

August 2009

VGP Section Newsletter #37

Dear colleagues,

This issue of the AGU Volcanology, Geochemistry, and Petrology Section newsletter contains several items of news and one very important bit of information about AGU in item 2 that is relevant to all members. Archives of newsletters, and much more VGP-related information can be found at the VGP website (<http://vgp.agu.org>). Please provide any feedback to Sarah Fagents at fagents@hawaii.edu.

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(1) VGP NEWS

VGP has been busy and the following are some headline items. In each case a lot of work has gone on behind the scenes by some very committed individuals and committees. Our thanks go out to all of these members for their support and efforts.

- 2009 Joint Assembly, Toronto, Canada

The spring Joint Assembly was by far the best in recent years in terms of VGP interests. We owe a huge debt of gratitude to the organiser of the Toronto meeting but particularly Don Baker who organized the sessions. In addition to the sessions, Mark Harrison gave us a tour through the issues of the early Earth in his Daly Lecture and several VGP members were made AGU Fellows at the Honors evening.

- Electing New VGP Officers

We will be electing new officers over the coming months. In each case you will be asked to cast your vote for one of two candidates. The following have agreed to serve if elected:

VGP President-elect (to follow Steve Sparks)

- *Bernard Marty*
- *Catherine McCammon*

Volcanology and Petrology Secretary (to follow Paul Wallace)

- *Anita Grunder*
- *Elisabeth Widom*

Geochemistry Secretary (to follow Janne Blichert-Toft)

- *Matt Kohn*
- *Sumit Chakraborty*

We are very grateful to the Nominations Committee (comprising *Kelly Russell* (UBC), *Hugh O'Neill* (ANU), *Susan Humphris* (WHOI), *Steven Goldstein* (LDEO), *Barb Dutrow* (LSU), and Committee Chair *Bill McDonough* (U Maryland)), for providing us with such an excellent list of difficult choices. Please take this very seriously and vote when the time comes.

- **Kuno Award**

I am delighted to say that this year's Kuno Award will be given to **Edwin Schauble** of UCLA for his pioneering work in theoretical modeling of stable isotope fractionation. Thanks to *Jon Davidson* for chairing the committee again. The other committee members were *Ikuo Kushiro, Charlie Bacon and Craig Manning*.

- **Bowen Award**

It also gives me great pleasure to announce that **Tim Holland** (Cambridge) and **Roger Powell** (Melbourne) will share this year's Bowen Award for their groundbreaking work in thermodynamics and metamorphic petrology. The committee was chaired by *Frank Spear*, the other members being *Frank Richter, Francis Albarede, Kathy Cashman and Roberta Rudnick*.

- **VGP at the 2009 Fall AGU Meeting**

The **Kuno and Bowen Awards** will be presented at Fall AGU in San Francisco on Tuesday, December 15 at the VGP Reception from 6:30 to 8:00 p.m. Please show up to support your colleagues and share in the occasion. Last year's award ceremony was excellent and this year we expect to improve upon it still further by providing a more reasonable amount to drink after the awards. Tim and Roger will also present some of their research in the Bowen Lectures. This promises to be another great Fall Meeting. *Janne Blichert-Toft* and *Paul Wallace* have worked hard on the program and special sessions (see item (3) below). The Fall meeting is unlike any other geosciences meeting and I would encourage you to plan on attending. It is now of sufficient size and consistency that there is a level of certainty that your colleagues will also be attending. However, it is much more than a VGP meeting; it is the biggest and many would argue the best meeting worldwide for bringing together almost the full spectrum of geoscientists to discuss the gamut of science from the origins of the solar system to the future of our anthropogenically perturbed environment with all of the ramifications for policy and the public awareness of science.

(2) BEYOND VGP

- **Changes in AGU**

Members may not all be aware but the President and President-elect of VGP sit on the AGU Council. AGU is now so big (>50,000 members) that although many VGP members probably have their own ideas for change it is not always easy for them to engage in a manner that makes them feel they are a part of the larger organization. For this reason and with a lot of consultation with various groups throughout AGU, Council has been considering new ways of organizing AGU. VGP members need to be aware of these issues; there will be more information and the need to vote on these issues in the coming months.

At the Joint Assembly in Toronto, the AGU Council passed three measures important to the Union's future: (1) a recommendation for a change in governance structure, (2) the schedule for the search for a new executive director, and (3) the announcement of a new strategic planning initiative.

- **Changes to Governance**

The AGU Council voted unanimously to (1) create a 16- member AGU Board of Directors elected by the membership to oversee the business of the Union and (2) expand the AGU Council to include section, focus group, and committee leaders to focus on matters related to the scientific activities of the Union.

The Council believes the changes will:

- Ensure more efficient and accountable volunteer oversight;
- Enable adaptation to a dynamic environment;
- Foster a healthy balance of power between staff and volunteer leaders;
- Correct inequities many perceive in the current system by including focus groups and committee chairs in Council decision making;
- Facilitate sections, focus groups, and committees working together to deliver the science needs

of our community.

- A New Executive Director

The AGU Council also approved a schedule for the executive director search, which is part of a yearlong succession planning process led by the Executive Review Committee. This search will officially begin in August 2009 and culminate in the selection of a new executive director by spring 2010. Applications will be sought in November–December 2009. As part of the succession planning process, AGU appointed Robert Van Hook as interim executive director following the retirement of Fred Spilhaus in January 2009.

- New Strategic Planning Initiative

Finally, the AGU Council approved a new strategic planning process that represents a fundamental shift from the past, which involved a small group planning on a 2-year cycle coinciding with presidential terms. Our new strategic planning culture, in contrast, will have a 5- to 10-year outlook, provide continuity across multiple leadership cycles, and actively engage AGU members, leaders, and external partners to help shape the future. It will be more transparent in how we plan, budget, and execute activities that members want AGU to undertake.

These are important and exciting opportunities for change that we will be asking you to consider carefully. Other issues, such as the way AGU delivers its meetings, publications and web presence, are also being considered. We need your opinions on these matters and believe that the new structure will make it easier for AGU to work as a cohesive society in charting its future.

Have a great summer, don't forget the abstract deadline, and look out for more information on the changes taking place in AGU.

Best wishes,
Alex Halliday
VGP President

(3) VGP SESSIONS AT THE 2009 AGU FALL MEETING, DECEMBER 14–18

Abstract Deadline: 3 September 2009, 2359 Eastern Daylight Time

The 2009 Fall Meeting in San Francisco (**December 14–18**) will once again be packed with sessions of interest to VGP members. The 44 special sessions sponsored by VGP represent a broad range of subjects within our discipline and include many new, rapidly evolving topics. In addition, there are at least two Union sessions that will be of particular interest to VGP members, as well as a host of sessions cosponsored with other sections or focus groups. Listed below are the titles, description and conveners of VGP-sponsored and relevant Union special sessions, along with titles of VGP-cosponsored sessions. You can find a full list of all sessions and descriptions online at the AGU website <http://www.agu.org/meetings/fm09/program/index.php>.

We in particular want to thank all of you who submitted proposals for special sessions this year – your effort is what makes the Fall Meeting such a big success each year.

Janne Blichert-Toft and *Paul Wallace* (VGP Secretaries)
Julie O'Leary (VGP Assistant)

Complete list of Volcanology, Geochemistry, and Petrology Sessions: (see below for complete session descriptions and names of conveners)

- V01: Volcanology, Geochemistry and Petrology General Contributions
- V02: Oceanic Plateaus Through Time: Formation, Preservation and Environmental Impacts
- V03: Volcanism in the East African Rift System (EARS)
- V04: Using Small-Scale Observations to Answer Big Questions in Earth Sciences: Advances From 30 Years of Ion Microprobe Analysis
- V05: Generation of High-Mg Andesitic and Adakitic Magmas - Petrogenetic Models and Ways Forward
- V06: Recent Developments in Non-traditional Stable Isotope Geochemistry

- V07: Mantle Heterogeneity: Origin, Scales and Caveats
V08: The Physics and Chemistry of Ignimbrites: 40 Years of Progress?
V09: Innovations in Isotope Mass Spectrometry and Isotope Metrology in Geosciences
V10: Remote Sensing of Earth's Active Volcanoes
V11: Geochemically Complex, Multicomponent Fluids and Geologic Processes
V12: Volcano-Tectonics: New Insights From Earth and Other Planets
V13: Chemical Evolution of the Mantle: Timing and Tempo?
V14: Crystals, Glass, Cracks and Bubbles: Degassing and Crystallisation in Silicic Conduits and Lavas
V15: Layered Intrusions
V16: Synthesizing Diverse Data Sets into Models of Hawaiian Plume and Island Evolution
V17: Field, Petrological, Textural, Geochemical, and Rheological Approaches to Understand Mantle Processes: A New Look at Old Problems?
V18: The Role of CO₂ in Magma Evolution and Degassing Processes
V19: Standards for Microanalysis: EPMA, LA-ICPMS and SIMS--Where are we and Where do we Need to Go?
V20: Ash Plumes, Lava Domes, Lahars, and Explosions: The 2009 Eruption of Redoubt Volcano, Alaska
V21: Mantle Potential Temperature: A Very Hot Topic
V22: Bridging Field, Geochemistry, and Physical Models to Better Understand the Evolution of Crustal Magma Reservoirs and the Generation of Differentiated Melts
V23: Major Geochemical Cycles on Earth
V24: Volatiles in the Earth - From Past to Present
V25: Cenozoic Volcanism in Western North America: Plumes, Drips, Extension and/or Subduction?
V26: Thermochronology: Diffusion Kinetics in Accessory Minerals from He to Pb
V27: New Insight Into Ultrahigh Pressure Metamorphism and Rheology in Collisional Orogenic Belts
V28: Advances in Stable Isotope Geochemistry at High Pressure and Temperature; A Multi-Disciplinary Approach
V29: Quantitative Modeling and Cyberinfrastructure in Volcanology, Geochemistry and Petrology
V30: The 2008-009 Eruption of Halema'uma'u, Kilauea: Eruption, Ascent Dynamics, and Plume Dispersion
V31: The Dynamics of Small Scale Magmatic Systems: Linking the Mantle to the Volcano
V32: Volcanic Dynamics: Temporal Changes of Physical Properties at Volcanoes With and Without Surficial Activity
V33: Volcano Databases: (Pre)Serving the Past and Present for the Future Natural Hazards
V34: Geochemical Investigations of Salt-Brine Systems at the Waste Isolation Pilot Plant (WIPP) and Other Geologic Repositories
V35: Submarine Volcanic Eruptions: Studies of Geological, Chemical, and Biological Processes
V36: A Multidisciplinary Look at Volcanism in Continental and Oceanic Plate Interiors
V37: Nano- and Micro-scale Processes at Mineral Grain and Phase Boundaries in Metamorphic and Igneous Rocks: Solid-State Diffusion, Dissolution-Reprecipitation, and Mass Transport
V38: Early Earth: Accretion, Magma Oceans, Giant Impacts and the Earliest Crust
V39: Mechanistic Understanding of Factors Influencing Non-mass Dependent Fractionation
V40: EARTHTIME and the Frontiers of U-Pb Geochronology
V41: Dynamics and Geochemical Consequences of Melting, Melt Migration, and Melt-Rock Reaction in a Multi-scale Heterogeneous Mantle
V42: Forecasting and Monitoring Volcanic-Cloud Hazards: Scientific Contributions to Aviation Safety
V43: Uranium Distribution in Time and Space: A Faithful Record of Earth's Evolution
V44: Bowen Lecture

Union Sessions: (see below for complete session descriptions and names of conveners))

- U03: Consequences and Fraction of Recycled Basalt in the Mantle
U04: Terra at 10
U05: An Earthquake in an Ancient City: the April 2009 L'Aquila (Central Italy) Seismic Sequence
U06: Diverse Views from Galileo's Window: Researching Factors and Processes of Climate Change in the Age of Anthropogenic CO₂
U07: Quantifying the Sensitivity of Landscapes to Climate-Change
U08: Mantle Heterogeneity: Bridging the Gap Between Observations and Dynamics
U09: Response of the Arctic Landscape to a Warming Climate
U10: Lunar Reconnaissance Orbiter / LCROSS: New Insights Into the Moon

- U11: Biogeophysical Exploration of Subglacial Systems and Global Implications
- U12: The Fruits of IYPE - Implementing Long-Term Activities
- U13: Consequences of an Unusually Long and Deep Solar Minimum
- U14: The Nature, Frequency, Size and Consequences of Instabilities of the Continental Lithosphere
- U15: Toward Environmental Literacy with Examples from IPY
- U16: Chemistry and Flow in Non-Aqueous Geologic Systems - CO₂ Storage, Enhanced Geothermal Systems, and Other Non-aqueous Phase Liquid (NAPL) Flow Systems
- U17: Neoproterozoic Low Latitude Glaciations: Trigger, Timing, Termination and Biotic Consequences
- U18: The EarthScope Initiative: From North America Geodynamics to New Frontiers in Science
- U19: Scientific Progress in Geophysics from 25 Years of Sharing Data and Resources
- U20: Climate Services in a Changing Climate: Approaches for User Engagement
- U21: Science and Technology in GEO and GEOSS
- U22: Sustainable Development: Long-Term Science and Policy Challenges
- U23: Understanding the Impacts of Climate Change on the Western U.S.

Sessions Co-Sponsored by VGP: (see <http://www.agu.org/meetings/fm09/program/index.php> for complete session descriptions and names of conveners)

- A45: Atmospheric Acoustics for the Geosciences
- B13: The Oxygen Side of Sulfate: Isotope Signatures and Applications
- B28: Terrestrial Biotic Influences on Silicate Weathering and the Long-Term Carbon Cycle
- DI02: Linking Earth's Deep Interior to the Surface Environment
- DI06: Structure and Dynamics of the Earth's Upper Mantle and Transition Zone: The Role of Water
- DI08: Subducting Slabs: Integrating Seismic Properties from Laboratory Data and Field Observations
- ED19: Representing Geoscience Data: For Research, Instruction, and Communicating with the Public
- EP10: As We Shape our Planet - Manmade Global Change and Natural Material Cycles
- G09: Volcano Geodesy: Monitoring and Modeling
- GP07: Geologic Insights from Magnetic Properties
- H17: Detecting and Attributing Change in Coupled Human-Hydrologic Systems: Foundations for Successful Prediction and Adaptation
- IN01: Earth and Space Science Informatics General Contributions
- IN04: Geo-Visualization with Virtual Globes
- IN05: Making Earth Science Data Records
- IN12: Semantic eScience
- IN16: Error, Uncertainty, and Data Quality in Earth and Space Observations
- IN18: Open Source Remote Sensing Software and Applications for Earth and Environmental Science
- MR02: Physics of Anelasticity and Dissipation in Earth and Planetary Bodies
- MR04: The Chemistry and Physics of Planetary Cores
- MR08: The Core-Mantle Boundary
- MR11: Masters of Terrestrial Igneous Activity: Magmas, Melts and Fluids
- NH11: Terrestrial and Satellite Observation Related to Abruzzo M6.3 Earthquake of April 6, 2009
- NH12: Multidisciplinary Approach for Earthquake Precursors Validation
- NH17: Seismic Correlation and Coupling from Underground, Surface, to the Ionosphere
- NH22: Extreme Natural Hazards: Risk Assessment and Forecasting
- P03: Mineralogy of the Lunar Crust: Results from the Moon Mineralogy Mapper
- P08: Return to the Moon: Latest Science Results
- S09: Non-double-couple Seismic Sources: Determination, Resolution, and Uncertainty
- S10: Joint Inversion of Seismic and Multi-disciplinary Geophysical Data
- S12: Monitoring Temporal Changes of Earth's Properties with Seismic Waves
- S17: Earthquake Swarms, Seismicity, and Tectonics in the Columbia Basin, Washington
- T03: The Many Faces of Slow Slip, Tremor, and Earthquakes
- T11: From East to West: New Views on the Geology and Tectonics of the Himalayan-Tibetan Orogen
- T12: Lithosphere - Asthenosphere Interaction: Top-Down or Bottom-Up?
- T14: Creating and Recycling Continental Crust in Subduction Zones: Rates, Processes and Dynamics
- T15: The Role of Magmatism in Rifting Continental Lithosphere and the Rift-Drift Transition
- T18: Heat Transfer from Pluton to Plate Scales
- T21: Cenozoic Mountain Building in Asia and South America: Impact on Surface Processes, Erosion, Climate Change, and Deep Earth Processes
- T22: Evolution of the Caribbean Plate: Linking its Tectonic, Magmatic, Metamorphic and Stratigraphic

Records

T24: Moho, Lithosphere and Upper Mantle Structure Beneath Europe: What Have we Learnt in 100 Years?

T27: The East Africa Rift System: Links Between the Surface and Depth

details: Volcanology, Geochemistry and Petrology

V01 Volcanology, Geochemistry and Petrology General Contributions

This session provides the opportunity for contributions that fall within the broad spectrum of Volcanology, Geochemistry and Petrology.

Conveners:

Paul Wallace, University of Oregon, USA, Tel: +1-541-346-5985, email: pwallace@uoregon.edu

V02 Oceanic Plateaus Through Time: Formation, Preservation and Environmental Impacts

Oceanic plateaus are one of the least well-understood tectonomagmatic environments on Earth. Although there has been significant work on extant oceanic plateaus, their origins are still controversial. Likewise, the role of ancient accreted oceanic plateaus in continental growth through geological time is contentious. More recently, the potential importance of oceanic plateau formation in environmental change has been explored. However, little attempt has been made to integrate all these aspects of oceanic plateau research. It is clear that oceanic plateau workers have much to learn from each other; hence the timely nature of this session, which will bring together those studying oceanic plateaus from a wide range of perspectives and disciplines. We invite abstracts on a variety of research topics relating to oceanic plateaus: from petrogenesis, to structure and tectonics, to accretion and preservation, to plateau-related economic mineralization and environmental impacts.

Conveners:

Andrew C Kerr, School of Earth and Ocean Sciences, Cardiff University, Park Place, Cardiff, CF10 3YE GBR, email: kerra@cardiff.ac.uk

John Mahoney, SOEST, University of Hawaii, USA, email: jmahoney@hawaii.edu

V03 Volcanism in the East African Rift System (EARS)

The East African Rift System (EARS) is presently the Earth's largest and most complex active continental extension zone, characterized by abundant magmatism, seismicity and crustal thinning. The reason for the fracturing of the African Plate has been subject to much debate but there seems to be consensus that it is due in part to the presence of rising thermal plume(s) in the mantle. Volcanism is currently spectacularly active at a number of locations including Erta Ale, Nyiragongo and Oldoinyo Lengai. EARS volcanism is commonly dominated by unusual, silica-deficient compositions including nephelinites, carbonatites and a host of site-specific rocks such as ugandite, kamafugite and katungite. This session invites contributions on all aspects of modern volcanism in the EARS: petrology, geochemistry, volatiles, xenoliths, shallow magmatic processes and regional volcanological/geologic studies. We also welcome experimental petrology studies that relate magma generation processes to the tectonic environment of the EARS.

Conveners:

Tobias Fischer, University of New Mexico, Department of Earth and Planetary Sciences, MSC 03 2040, Albuquerque, NM 87131-0001 USA, Tel: +1 505 277 0284, email: fischer@unm.edu

Tanya Furman, Pennsylvania State University, Department of Geosciences, 333 Deike Building, University Park, PA 16802 USA, Tel: +1.814.865.5782, email: furman@geosc.psu.edu

David Hilton, Scripps Institution of Oceanography, Geosciences Research Division, Scripps Institution of Oceanography, University California San Diego, La Jolla, CA 92093-0244 USA, Tel: +1 858 822 0639, email: drhilton@ucsd.edu

V04 Using Small-Scale Observations to Answer Big Questions in Earth Sciences: Advances From 30 Years of Ion Microprobe Analysis

For over 30 years, earth and planetary scientists have benefited from secondary ion mass spectrometry (SIMS). Multidisciplinary applications of SIMS involve micro-scale measurements of isotope ratios and element concentrations that span the entire periodic table. These have addressed a wide variety of questions about large-scale earth and planetary processes, such as: 1) How can the chemistry of the mantle be probed using derived melts? 2) How does the mantle melt to form basalt? 3) Can the explosivity of a volcano be predicted? 4) What were the conditions of the early Earth? 5) How did the early Solar System form? 6) What past-climate information can be obtained from marine organisms? This session seeks contributions that highlight novel techniques and groundbreaking results generated using ion microprobe techniques. We encourage submissions that explore a wide

range of topics, including igneous/metamorphic processes, paleoclimatology/biogeochemistry, mantle geochemistry, geochronology, cosmochemistry, and archeology.

Conveners:

Stan R Hart, Woods Hole Oceanographic Institution, USA, email: shart@whoi.edu

Jessica M Warren, Carnegie Institution of Washington, USA, email: jwarren@dtm.ciw.edu

Estelle F Rose-Koga, Laboratoire Magmas et Volcans, Université Blaise Pascal, CNRS, 5 rue Kessler, Clermont Ferrand, 63038 FRA, email: e.koga@opgc.univ-bpclermont.fr

Matthew G Jackson, Carnegie Institution of Washington, USA, email: mjackson@ciw.edu

V05 Generation of High-Mg Andesitic and Adakitic Magmas - Petrogenetic Models and Ways Forward

The generation of high-Mg andesitic and adakitic melts have been linked to a variety of processes including slab melting, equilibration of percolating slab melts with wedge peridotite, melting of continental lithosphere removed by forearc subduction erosion, melting related to continental lithospheric delamination, lower crustal melting, and assimilation of mafic crustal cumulates into more evolved melts. While each of these processes can explain some of the observations, in many cases there is significant controversy as to which model applies. Major problems are to define criteria to distinguish these processes and to determine which processes are dominant in explaining the majority of occurrences of high-Mg andesitic and adakitic melts. We particularly encourage contributions that test or present means of testing the available petrogenetic scenarios, and welcome contributions from the fields of mineralogy, petrology (including experimental petrology), geochemistry, melt inclusion studies, and any other suitable approaches, including those that incorporate geophysical observations.

Conveners:

Georg F Zellmer, Institute of Earth Sciences, Academia Sinica, 128 Academia Road, Sec. 2 Nankang, Taipei, 11529 TWN, email: gzellmer@earth.sinica.edu.tw

Jennifer Garrison, Department of Geological Sciences, California State University, 5151 State University Dr., Los Angeles, CA 90032 USA, email: jgarris@exchange.calstatela.edu

Suzanne M Kay, Department of Earth and Atmospheric Sciences, Cornell University, 3140 Snee Hall, Ithaca, NY 14853 USA, email: smk16@cornell.edu

Pablo Samaniego, Laboratoire Magmas et Volcans, Université Blaise Pascal - CNRS - IRD, 5 rue Kessler, Clermont-Ferrand, 63038 FRA, email: pablo.samaniego@ird.fr

V06 Recent Developments in Non-traditional Stable Isotope Geochemistry

This session will focus on recent developments in non-traditional stable isotope systems ranging from very light elements such as Li and Mg up to high z-number elements such as Tl and U. We seek contributions examining the mechanisms of non-traditional isotope fractionation and applying measurements of non-traditional isotopic systems to low- and high-temperature geochemical problems.

Conveners:

Fang-Zhen Teng, Department of Geosciences, University Of Arkansas, Fayetteville Fayetteville, AR 72701 USA, email: fteng@uark.edu

Craig Lundstrom, Department of Geology, University of Illinois-Urbana Champaign, IL USA, email: lundstro@illinois.edu

V07 Mantle Heterogeneity: Origin, Scales and Caveats

Chemical heterogeneities, observed on all length- and timescales at mid-ocean ridges and ocean islands, provide key information for understanding mantle convection. There remains much debate regarding the composition, origin and spatial distribution of heterogeneous regions. Advances in the precision and number of isotopic measurements have provided more insight through the chemical concept of mantle components (e.g. C, FOZO, and PHEM) whose physical meaning is however to be fully defined, since subduction, phase transitions, fluid migration and core/mantle reactions all appear able to induce complex mantle geology. In addition, mass fluxes related to reactive melt and fluid migration in crust and mantle, may be equally important in the creation and obliteration of such heterogeneities. This session is aimed at bringing together members of the OIB, ridge, ophiolite and margins community and invite all geochemical, petrological and theoretical contributions that help tackling in a new perspective the old problem of heterogeneity.

Conveners:

Eric Hellebrand, University of Hawaii, SOEST - Dept. of Geology and Geophysics 1680 East-West Rd, Honolulu, HI 96822 USA, email: ericwgh@hawaii.edu

Jasper Konter, University of Texas at El Paso, 500 W University Avenue, El Paso, TX 79968 USA, email: jgkonter@utep.edu

Pietro Armienti, Dipartimento di Scienze della Terra - Pisa, Via Santa Maria, 53, Pisa, I-56124 ITA, email:

armienti@dst.unipi.it

V08 The Physics and Chemistry of Ignimbrites: 40 Years of Progress?

Ignimbrites, or ash-flow tuffs, represent the largest erupted bodies of silicic magma on Earth. Their eruptions are the largest credible terrestrial natural hazard to humanity, and the deposits are the source of knowledge about physical processes in the largest-scale explosive eruptions and magmatic processes in the Earth's crust. In the ca. 40 years since R.L. Smith and co-workers published widely influential reviews of ash-flow tuffs, many studies of the physics and chemistry of ignimbrites and their eruptions have been presented, but there are still numerous unanswered questions. This session seeks contributions across the physical and chemical range of approaches to ignimbrites and what can be learned about the timing and mechanisms for generation and emplacement of these rock bodies. We encourage submissions that address integrated approaches to the dynamics of ignimbrite emplacement, impacts of such eruptions, and the nature and dynamics of the magmatic systems that gave rise to these eruptions.

Conveners:

Colin Wilson, Victoria University of Wellington, PO Box 600, Wellington, 6040 NZL, Tel: +64 4 463 9510, Fax: +64 4 463 5186, email: colin.wilson@vuw.ac.nz

Steve Sparks, University of Bristol, Wills Memorial Building Queens Road, Bristol, BS8 1RJ GBR, email: steve.sparks@bristol.ac.uk

Olivier Bachmann, University of Washington, Mailstop 351310, Seattle, WA 98195-1310 USA, email: bachmano@u.washington.edu

V09 Innovations in Isotope Mass Spectrometry and Isotope Metrology in Geosciences

Isotope Mass Spectrometry is essential to geochemical research. Recent advances in technologies and methodologies have spawned new applications in diverse fields of earth sciences. We invite contributions that emphasize new developments in isotope mass spectrometry, including advances in instrumentation, establishment of isotope reference materials, techniques for high precision ratio determinations, and methods for measuring radiogenic, cosmogenic, and stable isotopes, among others.

Conveners:

Chuan-Chou Shen, Dept Geosciences, National Taiwan University, No. 1, Sec. 4, Roosevelt Rd., Taipei, 106 TWN, Tel: 886-2-3366-5878, Fax: 886-2-3365-1917, email: river@ntu.edu.tw

Jacqueline L Mann, NIST, Analytical Chemistry Div. 100 Bureau Drive, Gaithersburg, MD 20899 USA, Tel: 301-975-4472, Fax: 301-869-0413, email: jmann@nist.gov

Robert Vocke, NIST, Analytical Chemistry Division 100 Bureau Drive, Gaithersburg, MD 20899 USA, Tel: 301-975-4103, Fax: 301-869-0413, email: vocke@nist.gov

Lars Eric Borg, Lawrence Livermore National Laboratory, 7000 East Ave L-231, Livermore, CA 94550 USA, Tel: (925) 424-5722, Fax: (925) 422-3160, email: borg5@llnl.gov

V10 Remote Sensing of Earth's Active Volcanoes

The 2009 AGU Fall meeting coincides with the 10th anniversary of the launch of NASA's first Earth Observing System spacecraft, Terra. By making large volumes of multispectral data available, at a range of spatial and temporal scales, for little or no cost, the spacecraft of the EOS era have promoted the rapid maturation of remote sensing as a tool for studying many facets of terrestrial volcanism. Several of these missions feature a direct broadcast capability, making the data suitable for real-time applications. This session will highlight recent advances in the field of satellite volcanology, with respect to basic science, algorithm development, and operational monitoring. We also invite presentations describing new opportunities for volcanologists that will be afforded by spacecraft to be launched in the future, either under the auspices of NASA, or other international space administrations.

Conveners:

Robert Wright, Hawaii Institute of Geophysics and Planetology, 1680 East West Road, Honolulu, HI 96822 USA, Tel: 808 956 9194, email: wright@higp.hawaii.edu

Vincent J Realmuto, Jet Propulsion Laboratory, CA USA, email: vincent.j.realmuto@jpl.nasa.gov

Michael Abrams, Jet Propulsion Laboratory, USA, email: michael.abrams@jpl.nasa.gov

V11 Geochemically Complex, Multicomponent Fluids and Geologic Processes

Volatile components in hydrothermal fluids exert fundamental controls on processes of metamorphism, magmatism, alteration and mineralization, and volcanic eruption. Natural hydrothermal fluids contain complex mixtures of the volatile components H₂O, CO₂/CH₄, H₂S/SO₂, Cl, F, ± B. Our understanding of complex

multicomponent fluids is currently limited, however, because experimental research typically involves only two, or more rarely, three of these volatile components. Furthermore, the limited nature of the experimental database has constrained the development of geologically accurate thermodynamic models that demonstrate how such fluids control processes of metamorphism, magmatism, alteration and mineralization, and volcanic eruption. We invite contributions from all avenues of study on geochemically complex fluids: thermodynamic, experimental, fluid/melt-inclusion, and hydrous-mineral geochemical studies. In particular, we encourage submission of contributions that focus on the interactions and interface between metamorphic/hydrothermal fluids and magmatic fluids.

Conveners:

Jim D Webster, American Museum of Natural History, Dept. of Earth and Planetary Sciences Central Park West at 79th Street, New York, NY 10024-5192 USA, Tel: 212-769-5401, Fax: 212-769-5339, email: jdw@amnh.org
Craig E Manning, University of California, Los Angeles, Dept. of Earth and Space Sciences, 595 Charles Young Drive East, Box 951567, Los Angeles, CA 90095-1567 USA, Tel: (310) 206-3290, email: manning@ess.ucla.edu

V12 Volcano-Tectonics: New Insights From Earth and Other Planets

“Volcano-Tectonics” encompasses both planetary and regional scale processes that determine every aspect of volcanic activity on many bodies of our solar system. Such volcano-tectonic processes have become an increasingly important focus of volcanological study. This session aims to provide a forum for discussion and further integration of diverse approaches to the study of volcano-tectonics at all scales. Topics for discussion include, but are not limited to: 1) the relative contribution of plate tectonics to the origin of various types of volcanic systems on different planets; 2) the control of regional-tectonic structures and/or stresses on volcanic and magmatic activity; 3) the relationships of rheology and stress state to the onset of fracturing, intrusion, and eruption; 4) the coupled growth of volcanic plumbing systems and crustal deformation, and; 5) the roles of geometric variability or mechanical heterogeneity in the structural evolution of various types of volcanic edifices. Contributions addressing such issues from the perspectives of planetary geology, remote sensing, geodesy, field geology, geophysics and, experimental and numerical modeling are invited. Descriptions of features that could be described as volcanoes in one planet, but not so in a different planetary environment are also encouraged.

Conveners:

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V13 Chemical Evolution of the Mantle: Timing and Tempo?

An increasing array of analytical approaches is leading to more detailed - and sometimes conflicting - views of long-term mantle evolution and the existence of, and interaction between, different reservoirs. This session will bring together observations from geochemistry (long and short half-life isotopic systems, stable isotopes, trace elements) of modern and ancient rocks and minerals, as well as from theoretical investigations to address key questions including: Was mantle evolution episodic or progressive? Were there nodal points in the chemical evolution of the mantle and what caused them? How do various records compare and how do we reconcile apparently discrepant isotopic records? What can the compositions of felsic rocks tell us about mantle chemistry? Does Hadean-Archean mantle evolution differ from that of the Proterozoic and Phanerozoic? Is the chondritic model for the Earth still valid for non-volatile refractory elements, and, if not, how does this change our views of mantle evolution?

Conveners:

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V14 Crystals, Glass, Cracks and Bubbles: Degassing and Crystallisation in Silicic Conduits and Lavas

The degassing and crystallization of magma during ascent and emplacement has profound implications for the mechanisms of both explosive and effusive silicic eruptions. The end product is lava or pumice that contains bubbles, crystals, cracks and glass in varying proportions. Details of the processes driving these textural changes, their timescales and consequences can be elucidated using textural and geochemical analysis, experimentation and modelling approaches. Key questions to address include how gas escapes from magma in the viscous and brittle regimes, how volatiles resorb and bubbles collapse, how rapidly magma ascends during different styles of activity, how crystallisation affects the ductile/brittle rheology of magma and how gas loss and crystal growth are interrelated. We welcome all contributions addressing these and related topics, especially those that combine natural observations with well-constrained experiments or numerical models.

Conveners:

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V15 Layered Intrusions

Layered intrusions represent a fascinating and complex manifestation of magma crystallisation and differentiation. They represent a key link between magma source and surface eruption, and can have significant economic impact through the development of mineral deposits. The study of layered intrusions brings together field geology, numerical and analogue modelling, fluid dynamics, experimental petrology and geochemical and textural study. Recent experimental, textural and geochemical work has highlighted the need for an integrated approach in order to constrain the underlying processes that control solidification, melt migration and efficiency of differentiation in mafic magma chambers. We encourage contributions that seek to advance our understanding of processes that control the development of layered intrusions, through integrated studies from any specialism.

Conveners:

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V16 Synthesizing Diverse Data Sets into Models of Hawaiian Plume and Island Evolution

The structure and composition of the Hawaiian mantle plume has been analyzed from multi-disciplinary perspectives (petrologic, geochemical, geophysical, oceanographic) utilizing a variety of data sets. Recent drilling and submarine sampling programs along the Hawaiian archipelago provide an important amplification and contrasting views to the subaerially collected Hawaiian sample set. Geochemical and petrologic data from these samples can be combined with new geodynamic models that take into account formation, distribution and migration of partial melts. This session provides a forum to synthesize the new, abundant geophysical, geochemical and petrologic data into models of island development, plume structure, melting dynamics and temporal evolution of the Hawaiian plume.

Conveners:

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V17 Field, Petrological, Textural, Geochemical

Rheological Approaches to Understand Mantle Processes: A New Look at Old Problems?

Mantle processes are key to understand mantle dynamics and formation and evolution of the lithosphere. Yet, our current knowledge of mantle processes is dominated by geochemical observations from mantle melts. In recent years there has been a revival to understand mantle processes by studying exposed mantle peridotites on-land and at sea, and the combination of field, petrological, geochemical together with experimental and numerical studies have yielded significant new insights into the interplay between melting, melt migration and deformation in mantle rocks. This session aims at bringing together a wide range of topics in the field of mantle peridotites. We encourage submissions of field, petrological/geochemical, experimental and numerical studies to understand mantle processes.

Conveners:

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V18 The Role of CO₂ in Magma Evolution and Degassing Processes

Magma degassing and crystallization are two critical and associated volcanic processes that play a major role in volcanic eruption style. Volatile transport and loss are strongly dependent on bubble growth, coalescence and ascent in volcanic conduits. In particular, carbon dioxide may exert a critical influence on magma evolution, possibly promoting magma dehydration, and processes that control both the chemistry of volcanic gas emissions at the surface and volcanic eruption dynamics. These problems are closely linked with the CO₂ budgets of volcanoes, and thus global CO₂ fluxes. This session will provide the opportunity to link these various studies for comprehensive understanding. This session will bring together physical, experimental, and numerical studies that examine degassing, gas bubble transfer and degassing budgets with a focus on CO₂. Studies of melt inclusions, volatile diffusivity, crystal/bubble growth, and surface gas records are welcome. Important questions regarding (i) the melt inclusion record of CO₂ and H₂O evolution upon magma ascent, (ii) the potential role of a CO₂-rich gas phase on magma evolution and degassing (ii) the disequilibrium processes that would result from differential diffusion during decompression

(iii) CO₂ degassing budget will be addressed.

Conveners:

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V19 Standards for Microanalysis: EPMA, LA-ICPMS and SIMS--Where are we and Where do we Need to Go?

Often the most critical possession of a microanalytical lab is not the expensive instrumentation but rather its collection of standards. But how good are those standards? More detailed investigations and comparisons of some standard materials have revealed inhomogeneities and values contradictory to the accepted/published ones. This is an opportunity for microanalysts to meet and share experiences and critically evaluate the standards which we are currently using. We will also have presentations by those who create, develop, and certify standards. This is your chance to populate a new standards wish list for the microanalytical community. (Cosponsored by Microbeam Analysis Society)

Conveners:

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V20 Ash Plumes, Lava Domes, Lahars

Explosions: The 2009 Eruption of Redoubt Volcano, Alaska

This session will address the geology, geophysics, environmental and economic impacts of the 2009 eruption of Redoubt Volcano. After about five months of precursory unrest, more than 20 explosive events occurred from March 22 - April 4 producing ash clouds as high as 19 km and ash fall over southern and interior Alaska causing hundreds of flight cancellations, and airport closures. Explosive destruction of at least two andesitic lava domes caused melting of snow and ice and resulted in lahar inundation of the Drift River valley forcing closure of an oil

storage and transfer facility. Activity was recorded by a diverse set of instruments beyond the traditional seismic and geodetic; local and global lightning detection networks, infrasound arrays, radar, and various satellite-based sensors. The goal of this session is to bring together a diverse group of scientists, and we invite presentations to highlight the multidisciplinary approach employed to monitor and investigate the eruption and its aftermath.

Conveners:

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V21 Mantle Potential Temperature: A Very Hot Topic

Petrologic estimates of mantle potential temperatures (Tp) are an important constraint in geodynamic and geophysical modeling of mantle processes, and play a central role in many geologic debates, including those regarding mantle plumes, layered vs. whole-mantle convection and Archean geodynamics. Methods of calculating Tp produce a range of values for different settings, however there is not a consensus on the absolute values. This session aims to bring together a variety of disciplines to discuss Tp. We encourage contributions relating to the calculation and use of Tp, and how variations in Tp bear on geologic interpretations. This includes, but not limited to, petrologic estimates of Tp, variations in Tp within and between MORBs and OIBs, influence of core-mantle interface on Tp, effects of Tp on mantle phase transitions, role of Tp in the plume debate, and the history of Tp through geologic time.

Conveners:

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Mike Krawczynski, MIT, USA, email: kraw@mit.edu

Christy Till, MIT, USA, email: ctill@MIT.EDU

V22 Bridging Field, Geochemistry

Physical Models to Better Understand the Evolution of Crustal Magma Reservoirs and the Generation of Differentiated Melts

Large volumes of differentiated magma are involved in Earth's plutonism and volcanism. The diversity in composition and eruptive styles shown by magmas at the surface is largely determined by processing of mantle-derived melts as they ascend and sometimes stall within the crust. Better understanding of magmatic processes in the crust requires insights from petrology, field observations, geochronology, geophysics, and physical modeling. We invite multi-disciplinary studies addressing the following questions: How much differentiation occurs in deep hot zones and how much in shallow reservoirs? Where are the large volumes of cumulates or restites required by crustal differentiation? What are the residence and differentiation timescales of magma at different levels in the crust? What processes control phase separation and differentiation? What controls the growth of giant magma reservoirs and what governs their eruptibility?

Conveners:

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Anita Grunder, Oregon State University, Department of Geosciences, Corvallis, OR 97331 USA, Tel: 541.737.1249, email: grundera@geo.oregonstate.edu

V23 Major Geochemical Cycles on Earth

Geochemistry is a powerful tool to decipher the major processes driving the Solid Earth-Ocean-Atmosphere system. Isotope and trace element geochemistry provide powerful constraints on mantle melting and mixing, the timing of fractionation events, and interactions with the ocean and atmosphere now and in the past. Combined geochemical and geophysical modeling is key for understanding the structure of the interior of the planet and its driving forces, as well as linkages between the surface and deep Earth. In this session, we encourage geochemists and geophysicists to present new data and models that improve our knowledge of the formation, differentiation and evolution of planet Earth, and the links between the major Earth reservoirs.

Conveners:

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Robert Cliff, University of Leeds, GBR, email: R.A.Cliff@leeds.ac.uk
William White, Cornell University, USA, email: wmw4@cornell.edu

V24 Volatiles in the Earth – From Past to Present

Volatiles have influenced the physical and chemical processes of the Earth's interior throughout the planet's evolution. The theme of this session is the origin, evolution, and distribution of volatiles such as water, carbon, sulfur, halogens, and noble gases in the Earth. Topics of interest encompass, but are not limited to (1) the Earth's early atmosphere, as well as in- and out-gassing of the young Earth's magma ocean; (2) the fate of volatiles during differentiation and solidification of the Earth; (3) the evolution of volatiles within the Earth from past to present; and (4) the budgets and distribution of volatiles in the Earth's interior at present and their influence on the dynamics of the Earth's interior. We invite contributions from all the disciplines of the deep Earth community that aim at some aspects of deep Earth volatiles, including related near surface processes, from the time of planetary accretion to present.

Conveners:

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Helge M Gonnermann, Rice University, Department of Earth Science 6100 Main Street MS 126, Houston, TX 77005 USA, email: helge@rice.edu

V25 Cenozoic Volcanism in Western North America: Plumes, Drips, Extension and/or Subduction?

Volcanism in Western North America during the Cenozoic encompasses ignimbrite sweeps, flood basalts, migrating volcanic lineaments, and arc volcanism. In the 1970s, this volcanic record provided an early connection between plate tectonics and continental magmatism. Since then, plumes and lithospheric delamination have been added to the list of possible instigators of volcanic activity. This session seeks to explore the relationships between the distribution of volcanism in space, time, and composition, with images of crust and upper mantle structure and dynamics – especially those capitalizing on the results of EarthScope and related projects - with the goal of improving our understanding of the evolution and driving forces of magmatism on this complex plate boundary. We seek contributions from a range of disciplines, including geochemical, petrologic, and structural observations of the volcanic record, seismologic and other geophysical observations of structure at depth, and geodynamic models that link surface volcanism to deep processes.

Conveners:

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V26 Thermochronology: Diffusion Kinetics in Accessory Minerals from He to Pb

Accessory minerals contain a rich thermochronological record from crystallization, reheating to final quenching. Knowledge of diffusion kinetics for radiogenic daughter isotopes is required to assign accurate temperatures to measured thermochronologic dates. This information in turn is crucial for accurately inferring the time-temperature paths used to interpret earth processes. The utility of the (U-Th)/He and U-Pb systems is expanding due to advances in our understanding of diffusion in a variety of U-Th bearing phases, both in minerals widely used and those emerging as new thermochronometers (e.g. zircon, apatite, titanite, rutile, monazite, Fe-oxides, magnetite, etc.). We seek contributions using a variety of approaches including theoretical, experimental, and empirical that help to better constrain the diffusion kinetic values used, as well as innovative applications of accessory minerals to deduce thermal histories from >600°C to <50 °C that bear on a spectrum of processes ranging from the deep crust to the Earth's surface.

Conveners:

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Terrence Blackburn, MIT, 77 Massachusetts Ave Bld 54-1118, Cambridge, MA 02139 USA, email: terrence@mit.edu

V27 New Insight Into Ultrahigh Pressure Metamorphism and Rheology in Collisional Orogenic Belts

Substantial quantities of continental and oceanic lithosphere fragments are recycled to various levels in subduction zones. Some of them return to the shallow crust during forearc accretion and dewatering, some return to the arc crust via volcanism, some is mixed back into the deep mantle due to ultradeep subduction, and some may even re-emerge in mantle plumes. Discoveries of ultra-high pressure mineral assemblages in collisional orogenic belts have shown that continental crust may be subducted to the mantle depths >250-300 km. Fluids migrating through subducting slabs influence virtually all aspects of mineral reactions, change deformation mechanisms and rheology, cause earthquakes, control rocks flow during mantle convection – participating therefore in larger scale tectonic processes such as mountains building. To highlight new developments in understanding these small and large scale processes the session invites participants for discussion of the following topics: (a) Microstructures and mineral reactions of UHPM rocks during subduction and exhumation, PT-paths and geological timing of the subduction and exhumation, UHP mineralogical assemblages within collisional orogenic belts; (b) deformation processes, faulting and rheology under HP-UHP conditions: observations on natural rocks, experimental modeling; (c) volatiles and fluids during mineral reactions and minerals flow; fluid distribution in rocks, transport properties of the UHPM rocks during their deep subduction and subsequent exhumation. Such integrated knowledge provides a strong foundation for better understanding mantle rheology, thermal characteristics of different mantle sections of the Earth, origin of the partial melting in deep mantle find their role within the large scale processes such as formation of the continental and oceanic lithospheres and fluid+volatiles evolution in time.

Conveners:

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Haemyoung Jung, Seoul National University Seoul, KOR, email: hjung@snu.ac.kr

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V28 Advances in Stable Isotope Geochemistry at High Pressure and Temperature; A Multi-Disciplinary Approach

The combination of experimental petrology, isotope geochemistry, and theoretical calculations is a powerful tool to answering long standing questions regarding planetary processes and formation. In this session, we hope to bring together experimentalists, theoreticians, and isotope geochemists who study the mechanisms responsible for stable isotope fractionation at high pressure and/or temperature. Contributions from stable isotope applications to planetary scale problems, core formation, and mantle processes are welcome.

Conveners:

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Catherine Macris, Department of Earth and Space Sciences, UCLA Los Angeles, CA 90095 USA, email: cmacris@ucla.edu

V29 Quantitative Modeling and Cyberinfrastructure in Volcanology, Geochemistry and Petrology

Quantitative models provide fundamental constraints on nano- to macro-scale physical and chemical hypotheses for the evolution of volcanological, geochemical and petrological systems. Dramatic advances in computing power have strengthened the role that quantification plays in understanding natural systems, and application of natural data to quantitative models provides a framework for developing more sophisticated and increasingly realistic hypotheses. The VGP cyberinfrastructure facilitates access to modeling tools as well as databases that support model development and hypothesis testing. This session focuses on cyberinfrastructure, and microscopic to macroscopic model development and application to natural data sets in volcanology, geochemistry, and petrology. We seek contributions that highlight new quantitative models, including delineation of the governing principles upon which a model is built, case studies using existing quantitative models, descriptions of model deployment in distributed computing environments, and contributions describing databases that support the VGP community.

Conveners:

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V30 The 2008-009 Eruption of Halema'uma'u, Kilauea: Eruption, Ascent Dynamics Plume Dispersion

The ongoing eruption of Halema'uma'u crater at Kīlauea, that began in March 2008, has been an unprecedented opportunity to observe a small volume explosive summit eruption at close quarters. It has been weakly explosive, with a relatively small total volume of ejecta ($< 0.01 \text{ km}^3$). For much of the eruption lava has been ponded in the funnel-shaped vent system, accompanied by open-system degassing, and the activity has taken two forms: rare, short-lived impulsive discrete explosions and long intervals of pulsating, nearly continuous degassing with minor ash (\pm spatter) emission. The proximity of the Hawaiian Volcano Observatory to the eruption site has permitted close real time monitoring and observation, together with rapid quantification of the eruption products. The resultant increase in gas emissions has produced serious health and agricultural concerns in communities down wind. We welcome contributions from geophysics, petrology and gas geochemistry, physical volcanology and numerical modeling.

Conveners:

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Matthew R Patrick, USGS Hawaiian Volcano Observatory, 1 Crater Rim Road, Hawaii National Park, HI 96718 USA, Tel: 808-967-8861, Fax: 808-967-8890, email: mpatrick@usgs.gov

Rebecca J Carey, Geology & Geophysics, University of Hawaii, 1680 East-West Road, Honolulu, HI 96822 USA, Tel: 808-221-2455, Fax: 808-956-5512, email: beccarey@hawaii.edu

V31 The Dynamics of Small Scale Magmatic Systems: Linking the Mantle to the Volcano

This session will focus on the mechanisms controlling eruption dynamics and cone formation in small scale basaltic magmatic systems (magma flux below about $10\text{-}5 \text{ km}^3/\text{a}$) that are expressed at the Earth's surface as volcano fields. These types of volcano commonly show geochemical variations which reflect the processes of melt extraction and deep fractionation that occur in near source environments and thus provide a unique window on the way that magmas behave within the mantle. In turn, the subsequent behaviour of the magma at low pressures controls gas exsolution and segregation processes that influence eruptive phenomena. The aim of this session is to bring together scientists with interests in different parts of these small scale basaltic volcanic systems in order to progress understanding of the whole. Contributions from multidisciplinary approaches ranging across tectonic setting, scoria cone studies, geophysical and volcanological observations of ongoing activity, magma composition, volatile content, magma flux rates and eruption rates, numerical modelling, plumbing geometry, and hazard analysis are particularly encouraged. The session is supported by the recently formed IAVCEI commission on monogenetic volcanism.

Conveners:

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V32 Volcanic Dynamics: Temporal Changes of Physical Properties at Volcanoes With and Without Surficial Activity

One of the main goals of current volcanological research is the identification of reliable precursors to the onset of eruptions, or to changes in an ongoing eruption. While many eruptions are preceded by increases in the rate or intensity of commonly-monitored signals, sometimes eruption onsets are not preceded by obvious changes with adequate warning times (e.g., Ruapehu 1995, Hekla 2000, Okmok 2008). Furthermore, few reliable precursors to co-eruptive changes (such as an increase in effusion rate or explosivity) have been identified, and some observed changes at volcanoes are not associated with eruptions. Thus, new approaches to detecting and understanding the significance of subtle signals of magma ascent may provide important additions to the current set of tools for eruption forecasting. We seek studies that present new observations and/or models of dynamic processes coincident with or independent of eruptions that provide insight into volcano behavior, including but not limited to temporal changes in seismicity patterns or characteristics (e.g., changes in seismic velocities or source mechanisms), gas emissions, surface deformation, temperature, microgravity, self-potential, magnetotellurics, and volcano hydrology. A second goal is to encourage discussion, finement, and synthesis of physical and numerical models for the observed changes.

Conveners:

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V33 Volcano Databases: (Pre)Serving the Past and Present for the Future

Geologic, geophysical

geochemical data on volcanoes provide a foundation for understanding current and future volcanic activity. Information on impacts and demographics enable risk assessment as well. But because these data are collected by many individuals or observatories, formats and conventions vary widely and it is a challenge to make these data useful for others. Fortunately, technological tools for managing large datasets are improving daily. Several international initiatives now offer platforms for sharing data so that they might be studied for general lessons beyond the original intent of the data collection. This session is a forum for updates and discussion of local, national and international initiatives in volcano data management. We invite contributions from all aspects and efforts of large-scale volcano data management from individuals, observatories, public and private institutions, as well as government and non-government agencies.

Conveners:

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V34 Geochemical Investigations of Salt-Brine Systems at the Waste Isolation Pilot Plant (WIPP) and Other Geologic Repositories

For the last decade, the Waste Isolation Pilot Plant (WIPP) operated by the U.S. Department of Energy has been successfully operating as a deep geologic repository for the disposal of transuranic radioactive waste. The WIPP repository is located in bedded salts of the Permian Salado Formation, which consists of interbedded halite and anhydrite layers. The geochemical environment within the WIPP after closure will be an important factor in controlling the mobility of radionuclides to the accessible environment. Over the last 20 years numerous investigations have been conducted to understand the geochemistry of these evaporitic layers, associated brines and interactions between the host rock, brines and waste materials. We particularly encourage contributions addressing the geochemistry of high ionic strength brines, effects of host rock-brine-waste interactions, and radionuclide chemistry. We welcome contributions addressing radioactive waste disposal in salt (including non-WIPP studies) from all fields, including mineralogy, petrology, geochemistry, and geomicrobiology.

Conveners:

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Laurence H Brush, Sandia National Laboratories, 4100 National Parks Highway, Carlsbad, NM 88220 USA, Tel: 575-234-0105, Fax: 575-234-0061, email: lhbrush@sandia.gov

V35 Submarine Volcanic Eruptions: Studies of Geological, Chemical Biological Processes

In the last several years, submarine volcanic eruptions have been remotely detected or directly observed in a number of diverse tectonic settings – from volcanic arcs to mid-ocean ridges, from near surface to the deep ocean, from violently explosive to mildly effusive. This range of activity has attracted multidisciplinary study, including the geochemistry and petrology of erupted lavas, the chemistry and evolution of associated hydrothermal emissions on the seafloor and in the water column, the formation mechanisms and dispersal of tephra underwater, the seismic and acoustic characterization of eruptive activity, and the speed and mode of micro- and macro-biological colonization of eruption sites. We invite contributions across the broad spectrum of disciplines that relate to understanding submarine volcanic eruptions, past and present, with an emphasis on how recent direct observations of eruptive activity shed new light on active geological, chemical, and biological processes.

Conveners:

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Julie Huber, Marine Biological Laboratory, 7 MBL Street, Woods Hole, MA 02543 USA, Tel: 508-289-7291, email: jhuber@mbl.edu

Timothy Shank, Woods Hole Oceanographic Institution, Redfield 240, MS#33, Woods Hole, MA 02543 USA, Tel: 508 289 3392, email: tshank@whoi.edu

V36 A Multidisciplinary Look at Volcanism in Continental and Oceanic Plate Interiors

Volcanism not related to plumes, rifts, or arcs occurs within continental and oceanic plate interiors around the world. Although a variety of ideas about its nature and causes have been developed within many individual geologic disciplines, multidisciplinary study of plate interior volcanism is rare and many models cannot fully explain all the observations. By looking at intraplate volcanism from all aspects of the geologic sciences using both traditional and cutting edge techniques, we hope to develop a broader more comprehensive view of this volcanism. We welcome abstracts relevant to all aspects of volcanism occurring within continental and oceanic plate interiors from all geologic disciplines. We also welcome discussions of new techniques, technologies, observations, and modeling approaches that can be used to gain a better understanding of these volcanic processes, such as results from Earthscope in the western US.

Conveners:

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V37 Nano- and Micro-scale Processes at Mineral Grain and Phase Boundaries in Metamorphic and Igneous Rocks: Solid-State Diffusion, Dissolution-Reprecipitation

Mass Transport

Recent advancements in experimental technique and microanalytical capability now allow for chemical and structural analysis of processes at mineral interfaces and along grain and phase boundaries on the micro- and nano-scales. This development is paralleled by the advent of theoretical tools that clear the way for a realistic computation of complex reaction processes including transport (grain boundary diffusion with or without a fluid) and reaction steps that continue from fluid assisted dissolution-reprecipitation to solid-state nucleation-growth mechanisms. As a consequence, it has become feasible to combine the driving forces as defined by thermodynamics (phase equilibria, phase transitions) and rheology (chemical-mechanical feedback) with reaction kinetics (e.g. diffusion, nucleation, crystal growth) at mineral interfaces in a way applicable to natural rocks. Examples include evolution of rock textures, the structure and chemical composition of grain boundaries, chemical and isotopical zoning in minerals and reaction bands, and mass transport along grain boundaries through a rock column. In this regard, one of the principal goals of this session will be to demonstrate that high resolution investigations of micro- and nano-scale processes located at grain and phase boundaries can be used to help understand large-scale metamorphic and magmatic processes in the broadest sense (e.g. tectonics, chemical mass transport in crust and mantle, metasomatism).

Conveners:

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V38 Early Earth: Accretion, Magma Oceans, Giant Impacts and the Earliest Crust

Important recent results from cosmochemistry, petrology

numerical modeling of accretion processes indicate that this is an appropriate time for a session devoted to the understanding of the accretional, petrological, geochemical, and geodynamical processes that took place in the early Earth. From accretion and giant impacts, early differentiation and segregation of the core, to the formation of

the earliest crust through the various stages of crystallisation of the magma ocean. We seek contributions from petrology, geochemistry, cosmochemistry, and geodynamics. More specifically, we welcome contributions related to: [1] accretion and giant impacts; [2] core formation; [3] crystallisation and melting processes in the magma ocean and evolution of the mantle; [4] formation of the early crust.

Conveners:

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Frederick Ryerson, Lawrence Livermore National Laboratory, USA, email: ryerson1@llnl.gov

Michael Walter, University of Bristol, GBR, email: m.j.walter@bristol.ac.uk

V39 Mechanistic Understanding of Factors Influencing Non-mass Dependent Fractionation

The ability to apply stable isotope systematics to decipher the relative importance of different sources and transformations in paleo- and modern environmental samples depends on clear mechanistic understanding of processes causing stable isotope fractionation of the element in question. In addition to the more common mass dependent fractionation, several elements are now known to undergo mass independent fractionation (MIF) which is also referred to as non-mass dependent fractionation by some groups. The most notable cases are in the traditional isotope systems (e.g., O and S) where MIF has proven to be an invaluable tool in numerous fields including cosmochemistry, paleoclimatology, physical chemistry, geochemistry and atmospheric chemistry. In addition to these elements, MIF has now been documented for some non-traditional isotope systems including U and Hg. The theories of why MIF occurs vary for different isotope systems and the possibilities include molecular symmetry and self-shielding, the magnetic isotope effect and the nuclear volume effect. This session invites submissions which provide experimental or theoretical understanding of physico-chemical factors influencing extent of MIF during earth system processes with an emphasis on low temperature processes.

Conveners:

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Bridget A Bergquist, University of Toronto, Department of Geology 22 Russell Str., Toronto Ontario, Canada M5S 3B1, Toronto, ON M5S 3B1 CAN, Tel: 416 978 3709, Fax: 416 978 3938, email: bergquist@geology.utoronto.ca

V40 EARTHTIME and the Frontiers of U-Pb Geochronology

New instrumentation, analytical methods, isotopic tracers and standards refinements of existing methods are dramatically expanding the range of topics U-Pb geochronology can address. We can now constrain rates of biological/evolutionary/climatic processes with high-precision ID-TIMS, analyze complex crystals and measure high spatial resolution depth profiles by SIMS and LA-ICPMS. Analytical strategies using ID-TIMS, LA-ICPMS, and SIMS show remarkable promise, especially in combination. However, differences in analytical strategies, data reduction protocol, and calibration materials and methods introduce significant biases that limit the integrative approach. The ID-TIMS community, under the EARTHTIME initiative, has introduced shared isotopic tracers, data reduction software, and data archiving, facilitating detailed inter-laboratory comparison and ultimately a new generation of cooperative science. The proposed session is an opportunity to showcase some of these exciting developments and advance the EARTHTIME approach to all U-Pb geochronology. Abstracts from researchers involved in development and application of new methodologies are encouraged to participate.

Conveners:

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V41 Dynamics and Geochemical Consequences of Melting, Melt Migration

Melt-Rock Reaction in a Multi-scale Heterogeneous Mantle

Several lines of evidence suggest that the melt generation and segregation regions of the mantle are heterogeneous and consist of chemically (e.g., enriched vs. depleted) and lithologically (e.g., peridotite vs. pyroxenite; dunite vs. harzburgite) distinct domains of variable size and dimension. Partial melting of such heterogeneous mantle source regions gives rise to a diverse range of basaltic magma compositions. The processes of melt migration have been subjects of continuing studies. One of the long-standing problems of mantle geochemistry is to map the heterogeneities observed in basalts into the chemical and lithological heterogeneities presented in the mantle. Such a mapping is, in general, non-linear and can be affected by a number of processes or factors: including but not

limited to, size and distributions of mantle heterogeneity; dynamics of melting, style of melt extraction, and extent of melt-rock interaction during magma transport in the mantle and the crust. In this session we invite contributions from magma dynamists, geochemists, and petrologists to discuss recent progresses in understanding the dynamics and geochemical consequences of melting, melt migration, and melt-rock reaction in a multi-scale heterogeneous mantle. Contributions from theoretical analyses, numerical simulations, laboratory experiments, geochemical and petrologic observations are encouraged. Integrated and interdisciplinary approaches are especially welcome.

Conveners:

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E Marc Parmentier, Brown University, USA, email: EM_Parmentier@brown.edu

V42 Forecasting and Monitoring Volcanic-Cloud Hazards: Scientific Contributions to Aviation Safety

The presence of volcanic ash in the atmosphere continues to pose serious hazards to aviation. This session aims to highlight scientific progress in characterizing the nature of volcanic-cloud hazards to aviation and in applying research results to the practical problem of ash avoidance. A cross-disciplinary approach is needed to address key issues, including: forecasting style and magnitude of explosive eruptions; providing rapid confirmation of ash-producing eruptions; coupling plume theory and ash-cloud dispersal; investigating ash fallout processes to improve forecasts of ash-cloud movement; determining time-dependent variations in volcanic-cloud composition; understanding the role of meteorological processes in detection and dispersal of volcanic ash and gas; synthesizing data from various satellite- and ground-based sensors to distinguish volcanic gas and ash; characterizing the evolution of sulfate aerosols within volcanic clouds. Contributors are asked to consider how their research results can be applied in the dynamic, high-stakes, operational environment of flight planning and execution.

Conveners:

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V43 Uranium Distribution in Time and Space: A Faithful Record of Earth's Evolution

Uranium is a strongly incompatible element in crust-mantle fractionation significantly affected by redox-controlled reactions. These properties govern U concentrations in the upper crust as a result of crustal growth and recycling and in reduced marine sediments, and also contribute to the formation of uranium deposits. U concentrations in the upper crust and in organic matter-rich sediments as well as processes involved in uranium mineralization evolved over geological time. Knowledge of these secular trends is important to understanding the U endogenous and exogenous cycles and their interactions. These trends also help to constrain the redox evolution of surface environments. The multiple isotopes and oxidation states of U, its daughter products and uranium isotope fractionation provide a unique opportunity to the study of Earth processes. Contributions from the fields of geochemistry, mineralogy, and economic geology dealing with endogenous and exogenous U cycles and U mineral deposits are welcome.

Conveners:

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V44 Bowen Lecture

Conveners:

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details: Union

U01 Response of Sedimentary Systems to Rapid Climate and Sea Level Changes and its Impacts on Humans

The change in focus in paleoclimatology over the last decades toward studying rapid climate variability and associated sea level changes has been accompanied by a reassessment of the response of sedimentary systems at similar millennial or shorter time scales. Whether influencing the production of sediment at the source, the style of deposition or erosion along the transport route, or the final locus of deposition at the sink, rapid climate and sea level variability have emerged as key to our understanding of paleo-landscapes, coast and marine sedimentary environments. We invite field- and modeling-based contributions that address but are not limited to fluvial reorganization such as aggradation, degradation and depocenter migration, ecohydrological restructuring responding to changes in temperature and precipitation, deltaic/estuarine morphodynamic responses, such as subaqueous vs. subaerial deposition and lateral depocenter switching, as well as shelf/deep basin sediment budget partition. Contributions addressing the impact of abrupt changes in sedimentary dynamics on human societies are particularly welcomed.

Conveners:

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U02 Geophysical Monitoring, Verification

Accounting for Geologic Carbon Sequestration

Large-scale geologic carbon sequestration poses many scientific questions linking academic and industrial research. One driver is to "develop, by 2012, fossil fuel conversion systems that offer 90 percent CO₂ capture with 99 percent storage permanence at less than a 10 percent increase in the cost of energy services," a goal stipulated by the U.S. Department of Energy 2007 Carbon Sequestration Technology Roadmap and Program Plan.

Geophysical monitoring, verification, and accounting (MVA) will play a critical role in achieving this goal, ensuring long-term, safe geologic carbon sequestration. We will solicit abstracts on geophysical MVA techniques for monitoring CO₂ injection and migration, verifying its location and containment, and accounting/quantifying injected CO₂. This session, co-sponsored by the Research Committee of the Society of Exploration Geophysicists, is intended to bring together researchers from industry and academia to showcase the state-of-the-art geophysical MVA techniques, and provide a unique forum to discuss geophysical MVA challenges.

Conveners:

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U03 Consequences and Fraction of Recycled Basalt in the Mantle

Production of new oceanic crust and its recycling into the mantle, the Plate Tectonic cycle, is responsible for the formation of the continents and cooling of the mantle. This process has shaped the chemical evolution of the silicate Earth and produced some of the most prominent seismological features in the mantle. Slab graveyard(s), slab ponding at 660 km, depletion of MORB source region, addition of eclogitic/pyroxenitic components to basalt genesis are all the chemical and geodynamical consequences of crust recycling. How much recycled crust is there in the mantle today and where is it dominantly distributed? Does the oceanic crust separate from the rest of the slab at the 660, or somewhere in the deep mantle? What is the fate of the peridotites that constitute 90% of the recycled slab? Our session invites contributions from all fields of deep Earth studies to contribute to the questions and issues illuminated above.

Conveners:

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U04 Terra at 10

In December of 2009 Terra, first of the large Earth Observing System (EOS) satellites will be 10 years old. With its five instruments and a decade of simultaneous observations of the land surface, atmosphere, and oceans, the Terra Mission has made a remarkable contribution to our understanding of Earth's primary systems and our ability to observe and predict climate change. We propose a 1 day special (Union) session with 4 individual sub-sessions that cross over multiple AGU sections featuring science results representing the cumulative contribution of Terra to: Climate Variability and Weather, Carbon Water and Energy Cycles, Atmospheric Composition, and Solid Earth and Natural Hazards. We envision each session led by an invited talk followed by 5 or 6 proposed/submitted oral papers. A separate poster session could also be convened. As an international mission (US/Canada/Japan) with a large scientific constituency the sessions should have broad appeal to AGU members.

Conveners:

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U05 An Earthquake in an Ancient City: the April 2009 L'Aquila (Central Italy) Seismic Sequence

On April 6 (01:32 UTC) 2009 a MW 6.3 normal faulting earthquake struck the Abruzzi region in Central Italy. The quake heavily damaged the city of L'Aquila and surroundings, causing 299 deaths, 50,000 evacuees and incalculable losses to the cultural heritage. The shallow fault located exactly beneath the ancient city together with source directivity and site effects contributed to the damage. The region had previously been struck by damaging historical earthquakes in 1461 and 1703 A.D. As observed for the majority of the larger events in Italy, ground surveys carried out after the earthquake did not find unambiguous surface evidence of the fault dislocation, raising basic questions on the relationships between the Apennines' extensional deformation style and mapped active faults. We solicit studies from Geology, Seismology and Geodesy that move from fault system geometry, interactions, strong motion, response of the built environment, and earthquake mechanics and dynamics, to discuss previously proposed and future geological and earthquake hazard models.

Conveners:

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Christophe Voisin, Laboratoire de Géophysique Interne et Tectonophysique Grenoble, FRA, email: cvoisin@obs.ujf-grenoble.fr

Tom Parsons, U.S. Geological Survey, Menlo Park, CA USA, email: tparsons@usgs.gov

U06 Diverse Views from Galileo's Window: Researching Factors and Processes of Climate Change in the Age of Anthropogenic CO₂

Understanding the Earth's climate and its ecological system requires knowledge that spans across an extremely diverse range of expertise in which no single person or organization can master or capture. Synthesizing the myriad of complex inter-relationships that comprise the Earth's climate system requires an integrated assessment of the vast array of disciplines that affect and, in turn, are affected by, the Earth's climate. Thus, our proposed session is open to all scientists who are interested in such a master synthesis. Invited speakers will discuss emerging progress in the key areas of atmospheric processes, oceanography, hydrologic variation, paleoclimatic research, biological processes, geological sciences, mathematical and computational sciences, and solar variability. The ultimate goal of this session is to contribute to the scientific discussion for the upcoming UN IPCC's fifth assessment report which is due 2014. We plan to publish new results from this session.

Conveners:

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David R Legates, University of Delaware, 216 Pearson Hall, Newark, DE 19716-2541 USA, Tel: (302)831-4920, email: legates@udel.edu

U07 Quantifying the Sensitivity of Landscapes to Climate-Change

There is an urgent societal need for the development of high-resolution, quantitative models that quantitatively assess the sensitivity of landscapes to climate-change over time-scales of decades to millennia. Progress is being hampered, in part, by the difficulty of integrating the necessarily diverse range of disciplines whose processes are dynamically coupled as environments respond to a change of climate. Current impact models deal typically with event-specific characterizations and/or a relatively limited number of processes often within generic environments. This session calls for contributions toward the development of such models, including the demonstration of coupling and internal dynamics of processes, and encourages site-specific applications and evidence of performance success.

Conveners:

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James Syvitski, INSTAAR, University of Colorado Boulder, CO 80309 USA, Tel: (303) 735-5482, email: james.syvitski@colorado.edu

Bill Dietrich, University of California, Berkeley, 313 McCone Hall, Berkeley, CA 94720-4767 USA, Tel: (510) 642-2633, email: bill@geomorph.berkeley.edu

U08 Mantle Heterogeneity: Bridging the Gap between Observations and Dynamics

For decades, seismic imaging and geochemical studies have revealed the presence of heterogeneity in the mantle at many scale lengths. Recent self-consistent, geodynamic plate-generation models match the longest wavelength features of tomographic spectra but the full spectrum of tomographic images and geochemical heterogeneity has yet to be fully explained by models of mantle dynamics. We invite contributions from seismologists, geochemists, mineral physicists, and geodynamicists to discuss the nature of the spectra of seismological and geochemical heterogeneity, both in the deep and the shallow mantle, and at global and regional scales. New perspectives on the techniques and experiments that may improve resolution and on conceptual efforts that would make the dynamic models more testable against the observations are especially welcome.

Conveners:

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U09 Response of the Arctic Landscape to a Warming Climate

Increases in northern air temperatures are substantially modifying the Arctic landscape. Responses to this changing climate include intensification of the hydrologic cycle, permafrost thaw, changes in vegetation pattern and diversity, thermokarst formation, and modified cycling of carbon, nitrogen and phosphorus. The questions we seek to address cut across several geosciences fields, including: How much carbon will potentially be released due to permafrost degradation? To what degree are surface processes accelerating? How do terrestrial changes influence aquatic ecosystems? What promising new approaches are available to document the rate and extent of landscape change in the Arctic? What do model projections suggest about possible interactions and feedbacks in water and nutrient cycles? In this session we seek a broad set of presentations contributing to enhanced documentation and investigation of the feedbacks between Arctic climate change and landscape response.

Conveners:

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Jenny Baeseman, APECS, University of Tromsø, NOR, email: jbaeseman@gmail.com

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U10 Lunar Reconnaissance Orbiter / LCROSS: New Insights Into the Moon

The Lunar Reconnaissance Orbiter (LRO) will map the Moon from a polar orbit for 1 year beginning in mid 2009 to collect data in support of NASA's return of humans to the Moon and the ultimate establishment of an outpost. LRO will then continue for an additional period of time, the length of which depends upon the chosen orbit and available fuel to collect additional data in support of a broader suite of lunar science questions. The payload includes: an imaging system (LROC), a laser altimeter (LOLA), UV spectrometer (LAMP), a thermal radiometer (DRLE), a neutron spectrometer (LEND), a radar imager (Mini RF) and a radiation detector (CRaTER). The session will focus on the results of the first, approximately, six months in orbit. The results from the LCROSS impact into a permanently shadowed region to search for water ice, will also be presented. Fundamental new scientific advances provided by each of the instrument teams as well as implications for broader scientific questions will be presented. Oral session will consist of invited presentations; poster session will include all relevant abstracts.

Conveners:

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U11 Biogeophysical Exploration of Subglacial Systems and Global Implications

Recent evidence has demonstrated that Antarctica's subglacial environment is highly active. Subglacial lakes can fill and then drain periodically, releasing floodwater downstream; water eventually crosses the grounding zone and enters the Southern Ocean. Water and wet sediments play an important role in determining the rate of ice stream flow and in triggering changes in flow rates over short timescales. At grounding zones, thermal ocean forcing may represent a key mechanism for destabilizing the ice sheet, thereby increasing its contribution to global sea level rise and potentially altering ocean and atmospheric circulation. Recent biologic investigations of Antarctic subglacial environments show that they provide a significant habitat for life and source of bacterial carbon in a setting that was previously thought to be inhospitable. Just as streaming ice flow is dependent on availability and dynamics of subglacial water and wet sediments, subglacial microbial ecosystems rely on these two physical factors for a supply of water, nutrients, and energy sources. Subglacial microbial ecosystems also enhance biogeochemical weathering, mobilizing elements from long term geological storage. There are now three field programs funded to drill into Antarctic subglacial lakes and investigate the subglacial environment (Lake Vostok – Russia; Lake Ellsworth – United Kingdom; Lake Whillans – USA). In addition, the US study plans a first ever investigation of the sub-ice shelf cavity and ice-stream grounding zone, which will be immediately downstream from Lake Whillans. Over the next decade, we anticipate exciting new interdisciplinary results from these three programs, linking the fields of glaciology, geology, geophysics, geochemistry, hydrology, biology, and oceanography. This session is designed for interdisciplinary integration of results to further our understanding of subglacial environmental systems in the years leading up to their access and exploration, and continue our assessment of their global relevance.

Conveners:

Helen Amanda Fricker, Scripps Institution of Oceanography La Jolla, CA USA, email: hafriker@ucsd.edu

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Ross Powell, Northern Illinois University, USA, email: ross@geol.niu.edu

John Priscu, Montana State University, USA, email: jpriscu@montana.edu

U12 The Fruits of IYPE - Implementing Long-Term Activities

This session will focus on contributions by scientists to public interest in, excitement about and understanding of our planet and its future. The IYPE (International Year of Planet Earth) has provided an opportunity to test a variety of approaches for raising the consciousness of the knowledge and science that can be used to make Earth a safer and healthier place. This session is planned as an impetus for identifying effective successor activities to those carried out as part of IYPE. Abstracts from individuals in every country are welcomed. Contributors should describe what has been learned from IYPE activities in their own country and how that experience might inform the development of future programming that could be effective and sustainable.

Conveners:

John W Hess, Geological Society of America, USA, email: jhess@geosociety.org

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Jaime Urrutia-Fucugauchi, UNAM Mexico City, MEX, email: juf@geofiscia.unam.mx

U13 Consequences of an Unusually Long and Deep Solar Minimum

The recent lowest level of solar activity in living memory has led to a number of direct consequences for the state of the Sun and Heliosphere, and the magnetospheres and atmospheres of Earth and the other planets. For example, the time-histories of the solar magnetic field (generated in the solar interior), solar wind, and cosmic rays are very different from those of recent solar minima at the same phase of the 22-year heliomagnetic cycle. Cosmic rays have shown very unusual recent behavior associated with the solar minimum. For instance, at neutron-monitor energies, the cosmic-ray intensity was the largest ever observed. Moreover, instead of a peaked structure expected in the cosmic-ray maximum, the cosmic ray time-history displays a broad plateau that is followed by an on-going increase that as of 2009.3 had lasted for 1.1 years. The solar wind and interplanetary magnetic field are similarly different. These changes reflect the very different nature of the interplanetary medium over this period. There are other possible consequences of this particularly unusual quiet-Sun period such as its effect on Earth and its magnetosphere, atmosphere, and climate and those of the other planets. Proxy indicators used as records of solar activity from the distant past have shown similarly quiet periods that are correlated with variations in Earth's mean temperature. Theoretical and observational papers are solicited on the causes and consequences of the unusually quiet Sun during the deep minimum of solar cycle 23/24 on the state of the Sun, Heliosphere, Earth and other planets.

Conveners:

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Frank B McDonald, University of Maryland College Park, MD USA, email: fmcdonal@umd.edu

Jack Harvey, National Solar Observatory Tucson, AZ 85719 USA, Tel: 520-318-8337, email: jharvey@noao.edu

U14 The Nature, Frequency, Size and Consequences of Instabilities of the Continental Lithosphere

We are interested in exploring the basic processes by which the lower-most parts of the continental lithosphere are recycled into the deep mantle: the mechanisms involved in the removal, how much of the crust and lithospheric mantle can be removed by individual instabilities and what role they play in the long-term cycle between lithosphere and deep mantle, what initiates / terminates the process, the timescales, and the observable consequences of lithospheric separation such as the extent and relative timing of regional subsidence and uplift of the Earth's surface, mantle strains imaged by seismic anisotropy, changes in the character and magnitude of melt production, long-lived compositional consequences of deep recycling. We encourage the contribution of observations of currently active instabilities, as well as geomorphological and geophysical indicators of instabilities long-gone; modelling results which relate to the observations to the thermal, mechanical and chemical state of the lithosphere; and the geochemical consequences of deep-seated instabilities which constrain the rate and volume of material recycled in this way.

Conveners:

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U15 Toward Environmental Literacy with Examples from IPY

Environmental Literacy provides humans with capacity for personal and collective decision-making and civic participation. In human history there may be no time as crucial for wise community choices and knowledgeable political engagement as the next few decades may prove. We recognize the need for a comprehensive plan to establish environmental literacy to enhance understanding of interlinked global systems. To accomplish this goal, citizens of our planet must have access to accurate and relevant information, high quality educational material, and a variety of accessible and on-going learning opportunities. In response to a world-wide demand for environmental information, scientist-educator teams across science disciplines, stimulated in part by the explicit education components of many IPY projects, have produced a wide range of outreach, education and communication relevant to environmental literacy. This session is an opportunity to celebrate successes, explore best practices and set recommendations for future collaborations and environmental literacy projects.

Conveners:

Louise Huffman, ANDRILL Coordinator of Education and Outreach, 964 Sylvan Circle, Naperville, IL 60540 USA, Tel: 630-357-4541, email: lhuffman@andrill.org

David Carlson, IPY International Programme Office, British Antarctic Survey High Cross, Madingley Road, Cambridge, CB3 0ET GBR, Tel: 44 1223 22 1618, email: ipy.djc@gmail.com

U16 Chemistry and Flow in Non-Aqueous Geologic Systems - CO₂ Storage, Enhanced Geothermal Systems Other Non-aqueous Phase Liquid (NAPL) Flow Systems

Interactions of natural and introduced materials with aqueous fluids dominate the majority of research on flow, transport

chemical properties in geologic systems. However, with the recent emphasis on geologic carbon sequestration and enhanced geothermal systems, there is new interest in geologic systems dominated by non-aqueous phases. Chemical reactions that take place at interfaces between supercritical CO₂, host rocks, well construction materials, and aqueous pore fluids can have a significant impact on long-term performance metrics. In the case of geologic sequestration, the resulting changes could alter injectivity, storage capacity, wellbore integrity, and storage permanence. In geothermal systems, there could be an impact on production efficiency. For other non-aqueous phase systems, the underlying physics of two-phase flow are similar, but the reactivity could be vastly different. This session will focus on new insights regarding the important role of chemical reactions and flow and transport processes in non-aqueous dominated geologic systems with a particular focus on interactions with CO₂.

Conveners:

Brian R Strazisar, National Energy Technology Laboratory, USA, email: Brian.Strazisar@netl.doe.gov

Brian J Anderson, West Virginia University, USA, email: brian.anderson@mail.wvu.edu

B. Peter McGrail, Pacific Northwest National Laboratory, USA, email: Pete.McGrail@pnl.gov

U17 Neoproterozoic Low Latitude Glaciations: Trigger, Timing, Termination and Biotic Consequences

The terminal Neoproterozoic is marked by deep changes in the Earth system and the biosphere, with strong oscillations between icehouse and greenhouse accompanied by the break-up and assembly of supercontinents and ocean stratification events anticipating the rise of metazoans. But the trigger of Neoproterozoic extreme low latitude glaciations, their timing and duration, and the mechanism that led to their end are still strongly debated. This special Union session provides a forum for discussion on these issues and invites contributions on multiple aspects of Neoproterozoic research, including (but not limited to) sedimentology, isotope geochemistry, chemostratigraphy, paleoceanography, paleomagnetism, climate modeling, paleontology and molecular biogeochemistry.

Conveners:

Galen P Halverson, University of Adelaide, Centre for Tectonics, Resources

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U18 The EarthScope Initiative: From North America Geodynamics to New Frontiers in Science

EarthScope is a multidisciplinary geophysical observatory built to yield a comprehensive, time-dependent picture of the North American continent. EarthScope facilities include USArray, a continental-scale seismic component; the Plate Boundary Observatory (PBO), a geodetic network of GPS receivers and strainmeters; and SAFOD, a 3km hole drilled directly into the San Andreas fault. Data from the three projects are now being used as the basis of multidisciplinary geodynamic studies from local scales to continental scales in the western U.S., and are further being applied across a number of unexpected disciplines, including atmospheric, cryospheric, and hydrologic sciences. This session solicits abstracts that showcase the breadth of science coming out of the EarthScope project, from studies of lithospheric processes to new applications across disciplines.

Conveners:

Kristine M Larson, University of Colorado, Aerospace Engineering Sciences, Boulder, CO 80309 USA, Tel: 303 492-6583, Fax: 303 492-7881, email: kristinem.larson@gmail.com

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Christine Puskas, University of Utah, USA, email: c.puskas@utah.edu

Lucy Flesch, Purdue University, Department of Earth and Atmospheric Science USA, email: lmflesch@purdue.edu

U19 Scientific Progress in Geophysics from 25 Years of Sharing Data and Resources

Twenty-five years ago the U.S. seismological community committed itself to the notion that sharing seismological data and instrumentation would dramatically advance research and education in seismology. The collective undertaking that grew from that commitment proved remarkably successful, not in the least because vast improvements in instrumentation went hand-in-hand with the establishment of a global network, the acquisition of a large communal pool of portable instrumentation, and agreements on data archiving and free data exchange that were revolutionary at the time. The explosion of resources and open data that flowed from the IRIS consortium transformed the science of seismology, revolutionized our holistic understanding of the structure and dynamics of our planet, and ushered in an exciting new era of cross-disciplinary research. A strong interconnection has developed between advances in seismological research and complementary progress in marine geophysics, mineral physics, geodynamics, tectonophysics, geodesy, geochemistry, petrology, and planetary science. Rapidly evolving integrative research has impacted areas as varied as tsunami monitoring, episodic tremor and slip, deep earth structure, and climate-change induced ice sheet seismicity, and it is a principal cornerstone of EarthScope. The successful IRIS model has since been widely emulated by others, including the COMPRES, CIG, and GEON consortia, and it challenges other research communities to embrace the principles of shared resources and open data exchange. We welcome contributions from all geophysical and related disciplines that address the critical role played by organized sharing of data and resources in advancing geophysical research and influencing future directions.

Conveners:

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Guust Nolet, Geosciences Azur, FRA, email: nolet@geoazur.unice.fr

U20 Climate Services in a Changing Climate: Approaches for User Engagement

Timely, accurate, and actionable climate data and information that frame the national, regional, tribal, and local impacts of climate variability and change are in strong demand by many sectors and user groups. NOAA is responding to this demand by developing climate data and forecast products, services, and web-based access with both sector-, regional-, and local-based foci. This session will survey current and evolving approaches to meet such user needs in a systematic fashion. Presentations that address the following attributes of climate services on a thematic and/or sectoral basis are encouraged: (1) brokerage of climate data, information, and services that explicitly enables public- and private-sector applications, assessments, decision support, and both mitigation and adaptation responses; (2) user-defined accessibility to climate data and forecast information through web-based portals and databases; (3) research-to-operations and research-to-applications constructs that translate climate information for specific user groups; and/or (4) collaborative structures for synergies between environmental and socioeconomic data sources.

Conveners:

Tim Owen, NOAA/NESDIS/National Climatic Data Center, 151 Patton Avenue, Asheville, NC 28801 USA, Tel: 828-271-4358, email: Tim.Owen@noaa.gov

Marina Timofeyeva, NOAA/NWS/Climate Services Division, 1325 East West Highway SSMC2, Room 13344, Silver Spring, MD 20910 USA, Tel: 301-713-1970 x131, email: Marina.Timofeyeva@noaa.gov

U21 Science and Technology in GEO and GEOSS

The intergovernmental Group on Earth Observations (GEO) is a voluntary partnership of governments and international organizations, providing a framework within which to develop new projects and coordinate Earth observation strategies and investments. As of June 2009, GEO's Members include 79 Governments and the European Commission. In addition, 56 intergovernmental, international, and regional organizations with a mandate in Earth observation or related issues have been recognized as Participating Organizations. GEO Members and Participating Organizations are working towards the realization of a coordinated, comprehensive, sustained Earth observation system of systems called the Global Earth Observation System of Systems (GEOSS). The aim is to enable societal benefits of Earth observations, including advances in scientific understanding in the nine Societal Benefit Areas (Disasters, Health, Energy, Climate, Water, Weather, Ecosystems, Agriculture, and Biodiversity). To realize this vision, GEO's Science and Technology Committee aims to integrate advances in science and technology through appropriate consultation with the research, observation, and application communities; support research efforts necessary for the development of tools required; promote research and development in key areas of Earth sciences to facilitate improvements to Earth observation systems; and encourage and facilitate the transition of systems and techniques from research to operations. Examples of science and technology efforts already underway include the contribution of hydrology and geodesy data and models to the planning of improved observation of the water cycle, and the contribution of the broad earth science community to integrated

observations of geohazards. This session will highlight these and other examples that contribute to and demonstrate the mutual benefits of the involvement of science and technology in GEOSS.

Conveners:

Kathleen Fontaine, NASA, USA, email: kathy.fontaine@nasa.gov

Hans-Peter Plag, University of Nevada, Reno, Nevada Bureau of Mines and Geology Mail Stop 178, Reno, NV 89557 USA, email: hpplag@unr.edu

Nadine Gobron, Joint Research Centre, European Commission, FRA, email: nadine.gobron@jrc.ec.europa.eu

U22 Sustainable Development: Long-Term Science and Policy Challenges

The challenges of sustainable development – equitably improving global human welfare while ensuring that the environment is preserved for future generations – demand research at the nexus of the social and natural sciences. Massive and inevitable changes in climate, ecosystem functions, and human interaction with the environment will perturb societies throughout the world in different ways over the coming century. Developing an understanding of these phenomena will require analytical and modeling capabilities that couple physical and social phenomena, allowing feedbacks between the two to manifest and be forecast over long time scales. Heterogeneous income and population growth further complicate this need through their consequences for food security, migration, resource allocation, and conflict. Papers in the session will explore work in fields from the natural sciences with implications towards long-term social impacts, human-led environmental degradation, and sustainable development in general

Conveners:

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U23 Understanding the Impacts of Climate Change on the Western U.S.

Changes in climate in the western United States, observed in the 20th century and projected for the 21st century, include dramatic reductions in precipitation in the southwest and general reductions in snowpack across the West. These conditions will create periods of drought that will stress ecosystems, water resources and other human systems. Many western states are just beginning to understand and plan for the eventual implications of such change. For this session, we invite contributions from a wide variety of disciplines related to climate change impacts in the western U.S., including those focusing on joint efforts by scientists and decision-makers to translate impacts research into resilient decisions. Contributions are encouraged from multi-state and regional collaborations on impacts, including the Regional Integrated Science and Assessments (RISA) projects and state and local efforts to include climate change research in planning.

Conveners:

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