool (U/Pb LIMA Titanate) and an Impostor (40Ar/39Ar Phlogopite)  
| 16:45 | Insight on Formation and Evolution of Cratonic Mantle: Re-Os Dating of Single Sulfides from Somerset Mantle Xenoliths (Rae Craton, Canada)  
*Bragagni A, Luguet A, Pearson DG, Fonseca ROC & Kjarsgaard BA* |

(Session 05c continues on Wednesday 28th Posters on p.274)
06a: Understanding the Lower Continental Crust: Where are We Now?

Session chaired by Stacia Gordon, Tracy Rushmer & Oliver Jagoutz

16:00  **Keynote:** Constraints on the Composition of the Lower Continental Crust from Joint Inversion of P- and S-Wave Seismic Velocity Data  
*Behn M, Jagoutz O, Shillington D & Kelemen P*

16:30  Seismic Anisotropy as a Constraint on Composition in the Lower Crust  
*Brownlee S, Hacker B, Chapman A, Saleeby J & Seward G*

16:45  Petrologic Implications of Magmatic Underplating: Observations from the Athabasca Granulite Terrane  
*Williams M, Seaman S & Koteas C*

17:00  Evidence of Intergranular Melt Pools and Melt Films in Lower Crustal Granite: Products of Fluxing by Water Derived from Deformation of Nominally Anhydrous Minerals  
*Seaman S, Williams M, Jercinovic M, Koteas C & Brown L*

17:15  Biotite is an Important Host for Nb in the Lower Crust  
*Stepanov A & Hermann J*

(Session 06a continues on Wednesday 28th Posters on p.277)
06e: Advancements in Using Mineral Phases as Recorders of the Timing, Rates, and Processes of Continental Crustal Evolution

*Session chaired by Massimo Tiepolo, Terrence Blackburn & John Hanchar*

14:30 Metasomatic Perovskite
*Wu F-Y, Sun J & Liu C-Z*

14:45 NanoSIMS Mapping Combined to *in situ* Trace Element Analyses and U-Th-Pb Dating in Monazite: A Chemical Record of Three Successive Events
*Didier A, Bosse V, Mostefaoui S, Bouloton J, Devidal J-L & Paquette J-L*

15:00 A Distinct Tectono-Metamorphic Evolution at the Southern Edge of Tisia Mega-Unit Revealed by Monazite and Xenotime Age Dating
*Balen D, Horváth P, Finger F & Konečný P*

15:15 Temporal Evolution of the Raahe-Ladoga Shear Complex, Finland: Constraints from a Sheared Granitoid in the Pielavesi Shear Zone
*Woodard J, Tuisku P, Kärki A & Huhma H*

15:30 OH Incorporation in Quartz as a Tracer of Formation Conditions
*Kohut M, Stalder R & Konzett J*

15:45 Improved Crustal PTtD Evolution Constraints Using TitaniQ Thermobarometry
*Ashley K, Law R, Stahr D, Thomas J, Caddick M, Spear F & Webb L*

(Session 06e continues on Wednesday 28th Posters on p.278)
Session 06a follows this session in this room: see p.245.
07d: Non-Conventional Physical and Chemical Processes in Subduction Zones

Session chaired by Bradley Hacker & Mark Behn

14:30  **Keynote:** Some Less Conventional Processes in Subduction Zones  
**Kelemen P**

15:00  Protolith and Metamorphism of Moldanubian HP Granulites – A Geochemical Perspective  
**Janoušek V, Franěk J & Vrána S**

15:15  Deep Sediment Melts Contribute to Southwest Japan Adakitic Magmas  
**Feineman M, Moriguti T, Yokoyama T & Nakamura E**

15:30  Dehydration of Metasomatic Rocks along Subduction and Cold Diapiric P-T Trajectories  
**Schumacher JC & Marschall HR**

(Session 07d continues on Wednesday 28th Posters on p.281)  
Session 07g follows this session in this room: see p.248.
07g: Carbon Cycling in Subduction Zones

Session chaired by Olivier Beyssac, Katy Evans & Maria Luce Frezzotti

15:45  Keynote: Fluids, Subduction, and Deep Carbon
   Manning C, Li Y & Eguchi J

16:00  Record of Subduction Zone Carbon Cycling in HP/UHP Rocks, W. Alps
   Collins N, Bebout G, Cook-Kollars J & Kump L

16:15  Experimental Constraints on Carbon Recycling in Subducted Sediments and Altered Oceanic Crust
   Hermann J & Martin L

16:30  Carbonatites out of a Subducted Altered Oceanic Crust?
      Experimental Evidences for Epidote-Dolomite Eclogite Melting at 3.8 – 4.2 GPa
   Poli S

16:45  Thermodynamics of Carbon-Bearing Fluids and Oxidized Carbon Speciation Equilibria in Subduction Zone Fluids
   Sanchez-Valle C, Mantegazzi D & Driesner T

17:00  Subducted Carbon in Stagnant Slabs: Evidence from ‘Deep’ Diamonds
   Harte B

17:15  Diamonds and their Inclusions from Dachine, French Guiana:
      A Record of Paleoproterozoic Subduction
   Walter M, Smith C, Bulanova G, Mikhail S & Kohn S

(Session 07g continues on Wednesday 28th Posters on p.281)
08b: Advances in Transport Properties of Natural Melts, Glasses & Magmas
Session chaired by Cristina De Campos, Kelly Russell & Alan Whittington

14:30 *Keynote:* Concentration Variance Decay during Magma Mixing: A Volcanic Chronometer to Measure Magma Ascent Velocity during Explosive Eruptions
*Perugini D, De Campos C & Dingwell D*

15:00 Constraining OH Diffusivity in Silicate Melts
*Ni H, Xu Z & Zhang Y*

15:15 X-Ray Tomography Links Macroscopic Silicate Fabric and AMS Fabric
*Schöpa A, Floess D, Saint Blanquat MD, Launeau P, Annen C & Baumgartner L*

15:30 The Role of Fluoride-Silicate Liquid Immiscibility in REE Ore Genesis
*Vasyukova O & Williams-Jones AE*

(Session 08b continues on Thursday 29th Posters on p.391)

Session 08k follows this session in this room: see p.250.
08k: From Glass to Magma: Nucleation and Crystal Growth in Magmatic and Synthetic Silicate Melts

Session chaired by Pietro Armienti, Gianluca Iezzi & Julia Hammer

15:45 Crystallization Kinetics in Hydrous Magmas Subject to Decompression
Carroll M

16:00 Origin of Curved CSDs: Heterogeneous Nucleation of Crystals in Crystallizing Magmas
Špillar V & Dolejš D

16:15 Textural and Compositional Zoning of Plagioclase as Archive of Magmatic Evolution: The Mt. Etna Case Study
Giacomoni PP, Coltorti M, Ferlito C, Bonadiman C & Lanzafame G

16:30 PTt Path of Rising Magmas. An Ascent Rate Meter Recorded in Lava Volatile Contents
Armienti P & Perinelli C

16:45 Mineralogical Characterization and Crystallization Kinetics of Fibrous and Acicular Volcanic Orthopyroxenes from Mt. Etna, Sicily, Italy
Stelluti I, Viti C & Gianfagna A

17:00 Glass Forming Ability of Sub-Alkaline Silicate Melts

17:15 Studying Crystal Growth with NanoSIMS: An Example of Zircon

(Session 08k continues on Wednesday 28th Posters on p.283)
09h: Seawater Geochemical Evolution: Applications of Elemental and Isotopic Proxies

Session chaired by Anton Eisenhauer, Matthew S Fantle, Juraj Farkas, Elizabeth Griffith & Brad Opdyke

14:30 **Keynote:** A History of Inhibition: Thresholds and Echinoderm Mg/Ca
   *Rickaby R, Vickers M, Jenkyns H, Gale A, Bots P & Shaw S*

15:00 Marine Cements and the Late Cretaceous to Cenozoic History of Magnesium, Strontium, and Calcium in the Ocean
   *Opdyke B, Owens R, Caves J, Wilson P & Droxlar A*

15:15 Reconciling Seawater Mg/Ca Reconstruction with Foraminifera Geochemistry
   *Evans D, Müller W, Erez J, Oron S & Renema W*

15:30 **Invited:** Glacial-Interglacial Changes in Ocean Carbonate Chemistry Constrained by Boron Isotopes, Trace Elements, and Modelling
   *Rae J, Adkins J, Foreman A, Charles C, Ridgwell A, Foster G, Schmidt D & Elliott T*

15:45 **Invited:** Magnesium Isotope Evidence for a Link between Low-Temperature Clays, Seawater Mg/Ca, and Climate
   *Higgins J & Schrag D*

16:00 Magnesium Isotope Composition of Globally Distributed Modern Brachiopods: Implications for Paleo-Seawater $\delta^{26}$Mg Reconstructions
   *Farkas J, Brand U, Tomasovych A, Azmy K, Fietzke J & Eisenhauer A*

16:15 Constraining the Modern Riverine Sulfur Isotopic Budget

16:30 The Isotopic Composition and Controls on Modern Seawater Sulfate
   *Johnston DT, Gill B, Masterson A, Beirne E & Berelson W*

16:45 Calcium Isotopes in Evaporites Constrain Sulfate- vs Calcite-Rich Seawater Chemistry
   *Blättler C & Higgins J*

17:00 A First-Order Deep Time Reconstruction of the Marine Sr/Ba Ratio from Microbial Carbonate
   *Kamber B, Naegler T, Turner E, Webb G & Pretet C*

17:15 The Phanerozoic $\delta^{88/86}$Sr Record of Seawater: New Constraints on Past Changes in Oceanic Carbonate Fluxes

(Session 09h continues on Wednesday 28th Posters on p.285)
10c: Interactions between Nanomaterials and the Living World

Session chaired by Mélanie Auffan & Cole W Matson

14:30  **Keynote:** Modeling Nanomaterial Transport and Biouptake in a Complex Aquatic System: Exploring Surface Affinity as a Predictor of Nanoparticle Fate

*Wiesner M*

15:00  Low Concentration Soil Exposure to ZnO Nanoparticles by Stable Isotope Labeling

*Laycock A, Diez Ortiz M, Larner F, Dybowska A, Valsami-Jones E, Svendsen C & Rehkämper M*

15:15  The Effect of Chloride on the Dissolution Rate of Silver Nanoparticles and Toxicity to *E. coli*

*Levard C, Mitra S, Yang T, Jew A, Badireddy AR, Lowry GV & Brown Jr. GE*

15:30  Impact of Natural Sulfidation of Silver Nanoparticles on Bioavailability and Biouptake

*Stegemeier J, Lowry G, Dale A, Levard C, Schwab F, Colman B, Bernhardt E, Casman E & Weisner M*

15:45  Role of Material Properties on TiO$_2$ Nanoparticle Agglomeration

*Zhou D, Keller A, Ji Z, Dunphy D & Brinker J*

16:00  Environmental Fate, Transport, and Bioavailability of CeO$_2$ Nanoparticles in Stream Mesocosms

*Baker L, King R, Unrine J & Matson C*

16:15  Fate and Impacts of nano-CeO$_2$ in an Activated Sludge Bioreactor

*Barton L, Auffan M, Maison A, Santaella C, Olivi L, Roche N, Bottero J-Y & Wiesner M*

16:30  Environmental Fate and Impacts of Ceria Nanomaterials: Distribution, Transformation and Bioaccumulation within Aquatic Mesocosms


(Session 10c continues on Wednesday 28th Posters on p.288)

Session 10h follows this session in this room: see p.253.
10h: Combining Experimental and Theoretical Approaches to Understand Biogeochemical Interfaces in Soil

Session chaired by Gabriele E Schaumann, Adelia Aquino, Kai Uwe Totsche & Daniel Tunega

16:45 Keynote: Coupled Spectromicroscopic Investigations for Improved Conceptual Models of Soil Carbon Cycling
*Nico P. Keiluweit M, Pett-Ridge J, Weber P & Kleber M*

17:15 Invited: Experimental and Computational Spectra and Thermodynamics of Biogeochemical Interfaces
*Kubicki J & Kabengi N*

(Session 10h continues on Wednesday 28th Posters on p.289)
12g: Carbon Capture, Utilization and Storage

Session chaired by Alexis Navarre-Sitchler, Scott Imbus & Susan Carroll

14:30 An Inverse Modelling Approach for Assessing CO₂-Exposure Experiments on Ketzin Sandstone
*De Lucia M, Fischer S, Liebscher A & Kühn M*

14:45 **Keynote:** Quantifying the Isolation Performance of CO₂ Reservoirs: Requirements, Results, and Challenges
*Johnson JW*

15:15 Numerical Interpretation of Laboratory and Field Data Showing CO₂-induced Groundwater Changes

15:30 Geochemical and Geomechanical Influences on the Permeability of Wellbore Cement Fractures Exposed to CO₂-Rich Brine
*Carroll S, Walsh S, Mason H & DuFrane W*

15:45 **Invited:** Accurate Measurement of Diffusion Profiles in Altered Wellbore Cement Using XMCT
*Mason H, DuFrane W, Walsh S & Carroll S*

16:00 Impacts of CO₂ Perturbation on Well Composite Samples: Experiments and Numerical Simulations
*Tremosa J, Mito S, Audigane P & Xue Z*

16:15 Strontium Isotopes Map Fluid Flow in a Natural CO₂ Reservoir, Green River, Utah, USA
*Chapman H, Kampman N, Bickle M, Busch A & Evans JP*

16:30 Downhole Fluid Sampling of a Natural CO₂ Reservoir, Green River, Utah: Implications for Fault-Hosted Fluid Flow and Reservoir Caprock Performance

16:45 Characterization of Transport Parameters during Limestone Dissolution Experiments
*Luquot L, Rötting T & Carrera J*

17:00 Chlorite Dissolution Experiments Under CO₂ Saturated Conditions
*Black J & Haese R*

17:15 Interaction between CO₂-Rich Brine and Marly Shale Under Supercritical CO₂ Conditions
*Dávila G, Luquot L, Soler JM & Cama J*
13a: Asthenosphere-Lithosphere Interactions and Ore Genesis

**Session chaired by Jeremy Richards, Richard Arculus & Chris Heinrich**

15:45 **Keynote:** The Role of Arc Magmas and Subduction-Modified Lithosphere in Ore Formation

*Richards J*

16:15 Mass Transfer of Fluids and Metals in the Deep Earth


16:30 Subcontinental Lithospheric Mantle and Mantle Plume Controls on Crustal PGE Abundance: A Case Study of Palaeogene Magma Conduits from Western Scotland, UK

*Hughes H, McDonald I, Kerr A & Boyce A*

16:45 Fertile Magmatism in a Changing Compression and Extension Regime on the Central Balkan Peninsula

*Peytcheva I, Georgiev S, Grozdev V, Marchev P & von Quadt A*

17:00 Subduction-Related to Post-Arc Magmatism and Cu-Au-Te Metallogeny in the Carpathian Orogen, Romania

*Gallhofer D, von Quadt A, Peytcheva I, Seghedi I & Heinrich CA*

17:15 REE Signatures of Accessory Minerals from Iron Oxide Copper Gold – Skarn Mineralization, Hillside, South Australia

*Ismail R, Ciobanu C, Cook N, Giles D & Schmidt-Mumm A*

*(Session 13a continues on Wednesday 28th Posters on p.293)*
### 13e: Rare Earths and Rare Metal Mineralization

Session chaired by Yasushi Watanabe, Frances Wall, Olivier Pourret & Sophie Decrée

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<tr>
<td>14:30</td>
<td>Rare-Earth Element Speciation in Ferromanganese Oxides from the Indian Ocean</td>
<td>Nagender N, Vineesh TC &amp; Parthiban G</td>
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<tr>
<td>14:45</td>
<td>Geochemistry of Rare Earth Element (REE) in Weathered Crust from the Granitic Rocks in Sulawesi Island, Indonesia</td>
<td>Maulana A, Yonezu K, Imai A &amp; Watanabe K</td>
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<tr>
<td>15:00</td>
<td>Characteristics and Genesis of Ion-Adsorption Type REE Ores</td>
<td>Sanematsu K &amp; Watanabe Y</td>
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<td>15:15</td>
<td>REE Microdistribution in Laterite from Madagascar</td>
<td>Janots E, Brunet F, Berger A, Bernier F, Munoz M, Lanson M, Trcera N &amp; Gnos E</td>
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<tr>
<td>15:30</td>
<td>Adsorption Experiment of Rare Earth Elements on Clay Minerals: Implication to the Formation of Ion-Adsorption Type REE Deposit</td>
<td>Yonezu K, Nishida M, Watanabe K &amp; Yokoyama T</td>
</tr>
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</table>

*Session 13a follows this session in this room: see p.255.*
15e: Atmospheric Dust

Session chaired by Reto Gieré & Natalie Mahowald

14:30 Invited: Holocene Peat Bog Records of Atmospheric Dust Fluxes in Southern South America

14:45 Holocene Dust Record in a NW European Peat Bog: A Multiproxy Approach
Allan M, le roux G, Verheyden S, Mattiel N, Piotrowska N, Fagel N & Beghin J

15:00 Invited: When do Insoluble Particles act as Good CCN? Nenes A

15:15 New Insights into Iron Mineralogy and Geochemistry in Saharan Dust Precipitated over Greece

15:30 Impact of Anthropogenic Land Cover Changes (ALCC) on Dust Particle Emissions and Associated Impact on Radiation
Stanelle T, Bey I, Reick C, Raddatz T & Tegen I

15:45 Invited: Regional Modelling of Saharan Dust Tegen I & Heinold B

16:00 Keynote: Understanding Long-Term Variability of Dust in Different Parts of the World Ginoux P, Malyshev S & Shevliakova E

16:30 Inverse Modeling of Asian Dust Emission with MODIS AOT and the SPRINTARS Adjoint Model Yumimoto K & Takemura T

16:45 A Dustier World Since MIS12 Inferred from Sr and Nd Isotopes of Sediments in the Western Philippine Sea Jiang F, Frank M, Li T, Chen T-Y, Zhou Y & Li A

17:00 Isotopic Characterization of Winter Time Aeolian Dust over Cape Verde Kumar A, Abouchami W, Galer S, Fomba K & Andreea M

17:15 Dust Transport over the Late Quaternary Red Sea – Dead Sea Regions from Nd-Sr Isotopes in Deep-Sea Cores and Lake Sediments Stein M, Palchan D, Almogi-Labin A, Erel Y & Goldstein SL
17d: Isotopic and Elemental Tracers of Marine Biogeochemistry and Circulation

Session chaired by Seth John, Julie Granger, Katharina Pahnke & Gregory F. de Souza

14:30 Net Community and Gross Primary Production in the Southern California Bight Based on Carbon Export, Dissolved O₂/Ar and Triple Oxygen Isotopes: Exploration of How the Magnitude and Timing of Upwelling Events may Influence Export Efficiency
Haskell WZ, Prokopenko MG, Hammond DE, Stanley RHR & Berelson WM

14:45 Distinguishing between Advection and Source Changes Recorded by Nd Isotopes in the NE Atlantic
Roberts N & Piotrowski A

15:00 Modelling Scavenged Ocean Tracers: Rare Earth Element Transport and Fractionation

15:15 Boundary Addition of Hf and Nd in the Southern Ocean
Rickli J, Gutjahr M, Vance D, Hillenbrand C-D, Kuhn G & Fischer-Gödde M

15:30 Rare Earth Elements in the Surface Ocean Under the Saharan Dust Belt
Hathorne E, Frank M, Rutgers van de Loeff M, Roeske T & Rickli J

15:45 Factors Controlling the Distribution of Neodymium Isotopes and REEs in Tropical Atlantic Seawater
Zieringer M, Frank M & Hathorne E

16:00 Neodymium Isotopic Composition and Concentration in Equatorial to North Atlantic Seawater

16:15 Understanding the Marine Biogeochemical Cycle of Pb in the Equatorial Atlantic
Bridgestock L, Paul M, van de Flierdt T, Rehkamper M, Achterberg E & Lohan M

16:30 Aluminium in an Ocean General Circulation Model and Observations
van Hulten M, de Baar H, Middag R, Sterl A, Dutay J-C, Gehlen M & Tagliabue A

16:45 Sources of Fe to the North Atlantic: Insights from Fe Isotopes
Conway T & John S
17:00 Tracing Changes in the Biogeochemical Cycling of Iron during the Annual Subtropical Spring Bloom East of New Zealand

17:15 Iron Isotopes in Seawater from the Southeast Pacific and North Atlantic Oceans
Fitzsimmons J, Conway T, John S & Boyle E
18a: Contaminant Fate and Transport at the Groundwater-Surface Water Interface

Session chaired by Philippe Van Cappellen & Joel Kostka

16:30 Novel Method for Compound Specific Stable Isotope Analysis of Contaminated Groundwater Across the Sediment-Water Interface
Passeport E, Chu K, Lacrampe Couloume G, Landis R, Lutz EJ, Mack EE, West K & Sherwood Lollar B

16:45 Unravelling Complex Groundwater Recharge and Transport of Contaminants Using Combined Stable and Radioactive Isotope Tracers
Vennemann T, Reymond C, Buffat A, Desponds L, Morel C, Naude K, Miller J & Mapani B

17:00 Mercury Transport along the Tiber River Basin (Central Italy)
Gray JE, Rimondi V, Costagliola P, Lattanzi P, Vaselli O & Pattelli G

17:15 Speciation Study in the Sulfamethoxazole-Copper-Ph-Soil System: Implications for Antibiotic Retention Prediction in Soils
Morel M-C, Spadini L, Khaled B & Martins JMF

(Session 18a continues on Wednesday 28th Posters on p.298)
18e: Biogeochemical Processes Affecting Geologic Carbon Sequestration

Session chaired by Andrew Mitchell, Frederick Colwell & Robin Gerlach

15:45 Carbon Flow from Volcanic CO₂ into Soil Microbial Communities of a Wetland Mofette
Beulig F, Akob D, Viehweger B, Elvert M, Heuer V, Hinrichs K-U & Küsel K

16:00 Characterization of the Deep Microbial Life at Different CCS Sites
Morozova D, Neumann D, Zettlitzer M & Würdemann H

16:15 Microbial Communities in Terrestrial CO₂ Springs: Insights into the Long-Term Biogeochemical Effects of Geologic Carbon Storage
Santillan E, Major J & Bennett P

Session 18a follows this session in this room: see p.260.
18h: Application of Non-Traditional Isotopes for the Investigation of Contaminated Sites and Remediation Systems

Session chaired by Romy Matthies & David W Blowes

14:30 Keynote: Anthropogenic Fractionation of Zinc Isotopes
Borrok D & Thapalia A

14:45 Changes in $^{238}\text{U}/^{235}\text{U}$ Associated with Reductive Immobilization of Uranium in Groundwater

15:00 Comparison of $\delta^{53}\text{Cr}$ Ratios between Geogenic and Anthropogenic Chromium in Central European Waters

15:15 Modifications of Cu Isotopic Ratios in Coastal Sediments in Relation to the Increased Use of Copper Based Antifouling Paints
Briant N, Freydier R, Elbaz-Poulichet F, Bancon-Montigny C & Delpoux S

15:30 Pb Isotope Ratios in Stream Sediment Around Two Abandoned Mines Originating from One Ore Deposits
Choi J-W, Lee K, Yoo E-J, Lee W-S & Han J-S

(Session 18h continues on Wednesday 28th Posters on p.299)

Session 18e follows this session in this room: see p.261.
19c: Subsurface Porous Media as Biogeochemical Reactors: How Coupled Biogeochemical Processes Affect Material Fluxes from Molecular to Critical Zone Scales

Session chaired by Ruben Kretzschmar, Jon Chorover & Steve Banwart

14:30 Invited: Linking Fluvial Processes and Elemental Cycling within the Old Rifle, CO Aquifer
Williams K, Robbins M, Yabusaki S & Long P

14:45 Coupling of Arsenic Mobility to Microbial Sulfate Reduction in Subsurface Environments
Burton E, Johnston S & Adams D

15:00 Invited: Soil Aggregate-Scale Chemical Gradients Resulting from Coupled Biogeochemical and Transport Processes
Pallud C & Kausch M

15:15 Invited: Relating Grain-Scale Weathering Observations to Catchment-Scale Critical Zone Morphology
Buss HL, Moore OW, Chapela Lara M, Schutz M & White AF

15:30 Invited: Soil Organic Matter and Microbial Activity in Critical Zone of Tropical Soils from Luquillo, Puerto Rico
Stone MM & Plante AF

15:45 Invited: Modeling Soil Structure and Nutrient Dynamics Using the 1D-Integrated Critical Zone Model
Nikolaidis N, Valstar J, Rowe E, Moirogiorgou K & Stamati F

16:00 Invited: Labile Structures in Organic Matter Under the Influence of Multivalent Cations – An Issue for Dynamic Interfaces?
Schaumann GE

16:15 Invited: Feedbacks between Biological Retention of Nutrients, Carbon-Mineral Sorption, and Pore Space Generation along an Earthworm Invasion Chronosequence
Yoo K, Resner K, Lyttle A, Hale C, Aufdenkampe A & Sebestyen S

16:30 Si Isotope and Ge/Si Ratios Record Successive Cycles of Dissolution/Precipitation of Pedogenic Clay Minerals
Cornelis J-T, Weis D, Barling J, Lavkulich L & Delvaux B

Bonneville S, Bray A, Schmalenberger A, Morgan DJ, Brown A, Banwart S & Benning LG

17:00 Keynote: Where Groundwater Meets Surface Water
Van Cappellen P

(Session 19c continues on Wednesday 28th Posters on p.301)
19n: Biogeochemical and Geochemical Processes and Cycles in Wetlands

**Session chaired by Klaus-Holger Knorr & Christian Blodau**

**14:30** Keynote: Soil Respiration – A Wetlands Perspective  
*Van Cappellen P*

**15:00** Quantification of Organic Matter Redox States by Mediated Electrochemical Analysis  
*Sander M, Klüpfel L, Piepenbrock A, Kappler A & Aeschbacher M*

**15:15** Dependence of Sulfur Cycling and Mobility in Peat Soil on the Water Table Regime  
*Rezanezhad F, Couture R-M, Parsons C, Kovac R, O’Connell D & Van Cappellen P*

**15:30** Impact of Long-Term Nitrogen Deposition on the Fate of Nitrogen in Peatlands  
*Blodau C, Zajac K & Wu Y*

**15:45** Tracing Denitrification Using Isotopic Composition of Nitrogen in Soils and Plants  
*Sebilo M, Mothet A, Hamilton L, Malone E, Vaury V, Gros O & Pinay G*

**16:00** Changes of the GWP due to Shifts from Flooded to Upland Rice Cultivation  
*Weller S, Butterbach-Bahl K & Kiese R*

**16:15** Volatilization of Methylated Selenium, Sulfur and Arsenic from a Wetland  
*Vriens B, Berg M, Charlet L, Lenz M & Winkel LHE*

*(Session 19n continues on Wednesday 28th Posters on p.304)*

Session 19p follows this session in this room: see p.265.
19p: Biogeochemical Interactions in Thermal Ecosystems

Session chaired by M Hope Lee & Brent Peyton

16:30 Biological Diversity and Potential in Geothermal Systems
   Peyton B & Lee H

16:45 Microbial Diversity in an Arsenic-Rich Shallow-Sea Hydrothermal System Undergoing Phase Separation
   Price RE, Lesniewski R & Amend JP

17:00 Prediction of Effects of Acetogens on Hot Spring Biogeochemistry
   Lee B, Aston J, Lee M & Apel W

17:15 Impacts of Geothermal Energy Storage on the Microbial Community Composition and Activity in Shallow Systems
   Westphal A, Jesuśek A, Lienen T, Dahmke A & Würdemann H

(Session 19p continues on Wednesday 28th Posters on p.305)
20b: Biological Geochemistry: Advances in Biology and Medicine Realized Through Geochemical Analyses

**Session chaired by Vincent Balter, Anders Meibom & Nathalie Vigier**

16:00 **Keynote**: Use of LA-ICP-MS and MC-ICP-MS in a Biomedical Context

*Vanhaecke F, Aramendia M, Izmer A, Resano M & Van Heghe L*

16:15 Highly Dynamic Cellular-Level Response of Symbiotic Coral to Sudden Increase in Environmental Nitrogen


16:30 Using Stable-Isotope Probing to Elucidate the *in situ* Metabolic Activity of Microbial Populations in the Cystic Fibrosis Lung


16:45 Calcium Isotope Fractionation in Vertebrates

*Heuser A, Eisenhauer A, Scholz-Ahrens K & Schrezenmeir J*

17:00 Understanding Controls on Ca Isotopes in Human Blood and Urine

*Channon M, Gordon G, Shollenberger Q, Morgan J, Smith S & Anbar A*

17:15 High Precision Isotope Measurements Unveil Poor Control of Copper Metabolism in Parkinson’s Disease

*Larner F, Sampson B, Rehkämper M, Weiss DJ, Dainty JR, O’Riordan S, Panetta T & Bain P*

(Session 20b continues on Wednesday 28th Posters on p.306)
### 20g: Advances in Accurate and Precise Chemical and Isotopic Analysis: Your Data are Only as Good as Your Standards and Methods!

**Session chaired by Thomas D Bullen, Christophe Cloquet, Marc-Alban Millet & Dominique Weis**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:30</td>
<td>Influence of Surface Condition on Data Quality of U-Pb Zircon Dating</td>
<td>Takehara M, Horie K, Hokada T, Kaiden H &amp; Kiyokawa S</td>
</tr>
<tr>
<td>14:45</td>
<td>CO$_3^-$, OH, and Halogen Microanalysis in Apatite Group Minerals</td>
<td>Tacker C</td>
</tr>
<tr>
<td>15:00</td>
<td>A Pilot Br Isotopic Study of Arid Playa Lakes and Ordinary Chondrites</td>
<td>Schaefer BF</td>
</tr>
<tr>
<td>15:15</td>
<td>Tellurium Stable Isotope Variations in Chondrites</td>
<td>Fehr M, Hammond S &amp; Parkinson I</td>
</tr>
<tr>
<td>15:30</td>
<td>Introducing a Comprehensive Data Reduction Algorithm for High-Precision U-Th Geochronology with Isotope Dilution MC-ICP-MS</td>
<td>Pourmand A, Tissot FLH, Arienzo M, McGee D &amp; Sharifi A</td>
</tr>
<tr>
<td>15:45</td>
<td>Lead Isotope Analysis: Removal of $^{204}$Hg Isobaric Interference from $^{204}$Pb for U/Pb Dating Using an (MS/MS Capable) ICP-Qqq-Ms</td>
<td>Woods G &amp; Lener J-P</td>
</tr>
</tbody>
</table>

*Session 20b follows this session in this room: see p.266.*
22e: High Pressure Mineral Physics: A Key to Study Earth’s Dynamics

Session chaired by Paola Comodi, Leonid Dubrovinsky, Tonci Balic-Zunic & Razvan Caracas

14:30 Keynote: Probing Gold and Sulfur Geological Fluids at Extreme Conditions by in situ Spectroscopy

15:00 Crystal Structure in Earth’s Inner Core
Hirose K, Tateno S & Ozawa H

15:15 Fe-Si System: A Potential Major Component of the Earth’s Core
Caracas R, Verstraete M, Fischer R & Campbell A

15:30 Single Crystal Elasticity of the Na$_{1.07}$Mg$_{1.58}$Al$_{4.91}$Si$_{1.26}$O$_{12}$NAL Phase and Seismic Heterogeneity in the Deep Mantle
Pamato MG, Kurnosov A, Boffa Ballaran T, Trots DM, Caracas R & Frost DJ

15:45 Crystal Structures of Two Oxygen-Deficient Calcium Aluminum Silicate Perovskites from NMR and Powder X-Ray Diffraction
Kanzaki M, Xue X, Wu Y & Nie S

16:00 Pressure-Induced Phase Transitions in Coesite
Cernok A, Boffa Ballaran T, Caracas R, Miyajima N, Bykova E, Prakapenka V, Liermann H-P & Dubrovinsky L

16:15 P-V-T Equation of State of Sodium Majorite up to 21 GPa and 1673 K

16:30 Elasticity and Structure of Mantle Pyroxenes
Zhang JS, Sang L, Bass J, Reynard B, Montagnac G & Dera P

16:45 Experimental Study of the System Mg$_{4}$Si$_{4}$O$_{12}$ – Mg$_{3}$Cr$_{2}$Si$_{3}$O$_{12}$ at 12-25 GPa and 1600°C
Sirotkina E, Bobrov A, Luca B & Tetsuo I

17:00 Phase Transformation in Fe$_{2}$SiO$_{4}$ at High Pressure and High Temperature
Ono S

17:15 Pressure-Induced Insertion of Xenon into a Small-Pore Zeolite Natrolite

(Session 22e continues on Wednesday 28th Posters on p.308)
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:45</td>
<td>Molecular Scale Speciation of U(VI) Association with Clay Bacterial Isolates</td>
<td>Lopez Fernandez M, Sánchez-Castro I, Amador-García A, Romero Gonzalez M &amp; Merroun ML</td>
</tr>
<tr>
<td>15:00</td>
<td>The Stability of Uraninite in Anaerobic Conditions: Revisiting Cigar Lake and Oklo Natural Analogues</td>
<td>Bruno J &amp; Spahiu K</td>
</tr>
<tr>
<td>15:15</td>
<td>U Phase Evolution in the Bedrock Around Forsmark, Eastern Sweden</td>
<td>Krali L, Sandström B &amp; Tullborg E-L</td>
</tr>
<tr>
<td>15:30</td>
<td>Source and Speciation of $^{14}$C in a Cement-Based Repository for Radioactive Waste</td>
<td>Wieland E, Schenzel J &amp; Schlotterbeck G</td>
</tr>
<tr>
<td>16:00</td>
<td>Imaging the Reactivity and Transport of $^{99}$Tc Through Fe-Cement/Rock Barriers</td>
<td>Seliman A, Bridge J, Banwart S &amp; Romero-Gonzalez M</td>
</tr>
<tr>
<td>16:30</td>
<td>High Cesium Concentrations in Groundwater in a Coastal Granitoidic Fracture Network</td>
<td>Mathurin F, Drake H, Kalinowski B &amp; Åström M</td>
</tr>
<tr>
<td>16:45</td>
<td>Sorption of Uranium and Neptunium onto Diorite from Åspö HRL</td>
<td>Schmeide K, Gürtler S, Müller K, Steudtner R, Joseph C, Bok F &amp; Brendler V</td>
</tr>
<tr>
<td>17:00</td>
<td>Role of Black Carbon for Radioactive Iodine Sorption</td>
<td>Choung S, Kim M, Kim M-G &amp; Um W</td>
</tr>
</tbody>
</table>
01e: Causes of Phanerozoic Mass Extinctions: Impacts vs. Large Igneous Provinces vs. Others?

1. Hg as a Proxy for Volcanic Activity during Extreme Environmental Turnover: The K-T Boundary
   Sial AN, Lacerda LD, Ferreira VP, Frei R, Marquillas RA, Barbosa JA, Gaucher C, Windmüller CC & Pereira NS

2. The Platinum-Group Element Abundance Patterns of the Meishan Permian-Triassic Boundary, China
   Xu L & Hu S

02e: Accretion and Differentiation of Primitive Parent Bodies

3. Composition and Interior Structure of the HED Parent Body
   Ashcroft H, Wood B & Wade J

4. Triple O-Isotope Analyses of Pallasite Olivine Revisited: A Cautionary Tale

5. Trace Element Analysis of Iron Meteorites by ICP-MS
   Duan X & Regelous M

6. L2009R2: A Cluster IDP Sampling a Diversity of Formation Conditions
   Flynn G, Wirick S & Sutton S

7. LIME Olivine and Pyroxene: Multi-Stage Thermal Histories of AOAs
   Komatsu M, Fagan TJ & Mikouchi T

8. High-Precision Mg-Isotope Measurements of Peridotites and Bulk Chondrites

9. Ion Irradiation Experiments to Olivine: Comparison with Space Weathering Rims of Itokawa and Lunar Regolith Particles

10. Chalcopyrite in the R Chondrite PRE 95411
    Miller K, Thompson M, Zega T & Lauretta D

11. Igneous and Impact Processes on a Ureilite Parent Body Inferred from Y-983890 Polymict Ureilite
    Ozawa S, Yamaguchi A & Kojima H

12. The Age of the Moon from U-Th-Pb Systematics on Terrestrial and Lunar Primitive Mantles
    Rochd K
13 Halogens in the Early Solar System Inferred from Meteoritic Phosphates

Roszjar J, John T, Whitehouse MJ, Bischoff A & Layne GD

14 3D Shapes of Regolith Particles: Comparison between Itokawa and Moon


15 Impact History of Lunar Highlands Recorded in MIL 090034, 090036, and 090070 Lunar Meteorites

Yamaguchi A, Shirai N, Nyquist L, Park J, Shih C-Y, Ebihara M & Herzog G

(Session 02e continues on Thursday 29th AM on p.316)

02f: Chronology of Molecular Cloud Collapse, First Solids Formation, and Earliest Accretion

16 The Absolute Cr Isotopic Ratios of the Components of Carbonaceous Chondrites

Birck JL & Göpel C

17 Sr Isotope Anomalies in Meteorites: Uniform Distribution of S- and R-Process Sr at the Planetary Scale

Hans U, Kleine T, Burkhardt C & Bourdon B

18 Origin and Implications of $^{238}\text{U}/^{235}\text{U}$ Variations in CAIs

Livermore BD, Connelly JN & Bizzarro M

19 Strontium Isotope Anomalies and $^{26}\text{Al}-^{26}\text{Mg}$ Chronology in CAIs from CV Chondrites

Myojo K, Yokoyama T, Sano Y, Takahata N, Sugirua N, Iwamori H & Uno M

20 Molybdenum Isotopic Compositions in Allende Chondrules

Nagai Y, Yokoyama T & Okui W

21 Sr Stable Isotopic Anomalies in Primitive Meteorites and Chondrules

Okui W, Yokoyama T, Uno M, Iwamori H & Takahashi E

22 Mg-Isotopic Evidence for CBb Chondrule Formation by Condensation from an Impact Plume

Olsen MB, Schiller M & Bizzarro M

23 The $^{238}\text{U}/^{235}\text{U}$ of the Earth and the Solar System

Goldmann A, Brennecka G, Noordmann J, Weyer S & Wadhwa M
### 02g: Origins of Life: Environments, Mineral Surfaces, and Prebiotic

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>Fe(II) in Early Abiotic Processes</td>
<td>Holm N</td>
</tr>
<tr>
<td>25</td>
<td>Effects of Glycine on Oligomerization of Methionine Under High Temperature and High Pressure</td>
<td>Huang R, Furukawa Y &amp; Kakegawa T</td>
</tr>
<tr>
<td>26</td>
<td>Densities of Dilute Coenzyme M Solutions to 0.80 MPa and 353.15 K</td>
<td>Hall A &amp; Seitz J</td>
</tr>
</tbody>
</table>

(Session 02g continues on Thursday 29th AM on p.317)

### 03b: Geodynamics and Crust Formation in the Archean – Palaeoproterozoic

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>Zircon from Mesoarchean Enderbites of Volgo-Uralia: U-Pb Age, REE, Hf- and O-Isotope Compositions</td>
<td>Bogdanova S, Belousova E, De Waele B &amp; Postnikov A</td>
</tr>
<tr>
<td>30</td>
<td>The Paleoproterozoic Basin Evolution in the Trans-North China Orogen, North China Craton</td>
<td>Liu C &amp; Zhao G</td>
</tr>
<tr>
<td>32</td>
<td>Contemporaneous Crustal Records in the Eastern and Western Dharwar Craton: Evidence from U – Pb and Lu – Hf Isotope Sytematics</td>
<td>Maibam B, Gerdes A &amp; Goswami JN</td>
</tr>
<tr>
<td>33</td>
<td>New Zircon U-Pb Age and Hf-Isotope of the Birimian Terrane of the West Africa Craton</td>
<td>Parra LA, Fiorentini ML, Belousova E, Kemp AIS, Miller J, McCuaig TC &amp; Said N</td>
</tr>
<tr>
<td>34</td>
<td>Presence of &gt; 3.3 Ga Old Crust and Neoarchean Juvenile Magmatic Accretion in Easternmost Part of the Dharwar Craton: Evidence from Peddavura Greenstone Belt</td>
<td>Rajamanickam M &amp; Srinivasan B</td>
</tr>
</tbody>
</table>
35 Chromitites from the Andriamena Greenstone Belt, Madagascar: Hints of a Mid-Archean Ophiolite? 
Reisberg L, Ohnenstetter M & Zimmermann C

36 The North Australian Craton: A Palaeoproterozoic Accretionary Orogen 
Smits R, Collins W & Hand M

37 HF Isotope Systematics of Archean Anorthosites: The Manfred Complex, Yilgarn Craton, Western Australia 
Souders K, Sylvester P, Crowley J & Myers J

38 The Paleoproterozoic MORB-Type Tholeitic Dykes as Indicators of Early Continents Breakup 
Stepanova A, Samsonov A, Salnikova E, Larionova Y, Larionov A & Stepanov V

39 Pilbara Greenstones Revisited: A Multi-Proxy Geochemical Perspective on Archean Crust-Mantle Interaction 
Tympel JF, Hergt JM, Woodhead JD, Maas R & Greig A

03c: Peering into the Cradle of Life

41 Imogolite: An Ideal Mineralogical Substrate for the Prebiotic Assembly of Long Polynucleotides? 
French J

42 Silicon Isotope Variation in the Buck Reef Chert (Barberton Greenstone Belt) Records Early Archean Basin Evolution 
Geilert S, Van Bergen M & Vroon P

43 Experimental Studies of Catalytic Properties of Iron II and III Modified Hydrothermal Zeolites 
Iñiguez Pacheco JE, Hemminsson C & Holm NG

44 Evaporitic Sulfate Concretions, Moodies Group (~3.2 Ga, Barberton Greenstone Belt, South Africa) 
Nabhan S, Heubeck C & Homann M

45 A Possible Route to Potassium Enriched Aqueous Solutions on Early Earth 
Taran O, Lange H & Whitesides G

46 Geochemistry and Nano-Structure of Putative Filamentous Microbes from the 3.24 Ga Sulfur Springs Group, Pilbara, Western Australia 
Posters

03d: Building and Differentiating the Early Earth

47 Modeling the Evolution of the Isotopic Composition of Atmospheric Xenon Through Time
   **Avice G & Marty B**

48 Lu-Hf Isotope Systematics of the ca. 3.92-3.96 Ga Acasta Gneiss Complex (NWT, Canada)
   **Guittreau M, Blichert-Toft J, Mojzsis SJ, Roth ASG, Bourdon B, Cates NL & Bleeker W**

49 U-Pb, Lu-Hf and Sm-Nd Isotope Systematics during Polymetamorphism in the Ancient Gneiss Complex, Swaziland
   **Taylor J, Gerdes A & Zeh A**

50 Hydrogen Isotopic Composition of Earth’s Early Ocean Estimated from Archean MORB in Barberton Greenstone Belt
   **Tomiyasu F, Ueno Y & DeWit M**

51 $^{142}$Nd Isotope Anomaly in Chondrite Revisited
   **Yokoyama T, Takahashi H & Yamazaki H**

(Session 03d continues on Thursday 29th AM on p.318)

05c: Investigating the Origin and Modification of Cratonic Mantle over Time: The Role of Diamonds and Xenoliths

52 Apatite Exsolution as an Indicator of Udachnaya Grospydite UHP History
   **Alifirova TA & Pokhilenko LN**

53 The Redox State of Diamond-Forming Fluids: Constraints from Fe$^{3+}$/Fe$^{2+}$ of Garnets

54 Geochronology of the Lithospheric Mantle Underneath the Gibeon Kimberlite Field, Namibia
   **Hoefer CE, Brey GP, Luchs T, Gerdes A & Hoefer HE**

55 Nitrogen Isotope Systematics and Origins of Mixed-Habit Diamonds

56 Diamond Bearing Mantle Xenoliths in Alkaline Basalts: Karacadağ Volcano, South East Anatolia, Turkey
   **Kadioglu YK**

57 Differentiation of the Mantle Ultrabasic-Basic Magmas and Diamond-Forming Carbonatite Melts on Experimental Evidence
   **Litvin Y**
Growth Medium and Carbon Source of Unusual Rounded Diamonds from Alluvial Placers of the North-East of Siberian Platform

Ragozin A, Shatsky V, Zedgenizov D & Griffin W

How Kimberlites Form: Clues from Olivine Geochemistry

Sauzeat L, Cordier C & Arndt N

Evidence for Formation of Alluvial Diamonds from North-East of Siberian Platform in Subduction Environment

Shatsky V, Zedgenizov D, Ragozin A & Kalinina V

The Age of Eclogitisation Underneath the Kaapvaal Craton – A Composite Xenolith from Roberts Victor

Sieber M, Brey GP, Seitz H-M, Gerdes A & Hoefer HE

Melting and Breakdown of MgCO$_3$ at High Pressures

Solopova N, Spivak A, Litvin Y & Dubrovinsky L

05h: Origin of Mantle Heterogeneities Revealed from Oceanic and Continental Peridotites

Melt Modified Mantle Lithosphere beneath Dalnyayay Pipe

Ashchepekov I, Ntaflos T, Spetsius Z & Salikhov R

Ferrian Chromite Formation in Podiform Chromitites from South-Central Chile

Barra F, Gervilla F & Reich M

High- to Low-Pressure Features of Compound Xenoliths: Implications from Fe-Ti-Ca Metasomatism and Glass Formation

Baziotis I, Asimow P, Ntaflos T, Koroneos A & Poli G

Meter-Scale Chemical Interaction between Pyroxenite-Derived Melts and Mantle Peridotites in the Northern Apennine Ophiolites (Italy)

Borghini G, Rampone E, Zanetti A, Class C, Cipriani A, Hofmann A, Goldstein S & Godard M

Experimental Study on Interaction of the H$_2$O-NaCl Fluid and Model Peridotite at 6 GPa

Butvina V & Safonov O

Lithosphere-Asthenosphere Interactions (Middle Atlas, Morocco): Geochemical Highlights

Fernandez L, Bosch D, Elmessbah H, Bodinier J-L, Dautria J-M & Verdoux P

Microstructures and Geochemistry in the Subcontinental Lithospheric Mantle of NE Spain

70 Age and Matter Sources of Ophiolites of the Kuznetsk Alatau, SW Siberia: New Sm-Nd Isotope Data
  Gertner I, Bayanova T, Krasnova T, Dugarova N, Vrublevskii V & Sayadyan G

71 Neo-Archean Domains in the Mediterranean and their Implications
  Gonzalez-Jimenez JM, Villaseca C, Griffin WL, Belousova E, Konc Z, Ancochea E, O'Reilly SY, Pearson NJ, Garrido CJ & Gervilla F

72 Petrogenesis of Mafic-Ultramafic Rocks from the Berit Metaophiolite Massif: Implications for REE, PGE, Base Metal and Al-Rich Chromitite Composition
  Kozlu H & Rudashevsky V

73 Chemical Composition of Chromian Spinel of Podiform Chromitite, Sangun Zone, Southwest Japan
  Matsumoto I

74 Heterogeneous Melt Involved in Formation of a Thick Moho Transition Zone in Northern Oman Ophiolite: Implications for MORB Evolution
  Muroi R, Arai S, Negishi H & Tamura A

75 Os-Isotopes Constraints on the Dynamics of Orogenic Mantle: The Case of Central Balkans
  Prelević D, Brügmann G, Barth M, Božović M, Cvetković V & Foley S

76 High Pressure Garnet-Bearing Ultramafites and Basites from the Main Uralian Fault: Comprehension of the Uralian Mantle Composition
  Pushkarev E

77 Geodynamic Constraints on the Recycling of Ancient SCLM and Genesis of Tibetan Diamondiferous Ophiolites
  Shi R, William G, Suzzane O, Zhang X, Huang Q, Gong X & Ding L

78 The Relation between Metasomatism and Redox State of the Upper Mantle Below the Massif Central, France
  Uenver-Thiele L, Woodland A, Downes H & Altherr R

79 Chemical Composition of Detrital Spinel from Eastern Chugoku and Northern Kinki of Sangun Zone, Southwest Japan
  Umeda T & Matsumoto I

80 Geochemical Fingerprints in Siberian Mantle Xenoliths Reveal Progressive Erosion of an Archean Lithospheric Root

81 Multistage Refertilization of an Archean Peridotite Massif, N. Qaidam Orogen (NE Tibet, China)
  Xiong Q, O’Reilly S, Griffin W, Pearson N & Zheng J
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>82</td>
<td>Geodynamics of the Layered Mafic – Ultramafic Intrusions in the East Sayan (Russia)</td>
<td>Yurichev A &amp; Chernyshov A</td>
</tr>
<tr>
<td></td>
<td><em>(Session 05h continues on Thursday 29th AM on p.319)</em></td>
<td></td>
</tr>
<tr>
<td>83</td>
<td>Origin of Felsic Microgranular Enclaves from Salto Pluton, SE, Brazil</td>
<td>Alves A, Janasi V &amp; Pereira G</td>
</tr>
<tr>
<td>84</td>
<td>New Interpretation of Kinematics and Morphogenesis of Block Structures of the Black Sea-Central Transcaucasian Terrane</td>
<td>Basheleishvili L</td>
</tr>
<tr>
<td>85</td>
<td>Zircon U-Pb Ages and δ¹⁸O in a ‘Contaminated’ Lower Crustal Metagabbro (Serre Massif, Calabria)</td>
<td>Cirrincione R, Fiannacca P &amp; Williams IS</td>
</tr>
<tr>
<td>86</td>
<td>New Insights into the Evolution of the Finero Mafic Complex</td>
<td>Langone A, Renna MR, Tiepolo M, Zanetti A, Mazzucchelli M &amp; Giovanardi T</td>
</tr>
<tr>
<td>87</td>
<td>Chemical and Isotopic Features of Mafic Granulites from Serre Massif (Calabria-Italy)</td>
<td>Micheletti F, Fornelli A, Muschitiello A &amp; Piccarreta G</td>
</tr>
<tr>
<td>88</td>
<td>Crustal Structure beneath the Dharwar Craton, India</td>
<td>Rai S, Borah K, Gupta S &amp; Kumud SP</td>
</tr>
<tr>
<td>91</td>
<td>Granulite Xenolith Constraints on the Modification of the Lower Crust beneath the Northern Margin of the North China Craton</td>
<td>Ying J-F</td>
</tr>
<tr>
<td>92</td>
<td>Permeability of the Continental Crust – Experimental Study and Insight from the Petrological and Seismological Data</td>
<td>Zharikov A, Rodkin M &amp; Vitovtova V</td>
</tr>
</tbody>
</table>
06d: Delamination and Downwellings: The Secondary Convection Systems in Orogens and at Cratonic Peripheries

93 Subduction Modification of Western North America Lithosphere – Priming for Destruction?
Byerly B & Lassiter J

94 Tracing Old SCLM in Pan-African Granitoids from Dronning Maud Land (East Antarctica) with Sr-Nd Isotope Signatures
Kleinhanns IC, Jacobs J, Engvik AK, Bingen B, Roland NW, Laeufner A & Schoenberg R

95 Age, Geochemistry, and Origin of Proterozoic Rapakivi Granites in the North Qaidam Orogen, NW China
Wang X, Hu N & Wang T

(Session 06d continues on Thursday 29th AM on p.320)

06e: Advancements in Using Mineral Phases as Recorders of the Timing, Rates, and Processes of Continental Crustal Evolution

97 U-Pb ID-TIMS Zircon Ages and Coupled Lu-Hf S-ICP-MS Data – A Tool for Terrane Characterisation and Determination of Paleogeographic Affinities: An Example from the Caledonides
Augland LE, Andresen A & Steltenpohl M

98 Polyphase Evolution of the Eastern Ghats Belt (India) – A Multi Mineral Approach Using Rb-Sr and U-Pb Ages
Axelsson E, Mezger K & Villa IM

99 Sub-Micrometer Scale Chemical Mapping of Complex Monazites: The Contribution of the NanoSIMS
Bosse V, Didier A, Paquette J-L, Mostefaoui S & Devidal J-L

100 Geochemical Types of Tantalum and Niobium Mineralization from the Rare Metal-Bearing Granites and Pegmatites of the Western Mongolia
Bukharova O & Baeva A

101 Geochronological and Geochemical Constraints on the Construction of the Lluta Pluton, Tacna (Peru)
Demouy S, Benoit M, De Saint-Blanquat M & Paquette J-L

102 Deformation-Related Chemical Alteration of Meta-Pegmatites
Eberle T, Habler G, Abart R & Grasemann B
<table>
<thead>
<tr>
<th>Posters</th>
<th>103</th>
<th>REE Distribution in Granulite Assemblage from Lower Crust of the Serre Massif (Calabria-Italy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fornelli A, Langone A, Micheletti F, Muschitiello A &amp; Piccarreta G</td>
<td></td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>Evolution of AFM Mineral Assemblages in the Jálama Granitic Pluton</td>
<td></td>
</tr>
<tr>
<td>Gil-Crespo P-P, Torres-Ruíz J, Pesquera A &amp; Roda-Robles E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>Geochronological Evidence of Rapid Progression of Regional Metamorphism in Hida Metamorphic Complex, Southwest Japan</td>
<td></td>
</tr>
<tr>
<td>Horie K, Takehara M, Tsutsumi Y &amp; Cho M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>106</td>
<td>Contrasting Behaviour of Monazite and Zircon during Partial Melting and Fluid Infiltration: An Example from the Ryoke Metamorphic Belt, Japan</td>
<td></td>
</tr>
<tr>
<td>Kawakami T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>107</td>
<td>Geochemical Zoning of the Spodumene Vein Series of the Mineral Deposit Tastig Tuva, Central Asia</td>
<td></td>
</tr>
<tr>
<td>Konovalenko S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>108</td>
<td>The Composition of the Spodumene of Asian Pegmatite Fields</td>
<td></td>
</tr>
<tr>
<td>Konovalenko S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>109</td>
<td>Gramaccioliite-(Y) – Rare Yttrium Carrier in Metamorphic Rocks (Subpolar Urals, Russia)</td>
<td></td>
</tr>
<tr>
<td>Kozyreva I &amp; Shvetsova I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>Pre-Hallandian Metamorphism in the Sveconorwegian Province – Its Implication on the Tectonic Evolution of the Baltic Shield</td>
<td></td>
</tr>
<tr>
<td>Larson SÅ &amp; Tullborg E-L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>111</td>
<td>Chemical Composition of Apatite as a Tool for Modeling Composite-Pluton Evolution Using Polytopic Vector Analysis (PVA)</td>
<td></td>
</tr>
<tr>
<td>Lisowiec K, Slaby E, Förster H-J, Götze J &amp; Michalak P-P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>112</td>
<td>Ce-Monazite and Y-Xenotime Solubilities in H₂O-NaF at 800°C, 1 GPa: Implications for REE Transport</td>
<td></td>
</tr>
<tr>
<td>Tropper P, Harlov D &amp; Manning C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>113</td>
<td>U-Pb Geochronology of Detrital Zircons from Metasedimentary Rocks from Formation of Desejosa, Serra do Marão, Portugal</td>
<td></td>
</tr>
<tr>
<td>Teixeira R, Coke C, Gomes M, Dias R &amp; Martins L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>114</td>
<td>Remarkably Hot Quartz in Resurgent Intrusions Associated with the 18.8 Ma Peach Spring Tuff Supereruption</td>
<td></td>
</tr>
<tr>
<td>Mcdowell S, Miller C &amp; Wooden J</td>
<td></td>
<td></td>
</tr>
<tr>
<td>115</td>
<td>Origin of Two Different Zircon Types in Metabasite Veins from the Izera Metagranites, West Sudetes, Poland</td>
<td></td>
</tr>
<tr>
<td>Nowak I &amp; Whitehouse MJ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>116</td>
<td>Mineralogy and Boron Geochemistry of Mud Volcanoes from Northern Apennines (Italy)</td>
<td></td>
</tr>
</tbody>
</table>
**117** Tourmaline Breakdown in High-Grade Metamorphic Rocks from the Alamo Complex (Central Iberian Zone, Spain): Implications for Evolution of Boron during Crustal Anatexis

**Presquera A, Torres-Ruíz J, Gil-Crespo P-P & Roda-Robles E**

**118** Tracing the Time-Resolved Magmatic Evolution of the Hegau Volcanic Field (Southern Germany) Through Apatites

**Rahn M & von der Handt A**

**119** Geochemistry of Biotite of The Vila Nova Plutonite (Central Portugal)

**Reis A**

**120** Trace-Elements Distribution in Tourmaline, Micas and K-Feldspar from the Berry-Havey Pegmatite (Maine, USA): Implications for the Pegmatitic Evolution

**Roda-Robles E, Simmons W, Presquera A, Gil-Crespo P-P, Nizamoff J & Torres-Ruíz J**

**121** Monazite Anamnesis – Providing a Quantitative Timeframe for Metamorphic Petrogenetic Processes

**Săbău G, Negulescu E & Theye T**

**122** Alpine Metamorphism of the Pan-African Gneiss Basement in the Menderes/Çine Massif, SW Turkey, Revealed by Garnet Lu-Hf Geochronology

**Schmidt A & Oberhänsli R**

**123** The Occurrence of Very High-Grade Pyrometamorphic Xenocrysts/Xenoliths in the Plutonic Rocks of the Alvand Plutonic Complex, Hamedan, Iran

**Sepahi AA**

**124** Discovery of a Triassic Magmatic Arc Source for the Permo-Triassic Karakaya Subduction Complex, NW Turkey

**Ustaömer PA, Ustaömer T, Gerdes A, Robertson AHF & Zulauf G**

**125** New U-Pb Age and εHf Signature Data of Metasedimentary and Metabasic Rocks of the Front of the Southern Brasilia Orogen, South of São Francisco Craton, Brazil

**Westin A & Campos Neto MC**

**126** Mineralogical and Geochemical Characteristics of Clay Deposits from Northwest Gonabad District of Clay Deposit (East Iran)

**Zirjani Zadeh S, Karimpour MH & Ebrahimi Nasrabadi K**
### 07d: Non-Conventional Physical and Chemical Processes in Subduction Zones

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>127</td>
<td>Calculated P-T Paths for the Blueschist-Facies Metapelites from the Ile de Groix (France)</td>
<td><em>Centrella S, Ballèvre M, Pitra P &amp; Yamato P</em></td>
</tr>
<tr>
<td>128</td>
<td>Destruction of the North China Craton Induced by Ridge Subductions</td>
<td><em>Ling M, Sun W, Teng F, Li Y, Ding X, Yang X, Fan W &amp; Xu Y</em></td>
</tr>
<tr>
<td>129</td>
<td>Non-Ideal Fluid Geometry in the Mantle and Lower Crust</td>
<td><em>Nakamura M, Okumura S, Yoshida T, Sasaki O &amp; Takahashi E</em></td>
</tr>
</tbody>
</table>

### 07g: Carbon Cycling in Subduction Zones

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>131</td>
<td>Trace Elements in Olivine Characterize the Mantle Source of Subduction-Related Potassic Magmas</td>
<td><em>Ammannati E, Foley S, Avanzinelli R, Jacob D &amp; Conticelli S</em></td>
</tr>
<tr>
<td>132</td>
<td>Solubility of CO₂ in Rhyolitic Melts as a Function of Depth, Temperature, and Oxygen Fugacity – Implications for Carbon Flux in Subduction Zones</td>
<td><em>Duncan M &amp; Dasgupta R</em></td>
</tr>
<tr>
<td>133</td>
<td>Aqueous Carbonate Speciation in Equilibrium with Aragonite Under Subduction Zones Conditions</td>
<td><em>Facq S, Daniel I &amp; Sverjensky D</em></td>
</tr>
<tr>
<td>134</td>
<td>Graphite Formation by Calcite Reduction during Subduction</td>
<td><em>Galvez M, Beyssac O, Martinez I &amp; Benzerara K</em></td>
</tr>
<tr>
<td>135</td>
<td>Quartz Solubility and CO₃⁻ – HCO₃⁻ Equilibrium in H₂O+Na₂CO₃ and H₂O+NaHCO₃ Fluids at High P and T</td>
<td><em>Schmidt C</em></td>
</tr>
<tr>
<td>136</td>
<td>An Experimental Investigation of the Formation Mechanisms of Superdeep Diamonds</td>
<td><em>Thomson A, Walter M, Kohn S, Bulanova G &amp; Smith C</em></td>
</tr>
<tr>
<td>137</td>
<td>Multiple Origins of Carbon in Italian Kamafugite Melt</td>
<td><em>Nikogosian I, van Bergen M &amp; Chaneva S</em></td>
</tr>
</tbody>
</table>

### 08c: Small Degree Partial Melts and a Deep Carbon Connection

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
139 Carbonatites Age of the Tiksheozoer Mass (North Karelia, Russia)  
**Frantz N, Rodionov N & Lokhov K**

140 Trace Element Partitioning between Immiscible Silicate and Carbonates, Based on Natural Melt Inclusions from Kerimasi Volcano, Tanzania  
**Guzmics T & Zajacz Z**

141 Four Types of Olivine from Orangeites of Kostomuksha-Lentiirho Area (Russia, Finland)  
**Kargin A, Nosova A & Kovalchuk E**

142 Rare Elements of Diamond-Forming Melt Chambers Formed in the Mantle Peridotite (Estimation with Use of Experimental $K_0$, at 7.0-8.5 GPa)  
**Kuzyura A & Litvin Y**

143 Zircon U-Pb-Ages, Hf Isotope and Trace Element Composition in the Evolution of the IVAC Complex (Urals, Russia)  
**Nedosekova I, Belousova E, Belyatsky B & Pearson N**

144 Petrology of the Lamprophyres  
**Vasyukova E**

(Session 08c continues on Thursday 29th AM on p.321)

08g: Nuclear Waste Management and Glass Alteration

145 Redox in Silicate Melts: *In situ* XAS Investigation of 2 Redox Couples  
**Leconte M, Martin P, Testemale D, Petitjean C & Neuville D**

146 Dissolution Rates and Surface Chemistry of Calcium Aluminosilicate Glasses in Cementitious Systems  
**Snellings R & Scrivener K**

(Session 08g continues on Thursday 29th AM on p.322)

08j: Glasses and Melts at High Pressure

147 X-Ray Study of High Pressure Induced Densification of Lithium Disilicate Glass  
**Buchner S, Pereira AS, Lima JCD & Balzaretti NM**

148 Near-Infrared Measurements of Water Speciation in Hydrous $\text{Na}_2\text{Si}_2\text{O}_5$ Melt Using HDAC  
**Chertkova N**

149 Equation of State for Silicate Melts: Static vs. Shock Compression  
**Funamori N & Wakabayashi D**
Is There an Extreme Pressure Dependence of Sulphur Solubility in Hydrous Silicate Melts?
Kostyuk A & Gorbachev N

Viscosity and Structure of Fayalite Liquid at High Pressure up to 9GPa

(Session 08j continues on Friday 30th PM on p.469)

08k: From Glass to Magma: Nucleation and Crystal Growth in Magmatic and Synthetic Silicate Melts

The Origin of Myrmekite in the Boroujerd Granitoids, Sanandaj-Sirjan Zone
Ahadnejad V

Spherulites in Trachytic Melts

Genetic Classification Based on AFM
Deevsalar R & Ahmadian J

Using Textural Data and Fractal Analysis to Infer Crystallization of Dacites from Qorveh (W-Iran)
Eskandary A, De Rosa R, Amini S & Miraj H

Textural Evolution of a Basaltic Melt in Function of Cooling Rate

Syn to Post-Eruptive Crystallization of Phenocrysts in Pahoeohoe “Cicirara” Lavas from Mount Etna Volcano (Italy)
Lanzafame G, Mollo S, Iezzi G, Ferlito C & Ventura G

The Effect of Alkali-Feldspar Composition on Mineral-Melt Partitioning of Trace Elements
Maimaiti M, Arzilli F & Carroll M

Fayalite Oxidation Processes at Obsidian Cliffs, Oregon
Martin A, Médard E, Devouard B, Keller L, Righter K, Devidal J-L & Rahman Z

Plagioclase Crystallization Kinetics in Basalts by High-T Viscosity Measurements
Vona A & Romano C

The Partitioning of Trace Elements between Clinopyroxene and Trachybasaltic Melt during Rapid Cooling
Scariato P, Mollo S, Blundy J, Iezzi G & Langone A
09b: Ocean Acidification: Processes, Time Scales and Biotic Response

162 Boron Isotopic Composition in Arctica Islandica Shell: A Potential Historical, Prehistorical and Geological Seawater pH Indicator
Liu Y-W, Aciego S & Wanamaker A

163 Improved Boron Isotope pH Proxy Calibration for the Deep Sea Coral Desmophyllum dianthus Through Sub-Sampling of Fibrous Aragonite
Stewart J, Anagnostou E & Foster G

(Session 09b continues on Thursday 29th PM on p.360)

09e: Life in Ferruginous Settings: Building the Bridge between Sedimentology and Geomicrobiology

164 Establishing a Biomarker from Trace Element Incorporation Patterns in Abiotic and Biotic Magnetite
Amor M, Busigny V, Gélabert A, Ona-Nguema G, Tharaud M, Alphandéry E, Durand-Dubief M, Chebbi I & Guyot F

165 The Co-evolution of Fe-, Ti-Oxides and Other Microbially Induced Mineral Precipitates during the Diagenesis of Sandy Sediments
Bower D, Hummer D, Kyono A, Steele A & Armstrong J

166 Photoferrotrophy and Fe-Cycling in a Freshwater Column

167 Experimental Comparison of Abiotic and Microbial Fe-Mineral Transformations to Identify Pathways of Magnetic Nanoparticle Production during Pedogenesis

168 Micro-Scale Complexity in Iron-Sulfide Phases in Precambrian Sedimentary Rocks Determined by Coupled Spectroscopic, Isotopic, and Magnetic Techniques
Webb S, Johnson J, Slotznick S, Kirschvink J & Fischer W

169 Physiology, Mineralogy and Fe Isotope Fractionation of Fe(II) Oxidation by a Marine Photoferrotroph – Implications for the Deposition of Precambrian BIFs
Wu W, Swanner E, Pan Y, Schoenberg R & Kappler A

(Session 09e continues on Thursday 29th PM on p.361)
### 09f: Oceanic Volcanoes and Life

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>170</td>
<td>Cretaceous Large Igneous Provinces: The Effects of Submarine Volcanism on Calcareous Nanoplankton</td>
<td><em>Erba E, Bottini C &amp; Faucher G</em></td>
</tr>
<tr>
<td>171</td>
<td>Submarine Meteorite Impact Craters as Potential Cradles of Life: Mineralogical Evidence from the Onaping Formation, Sudbury</td>
<td><em>Kenny G &amp; Kamber B</em></td>
</tr>
</tbody>
</table>

(Session 09f continues on Thursday 29th AM on p.323)

### 09h: Seawater Geochemical Evolution: Applications of Elemental and Isotopic Proxies

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>172</td>
<td>Reconstruction of Redox Conditions during Deposition of Jordan Oil Shale Using Inorganic Geochemical Records</td>
<td><em>Aqleh S, van den Boorn S, Podlaha O, Marz C, Wagner T, Poulton S &amp; Kolonic S</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>174</td>
<td>Cyclic Dolomitization of Limestone at Oker (Germany)</td>
<td><em>Baldermann A, Dedelius AP, Stickler CP, Leis A &amp; Dietzel M</em></td>
</tr>
<tr>
<td>175</td>
<td>The Mesozoic Dolomites of the Levant Margin – Evaluating Dolomitization Style and Mechanism from Configuration and Stable Isotope Geochemistry</td>
<td><em>Bialik OM, Halevy I &amp; Higgins JA</em></td>
</tr>
<tr>
<td>176</td>
<td>Interpretation of Calcium Isotope Variations in Marine Fossil Records</td>
<td><em>Boehm F &amp; Eisenhauer A</em></td>
</tr>
<tr>
<td>177</td>
<td>Rhenium-Osmium Isotope Geochronology of the Neoproterozoic Fifteenmile Group, Coal Creek Inlier, Yukon, Canada</td>
<td><em>Braun S, Brandon A, Macdonald F, van Acken D &amp; Creaser R</em></td>
</tr>
<tr>
<td>178</td>
<td>Nickel Isotopic Composition of Modern Seawater and Rivers</td>
<td><em>Cameron V &amp; Vance D</em></td>
</tr>
<tr>
<td>179</td>
<td>Strontium, Carbon and Oxygen Isotopic Compositions of Silurian on the Northern and Southern Margins of Sichuan Basin, Chinan</td>
<td><em>Yang W, Zhang T &amp; Cheng X</em></td>
</tr>
<tr>
<td>180</td>
<td>Cold Marine Patagonia Waters and Stable Isotopes and Trace Elements from Quaternary Mollusk Shells</td>
<td><em>Consoloni I, Zanchetta G, Baneschi I, Dallai L, Guidi M, Tiepolo M &amp; D’Orazio M</em></td>
</tr>
</tbody>
</table>
181 The Potential of Platinum Stable Isotopes of Fe-Mn Nodules and Crusts as a Paleoceanographic Tracer
*Corcoran L, Handler M, Baker J, Seward T, Creech J & Bennett V*

182 Rare Earth Elements in Biogenic Silica of Giant Diatoms
*Ethmodiscus Rex*
*Dubinin A & Berezhnaya E*

183 Estimating the Potential Evapotranspiration by Using Landsat Imagery

184 Characterizing the Pb Isotopic Contribution of Dust to Seawater
*Erhardt A, Chen C-T, Jacobson A, Moy C & Paytan A*

185 C-, Cr-, Sr-Isotope Stratigraphies and Rare-Earth Elements in Carbonate and BIFs of the Neoproterozoic Jucurutu Formation, Seridó Belt, NE Brazil
*Campos MS, Sial AN, Gaucher C, Frei R, Ferreira VP, Nascimento RSC, Pimentel MM & Pereira NS*

186 Elemental and Os Isotope Variations Across the K/T Boundary in a Marine Fe-Mn Crust
*Fu Y, Peng J, Qu W, Hu R, Shi X & Yang J*

187 Evaluating the Role of Microscopic Pyrite for Budgets of Vital Metals in Precambrian Carbonate
*Gallagher M & Kamber BS*

188 Tracking Down the Ediacaran Isotope Anomalies in a Sedimentary Section from Kazakhstan
*Gamper A, Struck U & Ergaliev G*

189 Magmatic and Linked Hydrothermal Processes Fractionate Mo Isotopes
*Greber ND, Voegelin AR, Pettke T & Nägler TF*

190 Ferromanganese Crusts as Proxies for Deep Water Ni, Cu, Zn and Fe Isotope Variations
*Gueguen B, Rouxel O & Fouquet Y*

191 Secular Trends in the Global Ocean Revealed Through Trace Elements in Sedimentary Pyrite
*Halpin J, Large R, Danyushevsky L, Maslennikov V, Gregory D, Lyons T & Lounejeva E*

192 A Multi-Proxy Record from a Late Neoproterozoic Volcano-Sedimentary Basin, Eastern Arabian Shield

193 Sr Isotope Stratigraphy of Carbonate Fraction in Oil Shales
*Harlavan Y & Goren O*
Multi-Proxy Study of Shallow- and Deep-Water Doushantuo Carbonates, Yangtze Platform, South China
Hohl S, Becker H, Herzlieb S, Guo Q & Gamper A

Dolomitization Process and its Effect on the Behavior of Trace Elements in Carbonate Rocks
Hu W, Wang L & Wang X

Redox Controls on Diagenetic Incorporation of Rare Earth Elements in Fossil Fish Teeth
Huck C, van de Flierdt T, Bohaty S & Hammond S

Sedimentary Osmium Isotopic Records of Mediterranean Basins
Kuroda J, Jimenez-Espejo F, Nozaki T & Suzuki K

A New Benthic Mg/Ca Temperature Calibration to Reconstruct Thermocline Temperature Variability in the Indonesian Archipelago
Lo Giudice Cappelli E, Holbourn A, Kuhnt W & Regenberg M

Return of Archean Low Sulfate Levels during the Earliest Mesoproterozoic Oceans
Luo G, Ono S, Huang J, Li C, Liu J & Xie S

Ocean-Ph Evolution and Weathering Conditions during the Ediacaran: Insights from B, Sr & Li Isotopes at the Gaojiashan Section, South China
Ohnemueller F, Meixner A, Gamper A & Kasemann SA

Sedimentary and Diagenetic Features of the Oolithe Blanche Formation (Middle Jurassic): New Contribution from Ca, Sr, C, O Isotopic Compositions
Rad S, Makhoufi Y, Guerrot C, Flehoc C & Collin P-Y

Osmium Isotope Evidence for a Large Impact Event in the Late Triassic
Sato H, Onoue T, Nozaki T & Suzuki K

Late Devonian “Kellwasser-Event” a Global Mass-Extinction Equivalent to the Precambrian-Cambrian Boundary Interval?
Steinmann Y, Struck U & Gamper A

Geochemistry and Re-Os Age for Black Shales from the Cambrian-Ordovician Boundary, Green Point, Western Newfoundland
Tripathy G, Hannah J, Stein H & Yang G

Chemostratigraphy of Paleoasian Ocean’s Microcontinent Covers
Vishnevskaya I

Geochemistry of Uranium in the Reduced Carbonaceous Sediments of Small Lakes in Baikal Region
Vosel Y, Strakhovenko V & Makarova I
<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>207</td>
<td>Zn Isotope Compositions of the Ediacaran Carbonates, Yangtze Block</td>
<td>Yan B, Zhu X &amp; Tang S</td>
</tr>
<tr>
<td></td>
<td>(Session 09h continues on Thursday 29th AM on p.324)</td>
<td></td>
</tr>
<tr>
<td>10c</td>
<td>Interactions between Nanomaterials and the Living World</td>
<td></td>
</tr>
<tr>
<td>210</td>
<td>Study of Zsolnay Building Ceramics in Aspect of Deterioration by Environmental Factors</td>
<td>Baricza A, Bajnoczi B, Toth M &amp; Szabo C</td>
</tr>
<tr>
<td>212</td>
<td>Nanoparticle Interactions with Lipid Bilayers Studied by Nonlinear Optics</td>
<td>Troiano JM, Walter SR, Olenick LL &amp; Geiger FM</td>
</tr>
<tr>
<td>213</td>
<td>Nature of Transition Metals on Fine and Ultrafine Particles and the Cytotoxicity</td>
<td>Nakamatsu Y, Aoki T &amp; Utsunomiya S</td>
</tr>
<tr>
<td>215</td>
<td>Research on the Phase Compostion, Expansion Property and Heavy Metals Absorption Capacity of Vermiculite from Yuli Xinjiang Province</td>
<td>Wang L, Liao L &amp; Huo X</td>
</tr>
<tr>
<td>10d</td>
<td>Reactivity of Water-(Gas)-mineral Interfaces from the Nano to the Macroscopic Scale: Implications for Weathering, CO\textsubscript{2} Sequestration and Energy-Related Studies</td>
<td></td>
</tr>
<tr>
<td>216</td>
<td>Carbonation of Olivine at CO\textsubscript{2} Supercritical Conditions: Reactivity Differences between Synthetic and Natural Olivines</td>
<td>Aaberg I, Dideriksen K, Rodriguez-Blanco JD, Regnarsson E, Olsson J, Jespersen HT, Schaumburg K &amp; Stipp SLS</td>
</tr>
<tr>
<td>Session</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>217</td>
<td>Hydromagnesite Reactivity in Aqueous Solutions</td>
<td>Berninger U-N, Mavromatis V, Jordan G, Schott J &amp; Oelkers E</td>
</tr>
<tr>
<td>218</td>
<td>Antigorite Dissolution Rates as a Function of pH at 25 and 80°C</td>
<td>Bosc O, Declercq J, Mavromatis V &amp; Oelkers EH</td>
</tr>
<tr>
<td>219</td>
<td>Spatial Variation of Dissolution at Fracture Boundaries</td>
<td>Fitts JP, Deng H, Tappero R &amp; Peters CA</td>
</tr>
<tr>
<td>220</td>
<td>Superheating Water to Model Soil “Immobile” Water</td>
<td>Mercury L, Shmulovich K &amp; Simon P</td>
</tr>
<tr>
<td>221</td>
<td>Study of Surfaces of Al₂SiO₅ Minerals by Lateral Force Microscopy</td>
<td>Pimentel C, Pina CM &amp; Gnecco E</td>
</tr>
<tr>
<td>222</td>
<td>Leucoxene Photoactivity in the Water – Mineral System</td>
<td>Ponaryadov A, Kotova O &amp; Ryabkov Y</td>
</tr>
<tr>
<td>223</td>
<td>Are the Anhydrite and Gypsum Carbonatation Pathways the Same?</td>
<td>Roncal-Herrero T, Bots P, Rodríguez-Blanco JD, Astilleros JM, Prieto M, Benning L &amp; Fernández-Díaz-L</td>
</tr>
<tr>
<td>224</td>
<td>CO₂ Absorption and Precipitation in MgCl₂-NH₃·H₂O Solutions:</td>
<td>Zhao L, Zhu C, Dong S &amp; Teng HH</td>
</tr>
<tr>
<td></td>
<td>Relevance to CO₂ Sequestration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Session 10d continues on Thursday 29th AM on p.325)</td>
<td></td>
</tr>
<tr>
<td>226</td>
<td>XAS Crystal-Chemistry of Fe in Mangrove Sediments from New Caledonia.</td>
<td>Noël V, Marchand C, Juillot F, Ona-Nguema G, Marakovic G &amp; Morin G</td>
</tr>
<tr>
<td></td>
<td>Whole Soil and at the Microscale: Unraveling the Reactivities by</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Combining Chemical Analysis and Physical Fractionation</td>
<td></td>
</tr>
</tbody>
</table>

(Session 10h continues on Thursday 29th AM on p.326)
## 10j: Mineral Surfaces as Microbial Habitat

<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>228</td>
<td>Hierarchy of Two Drivers of Soil Organic Matter Biodegradation: Microbial Habitat Properties Versus Microbial Communities</td>
<td>Juarez S, Nunan N, Pouteau V, Lerch T &amp; Chenu C</td>
</tr>
<tr>
<td></td>
<td>(Session 10j continues on Thursday 29th PM on p.363)</td>
<td></td>
</tr>
</tbody>
</table>

## 11e: Magma Storage Systems throughout the Crust

<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>229</td>
<td>Periods of Magma Propagation and Homogenization Preserved in an Upper Crustal Pluton over 1.2 Ma</td>
<td>Floess D, Baumgartner L, Brack P, Broderick C, Chiaradia M, Muntener O, Püttilz B &amp; Schaltegger U</td>
</tr>
<tr>
<td>230</td>
<td>Short Crystal History in the Recent Magmatic System of Santorini Volcano, Greece: Inferences from Micro-Sr Isotope Data</td>
<td>Di Salvo S, Francalanci L, Druitt TH &amp; Braschi E</td>
</tr>
<tr>
<td>231</td>
<td>Experimental Constraints on the Magma Evolution of the Basanite-Phonolite Series from Cumbre Vieja Volcano (La Palma, Canary Islands)</td>
<td>Fuchs P, Almeev R &amp; Klügel A</td>
</tr>
<tr>
<td>232</td>
<td>Magmatic Systems of the Paleoproterozoic Large Igneous Provinces: Evidence from the Eastern Fennoscandian Shield</td>
<td>Sharkov E, Bogina M &amp; Chistyakov A</td>
</tr>
<tr>
<td>233</td>
<td>Polybaric Differentiation within a Clinopyroxenite Body in the Feeder-Zone of an Ocean Island Volcano (Fuerteventura, Canary Islands)</td>
<td>Tornare E &amp; Bussy F</td>
</tr>
</tbody>
</table>

## 11f: Stromboli Volcano: Recent Advances and Open Questions

<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>234</td>
<td>The Establishment of the Steady-State Activity at Stromboli Volcano (Italy): Evidence from Diffusion and Mixing Processes Revealed at Mineral Scale</td>
<td>Braschi E, Petrone CM, Francalanci L &amp; Tommasini S</td>
</tr>
<tr>
<td>236</td>
<td>Dual Explosive Activity Revealed by Petrochemical and Mineralogical Data on Tephra: Peculiar Roman-Age Eruptions of Stromboli Volcano</td>
<td>Francalanci L, Braschi E, Di Salvo S, Lucchi F &amp; Petrone MC</td>
</tr>
</tbody>
</table>
Tectonic Control of Volcanism in Potassic Volcanic Belt in NE China
Zhao Y & Fan Q

12c: Geothermal Energy

Recovering and Refurbishing of the SILNUC Code, a Tool to Mitigate and Prevent Amorphous Silica Scaling
Berro F, Virgili G, Minardi I & Marini L

Gas Analysis at a Geothermal Facility: on-Line Monitoring Above Ground and Measurements in the Borehole
Feldbusch E, Wiersberg T, Zimmer M, Francke H & Regenspurg S

A Model Study on the Effects of Polyacrylic Acid Added in Geothermal Water on the Growth of Silica Scale at a Geothermal Power Plant
Masunaga S, Etou M, Okaue Y & Yokoyama T

Isotope Geochemistry of Wayang Windu Geothermal Field, Indonesia
Prasetio R, Wiegand B, Sauter M & Malik D

The Influence of Fault-Fracture Network Activity on Fluid Geochemistry and Mineral Precipitation at the Tolhuaca Geothermal System, Southern Chile

Assessment and Geochemical Evolution of Springs at Hazaribagh District, Jharkhand, India
Singh HK, Chandrasekharam D, Trupti G & Singh B

Monitoring the Stability of Scale Inhibitors by ATR-FTIR at High Pressures and Temperatures in Synthetic Geothermal Fluids
Vetter A & Regenspurg S

Geochemical and Isotopic Investigation of Fluids from Lahendong Geothermal Field
Wiegand BA, Brehme M, Teuku F, Amran IA, Prasetio R, Kamah Y & Sauter M

Volumetric Properties of Multi-Electrolyte Aqueous Solutions at Elevated Temperatures and Pressures
Zezin D, Driesner T & Sanchez-Valle C

Occurrence and Distribution of Natural Occurring Radioactive Materials at a Geothermal Facility in the North German Basin

(Session 12c continues on Thursday 29th AM on p.327)
<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>248</td>
<td>Geochemical Characteristics and Correlation of Oil-Source in Minfeng Area for Dongying Depression, Bohai Bay Basin, Eastern China</td>
<td>Bao D, Jiang Y &amp; Jiang L</td>
</tr>
<tr>
<td>249</td>
<td>Simulated Exposure of Crude Oil to Sunlight and Characterization Using Atmospheric Pressure Photoionization Fourier Transform Ion Cyclotron Resonance Mass Spectrometry</td>
<td>Griffiths M, Da Campo R, O’Connor P &amp; Barrow M</td>
</tr>
<tr>
<td>250</td>
<td>Pockmark Activity Inferred from Pore Water Geochemistry in Shallow Sediments of the Pockmark Field in Southwestern Xisha Uplift, Northwestern South China Sea</td>
<td>Luo M &amp; Chen D</td>
</tr>
<tr>
<td>251</td>
<td>Unconventional Shale Gas</td>
<td>Dayal AM, Mishra S &amp; Mani D</td>
</tr>
<tr>
<td>252</td>
<td>Some Organic Geochemical Characteristics of Oil Shale Deposits in the Ereğli-Bor Basin, (Konya-Niğde), Central Turkey</td>
<td>Erdoğan MS, Korkmaz S, Kadınkız G &amp; Kara-Gülbay R</td>
</tr>
<tr>
<td>253</td>
<td>Analysis of Characteristics on Different Components of Hydrocarbons in Organo-Clay Complexes</td>
<td>Guo M, Cai J, Lei T &amp; Ding F</td>
</tr>
<tr>
<td>254</td>
<td>Stability Analysis on Hydrocarbon Secondary Migration Pathway</td>
<td>Jiang L, Bao D, Hong F, Hao J &amp; Fan Y</td>
</tr>
<tr>
<td>255</td>
<td>U-Th Systematics and Chronology of of CH$_4$-derived CaCO$_3$ Crusts of the Barents Sea</td>
<td>Sahy D, Lepland A, Noble S, Condon D &amp; Brunstad H</td>
</tr>
<tr>
<td>257</td>
<td>A Pathway for Aromatic Hydrocarbon Formation</td>
<td>Xia Y &amp; Chang J</td>
</tr>
<tr>
<td>258</td>
<td>Data-Processing and Multi-Type Anomaly Recognition in the Geochemical Survey in the South of the Dongying Depression, East China</td>
<td>Zhang L, Bai G &amp; Zhao Y</td>
</tr>
</tbody>
</table>

*(Session 12e continues on Thursday 29th AM on p.328)*
13a: Asthenosphere-Lithosphere Interactions and Ore Genesis

259 The Cihai Diabase in the Beishan Region, NW China: Isotope Geochronology, Geochemistry and Implications for Cornwall-Style Iron Mineralization
Hou T & Zhang Z

260 Fluid Electrolytes of Mohailaheng Pb-Zn Deposit in Tibetan Plateau
Liu Y, Hou Z, Yang Z & Tian S

261 Au Mineralization and its Relationship with Shear Zones in Senjedeh Gold Deposit
Noorian Ramsheh Z & Yazdi M

262 Geological Characteristics and Mineralization Stages in the Yaojiaoling Zinc-Gold Ore Deposit, Tongling Ore District, Anhui
Zhong G, Zhou T & Fan Y

263 Geochronology of Ore-Bearing Andesite in the Kuormenkuola Au Deposit, Northern Xinjiang, China
Xu C, Zhou T, Yuan F, Fan Y, Deng Y & Zhang D

13f: Crust-Mantle Evolution and Changing Patterns of Ore Deposits in the Early Earth

264 Neoarchean Island Arc Magmatism and Gold Mineralization: Examples from Eastern Dharwar Craton, India
Chakravadhanula M, Chatterjee A, Edadasi L & Mutum RS

265 Geochemical Signatures of Volcanic Rocks from Kadiri Greenstone Belt, Dharwar Craton, India: Implications on Gold Mineralization
Chatterjee A, Edadasi L, Mutum RS & Chakravadhanula M

266 Trace-Element Fingerprints of Chromites Link Ultramafic Massifs of the Bulgarian Rhodopes
Colás V, González-Jiménez JM, Fanlo I, Griffin WL, Gervilla F, Pearson NJ & Kerestedjian T

267 Geochemistry of Betul Mafic Layered Intrusion, Central India: Implications on Proterozoic Mantle Evolution and Ni-Cu-Pge Metallogeny
Denduluri Subba Rao V, Satyanarayanan M & Srinivasa Sarma D

268 Sr-Nd-Hf-Pb Isotope Mapping of Tien Shan in Uzbekistan

269 Contrasting Tourmaline Chemistry from late-Archaen Orogenic Gold Deposits at Hutti and Hira-Buddini, Eastern Dharwar Craton, India: Implications for Fluid Source
Hazarika P, Mishra B & Pruseth KL
The Olympic Dam Giant Ore Deposit – A Fossil Nuclear Reactor?
*Kirchenbaur M, Ehrig K, Maas R, Kamenetsky V, Ballhaus C & Münker C*

Similarities between Discordant Chromitites from Northern Oman Ophiolite and Chromitite Xenoliths from Takashima Alkali Basalt, Southwest Japan Arc
*Miura M, Arai S, Python M & Tamura A*

(Session 13f continues on Thursday 29th AM on p.329)

13g: Advances in the Geochemistry and Tectonic Understanding of Porphyry Deposits

Development of Fertile Magma at El Teniente, Chile: Implications for Porphyry-Style Mineralisation
*Baker M, Hollings P & Cooke D*

Preliminary Data on the Trace Elements Concentration in Moldova Noua Porphyry Copper Deposit (Romania)
*Cioaca ME, Munteanu M, Qi L, Costin G & Costea C*

Study of Lithium Isotope in Hydrothermal Quartz Veins from Qulong Porphyry Copper Deposit in Tibet
*Yang D, Yang Z & Hou Z*

(Session 13g continues on Thursday 29th PM on p.365)

14g: Novel Climatic Proxies: Towards Realism

Opening the Foraminiferal Proxy Black Box a Bit Further

Determination and Quantification of Fatty Acids in Speleothems and Cave Drip Water by HPLC – ESI – IT/MS
*Bosle JM, Scholz D & Hoffmann T*

A Novel Method of Stable H and O Isotope Analyses of Inclusion-Hosted Waters Based on Laser Spectroscopy
*Demény A & Czuppon G*

Understanding D/H Systematics of Leaf Wax N-Alkanes in C₃ and C₄ Plants at Stiffkey Saltmarsh, Norfolk, UK
*Eley Y & Pedentchouk N*

Tetraether Records for the Last 60 kyr from a Loess-Paleosol Sequence in the Western Chinese Loess Plateau
*Jia G, Rao Z, Zhang J, Li Z & Chen F*
280 Seasonal Distributions of Archaeal Membrane Lipids and TEX$\text{}_{86}$ Thermometry in the Modern Shallow Coastal Ocean

281 Branched Tetaethers Derived Temperature Reconstruction from Northwestern Black Sea: Proposition of Correction and Associated Sensitivity Test
Sanchi L, Menot G & Bard E

282 Holocene Climate in West Siberia Using Peat Deposits
Savinaykh Y, Preis Y, Pedentchouk N & Gulaya E

283 Sub-Daily Elemental Fluctuation in Mussel Shell
Shirai K, Miyaji T, Schöne B & Tanabe K

284 Pleistocene and Holocene Temperature Reconstructions Using Earthworm-Produced Calcite
Versteegh EAA, Hodson ME, Black S & Canti MG

285 The Mercury in the Low Latitude Holocene Peat Profile Associated with Monsoon Variation
Huang J, Zhou L & Zheng X

(Session 14g continues on Thursday 29th PM on p.366)

15b: Aerosols, Clouds and Precipitation

286 Evaluation of the Influence of Radon Carried by Evapotranspiration of Equatorial Forests (Northeastern of Brazil) in the Formation of Atmospheric Aerosols
Campos T, Hoelzemann J & Petta R

287 Aerosol Impact on the Stratiform Cloud and Light Precipitation in Mid-Korean Peninsula
Eun S-H & Kim B-G

288 Simultaneous Measurement of CCN Activity and Chemical Composition of Fine Aerosols at Noto Peninsula, Japan, in Autumn 2012
Iwamoto Y, Kinouchi K & Matsuki A

289 Research of Condensation of Supersaturated Water Vapor

290 Hindcast Study of Aerosol Optical Depth Using Retrieval of Geostationary Satellite over East Asia
Lee S, Song CH, Park ME, Park RS, Lee J & Kim J

291 Effect of Coarse Marine Aerosols on Stratocumulus Clouds
Lehahn Y, Koren I, Altaratz O & Kostinski A

292 Sulfur Isotopic Compositions of Total Suspended Particulates (TSP) in Chengdu, Southwest China
Vertical Transport of Black Carbon over East Asia during the AFORE Aircraft Campaign

Oshima N, Koike M, Kondo Y, Matsui H, Moteki N, Nakamura H, Takegawa N & Kita K

Enhanced Ice Nucleation Activity of Soil Dust Particles


Influence of Aerosols on Cloud Characteristics over Europe: Study with the Meteorology-Chemistry-Radiation Eulerian Model

Tuccella P, Curci G & Visconti G

(330 continues on Thursday 29th AM on p.330)

16c: Weathering Processes in Glaciated and Permafrost Dominated Environments

Evolution of Subglacial Weathering Based on Multiple Isotopic Systems

Arendt C, Aciego S, Sims K, Hetland E & Stevenson E

The Study of the Ferruterous Mineral Water in Kareliya by Isotopic and Chemical Tracers

Blazhennikova I, Avramenko I & Tokarev I

Surface Area Characterization of Suspended Sediment in Glacial Meltwater Using “nano-Bet”

Chutcharavan P & Aciego S

The Influence of Frost Weathering on the Release of Readily Available Ions from Granite Surfaces

Chwalek T, Torres N, Furrer G, Brandl H, Müller B & Hauser P

Microbial Communities Correlate with Lemon Creek Glacier Meltwater Discharge

Sheik C, Stevenson E, Den Uyl P, Aciego S & Dick G

Dramatic Seasonality of Biogeochemical Signatures in Watersheds Underlain by Continuous and Discontinuous Permafrost

Douglas T

Insights into Glacial Weathering from a New Hydrochemical Database from 95 Glaciated Catchments

Moosdorf N, Hartmann J & West JA

Assessing the Influence of Glacial Weathering on Marine Iron (Fe) Inputs Using Fe Stable Isotopes

| 304 | Combining Radiogenic and Stable Ca Isotopes to Explore Sub-Glacial Weathering Reactions  
*Hindshaw R, Bourdon B, Rickli J & Wadham J* |
| 305 | Subsurface Mineral Weathering in Transient Layers of Permafrost in the Canadian High Arctic  
*Lafreniere M, Montross S, Holloway J & Lamoureux S* |
| 306 | Detection of Non-Stoichiometric Silicate Mineral Dissolution in Rivers Draining Alpine Glaciers Using \(^{44}\text{Ca} / {^{40}\text{Ca}}\)  
*Moore J, Jacobson AD, Holmden C & Craw D* |
| 307 | Acid Rock Drainage Associated with Tropical Glacier Retreat: Nevado Pastoruri, Perú  
*Santofimia E, López Pamo E, Palomino J & Aguilera A* |
| 308 | Stable and Radiogenic Strontium Isotope Behaviour in the Subglacial Environment  
*Stevenson E, Aciego S, Parkinson I, Burton K & Arendt C* |

(Session 16c continues on Thursday 29th PM on p.367)

**16h: Chemical Weathering in Marginal Environments**

| 309 | The Origins of Detrital Clays on the East China Sea Shelf  
*Bi L, Yang SY, Li C, Wang Q & Liu JT* |
| 310 | Mineralogical and Microtextural Properties of Soils during Erosion due to Heavy Rain in the Andong Area, Southeastern Part of Korea  
*Choo C-O, Jeong G-C & Nam K-H* |
| 311 | Chemical Composition of the Western Arctic Ocean Sediments: Recommended Element Abundances and Potential Reference Material  
*Gao A-G & Zhao D-M* |
| 312 | Geochemical Studies of the Weathering Profile Developed on the Pegmatitic Terrain in Awo Mining District, Southwestern Nigeria  
*Jimoh MT, Bolarinwa AT & Aransiola O* |

(Session 16h continues on Thursday 29th PM on p.368)

**17c: Changing Ocean Oxygen: Past, Present, Future**

| 313 | Links between Diel Vertical Migrations and Ocean Oxygen  
*Bianchi D, Galbraith E, Smith A, Stock C, Jorge S & Carozza D* |
| 314 | Molybdenum Drawdown during the Cretaceous OAE 2  
*Goldberg T, Poulton S, Wagner T & Rehkämper M* |

(Session 17c continues on Thursday 29th AM on p.331)
### 17e: Water Isotopes as Tracers of Convection, Microphysics, and Atmospheric Dynamics

<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>315</td>
<td>Isotopic Composition of Water Vapour in Strong Convective Updrafts</td>
<td>Bolot M, Moyer E &amp; Legras B</td>
</tr>
<tr>
<td>317</td>
<td>Isotopic Composition of Precipitation in Ferrara Province</td>
<td>Marchina C, Vaccaro C, Fazzini M, Di Roma A &amp; Bianchini G</td>
</tr>
</tbody>
</table>

(Session 17e continues on Thursday 29th AM on p.332)

### 18a: Contaminant Fate and Transport at the Groundwater-Surface Water Interface

<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>319</td>
<td>Evaluation of Heavy Metals in Sediments of Chapala Lake</td>
<td>González Guadarrama MDJ, Villanueva Estrada RE &amp; Prol Ledesma RM</td>
</tr>
<tr>
<td>320</td>
<td>Influence of Different Organic Carbon Substrates on Denitrification Rates in Riparian Sediment</td>
<td>Hollingham M, Couture R-M, Rezanezhad F &amp; Van Cappellen P</td>
</tr>
<tr>
<td>323</td>
<td>Reactive Transport of Common Hydrological Tracers in Porous Media – An Experimental Study</td>
<td>Moola P, Sigfusson B &amp; Stefánsson A</td>
</tr>
<tr>
<td>325</td>
<td>Dissolved Mercury in Funil Reservoir, RJ, Brazil</td>
<td>Vidal M, Ferreira M, Satyro-Ferreira S, Soares T, Belmino I, Lacerda L &amp; Patchineelam SR</td>
</tr>
</tbody>
</table>
Geochemical and Multiple Sulfur Isotope Study on Tap and River Water Quality in the Beijing Urban Area

Peters M, Guo Q, Strauss H & Zhu G

Phosphorus Speciation in the Sediment Profile of Lake Erhai, Southwestern China by Fractionation and $^{31}$P NMR

Zhang R & Wang L

(Session 18a continues on Thursday 29th AM on p.333)

18h: Application of Non-Traditional Isotopes for the Investigation of Contaminated Sites and Remediation Systems

Dynamics of Zn in an Urban-Plant Soil System: Coupling Isotopic and EXAFS Approaches

Aucour A-M, Bedell J-P, Queyron M & Sarret G

Using Isotopic Analysis of Copper to Assess Copper Transport and Partitioning in Wetland Systems

Babcsanyi I, Chabaux F, Granet M & Imfeld G

Stable Pb and Cd Isotopes in the Riverwaters and Soils Near the Zn-Refinery, Korea

Choi M, Park J, Chang D, Park S & Choi J

Reactive Transport Modeling of Chromium Isotope Fractionation during Cr(VI) Reduction Under Saturated Flow Conditions

Jamieson-Hanes J, Amos R, Gibson B, Ptacek C & Blowes D

Stable Isotope Composition of Anthropogenic Thallium Deposition

Kreissig K, Rehkämper M & Kersten M

Evolution of Anthropogenic Contamination in the Seine River (France) over the Last 15 Years Revealed by Boron Isotope Ratios

Louvat P, Guinoiseau D, Paris G, Chen J-B, Chetelat B & Gaillardet J

Improved Understanding of Sources and Processes of Metal Mobilization from Sulfidic Mine Wastes Through the Application of Post-Transition Stable Isotopes

Matthies R & Blowes D

18j: Geochemical and Biological Fate of Anthropogenic Radionuclides

Selective Cs Sorption in Biotite on Granite

Aoi Y, Fukushi K, Morishita T & Kamei A
336 Comparison of $^2$H, $^{18}$O, $^3$H and Radionuclides Migration in Groundwater Near the Liquid Waste Injection Site (Tomsk-7, Russia)

Avramenko I, Blazhennikova I & Tokarev I

337 Chemical Homologue Speciation in Natural Systems: A Key to Understand the Anthropogenic RN Fate

Claret F, Lerouge C, Grangeon S, Sato T, Schäfer T, Giffaut E & Tournassat C

338 Detection of a Dissolved Alpha Emitter by Electro-Precipitation

Diener A & Wilhelm C

339 The Adsorptive Behaviour of Am and Tc on Fe-Bearing Minerals

Druteikienă R, Lukšienė B, Remeikis V, Šapolaitė J & Gvozdaitė R

340 Role of Bacteria on the Release of Cesium from Illite

Hazotte A, Lebeau T, Peron O, Saito T & Abdesselam A

341 Studies on the Concentration of I-129 and I-131/I-129 Ratios in Soil Samples Collected from Fukushima Prefecture

Inagawa N, Muramatsu Y, Ohno T, Toyama C, Satou M & Matsuzaki H

342 Southward Transport of the Fukushima-Derived Radiocesium due to the Subtropical Mode Water

Kumamoto Y, Murata A, Kawano T & Aoyama M

343 Behaviour of Anthropogenic Radionuclides in the Proglacial Environment

Łokas E, Wachniew P, Gąsiorek M & Bartmiński P

344 Montmorillonite Colloid Size Heterogeneity – Fractionation and Characterization


345 Uptake of Radiocesium by Crops from Soils Contaminated by the Fukushima Accident

Oda K, Muramatsu Y, Ohno T, Kobayashi T & Fujimura S

346 Autoradiography Analysis on Local Area Distribution of Radiocesium in Trees from FDNPP

Ohnuki T, Sakamoto F, Kozai N, Yamasaki S, Yoshida Z & Nanba K

347 Determination of U, Cs and Sr Isotopes and their Distribution Coefficients in Soil Affected by Fukushima Daiichi Nuclear Power Plant Accident

Mishra S, Takamas A, Arae H, Mietelski W, Watanabe Y, Yoshida S & Sahoo SK

348 Ensemble Simulation of the Atmospheric Radionuclides Discharged by the Fukushima Nuclear Accident

Sekiyama TT, Kajino M & Kunii M
| 349 | Immobilization of Selenium by Biofilms of Shewanella putrefaciens  
**Suzuki Y, Saiki H, Kitamura A & Yoshikawa H** |
| 350 | Determination of Strontium-90 in Seawater Using TODGA Chelating Resin  
**Tazoe H, Yamagata T, Obata H & Yamada M** |
| 351 | Temporal Variations of Fukushima-Derived $^{129}$I in Precipitations  
**Xu S, Freeman S, Hou X, Watanabe A, Yamaguchi K & Zhang L**  
(Session 18j continues on Thursday 29th AM on p.334) |

### 18m: Biogeochemical Cycles in the Rhizosphere: Examining Carbon, Trace and Heavy Metal Cycling at the Plant-Soil Interface

| 352 | Early Stage Uptake of Se into Rice (*Oryza sativa* Jap) Seedlings Depending on Medium and Se Concentration  
**Eiche E, Nothstein A & Konrad G** |
| 353 | Manganese and Cadmium Accumulated in Tomato Under Greenhouse Conditions  
**Li F, Jin Z & Sheng GD** |
| 354 | Time Resolved Monitoring of Uranium Contamination of Oak Trees  
**Merten D, Berger D, Märtens A & Köhler M** |
| 355 | Linking Nutrient and Contaminant Dynamics in Rhizospheres of Hyperaccumulators  
**Rosenfeld C, Chaney R, Lanzirotti A & Martinez CE** |
| 356 | Absorption and Fractionation of Rare Earth Elements (REE) by Plants  
**Steinmann M, Brioschi L, Lucot E, Pierret M-C, Stille P, Prunier J & Badot P-M** |
| 357 | Phytoremediation for Co-contaminated Soils of Polycyclic Aromatic Hydrocarbons and Cadmium Using Willow  
**Sun Y, Xu H, Li J & Wu J** |

### 19c: Subsurface Porous Media as Biogeochemical Reactors: How Coupled Biogeochemical Processes Affect Material Fluxes from Molecular to Critical Zone Scales

| 358 | Impacts of Porous Structure, Organic Matter and Mineralogy on Atrazine Fate in Two Contrasting Tropical Soils  
**Duwig C, Prado B, Delmas P, Gastelum Strozzi A, Charrier P & Hidalgo Moreno C** |
<p>| 359 | Soil Heterogeneity and Surfactant Desorption Influence PAH Distribution at a Tar-Contaminated Site |</p>
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>360</td>
<td>Impact of Fe Speciation in the Aquifer Sediments on Ferric (Hydr)oxide Precipitation at the Changwon Research Site, Korea</td>
<td>Heister K &amp; Lima AT</td>
</tr>
<tr>
<td>361</td>
<td>Impact of Suspended Inorganic Particles on Phosphorus Cycling in the Yellow (Huanghe) River</td>
<td>Hyun SP, Moon HS, Yoon P, Ha K &amp; Chae B-G</td>
</tr>
<tr>
<td>362</td>
<td>Redox Chemistry Profiling in the Kara Sea Sediments (From the Ob-River to the Saint Anna Trench)</td>
<td>Rozanov A</td>
</tr>
<tr>
<td>365</td>
<td>Serpentinites as Catalysts for Vapor Conversion of Methane in the Earth Crust</td>
<td>Barelko V, Safonov O, Bykova N, Dorokhov V &amp; Bykov L</td>
</tr>
<tr>
<td>366</td>
<td>Hydrogen Isotope Fraction in Lipids of Syntrophically Associated Sulfate-Reducing Bacteria</td>
<td>Dawson KS, Sessions AL &amp; Orphan VJ</td>
</tr>
<tr>
<td>367</td>
<td>Investigation of the Methanotrophic Activity in the Soils of a Geothermal Site of Pantelleria Island (Italy)</td>
<td>Gagliano AL, D’Alessandro W, Quatrini P &amp; Parello F</td>
</tr>
<tr>
<td>368</td>
<td>Microbial Uptake of Phosphate during Anaerobic Oxidation of Methane</td>
<td>Graf J, Milucka J, Ferdelman T &amp; Kuypers M</td>
</tr>
<tr>
<td>369</td>
<td>Novel Approaches to Reconstructing Sulfur Cycling in Methane Seeps</td>
<td>Hancock LG, Lyons TW, Gill BC, Shapiro RS &amp; Bates SM</td>
</tr>
</tbody>
</table>
Atmospheric Methane Concentration at the ClimaDat Network Sites

Toxic Effects of Butyl Elastomers on Aerobic Methane Oxidation
Niemann H, Steinle LI, Blees JH, Krause S, Bussmann I, Treude T & Lehmann MF

Anaerobic Methane Oxidation in the Water Column of the Eutrophic Sub-Alpine Lake Zug (Switzerland)
Oswald K, Milucka J, Kypers MMM, Wehrli B & Schubert CJ

Methane Transport and Release to the Atmosphere in Permafrost Areas via Subterranean Groundwater Discharge
Paytan A, Lecher A, Dimova N, Sparrow K & Kessler J

Variability of Biogeochemical Characteristics of Bottom Sediments Near the B.Goloustnoe Seep (Lake Baikal)
Pogodaeva T, Pavlova O, Kalmychkov G, Shubenkova O & Zemskaya T

Nitrate- and Nitrite-Dependent Anaerobic Oxidation of Methane
Rasigraf O, Zhu B, Kool DM, Jetten MSM & Ettwig KF

Geochemical and Acoustic Investigations of Hydrocarbon Seepage on the Continental Shelf off Northern Norway
Sauer S, Knies J, Schubert C, Lepland A & Chand S

Microbial Production and Transformation of Dissolved Organic Matter in the Hydrothermal System
Shulga N, Peresypkin V & Rusanov I

Origin of Methane to N-Butane in Marine Sediments of the New Jersey Shallow Shelf
Stadler S, van Geldern R & Schlömer S

The Research of Sulfur Early Diagenesis Cycle Drived by AOM and Methane-Seep Environment in the Cold Seep Area, Northern South China Sea
Wu D & Wu N

Geochemical Spectra as an Integral Characteristic of the Concentration and Dispersion of Elements in Soils, Peats and Natural Waters
Bogatyrev L, Pogozhev E, Pogozheva E & Antonova I

19h: Biochar Interactions with Soil, Plant and Water – Processes and Fate

Geochemical Spectra as an Integral Characteristic of the Concentration and Dispersion of Elements in Soils, Peats and Natural Waters
Bogatyrev L, Pogozhev E, Pogozheva E & Antonova I
19j: The Role of Biominerals in Biogeochemical Cycling

382 Mineral Transformations and Bacterial Diversity in As-Rich Waste Dumps
*Amoako FY, Majzlan J & Kothe E*

383 Role of Aggregates Formed during Process Stabilization in a Production of Methane in Biogas Reactors
*Kasina M, Kleybocker A, Michalik M, Liebrich M & Wuerdemann H*

384 Coupled m-Xafs-Fish Technique for Direct Observation of the Microbe-Metal-Mineral Interaction
*Mitsunobu S & Shiraishi F*

385 Carbonate Mineralization in Shallow Lake Balaton
*Nyir-Kósa I, Tompa É, Rostási Á, Cserny T & Pósfai M*

386 Cold-Water Coral Biomineralization in High Resolution
*Oppelt A & Rocha C*

(Session 19j continues on Thursday 29th AM on p.337)

19n: Biogeochemical and Geochemical Processes and Cycles in Wetlands

387 Dynamics of Chemical Characteristics of Solubilized Organic Matter in Wetland Soils Under Aerobic or Anaerobic Conditions
*Rouwane A, Bouven I, Rabiet M, Guibaud G & Grybos M*

388 Source and Geochemical Characteristics of Carbon and Nitrogen in Poyang Lake Sediments
*Zhou W, Huang D, Lou Q, Li L & Hu C*

389 Balance of Carbon in the System of Geochemically Linked Mire Landscapes
*Inisheva L, Udina N & Sergeeva M*

390 The Role of Swamps in Formation of Chemical Composition of River Waters in Western Siberia
*Kharanzhievskaya J, Sinyutkina A, Ivanova E & Voistinova E*

391 Impact of Long Term Wetting on Hydrology and Biogeochemistry of a Peat Bog in Ontario, Canada
*Knorr K-H, Blodau C, Frei S, Kasparbauer K & Schaper J*

392 Alternative Nitrogenases in Terrestrial Ecosystems?
*Bellenger J-P, Xu Y, Zhang X & Kraepiel A*

393 Denitrification Rates in Riparian Wetlands of the Seine River are Influenced by Carbon Quantity Rather Than Quality
*Laverman A, Anquetil C & Derenne S*
The Turnover Time of Organic Carbon in Boreal Riparian Zones – A Hydrological Approach

**Ledesma J, Grabs T, Bishop K & Köhler S**

Carbon Mineralization in Artificial Wetlands

**Power I, McCutcheon J, Harrison A, Diplett G & Southam G**

Investigation of Fungal Decomposition of Leaf Lignin Using Synchrotron Infrared Microspectroscopy

**Kerr J, Baldwin D, Tobin M, Puskar L, Rees G & Silvester E**

The Importance of Dry Deposition in Estimating Nitrogen Input in Peat Bogs

**Novak M, Bohdalkova L, Fottova D, Curik J, Stepanova M, Darmovzalova M, Veselovsky F & Stepanova M**

Seasonal Patterns of CO₂ Emission from a Subtropical Reservoir

**Wang F, Wang B & Yao C**

Selenium Geochemical Characteristics of Ruoergai Plateau Wetland, Eastern Margin of the Qinghai-Tibet Plateau, Southwest China

**Xu J & Wang T**

Re-evaluation of Electron Transfer Budgets for Oxidation and Incorporation of Bisulfide by Dissolved Organic Matter Under Anaerobic Conditions

**Yu Z & Knorr K-H**

19p: Biogeochemical Interactions in Thermal Ecosystems

Geochemical Evolution and Bioenergetic Potential of Shallow-Sea Hydrothermal Fluids from Panarea Island (Italy)

**LaRowe DE, Price RE & Amend JP**

Evaluation of Prokaryotes and Community Dynamics in Alvord Desert Hot Springs

**Lee MH & Magnuson T**

*In situ* Observation of Electrical Current Generation in Deep-Sea Hydrothermal Environments

**Nakamura R, Yamamoto M, Oguri K, Kawagucci S, Suzuki K, Hashimoto K & Takai K**

Characterization of Microbial Diversity of a Geothermal Plant after Long-Term Shutdown Periods

**Neumann D, Morozova D, Scheiber J, Teitz S & Würdemann H**

Geochemistry of Mineral Springs Ecosystems of Baikal Region

**Baranovskaya N, Soktoev B, Rikhvanov L & Perminova T**
| 406 | Spatial Microbial Community Structure of a Shallow-Water Hydrothermal System |
|     | *Sollich M, Santi I, Pop Ristova P, Pichler T, Hinrichs K-U & Bühring SI* |

**20b: Biological Geochemistry: Advances in Biology and Medicine Realized Through Geochemical Analyses**

| 407 | Deepwater Horizon Spill Effects on Fish Otoliths by LA-ICP-MS |
|     | *Patterson W, McLachlin K, Hutchinson R & O’Connor C* |
| 408 | Peloid Mud Maturation, a Mineralogical and Health Hazard Point of View |
|     | *Redolfi M* |

**20j: Diffusive Kinetic Isotope Fractionation in Low and High Temperature Settings: A New Frontier for Geochemistry**

| 409 | Barium Stable Isotope Fractionation during Diffusion Through Silica Hydrogel: Experimental Determination of Kinetic Isotope Effects at Low Temperatures |
|     | *Moeller K, Nägele TF, Dietzel M & Böttcher ME* |

*(Session 20j continues on Thursday 29th AM on p.338)*

**20l: Modern Applications in Secondary Ion Mass Spectrometry**

| 410 | The SwissSIMS Ion Probe Facility |
|     | *Baumgartner L & Bouvier A-S* |
| 411 | New Method for Precise Cl Isotopes Measurement by SIMS |
|     | *Bouvier A-S & Baumgartner L* |
| 412 | High-Resolution Imaging and Quantification of Au in Sulphide Minerals Using NanoSIMS |
|     | *Kilburn M & Liu R* |
| 413 | Design Overview of the Potsdam 1280-HR SIMS Instrument |
|     | *Rocholl A & Wiedenbeck M* |
| 414 | Simultaneous Measurements of C and N Isotopic Composition and N Abundance in Diamonds by NanoSIMS |
|     | *Wang J, Shirey S & Hauri E* |
| 415 | Quantification of the in situ Heterogeneity of RMs for Microanalytical Methods |
|     | *Ramsey M & Wiedenbeck M* |

*(Session 20l continues on Thursday 29th AM on p.339)*
20n: Half Lives of Geochronologically Useful Nuclides

416 High Precision Determination of the Terrestrial $^{40}$K Abundance

_Maumenko M, Mezger K, Nägler T & Villa I_

(Session 20n continues on Thursday 29th AM on p.340)

21a: Mineral Response to Extreme Conditions: Implications for the Nuclear Fuel Cycle

417 Swelling Induced by Alpha Decay in Monazite and Zirconolite Ceramics: A XRD and TEM Comparative Study


418 Invited: Multi-Scale Simulation of Structural Heterogeneity of Swift-Heavy Ion Tracks in Complex Oxides

_Wang J, Ewing RC & Becker U_

419 The Effect of Chemical Evolution in $^{137}$CsCl on Radionuclide Leaching

_Zhang F, Marks N, Gale J, Kang Q, Uberuaga B, Stanek C & Henson N_

(Session 21a continues on Thursday 29th PM on p.374)

21e: Quantification and Mechanisms of Stable Isotope Fractionation – New Insights from Theory and Experiments

420 The Structural Determinants of Silicon Fractionation Properties of Silicate Minerals: A First-Principles Density Functional Study

_Méheut M & Schauble EA_

(Session 21e continues on Thursday 29th AM on p.341)

22a: Thermodynamics of Minerals

421 Phase Transition in Aluminous Silica at Lowermost Mantle P-T Conditions

_Andrault D, Trønnes R, Konôpková Z, Morgenroth W & Liermann P_

422 Thermodynamics of Lower Mantle Minerals

_Bouhifd A, Andrault D & Bolfan-Casanova N_

423 Elastic Wave Velocities of Polycrystalline Mg$_2$Al$_2$Si$_3$O$_{12}$-pyrope Garnet to 24 GPa and 1300K

_Chantel J, Manthilake G, Frost D, Beyer C, Jing Z & Wang Y_
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>22e</td>
<td>Thermodynamic Study of Monoclinic Pyrrhotite in Equilibrium with Pyrite by Solid-State Galvanic Cell Technique</td>
<td>Chareev D &amp; Osadchii E</td>
</tr>
<tr>
<td>22e</td>
<td>Temperature-Induced Phase Transitions in Pb/Sr-Lawsonites</td>
<td>Ende M, Wunder B, Koch-Müller M &amp; Libowitzky E</td>
</tr>
<tr>
<td>22e</td>
<td>Thermodynamics of Solid Solutions: The Margules Equation and Beyond</td>
<td>Gottschalk M</td>
</tr>
<tr>
<td>22e</td>
<td>Temperature-Induced Phase Transitions in Pb/Sr-Lawsonites</td>
<td>Ende M, Wunder B, Koch-Müller M &amp; Libowitzky E</td>
</tr>
<tr>
<td>22e</td>
<td>Raman Spectra and Microhardness of Sphalerite Solid Solutions</td>
<td>Osadchii E, Bondarenko G, Chareev D &amp; Osadchii V</td>
</tr>
<tr>
<td>22e</td>
<td>Experimental and Theoretical Study of Malachite Solubility in Ammonia Aqueous Solutions</td>
<td>Bublikova T, Setkova T &amp; Balitsky V</td>
</tr>
<tr>
<td>22e</td>
<td>High-Pressure Stability of Synthetic Al&lt;sub&gt;63&lt;/sub&gt;Cu&lt;sub&gt;24&lt;/sub&gt;Fe&lt;sub&gt;13&lt;/sub&gt; Icosahedral Quasicrystal</td>
<td>Stagno V, Bindi L, Murphy C, Fei Y &amp; Steinhardt P</td>
</tr>
<tr>
<td>22e</td>
<td>Probing the Water Content of the Earth’s Mantle: Hydrogen Mobility Under Extreme Conditions</td>
<td>Brooke J, Bromiley G, Whaler C &amp; Graham C</td>
</tr>
<tr>
<td>22e</td>
<td>Spin Transition of Fe&lt;sup&gt;2+&lt;/sup&gt; in Ringwoodite (Mg, Fe)2SiO&lt;sub&gt;4&lt;/sub&gt; at High Pressures</td>
<td>Ivanova A, Lyubutin I, Gavrilyuk A, Lin J-F, Mironovich A &amp; Presnyakov M</td>
</tr>
<tr>
<td>22e</td>
<td>Single-Crystal Elastic Properties of Fe&lt;sub&gt;0.04&lt;/sub&gt;Mg&lt;sub&gt;0.96&lt;/sub&gt;SiO&lt;sub&gt;3&lt;/sub&gt; – Perovskite at High Pressure</td>
<td>Kurnosov A, Trots D, Boffa Ballaran T &amp; Frost D</td>
</tr>
</tbody>
</table>

**22e: High Pressure Mineral Physics: A Key to Study Earth’s Dynamics**

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>436</td>
<td>Investigation of Groundwater Salinity in the Ziz Basin, Southeastern Morocco, by Using Hydrochemical and Isotopic Tools</td>
<td>Lgourna Z, Bouchaou L, Boutaleb S, Tagma T, Hssaisoune M &amp; Ettayfi N</td>
</tr>
<tr>
<td>437</td>
<td>Sr and Pb Isotopes in Surface Water and Bottom Sediments from a Public Water Supply Reservoir, São Paulo, Brazil</td>
<td>Martins V, Murakami C &amp; Grohmann C</td>
</tr>
<tr>
<td>439</td>
<td>Assessment of Groundwater Quality in Some Parts of Southwestern Nigeria</td>
<td>Odukoya A &amp; Laniyan T</td>
</tr>
<tr>
<td>440</td>
<td>Groundwater Resource Management of Rampurbaghelan Satna (M.P.), India</td>
<td>Rabindra RNT</td>
</tr>
<tr>
<td>441</td>
<td>Fuzzy Hierarchical Cross-Clustering of Romanian Mineral Waters</td>
<td>Sârbu C</td>
</tr>
<tr>
<td>442</td>
<td>Hydrogeochemical Study of the Multi-Aquifer System of the Sibari Plain (Calabria, Southern Italy)</td>
<td>Vespasiano G, Apollaro C, Bloise A, Cianflone G, De Rosa R, Dominici R &amp; Marini L</td>
</tr>
<tr>
<td>443</td>
<td>Hydrochemistry and Isotope Evidence of Groundwater Evolution and Recharge in Poyang Lake, South China</td>
<td>Hu C, Zhou P, Huang D, Li L &amp; Zhou W</td>
</tr>
</tbody>
</table>

(Session 23b continues on Thursday 29th AM on p.344)

23e: Geochemical Speciation Codes and Databases: Present Status and Future Needs

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>444</td>
<td>Solubility of Nickel Ferrite (NiFe$_2$O$_4$) from 100 to 200°C</td>
<td>Bellefleur A, Bachet M, Bénézeth P &amp; Schott J</td>
</tr>
<tr>
<td>445</td>
<td>A Comparison of Pitzer Databases for Nuclear Waste Disposal Modelling</td>
<td>Bok F, Richter A &amp; Brendler V</td>
</tr>
<tr>
<td>446</td>
<td>Thermodynamic Potentials of Au-Hg Binary Solid Solution</td>
<td>Chudnenko K &amp; Pal’yanova G</td>
</tr>
</tbody>
</table>
23h: Coprecipitation: Mechanisms and Quantitative Models

453 Clarification for Boron Sorption Mechanism in Coprecipitation with Magnesium Hydroxide
Izawa S, Tokoro C, Suzuki S & Sasaki K

454 Sr$^{2+}$ and Mn$^{2+}$ Incorporation during CaCO$_3$ Cementation on Calcitic and Aragonitic Shells
Rinder T, Dietzel M & Dedtius A

455 Opal-Ct Precipitation in a Clayey Soil Explained by Geochemical Transport Model of Dissolved Si (Blégny, Belgium)

456 Removal Mechanisms of Silicate in the Wastewater Using Aluminum Hydroxide Coprecipitation Method
Suzuki S, Tokoro C, Haraguchi D, Izawa S & Owada S

457 Clarification of As(V) Sorption Mechanism with Ferrihydrite for Quantitative Modelling of Coprecipitation Process in Wastewater Treatment
Tokoro C, Haraguchi D, Izawa S & Owada S

(Session 23e continues on Thursday 29th PM on p.377)
458 The First Data About the REE’s Contents in New-Formed Phases (Berezitovoe Cold Deposit, Priamurye, Russia)  
**Vakh E, Vakh A & Kharitonova N**

459 Synthesis of Symplesite (Fe₃(AsO₄)₂·8H₂O)  
**Xu L, Jia Y, Jiang D, Chen N, Reid J & Demopoulos GP**

(Session 23h continues on Thursday 29th AM on p.345)

24b: Isotope Source Tracing: A Session Dedicated to the Memory of Jean Carignan

460 Hydrogeochemical and Isotopic Characterization of the Saturnia Thermal Aquifer  
**Barbagli A, Brogna F, Guastaldi E, Liali G, Rezza C & Trotta M**

461 XAS and Isotopic Approaches to Identify Zn and Cu Sources in the Seine River Watershed  
**Bonnot CA, Gélabert A, Morin G, Louvat P & Benedetti MF**

462 Archaeological Practices Validating Mineralogical and Geochemical Analyses in Metal Provenance Studies. The Gold Mines from Central Gaul (France) Case Study  
**Cauuet B, Tamas CG, Baron S & Milot J**

463 Sources and Chemistry of Nitrate in Snow at Summit, Greenland  
**Fibiger D, Hastings M, Dibb J & Huey LG**

464 The Distribution Map of Lead Isotope Compositions for Galena from Ore Deposits in South Korea  

465 Organic Genesis of the Sulphur Occurences and their Relationship with Black Shales in the Isparta Region, SW, Turkey  
**Kumral M & Budakoglu M**

466 Lithium Isotopes in Surficial Waters: Examples from Rivers and Peatlands  
**Millot R, Négrel P, Desaulty AM & Brenot A**

467 Tracing the Origin of Sulphur in Darzila Karst Cave, NE Iraq  
**Seither A, Heiland K & Kummer S**

468 Isotope Characteristics of the Bon Accord Oxide Body, Barberton Greenstone Belt, South Africa  
**Tredoux M, Roelofse F & Shukolyukov A**

469 Indonesian Mineralization Event in the Wulashan District, Northwest China: Evidence of Isotopic Geochronology  
**Zhang YM, Gu XX, Yang WL & Zhu WP**

(Session 24b continues on Thursday 29th AM on p.346)
Goldschmidt 2013

Summary and Highlights
Thursday 29\textsuperscript{th} August, 2013

Timetable:

- 09:00 - 12:00 Oral Sessions
- 12:00 - 13:15 Lunch
- 13:15 - 14:15 Plenary
- 14:30 - 17:30 Oral Sessions
- 17:30 - 20:00 Poster Sessions

Highlights:

- 14:30 (L07) Harry Elderfield (Goldschmidt Award)
- 13:15 (AUD) Admission of GS Distinguished Service Award Recipients
- 13:15 (AUD) Robert M Hazen (Plenary Lecture)

Other Events:

- 19:30 (CAV) Conference Banquet
<table>
<thead>
<tr>
<th>Time</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00</td>
<td>Kersten, Ludden</td>
</tr>
<tr>
<td>09:15</td>
<td>Vinograd, Kone, Borisover</td>
</tr>
<tr>
<td>09:30</td>
<td>Temgoua, Isabelle, Schreiber, Johnson</td>
</tr>
<tr>
<td>09:45</td>
<td>Lu, Carrasco, Francois, Grambow</td>
</tr>
<tr>
<td>10:00</td>
<td>Edmunds, Zheng, Poltraason</td>
</tr>
<tr>
<td>10:15</td>
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</tr>
<tr>
<td>10:30</td>
<td>Edmunds, Zheng, Poltraason, Takahashi, Johnson</td>
</tr>
<tr>
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<td>Edmunds, Zheng, Poltraason, Takahashi, Johnson</td>
</tr>
<tr>
<td>11:00</td>
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</tr>
<tr>
<td>11:15</td>
<td>Edmunds, Zheng, Poltraason, Takahashi, Johnson</td>
</tr>
<tr>
<td>11:30</td>
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</tr>
<tr>
<td>11:45</td>
<td>Edmunds, Zheng, Poltraason, Takahashi, Johnson</td>
</tr>
</tbody>
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**Thursday AM overview**
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<td>10:00</td>
<td><strong>Keynote:</strong> Formation of Chondritic Meteorites</td>
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<td>10:30</td>
<td>Cosmochemical Constraints on Asteroid Accretion</td>
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<td>10:45</td>
<td>Isotopic Evidence for an Activity of the Early Sun Studied from the Isotopic Measurements of Kapoeta</td>
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<td>11:00</td>
<td>Component Specific Hf-W Dating of Allende and Vigarano CV3 Chondrites</td>
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<td>11:15</td>
<td>Halogen (Cl, Br and I) Inventory of the Primitive Meteorites</td>
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<td>Highly Equilibrated Carbonaceous Chondrites</td>
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<td>HSE and S-Se-Te Fractionation in Components of Enstatite Chondrites</td>
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(Session 02e continues on Thursday 29th PM on p.351)
02g: Origins of Life: Environments, Mineral Surfaces, and Prebiotic

Session chaired by Robert M Hazen & Nils Holm

09:00  **Keynote:** Planets, Minerals and Life’s Origin  
*Benner S*

09:15  Prebiotic Simulations of Shallow Sea Hydrothermal Vents: Photochemical Reduction of CO$_2$ on Sphalerite  
*Guzman M & Zhou R*

09:30  Difficulty of the Self-Replication of Prebiotic RNA Molecules  
*Kawamura K, Maruoka Y, Hamahiga K & Konagaya N*

09:45  Effects of Oxide Ions on the Stabilization of Pentoses  
*Furukawa Y, Horiuchi M, Nitta S & Kakegawa T*

Session 02e follows this session in this room: see p.316.
03d: Building and Differentiating the Early Earth
Session chaired by Maria Schönbächler, Matt Jackson & Mark Jellinek

09:00  A Two-Stage Scenario for the Formation of the Earth’s Mantle and Core
       Kaminski E & Javoy M

09:15  Earth’s Building Blocks: The “Core Spyglass”
       Badro J, Brodholt J, Siebert J & Ryerson F

09:30  Platinum Stable Isotope Tracing of Earth’s Accretion and Differentiation
       Creech J, Baker J, Handler M, Schiller M & Bizzarro M

09:45  Metakomatiites, Dynamical Modeling and the Late Veneer
       Frank E, Maier W, Canup R & Mojzsis S

10:00  Isotopic and Elemental Evidence of Magma Ocean Processes Recorded in Early Archean Komatiites
       Puchtel I, Walker R, Touboul M & Blichert-Toft J

10:15  Tungsten Isotope Heterogeneities in Archean Komatiites
       Touboul M, Puchtel I & Walker R

10:30  The $\varepsilon^{182}$W Isotope Composition of the ca. 3920 Ma Acasta Gneiss Complex
       Willbold M, Mojzsis S & Elliott T

10:45  Rapid Core Formation and an Early ‘Veneer’ on Earth: Highly Siderophile Elements in Pre-Lunar Mantle Domains
       Dale CW, Burton KW, Gannoun A, Parkinson IJ, Williams HM & Moorbath S

11:00  Early Mantle Composition and Evolution Inferred from $^{142}$Nd and $^{182}$W Variations in Isua Samples
       Rizo H, Touboul M, Carlson RW, Boyet M, Puchtel IS & Walker RJ

11:15  What Does Hadean Mantle Mixing Tell Us About Hadean Geodynamics?
       O’Neill C, Debaille V & Griffin W

11:30  Invited: Earth’s Hadean Crust: Insights from the Nuvvuagittuq Greenstone Belt
       O’Neil J, Carlson R & Boyet M

       Bourdon B, Roth A, Guitreau M, Blichert-Toft J & Mojzsis S

(Session 03d continues on Thursday 29th PM on p.352)
05h: Origin of Mantle Heterogeneities Revealed from Oceanic and Continental Peridotites

Session chaired by James Day, Brian O'Driscoll, Richard Walker & J Stephen Daly

09:00 Preserving Fertile MORB Mantle in the Continental Lithosphere
Carlson R & Ionov D

09:15 Extremely Young Melt Infiltration of the Continental Lithospheric Mantle
Turner S & Turner M

09:30 Evidence for Global Metasomatic Enrichment in Oceanic Lithosphere
Pilet S, Abe N, Rochat L, Buchs D & Baumgartner PO

09:45 HIMU Lithospheric Mantle in the Southwest Pacific: Tracing the Roots of Zealandia
McCoy-West A, Bennett V & Amelin Y

10:00 An in situ Trace Element Study of Peridotites from the Gakkel Ridge
D'Errico M, Warren J & Godard M

10:15 Keynote: Highly Siderophile Elements and Mantle Heterogeneities: The Interplay between Accessory Sulfides and Trace Minerals
Lorand J-P

10:45 Constraining the History of the Mojavian Lithosphere with Sr, Nd, Hf, and Os Isotopes of Peridotite Xenoliths from Dish Hill, California
Armytage R, Brandon A, Peslier A & Lapen T

11:00 How Depleted is the Upper Mantle? Constraints from Elemental-Os Isotope Correlations in Abyssal Peridotites and Ocean Island Xenoliths
Lassiter J & Byerly B

11:15 Highly Siderophile Element Geochemistry of Upper Mantle Xenoliths from NE Bavaria
Ackerman L, Kochergina Y, Spacek P & Magna T

11:30 Effects of Subduction-Related Melt Extraction on Iapetus Ocean Mantle
O'Driscoll B, Walker R, Day J & Daly S

11:45 Sulfide Re-Os Dating in Modally Metasomatised Peridotites, Insights from Letlhakane (Botswana)
Wainwright AN, Luguet A, Fonseca ROC & Pearson DG

(Session 05h continues on Thursday 29th PM on p.355)
# 06d: Delamination and Downwellings: The Secondary Convection Systems in Orogens and at Cratonic Peripheries

**Session chaired by Alan Levander, Janne Blichert-Toft, Eugene Humphreys & Mary Reid**

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<tr>
<th>Time</th>
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<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>09:00</td>
<td>Invited</td>
<td>Mantle Jets and Mantle Plumes</td>
<td>Anderson DL</td>
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<tr>
<td>09:15</td>
<td>Keynote</td>
<td>Dripping, Thinning, Melt Injection, Metasomatism: Geochemical Consequences of Small-Scale Convection Under Continents</td>
<td>Elkins-Tanton L</td>
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<tr>
<td>09:30</td>
<td>Invited</td>
<td>Lithospheric Mantle Downwelling beneath the Southeast Carpathians</td>
<td>Houseman G, Lorinczi P, Ren Y &amp; Stuart G</td>
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<td>09:45</td>
<td>Invited</td>
<td>Mantle-Drip Magmatism beneath the Altiplano-Puna Plateau, Central Andes</td>
<td>Ducea M</td>
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<td>10:00</td>
<td>Invited</td>
<td>Is Late Cenozoic, Post-Subduction Volcanism in the Sierra Nevada (California) a Consequence of Lithospheric Downwelling?</td>
<td>Farmer GL</td>
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<td>10:15</td>
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<td>Three Styles of Delamination found beneath the Western United States</td>
<td>Humphreys E, Schmandt B &amp; Levander A</td>
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<td>10:30</td>
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<td>Deep Crustal Melting Revealed by Pb Isotopes and Seismology in the Western US</td>
<td>Bouchet R, Blichert-Toft J, Levander A, Reid M &amp; Albarède F</td>
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<td>10:45</td>
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<td>What Causes the Rapid Change of Cenozoic Magma Sources in the Pamir?</td>
<td>Malz N, Ratschbacher L, Pfänder JA &amp; Münker C</td>
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<td>11:00</td>
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<td>Intra-Plate Tectonics and Magmatism as a Consequence of Mantle Lithosphere Delamination</td>
<td>Gorczyk W, Vogt K &amp; Hobbs B</td>
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<td>11:15</td>
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<td>Delamination of the North China Craton: A Widespread Phenomenon or a One-Off Situation?</td>
<td>Wilde S</td>
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<td>11:30</td>
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<td>Continental Lithosphere Removal by Drip and Delamination Processes</td>
<td>Levander A, Bezada M, Humphreys E, Masy J &amp; Schmandt B</td>
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<td>11:45</td>
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<td>Asymmetric Plate Tectonics and Asymmetric Mantle Convection</td>
<td>Doglioni C</td>
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<td>09:00</td>
<td><strong>Keynote:</strong> Is Diamond a Repository of Mantle Helium and Noble Gases?</td>
<td>Jones A &amp; Basu S</td>
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<td>09:15</td>
<td>Clinopyroxene and its Relationship to Rapidly Erupted, Carbonate-Rich Magmas in Calatrava, Spain</td>
<td>Humphreys-Williams E, Jeffries T &amp; Bailey K</td>
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<td>09:30</td>
<td>Carbonate, Not Carbonatite, at Villamayor Volcano (Calatrava Volcanic District, Central Spain)</td>
<td>Lustrino M, Agostini S, Capizzi L, Psarakis M &amp; Prelevic D</td>
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<td>09:45</td>
<td>Trace Element Partitioning between Carbonate Globules and Silicate Glass in Volcanic Carbonatites</td>
<td>McMahon S, Humphreys-Williams E, Gilder C, Brooker R, Jeffries T &amp; Walter M</td>
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<td>10:00</td>
<td>Melting Phase Relations in Udachnaya-East Kimberlite and Search for Parental Melt Composition</td>
<td>Sharygin I, Litasov K, Shatskiy A, Golovin A, Ohtani E &amp; Pokhilenko N</td>
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<td>10:15</td>
<td><strong>Invited:</strong> Primary Alkali Kimberlite Melt: The Myth Dispelled</td>
<td>Kopylova M, Kostrovitsky S &amp; Egorov K</td>
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<td>10:30</td>
<td>Silicate-Natrocarbonate Immiscibility in Ijolites at Oldoinyo Lengai, Tanzania: Melt Inclusion Study</td>
<td>Sekisova V, Sharygin V &amp; Zaitsev A</td>
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<td>10:45</td>
<td><strong>Invited:</strong> Magnetite-Hosted Melt Inclusions from Phoscorites and Carbonatites (Kvodr, Kola): A Hydrous Analog of Oldoinyo Lengai Natrocarbonatites?</td>
<td>Zaitsev A &amp; Kamenetsky V</td>
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Session 08g follows this session in this room: see p.322.
08g: Nuclear Waste Management and Glass Alteration

Session chaired by David A McKeown

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| 11:00 | **Keynote**: Studies of Nuclear Waste Form Glasses with Synchrotron Radiation  
*Shuh D, Lukens W, Icenhower J, Darab J, Tyliszczak T, Bluhm H, McKeown D, Buechele A, Muller I & Pegg I* |
| 11:15 | Borosilicate Glass Dissolution Driven by Magnesium Silicate Precipitation  
*Fleury B, Godon N, Ayral A & Gin S* |
| 11:30 | Geochemical Modeling of Glass Alteration in Mg Rich Ground Water  
*Frugier P, Jollivet P & Godon N* |
| 11:45 | Impact of Increasing MoO$_3$ Loading on Incorporation Properties of Multi-Component Borosilicate Glass  

*(Session 08g continues on Thursday 29th PM on p.359)*
09f: Oceanic Volcanoes and Life
Session chaired by Paul Wignall, Robert Duncan & Elisabetta Erba

11:00 **Keynote:** The Connection between Life and Oceanic Volcanism: Biosphere Meets Lithosphere
   *Staudigel H*

11:30 Corals at Volcanic Island of Satsuma Iwo-Jima: Implication for a New Proxy of Hydrothermal Events and Biological Adaptation
   *Watanabe T, Kamimura K, Yamazaki A, Le Guern F & Kiyokawa S*

11:45 The Caribbean Plateau and OAE2: Resolution of Timing and Trace Metal Release
   *Duncan R, Snow L & Scopelliti G*
09h: Seawater Geochemical Evolution: Applications of Elemental and Isotopic Proxies

Session chaired by Anton Eisenhauer, Matthew S Fantle, Juraj Farkas, Elizabeth Griffith & Brad Opdyke

09:00 Crustal Evolution Determines Seawater Sr and Nd Isotope Records

Peucker-Ehrenbrink B

09:15 Late Quaternary Nd-Hf Isotope Evolution of the Weddell Sea and the Abyssal Southern Ocean

Chen T-Y, Frank M, Gersonde R & Osborne A

09:30 Li and Ca Isotope Evidence for Continental Weathering as a Driver of End-Ordovician Glaciation

Pogge von Strandmann P, Desrochers A & Meidla T

09:45 Perturbation to the Marine Ca Isotope Cycle Across Oceanic Anoxic Event 2

Du Vivier A, Jacobson A, Lehn G, Selby D & Sageman B

10:00 Clumped Isotopes, δ¹⁸O, δ¹³C, δ¹¹B, ⁸⁷Sr/⁸⁶Sr: A Multiproxy Approach to Silurian Brachiopod Shells


10:15 Rapid Recovery of Seawater ¹⁸⁷Os/¹⁸⁸Os after CAMP Magmatism at Triassic-Jurassic Boundary

Xu G, Hannah J, Stein H, Galimberti RF & Nali M

10:30 Osmium Isotope Records of Continental Weathering and Volcanism Spanning the Paleocene-Eocene Thermal Maximum

Dickson A, Cohen A, Coe A, Davies M, Scherbinina E & Gavrilo Y

10:45 Temporal Trends in the Seawater Osmium Inventory and ¹⁸⁷Os/¹⁸⁸Os

Kendall B & Lu X

Session 09f follows this session in this room: see p.323.
10d: Reactivity of Water-(Gas)-mineral Interfaces from the Nano to the Macroscopic Scale: Implications for Weathering, CO$_2$ Sequestration and Energy-Related Studies

Session chaired by Damien Daval, Alejandro Fernandez-Martinez & Kate Maher

09:45 **Keynote:** CO$_2$: Waste or Resource? The Role of Mineral/Water Interfaces  
*Guyot F*

10:15 CO$_2$ Mineralization in Percolated Olivine-Rich Rocks: Control of Olivine Crystallographic Orientation and Fluid Flux  
*Peuble S, Andreani M, Godard M, Van De Moortele B & Gouze P*

10:30 Composition, Formation, and Role of the Si-Rich Surface Layer during Olivine Dissolution  
*Johnson N, Maher K, Bird D & Brown G*

10:45 Physico-Chemical Evolution of Fe-Si-Rich Interfacial Layers during Olivine Carbonation Reactions  
*Saldi G, Guo H, Davai D, Davis J & Knauss K*

11:00 **Invited:** Porosity Development during Carbonation Reactions  
*Ruiz-Agudo E, Putnis CV & Putnis A*

11:15 *In-situ* IR Spectroscopic Study of Forsterite Carbonation in wet-scCO$_2$  
*Bénézeth P, Chen J, Qafoku O, Schaefer T, Thompson C, Pearce C, Felmy A, Bonneville A, Rosso K & Loring J*

11:30 An Example of CO$_2$ Sequestration: Direct Nano-Scale Observations of Brucite [Mg(OH)$_2$] Dissolution  
*Putnis CV, Hövelmann J-E, Ruiz-Agudo E & Austrheim H*

11:45 Unconventional Generation of Hydrocarbons in Petroleum Basin: The Role of Siderite/Water Interface  
*Milesi V, Prinzhofer A, Guyot F, Brunet F, Richard L, Dairou J & Benedetti M*

*(Session 10d continues on Thursday 29th PM on p.362)*
10h: Combining Experimental and Theoretical Approaches to Understand Biogeochemical Interfaces in Soil

Session chaired by Gabriele E Schaumann, Adelia Aquino, Kai Uwe Totsche & Daniel Tunega

09:00 Invited: IPore Scale Visualization of Chemical Gradients at Biogeochemical Interfaces Using Micromodels and Raman Microspectroscopy

*Baumann T, Metz C, Ivleva NP & Niessner R*

09:15 How do Organic Molecules Affect Interactions of Water with Environmental Sorbents?

*Borisover M*

09:30 Investigation of Reactive Transport with Closed-Flow Column Experiments and Parallel Factor Analysis (PARAFAC) of Fluorescence Data

*Ritschel T & Totsche KU*

*Session 10d follows this session in this room: see p.325.*
12c: Geothermal Energy

Session chaired by Angelo Minissale, Yuri Taran, Nic Spycher & Simona Regenspurg

10:15  **Keynote:** Chemical Geothermometry of Geothermal Fluids: Past, Present, and Future

   *Marini L*

10:30  Hydrochemical Patterns in a Structurally Controlled Geothermal System


10:45  Understanding the Role of Phanerozoic and Active Tectonics in Generating Geothermal Resources in Central Australia

   *Uysal T, Ring U & Middleton A*

11:00  Simulation of water–Rock Interaction and Porosity Evolution in a Granitoid-Hosted Enhanced Geothermal System

   *Diamond LW & Alt-Epping P*

11:15  Interactions between Chemical Inhibitors, Scale Formation, Corrosion and Microbes at Geothermal Plants

   *Lerm S, Westphal A, Eichinger F, Huenges E & Würdemann H*

11:30  Fluid-Mineral Reactions during CO$_2$-Based Geothermal Energy Extraction

   *Saar M, Kong X-Z, Tutolo B, Luhmann A & Seyfried Jr. W*

11:45  Tectonic and Geothermal Significance of Thermal Springs of Sicily Island (Southern Italy)

   *Minissale A, Giammanco S, Montanari D, Monteleone S & Doveri M*
12e: Hydrocarbon Seeps, Spills, Geochemical Prospecting, and Analytical Advances

Session chaired by Robert Pottorf, Rich Camilli & Tim Eglinton

09:00 **Keynote**: Downhole Fluid Analysis Coupled with Asphaltene Nanoscience for Reservoir Evaluation
*Mullins O*

09:30 *In situ* Isotopic Analysis of Volatile Fluids from Subsurface Carbon Reservoirs
*Camilli R & Duryea A*

09:45 Origin of Natural Gas-Fed “Eternal Flames” in the Northern Appalachian Basin, USA
*Schimmelmann A, Etope G & Drobnia A*

10:00 Reconstruction of Oil-Filling History by Fluid Inclusion Analysis: A Case Study of Tahe Oil Field, Tarim Basin, NW China
*Shi W, Zhang Z, Volkman J, Qin J, Ten G & Xi B*

*Session 12c follows this session in this room: see p.327.*
13f: Crust-Mantle Evolution and Changing Patterns of Ore Deposits in the Early Earth

Session chaired by Sisir Mondal & William L Griffin

09:00  Keynote: Ore Deposits and Lithosphere Evolution in the Early Earth
       Begg GC, Griffin WL, O’Reilly SY & Hronsky JMA

09:15  Invited: Ore Deposits Related to Felsic Magmatism Through Time
       Lehmann B

09:30  Invited: Archean Lithospheric Mantle: The Fount of all Ores?
       O’Reilly S, Griffin W, Begg G, Pearson N & Hronsky J

09:45  Why was Rodinia Underendowed? Comparing the Effects of Paleogeography Versus Lithosphere Thickness on Secular Ore Deposit Preservation
       Pehrsson S, Eglington B, Huston D & Evans D

10:00  A Secular Solution to a Diabolical Problem: Porphyry vs. Iron Oxide-Copper-Gold Deposits
       Mumin H & Richards J

       Heinrich CA

10:30  Mobility of Au in the Mantle
       Saunders J, Pearson N, O’Reilly S & Griffin W

10:45  Invited: Secular Change of the Chromite Concentration Process from the Archean to Phanerozoic
       Arai S & Ahmed AH

11:00  Age of the Bird River Sill (Manitoba, Canada) and the Secular Variation of Layered Intrusion-Hosted Stratiform Chromite Mineralization
       Scoates J, Scoates J & Wall C

11:15  Lithospheric Mantle Connection of Clinopyroxene Inclusions in Chromites from the Archean Nuasahi Ultramafic-Mafic Complex (India)
       Mondal SK, Arai S, Payot BD & Tamura A

11:30  Trace-Element Fingerprints of Chromites and Sulfides from the Archean Nuggihalli Greenstone Belt, Western Dharwar Craton, India
       Mukherjee R, Mondal SK, González-Jiménez JM, Griffin WL, Pearson NJ & O’Reilly SY

11:45  On the Origins of Platinum-Group Minerals in Ophiolitic Chromitites
       Gervilla F, Griffin WL, González-Jiménez JM, Proenza JA, O’Reilly SY & Pearson NJ
15b: Aerosols, Clouds and Precipitation

Session chaired by Athanasios Nenes & Ilan Koren

09:00  Keynote: Low-Dimensional Models of Complex Aerosol-Cloud Interactions
       **Feingold G & Koren I**

09:30  Invited: Observed Aerosol Effects on Eastern Pacific Stratocumulus Clouds
       **Russell L**

09:45  Combustion Aerosol over Marine Stratus: Long Range Transport, Subsidence and Aerosol-Cloud Interactions over the South East Pacific
       **Clarke A, Freitag S, Kazil J, Feingold G, Blot R, Snider J,**
       **Campos T & Brekhovskikh V**

10:00  Invited: Satellite and Aircraft Views of Relationships between Particles, Cloud Water, and Rain Water

10:15  Invited: The Physical and Chemical Characteristics of Marine Primary Organic Aerosol
       **Meskhidze N & Gantt B**

10:30  Invited: Surfactants from the Gas Phase may Promote Aerosol Cloud Droplet Formation
       **Sareen N, Schwier A, Lathem T, Nenes A & McNeill VF**

10:45  Invited: Simulating Arctic Mixed-Phase Clouds with Aerosol-Dependent Ice Nucleation and Ice Nuclei Depletion
       **Paukert M & Hoose C**

11:00  Study of Droplet Activation in Thin Broken Clouds
       **Madonna F, Rosoldi M & Pappalardo G**

11:15  Invited: CCN Relevant Properties of Biomass Burning Aerosol
       **Giordano M & Asa-Awuku A**

11:30  Invited: Uncertainties in Global CCN and Cloud Drops: Which Aerosol Processes are Important?
       **Carslaw K, Lee L, Pringle K, Mann G & Reddington C**

11:45  Invited: Marine Aerosol Activation to CCN and Cloud Formation
       **Ovadnevaite J, Martucci G, Ceburnis D, Bialek J & O’Dowd C**
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<tr>
<td>09:00</td>
<td><strong>Keynote</strong>: Expanding Hypoxia Challenging Marine Life: Metazoan Adaptations and Limitations Revisited</td>
<td>Poertner H-O</td>
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<td>09:30</td>
<td>Ocean Redox Dynamics during the End-Permian Extinction and Early Triassic Recovery</td>
<td>Clarkson M, Poulton S, Wood R &amp; Richoz S</td>
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<td>09:45</td>
<td>Trace Metal Drawdown during a Cretaceous Oceanic Anoxic Event: Implications for Global Redox Conditions</td>
<td>Owens JD, Reinhard CT &amp; Lyons TW</td>
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<td>10:00</td>
<td>$\text{I/Ca}$ Evidence for Upper Ocean Deoxygenation during the Paleocene-Eocene Thermal Maximum</td>
<td>Lu Z, Thomas E, Zhou X, Rickaby R &amp; Winguth A</td>
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<td>10:30</td>
<td>Rapid High Amplitude Variability in Baltic Sea Hypoxia during the Holocene</td>
<td>Jilbert T &amp; Slomp CP</td>
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<td>10:45</td>
<td>Observed Large- and Meso-Scale Oxygen Changes in the Ocean</td>
<td>Stramma L, Weller RA, Czeschel R, Bigorre S, Schmidtko S &amp; Oschlies A</td>
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<td>11:00</td>
<td>Temporal Evolution of the Oxygen Depletion in the Bottom Water of the Lower St. Lawrence Estuary: From 1930 to 2100</td>
<td>Lefort S, Dadou I, Gilbert D, Bopp L, Mucci A, Gratton Y &amp; Resplandy L</td>
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Session 17e follows this session in this room: see p.332.
17e: Water Isotopes as Tracers of Convection, Microphysics, and Atmospheric Dynamics

Session chaired by Liz Moyer & Vasileios Gkinis

11:15 Invited: Asian Monsoon Hydrometeorology from TES and SCIAMACHY Water Vapor Isotope Measurements and the LMDZ Simulations: Implications for Speleothem Climate Record Interpretation

11:30 Invited: A Practical Constraint on Entrainment and Condensate Evaporation and from Aircraft and Satellite Observations of Isotope Ratios of Water
Noone D

11:45 Airborne in situ Measurements of HDO/H$_2^{16}$O Confirm Strong Influence of Convection on Isotopic Composition of Upper Tropospheric Humidity
Christner E, Dyroff C & Zahn A
18a: Contaminant Fate and Transport at the Groundwater-Surface Water Interface

Session chaired by Philippe Van Cappellen & Joel Kostka

09:00  **Keynote:** Depth-Dependent Links between Surface and Subsurface as Reflected by Microbial Community Structures in Limestone Aquifers  
Kuesel K, Herrmann M, Rusznyak A, Akob D, Risse-Buhl U, Opitz S & Totsche K-U

09:15  Heavy Metal Attenuation and Mobility in the Wood Creek Sand Channel Aquifer: Correlation of Experimental and Field Study  
Kone M, Ulrich M & Ulrich A

09:30  Arsenic Contamination in an Anoxic Aquifer in Southwest Germany: Assessment and Process Studies  
Isenbeck-Schroeter M, Maier M, Al Najem S & Salm N

09:45  Integrated Analysis of Hydrogeologic and Biogeochemical Processes Controlling Technetium Mobility at the Hanford Site, Washington State, USA  
Wellman D, Lee H & Jansik D

10:00  Structure and Fate of Zn-Bearing Green Rust Nanominerals in Slightly Acidic Mine Drainage Crossing a Steep Redox Boundary  
Johnson C, Freyer G, Fabisch M, Murayama M, Küsel K & Hochella, Jr M

Session 18j follows this session in this room: see p.334.
18j: Geochemical and Biological Fate of Anthropogenic Radionuclides

Session chaired by Toshihiko Ohnuki, Satoshi Utsunomiya, Kazuya Tanaka & Tomo Suzuki-Muresan

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<tr>
<th>Time</th>
<th>Topic</th>
<th>Authors</th>
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<tr>
<td>10:15</td>
<td>Invited: Long-Term Fate and Transport of Fission Products and Actinides in Geosphere</td>
<td>Grambow B, Montavon G, Abdelouas A &amp; Suzuki-Muresan T</td>
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<td>10:30</td>
<td>Keynote: Migration of Radiocesium and Radioiodine in Soil-Water-River System Related to Fukushima-Diichi Nuclear Power Plant Accident</td>
<td>Takahashi Y, Fan Q, Sakaguchi A, Togo Y &amp; Tanaka K</td>
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<td>11:00</td>
<td>Role of Submicron-Sized Particles on the $^{134, 137}$Cs Migration in Fukushima</td>
<td>Kaneko M, Nakamatsu Y, Ohnuki T, Nanba K &amp; Utsunomiya S</td>
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<td>11:15</td>
<td>Invited: Particle-Size Dependent Distribution of Radiocesium in River Sediments after the FDNPP Accident</td>
<td>Tanaka K, Iwatani H, Sakaguchi A, Takahashi Y &amp; Onda Y</td>
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<td>11:30</td>
<td>Desorption Behavior of Cesium from Smectite by Major Cations</td>
<td>Fukushi K, Yamashina Y, Aoi Y &amp; Sakai H</td>
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<td>Interpretation of Cs Adsorption Behavior Based on the EXAFS, TR-Dxafs, and STXM Methods</td>
<td>Yaita T</td>
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(Session 18j continues on Thursday 29th PM on p.369)
19d: From Parts to Processes: Progress and Challenges of Using Omics Data to Elucidate Novel Metabolic Pathways and Predict Geochemical Rates

Session chaired by Adam Kustka, Chris Bowler, Steve Giovannoni & Rizlan Bernier-Latmani

09:00  Invited: Using Genomics to Reveal the Secrets Underlying the Ecological Success of Marine Diatoms  
       Bowler C

       Kustka A, Jones B & New A

09:30  Bacterial Diversity in Baltic Sea Sediments from Skagerrak and Bothnian Bay  
       Reyes C, Oni O, Dellwig O, Böttcher ME & Friedrich MW

09:45  Invited: Environmental Diversity of Denitrification  
       Pace L, Hemp J, Murali R, Gennis R & Fischer W

10:00  Microbial Iron Reduction in Marine Intertidal Sediments  
       Geelhoed J, Tegetmeyer H & Strous M

10:15  Invited: Dissolved Organic Matter Composition Across a Coastal-Open Ocean Gradient in the Eastern Pacific Ocean  
       Kujawinski E, Johnson W & Longnecker K

10:30  Evaluation of Different RNA Preservation Methods to Study the Active Microbial Communities in Oil Sand Tailings Ponds  
       Sabari Prakasan MR, Loick N & Weisener C

Session 19h follows this session in this room: see p.336.
19h: Biochar Interactions with Soil, Plant and Water – Processes and Fate

**Session chaired by Bruno Glaser & Heike Knicker**

11:15 Organic Carbon and Trace Element Mobilization from a Biochar Amended Arable Soil: A Soil Column Study
*Riedel T, Geilich J & Iden S*

11:30 Comparative Characterization of Charcoals Prepared from Pyrolysis and Hydrothermal Carbonization and their Water Extractable Organic Carbon
*Huang R, Hockaday W, Lau B, Lu X & Jack D*

11:45 Biochar Determination in Soils by Applying Pyrolysis GC-MS Analysis and Black Carbon (BC) Concentration Through Dichromate and Permanganate Oxidation
*Suarez-Abelenda M, Kaal J, Knicker H, Camps-Arbestain M & Macías-Vázquez F*
19j: The Role of Biominerals in Biogeochemical Cycling

Session chaired by Emma Versteegh & Mark Hodson

09:00  **Keynote:** Isotopes in Vertebrate Bioapatite: Proxies for Climate, pCO₂ and Diet
       *Tütken T, Held P & Galer SJG*

09:15  The Role of Earthworm-Produced CaCO₃ in the Terrestrial Calcium and Carbon Cycles
       *Hodson ME, Versteegh EAA & Black S*

09:30  Zn Immobilization by Lumbricus Terrestris Calcium Carbonate Biomineralized Granules
       *Brinza L, Mosseumans JFW, Schofield PF, Donner E, Lombi E & Hodson ME*

09:45  Invited: The Contribution of Phytoliths in Improving the Understanding of Si Cycling
       *Meunier J-D & Keller C*

10:00  Emerging Understanding of Anthropogenic Interferences in the Ecosystem Silica Filter
       *Struyf E & Conley D*

10:15  Invited: Nitrogen in Bivalve Shell & Soft Tissues: Implications for N Sequestration and Cycling in Coastal Waters
       *Carmichael RH, Dalrymple DJ, Biancani P, Kovacs C, Walton W & Condon E*

10:30  Inter- and Intra-Specific Variability of Trace Metals in Shells of Mytilus sp., Serripes sp., and Arctica sp
       *Ponnurangam A, Koschinsky A, Bau M, Brey T & Bijma J*

10:45  Calcification Rate and Carbon-Isotope Fractionation in Coccolithophore Calcite Through Laboratory Culture Experiments
       *Hermoso M, Minoletti F, Candelier Y, McClelland H, Aloisi G & Rickaby R*

Session 20n follows this session in this room: see p.340.
### Session chaired by Nicolas Dauphas & James Watkins

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<td><strong>Keynote</strong>: Kinetic Isotope Fractionation at the Frontier of Modern Geochemistry</td>
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<td>11:00</td>
<td>Diffusion-Driven Isotopic Fractionations in Olivine in Laboratory and Natural Settings</td>
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<td><em>Sio CKI, Roskosz M, Chaussidon M, Dauphas N, Mendybaev R, Richter F &amp; Teng F-Z</em></td>
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<td>11:15</td>
<td>Using Coupled Fe-Mg Chemical and Isotopic Diffusion Profiles to Model Magma Residence Times of Crystals</td>
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<td><em>Oeser M, Weyer S, Dohmen R, Horn I &amp; Schuth S</em></td>
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<td>11:30</td>
<td>A Theoretical Approach of Isotope Fractionation Mechanism for Thermal Diffusion Processes</td>
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<td><em>Li X-F &amp; Liu Y</em></td>
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<td>11:45</td>
<td>Exhalation and Inhalation of Cera Lattice Oxygen: A Triple Oxygen Isotope Persective</td>
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<td><em>Hayles J &amp; Bao H</em></td>
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20l: Modern Applications in Secondary Ion Mass Spectrometry

Session chaired by Michael Wiedenbeck, Noriko Kita & Claire Rollion-Bard

09:00  **Keynote**: Ion Imaging and Ion Tomography Applications in Zircon Geochronology
   *Whitehouse M*

09:30  $^{16}$O$^+$H Signal as an Indication of Metamict O-Contamination in Zircon
   *Cliff J, Pidgeon B & Nemchin A*

09:45  Characterisation of Baddeleyite Oxygen Isotopes and Microstructure
   *Davies J, Stern R, Heaman L, Moser D & Walton E*

10:00  Analysing Conodont $^{18}$O by SIMS
   *Williams I, Trotter J, Rigo M & Barnes C*

10:15  Preparation of Micrometer Sized Soil Particles for NanoSIMS Analysis
   *Hoeschen C, Hoeschen T, Mueller CW, Rennert T, Lugmeier J & Kögel-Knabner I*

10:30  Development of a Novel TOF-Snms to Analyze Sub-Micron Noble Gas Distribution
   *Bajo K-I, Itose S, Matsuya M, Ishihara M, Uchino K, Kudo M, Sakaguchi I & Yurimoto H*

*Session 20j follows this session in this room: see p.338.*
20n: Half Lives of Geochronologically Useful Nuclides
Session chaired by Igor Villa, Yuri Amelin, Paul R Renne & Noah McLean

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<td>11:00</td>
<td><strong>Keynote:</strong> Decay Constants for Dating</td>
<td>Holden N</td>
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<td>11:30</td>
<td>Stepwise Calibration of the Alder Creek Sanidine $^{40}$Ar/$^{39}$Ar Dating Standard to the Historical 79 CE Eruption of Vesuvius</td>
<td>Renne P &amp; Deino A</td>
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<td>11:45</td>
<td>$^{184}$Os-$^{180}$W Decay: A New Chronometer in Geocosmochemistry</td>
<td>Peters S, Münker C, Becker H &amp; Schulz T</td>
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</table>
21e: Quantification and Mechanisms of Stable Isotope Fractionation – New Insights from Theory and Experiments

Session chaired by Sandro Jahn, Edwin Schauble & Helen Williams

09:00 **Keynote:** Calculation of Mass-Dependent Isotope Fractionation in Aqueous-Mineral Systems: In Pursuit of 1-Permil Accuracy

*Rustad J*

09:30 **Invited:** Cd Isotope Fractionation during Sorption to Mn Oxide at Low and High Ionic Strength

*Wasylkenko L & Swihart J*

09:45 Aqueous Li$^+$ Speciation and Ancient Climate Monitoring

*Bogatko S, Claeyts P, De Proft F & Geerlings P*

10:00 Equilibrium Isotope Fractionation Factors in Liquids from Path Integral Molecular Dynamics Simulations

*Pinilla C, Blanchard M, Ferlat G, Balan E, Vuilleumier R & Mauri F*

10:15 Silicon Isotope Fractionation Implying Liquid Phases at 300K: The Importance of Configurational Disorder

*Dupuis R, Benoit M & Méheut M*

10:30 **Invited:** Fractionation of Si Isotopes during Core Formation from First Principles Calculations

*Kowalski P & Jahn S*

10:45 On the Test of a New Volume Variable Cluster Model Method for Stable Isotope Fractionation of Solids: Equilibrium Mg Isotope Fractionations between Minerals and Solutions

*Liu Y*

11:00 First-Principles Investigations of Equilibrium Calcium Isotope Fractionation between Orthopyroxene and Clinopyroxene

*Feng C, Qin T, Huang S, Wu Z & Huang F*

11:15 **Invited:** Redox and Pressure Controls on Iron Isotope Variations in MORBS Determined by NRIXS Spectroscopy

*Roskosz M, Dauphas N, Alp EE, Sio CK, Tissot FLH, Neuville DR, Hu M, Zhao J, Tissandier L, Cordier C & Médard E*

11:30 **Invited:** First-Principles Investigation of Equilibrium Iron Isotope Fractionation in Oxide and Sulfide Minerals

*Blanchard M, Pinilla C, Poitrasson F, Méheut M, Lazzeri M, Mauri F & Balan E*

11:45 Fe $\beta$-Factors for Sulfides from NRIXS Synchrotron Experiments

*Polyakov V, Osadchii E, Chareev D, Chumakov A & Sergeev I*
22a: Thermodynamics of Minerals

Session chaired by Ali Bouhifd & Denis Andrault

09:00  Keynote: Mineral Formation and Evolution from a First-Principles Perspective

         Jahn S

09:30  Invited: Thermodynamics of Melts from Shock Wave Experiments and a Simplified Speciation Model

         Asimow PD, Thomas CW & Wolf AS

09:45  Invited: P-V-T Equation of State for ε-Iron up to 80 GPa and 1900 K Using the Kawai-type High Pressure Apparatus


10:00  Invited: Phase Diagrams of FeO and Fe-Si Alloys

         Fischer R, Campbell A, Reaman D, Heinz D, Dera P & Prakapenka V

10:15  Some Solid Solutions Involving Fe$_4$O$_5$

         Woodland A, Schollenbruch K, Koch M & Frost D

10:30  Newly Measured Enthalpies of Mixing for Low Albite – Microcline Crystalline Solutions

         Hovis G

10:45  Thermodynamics of Almandine-Spessartine Garnet Solid Solutions

         Dachs E, Geiger CA, Benisek A & Grodzicki M

11:00  The Ultra-High Pressure Phase Diagrams of SiO$_2$ and MgSiO$_3$

         Guyot F, Benuzzi Mounaix A, Mazevet S & Tsuchiya T

Session 22g follows this session in this room.
For details see page 343.
22g: GEOLIFE- Geomaterials for Environment, Technology and Human Activities

Session chaired by Roberta Oberti, Reto Gieré, Simona Quartieri & Roy Wogelius

11:15  **Keynote:** Harvesting, Storage and Saving of Energy Using Microporous Minerals

*Cruciani G*

11:45  **Invited:** Let's Use Metastable Geomaterials in Environmental Protection: An Intelligent Geotechnology Learnt from Natural Processes

*Sato T & Fukushi K*

(Session 22g continues on Thursday 29th PM on p.376)

Session chaired by Yan Zheng & Pauline Smedley

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<td>10:00</td>
<td><strong>Keynote</strong>: Water Security in Low Rainfall Areas</td>
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<td><em>Edmunds WM</em></td>
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<td>10:30</td>
<td>Navigating Troubled Waters</td>
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<td><em>Zheng Y</em></td>
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<td>10:45</td>
<td>Physical and Geochemical Processes during Groundwater Replenishment with Highly Treated Wastewater</td>
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<td><em>Seibert S, Prommer H, Siade A &amp; Atteia O</em></td>
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<td>11:00</td>
<td>Arsenic Anomalies in Shallow Groundwater and Sediments (Venetian Plain, Italy)</td>
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<td><em>Carraro A, Fabbri P, Giaretta A, Peruzzo L, Tateo F &amp; Tellini F</em></td>
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<td>11:15</td>
<td>Groundwater Chemistry in 2012 in Miyagi Prefecture Including Tsunami Affected Area</td>
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<td><em>Masuda H, Nakaya S, Ikawa R &amp; Marui A</em></td>
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<td>11:30</td>
<td>How Isotopic Hydrogeochemical Tools can Help Policy Makers to Target Priority Area for Drinking Water Preservation?</td>
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<td><em>Brenot A, Gourcy L, Petelet-Giraud E &amp; Négrel P</em></td>
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<td>11:45</td>
<td>Hydraulic Properties and Fresh Water Prospect of the Ganges River Basin, Bangladesh</td>
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<td><em>Ahmed N</em></td>
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23h: Coprecipitation: Mechanisms and Quantitative Models

Session chaired by Peng Lu, Chen Zhu & Michael Kersten

09:00  Keynote: Coprecipitation: Mechanisms and Quantitative Models
       Kersten M

09:15  Effects of Lead and Strontium on Radium Uptake by Barite:
       Atomistic Simulations and Thermodynamic Assessment
       Rozov K, Vinograd V, Kulik D, Brandt F, Winkler B
       & Bosbach D

09:30  Effect of Solution Supersaturation and Presence/Absence of
       Seeding Crystals on the Precipitation Kinetics of Celestite and
       Strontianite
       Temgoua LG, Chagneau A, Geckeis H & Schaefer T

09:45  Pb and Zn Coprecipitation with Iron Oxyhydroxide Nano-
       Particles
       Lu P, Kelly S & Zhu C

Session 23b follows this session in this room: see p.344.
### Session 24b: Isotope Source Tracing: A Session Dedicated to the Memory of Jean Carignan

Session chaired by Christophe Cloquet, Estrade Nicolas, Sandrine Baron, Maccali Jenny & Agnès Brenot

<table>
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<th>Time</th>
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</table>
| 09:00  | **Keynote**: Understanding the Impact of Geochemistry: A Tribute to Jean Carignan  
*Ludden J* |
| 09:30  | Pb Isotopic Composition of Himalayan Sediments  
*Galy A, Gattacceca J, Piotrowski A & Frank M* |
| 09:45  | Late Quaternary Sedimentary Provenances in the Central Arctic Ocean Inferred by Nd and Pb Isotopes of Fine Detrital Fraction  
*Fagel N, Not C, Gueibe J, Mattielli N & Bazhenova E* |
| 10:00  | Tracing Lead Sources and Chronologies in Sediments and Coral Cores in Kuwait  
*Carrasco G, Boyle E, Zhao N, Nurhati I, Gevao B & al Ghadban AN* |
| 10:15  | **Invited**: Rare Earth Element Origin and Dynamic in Contaminated River Basins: Nd Isotopic Evidence  
*Stille P, Hissler C & François C* |
| 10:30  | **Invited**: Comparison of the Fe Isotope Composition of Unfiltered Waters, Dissolved and Particulate Fraction of the Amazon River and its Tributaries  
| 10:45  | **Invited**: Iron Isotopes in the Suspended Load of the Seine River (France): Natural Versus Anthropogenic Sources  
*Chen J-B, Busigny V, Gaillardet J & Louvat P* |
| 11:00  | Pb-Zn-Cd-Hg Multi Isotopic Characterization of the Loire River Basin, France  
| 11:15  | Study of Pb Isotopic Compositions during Metallurgical Slags Leaching Experiments  
*Yin NH, Sivry Y, Lens P & van Hullebusch E* |
| 11:30  | Isotopic Tracing of Ancient Metal Production Using Geological and Mining Archaeological Research – Gaul Mining from Limousin and Morvan (France). A Case Study  
*Baron S, Cauuet B & Tamas CG* |
| 11:45  | **Invited**: Method Development and Validation for B Isolation from Roman Glass  
*Devulder V, Degryse P & Vanhaecke F* |

*(Session 24b continues on Thursday 29th PM on p.378)*
<table>
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<tr>
<th>Time</th>
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*Oral Presentations Overview*
02d: Comparative Planetology of Crust Formation

Session chaired by Vinciane Debaille & Lindy Elkins-Tanton

16:45 Invited: Petrological Constraints on Formation of the Martian Crust
Baratoux D, Monnereau M, Toplis MJ, Kurita K, Samuel H, Garcia R & Wieczorek M

17:00 What can Spectral Properties of SNCs and Martian Surface Tell us About Crust-Mantle System Evolution?
Ody A, Poulet F, Baratoux D, Bibring J-P, Toplis M & Quantin C

17:15 Anorthosite Deposits: Fragments of Early Mars
Carter J & Poulet F

(Session 02d continues on Thursday 29th Posters on p.381)
02e: Accretion and Differentiation of Primitive Parent Bodies

Session chaired by Akira Yamaguchi & Denton Ebel

14:30 Major Melting on EL Enstatite Chondrite Parent Body
*Hammouda T, Boyet M, Moine B, Cartier C & Devidal J-L*

14:45 Transmission Electron Microscopy of Iron Metal in Almahata Sitta Ureilite
*Mikouchi T, Yubuta K, Sugiyama K, Aoyagi Y, Yasuhara A, Mihira T, Zolensky M & Goodrich C*

15:00 Accretion and Differentiation Processes in the Ureilite Parent Body
*Downes H, Smith C, Abernethy F, Herrin J & Ross A*

15:15 Formation of the IIE Non Magmatic Iron Meteorites
*Van Roosbroek N, Debaille V, Goderis S, Valley J, Spicuzza M & Claeyss P*

15:30 Formation Timescales of Pallasite Meteorites Inferred from the Mg Isotope Composition of Olivine
*Larsen K, Schiller M, Paton C & Bizzarro M*

15:45 Discovery of Coesite and Stishovite from Eucrite
*Miyahara M, Ohtani E, Yamaguchi A, Ozawa S, Sakai T & Hirao N*

16:00 Geological History of 4-Vesta: $^{26}$Al-$^{26}$Mg Dating on Ecrites and Diogenites
*Hublet G, Debaille V, Wimpenny J & Yin Q-Z*

16:15 U–Pb Chronology and REE Geochemistry of Large Zircons in Estherville Mesosiderite
*Haba M, Yamaguchi A, Kagi H, Nagao K & Hidaka H*

16:30 Mg Isotope Evidence for Ancient Magmatic Differentiation on the Angrite Parent Body
*Schiller M, Mikouchi T, Connelly JN & Bizzarro M*

Session 02d follows this session in this room: see p.350.
03d: Building and Differentiating the Early Earth

Session chaired by Maria Schönbächler, Matt Jackson & Mark Jellinek

14:30 Origin of Earth’s Earliest Continental Crust: A Combination of Partial Melting and Fractional Crystallization?
Rushmer T & Adam J

14:45 The Myth of a Highly Heterogeneous Hf-Nd Eoarchean Mantle and Large Early Crustal Volumes
Vervoort J, Fisher C & Kemp A

15:00 Early Archean Ultra-Depleted Mantle: Evidence from Newly Discovered ~3.8 Ga Trondhjemite in North China
Wang Y, Li X, Jin W & Zhang J

Session 03f follows this session in this room: see p.353.
03f: What do We Know About the Hadean after 30 Years? – Zircons, Extinct Nuclides – And More

Session chaired by Vickie Bennett, Klaus Mezger & John Valley

15:15 **Keynote:** Deep Time: How did the Early Earth Become our Modern World?  
*Hirschmann M*

15:45 Paleoineralogy of the Hadean Eon  
*Hazen RM*

16:00 The Lu-Hf BSE Parameters and the Early Earth Zircon Record  
*Bizzarro M & Connelly J*

16:15 Initial $^{176}\text{Hf}/^{177}\text{Hf}$ of the Earth and Early Silicate Differentiation  
*Sprung P, Kleine T & Scherer EE*

16:30 The Oldest Zircons of Africa – Their Implications for Hadean to Archean Crust-Mantle Evolution  
*Zeh A, Gerdes A & Stern R*

16:45 Tomography at Single-Atom Scale of $^{207}\text{Pb}$ and $^{206}\text{Pb}$ in a 4374 Ma Zircon  

17:00 Ancient Mobilisation of Radiogenic Pb and Ti during High-Grade Metamorphism  
*Kusiak MA, Whitehouse MJ, Wilde SA, Dunkley DJ, Nemchin AA, Wirth R & Marquardt K*

17:15 $^{186}\text{Os}$ Mantle Evidence of Hadean Crust Formation  
*Coggon J, Luguet A, Nowell G & Appel P*

(Session 03f continues on Thursday 29th Posters on p.383)
05f: Integrated Geophysical-Geochemical Constraints on Composition and Structure of the Lithosphere

Session chaired by Derek Schutt, Costanza Bonadiman, Sonja Aulbach & Gianluca Bianchini

15:45 Keynote: Heterogeneity and Anisotropy in the Lithospheric Mantle

16:00 Invited: Multi-Observable Thermochemical Tomography: A New Framework in Integrated Studies of the Lithosphere
Afonso JC

16:15 Rethinking Mantle Geochemical Heterogeneity: New Insights into Mantle Geology
Armienti P & Gasperini D

16:30 The Role of Carbon Dioxide from Recycled Sediments in the Genesis of Ultrapotassic Magmas from Lithospheric Mantle
Conticelli S, Avanzinelli R & Ammannati E

16:45 Compositional Heterogeneity of the Upper Mantle beneath the Siberian Craton: Reconciling Thermal, Seismic and Gravity Data
Artemieva I, Herceg M, Cherepanova Y & Thybo H

17:00 Multidisciplinary Study on the Oceanic Plate: Implications from the Research on Petitspot Volcanoes
Abe N & Fujiwara T

17:15 Integrated Geological and Geophysical Probing of Lithospheric Dynamics in a Young Extensional Basin (Carpathian-Pannonian Region)

(Session 05f continues on Thursday 29th Posters on p.387)
05h: Origin of Mantle Heterogeneities Revealed from Oceanic and Continental Peridotites

Session chaired by James Day, Brian O’Driscoll, Richard Walker & J Stephen Daly

14:30 Lithium Isotope Evidence for Pervasive Metasomatism of Sub-Continental Lithospheric Mantle
*Magna T, Ackerman L & Špaček P*

14:45 Invited: Sub-Arc δ11B: The Introduction of Boron Isotope Heterogeneity into the Convecting Mantle
*Harvey J, Garrido C, Agostini S, Padron-Navarta J-A, Lopez Sanchez-Vizcaino V, Savov I & Marchesi C*

15:00 Invited: Existence of Elevated δ18O Values in the Lithospheric Mantle: Evidence from Olivines in Sailipu Mantle Xenoliths, Tibet
*Liu C-Z, Wu F-Y & Li Q-L*

15:15 Iron Isotope Fingerprinting of Mantle Mineralogy
*Williams H & Bizimis M*

15:30 Invited: Evidence for Mantle Heterogeneity from Selenium-Tellurium Systematics in Peridotites

Session 05f follows this session in this room: see p.354.
06g: Quantification of Metamorphic Processes and the Thermo-Tectonic Evolution of Orogens

Session chaired by Michael Brown, Bernardo Cesare, Sumit Chakraborty & Taras Gerya

14:30 The Role of Brines in Metamorphism and Anatexis
Aranovich L

14:45 Leucosome Formation byDesequilibrium Melting and Melt Loss: Perspectives from the South Marginal Zone (SMZ) of the Limpopo Belt, South Africa
Nicoli G, Stevens G, Moyen J-F & Taylor J

15:00 Phase Equilibria Modelling of Open System Melting: Some Implications
Yakymchuk C & Brown M

15:15 Invited: Petrologic Preconditioning: A Predisposition to Polymetamorphism?
Caddick M

15:30 Three-Dimensional Distribution of Anatectic Melt Inclusions in Garnets by X-Ray Micro-Tomography
Turina A, Parisatto M, Cesare B & Peruzzo L

15:45 Water Contents of Natural Anatectic Melts: Constraints from NanoSIMS Analysis of Remelted Nanogranites and Glassy Inclusions
Bartoli O, Cesare B, Acosta-Vigil A, Remusat L & Poli S

16:00 Successive Geotherms, Granitic Production and Evolution of the Lower Crust in a Post Collisional Context
Villaros A, Moyen J-F & Pichavant M

16:15 Keynote: Heating from within and Without, Tales of Contrasting Long-Lived Crustal Hots Spots
Martin H

16:45 Constraining the Thermal History of an Ultra-Hot Orogen from Metamorphic Reaction History and Garnet-Orthopyroxene Diffusion Modelling Studies
Bhowmik SK & Chakraborty S

17:00 The P-T-T Path of the UHT Granulites from Tongbai Orogen, Central China

17:15 Split-Stream ICP-MS Migmatite Geochemistry: Significance for the Rheologic Evolution of the Western Gneiss Region, Norway

(Session 06g continues on Thursday 29th Posters on p.388)
08d: Gases and Degassing in Magmatic Systems: Physics and Chemistry

Session chaired by Don Baker, Paolo Papale, Pete Burnard & Didier Laporte

15:45 Daily Geochemical Monitoring of Volcanic Rivers: A Tool for Eruption Prediction?
*Jones M, Gkritzalis-Papadopoulos A, Palmer M, Mowlem M & Gislason S*

16:00 Determining the Pre-Eruptive Magmatic Conditions and Sulfur Release of the AD1280 Quilotoa Eruption, Ecuador
*Stewart A-M & Castro J*

16:15 Keynote: Closed System vs. Open System Degassing: A Combined Textural and Geochemical Approach
*Boudon G & Balcone-Boissard H*

16:30 Using CO$_2$ Flux to Constraint a 3D Physical Model of the Campi Flegrei Caldera Geothermal System

16:45 Insights into Boron Volatility in Magmatic Systems
*Menard G, Vlastelíč I, Rose-Koga EF, Piro J-L & Pin C*

17:00 How Much Magmatic Water is Transported by Volcanic Gases?
*Taran Y, Zelenski M & Chaplygin I*

17:15 Simulating Magma Ascent: An Experimental Challenge
*Marxer H, Bellucci P, Ulmer S & Nowak M*

(Session 08d continues on Thursday 29th Posters on p.392)
08f: Computational Modelling of Melts and Glasses

Session chaired by Bertrand Guillot, Rudolphe Vuilleumier & Sandro Jahn

15:00 Invited: A Multi-Component Model for the Partial Melting in Presence of CO$_2$ and H$_2$O in the Mantle
Massuyeau M, Morizet Y & Gaillard F

15:15 Invited: Structure-Property Relationship of Na/Ca Silicate Liquids Under Pressure by Molecular Dynamics Simulation
Noritake F & Kawamura K

15:30 Invited: CO$_2$ Speciation and Transport Properties of CO$_2$-Bearing Silicate Melts from First-Principle Simulations
Vuilleumier R, Seitsonen A, Sator N & Guillot B

(Session 08f continues on Thursday 29th Posters on p.394)

Session 08d follows this session in this room: see p.357.
08g: Nuclear Waste Management and Glass Alteration

Session chaired by David A McKeown

14:30 Partitioning Behavior of Cs in the Matrix of Simulated Ash Residues
   Saffarzadeh A & Shimaoka T

14:45 Effect of Hafnium on Glass Structure and Dissolution
   Pierce E, Kerisit S, Charpentier T, Angeli F & Icenhower J

Session 08f follows this session in this room: see p. 358.
09b: Ocean Acidification: Processes, Time Scales and Biotic Response

Session chaired by Gavin L Foster & Appy Sluijs

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| 16:30 | **Keynote**: Is This a Good Time to be Burning Fossil Fuels?  
*Ridgwell A* |
| 17:00 | Relatively Small Degree of Surface Ocean Acidification during the PETM in the North Atlantic  
*Gutjahr M, Sexton PF, Pearson PN, Heiko P, Norris RD & Foster GL* |
| 17:15 | Boron Isotope Systematics of Calcitic Gorgonian Corals and their Response to Ocean Acidification  
*Trotter J, Thresher R, Montagna P, Taviani M & McCulloch M* |
**09e: Life in Ferruginous Settings: Building the Bridge between Sedimentology and Geomicrobiology**

*Session chaired by Elizabeth Swanner, Bertus Smith & Nicole Posth*

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<td>14:45</td>
<td>Bacterial Formation of Fe-Phosphates in the Water Column of Meromictic Ferruginous Lake Pavin (Massif Central, France)</td>
<td>Cosmidis J, Benzerara K, Morin G, Busigny V, Jézéquel D, Lebeau O, Noël V, Dublet G &amp; Othmane G</td>
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<td>Invited: Evaluating the Fossilization Potential of Fe(II)-Oxidizing Bacteria</td>
<td>Picard A, Obst M &amp; Kappler A</td>
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<td>15:30</td>
<td>Invited: Contrasting Style of Iron Formations Deposited Before and after the GOE</td>
<td>Bekker A</td>
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<td>Geomicrobiological Activity in the Mesoarchean Witwatersrand-Mozaan Succession: Evidence from Iron Formations and Shales</td>
<td>Smith A, Beukes N &amp; Gutzmer J</td>
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<td>16:00</td>
<td>Keynote: Sedimentary and Genomic Insights into the Evolution of Iron Oxidation</td>
<td>Fischer WW, Johnson JE, Hemp J, Pace LA, Planavsky NJ &amp; Webb SM</td>
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Session 09b follows this session in this room: see p.360.
10d: Reactivity of Water-(Gas)-mineral Interfaces from the Nano to the Macroscopic Scale: Implications for Weathering, CO₂ Sequestration and Energy-Related Studies

Session chaired by Damien Daval, Alejandro Fernandez-Martinez & Kate Maher

14:30 Invited: CO₂ Induced Geochemical Reactions at the Pore Scale

14:45 How Surface Heterogeneity Impacts Reaction Rates in Carbonate Rocks
Emmanuel S & Levenson Y

15:00 Pore Scale Heterogeneity in the Reactive Surface Area of Rocks
Parbhoo A, Lai P & Krevor S

15:15 Nanotribology of Mineral Surfaces in Aqueous Environments
Pina CM, Pimentel C & Gnecco E

15:30 Calcite and Chalk: Differences in Vapour Adsorption Behaviour
Okhrimenko DV, Dalby KN, Skovbjerg LL, Bovet N, Andersson MP, Olsson MHM & Stipp SLS

15:45 Vibrational Spectroscopic Study of Np(V) Sorption on Mineral Oxides
Müller K, Berger J, Cordiez M, Gröschel A & Foerstendorf H

16:00 Long-Term Residual Alteration Rates of Synthetic Basaltic Glass
Parruzot B, Jollivet P & Gin S

Session 10j follows this session in this room: see p.363.
10j: Mineral Surfaces as Microbial Habitat

Session chaired by Katja Heister, Geertje J. Pronk, Ellen Kandeler & Christian Poll

16:15 Keynote: Living in Soil Pores: Physical and Nutritional Constraints for Microbial Decomposers of Soil Organic Matter
Chenu C, Nunan N, Juarez S, Moyano F, Otten W, Schmidt S, Garnier P & Monga O

16:30 Succession of Soil Microbial Communities and Enzyme Activities in Artificial Soils
Ditterich F, Poll C, Pronk GJ, Heister K, Kögel-Knabner I & Kandeler E

16:45 How Bugs Get their Food: Linking Mineral Surface Chemistry to Nutrient Availability
Bray A, Oelkers E, Bonneville S & Benning L

17:00 Biomass Residues from Different Classes of Soil Microorganisms are a Significant Source of Soil Organic Matter

17:15 Impact of Phenanthrene on the Formation of Microbial Habitats in Soil
Hanzel J & Totsche KU
12a: Unconventional Oil and Gas Resources: Exploration and Production Geochemistry

Session chaired by Andrew Aplin, Rolando di Primio, Ron Hill & Maowen Li

14:30 Keynote: New Insights on Gas Storage and Transport in Shales
Walters C

15:00 Invited: Molecular Geochemistry as Indicators of Seal Integrity and Relevance to Shale Oil Exploration
Cao T, Li M, Jiang Q & Li Z

15:15 Eocene Hydrocarbon Migration, Green River Formation, Utah

15:30 Kerogen-Generated Bitumen as a Source of Shale Gas: Experimental Results and Mass Balance Calculation
Sun Y & Xie L

15:45 Hydrocarbon Mobility Prediction for Lacustrine Shale Oil Plays
Wang F, Weiping F & He Z

16:00 From Shale Oil to Shale Gas: Mineralogical and Geochemical Evolution of Barnett Shales

16:15 Nano Pore Evolutions of Shale and Coal during Petroleum Generation Process Using SANS and Pyrolysis
Wang Y, Ding M & Liao L

16:30 Understanding Shale Gas Plays Through the Application of Inorganic Geochemistry
Finlay A & Martin J

16:45 Chemostratigraphy of Pennsylvanian Core Shale Cyclothems, Illinois Basin, Southern Indiana
Smith C, Broach C, Chok H, Elliott Jr. W & Gilhooly III W

17:00 Geochemical Tracing of Methane from Unconventional Gas Production
Gilfillan S, Haszeldine S, Stuart F & Waldron S

(Session 12a continues on Thursday 29th Posters on p.397)
13g: Advances in the Geochemistry and Tectonic Understanding of Porphyry Deposits

Session chaired by Pete Hollings & Mike Baker

14:30  **Keynote:** Distinctive Composition and Genesis of Copper Ore-Forming Arc Magmas

*Loucks R*

15:00  Porphyry Deposits and Oxidized Magmas

*Sun W, Liang H, Ling M, Zhang H & Yang X*

15:15  Origin of Porphyries Related to Cu-Mo Mineralization, California-Vetas District, Colombia

*Bissig T, Mantilla LC & Hart C*

15:30  Magmatic-Hydrothermal Sutures and Clusters of Giant Porphyry Cu-(Au-Mo) Deposits

*Cooke D & Piquer J*

15:45  Tectonic Evolution of the Cerro Casale Cu-Porphyry System, Chile: Implications for Mineralisation

*Hollings P, Chen H & Cooke D*

16:00  The Selva Negra: A Favourable Setting for Alkaline Au Mineralisation

*Jansen N, Hollings P & Martinez-Legorreta F*

16:15  Copper Mineralization Prevented by Arc-Root Delamination during Alpine-Himalayan Collision in Iran

*Haschke M, Ahmadian J, Sarjoughian F & Shafiei B*

16:30  Petrography and Alteration of Cu-Mineralization in the Niaz, Meshginshahr, NW Iran

*Yazdi M, Mohammad H, Hosseinzaheh G & Masoudi F*

16:45  Gold Associated with Neoarchean Alkaline Intrusion, Lac Bachelor, Abitibi, Canada

*Fayol N, Jébrak M & Harris LB*

17:00  The Microstructure and Trace Metal Geochemistry of Pyrite from Porphyry Cu Deposits

*Reich M, Deditius A & Barra F*

17:15  Abiogenic Fischer-Tropsch Synthesis of Methane at the Baogutu Reduced Porphyry Cu Deposit, Western Junggar, NW-China

*Cao M, Qin K, Li G, Evans NJ & Jin L*
14g: Novel Climatic Proxies: Towards Realism  
Session chaired by Sambuddha Misra, Peter Swart & Ann Pearson

14:30  **Medal:** Ocean Geochemistry and Paleoproxies: Deep Ocean Carbonate Ion Through Six Glacial-Interglacial Cycles  
*Elderfield H*

15:15  Isotopic Composition as Climate Proxy  
*Rahul P, Ghosh P & Sneha S*

15:30  Alkenones and Hydrogen Stable Isotopic Composition of N-Alkane as Indicators of Past Temperature and Salinity in Lake Van  
*Randlett M-È, Coolen MJL, Bechtel A, Stockhecke M, Kwiecien O, Tomonaga Y, Wehrli B & Schubert CJ*

15:45  Temperature Determination from Speleothems Through Fluid Inclusion and Clumped Isotope Techniques  
*Arienzo M, Swart P, Murray S & Vonhof H*

16:00  It’s Getting Hot on Earth – The Middle Eocene Climatic Optimum in a Terrestrial Sedimentary Record  
*Methner K, Wacker U, Fiebig J, Mulch A & Chamberlain CP*

16:15  A New Cenozoic Record of Sulfur Isotopes from Foraminiferal Calcite  
*Rennie V, Paris G, Adkins JF & Turchyn AV*

16:30  Groundtruthing the Nitrogen Isotopic Composition of Planktonic Foraminifera as a Paleobiogeochemical Proxy  

16:45  Keynote: Lithium Isotope History of Cenozoic Seawater: Changes in Silicate Weathering and Reverse Weathering  
*Misra S & Froelich P*

17:00  Application of a Novel Microfluorination Technique to Quantify Biogenic Opal δ¹⁸O  
*Menicucci A, Spero H & Matthews J*

17:15  A Combined Isotopic and XAS Study of Cr Incorporation into Marine Carbonates: Towards Verifying Cr Isotopes as a Palaeoredox Proxy  
*Dixon S, Peacock C, Parkinson I, Fehr M & James R*

(Session 14g continues on Friday 30th AM on p.447)
16c: Weathering Processes in Glaciated and Permafrost Dominated Environments

Session chaired by Ruth Hindshaw, Andrew Jacobson, Emily Stevenson & Sarah M Aciego

14:30  **Keynote:** Chemical Weathering in Glacial and Proglacial Environments
   *Tranter M*

15:00  Seasonal Variation in Biological Methane Production in a Subglacial Ecosystem

15:15  Controls on Dissolved REE and HFSE in Glacial Meltwater Rivers in Southern Iceland
   *Tepe N & Bau M*

15:30  Changing Riverine Silicon Isotope Delivery to the Ocean over Glacial-Interglacial Intervals? Evidence from Glaciated Basaltic Terrains

15:45  Ca Isotope Fractionation in a Permafrost-Dominated Boreal Ecosystem (Kulingdakan Watershed, Central Siberia)
   *Bagard M-L, Schmitt A-D, Chabaux F, Prokrovsky OS, Viers J, Stille P, Labolle F & Prokushkin A*

16:00  Combining Geochemistry with Thermal Infrared Remote Sensing to Characterize Glacial Weathering
   *Rutledge A, Canovas P, Shock E & Christensen P*

*Session 16h follows this session in this room: see p.368.*
16h: Chemical Weathering in Marginal Environments

Session chaired by Bernhard Peucker-Ehrenbrink & Morgan Jones

16:15 **Keynote:** Revisiting Land to Ocean Fluxes
  
  Jeandel C & Oelkers E

16:45 Recent Changes in Coastal Aquifers: Local Effects Expressed Globally
  
  Moore W

17:00 Tracing Weathering and Reverse Weathering in Floodplains Using Si Isotopes and Ge/Si Ratios
  

17:15 Paired Sr Isotope ($^{87}$Sr/$^{86}$Sr, $\delta^{88/86}$Sr) Systematic of Sulfates and Pore Waters: New Perspectives in Marine Weathering, Seepage Signatures and Fractionation Processes
  
18j: Geochemical and Biological Fate of Anthropogenic Radionuclides

Session chaired by Toshihiko Ohnuki, Satoshi Utsunomiya, Kazuya Tanaka & Tomo Suzuki-Muresan

14:30 Invited: Reconstruction of the Accident-Derived I-131 Deposition in Fukushima Through the Analysis of I-129 in Soil
Muramatsu Y, Matsuzaki H, Ohno T, Inagawa N & Toyama C

14:45 The Fate of Iodine-129 Released from the Fukushima-Daiichi Nuclear Accident
Herod MN, Suchy M, Clark ID, Kieser WE & Graham G

15:00 Determination of $^{129}\text{I}$ by ICP-MS/MS; It’s Application to Fukushima Soil Samples
Ohno T, Muramatsu Y, Toyoda S & Matsuzaki H

Session 18l follows this session in this room: see p.370.
18l: Environmental Application of Engineered Nanomaterials: Benefits and Risks

Session chaired by Thilo Hofmann, Gregory Lowry, Rald Kaegi, Armand Masion & Mélanie Kah

15:15 Invited: Evaluating Possible Risks and Benefits of Nanopesticides Application
Kah M, Beulke S, Tiede K & Hofmann T

15:30 Engineered Crumpled Graphene Oxide Nanocomposite for Environmental Application

15:45 Keynote: Beneficial Uses of Engineered Nanoparticles and the Behavior of Natural and Engineered Nanoparticles in the Environment

16:15 Functionalized Carbon Nanotube for Forward Osmosis Membrane: Fabrication and Desalination Application
Choi H-G, Son M, Park H & Choi H

16:30 Release of Engineered Nanomaterials from Flexible Thin-Film Photovoltaic Cells
Zimmermann Y-S, Schäffer A, Corvini PF-X & Lenz M

16:45 A Simple Method to Filter Arsenic from Water Using CuO Nanoparticles
Reddy KJ & McDonald KJ

17:00 The Effects of Sulfide and Sulfate Ions on Degradation Kinetics of Chlorinated Organics by Nanoscale Zero Valent Iron
Ghoshal S & Rajasekar CRS

17:15 Polyelectrolyte Injection Increases Mobility of Nanoscale Zero-Valent Iron in Carbonate Sand
Laumann S, Micic V & Hofmann T

(Session 18l continues on Thursday 29th Posters on p.410)
19g: Methane in the Marine and Terrestrial Realms: From Environmental Impacts and Climate to Microbial Metabolisms

Session chaired by Helge Niemann & Alina Stadnitskaia

14:30 Keynote: Controls on Methane Cycling in the Baltic Sea
Jørgensen BB & Rehder G

14:45 Metal Micronutrients for Anaerobic Oxidation of Methane
Glass J, Steele J, Dawson K, McGlynn S, Reinhard C & Orphan V

15:00 Oceanographic Control on Methane Oxidation in the Water Column Offshore Svalbard

15:15 Seasonal Methane Fluxes and Sulfate Reduction Rates in a Eutrophied Baltic Estuarine System
Sawicka JE, Olsson C & Brüchert V

15:30 Influence of River Inflow and Organic Matter Loads on Benthic Methane Fluxes in the Rhone Delta (Lake Geneva)

15:45 Diversity of Microbial Communities in Sites of Discharges Gas-And-Oil Containing Mineralized Fluids in Lake Baikal
Lomakina A, Pogodaeva T, Morozov I & Zemskaya T

16:00 Unravel the Role of Sub-Arctic Lake Ice Cover on the Methane Budget: A Multi-Proxy Analysis
Sapart CJ, Boerenboom T, Röckmann T, Niemann H, van der Veen C & Tison J-L

16:15 Increasing Greenhouse Gas Emissions in Circumpolar Regions due to Climate Change-Induced Permafrost Retreat
Whiticar M, Bhatti J & Startsev N

16:30 Tracing the Fate of Endogenous Methane in Water-Logged Soil and Peat
Lim K, Pancost R, Hornibrook E, Maxfield P & Evershed R

16:45 Quantification of Methanogenic Potential in Environmental Samples
Kaneko M, Takano Y, Watanabe T, Asakawa S, Shiina S, Ogawa N & Ohkouchi N

17:00 Buried Ikaite Precipitates in Antarctic Sediments: Are They Fossil Indicators of Microbial Sulfate Reduction or AOM?
Shimizu M, Yoshinaga M, Hinrichs K-U & Van Dover C

17:15 Dating the Collapse of the Scandinavian Ice Sheet Using CH₄-Derived Carbonate Crusts from the Barents Sea
Lepland A, Chand S, Sahy D, Noble SR, Condon DJ, Martma T, Pedersen J, Sauer S, Brunstad H & Thorsnes T
19o: Geomicrobiology of Sulfur Cycling in Engineered Ecosystems

Session chaired by Hans Carlson, John Coates & Juergen Thieme

14:30  **Keynote**: Souring Control by Six Years of Nitrate Injection into a Low Temperature Oil Field
       **Voordouw G, Agrawal A, Park HS, Jack T, Miner K & Benko A**

15:00  Biogeochemical Responses to Gamma Irradiation of Alberta Oil Sands Fluid Fine Tailings
       **Boudens R, Reid T, Ciborowski J & Weisener C**

15:15  Dissimilatory Sulfate Reduction in Hypersaline Environments: What is Regulating Sulfate Uptake?
       **Roychoudhury A & Porter D**

15:30  $^{34}$S Enrichment during Chemotrophic Sulfur Oxidation by Bacteria
       **Ghosh W, Alam M & Mazumdar A**

15:45  Isotope Tracking of Microbial Sulfate Reduction in Oil Reservoirs
       **Conrad M, Hubbard C, Engelbrektson A & Coates J**

16:00  **Invited**: Chances and Challenges in Applying Sulfur-Oxygen Isotope Relationships of Sulfate to Studying Sulfur Cycling in Engineered Environments
       **Brunner B**

16:15  **Invited**: X-Ray Spectroscopy and Spectromicroscopy Study of Sulfur Speciation in Urban Soils
       **Thieme J & Mathes M**

16:30  **Invited**: Role of Zero-Valent Sulfur in Marine Methane Oxidation
       **Milucka J**

16:45  **Invited**: Proteogenomic Insights into Completely Oxidizing Sulphate Reducers (Desulfobacteriaceae)
       **Rabus R**

17:00  **Invited**: Energy Metabolism in Sulfate Reducing Bacteria
       **Pereira IAC, Ramos AR & Venceslau SS**

17:15  Systems Biology Studies on the Stress Response of Perchlorate, Chlorate Oxidative and Nitrosative Stress in Desulfovibrio alaskensis G20
       **Carlson HK, Mullan MR, Deutschbauer AM, Price MN, Arkin AP & Coates JD**
20h: Analytical Frontiers in High Spatially Resolved Analysis Using Mass Spectrometric and Related Techniques

Session chaired by Detlef Günther, Paolo S. Garofalo & Alison Koleszar

14:30 **Keynote:** LA-ICP-MS: A Success Story of *in situ* Element & Isotope Ratio Analysis
  *Pettke T*

15:00 A New Analytical Protocol for Ultra High Precision EPMA of Olivine
  *Batanova V & Sobolev A*

15:15 LA-ICPMS Imaging of Micro-Inclusions and High Compositional Gradients in Minerals
  *Danyushevsky L, Meffre S & Gilbert S*

15:30 Optimization of LA-ICP-MS for U-Pb Dating of Young Zircons
  *Guillong M, Bachmann O & von Quadt A*

15:45 Geochemical Analysis of the Pigments and Affinity of the Jurassic Calcareous Algae *Solenopora jurassica*
  *Barden H, Withers P, Behnsen J, Bergmann U, Manning P, Wogelius R & van Dongen B*

16:00 Synchrotron X-Ray Fluorescence Reveals the Colourful Chemistry of Fossils
  *Edwards N, Manning P, Barden H, Sellers W, Bergmann U & Wogelius R*

16:15 Matrix Dependence for the Quantification of Sulphur in Sulphide Minerals by LA-ICP-MS
  *Gilbert S, Danyushevsky L & Meffre S*

16:30 Laser Ablation for Spatially Resolved Radiocarbon Measurements with Gas Source-Accelerator Mass Spectrometry
  *Hattendorf B, Münsterer C, Dietiker R, Koch J, Wacker L, Christl M, Synal A & Günther D*

16:45 CA-U-Pb Zircon Dating Obtained by the LA-ICP-MS System: Impact for their Interpretations
  *von Quadt A, Gallhofer D, Waelle M, Heinrich C & Peytcheva I*

17:00 Using TOF-SIMS Isotope Mapping for Studying Dissolution and Precipitation Processes at Mineral Grains in an Experimental CO$_2$-Sequestration Setup
  *Rinnen S, Riße A, Ostertag-Henning C & Arlinghaus HF*

17:15 Genesis of Quartz-Rich Geodes from Peculiar Aqueous Fluids in a Cu-Zn-Pb Skarn (Temperino Mine, Italy) and Relations with Ore Bodies
  *Garofalo P & Pettke T*

*(Session 20h continues on Thursday 29th Posters on p.413)*
21a: Mineral Response to Extreme Conditions: Implications for the Nuclear Fuel Cycle

**Session chaired by Ram Devanathan, Chris Stanek, Nigel Marks & Jianwei Wang**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
</table>
| 15:30 | **Keynote:** Nuclear Materials Under Extreme Conditions  
Ewing R |
| 16:00 | **Invited:** Experimental and Modelling Studies of Nuclear Materials  
| 16:15 | **Invited:** Thermodynamic Constraints on Stability of Ceramics Under Extreme Conditions – Phase Change and Amorphization from Chemical Effects of Radioactive Decay  
Navrotsky A |
| 16:30 | **Invited:** First-Principles Modeling of Hydrolysis Reactions for Nuclear Waste Glass Forms  
Zapol P |
| 16:45 | **Invited:** Structure and Radiation Damage in $Y_2Ti_2O_7$ and $Y_2TiO_3$  
Robinson M, Marks N, Carter D, Qin M, Middleburgh S, Thorogood G, Kuo E, Aughterson R & Lumpkin G |
| 17:00 | **Invited:** Radiation Damage Evolution in Nanocomposites  
Uberuaga BP |
| 17:15 | **Invited:** Raman Spectroscopy and Powder Diffraction Study of Synthetic Coffinite (USiO$_4$) at High Pressures  
Bauer JD, Labs S, Weiss S, Bayarjagal L, Curtius H, Morgenroth W, Bosbach D, Hennig C & Winkler B |
21b: Both Sides Now: Melts Viewed from Experimental and Computational Perspectives

Session chaired by Nico de Koker & Mark Ghiorso

14:30 Keynote: Experimental Efforts to Understand Deep Mantle Melting

Frost D, Novella D, Myhill R, Liebske C & Tronnes R

14:45 Structural Change in Molten Basalt at Deep Mantle P-T Conditions


15:00 Structure of Carbonate-Silicate Melts at High P-T Conditions Using in situ X-Ray Diffuse Scattering

Hummer D, Kavner A & Manning C

15:15 Activities and Volatilities of Trace Components in CaO-MgO-FeO-Al₂O₃-SiO₂ Melts

Norris A & Wood B

Session 21a follows this session in this room: see p.374.
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:45</td>
<td>Invited: Planning Cement Materials for a Sustainable Future</td>
<td>Artioli G</td>
</tr>
<tr>
<td>15:00</td>
<td>High-Pressure Behavior and Phase Transitions of Thaumasite</td>
<td>Ardit M, Cruciani G, Dondi M, Garbarino G &amp; Nestola F</td>
</tr>
<tr>
<td>15:30</td>
<td>Glass Ceramics and Mineral Materials for the Immobilization of Lead and Cadmium from Municipal Solid Waste Incinerator Ashes</td>
<td>Krausova K, Gautron L, Catillon G &amp; Borensztajn S</td>
</tr>
<tr>
<td>16:00</td>
<td>Regeneration of Organophilic Zeolites after Sulfomethoxazole Antibiotic Adsorption</td>
<td>Leardini L, Martucci A, Braschi I, Blasioli S, Arletti R &amp; Quartieri S</td>
</tr>
<tr>
<td>16:30</td>
<td>Cs and Sr Mass Transfer Constrained via Ion Beam Analysis</td>
<td>Zou B, Wogelius R, Ohe T &amp; Grime G</td>
</tr>
<tr>
<td>17:00</td>
<td>Keynote: The Role of Th-U Minerals in Assessing the Performance of Nuclear Waste Forms</td>
<td>Lumpkin G, Giere R, Williams T &amp; Geisler-Wierwille T</td>
</tr>
</tbody>
</table>

(Session 22g continues on Thursday 29th Posters on p.418)
23e: Geochemical Speciation Codes and Databases: Present Status and Future Needs

Session chaired by Dmitrii Kulik, Grégory Lefèvre & Johannes Lützenkirchen

14:30 Keynote: A Database for Calculating Geochemical Reactions of CO₂ and Gas Mixtures at High Pressure, Temperature and Salinity
   Appelo T & Parkhurst D

15:00 Modeling Water-Gas-Rock Interactions Using CHESS/HYTEC
   Corvisier J

15:15 Modelling Fluid-Mineral Equilibria in Two-Phase Fluid Systems
   Shvarov Y, Bastrakov E, Mernagh T & Akinfiev N

15:30 Developing Speciation Codes and Thermodynamic Data for Non-Isothermal and Non-Isobaric Systems: Applications to CO₂ Sequestration
   Tutolo BM, Luhmann AJ, Kong X-Z, Saar MO & Seyfried, Jr. WE

15:45 Redundant Data in Geochemical Calculations: Helpful or Not?
   De Gaspari F, Saaltink M & Carrera J

16:00 Invited: Thermodem: An Example of Alive Thermochemical Database

16:15 Invited: FreeGs Thermodynamic Database Project: Implementation, Lessons, and Future?
   Bastrakov E, Wyborn L, Mernagh T & Chalnev A

16:30 THEREDA – Thermodynamic Reference Database
   Moog H & Bok F

16:45 Dissolved Metals in Redox-State Zero: A Gap in Thermodynamic Databases
   Hummel W

17:00 Invited: Thermodynamic Data for Cementitious Systems: Katoite
   Lothenbach B

17:15 Interpretation of Extreme Diagenetic Settings with a New Thermodynamic Activity Model
   Haffert L, Haeckel M, Liebetrau V & de Beer D
24b: Isotope Source Tracing: A Session Dedicated to the Memory of Jean Carignan

Session chaired by Christophe Cloquet, Estrade Nicolas, Sandrine Baron, Maccali Jenny & Agnès Brenot

14:30 Non-Traditional Stable Isotope Systematics of Seafloor Hydrothermal Systems
   Rouxel O

14:45 Seawater Derived Sulfur Contributions to the Archean VMS Deposits: Multi-Sulfur Isotope Evidences from the Neo-Archean Jaguar Deposits, Western Australia
   Chen M, Campbell I, Xue Y, Tian W & Ireland TR

15:00 Invited: Zn Isotope Fractionation in Pristine Larch Forest Developed on Permafrost-Dominated Soils in Central Siberia
   Viers J, Prokushkin A, Pokrovsky O, Kirdyanov A, Zouiten C, Oliva P & Dupre B

15:15 $\delta^{66}$Zn Values: An Isotopic Tool for Comprehension of Metallurgical Slags Weathering
   Yin NH, Sivry Y, Lens P & van Hullebusch E

15:30 Invited: Stable Isotope Tracking of Manufactured Nanoparticles

15:45 Invited: Mass-(in)dependent Cd Isotope Fractionation during Evaporation
   Wombacher F & Rehkämper M

16:00 Invited: (Non-?)Traditional Hg Stable Isotope Geochemistry in the Early 1920’s
   Sonke J, Estrade N, Donard O & Carignan J

16:15 Tracing Local Industrial Pollution Sources with Mercury Isotopes
   Wiederhold JG, Jiskra M, Skyllberg U, Drott A, Jonsson S, Björn E, Bourdon B & Kretzschmar R

16:30 Tracing Anthropogenic Hg Emissions in an Urban Area in Northeastern France
   Estrade N, Cloquet C, Amouroux D, Tessier E, Donard O & Carignan J

16:45 The Isotopic Composition of Selenium in Chinese Coals

17:00 Levels and Distribution of Traffic Related Metals in Israel; Pb, Zn and Platinum Group Metals (PGM)
   Teutsch N, Halicz L & Harlavan Y
17:15 **Invited:** Tracing Industrial Atmospheric Emissions Using Radiogenic Isotopes

*Poirier A, Gogot J & Boullemant A*
### 01f: Deep Subsurface Fluids, Habitability and Microbial Ecosystems

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strata-Specific Bacterial Diversity in Aquifers of the Thuringian Basin/Germany</td>
<td>Beyer A, Burow K, Kothe E &amp; Buechel G</td>
</tr>
<tr>
<td>3</td>
<td>Noble Gas Constraints on Reduced Deep Subsurface Fluids</td>
<td>Fellowes J &amp; Ballentine C</td>
</tr>
<tr>
<td>4</td>
<td>Mineralogical Effects on Microbial Diversity and Accumulation in Subsurface Communities</td>
<td>Jones A &amp; Bennett P</td>
</tr>
<tr>
<td>5</td>
<td>Habitability and Hydrogen Generation in Peridotite Aquifers</td>
<td>Templeton A, Mayhew L, Miller H, Streit L &amp; Kelemen P</td>
</tr>
<tr>
<td>6</td>
<td>Thermogenic Hydrocarbons in Mid Ocean Serpentinites</td>
<td>Pasini V, Brunelli D &amp; Ménez B</td>
</tr>
<tr>
<td>7</td>
<td>Serpentinization, Microbial Activities, and Carbon Flow in the Deep Biosphere</td>
<td>Schrenk M</td>
</tr>
<tr>
<td>8</td>
<td>Rock-Hosted Serpentinite Microbiome</td>
<td>Twing K, Brazelton W, Cardace D, Hoehler T &amp; Schrenk M</td>
</tr>
</tbody>
</table>

(Session 01f continues on Friday 30th AM on p.428)

### 01g: Element Partitioning; A Universal Tool in Geochemistry

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Distribution of Ta and Nb between Silicate and Aluminofluoride (Salt) Melts</td>
<td>Alferyeva Y, Shchekina T &amp; Gramenitskiy E</td>
</tr>
<tr>
<td>10</td>
<td>The Unexpected ‘Compatible’ Behavior of W during Mantle Melting: Implications for the W/U Ratio of the Lunar Mantle</td>
<td>Fonseca R, Mallmann G, Sommer J, Sprung P, Speelmanns I &amp; Heuser A</td>
</tr>
<tr>
<td>12</td>
<td>Testing of Ce and Eu Anomalies in Natural Zircon as a Sensor of Oxygen Fugacity for Archean Magmas</td>
<td>Goncharov A &amp; Korolev N</td>
</tr>
<tr>
<td>13</td>
<td>Chalcophile Element Partitioning between Silicate and Sulphide Liquids</td>
<td>Kiseeva K &amp; Wood B</td>
</tr>
</tbody>
</table>
14 Experimental Study of Trace Element Partitioning between Spinel and Silicate Melts: Effects of Oxygen Fugacity and Spinel Composition  
Klemme S, Wijbrans I, Vollmer C, Menneken M & Berndt J

15 The Impact of Element Speciation on Apparent Partition Coefficients  
van Hinsberg V, Wood B, Williams-Jones A & Migdisov A

16 The Effect of Light Elements on Metal/Silicate Partitioning  
Mirolo F, Kiseeva K, Wade J & Wood B

(Session 01g continues on Friday 30th PM on p.462)

02d: Comparative Planetology of Crust Formation

17 Coherent Pyroxene-Akimotoite Phase Transformation in NWA 5011 Shocked Chondrite  
Pál-Molnár E, Nagy S, Fintor K, Gyollai I & Bendő Z

18 Natural and Synthetic Plagioclases for the Interpretation of Planetary Surfaces  
Serventi G, Carli C, Orlando A, Borrini D, Pratesi G, Sgavetti M & Capaccioni F

(Session 02d continues on Friday 30th AM on p.429)

02j: In Situ, High Spatial Resolution Isotopic Measurements Applied to Extraterrestrial Materials

19 Improved Multi-Ion-Counting Capabilities for High Sensitivity U-Pb LA-MC-ICP-MS Zircon Geochronology  
Lloyd NS & Bouman C

20 Oxygen Isotope Compositions of Al-Rich Chondrules from Carbonaceous Chondrites  
Wang Y, Hsu W, Li X & Li Q

(Session 02j continues on Friday 30th AM on p.430)

03a: Continental Crust Formation in the Early Archean and the Emergence of Life

21 Geology, Lithostratigraphy and Geochemistry of the Oldest Eoarchaean BIFs, Northern Labrador  
Aoki S, Masanori M, Sakata S, Yamamoto S, Ishikawa A, Hirata T & Komiya T

22 Precise U-Pb (ID-TIMS) and SHRIMP Ages on Single Zircon for Achaean TTG Rocks on Baltic Shield  
Bayanova T, Mitrofanov F, Morozova L, Nitkina E, Serov P, Fedotov G & Larionov A
23 Component Geochronology of the ca. 3920 Ma Acasta Gneiss

24 Multiple Generations of TTG Gneisses Host Eoarchean Supracrustals in the Inukjuak Domain (Québec, Canada)
Greer J, Cates N, Caro G & Mojzsis S

25 Petrology and Geochemistry of Mafic Rocks in the Acasta Gneiss Complex
Koshida K, Ishikawa A, Iwamori H & Komiya T

26 Zircon U–Pb and Lu–Hf Isotopic and Whole-Rock Geochemical Constraints on the Protolith and Tectonic History of the Changhai Metamorphic Supracrustal Sequence in the Jiao–Liao–Ji Belt, Southeast Liaoning Province, Northeast China
Meng E, Liu F, Cai J & Cui Y

27 Occurrence of >3.9 Ga “Nanok” Gneiss from Sagleq Block, Northern Labrador, Canada

28 In situ Iron Isotope Analysis of Pyrite in ca. 3.8 Ga Metasediments from Isua Supracrustal Belt, Greenland
Yoshiya K, Sawaki Y, Komiy T, Maruyama S & Hirata T

(Session 03a continues on Friday 30th AM on p.431)

03e: Earth’s Oxygenation and Associated Ocean Chemistry Before and after the Archaean-Proterozoic Boundary

29 A δ13C Record from Marine Carbonates Deposited Below Diamictites between ca. 2430 and 2440 Ma
Brasier A, Martin A, Melezhik V, Prave A, Condon D & Fallick A

30 Microaerophilic Biological Methane Cycling 2.6-2.1 Billion Years ago

31 Pressure-Dependent Change of Ultraviolet Absorption Cross Section of SO₂ Isotopologues and S-Mif
Endo Y, Danielache S, Ueno Y, Hattori S, Johnson M & Kjærgaard H

32 Molybdenum Isotopic Composition of Pre-Goe Tidal Carbonates
Eroglu S, Schoenberg R, Beukes N & Wille M
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td>Abiotic O₂ Availability on an Early Alkaline Ocean Through Halogen-Induced Superoxide Species</td>
<td>Gago-Duport L, Fernandez Bastero S, Gil Lozano C, Losa-Adams E, Fernandez-Dávila A &amp; Gonzalez Fairen A</td>
</tr>
<tr>
<td>34</td>
<td>Limitations of Isotopic and Elemental Signatures of Oxygenic Photosynthesis: A Possible Solution?</td>
<td>Hubert A, Westall F, Simionovici A, Rollion-Bard C &amp; Grasineau N</td>
</tr>
<tr>
<td>35</td>
<td>Estimates of Atmospheric CO₂ in the Neoarchean-Paleoproterozoic</td>
<td>Kanzaki Y &amp; Murakami T</td>
</tr>
<tr>
<td>36</td>
<td>The Mo-Isotopic Composition of Late Archean Iron Formations</td>
<td>Kurzweil F, Wille M, Schoenberg R &amp; Van Kranendonk M</td>
</tr>
<tr>
<td>37</td>
<td>Archean Cherts: Are They Reliable Paleo-Seawater Proxies?</td>
<td>Ledevin M, Arndt N &amp; Simionovici A</td>
</tr>
<tr>
<td>38</td>
<td>Fe, S Isotope Systematics of the 3.24 Ga Old Mendon-Mapepe Formations, Kaapvaal Craton, South Africa</td>
<td>Marin-Carbonne J, Muller E, Busigny V, Rollion-Bard C &amp; Philippot P</td>
</tr>
<tr>
<td>40</td>
<td>Multiple Sulphur Isotope Analyses of Sulphate Deposits from the Sargur Group, Dharwar Craton, India</td>
<td>Muller E, Philippot P, Rollion-Bard C &amp; Sarma DS</td>
</tr>
<tr>
<td>41</td>
<td>Deposition of the Precursor Sediments of Banded Iron Formations</td>
<td>Rasmussen B, Krapez B, Muhling J &amp; Meier D</td>
</tr>
<tr>
<td>42</td>
<td>REE Geochemistry of ~3.2 Ga Old BIFs from the Mapepe Formation and Msaupi Member, Barberton, South Africa</td>
<td>Yahagi TR, Yamaguchi KE, Haraguchi S, Sano R, Teraji S, Kiyokawa S, Ikehara M &amp; Ito T</td>
</tr>
<tr>
<td>43</td>
<td>Biogeochemical Cycling of Nitrogen and Carbon in the 3.2 Ga Ocean: Results from DXCL-Dp, NW Pilbara, Western Australia</td>
<td>Yamaguchi KE, Kobayashi D, Yamada K, Sakamoto R, Hosoi K, Kiyokawa S, Ikehara M &amp; Ito T</td>
</tr>
</tbody>
</table>

(Session 03e continues on Friday 30th AM on p.432)

03f: What do We Know About the Hadean after 30 Years? – Zircons, Extinct Nuclides – And More

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
45 An Iceland-Like Setting for Generation of Earth’s Earliest Known Crust
*Reimink J, Chacko T, Stern R & Heaman L*

46 Apatite Inclusions in Hadean Zircon from Jack Hills, Australia
*Yamamoto S, Komiya T, Shimojo M, Sakata S, Maki K & Hirata T*

**03g: Reconstructing Ancient Surface Environments from Modern (Near) Analogues**

47 Horizontal Gene Transfer in Phylogenetically-Distant Taxa that Induce the Formation of Modern Wrinkle Structures: Implications for the Interpretation of Earth’s Earliest Microbialites
*Bailey J & Flood B*

48 Deconstructing the Dissimilatory Sulfate Reduction Pathway: Isotope Fractionation of a Mutant Unable to Grow on Sulfate
*Bertran E, Leavitt W, Pellerin A, Zane G, Wall J, Johnston D & Wing B*

49 High Sulfur Isotopic Fractionations in a Low-Sulfate Environment
*Fallas Dotti M & Canfield D*

50 The Characteristics of Metamorphic Basement for the Bogda Late Paleozoic Rift Through, Eastern Tianshan Mountains, China
*Guo J & Li Y*

51 Nitrogen Biogeochemical Cycling in Ferruginous Lake Pavin
*Lebeau O, Busigny V, Jézéquel D, Chaduteau C, Crowe S & Ader M*

52 Bacterial Phosphate Acquisition from Minerals in Ultra-Oligotrophic, Ferruginous Environments
*Maresca J, Yao M, Jones C, Crowe S, DeLong E & Canfield D*

53 Abiotic Methane Formation Not from $H_2$ but from $H_2O$ in the Serpentinite-Hosted Hakuba Happo Hot Spring
*Suda K, Ueno Y & Maruyama S*

*(Session 03g continues on Friday 30th AM on p.433)*

**05e: Volatiles in the Mantle: Origin, Evolution and Consequences for Earth’s Dynamics**

54 Crystal/Melt Partitioning of Volatiles during the Near-Solidus Melting of Peridotite
*Adam J, Turner M, Hauri E & Turner S*

55 Melt Generation in the West Antarctic Rift System: The Volatile Legacy of Gondwana Subduction?
*Aviado KB, Rilling S, Mukasa SB, Bryce JG & Cabato J*
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>57</td>
<td>A New Insight of the Role of the Fluids Below Victoria Land</td>
<td>Gentili S, Comodi P, Bonadiman C, Coltorti M, Biagioni C &amp; Zucchini A</td>
</tr>
<tr>
<td>59</td>
<td>Noble Gases in Mantle Xenoliths from the Tan-Lu Fault Zone, North China Craton</td>
<td>He H, Su F &amp; Zhu R</td>
</tr>
<tr>
<td>60</td>
<td>Geochemical Variations in the Central Southern Volcanic Zone, Chile (38-43°S): The Role of Fluids in Generating Arc Magmas</td>
<td>Jacques G, Hoernle K, Wehrmann H, Gill J &amp; Bindeman I</td>
</tr>
<tr>
<td>61</td>
<td>Thermodynamics of the C-H-O Fluids: High Pressure Experiments on Dissociation of Carbonates and Hydrides</td>
<td>Hrubiak R, Drozd V &amp; Saxena S</td>
</tr>
<tr>
<td>62</td>
<td>Melt-Inclusion Evidence for a CO₂-Rich Mantle beneath the Western Branch of the East African Rift</td>
<td>Hudgins T, Mukasa S &amp; Simon A</td>
</tr>
<tr>
<td>63</td>
<td>The Nitrogen Isotope Composition of Volcanic Fluids</td>
<td>Inguaggiato S, Taran Y, Fridriksson T &amp; Caliro S</td>
</tr>
<tr>
<td>64</td>
<td>U-Pb Dating of Eoarchaean Zircons Using a NanoSIMS</td>
<td>Ishida A, Takahata N, Sano Y, David J &amp; Pinti DL</td>
</tr>
<tr>
<td>65</td>
<td>Highly Sensitive and Precise Analysis of Stable Chlorine Isotope Ratio by Continuous-Flow Isotope Ratio Mass Spectrometry</td>
<td>Kawagucci S &amp; Konno U</td>
</tr>
<tr>
<td>67</td>
<td>Noble Gas Signature of Tertiary Alkaline Basalts and Xenoliths from Central Europe</td>
<td>Kochergina Y, Niedermann S, Rapprich V &amp; Magna T</td>
</tr>
<tr>
<td>68</td>
<td>Investigating the Link between Magmatic Volatiles and Mantle Source Lithology in the Hawaiian Plume: A View from Olivine-Hosted Melt Inclusions, Glasses, and Osmium Isotopes</td>
<td>Marske J, Hauri E, Garcia M &amp; Pietruszka A</td>
</tr>
</tbody>
</table>
Origin of Noble Gases on Earth: A Mixture of Solar, Solar Wind Implantation and Phase Q  
*Moreira M & Roubinet C*

Geochemistry of Nowdouz Potassic Volcanic Rocks, the Sample for Early Cenozoic Potassic Magmatism in NW Iran  
*Mousavi SZ*

Helium Isotope Compositions of Geothermal Fluids and Alkaline Volcanics in Turkey: A Comparative Assessment for Crust-Mantle Dynamics  
*Mutlu H, Aldanmaz E, Stuart FM, Aral D, Gülec N & Hilton DR*

Petrological Study of Cenozoic Basic Lavas and Melt Inclusions from Northern Victoria Land (Antarctica)  
*Giacomoni PP, Coltorti M, Mukasa S, Bonadiman C, Ferlito C & Pelorosso B*

Volatile Budget of the Galapagos Plume  
*Peterson M, Saal A, Hauri E, Kurz M, Werner R, Hauff F, Geist D & Harpp K*

Insights into a Volatile Rich Subcontinental Lithospheric Mantle: Lherzolithe Xenoliths from the Cameroon Volcanic Line, Africa  
*Pintér Z, Kovács I, Konc Z, Berkesi M, Szabó C, Perucchi A & Patkó L*

F and Cl Solubilities in Wadsleyite and Ringwoodite  
*Roberge M, Bureau H, Bolfan-Casanova N, Frost D, Raepsaet C, Surble S, Khodja H & Fiquet G*

Heavy Noble Gases in Enstatite Chondrites. Implications for the Earth Primordial Signature and its Evolution  
*Roubinet C & Moreira M*

Decoupling of the Sub-Basinal CO$_2$ and He Mantle Fluxes as Evidenced by Intense CO$_2$/He Fractionation of Natural Gases from Brazilian South Atlantic Margin Basins  
*Rouchon V, Vaz Dos Santos Neto E & Tavares de Morais E*

Thermodynamics of the C-H-O Fluid at Extreme Conditions  
*Saxena S, Hrubik R, Drozd V, Belonoshko A, Shi P & Eriksson G*

Complex C-O-H-N-S Fluids and Sulphide-Silicate Melt Immiscibility in the Upper Mantle  
*Solovova I, Boukine A, Kogarko L & Verchovsky A*

Recycling of Water between the Mantle and Crust/Hydrosphere  
*Turner M, Turner S, Ireland T & Adam J*

Recent Views on Lamprophyric Mellilitic Rocks (Polzenites) of the Bohemian Massif  
*Ulrych J & Krmíček L*
Role of Deep Carbides in the Formation of Hydrocarbons?  
**Vecht A & Jones A**

Early Paleozoic Intrusives of the Kuznets Alatau, Siberia: Nd–Sr Isotopes Evidence of Oceanic Lithosphere Participation in Magmatic Sources  
**Vrublevskii V, Gertner I & Kotelevnikov A**

Compositional Variation in Apatites from Alkaline Silicate Rocks and Associated Carbonatites: A Case Study of the Kaiserstuhl Complex, Germany  
**Wang L, Wenzel T, von der Handt A, Keller J, Marks MAW & Markl G**

H in Garnet: Implications for Upper Mantle H2O Storage Capacity  
**Withers A & Hirschmann M**

**05f: Integrated Geophysical-Geochemical Constraints on Composition and Structure of the Lithosphere**

Cannibalization of Previous Na-Rich Clinopyroxenes by Ascending Basic Magmas of the Garrotxa Volcanic Field (NE, Spain)  
**Aulinas M, Gisbert G, Gimeno D & Gasperini D**

A New Lithospheric Model for Southeastern Sicily (Italy)  
**Manuella F, Brancato A, Carbone S & Gresta S**

Geophysical Evidences for Eclogites beneath the West Siberian Basin  
**Cherepanova Y & Artemieva I**

The Role of Oceanic Sediments in the Metasomatism of Subpatagonian Lithospheric Mantle beneath Cerro del Fraile (Argentina)  
**Faccini B, Bonadiman C, Coltorti M, Gregoire M & Siena F**

“Garnet Signature” Systematics and the Structure of Oceanic Lithosphere  
**Grose C & Afonso JC**

Hidden Hotspot Track beneath Eastern United States  
**Helmbberger D, Chu R, Leng W & Gurnis M**

Metasomatism Recorded in the Peridotite Overlying Metamorphic Sole of the the Oman Ophiolite: An Analog of Mantle-Wedge Events  
**Ishimaru S, Arai S & Tamura A**
93 Predicting the Depth of the Lithosphere-Asthenosphere Boundary from Surface Heat Flow in the Carpathian-Pannonian Region: The Role of Pargasitic Amphibole

Lenkey L, Kovács I, Orosz L, Angyal J & Vikor Z

94 Geochemistry and Crystal Preferred Orientation of Upper Mantle Peridotite Xenoliths from the Nógrád-Gömör Volcanic Field (Northern Pannonian Basin)


95 Modal Metasomatism in Upper Mantle from Eastern Part of Central European Volcanic Province (SW Poland)

Matusiak-Małek M, Puziewicz J, Ntaflos T & Grégoire M

96 Petrological and Geochemical Evidences for the Origin of the Neyriz Ophiolites, SE Zagros, Iran

Rahgoshay M & Monsef I

97 Lithospheric Mantle Heterogeneities beneath Southern Patagonia

Mundl A, Ntaflos T, Bjerg E, Ackerman L & Hauzenberger C

98 Magma Sources within the Armenian Territory Since the Jurassic

Nikogosian I, Meliksetian K, Van Bergen M, Mason P & Navasardyan G

99 Delaminated Lithospheric Mantle and Exotic Metasomatism beneath East Russia

Ntaflos T, Aschchepkov I, Koutsovitis P, Hauzenberger C, Prikhodko V & Asseva A

100 Different Styles of Metasomatism in Lithospheric Mantle beneath Central Europe

Puziewicz J, Matusiak-Małek M, Ntaflos T & Gregoire M

101 Mantle Xenoliths from Bir Ali (Yemen)

Squaldo P, Beccaluva L, Bianchini G & Siena F

102 U-Pb and Hf Isotopes in Zircons from Mantle Chromitites of the Finero Peridotite (Ivrea Verbano Zone)


103 Garnet and Spinel in the Upper Mantle: Results from Thermodynamic Modeling in Fertile and Depleted Compositions

Ziberna L, Klemme S & Nimis P

06g: Quantification of Metamorphic Processes and the Thermo-Tectonic Evolution of Orogens

104 Ca. 1750 Ma Arc-Related Metamorphism in the Southern Arunta Complex, Central Australia?

Anderson J, Kelsey D, Hand M & Collins W
105  Igneous Sapphirine in Ambatomena, Southern Madagascar  
Arima M, Kimoto K, Rakotondrazafy R, Rakotonrandasaana T & Ranaivoson M  

106  Zeolites and Mafic Phyllosilicates in Livingston Island, Antarctica  
Bastias J, Fuentes F, Aguirre L, Hervé F, Fernandoy F & Demant A  

107  Organic Geothermometry: Defining Metamorphic Grades in Coal  
Bussio J, Roberts J & Wagner N  

108  Microstructures and Melt Inclusions from Jubrique (S Spain): Implications for Anatexis  
Barich A, Acosta-Vigil A, Garrido CJ, Cesare B & Bartoli O  

109  Petrogenesis and Geochronology of the Xilushan Granitic Complex in the Bengbu Uplift  
Chen J & Wang X  

110  Generation of a Multi-Annuli Corona Sequence in Two-Pyroxene Gabbro, Fiordland, New Zealand: Intrusion, Rapid Post-Magmatic Cooling and Transformation of Gabbro to High-P Granulite  
De Paoli M, Fitzherbert J & Clarke G  

111  Timescales of Partial Melting and UHP Exhumation, Papua New Guinea  
DesOrmeau J, Gordon S, Little T & Bowring S  

112  Unraveling Cryptic High-Temperature Polymetamorphism: An Alpine Example  
Guevara V & Caddick M  

113  Can Mineral Inclusions in Metamorphic Rutile Help to Constrain P-T Conditions of Formation?  
Hart E, Storey C & Bruand E  

114  P-T Evolution of Neoproterozoic and Ordovician Metamorphic Rocks in the Iberian Massif, Central Portugal  
Henriques SBA, Ribeiro ML, Neiva AMR, Dunning GR & Tajcmanova L  

115  Multi-Stage Cl-Rich Fluid Activity and Behavior of REE-Bearing Minerals in a Neoproterozoic Granulite Terrane  
Higashino F, Kawakami T, Satish-Kumar M, Ishikawa M, Tsuchiya N & Grantham G  

116  Experimental Studies of Partial Melting at the Contact between Limestone and Pelitic Gneiss  
Kato M, Hiroi Y & Arima M  

117  New Geochronological Constraints on the Ruili Metamorphic Belt in Western Yunnan, China  
Lai C-K, Khin Zaw & Meffre S
**Posters**

118. Compositional Zoning of Polyphase Garnet in Pelites as a Consequence of Three Metamorphic Events in Precambrian P-T-T History of the Yenisey Ridge, Siberia  
*Likhanov I & Reverdatto V*

119. Multiple Metamorphic Events Hidden in Zircons from the Sanjiang Complex Belt, Southeastern Tibetan Plateau  
*Liu F, Wang F, Liu P & Liu C*

120. Thermal Structure of the Sgurr Beag Thrust, NW Scotland  
*Mazza SE, Law RD & Caddick MJ*

121. Ar-Ar and U-Pb Isotopic Ages of Early Caledonian Granulites from the Svyatoy Nos Peninsula (Transbaikalia)  
*Mikheev E, Vladimirov A, Travin A, Bayanova T & Volkova N*

122. Ages and Deformation of Felsic Dikes within Granulites and Gneisses of the Gruf Complex, Central Alps  
*Savage J, Möller A, Oaimann J & Bouquet R*

123. High-Pressure Amphibolite Facies Metapelites of Carrancas Klippe, Southern Brasilia Belt, Brazil  
*Pavan M & Moraes R*

124. Formation Conditions of Sapphirine-Bearing Assemblages from Some Complexes of Siberia  
*Podlesskii KK*

125. Thermochronological Estimates of Uplift and Cooling Rates of the Bodonchin Metamorphic Wedge  
*Polyanskiy OP & Sukhorukov VP*

126. Zircon as an Indicator of Metamorphic Conditions  
*Pystina J*

127. On Some Feedback-Coupling Relations between Fluid Flow, Igneous Intrusion, Metamorphic / Metasomatic Events and Deformation during Low-P High-T Regional Thermal Metamorphism. An Example from the Osor High-Grade Complex (Catalan Coastal Ranges, NE Iberia)  
*Reche J & Martinez F*

128. Partial Melting and Melt Loss: Migmatites from Val Strona di Omegna (Ivrea Zone, NW Italy)  
*Redler C*

129. U-Pb Age of a Syn-Collisional Lower Continental Crust Anatectic Event, Soccoro-Guaxupé Nappe, SE Brazil  
*Salazar Mora CA & Campos Neto MC*

130. Dahomeyan Neoproterozoic Imprint on Eburnean Palaeoproterozoic Rocks in Southeast Ghana – *rubust* Ar, Flimsy Pb  
*Scherstén A, Page L, Kalvig P, Petersson A & Anum S*

131. Partial Melting of Rhyolites in the Chaltén Contact Aureole (Patagonia, Argentina)  
*Seitz S, Putlitz B, Baumgartner LP, Leresche S & Nescher P*
132 Zirconology of UHP-Ultramafic Rocks and Eclogites from the Maksyutovo Complex (South Urals, Russia)
**Valizer P, Krasnobaev A, Rusin A & Medvedeva E**

133 Probing Quartz for P-T-D Paths
**Webb L, Dyess P, Ashley K, Spear F & Thomas J**

134 Building of the Deep Gangdese Arc, South Tibet: Linking Granulites, and Magmatism and Crustal Growth in the Active Continental Margin
**Zhang Z, Dong X & Xiang H**

(Session 06g continues on Friday 30th AM on p.435)

08a: Latest News on the Structure of Melts and Glasses

135 $^{57}$Fe Mössbauer Spectroscopy of Pantelleritic Melts
**Borovkov N, Hess K-U, Fehr KT, Cimarelli C, Dingwell D & Günther A**

136 Properties and Structural Role of Iron in Silicate Melts and Glasses
**Tannou I, Jeffroy M, de Ligny D & Neuville D**

(Session 08a continues on Friday 30th PM on p.468)

08b: Advances in Transport Properties of Natural Melts, Glasses & Magmas

137 A Rheological and Textural Characterization of the Fall-Out Phase of the Large Volume Pozzolane Nere Mafic Ignimbrite (Colli Albani Volcano, Rome)
**Campagnola S, Romano C, Vona A & Giordano G**

138 Magmatic Evolution and Intensive Parameters of the Santa Maria Rhyolites, Paraná Magmatic Province, Brazil, as Inferred from Whole Rock and Mineral Geochemistry
**Guimaraes LF, Polo LA & Janasi VA**

139 Invited: CSD, Crystal Shape and Connectivity in Synthetic Basalt from 3D Reconstruction by X-Ray CT Image
**Ottavi-Pupier E, Dardé B, Monnier L, Nakamura M, Okumura S, Tsuchiyama A, Uesugi M & Uesugi K**

140 High-Temperature Rheology of a Megacryst-Bearing Mugearitic Magma from Etna (Italy)
**Vona A, Di Piazza A, Nicotra E, Romano C & Viccaro M**

141 Geochemistry of Huashan A-Type Granitoid Complex, South China, and its Geotectonic Significance
**Zhu J**
<table>
<thead>
<tr>
<th>Posters</th>
<th>08d: Gases and Degassing in Magmatic Systems: Physics and Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>142</td>
<td>He and Ar Diffusivity in Basaltic Glasses and Melts</td>
</tr>
<tr>
<td></td>
<td>Amalberti J, Burnard P &amp; Laporte D</td>
</tr>
<tr>
<td>143</td>
<td>Petrological and Textural Constraints on Explosive Activity of the Last 2ka of Turrialba Volcano (Costa Rica)</td>
</tr>
<tr>
<td></td>
<td>Di Piazza A, Romano C, De Astis G, Vona A &amp; Soto JG</td>
</tr>
<tr>
<td>144</td>
<td>CO₂ Degassing in a Haplo-Basaltic Magma: An Experimental Approach</td>
</tr>
<tr>
<td></td>
<td>Hardiagon M, Laporte D, Morizet Y &amp; Provost A</td>
</tr>
<tr>
<td>145</td>
<td>Simulation of Magma Ascent Prior to the High Risk Caldera Forming Eruptions of Campi Flegrei</td>
</tr>
<tr>
<td></td>
<td>Preuss O &amp; Nowak M</td>
</tr>
<tr>
<td>146</td>
<td>A New Experimental Approach to Silicic Magma Differentiation</td>
</tr>
<tr>
<td></td>
<td>Rodríguez C, Castro A &amp; Sánchez-Navas A</td>
</tr>
<tr>
<td>147</td>
<td>Fast Hydration of Volcanic Glass at Low Temperatures</td>
</tr>
<tr>
<td></td>
<td>von Aulock FW, Lavallée Y, Hess K-U, Henton - De Angelis S &amp; Kennedy BM</td>
</tr>
<tr>
<td>148</td>
<td>Determination and Comparison of Acidic Gas Ratios at the Stromboli Volcano and Mount Etna Obtained by Various Active Alkaline Traps</td>
</tr>
<tr>
<td>149</td>
<td>Anorthosite Dikes from Cyprus: Phase Relations in the System CaAl₂Si₂O₈ – CaMgSi₂O₆ – Mg₂SiO₄ at 5 Wt.% H₂O</td>
</tr>
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<td>Zirner A, Ballhaus C, Münker C &amp; Marien C</td>
</tr>
</tbody>
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<thead>
<tr>
<th>08e: Glasses, Melts and Fluids as Tools for the Understanding of Volcanic Processes and Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
</tr>
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<td>151</td>
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<td>153</td>
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<td></td>
</tr>
<tr>
<td>Posters</td>
</tr>
<tr>
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<tr>
<td>168</td>
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<td>169</td>
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<td>179</td>
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<td>180</td>
</tr>
</tbody>
</table>
The Role of Alkalis in the Solubility of H$_2$O and CO$_2$ in Silicate Melts

**Vetere FP, Behrens H, Botcharnikov R, Holtz F & Fanara S**

The Volatile Content of Mount Etna Magma: An FTIR and Raman Study of Glassy Melt Inclusions

**Wylie R**

Magma Storage and Ascent Conditions beneath Pico and Faial Islands (Azores Islands). A Study on Fluid Inclusions

**Zanon V & Frezzotti ML**

Phosphorus-Bearing Pyroxenes in Flood Basalts with Native Iron, Khungtukun, Polar Siberia, Russia

**Zhitova L, Sharygin V, Kamenetsky V, Karmanov N & Nigmatulina E**

(Session 08e continues on Friday 30th AM on p.437)

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**08f: Computational Modelling of Melts and Glasses**

**Invited:** Physical Properties of CO$_2$-Rich Melts at Mantle Conditions: A Simulation Study

**Folliet N, Sator N & Guillot B**

Structural Simulation on Silica Crystals and Glasses

**Takada A**

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**09c: Patterns, Controls, and Consequences of the Earliest Rise of Atmospheric Oxygen**

Pockets of Proterozoic Hydrocarbons and Implications for the Archaean

**Bruisten B, Jarret A, Schinteie R, Colangelo-Lillis J, Reuning L, Littke R & Brocks J**

Redox-Sensitive Controls on the Proterozoic Nitrogen Cycle

**Daines S & Lenton T**

Do Pyrolytic Biomarker Fragments Retain Some Diagnosticity?

**Leider A & Hallmann C**

The Marine Biogeochemical Carbon Cycle Modeling of Yangtze Sea during the Ediacaran–Cambrian Transition

**Li D**

Multiple Sulfur Isotope Geochemistry of Dharwar Supergroup, Southern India: Late Archean Record of Changing Atmosphere

**Mishima K, Yamazaki R, Kumar MS, Hokada T & Ueno Y**

Chromium Enrichment in Sedimentary Rocks Deposited in Shallow Water in the 3.2 Ga Moodies Group, South Africa

**Otake T, Sakamoto Y, Itoh S, Yurimoto H & Kakegawa T**

(Session 09c continues on Friday 30th AM on p.438)
09g: Geochemical and Biological Consequences of Changes in the Biological Pump over Geological Time

193 Carbon Isotopic Evidence for Methane Release during the End-Permian Mass Extinction
   Huang J, Lei L, Luo G & Zhou Q

194 The Biological Pump and Evolution of Marine Animal Ecosystems
   Meyer K, Ridgwell A & Payne J

(Session 09g continues on Friday 30th AM on p.439)

09i: Alteration Processes and Geobiochemical Interactions at Mid-Ocean Ridges

195 The Lost City Hydrothermal Field: A Geochemical Analog for Nili Fossae, Mars
   Amador E, Bandfield J, Kelley D & Brazelton W

196 Diverse Hydrothermal Venting at the Jan Mayen Vent Fields, AMOR
   Baumberger T, Lilley MD, Pedersen RB, Thorseth IH & Stensland A

197 Metamorphic-Hydrothermal Transition in the Alteration of Pillow and Dike Basalts from the Rodriguez Triple Junction
   Franke H, Heeschen K & Schwarz-Schampera U

198 Carbon Budget during Alteration of the Oceanic Crust
   Martinez I, Shilobreeva S, Busigny V, Laverne C, Alt J & Agrinier P

199 H₂, CH₄ and NH₄ Formation Through Low Temperature Water-Rock Reactions in Ultramafic Rock
   Okland I, Thorseth IH & Pedersen RB

200 Organomineralization Drives Early Chimney Edification at the Hyperalkaline Hydrothermal Field of the Prony Bay (New Caledonia)
   Pisapia C, Gerard E, Gerard M & Menez B

201 Serpentinitization History of the Santa Elena Complex Peridotites, Costa Rica
   Schwarzenbach E & Gazel E

(Session 09i continues on Friday 30th PM on p.471)
10b: Isotope Geochemistry Across Environmental and Redox Gradients: Tracing Biological and Geochemical Processes

202 Sneaky Sulfate Signals: Isotope Fingerprints Reveal Cryptic Pathways  
Arnold GL & Brunner B

203 Multiple Isotopic Tracers to Monitor Remediation of Uranium Solution Mining  

204 Depositional Controls on Spatial Heterogeneity in Pyrite $\delta^{34}$S: Comparing the Modern and Ancient  
Fike D, Gao J & Aller R

205 A Combined Sedimentological and Biomarker Record Across the Neoproterozoic Bitter Springs Excursion  
Giorgioni M, Jarrett A, Kennedy M & Brocks J

206 Lateral Carbon Isotope Homogeneity in a Late Ordovician Epeiric Sea  
Metzger JQ & Fike D

207 Fe Isotope Fractionation during Reduction of Fe(III) to Fe(II)  
Rosenberg A, Hodierne C & John S

(Session 10b continues on Friday 30th AM on p.440)

10e: Computational/experimental Studies of Nanoscale Geochemical Phenomena

208 Study of Geogas Particles of Metal Deposit in Inner Mongolia Plateau, China  
Luo S, Cao J & Wu Z

209 Characterization of Hydrocarbon and Functionalized Silica Nanoparticle Adsorption on Mineral Surfaces Through Advanced First Principles Techniques  
Bevilaqua R, Rigo V & Miranda CR

210 Effects of pH and Ionic Strength on the Surface Charge Density of Self Assembled Monolayers (SAM)  
Olsson MHM, Andersson MP, Matthiesen J & Stipp SLS

211 Modeling of TiO$_2$ Nanoparticles Interactions with Water and Ions  
Kubicki J, Sung-Yup K, van Duin A, Ridley M, Machesky M, Hummer D & Kent P

212 Ash-Slag Wastes: The Problem of Recycling  
Tropnikov E & Kotova O

(Session 10e continues on Friday 30th PM on p.472)
12a: Unconventional Oil and Gas Resources: Exploration and Production Geochemistry

213 Application of Geochemistry in Shale Gas Exploration: A Case Study from Cambay Basin, Gujarat, India
Annapurna B, Rasheed MA, Zaheer Hasan S, Rao PH & Kumar B

214 A New Strategy for Identifying Shales with High Gas Retention Using Noble Gas, Nitrogen and Carbon
Basu S, Jones A & Verchovsky A

215 From Diagenesis to Metagenesis, Geochemical Changes of the Late Paleozoic Shale and Mudstone, Periphery of Songliao Basin
Chen S

216 The Structural Analysis of Dunhua Basin, China
Cheng S & Li Y

217 Research on Carbon Isotopic Evolution of Pyrolysis Methane and its Dynamics
Duan Y

218 Characteristic of Fluid Inclusion of the Xujiahe Formation in the Central Sichuan Basin, China
Gao X, Tao S & Zhao X

219 Geochemistry of Organic Matter from Lower Ordovician Dictyonema Shale (Podlasie Depression, NE Poland)
Grotek I, Klimuszko E, Wołkowicz S & Miecznik J

220 Mineral Compositions of Lower Silurian Longmaxi Formation, Sichuan Basin, China
Hu P, Shen J & Rao W

221 Hydrocarbon Geology Characteristics and Exploring Prospect of Ultradeep Layers Onshore China
Hu S, Zou C, Hou L & Zhu R

222 Biogenic or Abiogenic Hydrocarbon Source of Melekes Depression
Kamaleeva A & Galimov E

223 Composition of Hydrocarbon Source Rocks of the Hayrettin Formation (Denizli/Western Turkey): Provenance, Source Weathering and Tectonic Setting
Koralay DB

224 Hydrocarbon Generation and Accumulation in the Unconventional Petroleum System of the Silurian Shale, Lublin Basin, Poland
Lehne E, Schenk O, Peters K & Stankiewicz A

225 Experimental Study on Gas Generation Potential of Marine Source Rock with High Maturity
Li Y, Wang Z & Wang H
226 Control of Gypsum-Salt Rock on Source Rock and Reservoir in the Dongpu Depression of Bohai Gulf Basin, Eastern China
   Liu J & Jiang Y

227 The Heavy Oil Accumulation Characteristics and Exploration Potential of Orinoco Heavy Oil Belt in East Venezuela Basin
   Liu YM

228 Light Hydrocarbons and Dissolved Organic Carbon in Shallow Aquifers of the St. Lawrence Lowlands: Concentrations and δ¹³C Signatures
   Moritz A, Gélinas Y, Hélie J-F, Pinti D, Larocque M & Barretche D

229 Geochemical Characteristics of Different Type Reservoirs from the Sinian Dengying Formation in Southeastern Sichuan Basin, China
   Wang Y

230 Origin of Deep Gas and Oil Cracking Gas Potential in Tarim Basin, China
   Wang Z, Li Y & Zheng H

231 Prospective Shale Gas Zones in the Kimmeridgian and Tithonian Strata of Polish Lowlands
   Wieclaw D & Kotarba MJ

232 Pristane Isomerization Ratio: Novel Maturity Index for Highly Mature and Overmature Oils

233 Gas and Water Distributed Patterns and Influential Factors in the Tight Sandstone Gas Reservoirs of Upper Triassic Xujiahe Formation in Hechuan Area of Sichuan Basin, China
   Xu A, Wang Z & Bian C

234 PhenylNaphthalenes and Terphenyls in Mesozoic-Cenozoic Source Rocks of the Qaidam Basin, China
   Zhang M, Tuo J, Wu C & Chen R

235 Early Paleozoic Shale Gas Reservoir Microscopic Structure Characteristics in Southern Sichuan, China
   Yang Y & Zhang TS

236 The Characteristics of Fluid Inclusion from Ordovician Carbonate Reservoirs in Western Ordos Basin
   Zhang Y, Guo Y & Liu J

237 Reservoir Characteristics of Volcanic Rocks in the Northeast of Junggar Basin, China
   Zhao X, Zhang X, Gao X, Hou L & Wei Y

238 Tight Oil in the Continuous Sandbody in the a’er sag of the Erlian Basin, China
   Zhao X, Zhang L, Jin F, Wang Q & Luo Q
239 Natural Gas Genetic Types in the Northern Margin of the Qaidam Basin, NW China
   Zhou S, Gong S, Li J, Fu D & Zhang H
240 Research on the Super-Long Life of Deep Carbonate Oil Reservoir
   Zhu G, Zhang S & Su J
241 Discussion on the Characteristics and Influence Factors of Specific Surfaces in Argillaceous Source Rocks
   Zhu X, Cai J, Song G & Ji J
   (Session 12a continues on Friday 30th AM on p.441)

12b: Water-Rock-Petroleum Interactions

242 Karsting Mode and Its Features In YINGMAI-2 of North Tarim Basin, China
243 A Contrastive Study of Organic Matter Influences on the Smectite Illitization in Dongying Sag, China
   Li Y, Cai J, Zhang S & Ji J
244 Characterization of Diagenetically Altered Carbonate Reservoirs, Asmari Formation, Dezful Embayment, SW Iran
   Nazarian Samani P, Moradpour M & Moallemi A
245 New Frontiers in Natural and Chemical Tracers Monitoring for Reservoir Management
   Preud’homme H
246 Solid – Liquid Equilibria of K₂SO₄-KBr-H₂O System at 373 K
   Sang S, Li T & Hu Y
247 Evidence of Underground Water for the Forming Mechanism of High Sulfur Condensate Reservoirs, Example from the Tazhong Area
   Su J, Zhang S, Zhu G & Wang Y
248 Carbonate Reservoir Features and Its Main Control Factors In South Slope of Northern Tarim, China
249 Structure of Weathered Clastic Crust and Its Significance in Deep Petroleum Exploration
   Yang F, Hou L & Yang C
   (Session 12b continues on Friday 30th AM on p.442)

12d: Geochemistry of Nuclear Storage

250 Petrology of Column Experiments on the Interaction of Young Cement Leachate with Silicate Host Rock in a Geological Disposal Facility
   Field L, Milodowski A, Bateman K, Moyce E, Shaw S & Rochelle C
251 Effect of pH and Temperature on Zeolite Precipitation Rates and Mechanisms from Amorphous Precursors
Francisco PC & Sato T

252 Numerical Modeling of Iron-Corrosion and Interaction with Bentonite
Hansmeier C, Bracke G & Reichert B

253 Natural Analogue Study on Long Term Alteration of Bentonite (1) – Geochemistry and Clay Mineralogy
Ishii T, Satoh H, Yamaguchi K, Etoh J & Ohe T

254 XAFS Analysis of C-S-H Formed by Cemet-Betonite Interaction
Negishi K, Sakamoto H, Ishii T, Hayashi D, Fujii N, Owada H & Nitani H

255 Hydration, Structure and Mobility of Cs\(^+\) and Sr\(^{2+}\) in Montmorillonite and Muscovite Clay Minerals
Ngouana W, BF, Loganathan N & Kalinichev A

256 Alteration at Bentonite-Cement Interfaces – An Experimental Approach
Nickel C, Baldermann A, Dietzel M, Grathoff G & Warr LN

257 Characterisation of Cronstedtite Synthesized by Iron Clay Interaction in a Cooling Procedure
Pignatelli I, Mugnaioli E, Hybler J, Mosser-Ruck R & Cathelineau M

258 Natural Analogue Study on Long Term Alteration of Bentonite (2) – Geochemical Simulation
Yamaguchi K, Satoh H, Akahori K, Ishii T, Eto J & Ohe T

259 The Comparison Experiments of Acid Leaching and Bioleaching of Sand-Type Uranium Ore
Yipeng Z, Zhaoli S, Weijun S, Jinhui L & Yajie L

(Session 12d continues on Friday 30th PM on p.473)

12f: Targeting Microbial Communities Associated with Fossil Fuel Deposits for Energy Applications

260 Occurrence of Aerobic and Methanogenic Oil Biodegradation in a Water-Flooded Oil Field
Jiménez Garcia N, Cai M, Jun Y, Krüger M & Richnow HH

261 Algal Biofuels: A Sustainable Pathway to Mitigate Energy Demand
Rasheed MA, Zaheer Hasan S & Kumar B

262 Methane Production Potential of Subsurface Microbes in Pleistocene Sediments from a Water-Dissolved Natural Gas Field in Central Japan
Yoshioka H, Sakata S & Mochimaru H
263 Characterization of Indigenous Oil Field Microorganisms for Microbially Enhanced Oil Recovery (MEOR)
*Sitte J, Biegel E, Herold A, Alkan H & Krüger M*

264 Insights in the Methanogenic Degradation of BTEX and PAH in Different Geological Systems
*Straaten N, Jimenez-Garcia N, Gründger F, Richnow H-H, Lüders T & Krüger M*

265 Coal Petrography and Depositional Environments Relationship of the Tertiary Coals from Anatolides (Tokat Region – Turkey)
*Yalcin Erik N & Ay F*

(Session 12f continues on Friday 30th AM on p.443)

13c: Ocean Chemistry, Politics, Resources and Mining

266 Sulfide Sites in the Arctic Ocean: Jan Mayen and Loki’s Castle
*Cruz MIFS, Marques AFA, Dias ASCA, Pedersen RB, Relvas JMRS & Barriga FJAS*

267 Iron Isotopic Composition of Submarine Hydrogenetic, Diagenetic, and Hydrothermal Ferromanganese Deposits
*Yamaoka K, Borrok D, Usui A & Kawahata H*

(Session 13c continues on Friday 30th AM on p.444)

13d: Geochemistry and Mineralogy of Mine Wastes

268 Behaviour of Mineral Phases during Combustion of Coal Waste Dumps – Experimental Study
*Ciesielczuk J*

269 Insights into the Uranium Speciation in the Mill Tailings of the Cominak Mine at Akouta, Niger
*Déjeant A, Galoisy L, Calas G, Phrommavanh V & Descostes M*

270 Mineralogy and Geochemistry of Natural Porcelanites
*Dumitras D-G, Ion A, Milosan I, Marinea S & Costea C*

271 Characterization of the Effects of Grain Size to Mine Water Quality and Acid Rock Drainage (ARD) Production in Kinetic Testing

272 Distribution of Heavy Metals and Arsenic in Soils of an Abandoned Lead Mine (Central Portugal)
*Favas P, Pratas J, D’Souza R, Varun M & Paul M*

273 Crystallization of Schwertmannite from Na-Rich Solutions
*Jimenez A, Fernandez-Gonzalez MA & Prieto M*
274  New Insights into Environmental Characterization of Bauxite Residues (Red Mud) from Greece  

275  The Study of Hg Transformation in the Au Recovery Plant Tailing Area Using Thermal Release Technique with Atomic Absorption Detection  
_Gustaytis M, Shuvaeva O, Myagkaya I & Lazareva E_

276  Gold in Sulfide Wastes – Peat System  
_Myagkaya I, Lazareva E, Gustaytis M & Zhmodik S_

277  Acid Water Problem: Mining Districts from Tuscany (Central Italy)  

278  Metal Isotope Fractionation during Microbial Processes in the Critical Zone  
_Rabe K, Schippers A, Weyer S, Schuth S & Lazarov M_

279  Sub-Sea Tailings Deposition Leach Modeling  
_Rzepka P, Walder I, Bożęcki P & Rzepa G_

280  What is Hidden in a Slag Heap?  
_Tyszka R, Kierczak J, Pietranik A, Ettler V & Mihaljević M_

281  Heavy Metals Mobility: Surface Water Processes (The Copperbelt Case Study)  
_Zaludková K & Zeman J_

(Session 13d continues on Friday 30th PM on p.474)

13h: Lithium Deposits in Evaporites: Element Sources, Extraction and Deposition  
282  Production of the Sodium Sulphate from Acıgöl by Solution Mining Method, Denizli, Turkey  
_Uzasci Sultanyan S, Karabel SB, Kiran Yildirim D, Budakoglu M, Kumral M & Karaman M_

(Session 13h continues on Friday 30th AM on p.445)

14b: Reconstructing Terrestrial Hydrology: Proxies, Mechanisms, and Records  
283  Space-Time Kriging of Precipitation Reconstructed at 12km Grid Intervals from Tree-Ring Records  
_Biondi F_

284  Tephra Interference during Amorphous Silica Determination - A False Environmental Signal?  
_Clymans W, Van der Putten N, Wåstegard S, Björck S & Conley DJ_
285 Evaluation of Precipitation Isotope Variability Across the Tropical Pacific in SWING2 Simulations and Observations
Conroy J, Cobb K & Noone D

286 The Modern Hydrogeochemistry of Small Pools in Corchia Cave, Italy: Implications for Palaeoclimate Reconstruction

287 The $\delta^{18}O$ Signals of Precipitation and Drip Water: Two Hydrological Years’ Monitoring Results from Eight Caves in Monsoon Regions of China

288 Geochemical Investigations of Fjord Sediments Reveal Zr, Ni and Ca as NAO Proxies in Central Norway

289 Experimental Approach of Carbonate Isotopes Fractionation Related to Kinetic Effect during Travertine Growth
Fleurent L, Gibert-Brunet E & Barbecot F

290 Colloidal Metals in Stalagmites: Potential for Palaeohydrology
Hartland A, Fairchild IJ, Muller W & Dominguez-Villar D

291 Relationship between Modern Speleothem Formation and Surface Weather in an Asian Tropical Cave
Hasegawa W, Watanabe Y, Matsuoka H, Ohsawa S, Brahmantyo B, Maryunani KA & Tagami T

292 Abrupt Variations of Indian and East Asian Summer Monsoons during the Last Deglacial Stadial and Interstadial
Hong B, Hong Y, Uchida M, Shibata Y & Zhu Y

293 Altitudinal $\delta^{18}O$ Gradients from Chinese Stalagmites Provide Records of Holocene Humidity Variation

294 Mid to Late Holocene Decreasing Precipitation Trends as Reflected in $\delta^{18}O$ of Speleothems from Apuan Alps (Central Italy): Implications for Seasonality
Isola I, Regattieri E, Zanchettta G, Zhornyak L, Drysdale R & Hellstrom J

295 North Pacific SST Variability and Drought in Southwestern North America Since 854 AD

296 Substantial Changes in the Salinity and Paleo-Hydrology of the Late Quaternary Dead Sea Revealed in the ICDP Deep Drill
<table>
<thead>
<tr>
<th>Posters</th>
</tr>
</thead>
</table>
| 297 | The Geochemical History of the Dead Sea from Dissolved Chemical Species and Isotopes in Pore Waters  
**Levy EJ, Sivan O, Yechieli Y, Gavrieli I, Lazar B & Stein M** |
| 298 | Incorporation of Trace Metals into Soil Microcodium as a Novel Proxy for Paleo-Precipitation  
**Li T & Li G** |
| 299 | Reconstruction of Holocene Climate Variability Using Stalagmites from the Herbstlabyrinth, Central Germany  
**Mischel S, Scholz D, Spötter C & Joachum KP** |
| 300 | Millennial-Scale Wet and Dry Climate Changes during the Last Glacial Maximum in the South Siberia  
**Nara F, Watanabe T, Kakegawa T, Minoura K, Yamasaki S, Tsuchiya N, Nakamura T & Kawai T** |
| 301 | Annual Rainfall Proxy Records from Soda-Straw Stalactites  
**Paul B, Green H, Drysdale R, Woodhead J, Hergt J, Hellstrom J & Desmarchelier J** |
| 302 | Hydrogen Isotope Systematics of Leaf Wax N-Alkanes in Betula, Pinus, and Salix: Spatio-Temporal Investigation  
**Pedentchouk N & Eley Y** |
| 303 | Holocene Climate Variability from Rio Martino Cave (Western Alps, Northern Italy)  
| 304 | A Decadal Lipid Biomarker Paleohydrological Record during the Onset of the Younger Dryas from Northeastern Germany  
**Schütrumpf K, Brauer A, Neugebauer I, Rach O & Sachse D** |
| 305 | Tracking Environmental Changes over the Past 3000 Years in the Region of Ria do Mamanguá, Rio de Janeiro, Southeastern Brazil Using Molecular Organic Markers  
**Spera A, Taniguchi S, Leonel J & Bicego M** |
| 306 | Record of Historical Mercury Trends in Sediments from the Laguna del Plata, Córdoba, Argentina  
**Stupar Y, Schäfer J, Garcia MG, Schmidt S, Piovano E, Blanc G, Huneau F & Le Coustumer P** |
| 307 | Hydrological Change in the Turkana Basin Through the Termination of the African Humid Period: The Lacustrine Sr-Isotope Record  
| 308 | Geochemical Characteristics of Sediment of Pearl River Estuary and its Palaeoenvironmental Evolution  
**Wang S-S, Cao Z-M & Lan D-Z** |
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>309</td>
<td>Reconstruction of Humid Phases in the Caribbean during the Late Pleistocene</td>
<td>Winterhalder S, Scholz D, Mangini A, Spötl C, Miller TE, Winter A, Jochum KP &amp; Pajón JM</td>
</tr>
<tr>
<td>310</td>
<td>Calcitic Corals from the Northern Red Sea as Paleohydrological Monitors</td>
<td>Yehudai M, Lazar B, Kohn N, Shaked Y, Agnon A &amp; Stein M</td>
</tr>
<tr>
<td></td>
<td>(Session 14b continues on Friday 30th AM on p.446)</td>
<td></td>
</tr>
<tr>
<td>311</td>
<td>Seasonal Variations of Chemical Weathering Rates and CO₂ Consumption in Yangtze River Basin</td>
<td>Li S, Chen Y, Chen J &amp; Ji J</td>
</tr>
<tr>
<td>312</td>
<td>Pleistocene Weathering and Climate Evolution in Southern Italy: Data from Intermontane Basins</td>
<td>Di Leo P, Giano SI, Gioia D, Pulice I &amp; Schiattarella M</td>
</tr>
<tr>
<td>313</td>
<td>Cosmogenic Nuclides, River Geochemistry, and Lanforms Reconstruction Methods to Estimate Erosion Rates in Reunion Island</td>
<td>Gayer E, Louvat P, Michon L, Etzol C &amp; Kurz M</td>
</tr>
<tr>
<td>314</td>
<td>Delayed Response in Sedimentary Discharge from the Himalaya to the Ocean at Milankovitch Periods</td>
<td>Gourlan AT, Voisin C, Chavel C &amp; Braun J</td>
</tr>
<tr>
<td>316</td>
<td>Measurement of Soil Loss Affected by Rainfall and Slopes with Different Rocks and Slopes from Andong, Korea</td>
<td>Jeong G-C, Lee J-J, Nam K-H &amp; Choo C-O</td>
</tr>
<tr>
<td>317</td>
<td>Carbon and Sr Fluxes of River Waters from a Karstic and a Granitic Terrain in the Yangtze River System</td>
<td>Ji H &amp; Jiang Y</td>
</tr>
<tr>
<td>318</td>
<td>A Case Study for Soil Erosion in the Han River Buffer Zone, South Chuncheon, Korea</td>
<td>Lee D-H, Chung SL, Choi WY &amp; Chae SH</td>
</tr>
<tr>
<td>320</td>
<td>Chemical Weathering and Regolith Development over Rajmahal Basalt and Chotanagpur Gneiss: A Comparative Study</td>
<td>Kisku PC, Pattanaik JK, Dalai TK &amp; Balakrishnan S</td>
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<tr>
<td>321</td>
<td>Variations in Modes and Rates of Long-Term Denudation in Carbonate Terrains Under Mediterranean to Hyper-Arid Climates</td>
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<tr>
<td><strong>Ryb U, Matmon A, Erel Y, Haviv I &amp; Benedetti L</strong></td>
<td></td>
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<tr>
<td>322</td>
<td>Mineralogical and Geochemical Variations in Lower Godavari River Sediments, Peninsular India: Implications to Source Rock Weathering</td>
<td></td>
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<tr>
<td><strong>Vuba S, Farnaaz S, Sagar N &amp; Ahmad M</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>323</td>
<td>Chemical Weathering, Atmospheric CO(_2) Consumption, and the Controlling Factors of a Small Silicate Watershed in Subtropical Zone</td>
<td></td>
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<tr>
<td><strong>Wu W, Zheng H &amp; Luo C</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Session 16g continues on Friday 30th AM on p.448)

### 16i: Biotic Enhancement of Weathering

| 324 | Atmospheric CO\(_2\) Starvation of Trees Arrests Mycorrhizal-Driven Silicate Weathering  |
| **Beerling D, Quirk J, Taylor L, Banwart S & Leake J** |
| 325 | The Rate of Iron Compounds Precipitation from AMD Waters in the Łęknica Region (the Muskau Arch, Western Poland)  |
| **Bożęcki P & Rzepa G** |
| 326 | Carbon Allocation to Ectomycorrhizal Fungi and Bacteria Colonising Granite  |
| **Fahad Z, Finlay R, Mahmood S & Rosling A** |
| 327 | Ectomycorrhiza-Bacterial Interactions in Weathering  |
| **Marupakula S, Mahmood S & Finlay R** |
| 328 | Estimating Uncertainties in Base Cation Weathering Rates According to Mass Balance  |
| **Simonsson M, Bergholm J, Olsson B & Öborn I** |
| 329 | Modelling Carbon Cycle and Major Cations Weathering Fluxes in a Young Temperate Forest  |
| **Violette A, Carnol M, Aubinet M, Godderis Y, Erpicum M, Heinesch B & Français L** |
| 330 | Bioweathering of Chrysotile Asbestos  |
| **Washington K, Willenbring J & Casper B** |

(Session 16i continues on Friday 30th PM on p.477)

### 16j: Pedogenetic, Geomorphic Processes and Landscape Evolution with an Emphasis on Potential Input of Relative and Absolute Dating

| 331 | Geotechnical Assessment of the Rock Masses in Düzyurt Area (Trabzon, NE Turkey)  |
| **Ersoy H & Sunnetci MO** |
332 Origin of Secondary REE Minerals in Grusified Karkonosze Granites, SW Poland
Kajdas B & Michalik M

333 Insight into Biotite Weathering Rate Using U-Series Isotopes
Rhhs S, Gontier A, Turpault M-P, Lemarchand D, Voinot A & Chabaux F

334 Chemical and Isotopic Composition of Soil Solutions from Cambisols in Styria (Austria) – Seasonality, Evaporation and Interstitial Distribution
Schön W, Dietzel M & Leis A

335 Diagenesis, Deformation Mechanisms and Architecture of the Fault Zones in the Extensional Neogene Basins of the Northeast Iberian Peninsula
Travé A, Baqués V, Cantarero I, Playà E, Alias G, Moragas M, Martínez C, Pacheco F, Zafra C & Plata A

(Session 16j continues on Friday 30th PM on p.478)

18b: Climate Impacts on SOM Storage and Decomposition

336 Modelling the Impact of C4 Biofuel Crops (Miscanthus spp) on Soil Carbon Storage in Different Climates
Agostini F, Roncucci N & Richter G

337 Vulnerability of Soil Carbon Release with Increasing Temperature in Tropical Montane Forests
Gerschlauer F, Butterbach-Bahl K & Kiese R

338 Invited: Biogeochemical Mechanisms Underlying the Manganese Dependence of Litter Decomposition

339 Indispensable Amino Acids Become Dispensable via Bacterial Symbiosis in a Generalist Soil Detritivore
Larsen T, O’Brien D, Andersen N & Ventura M

340 Impact of Climate Change on Soil Microorganisms and Carbon Cycling in an Arable Ecosystem
Poll C, Marhan S & Kandeler E

341 The Vulnerability of Subsurface Soil Organic Carbon to in situ Warming and Altered Root Inputs

(Session 18b continues on Friday 30th PM on p.479)
| Posters |
|-----------------|---------------------------------------------------|
| 342  | Copper Contamination of Lake Sediments in the Vicinity of Konin (Poland) |
| **Bojakowska I. Wołkowicz S & Krasuska J** |
| 343  | Geochemical Assessment in Environmental Assessment of Human Settlements |
| **Dai D. Rao Y & Cheng S** |
| 344  | Enrichment of Pb, Se, As, U and Cs in Commercial Cosmetic Clays |
| **Giouri K. Papadopoulos A, Bourliva A, Tzamos E, Papadopoulou L, Ntouanolou K & Filippidis A** |
| 345  | Hydrogeochemical Characteristics in the Basin Area of the "Rovni" Accumulation – Influence of the Natural Radionuclides |
| **Gordanić V. Vidović M, Spasić-Jokić V, Jovanović D & Seke A** |
| 346  | The Characteristics of Polycyclic Aromatic Hydrocarbons (PAHs) in the Drainage Basin of the Liao River, Northeast China |
| **Hu J, Zhang Y, Liu B, Li S & Guan J** |
| 347  | Geochemistry of Uranium and Thorium in Soils on the Ditrău Alkaline Massif, Eastern Carpathians, Romania |
| **Ion A** |
| 348  | Mineralogical Characterization of Tremolite Asbestos-Containing Soils |
| **Kim J, Park J, Song S, Lim H & Roh Y** |
| 349  | Rare Earth Elements in Lake Sediments in Poland |
| **Lech D. Bojakowska I & Karmasz D** |
| 350  | Mineralogical Characterization of Chrysotile-Containing Soils |
| **Lee C, Park J, Song S, Lim H & Roh Y** |
| 351  | Evaporation as the Transport Mechanism of Metals in Arid Regions |
| **Lima AT, Safar Z & Loch JPG** |
| 352  | Resilience Biomimicry Model for Natural Disturbance Scenarios |
| **Nunes L & Narog M** |
| 353  | Environmental Degradation and Health Risks in Pearl River Delta, China |
| **Qi J** |
| 354  | Characterization of Gas-Phase Air Pollutants and their Public Health Impact |
| **Roberts-Semple D** |
| 355  | Arsenic Contamination in Pond Sediment of Central India |
| **Sahu BL, Patel KS, Wysocka I & Jaron I** |
Soil Mineralogy, Geochemistry and Trace Element Mobility in the Bitumen Environment of Ondo State, Southwestern Nigeria
Tomori W, Yanful E, Flemming R, Amoo I, Aiyesanmi F & Adekoya JA

Mapping Lead Contamination of Soil Due to Mining in Peru
Kragie SX & van Geen A

Hydrogeochemical Characteristics of Water Source in the Area of Lazarevo Village (From the Aspect of Balneology)
Vidović M, Gordanić V, Spasić-Jokić V, Ćirić A & Seke A

Study on Sulfur Isotopic Composition of Acid Rain in Nanchang City, China

Chemical Speciation of Heavy Metal Elements in Indoor Dust by XAFS Spectroscopy
Yamada H, Qin H & Takahashi Y

Mineralogical Characterization of Thermal Treated Chrysotile and Tremolite Asbestos in Soils
Yoon S, Jeong H, Moon W & Roh Y

(Session 18f continues on Friday 30th PM on p.480)

18g: Geochemical Mechanisms of Mineral-Based Amendments for Soil and Sediment Remediation

Sorption of Pb(II) from Aqueous Solution by Greek Attapulgite Clay
Argyraki A, Messini P & Zotiadis V

Surface Complexation on Birnessite Controls Pb Distribution in Highly Contaminated Soil and Karst Groundwater
Bacon CGD & Sherman DM

Immobilisation of PTEs by Water Treatment Residual: A Potential Amendment for Contaminated Land
Finlay N, Robertson S & Johnson K

The Use of Fe-Rich Compost for the Amelioration of As-Contaminated Soils
Freeze P, Harsh J, Shi Z, Abi-Ghanem R & Okubara P

Evaluating the Efficiency of a Synthetic Amorphous Manganese Oxide for Chemical Stabilization of Cu in a Contaminated Soil
Komarek M, Trakal L, Michalkova Z & Della Puppa L

Cadmium Sorption by Green Rust
Nedel S, Dalby KN, Dideriksen K, Christiansen BC & Stipp SLS
368 Chemical Stabilization of Soil Thallium Using Mn(III, IV) Oxide Birnessite (δ-MnO$_2$)

Vanek A, Komarek M & Mihaljevic M

(Session 18g continues on Friday 30th AM on p.449)

18l: Environmental Application of Engineered Nanomaterials: Benefits and Risks

369 Combining Life Cycle (LCA) and Risk (RA) Assessments of TiO$_2$ Nanomaterials: Use of a Bayesian Network

Adam V, Quaranta G & Loyaux Lowniczak S

370 Transport of Carbon Colloid Supported Nano Zero-Valent Iron

Busch J & Oswald S

371 Synthesis, Toxicity and Reactivity of Several Types of NZVI

Chen J

372 Green Rust Sulphate – Making Space for Interlayer Cations

Christiansen BC, Katz A, Bovet N, Sørensen HO, Andersson MP, Nedel S, Frandsen C, Dideriksen K & Stipp SLS

373 Stability Behaviour of Silver Nanoparticles in Different Aqueous Media

Metreveli G & Schaumann GE

374 Immobilization of Boron in Groundwaters by Combination of MgO with Woodchips

Sasaki K, Qiu X, Takamori H, Moriyama S, Ideta K & Miyawaki J

375 Reactivity of Nanoscale Zero-Valent Iron Particles Used for in situ Groundwater Remediation

Schmid D, Laumann S, Micic Batka V & Hofmann T

376 Organic and Inorganic Contaminant Remediation by Biogenic Nanopalladium

Suja E, Nancharaiah YV, Venugopalan VP & Francis AJ

(Session 18l continues on Friday 30th AM on p.450)


377 Sulfate-Oxygen Isotope Insight into Anaerobic Methane Oxidation in Estuarine Sediments

Antler G, Turchyn AV, Davies A, Adler M, Rennie V, Herut B & Sivan O
378 Sulfur and Iron Speciation in Warm Deep Sediments Affected by Dry Deposition of Iron
Blonder B & Kamyszny A

379 Greenhouse Gas (CO$_2$, N$_2$O, CH$_4$) Emissions from Llobregat (Barcelona) Riverbed Sediment: Effects of Soil Moisture and C, N, Fe Substrates
Dutta T, Rubol S, Vall SA & Tirado J

380 High Rates of Carbon Oxidation Through Dissimilatory Manganese Reduction in Sediment of Ulleung Basin in the East Sea

381 Cyanide and Thiocyanate Biogeochemistry in Non-Polluted Natural Aquatic Systems
Kamyszny A, Oduro H, Mansaray Z & Farquhar J

382 Rare Earth Elements in the Sediments of Lake Baikal

383 Microbial Mobilization of Arsenic for Bioremediation of Contaminated Soils
Rajpert L, Drewniak Ł, Skłodowska A & Lenz M

384 Anammox in an Ammonium-Impacted Groundwater Aquifer
Uldahl A, Thamdrup B & Jakobsen R

385 The Transformation and Co-evolution of Archaea with its Environment Assessed by Energy Quantum
Xiao X, Zhang Y, Wang F, He Y & Xu J

(Session 19f continues on Friday 30th AM on p.451)

20a: Tuning the Torch with Innovative Applications in Multicollector Inductively Coupled Plasma Mass Spectrometry: A Tribute to Francis Albarède

386 Investigating Instrumental Mass Bias in MC-ICP-MS Using Isotope Ratio Plasma Profiles
Barling J, Belshaw N & Halliday A

387 Lu-Hf and Sm-Nd Systematics of the First Solids in the Solar System
Bouvier A & Boyet M

388 Metal Isotopic Distributions in Mycorrhizal Trees: Weathering Manifestations and within-Plant Fractionations
Bryce J, Hobbie E, Bullen T, Blichert-Toft J, Colpaert J, Hoff C, Meana-Prado MF, Telouk P & Vadeboncoeur M
401  Clumped Isotope Thermometry of Neoproterozoic Cap Carbonates from Northwest and Southeast China  
Gallagher T, Sheldon N & Xiao S

402  Clumped Isotope Geochemistry of Travertine Carbonates in the 22-95°C Temperature Range  

403  Calibration of the Δ_{47} (Clumped Isotope) Thermometer for Biogenic and Inorganic Carbonate Using the MIRA IRMS  
Kirk R, Dennis P, Farkas J &Marca A

404  Constraints for the Clumped Isotope Application in Diagenetic Environments Involving High Salt Concentrations  
Kluge T, John C & Davis S

405  Application of Clumped Isotopes to the Dolomite Problem  
Murray S, Swart P & Arienzo M

406  Mollusc Clumped Isotope Thermometry Using a New Approach  
Naidu PK & Ghosh P

407  Evaluation of Kinetic Effect on Clumped Isotope Fractionation (Δ_{47}) during Inorganic Calcite Precipitation  
Tang J, Rosenheim B, Dietzel M & Fernandez A

408  Novel Method to Reconstruct Pressure: A Combined Clumped Isotope and Fluid Inclusion Technique  
Vandeginste V & John C

409  CO₂ Clumped Isotopologue Thermometry to Study Natural and Synthetic Carbonates  
Jabeen I, Webb E, Banerjee N & Ali A

(Session 20c continues on Friday 30th AM on p.453)

20h: Analytical Frontiers in High Spatially Resolved Analysis Using Mass Spectrometric and Related Techniques

410  Determination of REE in Carbonaceous Geological Samples by Inductively Coupled Plasma Mass Spectrometry  
Anoshkina Y

411  Performance and Gas-Flow Effects of an Active 2-Volume Sampling Chamber Using a 213 nm Laser Ablation System for Inductively Coupled Plasma-Mass Spectrometry  
Asogan D, Green D, Shuttleworth S & Roy J

412  Spatially Resolved Fully Simultaneous Determination of Large Numbers of Isotope Concentrations and Isotope Ratios by LA-Mh-ICP-MS  
Barger W, Ardelt D, Reijnen M & Primm O
| 413 | A New Approach for LA-ICP-MS Using a High Sensitive Mass Spectrometer  
*Chennitzer R & Hamester M*  |
| 414 | Element Quantification in Chondritic Components by LA-ICP-MS  
*Funk C, Wombacher F, Glaus R, Tabersky D, Koch J & Günther D*  |
| 415 | Li Isotopes in Zircon: Effects of Li Substitution and Kinetic Fractionation  
*Gao Y-Y, Li X-H, Griffin W, O’Reilly S & Pearson N*  |
| 416 | Nano-Particulate Pressed Powder Tablets for LA-ICP-MS  
*Müller S & Garbe-Schönberg D*  |
| 417 | Characterization of Complex Fe-Mn Phosphates by LA-ICP-MS Methods  
*García de Madinabeitia S, Roda-Robles E, Pesquera A, Sánchez ME & Gil Ibarguchi JI*  |
| 418 | Vaporization Studies on Laser-Generated Aerosols as Used in LA-ICPMS  
*Günther D, Flamigni L, Koch J, Borovinskays O, Hattendorf B & Tanner M*  |
| 419 | Compacted Nanoparticles for Quantification in LA-ICPMS  
*Tabersky D, Lüchinger N, Halim S, Rossier M & Günther D*  |
| 420 | *In situ* Lithium Isotope Measurements for Spodumene Using LA-MC-ICP-MS  
*Hou K*  |
| 421 | Assessment of Accuracy and Precision for IRMS by Standard Material  
*Hwang J-Y, Kim B-K, Lee W-S, Kim M-S & Han J-S*  |
| 422 | Multi-Element 2D Analysis of Drilling Cores Containing Mining Residues Using LIBS and Chemometric Analysis  
*Meima J*  |
| 423 | A Novel 2D LA-ICP-MS Data Analysis and Visualization Solution  
*Petrus J & Kamber B*  |
| 424 | Determination of Trace Elements in Iron Formations by LA-ICP-MS  
*Sampaio G, De Abreu A, Nalini Jr H & Lana C*  |
| 425 | Ion Microprobe U-Pb Dating and Sr Isotope Measurement of a Protoconodont  
*Sano Y, Toyoshima K, Shirai K, Takahata N, Sato T & Komiya T*  |
| 426 | The Potential of Using a Sector Field ICP-MS for Analysis of Fluid Inclusions by Laser Ablation ICP-MS  
*Wälle M & Heinrich CA*  |
20i: Understanding Microbes: Frontiers in Analytical Geomicrobiology

From Death of a Glacier to the Beginning of Life in Soil: A Case Study in the Swiss Alps
Ascher J, Mavris C, Fornasier F, Ceccherini M, Pietramellara G & Egli M

20k: Laser Gas Analyzers and their Application In The Geochemical Sciences

Advances in Instrumentation Based on Cavity Enhanced Laser Absorption Spectroscopy
Baer D, Gupta M, Dong F, Berman E, Owano T & Provencal R

Ultrasensitive Portable Multiple Laser Continuous-Wave Cavity-Ringdown Spectrometer for CH₄ Isotope Analysis
Chen Y, Lehmann K, Mahaffy P, Holmes V, Morey P & Onstott T

Laser Spectroscopic in situ Measurements of D/H in Water Vapor Onboard a Passenger Aircraft
Dyroff C, Christner E & Sanati S

Isotopic Analysis of Ice Core Carbon Dioxide Inclusions by Means of Quantum Cascade Laser Cavity Enhanced Absorption Spectroscopy

Water H₂¹⁸O Isotope Studies in the AIDA Cloud Simulation Chamber
Kühnreich B, Landsberg J, Habig J, Wagner S, Moyer EJ, Saathoff H, Ebert V & Kerstel E

Quantifying the Relative Contribution of Natural Gas Fugitive Emissions to Total Methane Emissions in Colorado, Utah, and Texas Using Mobile Isotopic ¹³CH₄ Analysis
| 436 | Cavity Ring-Down Spectroscopy for the High-Precision Analysis of the Triple Oxygen Isotope Composition of Water and Water Vapor  
  
**Steig E, Gkinis V, Schauer A, Hoffnagle J, Tan S & Schoenemann S** |

| 437 | Robust Calibration Systems Based on Syringe Pumps for Water Vapor Isotopologue Measurements  
  
**Stutz E, Landsberg J, Sarkozy L, Moyer E & Kerstel E** |

| 438 | Using Laser-Based Technology to Quantify Carbon-13 Ratios and Fugitive Emission CH\textsubscript{4} Flux Rates Quickly and Easily  
  
**Tsai T, Rella C & Crosson E** |

(Session 20k continues on Friday 30th PM on p.485)

---

21c: Transition Metals and Strongly Correlated Systems

| 439 | Computational Science in Nuclear Waste Management: \textit{ab Initio} Investigation of F-Elements Bearing Monazite  
  
**Blanca Romero A, Kowalski PM & Beridze G** |

(Session 21c continues on Friday 30th PM on p.486)

---

21d: Transport Processes in the Earth’s Interior from Experiment and Simulation

| 440 | Deformation Mechanisms of Olivine Compressed at 300 MPa and 800-1100°C  
  
**Cordier P, Demouchy S, Mussi A & Tommasi A** |

(Session 21d continues on Friday 30th PM on p.487)

---

21f: Theoretical and Experimental Approaches to Geochemical Reactions, Including Solvation, Complexation, Adsorption, and Redox

| 441 | Systematic Understanding of Adsorption of Oxyanions of Cr, Mo, and W at Solid/Water Interfaces  
  
**Ariga D, Tanaka M, Kashiwabara T & Takahashi Y** |

| 442 | Measuring Mineral Dissolution Kinetics Using an Automated Flow-Through Module  
  
**De Baere B, Mayer U & Francois R** |

| 443 | Quantum-Mechanical Calculations on Uranium (Co)adsorption and Reduction on Iron and Aluminum (Oxyhydr)oxides  
  
**Fernando S & Becker U** |

| 444 | Redox Behavior of Uranium Incorporated into Hematite  
  
**Hood D, Wen Y & Shuller-Nickles L** |

<p>| 445 | PH-Eh Diagram of Ore-Forming Elements from First Principles Molecular Dynamics Simulations |</p>
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>22c</td>
<td>Ion Exchange and Dissolution-Precipitation in a Zeolitic System</td>
<td>Dunkel K &amp; Putnis A</td>
</tr>
<tr>
<td></td>
<td>Early Diagenetic Alteration of Zeolites in Subseafloor Sediment of the South Pacific Gyre</td>
<td>Hoppie B &amp; Witt A</td>
</tr>
<tr>
<td></td>
<td>Cathodoluminescence Characterization of Norsethite BaMg(CO$_3$)$_2$</td>
<td>Kusano N, Nishido H, Makio M &amp; Ninagawa K</td>
</tr>
<tr>
<td></td>
<td>Cathodoluminescence of Baytocalcite CaBa(CO$_3$)$_2$</td>
<td>Makio M, Nishido H, Kusano N &amp; Ninagawa K</td>
</tr>
<tr>
<td></td>
<td>Temperature Effects on Cathodoluminescence of Calcite</td>
<td>Nishido H, Nishizawa S &amp; Kusano N</td>
</tr>
<tr>
<td></td>
<td>Termination and Hydration of Forsterite (010) and Diopside (010) Surfaces</td>
<td>Park C &amp; Yan H</td>
</tr>
<tr>
<td></td>
<td>Uptake of Pb$^{2+}$(aq) by Baryte-Celestine Solid-Solution Crystals</td>
<td>Rodríguez Galán RM, Carneiro J &amp; Prieto M</td>
</tr>
<tr>
<td></td>
<td>Micromorphology of Diamond Resorption at 100 kPa: The Role of Metal Ions</td>
<td>Skvortsova V, Fedortchouk Y &amp; Shiryaev A</td>
</tr>
</tbody>
</table>
460  Cathodoluminescence of Terrestrial and Extraterrestrial Halite

Yoshida E, Nishido H, Nimura N & Ninagawa K

(Session 22c continues on Friday 30th AM on p.456)

22g: GEOLIFE- Geomaterials for Environment, Technology and Human Activities

461  Flux Particle Size and Composition Effects on the Evolution of Sanitary-Ware Vitreous Body

Bernasconi A, Marinoni N, Pavese A, Diella V, Francescon F & Young K

462  Hydrothermal Alteration of the Products of Transformation of Cement-Asbestos

Catalano M, Bloise A, Belluso E, Cannata CB, Barrese E, De Rosa R & Gualtieri A

463  Oldhamite CaS and Potentially New Mineral CaCu$_2$S$_2$ from Pyrometamorphic Rock of the Hatrurim Formation

Galuskin E, Galuskina I, Vapnik Y, Murashko M, Prusik K & Dzierżanowski P

464  Potential New Minerals Ba$_3$(VO$_4$)$_2$ and Hexagonal BaAl$_2$Si$_2$O$_8$ from Rocks of the Hatrurim Formation

Galuskina I, Vapnik Y, Prusik K, Dzierżanowski P, Murashko M & Galuskin E

465  Natural BaCa$_6$[(SiO$_4$)(PO$_4$)](PO$_4$)$_2$F with a New Modular Structure Type


466  Veined Quartz of the Urals: Structure, Mineralogy

Igumentseva M & Anfilogov V

467  Synthesis and Characterization of K-Zeolites by the Use of a Diatomite

Pace C, Novembre D & Gimeno D

468  The Microstructural Study of Clay Minerals – Polymer Matrix Nanocomposites

Vasiliev A, Orekhov A, Orekhov A, Chvalun S & Cherdynceva S

469  Thermal Ageing of Sepiolite/Polyamide66 Nanocomposites

Fernández-Barranco C, Yebra-Rodríguez Á, La Rubia-García MD, Rodríguez-Navarro AB & Jiménez-Millán J
23c: Urban Biogeochemistry

470 Nonlinear Chlorinated Solvent Sorption and its Impact on Remediation in Surficial Sedimentary Aquifers

471 Gadolinium Anomalies in Atibaia River Water (SP, Brazil)
*Campos F & Enzweiler J*

472 Exploring a 60-Year Record of Mn Deposition by Comparing Atmospheric Dispersion Models to Soil Chemistry Profiles in Ohio (USA)
*Carter M & Brantley S*

473 Hydrochemical and Stable Isotopic Assessment of Groundwater Quality in the West Lake Watershed in China
*Jin Z, Li F & Chen L*

474 Treatment of Fluoride Containing Acid Wastewater Using Red Mud
*Lee JH, Kim JG, Jeon CM & Nam IH*

475 Shells of *Corbicula fluminea* Mussels and the Bioavailability of Anthropogenic Rare Earth Elements in River Water
*Merschel G & Bau M*

476 Comparing MSW Landfill Sites of Ottawa (Capital of Canada) and Mashhad (the 2nd Biggest City of Iran)
*Mohammadzadeh H*

477 A Modeling Framework to Predict Changes in Soil Chemistry and Agricultural Return Flow in Seawater Farming of Halophytes
*Ning Q, Wan A-M & Ahmad F*

478 Role of Small Urban Reservoirs in Regulating Watershed Quality
*Rademacher L & Faul K*

479 Behaviour of Rare Earth Elements (REE) at Funil Reservoir, Southeastern Brazil
*Santos-Neves J, Ferreira M, Vidal M, Rocha A & Patchineelam S*

480 Important Factors for Geochemical Research of Stream Sediments Near Storm Water Outflow Sites
*Taraškevičius R, Zinkuté R & Stankevičius Ž*

(Session 23c continues on Friday 30th AM on p.457)
<table>
<thead>
<tr>
<th>Posters</th>
</tr>
</thead>
<tbody>
<tr>
<td>23g: Noble Gases and Other Transient Tracers in Terrestrial Waters and Gases: Bridging Established Science with Emerging Applications</td>
</tr>
<tr>
<td>Dissolved Gases and Radioactivity in Spring Waters of Southeast Brazil</td>
</tr>
<tr>
<td>Noble Gases as Physiological Tracers for Gas Dynamics in Human Blood</td>
</tr>
<tr>
<td>First Tritium-Helium Dating Results of Groundwater in Central Taiwan</td>
</tr>
<tr>
<td>TRACE: A Multi-Tracer Analysis of Shallow Aquifers to Improve Geothermal Potential Assessment</td>
</tr>
<tr>
<td>Precursory Soil Radon Anomalies Related to the Major Earthquakes in Taiwan</td>
</tr>
<tr>
<td>Oxygen Transfer Across the Capillary Fringe: Impact of Transient Flow Conditions and Coarse-Material Lenses</td>
</tr>
<tr>
<td>PANGA: A New Tool for the Evaluation of Noble Gas Data</td>
</tr>
<tr>
<td>Delineation of Recharge Patterns and Nitrate Contamination Using Stable Isotopes of Water, $^3$H-$^3$He, and CFCs in an Agricultural Basin</td>
</tr>
<tr>
<td>Recent Advances of Noble Gas Geochemistry in Aquatic Systems</td>
</tr>
<tr>
<td>Use of Uranium, Thorium and Carbon Isotopes for Thermal Groundwater and Travertine Dating</td>
</tr>
<tr>
<td>Hydrogeochemical Modeling and Noble Gas Analysis of Spring Waters from Poços de Caldas, MG-Brazil</td>
</tr>
<tr>
<td>Rn in Water Detection by LSC – Sample Volume Optimization</td>
</tr>
</tbody>
</table>

---

**481** | Bonotto DM |
---

**482** | Brennwald M, Lundby C, Tomonaga Y & Kipfer R |
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**483** | Chen A-T, Yang TF, Liu T-K, Sano Y, Takahata N, Chen K-Y & Wang Y |
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**484** | Freundt F, Al Najem S, Aeschbach-Hertig W, Isenbeck-Schroeter M, Kober B, Kraml M, Grobe R & Wenke A |
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**486** | Haberer CM, Rolle M, Cirpka OA & Gratwohl P |
---

**487** | Jung M & Aeschbach-Hertig W |
---

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**489** | Brennwald M, Maden C, Vogel N, Tomonaga Y & Kipfer R |
---

**490** | Malov A, Bolotov I, Zykov S, Druzhinin S & Pokrovsky O |
---

---

**492** | Schubert M & Kopitz J |
493 LabData-Gc: A Database Sub-System for Post-Processing and Quality Control of CFC and SF\textsubscript{6} Measurements
**Suckow A**

494 Recent Groundwater Circulation of U at Forsmark, Eastern Sweden
**Tullborg E-L, Suksi J, Sandström B, MacKenzie AB, Smellie J, Krall L & Puigdomenech I**

495 Noble Gas Temperature Determination in Fluid Inclusions – Method, Tests, Future Applications
**Vogel N, Brennwald M, Meckler N, Fleitmann D, Maden C, Wieler R & Kipfer R**

496 Natural Radionuclides as Tracers in Surface Water and Groundwater Interaction
**Yoon YY, Cho SY, Lee KY & Kim YC**

(Session 23g continues on Friday 30th AM on p.458)

24a: Continental and Regional Scale Geochemical Mapping

497 GIS Mapping of Geological Features of the Baikal Mountain Region Based on Integrated Geochemical Indicators
**Budyak A & Parshin A**

498 Geochemical Atlas of Italian Soils
**Cicchella D, Albanese S, Dinelli E, Giaccio L, Lima A, Valera P & De Vivo B**

499 The Origin of Geochemical Anomalies in Top Soils of Eastern-Central Peloritani Mountains (Sicily, Italy)
**Cosenza A, Ayuso R, Foley N, Albanese S, Lima A, Messina A & De Vivo B**

500 Influence of Geological Setting on Geochemical Baselines of Heavy/Trace Elements in Soils of Medak District, Andhra Pradesh, India
**Dantu S**

501 GEMAS Results at a Regional Scale: The Alps

502 Geochemical Mapping in Urban Area of an Old Mercury Mining Town (Idrija, Slovenia)
**Bavec Š, Gosar M, Biester H & Grčman H**

503 Mapping the Natural Radioactivity of Elba Island by Means of Geostatistical Interpolation of Airborne Gamma-Ray Data
<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>504</td>
<td>Tellus: Regional-Scale Baseline Geochemical Mapping of Soil, Stream Sediment and Stream Water for the Island of Ireland</td>
<td>Knights K &amp; Scanlon R</td>
</tr>
<tr>
<td>505</td>
<td>Regional Geochemical Mapping at High Density Sampling: Various Criteria in Representation of Romagna Apennines, Northern Italy</td>
<td>Lancianese V &amp; Dinelli E</td>
</tr>
<tr>
<td>506</td>
<td>Geochemical Map of $\frac{{^{87}Sr}}{{^{86}Sr}}$ Ratios Using Stream Sediments is Useful for Detection of Food-Producing Areas and Human Migration?</td>
<td>Luo X, Wen M &amp; Ouyang F</td>
</tr>
<tr>
<td>507</td>
<td>The Spatial Distribution of Chalcophile Elements in Terrestrial and Marine Areas of Japan</td>
<td>Ohta A &amp; Imai N</td>
</tr>
<tr>
<td>509</td>
<td>Geochemistry and Petrogenesis of Volcanic Rocks in the Lahrud Region, of the Ardebil Province, Iran (Stones Used, the Foundation of Buildings the Safavid Period Meshkinshahr and Ardebil)</td>
<td>Shahbazi Shiran H</td>
</tr>
<tr>
<td>510</td>
<td>Geochemistry of Urban Soils in Karlstad, Central Sweden – Preliminary Results</td>
<td>Uhlbäck J, Ladenberger A, Andersson M &amp; Sadeghi M</td>
</tr>
<tr>
<td>511</td>
<td>Evaluation of the Pollution in the Agricultural Grounds Irrigated by Waters “Case of the High Valley of Oued Bounamoussa” (Algerian Northeast)</td>
<td>Zaouii L &amp; Benslama M</td>
</tr>
</tbody>
</table>

(Session 24a continues on Friday 30th AM on p.459)

**24c: High Temperature Geochemistry**

<table>
<thead>
<tr>
<th>Poster Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>513</td>
<td>Melting of Rutile Under Pressure</td>
<td>Arafin S, Singh R, Al-Saidi Y &amp; George A</td>
</tr>
<tr>
<td>514</td>
<td>Neoproterozoic Late to Post-Collisional, Quartz-Bearing Ultrapotassic Syenites from Southernmost Brazil</td>
<td>Bitencourt MF, Nardi LVS, De Toni GB &amp; Florisbal LM</td>
</tr>
<tr>
<td>515</td>
<td>Geochemical Characteristics of Volcanites, as a Reflection of Subduction Decay (Northern Flank of Bureja-Jziamusy Superterrain)</td>
<td></td>
</tr>
</tbody>
</table>
Derbeko I
516 Geochemical Considerations of the Gehlenitic Skarns from Valea Crişenilor – Oraviţa (Romania)

Ghinet C, Marincea S, Bilal E & Iancu A-M
517 Use of Whole Rock Geochemistry for Ignimbritic Unit Recognition: An Example from the Sulcis Area (SW Sardinia, Italy)

Gisbert G & Gimeno D
518 In situ Observations of Liquid-Liquid Immiscibility in the System MgSO₄·H₂O (D₂O)
Wang X & Hu W
519 Fluid Inclusion Study of Maoping W Deposit, Southern Jiangxi Province, China
Hua R & Hu D
520 Late Ordovician Volcanic Rocks in South Korea: Speculation on the Cause of Paleozoic Regional Unconformity in Sino-Korean Craton
Lee SR, Cho D-L, Park J & Koh H
521 Geochemical Features of Granitoid Central Siberia Magmatism in the Permian-Triassic
Nebere T & Boroznovskaya N
522 Trace Element and Isotope Geochemistry of Cretaceous Basalts from Axel Heiberg Island, Arctic Canada
Nobre Silva I, Pease V & Morris G
523 Triplite in Baxiannao W Deposit, Southern Jiangxi, and its Geological Significance
Qiu L & Li G
524 Carbonatitic Magmas? A Mineralogical and Isotopic Approach
Rios DC, Davis DW, Conceicao H, Rosa MLS & Moura CAV
525 Magmatic Epidote in Calcalkaline Tonalite, Dehnow (NW Mashhad, NE Iran)
Samadi R, Sheikh Zakariae SJ & Shirdashtzadeh N
526 Geochemical Characterization of Thermal Springs in the Tete Province, Northern Mozambique
Sciarra A, Procesi M, Quattrocchi F & Cinti D
527 Application of Mineral Thermometers and Barometers to Shoshonitic-Ultrapotassic Rocks: The Simav Graben (Western Anatolia, Turkey)
Semiz B
528  Microstructural Development of *in situ* Deformed and Heated Polycrystalline Halite in Dependence of Silica Gel  
Tommaseo C

529  Mantle Source Characteristics and Petrogenesis in the Lunar Crater Volcanic Field  
Rasoazanamparany C, Widom E, Cortes J, Smith E, Valentine G, Kuentz D & Johnsen R

(Session 24c continues on Friday 30th PM on p.493)
Goldschmidt 2013

Summary and Highlights

Friday 30th August, 2013

Timetable:

09:00 - 12:00 Oral Sessions
12:00 - 13:15 Lunch
13:15 - 14:15 Plenary
14:30 - 17:30 Oral Sessions

Highlights:

13:15 (AUD) Sujoy Mukhopadhyay (Plenary Lecture)
14:30 (L10) Jérôme Chappellaz (Science Innovation)
<table>
<thead>
<tr>
<th>Time</th>
<th>Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00</td>
<td>Barles, Boyd</td>
</tr>
<tr>
<td>09:15</td>
<td>Kühn, Turchyn</td>
</tr>
<tr>
<td>09:30</td>
<td>Hursthouse, Holland</td>
</tr>
<tr>
<td>09:45</td>
<td>Querol, Kietäväinen</td>
</tr>
<tr>
<td>10:00</td>
<td>Grathwohl, Klinkhammer</td>
</tr>
<tr>
<td>10:15</td>
<td>Castro, Jurado</td>
</tr>
<tr>
<td>10:30</td>
<td>Chiarantini, Groeleau, Crespo-Medina</td>
</tr>
<tr>
<td>10:45</td>
<td>Castro, Smith</td>
</tr>
<tr>
<td>11:00</td>
<td>Reimann, Durr</td>
</tr>
<tr>
<td>11:15</td>
<td>Reimann, Castro</td>
</tr>
<tr>
<td>11:30</td>
<td>Smith, Lehdenberger</td>
</tr>
<tr>
<td>11:45</td>
<td>Warr, Buccianti</td>
</tr>
</tbody>
</table>

**Oral Presentations Overview**

- AM
- L01 L02 L03 L04 L05 L06 L07 L08 L09
- 23c / 23g 01f / 24a 18l / 18g 10b 09c / 09g 16g 14g / 14b 12a / 12b / 12f 13c / 13h

**Friday AM overview**

<table>
<thead>
<tr>
<th>Time</th>
<th>Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00</td>
<td>Lowry, Brunner</td>
</tr>
<tr>
<td>09:15</td>
<td>Boyd, Kühn</td>
</tr>
<tr>
<td>09:30</td>
<td>Holland, Lowry</td>
</tr>
<tr>
<td>09:45</td>
<td>Kleinjäger, Hursthouse</td>
</tr>
<tr>
<td>10:00</td>
<td>Duhr, Castro</td>
</tr>
<tr>
<td>10:15</td>
<td>Smith, Lehdenberger</td>
</tr>
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### Oral Presentations Overview AM

**L10**
- **09:00**: Blichert-Toft, Ferdelman, Kosler, Gilhooly, Oalmann
- **09:15**: Baker, Pearson, Gomes, Frezzotti, Faccenda
- **09:30**: Horan, Canfield, Albrecht, Miller, Pellerin
- **09:45**: Dauphas, Leavitt, Miller, Godinho, Vetter Kaaden, Halliday, Gomes
- **10:00**: Elliott, Weber, Tang, Charlier, Dubinko, Yu, Yang, Rosso, Gilhooly
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**L12**
- **09:00**: Blichert-Toft, Ferdelman, Kosler, Gilhooly, Oalmann
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**L13**
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01f: Deep Subsurface Fluids, Habitability and Microbial Ecosystems

Session chaired by Matt Schrenk, Barbara Sherwood Lollar & Chris Ballentine

09:00  **Keynote:** Hot Spring Environments as Accessible Portals into the Metabolic Underpinnings of the Deep Hot Biosphere  
*Boyd E, Alsop E, Shock E & Raymond J*

09:30  Deep Fracture Fluids Isolated in the Crust Since the Precambrian  
*Holland G, Sherwood Lollar B, Lacrampe-Couloume G, Slater G & Ballentine C*

09:45  Residence Times of Ancient Water in Outokumpu (Finland) Revealed by Noble Gases  
*Kietäväinen R, Ahonen L, Kukkonen I, Niedermann S & Wiersberg T*

10:00  Active Carbon Cycling in Deep Subsurface Fracture Environments: Insights from RNA, Lipid and Isotopic Analyses  

10:15  Frequent Bacteria-Phage Interactions in Deep Biosphere  
*Labonté JM, Field EK, Lau M, Van Heerden E, Kieft TL, Onstott TC & Stepanauskas R*

10:30  Microbial Metabolism in Serpentinite Fluids  
*Crespo-Medina M, Brazelton W, Twing K, Kubo M, Hoehler T & Schrenk M*

10:45  Clumped Methane Isotopologue ($^{13}$CH$_3$D) Thermometry of Geological Methane by Tunable Mid-Infrared Laser Spectroscopy  
*Ono S, Sherwood Lollar B, Harris E, McManus B, Zahniser M & Nelson D*

*Session 24a follows this session in this room: see p.459.*
02d: Comparative Planetology of Crust Formation

Session chaired by Vinciane Debaille & Lindy Elkins-Tanton

09:00 Keynote: The Composition of Mercury’s Crust from MESSENGER Observations
Nittler L, Weider S & Solomon S

09:30 Experimental Investigation into the Density, Compressibility, and Phase Equilibria of the Northern Volcanic Plains on Mercury
Vander Kaaden K, McCubbin F & Agee C

09:45 Compositional Variability of Ultramafic Lavas on Mercury: Implications for Surface Mineralogy and Mantle Sources
Charlier B, Namur O & Grove TL

10:00 Lithium in HED Meteorites – Implications for Planetary Crusts
Šimčíková M, Magna T & Moynier F

10:15 Tholeiitic vs. Calc-Alkaline Igneous Trends on the Moon: Lunar Meteorite Northwest Africa 773 vs. Apollo 15 Quartz Monzodiorite
Fagan TJ, Wakabayashi Y, Suginoara A & Kashima D

Session 02j follows this session in this room: see p.430.
### 02j: In Situ, High Spatial Resolution Isotopic Measurements Applied to Extraterrestrial Materials

**Session chaired by Kate Souders & Paul Sylvester**

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<th>Time</th>
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| 10:00 | **Keynote:** The Chicago Instrument for Laser Ionization: Progress and Promise  
*Davis A, Stephan T, Pellin M, Rost D, Savina M, Trappitsch R & Liu N* |
| 10:30 | **Accurate Isotope Composition Measurements by a Miniature LMS System Designed for in situ Space Research**  
*Riedo A, Neuland M, Meyer S, Tulej M & Wurz P* |
| 11:00 | **Development of an in situ K-Ar Dating Technique Using LIBS-Qms Combination**  
*Cho Y, Miura YN & Sugita S* |
| 11:15 | **Simultaneous Laser Ablation Molecular Isotopic Spectrometry (LAMIS), Laser-Induced Breakdown Spectroscopy (LIBS) and Laser Ablation Inductively Coupled Plasma Spectrometry (LA-ICP-MS) for Analysis of Geological Samples**  
*Gonzalez J, Chirinos J, Dong M, Oropeza D, Mao X, Bol'shakov A, Yoo J, Sylvester P, Souders K, Longerich H & Russo R* |
| 11:45 | **In situ Determination of Fe Isotopes in Kamacite-, Taenite- and Troilite-Phases of Ordinary Chondrites**  
*Goldmann A & Weyer S* |

(Session 02j continues on Friday 30th PM on p.464)
03a: Continental Crust Formation in the Early Archean and the Emergence of Life

**Session chaired by Matthias Willbold & Stephen Mojzsis**

**10:15 Keynote:** Anoxic Geothermal Fields and the Early Life

*Mulkidjianian A*

**10:45** Archean Regional Metamorphism of the 3.8-3.7 Ga Isua Greenstone Belt, SW Greenland: Geothermal Gradient of the Archean Subduction Zone and Implication for Global Carbon Cycle

*Arai T, Omori S, Komiya T & Maruyama S*

*Session 03e follows this session in this room: see p.432.*
03e: Earth’s Oxygenation and Associated Ocean Chemistry Before and after the Archaean-Proterozoic Boundary

Session chaired by Mark van Zuilen, Ronny Schoenberg, Balz Kamber & James Farquhar

11:00  Keynote: What Caused the Rise of Atmospheric $O_2$?


11:45  Response of the Global Nitrogen Cycle to the Great Oxidation Event

(Session 03e continues on Friday 30th PM on p.465)
03g: Reconstructing Ancient Surface Environments from Modern (Near) Analogues

Session chaired by Aubrey Zerkle & Sean Crowe

09:00 Invited: Microbial Sulfur Cycling in the Modern Black Sea

09:15 Invited: The Preservation of Sulfur Isotope Signals in Low Sulfate Systems: How Low is Low?
Gomes M & Hurtgen M

09:30 Invited: Experimental Evolution of Dissimilatory S Isotope Fractionation
Pellerin A, Mykyczuk N, Austin R, Zane G, Whyte L, Wall J & Wing B

09:45 Keynote: Anoxygenic Cyanobacterial Mats in Middle Island Sinkhole, Lake Huron: An Analogue of the Precambrian
Dick G, Kinsman-Costello L, Sheldon N, Biddanda B, Marcus D, Voorhies A, Snider M & Gallagher T

Session 03a follows this session in this room: see p.431.
05e: Volatiles in the Mantle: Origin, Evolution and Consequences for Earth’s Dynamics

Session chaired by Alberto Saal & Manuel Moreira

09:00  Keynote: Volatile Budgets and the Late Veneer  
       Halliday A

09:30  Invited: The Composition of the Archean Atmosphere as a Tracer of Volatile Exchange between the Mantle, the Surface and the Outer Space  
       Marty B, Pujol M, Burgess R, Hébrard E, Zimmermann L & Philippot P

09:45  The Formation of Low Degree Hydrous Melts in the Earth’s Upper Mantle  
       Novella D, Frost DJ & Hauri EH

10:00  Non-Chondritic Sulfur Isotope Composition of the Earth’s Mantle: Implications on Planetary Differentiation  
       Labidi J, Cartigny P & Moreira M

10:15  Hydrogen Mobility in Wadsleyite at Low Temperatures  
       Vigouroux E, Ingrin J, Depecker C, Bolfan-Casanova N & Frost D

10:30  Concentration and Behavior of CO₂ in MORB and OIB: A Reevaluation  
       Michael P & Graham D

10:45  Volatile Element Content of the Mid-Ocean Ridge Mantle  
       Shimizu K, Saal A, Hauri E, Kamenetsky V & Hékinian R

11:00  Water Storage in the Earth’s Mantle  
       Bolfan-Casanova N & Férot A

11:15  Water Content of the Oceanic Lithosphere at Hawaii from FTIR Analysis of Peridotite Xenoliths  
       Peslier A & Bizimis M

11:30  Sulfur and Halogen Fluxes at Mid-Ocean Ridges: Estimations Based on Gas Compositions in MORB Vesicles  
       Kagoshima T, Sano Y, Takahata N & Marty B

11:45  Helium Isotopic and Concentration Variations in a Clinopyroxenite Vein: Implications for Mantle Evolution  

(Session 05e continues on Friday 30th PM on p.466)
06g: Quantification of Metamorphic Processes and the Thermo-Tectonic Evolution of Orogens

Session chaired by Michael Brown, Bernardo Cesare, Sumit Chakraborty & Taras Gerya

09:00 P-T Modeling Reveals Juxtaposition of Units within the Gruf Complex (Central Alps) during Orogenesis
Oalmann J, Möller A & Bousquet R

09:15 Invited: The Complex Dynamics of Collisional Orogens Unveiled by Numerical Modeling
Faccenda M, Gerya T & Chakraborty S

09:30 World’s Oldest Eclogites? Phase Equilibria Constraints on 2 Ga Metapelitic-Hosted Eclogites from the Usagaran Orogen, Tanzania
Walsh A, Hand M, Collins A & Brick R

09:45 Metamorphism and P-T Evolution of High Pressure Mafic Granulite in Chicheng, Northern Part of the Paleoproterozoic Central Zone of the North China Craton
Zhang D & Guo J

10:00 P-T Modelling and Geochronology of the Barberton Granite Greenstone Belt, South Africa: Rates of Tectonic Processes in the Archaean
Cutts K, Stevens G, Hoffmann E, Buick I, Frei D & Münker C

10:15 Seismic Evidence for the α-β Quartz Transition beneath Taiwan from Vp/Vs Tomography
Kuo-Chen H, Wu F, Jenkins D, Mechie J, Roecker S, Wang C-Y & Huang B-S

10:30 Calculating Rates of Ductile Thrusting
Mottram C, Parrish R, Warren C, Harris N & Argles T

10:45 Invited: Pressure Variations in Metamorphic Rocks: Implications for the Interpretation of Petrographic Observations
Tajcmanova L

11:00 Deciphering Crustal Evolution from Metamorphic and Geochemical Signatures in Calc-Silicate Gneisses
Fukai I, Dutrow B, Henry D, Mueller P & Foster D

11:15 Quantifying Effective Ferric Iron Content in Hematite-Rich Metapelites Through Phase Equilibria Modelling
Lo Pò D & Braga R

11:30 Regional-Scale Metasomatism in the Fortescue Group Volcanics, Hamersley Basin, Western Australia, Constrained Through Phase Equilibria Modelling
White A, leGras M, Smith R & Nadoll P
11:45 Deep Ingression of Meteoric Water in Late-Metamorphic Veins: A LA-ICPMS Fluid Inclusion Study from the Rhenish Massif, Germany

*Marsala A, Wagner T & Wälle M*

(Session 06g continues on Friday 30th PM on p.467)
08e: Glasses, Melts and Fluids as Tools for the Understanding of Volcanic Processes and Hazards

Session chaired by Nicole Métrich, Roberto Moretti, Claudia Cannatelli, Rosario Esposito & Rita Klebesz

09:00 Contrasted Iron-Speciation in Obsidians and Tektites: A Spectroscopic Study  
Chassé M, Galoisy L, Lelong G & Calas G

09:15 Invited: Dynamics of Sulfur Degassing in Alkaline Magmas Illustrated with Melt and Fluid Inclusions  
Frezzotti ML & Tecce F

09:30 Pathways of Redox State and Sulfur Release Track the Shift from Low-Energy to Highly-Explosive Basaltic Eruptions at Mt. Etna  

09:45 Sulfur Isotope Systematics of Geothermal Fluids, Krafla, Iceland  
Keller N, Stefansson A, Ono S & Gunnarsson Robin J

10:00 Keynote: Reading the Melt Inclusion Record of Pre-Eruptive Magmatic Volatiles  
Gaetani G, Bucholz C, Rose-Koga E, Shimizu N, Koga K & Monteleone B

10:30 Source of Magmas that Generated Eruptive Products at Mt. Somma-Vesuvius and Campi Flegrei Based on Melt Inclusions Data  
Cannatelli C, Esposito R, Lima A, De Vivo B & Bodnar RJ

10:45 Melt Inclusion Constraints on the Origin of the Peridote Mesa Phonotephrite, San Carlos, Arizona  
Moore G

11:00 Invited: Melt Inclusions in Mafic-Ultramafic Potassic Volcanic Rocks in British Columbia, Canada: A Record of the Transfer of PGE from Mantle to Crust in Porphyry Settings  
Hanley J & Zajacz Z

11:15 New Constraints on the Pre-Eruptive Storage Conditions of the Campanian Ignimbrite (Campi Flegrei, IT)  

11:30 CI in Magmas: A Tool for Degassing Processes  
Balcone-Boissard H & Boudon G

11:45 Invited: Examination of Magma Degassing Paths Based on Melt Inclusions  
Bodnar R, Gazel E, Esposito R, Moore L, Steele-MacInnis M & Wallace P
09c: Patterns, Controls, and Consequences of the Earliest Rise of Atmospheric Oxygen

Session chaired by Timothy Lyons, Noah Planavsky & Ariel Anbar

09:00  **Keynote:** Archean Hydrocarbon Biomarkers: Ancient or Not?
  *French K, Hallmann C, Hope J, Buick R, Brocks J & Summons R*

09:15  **Invited:** Oxygenic Photosynthesis 3 Billion Years ago
  *Crowe SA, Dissing LN, Beukes NJ, Bau M, Kruger SJ, Frei R & Canfield DE*

09:30  **Invited:** Terrestrial $\Delta^{33}$S and the S Cycle during the Archean: Evidence from Paleosols
  *Sutton S, Maynard J, Rumble D & Bekker A*

09:45  Cause of the Maximum S-Mif Scatter in the Late Archean: Atmospheric Organic Sulfur and Episodic Volcanism
  *Ueno Y, Danielache S, Saito M, Endo Y & Johnson M*

10:00  Redox and Nutrient Cycling in a Late Mesoproterozoic Sea
  *Husband K, Poulton S, Guilbaud R, Rooney A & Selby D*

10:15  Causes and Consequences of Low Atmospheric $pCO_2$ in the Late Mesoproterozoic
  *Sheldon N*

10:30  The “Boring Billion”: An Exciting Time for Early Eukaryotes!
  *Javaux EJ, Beghin J, Houzay J-P & Blanpied C*

10:45  Earth Surface Redox Constraints from the Ancient Cr Cycle
  *Planavsky N, Reinhard C, Wang X, Fischer W, Johnson T & Lyons T*

*Session 09g follows this session in this room: see p.439.*
09g: Geochemical and Biological Consequences of Changes in the Biological Pump over Geological Time

Session chaired by Jonathan Payne, Katja M Meyer, Bas van de Schootbrugge & Elisabetta Erba

11:00 Keynote: Evolution of the Ocean’s Biological Pump

Ridgwell A

11:30 Inventing the Phanerozoic Biological Pump – And Inducing Snowball Earth

Butterfield N

(Session 09g continues on Friday 30th PM on p.470)
10b: Isotope Geochemistry Across Environmental and Redox Gradients: Tracing Biological and Geochemical Processes

Session chaired by David Fike, Sara B. Pruss & Matthew T. Hurtgen

09:00  Keynote: Lifestyles of the Slow and Lonely – A Story Told by Sulfate Isotopes
Brunner B

09:15  The Formation of Elemental Sulfur Nodules; A Modified ‘Thiosulfate Shunt’ in Unique Environments
Turchyn A, Bishop T & Sivan O

09:30  Invited: Controls on Redox-Nutrient Cycling in the Cretaceous Greenhouse Ocean: Insights from S Isotope Systematics

09:45  Constraining the Origin of Sulfur Isotopic Variability Through the End-Ordovician Hirnantian Glaciation and Mass Extinction
Rose C & Fike D

10:00  $\delta^{34}$S of Discrete Authigenic Framboidal Pyrite: A Powerful Palaeo-Indicator for Barrier Estuary Closure
Bush R, Sullivan L, Bush M & Ward N

10:15  Carbon Isotope Analysis of Conglomerates of the Cambro-Ordovician Cow Head Group, Western Newfoundland as a Proxy for the Origin of Carbonate Cements
Pruss S, Fike D, Castagno K & Hurtgen M

10:30  Tracing Episodic Microbial Oxidation of Biogenic Methane Deep in Fractured Granite Using $\delta^{13}$C$_{\text{calcite}}$
Drake H, Heim C, Åström M & Whitehouse M

10:45  Calcium and Oxygen Isotope Fractionation during Precipitation of Calcium Carbonate Polymorphs

11:00  Isotopic Signature of Naturally Cr(VI) Contaminated Spring Waters from Western Tuscany (Italy)
Chiarantini L, Agostini S, Baneschi I, Guidi M, Natali C, Tonarini S & Frei R

11:15  Uranium Partitioning and Isotope Composition in Shales of the Middle Devonian Marcellus Formation
Phan T, Capo R, Stewart B, Sharma S & Toro J

11:30  Fractionation of $^{238}$U/$^{235}$U by Reduction during Low T Uranium Mineralisation Processes
Murphy M, Stirling C, Kaltenbach A, Turner S & Schaefer B
12a: Unconventional Oil and Gas Resources: Exploration and Production Geochemistry

Session chaired by Andrew Aplin, Rolando di Primio, Ron Hill & Maowen Li

09:15 Origin of Dissolved Solids in Marcellus Shale Produced Water

Stewart B, Chapman E, Capo R, Graney J & Johnson J

Session 12b follows this session in this room: see p.442.
### 12b: Water-Rock-Petroleum Interactions

**Session chaired by Alexandra Hakala & Athanasios Karamalidis**

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<tr>
<td>09:30</td>
<td><strong>Keynote</strong>: Diagnosing Petroleum Fractionation Processes in Surface and Subsurface Environments Using GCxGC</td>
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<td>09:45</td>
<td>Setschenow Constants for Prediction of Salting-Out of Petroleum Hydrocarbons in Brines</td>
<td><em>Burant A, Lowry G &amp; Karamalidis A</em></td>
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<td>10:00</td>
<td>Testing the Deep-Basin High-Rank Gas Machine Hypothesis</td>
<td><em>Ostertag-Henning C</em></td>
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<td>10:30</td>
<td>Thermodynamic Analysis of Water-Rock-Hydrocarbon Interactions in Petroleum Systems</td>
<td><em>Richard L</em></td>
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*Session 12f follows this session in this room: see p.443.*
12f: Targeting Microbial Communities Associated with Fossil Fuel Deposits for Energy Applications

Session chaired by Casey Hubert, Martin Krüger, Hans Richnow & Sebastien Dreyfus

10:45 Keynote: Not so Hot and not so Salty Microbes and their Role in Oil Recovery and Corrosion
McInerney M

11:15 Evidence for the Microbial in situ Conversion of Oil to Methane in the Dagang Oilfield
Jimenez N, Cai M, Straaten N, Morris B, Yao Y, Richnow H-H & Krüger M

11:30 Metagenomic Insights into the Response of Indigenous Microbial Communities in Beach Sands to the Deepwater Horizon Oil Spill

11:45 Future Gas Through Bioconversion of Stranded Coals
13c: Ocean Chemistry, Politics, Resources and Mining

Session chaired by Chris Yeats, Tim McConachy & Wolfgang Bach

09:00 **Keynote:** Hydrothermal Exploration of Mid-Ocean Ridges: Where Might the Largest Sulfide Deposits Occur?
*German C*

09:30 Actively Forming Kuroko-Style Massive Sulfide Mineralisation and Hydrothermal Alteration at Iheya North, Okinawa Trough
*Yeats C & Hollis S*

09:45 Seafloor Massive Sulfide Exploration in SW Pacific – A Commercial Perspective
*McConachy T*

10:00 Accumulation Mechanisms and Bonding of High-Tech Metals in Marine Ferromanganese Crusts
*Koschinsky A, Hein J, Mohwinkel D, Foster A & Bargar J*

10:15 Discrimination Scheme for Fe-Mn Deposits Based on REY, HFSE and Th
*Schmidt K, Bau M & Koschinsky A*

10:30 Aluminum Oxide in Submarine Hydrothermal Sulfide from East Pacific Rise Near 13°N
*Zeng ZG & Qi HY*

*Session 13h follows this session in this room: see p.445.*
13h: Lithium Deposits in Evaporites: Element Sources, Extraction and Deposition

**Session chaired by Simone Kasemann, Broder Merkel & Friedrich Lucassen**

10:45 Source Tracing in Li–bearing Brines, Salar Pozuelos, NW Argentine
*Lucassen F, Korte L, Kasemann S, Meixner A & Alonso R*

11:00 Hydraulic and Geochemical Survey of the Lithium-Resources in the Salar de Uyuni (Bolivia)
*Sieland R, Schmidt N & Merkel B*

11:15 Distribution and Enrichment Processes of Lithium and Other Solutes in the Salar de Uyuni Brine
*Schmidt N, Sieland R & Merkel B*

11:30 Sorption Behavior of Lithium
*Hoyer M & Kummer N-A*

11:45 The Origin of Lithium in Playas in Nevada, USA: Constraints by Lithium Isotope Ratio
*Araoka D, Kawahata H, Takagi T, Watanabe Y, Nishimura K & Nishio Y*
14b: Reconstructing Terrestrial Hydrology: Proxies, Mechanisms, and Records

Session chaired by Kathleen Johnson & Jessica Tierney

09:45 Keynote: Towards Quantitative Paleohydrology: Reconstructing Changes in Relative Humidity from Lipid Biomarker δD Values
Sachse D, Rach O, Kahmen A, Wilkes H & Brauer A

10:15 Invited: Hydrologic Variability in Coastal Southwest USA
Feakins S, Kirby M, Wu MS & Heusser L

10:30 Diagnosing the Hydroclimate Influences on Soil Water δ18O: Precipitation δ18O, Evaporation, or Moisture Transport?
Kanner L, Buennning N, Stott L, Timmerman A, Noone D & Sloan L

10:45 Asian Monsoon Circulation Strength Inferred from Multicentury Tree-Ring Stable Isotope Chronologies from Southeast Asia
Anchukaitis K, Gagen M, Martin-Benito D, Buckley B, Ummenhofer C & LeGrande A

11:00 Causes of Late Pleistocene Lake Victoria Water Level Change, Derived from Clumped Isotopes in Land Snails and Fresh Water Molluscs
Zaarur S, Affek HP, Tryon C, Peppe D & Faith JT

11:15 Abrupt Shifts in Horn of Africa Hydroclimate Since the Last Glacial Maximum
Tierney J & deMenocal P

11:30 The ICDP Dead Sea Deep Drill Core: Chronology and Implications for Levant Climate Change
Goldstein S, Torfstein A, Stein M & Kitagawa H

11:45 A 2000-Year Rainfall Record from the Eastern Tropical Pacific and ENSO Variability during the Common Era
Romero-Viana L, Kiene U & Sachse D

(Session 14b continues on Friday 30th PM on p.475)
14g: Novel Climatic Proxies: Towards Realism

Session chaired by Sambuddha Misra, Peter Swart & Ann Pearson

09:00  Investigation of Boron, Carbon, and Oxygen Isotope Systematics in the Aragonite-CO$_2$-H$_2$O System
Klein Gebbinck C, Kim S-T, Henehan M & Foster G

09:15  The Coordination of Boron in Foraminiferal Calcite
Branson O, Redfern S, Kaczmarek K, Tyliszczak T & Elderfield H

09:30  Growth-Rate Induced Disequilibrium of Boron and Divalent Cations in Calcite: An $in situ$ Approach
Gabitov R, Sadekov A, Rollion-Bard C & Watson B

Session 14b follows this session in this room: see p.446.
### 16g: Rates, Fluxes and Coupling between Erosion and Weathering

**Session chaired by Sean Willet, Jane Willenbring, Joshua West & Niels Hovius**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speakers</th>
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<tbody>
<tr>
<td>09:00</td>
<td><strong>Keynote:</strong> Coupling Fluid Residence Times, Erosion Rates and Weathering Fluxes to Evaluate the Operation of a Hydrologic Thermostat</td>
<td><strong>Maher K &amp; Chamberlain CP</strong></td>
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<tr>
<td>09:30</td>
<td>Revealing the ‘Blind Spot’: A Simple Physical Model for the Temporal Evolution of Silicate Mineral Weathering</td>
<td><strong>Evaristo J &amp; Willenbring J</strong></td>
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<tr>
<td>09:45</td>
<td>The Impact of Climate on Land Derived Nutrient Fluxes to the Ocean</td>
<td><strong>Eiriksdottir ES, Gislason SR &amp; Oelkers EH</strong></td>
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<td>10:00</td>
<td>Large River Floodplains: Weathering Without Erosion?</td>
<td><strong>Bouchez J, Lupker M, Gaillar J, France-Lanord C, Louvat P &amp; Maurice L</strong></td>
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<tr>
<td>10:15</td>
<td>Glaciers and Floodplains Controls on Weathering Fluxes Deciphered from Two Glacial-Interglacial Nd Isotopes Records on Both Sides of New Zealand</td>
<td><strong>Meynadier L, Cogez A &amp; Allègre C</strong></td>
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<td>10:30</td>
<td>Exhumation Rates from Orogenic Areas</td>
<td><strong>Herman F, Champagnac J-D, Lupker M &amp; Willett S</strong></td>
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<td>10:45</td>
<td>Paleo-Denudation Rates at the Plio-Pleistocene Transition from in situ Produced Cosmogenic $^{10}$Be: Method and New Results from the Tianshan and the Himalayas</td>
<td><strong>Charreau J, Puchol N, Blard P-H, Pik R, Braucher R, Leanni L, Bourles D, Lave J &amp; Bourles O</strong></td>
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<tr>
<td>11:00</td>
<td>$^{10}$Be Derived Catchment Denudation Rates from the Garhwal Himalaya</td>
<td><strong>Swander Z, Dosseto A, Fink D, May J-H &amp; Korup O</strong></td>
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<td>11:15</td>
<td>Impacts of Arc Collision on Small Orogens: New Insights from the Coastal Range Detrital Record of Taiwan</td>
<td><strong>Kirstein L, Carter A &amp; Chen Y-G</strong></td>
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<td>11:30</td>
<td>Anthropogenic Sulfate in the Atmosphere Decrease the Carbon Uptake by Karst in Rural Area of SW, China</td>
<td><strong>Ding H, Liu C, Lang Y &amp; Liu T</strong></td>
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<td>11:45</td>
<td>Radionuclides ($^{10}$Be, $^{210}$Pb, $^{137}$Cs and $^{7}$Be) to Determine Anthropogenic Impact on Erosion Rates</td>
<td><strong>Marquard J, Barrows TT &amp; Aalto RE</strong></td>
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</tbody>
</table>
18g: Geochemical Mechanisms of Mineral-Based Amendments for Soil and Sediment Remediation

Session chaired by Mario Villalobos & Dimitri Vlassopoulos

09:45 Keynote: Technetium Reduction and Permanent Sequestration by Formation of Low-Solubility Sulfide Mineral Phases
Tratnyek P & Fan D

10:00 Enhanced Stability and Inhibited Dissolution of Uraninite by Nanoparticulate Iron Sulfide Under Oxic Conditions
Bi Y & Hayes K

10:15 Invited: Remediation Strategies for Redox-Active Elements Using Combined Experimental, Spectroscopic, and Computational Approaches
O’Day P, Serrano S, Illera V & Vlassopoulos D

10:30 Field Sampling for Porewater Mercury and Methylmercury Using DGT
Reible D, Bireta P, Schierz A, Grundy J & Landis R

10:45 Understanding Electron Transfer at Fe-Bearing Mineral Surfaces to Optimize Contaminant Remediation
Pearce C, Liu J, Kabius B, Arenholz E & Rosso K

11:00 Formation of Magnetite within Aquifer Sediments and Its Effects on Arsenic Mobility
Sun J, Chillrud S, Mailloux B & Bostick B

11:15 Invited: Arsenic Sequestration by Fresh and Aged Fe Oxidation Products
Voegelin A, Senn A-C, Kaegi R & Hug S

11:30 Siderite Amendment for in situ pH Control in Hyperalkaline Environments
Vlassopoulos D, Goin J & Carey M

11:45 Mesocosms Experiments with Zeolite-Amended Marsh Soils to Reduce Nitrogen Leaching
Facchinì B, Colombani N, Di Giuseppe D, Mastrocicco M & Coltorti M
18I: Environmental Application of Engineered Nanomaterials: Benefits and Risks

Session chaired by Thilo Hofmann, Gregory Lowry, Rald Kaegi, Armand Masion & Mélanie Kah

09:00 Keynote: Are There Unique “Nano” Effects from Exposure to Metal and Metal Oxide Nanoparticles? – Yes and No!
Lowry GV, Ma R, Levard C, Colman BP, Bernhardt ES, Brown, Jr. GE & Wiesner MR

09:15 Visualization of Dynamic Changes and the Effects of Coatings on Silver Nanoparticles by Surface Enhanced Raman Spectroscopy
Kühn M, Ivleva NP, Niessner R & Baumann T

09:30 Invited: Transformation of Silver Nanoparticles: From the Sewer to the Fly Ash
Kaegi R, Voegelin A & Thalmann B

Session 18g follows this session in this room: see p.449.

Session chaired by Carol Arnosti, Moritz Lehmann, Scott Wankel, Bo Thamdrup & Joel Kostka

09:00 Keynote: Sulfur Runs Through it: A Celebration of Bo Barker Jørgensen’s Science and a Multi-Faceted Element 
Ferdeman T

09:30 Invited: Sulfate was a Trace Constituent in the Oceans of the Early Earth 
Canfield D, Crowe S, Jones C, Paris G, Adkins J, Session A, 
Farquhar J, Zerkle A, Kim S-T & Nomosatryo S

09:45 Enzymatic Constraints on the Global S Cycle: The Fractionation Factors of Dsr 
Leavitt W, Pereira I, Bradley A, Guo W & Johnston D

10:00 Large 34S Depletions of Reduced Sedimentary Sulfides at Low Sulfate Concentrations in an Iron-Rich Lake Dominated by Anaerobic Methane Oxidation 
Weber HS, Thamdrup B & Habicht KS

10:15 Coupled Fe-S-P Cycling in Sediments of an Oligotrophic Coastal Basin and the Role of Anaerobic Oxidation of Methane 
Egger M, Jilbert T & Slomp C

10:30 Early Diagenesis of Sulfur and Trace Element Pyritization in Sediments of a Tropical Upwelling System: Cabo Frio, Southeastern Brazil 
Mendoza U, Díaz R, Moreira M, Amorim N, Böttcher ME, 
Machado W, Patchineelam S, Capilla R & Albuquerque AL

10:45 Effect of Magnetite Addition on $H_2S$ Dynamics in Coastal Marine Sediment 
Sayama M

11:00 Sulphur Driven Denitrification Dominates N-Removal in the Water Column of Lake Lugano 
Zopfi J, Wenk CB, Schweighoffer D, Blees J, Niemann H & Lehmann MF

11:15 Does the Redox Cascade Apply to Permeable Sediments? 
Cook P, Evrard V, Bourke M & Glud R

11:30 Microbial Phosphate Release from Marine Sediments: Transcriptomics and Geochemistry 
Jones D, Flood B & Bailey J

11:45 Iron and Manganese Reduction and Associated Phosphorus Release in Coastal Baltic Sea Sediment 
Downs K & Bruchert V

(Session 19f continues on Friday 30th PM on p.481)
20a: Tuning the Torch with Innovative Applications in Multicollector Inductively Coupled Plasma Mass Spectrometry: A Tribute to Francis Albarède

Session chaired by Arnaud Agranier, Audrey Bouvier, Maud Boyet & Fred Moynier

09:00 Invited: Tuning the Torch for Lead Isotopes: The Battle in Lugdunum
Blichert-Toft J

09:15 Invited: Trace Element and $^{26}$Al–$^{26}$Mg Constraints on Silicate Differentiation of the HED Parent Body
Baker J, Dallas J, Schiller M, Creech J & Bizzarro M

09:30 Invited: Improved Pd-Ag Isotopic Systematics by MC-ICP-MS
Horan M, Carlson R & Schoenbaechler M


10:00 Keynote: The Global U Isotopic Cycle
Elliott T, Andersen M & Freymuth H

10:30 Invited: “Tuning the Torch” of the Nu Plasma II-Es MC-ICP-MS
Weis D, Gordon K, Xing L, Burrows A, Cohen R & Freedman P

10:45 A Mass Fractionation Law for High-Transmission MC-ICP-MS
Albarède F, Telouk P & Albalat E

11:00 Invited: Heavy Element-Stable Isotope Systematics for Metallomics Induced by the MC-ICPMS Technique
Hirata T, Okabayashi S, Ohno T, Yoshiya K, Komiya T & Maruyama S

11:15 Early Detection of Osteolytic Lesions in Multiple Myeloma Using Natural Ca Isotopes
Gordon G, Skulan J, Channon M, Fonseca R & Anbar A

11:30 Invited: Li Isotopes: The Ideal Weathering Tracer?
Gaillardet J, Dellinger M, Bouchez J, Clerque C, Louvat P, Dessert C & Gorge C

McCulloch M, Trotter J, Holcomb M & Montagna P
20c: Deviant Isotopologues: Theory, Processes and Measurements of Clumped Isotopes and Position-Specific Fractionations

Session chaired by Cedric John, Mathieu Daëron, Rosemarie Came & Edwin Schauble

10:00 Theoretical Calibration of $\delta_{47}$ Values of $^{13}$C-$^{18}$O Clumps for Carbonates

Tang M, Zhang S-T & Liu Y

10:15 A New Calibration of the Carbonate Clumped Isotope Thermometer Based on Synthetic Calcites

Millán I, Breitenach S, Meckler N, Ziegler M & Bernasconi SM

10:30 Evaluation of Potential Explanations for the Offsets in $\Delta_{47}$ Amongst Various Taxa of Naturally Occurring Modern Carbonate Organisms

Came R

10:45 Clumped Isotope Thermometry on Ultramafic-Hosted Magnesium Carbonates


11:00 Clumped Isotopes and Concretions: The Prairie Canyon Member of the Mancos Shale, Colorado

Dale A, John CM, Mozley P, Smalley CP & Muggeridge AH

11:15 Clumped Isotope Thermometry of Marbles as an Indicator of the Closure Temperatures of Calcite and Dolomite with Respect to Solid-State Reordering of C–O Bonds

Bonifacie M, Calmels D & Eiler J

11:30 Carbonate Clumped Isotope Thermometry in the Subsurface

Bergmann K, Al-Balushi S, Grotzinger J & Eiler J

11:45 Application of Clumped Isotope Thermometry to Subsurface Dolostone Samples

MacDonald J, John C & Girard J-P

(Session 20c continues on Friday 30th PM on p.483)
20h: Analytical Frontiers in High Spatially Resolved Analysis Using Mass Spectrometric and Related Techniques

Session chaired by Detlef Günther, Paolo S. Garofalo & Alison Koleszar

09:00 Factors Controlling Elemental Fractionation in Laser Ablation ICP-MS Zircon Geochronology
  Kosler J, Jackson S & Yang Z

09:15 The Hole Story About Laser Ablation ICP-MS
  Pearson N, Powell W, Grant K, Payne J, Murphy R, Belousova E, Griffin W & O’Reilly S

09:30 Analysis of Fluid Inclusions with fs-LA-ICP-MS
  Albrecht M, Derrey IT, Horn I, Schuth S, Meicher F & Weyer S

09:45 Construction of High-Resolution Trace Element Time-Series in Slow Growth Speleothems by ELA-ICP-MS: Challenges, New Approaches and Validation Strategies
  Miller N & Banner J

Session 20c follows this session in this room: see p.453.
21f: Theoretical and Experimental Approaches to Geochemical Reactions, Including Solvation, Complexation, Adsorption, and Redox

Session chaired by Aurora Clark & Udo Becker

09:00  **Keynote:** Electron Flow in Bacterial Multi-Heme Cytochromes  
*Breuer M, Smith D, Blumberger J & Rosso K*

09:30  **Invited:** Understanding Uranyl Adsorption at the Water-Mineral Interface: A Theoretical Approach  
*Yang P, Bylaska E & de Jong W*

09:45  Effect of Anharmonic Lattice Vibrations on the Reaction Rates in Minerals  
*Dubinko V & Archilla J*

10:00  Non-Innocent Role of Electron-Mediating Ligands in Reductive Dissolution of Hematite  
*Zarzycki P, Toczydlowska D, Chatman S & Rosso K*

10:15  Analysis of Nanostructures Consisting of the Al-Pyrocatechol Complex Using Spectroscopic Ellipsometry  
*Franke M*

10:30  **Invited:** Computational Studies of Hydrolysis Reactions of CO$_2$ and Actinides  
*Dixon D, Thanthiriwatte KS, Moon J, Duke J & Jackson V*

10:45  Molecular Simulation of Aqueous Electrolyte Solutions  
*Smith W, Moucka F & Nezbeda I*

11:00  Iodide Ion Hydration in Aqueous Solution to 360°C: Insight from XAS and *ab Initio* MD  
*Seward T, Henderson M, Suleimenov O & Charnock J*

11:15  IR Spectroscopic and Quantum Chemical Study of Metal Bicarbonate and Carbonate Interaction in Aqueous Solutions  
*Stefansson A, Lemke K, Bénézeth P & Schott J*

11:30  Cation Adsorption, Hydrogen Bonding Structure and Dynamics at the Clay-Water Interface: MD Simulations with New Models of Muscovite and Montmorillonite  
*Loganathan N, Ngouana W, BF & Kalinichev A*

11:45  **Invited:** Interfacial Chemistry Viewed Through the Lens of Network Analysis  
*Clark A, Ozkanlar A & Kelley M*

(Session 21f continues on Friday 30th PM on p.488)
22c: Mineral Reactivity and Interface Processes

Session chaired by Encarnación Ruiz Agudo, Henry Teng & Christine Putnis

09:00 **Keynote:** Driving Mineral Dissolution Studies in a New Direction
*Luttge A, Fischer C, Arvidson RS & Kurganskaya I*

09:30 Biotite and Phlogopite Dissolution: Topographic Observation by VSI
*Cappelli C, Cama J, Huertas FJ, Fischer C & Lüttge A*

09:45 Direct Observations of Structures Developed on Fluorite Surfaces after Contact with an Aqueous Solution
*Godinho J, Putnis C & Piazolo S*

10:00 Experimental Dissolution of FeCO$_3$ Under Controlled Sulfidic Conditions
*McAnena A & Poulton S*

10:15 The Stochastic Treatment of Mineral Surface Reaction Kinetics
*Arvidson R, Fischer C & Lüttge A*

10:30 Precipitation and Stability Behaviour of Calcium Sulfate: The Role of Salinity, Temperature and Reaction Time
*Ossorio M, Van Driessche AES, Pérez P & García-Ruiz JM*

10:45 The pH Influence on Barite Nucleation and Growth
*Ruiz Agudo C, Putnis C & Putnis A*

11:00 Surface Topography Controls on Calcite Growth Kinetics: From Molecular Dynamics Simulations to Macroscopic-Scale Modelling
*Wolthers M, Di Tommaso D, Du Z & de Leeuw N*

11:15 Effect of Solution Chemistry on the Kinetics of Step Growth
*Teng HH & Hong M*

11:30 Early Stage Ostwald Ripening of Submicrometer Calcite
*Schultz LN, Dideriksen K, Mütter D, Hakim SS & Stipp SLS*

11:45 Micro-Scale Carbonation of Single Facets of Portlandite
*Griffiths G, Cherns D, Ball R, Allen G & El-Turki A*

*(Session 22c continues on Friday 30th PM on p.489)*
# 23c: Urban Biogeochemistry

Session chaired by Philippe Van Cappellen, Ana Lima & Pasi Peltola

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</table>
| 09:00 | **Keynote:** Trends in Urban Biogeochemistry at the Anthropocene<br *
  Barles S  |
| 09:30 | **Invited:** The Influence of Urbanisation on Forest Soils: Comparing Variability and Mobility of Potentially Toxic Elements and Carbon Sequestration between Urban Regions in Scotland and Bulgaria<br *
  Hursthouse A, Doichinova V & Zhiyanski M  |
| 09:45 | **Invited:** Levels and Geochemistry of Urban and Rural Atmospheric Particulate Matter in Spain<br *
  Querol X, Alastuey A, Moreno T & Viana M  |
| 10:00 | Assessment of River Water Quality in Catchments: Impact of Urbanization on Particle Bound Pollutant Fluxes<br *
  Grathwohl P, Schwientek M, Rügner H & Rode M  |
| 10:15 | Hybrid Multispectral Analysis: Innovative Technology for Continuously Monitoring the Biogeochemistry of Urban Waterways<br *
  Klinkhammer G & Russo C  |
| 10:30 | High Frequency Network Sensors for Integrating Biogeochemical Processes in the Seine River and Quantifying the Impact of Paris Megalopolis<br *
  Escoffier N, Flipo N, Vilmin L, Bensoussan N, Laverman A, Raimonet M & Groleau A  |
| 10:45 | Modeling the Fate of the Pharmaceuticals in an Urban Aquifer. Besós River Delta Case Study (Barcelona, Spain)<br *
| 11:00 | **Invited:** Heavy Metal Contamination in the Semi-Urbanised Laurel Creek Watershed, Waterloo (Ontario), Canada<br *

Session 23g follows this session in this room: see p.458.
23g: Noble Gases and Other Transient Tracers in Terrestrial Waters and Gases: Bridging Established Science with Emerging Applications

Session chaired by Rolf Kipfer, Florent Barbecot, Matthias Brennwald & Axel Suckov

<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>11:15</td>
<td>Advances in Our Understanding of the Noble Gas Thermometer in Groundwater – New Applications</td>
<td>Castro MC, Hall CM, Warrier RB &amp; Lohmann K</td>
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<tr>
<td>11:30</td>
<td>Helium Equilibrium between Pore Water and Quartz: A Clever, but Limited Tool</td>
<td>Smith SD, Harrington GA, Smerdon BD &amp; Solomon DK</td>
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<tr>
<td>11:45</td>
<td>Noble Gas Partitioning in CO₂ Environments: A Supercritical Assessment of Current Assumptions</td>
<td>Warr O, Masters A, Rochelle C &amp; Ballentine C</td>
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(Session 23g continues on Friday 30th PM on p.490)
24a: Continental and Regional Scale Geochemical Mapping

Session chaired by Benedetto De Vivo & Ilse Schoeters

11:00  **Keynote:** Chemistry of Europe’s Agricultural Soils – The GEMAS Project
       *Reimann C, Demetriades A & Birke M*

11:30  Elemental Patterns in Agricultural and Grazing Land Soils in Norway, Finland and Sweden – What Have We Learned from Continental Scale Mapping?

11:45  Geochemical Processes Affecting Stream Water at European Scale Investigated by Differential Scaling Operator (Perturbation) in the Simplex Metric
       *Buccianti A, Egozcue JJ & Pawlowsky-Glahn V*

*(Session 24a continues on Friday 30th PM on p.492)*
<table>
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<td>17:15</td>
<td>Kis</td>
<td>Glennon</td>
<td>Major</td>
<td>Banothu</td>
<td>Weinzier</td>
<td>Marques</td>
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Oral Presentations Overview PM
L01 L02 L03 L04 L05 L06 L07 L08 L09
23g 01g / 24a 18b / 18f 10e 09g / 09i 16i / 16j 14b 12d 13d
## Oral Presentations Overview

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>14:30</td>
<td>Chappelaz, Boelius, Sánchez-Farot-April</td>
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<td>14:45</td>
<td>Arnosti, Yeung, Liu, Majumdar, Siplic</td>
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<td>15:00</td>
<td>Holister, Jia, Li, Stilp, Stojic, Liang</td>
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<td>15:15</td>
<td>Hubert, Magyar, Strofer, Kasperczyk, Li</td>
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<td>15:30</td>
<td>De Leeuw, Shirey, Murakami, Clark</td>
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<td>15:45</td>
<td>Fischer, Canion, Stolper, Kominek, Stojic</td>
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<td>16:00</td>
<td>Wehrmann, Clog, Caporuscio, Hu, Lin</td>
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<td>16:15</td>
<td>Zahniser, Kuyers, Robertson, Teude, Li</td>
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<td>16:30</td>
<td>McDermitt, Kasperczyk, Teude, Li, Szeto</td>
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<tr>
<td>16:45</td>
<td>Lowry, Seitz, Veeramani, Fischer, Kretke</td>
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01g: Element Partitioning; A Universal Tool in Geochemistry

**Session chaired by Jon Wade, Vincent Van Hinsberg, James Badro & Guillaume Fiquet**

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<th>Time</th>
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<tbody>
<tr>
<td>14:30</td>
<td>New Insights into the Size of Atoms from Electron Density Distributions</td>
<td>Gibbs GV, Ross NL &amp; Iversen BB</td>
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<tr>
<td>14:45</td>
<td><strong>Keynote:</strong> Melts, Fluids, Crystals, Sulphides, Metals: Trace Element Partitioning and Geochemical Applications</td>
<td>Wood B</td>
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<tr>
<td>15:15</td>
<td>Complexation of Sr in Aqueous Solutions Equilibrated with Silicate Melts: Implications for Fluid-Melt Partitioning</td>
<td>Borchert M, Wilke M, Schmidt C, Kovashina K &amp; Jahn S</td>
</tr>
<tr>
<td>15:45</td>
<td>Canonical Trace Element Ratios and Partitioning during Global Differentiation</td>
<td>Hofmann A</td>
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*Session 24a follows this session in this room: see p.492.*
## 02h: Dynamics and Chemistry in Protoplanetary Disks

**Session chaired by Doug Lin & Fred Ciesla**

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<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>15:30</td>
<td><strong>Keynote:</strong> The Joy of Making Planets in Disks: Dynamical and Chemical Recipes</td>
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<td><em>Meyer MR</em></td>
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<tr>
<td>16:00</td>
<td>From Grains to Planetesimals in Evolving Protostellar Disks</td>
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<td><em>Lin D, Zhang Y, Dai B, Feng Y &amp; Li C</em></td>
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<td>16:15</td>
<td>Large Scale Material Transport in the Protoplanetary Disk and its Relevance to the “Planetary” Oxygen Isotopic Composition</td>
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<td><em>Nagahara H &amp; Ozawa K</em></td>
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<td>16:30</td>
<td>Resolving S- and R-Process Presolar Carriers Using Ba-Isotope Anomalies in FUN CAIs, Bulk Meteorite Samples, and Ivuna Acid Leaches</td>
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<td><em>Paton C, Schiller M &amp; Bizzarro M</em></td>
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<td>16:45</td>
<td>Irradiation Histories of Meteoritic Inclusions Measured by $^{40}$K</td>
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<td><em>Wielandt D &amp; Bizzarro M</em></td>
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<td>17:00</td>
<td><strong>Invited:</strong> On the Filtering of Dust by Planetesimals and its Consequences for the Compositions of Planetary Systems</td>
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<td><em>Guillot T &amp; Ida S</em></td>
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<td>17:15</td>
<td>A Method to Constrain the Size of the Protosolar Nebula</td>
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<td><em>Kretke K, Levison H, Buie M &amp; Morbidelli A</em></td>
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**02j: In Situ, High Spatial Resolution Isotopic Measurements Applied to Extraterrestrial Materials**

Session chaired by Kate Souders & Paul Sylvester

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<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>14:45</td>
<td>The Shocking State of Baddeleyite in Basaltic Shergottite NWA 5298</td>
<td>Darling J, Moser D, Barker I, Tait K, Chamberlain K &amp; Schmitt A</td>
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<tr>
<td>15:00</td>
<td>NanoSIMS Pb/Pb Dating of Tranquillityite in Lunar Basalts</td>
<td>Tartese R, Anand M &amp; Delhaye T</td>
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<tr>
<td>15:15</td>
<td>A Coordinated <em>in situ</em> NanoSIMS, HR SEM and TEM Search for Presolar Grains in an ALHA77307 Chondrule Rim</td>
<td>Stojic AN, Brenker FE, Hoppe P &amp; Leitner J</td>
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*Session 02h follows this session in this room: see p.463.*
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenters</th>
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<tbody>
<tr>
<td>14:30</td>
<td>Clues to Atmospheric Evolution in Earth’s Ancient Sediments</td>
<td>Claire M</td>
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<tr>
<td>14:45</td>
<td>Non-Adiabatic Calculations of Ultraviolet Absorption</td>
<td>Danielache S, Suzuki T &amp; Nanbu S</td>
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<tr>
<td>15:00</td>
<td>Ocean Chemistry Before and after the Rise of Atmospheric $O_2$</td>
<td>Halevy I</td>
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<tr>
<td>15:30</td>
<td>Hf-Nd Isotope Decoupling in Early Precambrian Seawater</td>
<td>Viehmann S, Hoffmann JE, Münker C &amp; Bau M</td>
</tr>
<tr>
<td>15:45</td>
<td>Archean Mo Isotopic Evolution: Comparing the Pilbara and the Kapvaal Cratons</td>
<td>Wille M, Kurzweil F, Eroglu S, Schoenberg R, Beukes N &amp; Van Kranendonk M</td>
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<tr>
<td>16:00</td>
<td>Cr Isotopic Variations in Neoarchean to Paleooproterozoic Near-Surface Chemical Sediments</td>
<td>Schoenberg R, Kleinmanns I, Wille M, Van Zuijen M, Pedersen R-B, Melezhik V &amp; Beukes N</td>
</tr>
<tr>
<td>16:15</td>
<td>Establishment of Euxinic Oceanic Conditions Following the Lomagundi Event</td>
<td>Ngombi-Pemba L, Canfield DE, Hammarlund EU, Bengtson S, Pierson-Wickmann A-C, Gauthier-Lafaye F, Rouxel O &amp; El Albani A</td>
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<tr>
<td>16:30</td>
<td>Carbonates of the 2.0 Ga Zaonega Formation: REE and Sr Isotopic Indications of their Origin</td>
<td>Crne AE, Lepland A, Kamber BS, Melezhik VA, Prave AR, Fallick AE, Brasier AT &amp; Condon DJ</td>
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<tr>
<td>16:45</td>
<td>Microbially Mediated Phosphogenesis 2 Ga ago</td>
<td>Joosu L, Lepland A &amp; Kirsimäe K</td>
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<tr>
<td>17:00</td>
<td>Oxygen Before Cyanobacteria Implied from Magnetotactic Bacteria</td>
<td>Yu H &amp; Kirschvink J</td>
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<tr>
<td>17:15</td>
<td>Cerium Stable Isotope Fractionation as a Potential Paleo-Redox Proxy</td>
<td>Nakada R, Takahashi Y &amp; Tanimizu M</td>
</tr>
</tbody>
</table>
05e: Volatiles in the Mantle: Origin, Evolution and Consequences for Earth’s Dynamics

Session chaired by Alberto Saal & Manuel Moreira

14:30  Water Content of Inclusions in Superdeep Diamonds  
Shirey SB, Hauri EH, Thomson AR, Bulanova GP, Smith CB, Kohn SC & Walter MJ

14:45  C, N₂, Ar, He in Fluid Inclusions in a Garnet Lherzolite from Oasis Jetty, East Antarctica  
Buikin A, Verchovsky A, Solovova I & Kogarko L

15:00  Experimental Melting of Phlogopite-Peridotite at 1 GPa – Implications for Potassic Magmatism  
Condamine P, Médard E, Laporte D & Nauret F

15:15  Recycled Volatiles beneath the Western Antarctic Rift  
Broadley M, Ballentine C, Dallai L & Burgess R

15:30  Relationship between Volatiles and Noble Gases in Icelandic Lavas: Evidence for Crustal Recycling  
Mukasa SB, Loudin LC, Peterson M & Dixon ET

15:45  The D/H Ratio of the Deep Mantle  
Hallis LJ, Huss GR, Taylor GJ, Nagashima K, Halldórsson SA & Hilton DR

16:00  Halogens in Basalts of the Azores, Canaries and Tristan da Cunha  
Jeppson L, Burgess R, Fernandes V, Murphy D & Ballentine C

16:15  Halogen Partitioning Behavior at Earth’s Mantle Conditions  

16:30  Helium Isotope and C³⁷He Signatures in the Northern Lau Basin: Distinguishing Arc, Backarc, and Hotspot Affinities  

16:45  Convergence in Chemical Compositions between Aqueous Fluid and Silicate Melt in the Peridotite-H₂O System  
Mibe K, Kawamoto T & Ono S

17:00  The Halogen Cycle in Subduction Zones: Insight from Back-Arc Basin Basalts  

17:15  Noble Gas and Halogen Recycling at Subduction Zones  
06g: Quantification of Metamorphic Processes and the Thermo-Tectonic Evolution of Orogens

Session chaired by Michael Brown, Bernardo Cesare, Sumit Chakraborty & Taras Gerya

14:30 Invited: Garnet, Zircon and Monazite as Monitors of High-Temperature Metamorphic Events: How Useful are They? Clark C

14:45 Timing of Ultra-High Temperature (UHT) Metamorphism and Formation of Incipient Charnockites in the Kerala Khondalite Belt (KKB), Southern India Taylor R, Clark C & Fitzsimons I

15:00 Combined Lu-Hf and Sm-Nd Garnet-Geochronology of Lower Crustal Rocks from Val Strona, Ivrea Zone, Italy van de Löcht J, Schüngel M, Kleinschrodt R, Münker C, Kirchenbaur M & Fonseca R

15:15 Dating Metamorphic Stages in HP-Terranes: Case Study in the Sesia Zone (NW-Alps, Italy) Giuntoli F, Engi M & El Korh A

15:30 Relating U-Th-Pb Ages of Accessory Minerals to Metamorphism: A Case Study from the Barrovian Sequence of the Central Alps, Switzerland Boston K, Rubatto D, Hermann J, Amelin Y & Engi M

15:45 Duration of Prograde Metamorphism in the Inverted Barrovian Sequence, Sikim Himalaya, India Anczkiewicz R, Chakraborty S, Dasgupta S & Mukhopadhyay D

16:00 Protracted Cooling from Neoproterozoic Metamorphic Events in the NW Highlands, Scotland Investigated Using Garnet Lu-Hf and Sm-Nd Geochronology Bird A, Thirlwall M & Strachan R

16:15 Timescales of Metamorphism: A Hierarchical Distribution Chakraborty S

Session 24c follows this session in this room: see p.493.
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>15:45</td>
<td>Carbonate Speciation in Depolymerized Silicate Melts (Glasses): New Evidence from \textit{ab Initio} Calculations and $^{13}$C MAS and Static NMR Measurements</td>
<td>Xue X, Kanzaki M</td>
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<td>16:00</td>
<td>Effect of K$_2$O Addition on the Viscosity of CaO-SiO$_2$-Al$_2$O$_3$ Melt</td>
<td>Sukenaga S, Higo T, Shibata H, Saito N &amp; Nakashima K</td>
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<td>16:15</td>
<td>Effect of Al/B Substitution on Structure and Properties of Silicate Glasses and Melts</td>
<td>Neuville D</td>
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<td>16:30</td>
<td>On the Arrangement of Sodium Atoms Around Structural Units and Vibrational Properties of a Sodium Borosilicate Glass</td>
<td>Ispas S, Pedesseau L, Kob W</td>
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<td>16:45</td>
<td>Fe K-Edge XANES of Synthetic and Natural Silicate Glasses: Composition and fO$_2$ Dependent Structural Properties</td>
<td>Poe B, Romano C, Cibin G, Dingwell D, Hess K-U &amp; Potuzak M</td>
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<td>17:00</td>
<td>Multi-Component Silicate Glasses and Melts Under Compression</td>
<td>Lee SK</td>
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<td>17:15</td>
<td>Insight to the Local Melt Structures and their Influence on the Fractionation of Rare Earth Elements (La, Gd, Yb, Y)</td>
<td>Simon S, Wilke M, Klemme S, Caliebe WA, Chernikov R, Kvashnina KO</td>
</tr>
</tbody>
</table>
08j: Glasses and Melts at High Pressure

Session chaired by Chrystele Sanloup & Nobumasa Funamori

14:30 Keynote: Structure and Thermal Property of Dense Silicate Glasses Under High-Pressure
Murakami M

14:45 Demixing Instability in Dense Molten MgSiO₃
Bonev S & Boates B

15:00 Invited: Mineral Physics in the Terapascal Regime: Dynamic Studies of Planetary Interiors
Spaulding D

15:15 Effect of Pressure on Oxygen Fugacities in Magma Oceans
Zhang H & Hirschmann M

15:30 Invited: Silicate Melts Under High Pressure
Wang Y, Sakamaki T, Skinner L, Shen G, Yu T, Kono Y, Jing Z & Park C

Session 08a follows this session in this room: see p.468.
09g: Geochemical and Biological Consequences of Changes in the Biological Pump over Geological Time

Session chaired by Jonathan Payne, Katja M Meyer, Bas van de Schootbrugge & Elisabetta Erba

14:30 Coupling of Nitrogen Inputs and Losses during the Permian-Triassic Biotic Crisis
Knies J, Grasby S, Beauchamp B & Schubert C

14:45 Paleoredox Chemistry of Cenomanian–Coniacian Black Shales at High Paleolatitudes: Implications for the Extent of Anoxia during OAE2
Lenniger M, Nøhr-Hansen H, Hills LV & Bjerrum CJ

15:00 Response of the Biological Pump to Elevated Ocean Temperatures during the Eocene

15:15 Increasing Metabolic Activity of Clams and Brachiopods over the Past 500 Million Years: A Consequence of the Changing Biological Pump?
Payne JL, Heim NA, Knope ML, Meyer KM & McClain CR

Session 09i follows this session in this room: see p.471.
09i: Alteration Processes and Geobiochemical Interactions at Mid-Ocean Ridges

Session chaired by Esther Schwarzenbach, Chiara Boschi, Tamara Baumberger & Benjamin Eickmann

15:30  **Keynote:** Oxygen and Carbon Cycling in Basaltic Crust  
*Orcutt B, Bach W, Edwards K, Girguis P & Wheat G*

15:45  The Microbial Compelling Attraction for Hydrogarnets in the Oceanic Crust  
*Ménez B, Pasini V, Brunelli D, Pisapia C, Le Campion P, Laverne C & Gérard E*

16:00  Serpentinization, Metasomatism and Carbonate Precipitation in Jurassic Mafic and Ultramafic Sea-Floor  
*Vogel M, Früh-Green GL, Boschi C & Schwarzenbach EM*

16:15  Invited: Rocky Constraints on Catabolic Energy Supply in the Subseafloor  
*Bach W, Kahl W-A, Jöns N, Türke A & Plümper O*

16:30  B and O Isotopes as Tracers of Serpentinization along Fossil Oceanic Detachments, Troodos Ophiolite, Cyprus  
*Elisha B, Katzir Y, Abelson M, Agostini S, Valley J & Spikuzza M*

16:45  High Temperature Alteration of the Gabbroic Oceanic Crust (Ligurian Ophiolites, Italy): Evidence for Hydrothermal-Magmatic Interactions  
*Tribuzio R, Renna MR, Dallai L & Zanetti A*

17:00  Deep Fast-Spread Oceanic Crust – Fluid Interactions: Petrography and Volatiles from IODP Expedition 345 Hess Deep Plutonic Crust  
*Meyer R, Wintsch RP, Nozaka T, Gillis K, Snow JE & Expedition 345 Shipboard Scientific Party*

17:15  Low-T Hydrothermal Fluid Evolution  
*Weinzierl C, Bach W, Böhm F, Regelous M & Haase K*
### 10e: Computational/experimental Studies of Nanoscale Geochemical Phenomena

**Session chaired by Jim Kubicki, Tue Hassenkam & Martin Andersson**

<table>
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<tr>
<th>Time</th>
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<tr>
<td>14:30</td>
<td><strong>Keynote</strong>: Polyoxoions as Model Systems for Mineral Surface Chemistry</td>
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<td><em>Rustad J</em></td>
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<td>15:00</td>
<td>Proton Behavior at Water/Silica Interfaces: Reactions and Proton Transport</td>
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<td><em>Garofalini S &amp; Lockwood G</em></td>
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<td>15:15</td>
<td>A Disordered Whole-Nanoparticle Model for 6-Line Ferrihydrite</td>
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<td><em>Gilbert B, Erbs J, Penn RL, Spagnoli D, Petkov V &amp; Waychunas G</em></td>
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<td>15:30</td>
<td>Predicting the Protonation Behavior of the Kaolinite Surface</td>
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<td><em>Andersson MP &amp; Stipp SLS</em></td>
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<td>15:45</td>
<td>Novel Bionanocomposites – Chitosan Geothite Bead – for Arsenic Remediation</td>
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<td><em>He J, Bardelli F, Gehin A &amp; Charlet L</em></td>
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<td>16:00</td>
<td>Wettability Alteration of Calcite Surface Induced by Ion Exchange</td>
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<td><em>Sakuma H, Andersson M &amp; Stipp S</em></td>
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<td>16:15</td>
<td>Specific Ion Effects on the Wettability of Sandstone Particle</td>
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<td><em>Hassenkam T, Mathiessen J, Andersson MP &amp; Stipp SLS</em></td>
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<td>16:30</td>
<td>Simulating Macromolecule Behaviour on Calcite Surfaces</td>
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<td><em>Freeman C, Sparks D, Kakonyi G, Romero-Gonzalez M, Banwart S &amp; Harding J</em></td>
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<td>16:45</td>
<td>Making Natural Materials Clean – And Model Samples Dirty</td>
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<td><em>Dalby KN, Bovet N, Andersson MP, Juhl K &amp; Stipp SLS</em></td>
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<td>17:00</td>
<td>Molecular Dynamics Study of Cement-Aqueous Solution Interfacial System: Cesium Ion Fixation</td>
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<td><em>Kobayashi K, Liang Y, Bourg I &amp; Matsuoka T</em></td>
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<td>17:15</td>
<td>Research on Particles Carried by Ascending Gas Flow of Earthquake Ruptures</td>
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12d: Geochemistry of Nuclear Storage

Session chaired by Francis Claret & Claire Fialips

14:30 **Keynote:** Fe-Serpentines to Fe-Chlorites Experimental Synthesis: An Iron Metal-Shale Interaction between 60 and 300°C
*Cathelineau M, Mosser-Ruck R, Pignatelli I, Caumon M-C & Truche L*

15:00 Microbial Corrosion of Steel in Toarcian Argillite: Influence of Metabolisms and Biofilms

15:15 Coupling HTO Tracer Experiments and Tomography Imaging to Monitor the Effects of Celestite Porosity Clogging on Diffusion Properties in Porous Media
*Chagneau A, Claret F, Madé B, Wolf M, Enzmann F & Schäfer T*

15:30 Tracking High-Ph Reaction Fronts in MX-80 Bentonite Using Infiltration Techniques and 4D CT
*Dolder F, Mäder U & Jenni A*

15:45 Carbonation of Cement within a Repository for Radioactive Wastes: Impact of CO$_2$ on Cement Mineralogy and Permeability
*Rochelle C, Purser G & Milodowski A*

16:00 Micro-X-Ray-Diffraction Investigations of an Altered Cement-Clay Interface
*Dähn R, Schaub P, Popov D, Pattison P, Jenni A, Mäder U & Wieland E*

16:15 Reactive Transport in Bentonite: Experiments and Modelling
*Jenni A, Mäder U & Fernandez R*

16:30 Reactive Transport Modeling of Cement/Concrete – Rock Interaction: The Tournemire and Maqarin Cases
*Soler JM*

16:45 Zeolites as Ion Exchanger in Harsh Ultra-Alkaline Conditions
*Breynaert E, Van Tendeloo L, Gobechiya E, Wangermez W, Debiochouse B, Martens JA, Kirschhock CEA & Maes A*

17:00 Analcime Alteration of Montmorillonite: Growth Rates
*Sato H, Tsukamoto K, Owada H & Ishii T*

17:15 Invited: Bottom up Approach for the Predictive Modelling of Sorption Isotherms on Argillaceous Rocks
*Marques Fernandes M, Dähn R, Ver N & Baeyens B*
13d: Geochemistry and Mineralogy of Mine Wastes

**Session chaired by Bernd Lottermoser & Bernhard Dold**

14:30 **Invited:** Assessment of Seasonal Variations in the Mineralogical and Geochemical Features of Sulfide Mine Tailings

*Acero P, Pérez-López R, Ayora C, Quispe DL & Nieto JM*

14:45 Leaching of Zn, Cu and Pb from Oxidised Sulphidic Mine Waste as a Function of Temperature, L/S Ratio and Leaching Reagents

*Sagib N & Bäckström M*

15:00 Zinc Melanterite Formation from Acid Mine Drainage in Pan de Azúcar Mine (Zn-Pb-Ag), Northwest Argentina

*Murray J, Kirschbaum A & Dold B*

15:15 Metal Mobilization by Iron- and Sulfur-Oxidizing Bacteria in a Multiple Extreme Mine Tailings in the Atacama Desert, Chile

*Korehi H, Blöthe M, Sitnikova MA, Dold B & Schippers A*

15:30 Biogeochemistry of Acidic Lakes in the Iberian Pyritic Belt


15:45 **Keynote:** Mineralogy and Thermodynamics of Secondary Arsenic Phases

*Majzlan J, Drahota P & Filippi M*

16:15 Arsenic Mobility in Limestone and Fertiliser-Amended Tailings

*Noble T & Lottermoser B*

16:30 Weathering Processes and Supergene Formation of Uranium Bearing Minerals at U-Mines in the Saint-Sylvestre Area (French Massif Central)

*Boekhout F, Gérard M, Phrommavanh V, Descostes M & Calas G*

16:45 Bioremediation and Soil Formation Processes in Bauxite Residue Tailings

*Santini T & Warren L*

17:00 Enhancing CO$_2$ Sequestration in Mg-Rich Mine Tailings

*Harrison AL, Power IM, Wilson SA, Dipple GM & Mayer KU*

17:15 Carbonation of Serpentine Mine Tailing: The Example of Montecastelli Mine (Tuscany, Italy)

*Boschi C, Dini A, Bedini F, Baneschi I, Natali C & Dallai L*
### 14b: Reconstructing Terrestrial Hydrology: Proxies, Mechanisms, and Records

**Session chaired by Kathleen Johnson & Jessica Tierney**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>14:30</td>
<td>Uranium Isotopes as a Novel Tracer of Paleo-Hydrology?</td>
<td>Robinson LF, Swartz JM &amp; Thompson WG</td>
</tr>
<tr>
<td>14:45</td>
<td>$^{234}$U/$^{238}$U in Speleothems Revisited: Are There Generally Applicable Relationships of This Proxy to Past Environmental Change?</td>
<td>Hellstrom J</td>
</tr>
<tr>
<td>15:00</td>
<td>Variations in Triple Oxygen Isotopes in Precipitation and River Waters in the Continental U.S</td>
<td>Levin NE, Li S, Brooks JR &amp; Welker JM</td>
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<tr>
<td>15:15</td>
<td>Circulation Effect: Response of Precipitation $\delta^{18}$O to the ENSO Cycle in Monsoon Regions of China</td>
<td>Tan M</td>
</tr>
<tr>
<td>15:45</td>
<td>Invited: Reducing Uncertainty in the Climatic Interpretations of Speleothem $\delta^{18}$O</td>
<td>Jex C, Phipps S, Baker A &amp; Bradley C</td>
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<tr>
<td>16:00</td>
<td>Stalagmite Trace-Element Reconstruction of Terrestrial Hydrology: Results from Cave-Analogue Studies</td>
<td>Day CC &amp; Henderson GM</td>
</tr>
<tr>
<td>16:15</td>
<td>Seasonal Distinction of Hydrological Variability in Speleothem Calcite</td>
<td>Wynn PM, Fairchild IJ, Spotl C, Hartland A, Mattey D, Cotte M &amp; Fayard B</td>
</tr>
<tr>
<td>16:30</td>
<td>Invited: Evolution of Temperature and Precipitation during Marine Isotope Stage 5 Recorded in Speleothems from the Hüttenerbläserschachthöhle, Western Germany</td>
<td>Scholz D, Hoffmann D, Spötl C, Kocot Y &amp; Hopcroft P</td>
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<tr>
<td>16:45</td>
<td>Timing and Progression of Mediterranean Climate during MIS5 as Deduced by Speleothem Records from Corchia Cave (Central Italy)</td>
<td>Zanchetta G, Drysdale R, Hellstrom J, Fallick A, Couchoud I, Isola I, Fohlmeister J, Sanchez Goni MF &amp; Regattieri E</td>
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<tr>
<td>17:00</td>
<td>Millennial Scale Holocene Climate Variability: Iberian Precipitation Reconstructed from Two Speleothems</td>
<td>Smith AC, Wynn PM, Barker P, Leng M &amp; Noble S</td>
</tr>
</tbody>
</table>
Reconstructing Past Hydrology from Annual Cycles in Trace Elements in a Moroccan Stalagmite

*Barrott J, Day C & Henderson G*
16i: Biotic Enhancement of Weathering
Session chaired by David Schwartzman, Roger Finlay & Steeve Bonneville

14:30 **Keynote:** The Geobiology of Weathering: The 13th Hypothesis
*Schwartzman D & Brantley S*

15:00 **Invited:** Microbial Communities Colonising Bedrock Outcrops in a Swedish Forest
*Mahmood S, Ekblad A, Bylund D & Finlay R*

15:15 **Invited:** Effect of N on Microbially Mediated Weathering of Primary Minerals
*Mahmood S, Martins C, Olofsson M, Bylund D & Finlay R*

15:30 **Invited:** Contrasting Patterns of Bacterial Weathering of Granite, Granulite and Gabbro from Tropical Regions of South India
*Subashri R, Dash J, Srinivasan B & Natarajan S*

15:45 **Invited:** Characterisation of Active Forest Soil Bacteria during Mineral Weathering
*Kelly L, Uroz S & Turpault M-P*

*Session 16j follows this session in this room: see p.478.*
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>16:00</td>
<td>Geochronology of Weathering and Pedogenesis</td>
<td><em>Vasconcelos PM</em></td>
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<tr>
<td>16:15</td>
<td>The Recovering of Weathering Propagation Rates from the Analysis of <strong>238</strong>U-<strong>234</strong>U-<strong>230</strong>Th-<strong>226</strong>Ra Nuclides in Regoliths</td>
<td><em>Chabaux F, Pelt E, Di Chiara-Roupert R, Rihs S &amp; Stille P</em></td>
</tr>
<tr>
<td>16:45</td>
<td><strong>87</strong>Sr/<strong>86</strong>Sr in Gypsic Soils of Hyperarid Settings as an Altitude Proxy: Results for Northern Chile (19-24°S) and Paleoaltimetry Applications</td>
<td><em>Cosentino N &amp; Jordan T</em></td>
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<td>17:00</td>
<td>Meteoric <strong>10</strong>Be in Soils of Loessic Origin- a Case Study of Luvisols from Northern France</td>
<td><em>Jagercikova M, Cornu S, Mayor M, Guillou V &amp; Bourlès D</em></td>
</tr>
</tbody>
</table>
18b: Climate Impacts on SOM Storage and Decomposition

Session chaired by Ingrid Kögel-Knabner & Margaret Torn

14:30 **Keynote:** Vulnerability and Resilience of Soil Organic Matter to Environmental Change
*Amelung W, Herbst M, Sandhage-Hofmann A, Meyer N & Vereecken H*

15:00 **Keynote:** Microbial-Soil Organic Matter Linkages in Response to Climate Warming
*Frey S*

15:30 **Invited:** Sequestration of Labile Organic Carbon in Alaskan Permafrost Soils
*Mueller CW, Kao-Kniffin J, Rethemeyer J, Löppmann S, Hinkel K & Bockheim J*

15:45 Stable Soil Carbon Decomposition is More Sensitive to Temperature. Evidence from Long Term Bare Fallow Experiments

Session 18f follows this session in this room: see p.480.
18f: Impacts of Soil, Air, and Water Geochemistry on Human Health

Session chaired by Alexander van Geen

16:00  Mercury Biogeochemistry and its Biomagnification in the Fish Food Web in Three Gorges Reservoir after 175 m Impoundment
       Wang Y, Ma M & Yu Y

16:15  Use of Passive Sampling to Measure Organic Chemicals and Metabolites in Water and Soil: Application to Human Health Risk Assessment in Developing Countries
       Shea D, Hong T, Xia X-R, Kong X, O’Neal K & Lazaro P

16:30  Mineralogy, Geochemistry and Metals Content in Tailings, Sediments and Soils Next to Some Metallic Ore Deposits in East Central Mexico
       Carrillo-Chavez A, Cruz N, Salas E, Monoz C, Audifred A & Levresse G

16:45  Spatial Distribution of Heavy Metals in the Urban Soils of Chisinau City (Republic of Moldova)
       Tofan E, Iancu GO, Jigau G & Buzgar N

17:00  Distribution, Correlation and Health Risk Assessment of Heavy Metal Contamination in Surface Soils Around an Industrial Area, Hyderabad, India
       Aradhi KK & Kurakalva RM

17:15  Major and Trace Element Geochemistry in Groundwater of Patancheru Industrial Area, Andhra Pradesh, India
       Banothu D

Session chaired by Carol Arnosti, Moritz Lehmann, Scott Wankel, Bo Thamdrup & Joel Kostka

14:30 Invited: Algal Mats of the North Pole: How Sea Ice Melt can Cause Anoxic Spots on the Arctic Deep-Sea Floor
Boetius A & Wenzhöfer F

14:45 Functional Contrasts and Functional Redundancy in Arctic Bacterial Communities in the Oxic Water Column and Anoxic Sediments
Arnosti C, Cardman Z, Steen A, Ziervogel K & Teske A

15:00 A Constant Flux of Diverse Anaerobic Thermophilic Endospores into Cold Marine Sediments

15:15 Controls of Microbial Nitrate/Nitrite Respiration in Polar Marine Sediments and Implications for Global Climate Change
Canion A & Kostka J

15:30 The Cycling and Transport of Glacially Derived Iron in Arctic Fjord Sediments
Wehrmann LM, Formolo MJ, Owens JD, Ferdelman TG, Raiswell R & Lyons TW

15:45 Invited: Correlative Imaging of Microbial Transformations in Nature
Kuypers M

16:00 Linking Iron and Nitrogen Cycles in Lake Sediment
Robertson E & Thamdrup B

16:15 Benthic Nitrogen Fixation and Mn/Fe Reduction in the Mauritanian Oxygen Minimum Zone: Two Overlooked Processes?
Treude T, Bertics V, Gier J & Sommer S

16:30 Sediment Phosphorus Dynamics in a Marine Coastal Lake: Response to Seasonal Bottom Water Anoxia
Sulu-Gambari F, Seitaj D, Meysman F & Slomp C

16:45 Activity of Cable Bacteria and Electro-Physical Properties of Gradient Systems Studied with a Novel Microsensor for Electric Potential
Damgaard LR, Risgaard-Petersen N & Nielsen LP
17:00  Distribution of Metabolic Activity and Current Production along Conductive Cable Bacteria

Pfeffer C, Larsen S, Damgaard LR, Nielsen LP & Risgaard-Petersen N

17:15  Competition for Sulfide in Marine Sediments: Electrogenic Filamentous Bacteria Versus Beggiatoa

Seitaj D, Malkin SY, Schauer R & Meysman FJR
20c: Deviant Isotopologues: Theory, Processes and Measurements of Clumped Isotopes and Position-Specific Fractionations

Session chaired by Rosemarie Came, Edwin Schauble, Mathieu Daëron & Cedric John

14:30 Invited: Atmospheric Chemistry and Dynamics Recorded in the Isotopic Ordering in O₂ and CO₂
Yeung L, Young E, Schauble E, Affek H, Boering K, Eiler J & Okumura M

14:45 Anharmonic Effects of Equilibrium Clumped Isotope Signatures for H₂O, H₂S, SO₂, NH₃ and CH₄
Liu Q & Liu Y

15:00 Isotopologue Effects in the Generation and Consumption of Nitrous Oxide
Magyar P, Kopf S, Orphan V & Eiler J

15:15 Combined ¹³C-D and D-D Clumping in CH₄: Preliminary Results
Stolper D, Shusta S, Valentine D, Sessions A, Ferreira A, Santos Neto E & Eiler J

15:30 Doubly ¹³C-Substituted Ethane
Clog M, Eiler J, Guzzo J, Moraes E & Souza I

15:45 Site-Specific Carbon Isotope Measurement of Organics by Gas Source Mass Spectrometry

Session 20i follows this session in this room: see p.484.
20i: Understanding Microbes: Frontiers in Analytical Geomicrobiology

**Session chaired by Janice Kenney, Daniel Alessi & Harish Veeramani**

16:00 Discovery and Characterization of Contrasting Siderophores Produced by Related Nitrogen Fixing Bacteria Using High Resolution LC-Ms

*Baars O, Perlman DH, Kraepiel AML & Morel FMM*

16:15 **Invited:** Cryo-Xps Monitoring of Cell Wall Compositional Changes for *Bacillus subtilis* as a Function of pH and Zn$^{2+}$ Exposure

*Ramstedt M, Leone L, Shchukarev A & Persson P*

16:30 Spectroscopically Visualising the Availability of Goethite-Sorbed Phosphate to Soil Microorganisms

*Kenney J, Giesler R & Persson P*

16:45 **Invited:** Biogeochemical Cycling of Au and Pt – Integrating Field Studies, Micro-Analyses and Molecular Biology

*Reith F, Zammit C, Nies DH, Southam G & Brugger J*

17:00 **Invited:** Phase Identification of Complex Cu-Fe Sulfides Using Time-Of-Flight Secondary Ion Mass Spectrometry (TOF-SIMS)

*Harmer S & Kaleowda Y*

17:15 Nano and Bulk-Scale Characterization of Biogeochemical Processes: A Case Study

*Veeramani H & Hochella, Jr M*
20k: Laser Gas Analyzers and their Application In The Geochemical Sciences

Session chaired by Erik Kerstel & Peter Werle

14:30 Medal: Trace-Gas Measurements in Firn and Ice Cores Using CRDS Instruments
Chappellaz J

15:15 Keynote: Airborne Measurements of Atmospheric Trace Gases via Infra-Red Laser Absorption Spectroscopy
Fischer H

McDermitt D, Xu L, Lin X, Amen J, Welding K, Anderson T & Komissarov A

16:00 Invited: Atmospheric Trace Gases and Isotopologues Using Mid-Ir Laser Direct Absorption Spectroscopy

16:15 Invited: Tracking Stable CO₂ Isotopes with Laser Spectroscopy at Jungfraujoch
Emmenegger L, Tuzson B, Sturm P & Henne S

16:30 Invited: Applications of Absorption Spectroscopy for Water Isotopic Measurements in Cold Clouds

Orr-Ewing A, Reid J, Carruthers A, Walker J & Mason B

17:00 First Investigations of IO, BrO, and NO₂ Summer Atmospheric Levels at a Coastal East Antarctic Site Using Mode-Locked Cavity Enhanced Absorption Spectroscopy
Grilli R, Méjean G, Legrand M, Preunkert S & Romanini D

17:15 Use of Mobile Laser-Based Methane Analysers to Target Plume Sampling for High-Precision Isotopic Analysis
21c: Transition Metals and Strongly Correlated Systems

Session chaired by Stephen Stackhouse, Dane Morgan & Vallerie Vallet

15:45 **Keynote:** Electronic Structures of Transition Metal Oxides and Sulfides: Applications to the Physics and Chemistry of the Earth
_Sherman DM_

16:00 **Invited:** Electronic Spin Transitions of Iron and Geoelectrons in Earth’s Mantle
_Lin J-F_

16:15 **Invited:** DFT+U Investigations of Spin Crossovers in Lower-Mantle Minerals
_Hsu H_

16:30 **Invited:** Dynamical Mean Field Theory and Insulator to Metal Transitions in FeO and Other Iron-Bearing Minerals
_Cohen R & Haule K_

Session 21d follows this session in this room: see p.487.
21d: Transport Processes in the Earth's Interior from Experiment and Simulation

Session chaired by Andrew Walker, Patrick Cordier, James Van Orman & David Dobson

16:45 Keynote: Mechanisms and Kinetics of Hydrogen Exchange in Olivine: A Review from Experimental and Computational Studies
Ingrin J

17:00 Hydrogen Diffusion in Ti-Bearing Forsterite
Padrón-Navarta JA, Hermann J & O’Neill HS

17:15 Thermal Conductivity of (Mg, Fe)O from Ambient to Deep Mantle Conditions
Beck M, Haigis V, Schilling F & Jahn S
21f: Theoretical and Experimental Approaches to Geochemical Reactions, Including Solvation, Complexation, Adsorption, and Redox

Session chaired by Aurora Clark & Udo Becker

14:30 Keynote: Modelling Trace Metal Partitioning into Calcium Carbonate from Solution

*de Leeuw NH, Ruiz Hernandez S & Grau Crespo R*

15:00 FT-ICR Mass Spectrometric and Density Functional Theory Studies of Solvated Cerium Chloride Clusters

*Lemke K & Zhao Y*

15:15 Modeling Inverse Adsorption Isotope Effects for CO₂ and CH₄ from Experimental and Field Data

*Larson T & Lu J*

15:30 Uranium Reduction on Magnetite: An Electrochemistry Approach

*Yuan K, Ewing RC & Becker U*

Session 21c follows this session in this room: see p.486.
22c: Mineral Reactivity and Interface Processes

Session chaired by Encarnación Ruiz Agudo, Henry Teng & Christine Putnis

14:30 Raman Spectroscopy Evidence for the ikaite-Calcite/Vaterite Transformation
**Sánchez-Pastor N., Oehlerich M., Astilleros JM, Kaliwoda M., Mayr C., Schmahl WW & Fernández-Diaz L.**

14:45 Linking nm-Scale Characterizations of Altered Silicate Surface to Macroscopic Dissolution Rate Laws: New Insights Based on Diopside
**Daval D., Hellmann R., Saldi GD., Wirth R & Knauss KG.**

15:00 Pseudomorphic Replacement of Diopside during Interaction with (Ni, Mg)Cl₂ Aqueous Solutions
**Majumdar AS., King HE, John T., Kusebauch C. & Putnis A.**

15:15 Mechanisms of Replacement Reactions of Single Cerussite PbCO₃ Crystals by Pyromorphite, Mimetite and Vanadinite
**Kwaśniak-Kominek M. & Manecki M.**

15:30 A Potential Steel Passivating Layer: Fe-Saponite and Chlorite Growth on Steel in High P, T Engineered Barrier Experiments
**Caporuscio F. & Cheshire M.**

15:45 Experimental Incorporation of U into Xenotime at 900°C, 500-1000 MPa Utilizing Alkali-Bearing Fluids
**Harlov D. & Rhede D.**

16:00 Kinetic Experiments of Actinolite in CaCl₂ –HCl-H₂O up to 400°C
**Hu S., Zhang R & Zhang X.**

16:15 Diamond Dissolution in COH Fluids
**Fedortchouk Y.**

16:30 A Bond Valence Approach to Surface Energy and Crystal Morphology
**Mutter A. & Dove M.**

16:45 Rb and Sr Adsorption at the Quartz(101) – Water Interface
**Bellucci F., Lee SS., Zhang Z., Fenter P & Wesolowski D.**

17:00 Reactivity and Chemical Reduction of Iron Oxides Nanoparticles in Highly Alkaline Medium
**Duchateau A., Chanéac C. & Jolivet J-P.**

17:15 Can We Learn About Bacterial Attachment at Mineral Surfaces Through Colloid Adsorption Experiments?
**Fischer C., Konneke M., Arvidsson RS, Hinrichs K. & Luttge A.**
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
</tr>
</thead>
</table>
*Vollmer MK & Brennwald M* |
| 14:45 | Resolving Gas Transport Through Compacted Sand/Bentonite Material by Using Noble Gases  
*Rueedi J, Senger R & Marschall P* |
| 15:00 | $^{81}$Kr Concentrations in Deep Fracture Waters of the Witwatersrand Basin, South Africa  
| 15:15 | Linking Noble Gas and CH$_4$ Concentrations in the Sediment Porewater of Lake Lungern, Switzerland  
*Tyroller L, Brennwald M, Ndayisaba C, Tomonaga Y & Kipfer R* |
| 15:30 | Deep Geothermal Reservoir Analysis in the Upper Rhine Graben Using a Geochemical and Isotopical Multi-Tracer Method – First Results  
*Al Najem S, Freundt F, Isenbeck-Schröter M & Aeschbach-Hertig W* |
| 15:45 | Gas Geochemistry of Spring Waters along the Alpine Fault, NZ  
*Niedermann S, Zimmer M, Erzinger J, Cox SC, Menzies CD & Teagle DA* |
| 16:00 | Earthquake-Driven Noble-Gas Geochemistry in Lake Van (Turkey)  
*Tomonaga Y, Brennwald MS, Maden C, Meydan AF & Kipfer R* |
| 16:15 | Radon Activity Around Active Faults in a Geothermal Environment  
*Davidson J, Gravley D, Nicol A & Fairley J* |
| 16:30 | Helium Isotopic Gradients in a Catchment Basin: Constraining Groundwater Flow Patterns and Residence Times  
*Pinti DL, Vautour G, Rouleau E, Castro MC & Sano Y* |
| 16:45 | Flow Dynamics and $^3$H/$^3$He Ages of Deep Groundwater at Gardermoen (Oslo Airport, Norway)  
*Sundal A, Aagaard P, Wejden B & Brennwald MS* |
17:00 Multitracer Paleoclimate and Recharge Study of Groundwater in the North China Plain
Schneider T, Aeschbach-Hertig W, Zheng C & Cao G

17:15 Geochemistry of Fluids from the Eastern Carpathians and Transylvanian Basin Boundary (Romania) – Constraints on the Origin of Mineral Waters and Dissolved Gases
Kis B-M, Italiano F, Baciu C, Rizzo A & Kármán K
### 24a: Continental and Regional Scale Geochemical Mapping

Session chaired by Benedetto De Vivo & Ilse Schoeters

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:00</td>
<td><strong>Keynote:</strong> The National Geochemical Survey of Australia (NGSA) Project</td>
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<td>16:15</td>
<td>Geochemical Mapping of $^{87}\text{Sr}/^{86}\text{Sr}$ Ratios Using Stream Sediments in Japan</td>
<td><strong>Jomori Y, Minami M &amp; Ohta A</strong></td>
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<td>16:30</td>
<td>Geochemical Baseline Mapping in India Using Top and Bottom Soil Samples for Environmental Management</td>
<td><strong>Govil P</strong></td>
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<td>17:00</td>
<td>The URGE Project in Italy: The Acerra–Pomigliano-Marigliano Conurbation</td>
<td><strong>Albanese S, Lima A, Rezza C, Ferullo G, De Vivo B, Chen W &amp; Qi S</strong></td>
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<td>17:15</td>
<td>Regional Urban Geochemical Baseline for Heavy Metals and Persistent Organic Pollutants in Dublin, Ireland (SURGE Project)</td>
<td><strong>Glennon M, Scanlon R, O'Connor P, Harris P &amp; Ottesen RT</strong></td>
</tr>
</tbody>
</table>
24c: High Temperature Geochemistry

Session chaired by Andrew Matzen

16:30 The Future of Thermodynamic Databases: Community Driven Data Systems Fueled by the Geoinformatics Revolution
*Ghiorso M*

16:45 Developing a Cyberinfrastructure Vision for Geochemistry, Petrology, and Volcanology
*Lehnert K & Hsu L*

17:00 $^{238}$U-$^{230}$Th and $^{235}$U-$^{231}$Pa Disequilibria from the Island of Fogo, Cape Verde
*Adena K, Elliott T & Ramalho R*
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12:00-13:15 Lunch
• Boxed lunches (ticket only)
  Ground Floor Spadolini
• Buffet lunches (ticket only)
  Arsenale

13:30-17:30 Oral Sessions
(L01-L13 and U01-U06, Spadolini)

17:30-20:00 Poster Sessions
(Ground Floor, Spadolini)

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