November 2008
VGP Section Newsletter #34

Dear Colleagues,
Here is the final VGP newsletter of 2008, which has a strong focus on the upcoming AGU Fall Meeting. We hope this has been a rewarding year for the membership of VGP, and wish you all the best for 2009. Archived newsletters and a variety of other VGP-related information can be found at http://vgp.agu.org. Please send any feedback to Sarah Fagents at fagents@hawaii.edu.

In this issue:

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(1) MESSAGE FROM THE VGP PRESIDENT

-- New VGP Executive Committee

I would like to start by thanking ***Bernie Wood*** and the previous VGP Executive Committee plus all the associated committee members, for their hard work and commitment, as well as for making VGP run so well over the past two years. Personally, I doubt that you can be passionate about science and not care about the quality of the mechanisms by which it is discussed, published, honored and communicated to the wider world. This is what we are about as a society. Key players, in addition to Bernie, who have greatly helped over the past two years have been *Francis Albarede, Richard Arculus, Charlie Bacon, Bob Bodnar, Rick Carlson, Jon Davidson, Sarah Fagents, Ken Farley, Attila Kilinc, Craig Manning, Chris Nye, Terry Plank, Kelly Russell, Joop Varekamp and Youxue Zhang*. Thank you all very much.

We have a **new Executive Committee** which will expand over the coming year as the timing of the various roles comes around. The new **President-elect** is ***Steve Sparks***. ***Janne Blichert-Toft*** is the **Geochemistry Secretary** and ***Paul Wallace*** the **Volcanology and Petrology Secretary**. Janne and Paul are also responsible for putting together this year's outstanding Fall meeting VGP program. *Simon Turner* is organising the program for the Western Pacific Meeting and *Don Baker* the 2009 Spring AGU in . *Jon Davidson* is staying on as Chair of the new Kuno Award Committee. *Catherine McCammon* has taken over as Chair of the Fellows Committee. *Sarah Fagents, Attila Kilinc, Chris Nye and Joop Varekamp* are the Newsletter Editor, Website coordinator, Press Officer and Outreach Officer respectively.

-- AGU Fall and Spring Meetings

It is very evident that the current standard of VGP science is at the pinnacle of our field. There is no other meeting but Fall AGU that competes in terms of its ability to bring together the very best in volcanology, geochemistry and petrology. What is increasingly evident is the

strength and interest of the joint sessions. The ability to discuss science across traditionally distinct subject boundaries is a very special feature that lies at the heart of the mandate and success of this meeting.

The role of the spring meeting is evolving and is one of several issues to consider in this coming year. The fact that it moves around physically provides us with an opportunity to engage scientifically with different communities and to derive benefit from special topics that are especially well suited to the different mix of attendees. I would encourage you to think about good sessions to propose for the Spring meeting and to contact *Don Baker* (donb@eps.mcgill.ca) if you want further information. is a fantastic venue for an international geoscience conference and we are confident this will be a memorable spring meeting. Information regarding how to propose a special session and the link to submit the session can be found at:
http://www.agu.org/meetings/ja09/program/program_main_SessionProposal.php

Communication is going to be one of the priority issues I want to discuss with the VGP Executive Committee and your opinions on this would be welcome. We have a great opportunity and responsibility to bring our science to the world and the top geoscience society should be really good at it. However, it is a fast changing activity. In this respect I am particularly looking forward to working with Sarah, Attila, Chris and Joop as we explore new ways to communicate VGP science more effectively.

-- Please contribute to VGP

Please remember VGP when you are thinking about earmarking money for AGU as you renew your subscriptions. Contributions above an initial $60 can be designated for VGP (details on www.agu.org). It is easy to do and it means that you can directly help with the costs of improvements in what VGP does for you.

I look forward to seeing you in .
Best wishes,
--Alex Halliday, VGP President

(2) SPECIAL EVENTS AT THE AGU FALL MEETING

-- VGP Reception and Awards at Fall AGU, Tuesday 16 December

Please come to the VGP reception on the Tuesday evening at the San Francisco Marriot. It is a unique opportunity to relax together and talk informally in a large group.

Most importantly the reception provides us with the chance to recognise our new Bowen and Kuno awardees. This year's **Bowen Award** will go to ***Rick Carlson*** (DTM), who will also give a special Bowen Lecture on Tuesday morning.

The first recipient of the exciting **new Kuno Award** is ***Cin-Ty Lee*** ( ). Receiving these awards is a very big deal for the scientists and their science. Please come along to join in the congratulations and celebrations, as well as to find out a bit more about their research.

-- Bowen Lecture, Tuesday 16 December

Rick Carlson will give this year's Bowen Lecture at 9:15 am in session V21E, entitled "On the Causes of Continental Intraplate Volcanism: An Example From the High Lava Plains of ".

-- AGU Honors Evening, Wednesday 17 December

Another opportunity to honor our colleagues occurs on the Wednesday of AGU week, when the 2008 AGU Medals are presented. This year VGP member ***Miriam Kastner*** will be

receiving the **Maurice Ewing Medal** for major contributions to understanding marine sedimentation and ocean chemistry, and ***Gerald Wasserburg*** will be receiving the **Bowie Medal** for his important contributions to earth and planetary sciences resulting from his developments in the field of radiogenic isotope geochemistry

The Honors Reception begins at 6 pm at the San Francisco Marriot, and will be followed by the Honors Banquet at 8:30pm. The latter event requires tickets which can be purchased from AGU. For more details, see http://www.agu.org/meetings/fm08/index.php/Events/HomePage.

(3) CALL FOR STUDENT PRESENTATION JUDGES

This year we are expecting a record attendance at AGU, and we expect many student-presented papers. So now more than ever, we will be looking for judges to help us decide who are the most deserving students to get AGU-VGP awards. ***Please email me if you are willing to serve as a judge***, and let me know which days you will be present at the Fall meeting. Thanks for helping out.

--Joop Varekamp and the VGP Education-Outreach Committee jvarekamp@wesleyan.edu

(4) VGP SESSIONS AT THE AGU FALL MEETING

The full program for the AGU Fall Meeting is available at http://www.agu.org/meetings/fm08/index.php/Program/HomePage. Sessions of particular interest to VGP attendees include the following:

V01 Volcanology, Geochemistry, Petrology: General Contributions
V02 Innovations in Isotope Mass Spectrometry and Isotope Metrology in Geochemistry
V03 Large Igneous Province Development and Environmental Impacts
V04 The Influence of Geologic Processes in the Lower Continental Crust and Upper Mantle on Crustal Formation and Mantle Geochemistry From Field, Petrological, Geochemical, and Geophysical Perspectives
V05 Recent Advances in Lithium Isotope Geochemistry
V06 Subduction Zones: Geochemical Processes and Geophysical Constraints
V07 Abyssal Mantle: Origin and Surface Exposure Processes of Ultramafic Rocks
V08 Early Earth Evolution: Geodynamics, Geochemistry, Geobiology
V09 Thirty Years of Mantle Recycling
V10 Geological Fluid Dynamics
V11 Volcano Imaging Experiments at and Other Arc Volcanoes
V12 Nature and Role of Colloids and Nanoparticles in the Environment
V13 The Rest of the Story: Mount St. Helens 2004-2008
V14 From Subduction Zones to Mantle Plumes: High Field Strength Elements as Geochemical Tracers of Crustal Recycling
V15 Minerals, Inclusions and Volcanic Processes 1: Thermobarometry and Implications for Magma Storage and Transport
V16 Oceanic Spreading Centers and Volcanic Rift Systems: Tracking Fluxes and the Interplay Between Processes from Mantle to Microbe
V17 The First Historical Eruption of
V18 Episodic Behavior of the Earth's Interior
V19 Mass-Independent Isotopic Fractionation in Natural Systems: Experimental and Theoretical Analyses
V20 Subduction Zone Metamorphism: Fluid-Rock Interaction in Time and Space
V21 Frontier of UltraHigh-Pressure Metamorphism and Deep Subduction: From Atomic Scales to

V22 Minerals, Inclusions and Volcanic Processes 2: Contrasting Views of the Origin of Large Volume Silicic Magma Chambers and Granitic Batholiths
V23 Minerals, Inclusions and Volcanic Processes 3: Melt Inclusions in Phenocrysts From Mafic and Ultramafic Magmas
V24 Results From the Scientific Drilling Project
V25 New Insights on the Formation and Evolution of Crust from IODP Site 1256, Pito and Hess Deeps, and Active Ridges
V26 Observations and Modeling of Volcanic Blasts and Jets
V27 "Failed" Magmatic Eruptions: When Unrest Leads to Quiescence
V28 New Scientific Insights From Mining Geochemical and Geophysical Databases
V29 Quantifying Surface Processes Using Noble Gases
V30 Arc Dynamics of : Recent Volcanological, Geophysical, and Petrologic Results
V31 Nanoscale Views on Geochemical Processes
V32 Hydrology of Marine Hydrothermal Systems
V33 Advances in Analyzing Rock Textures and Microgeochemistry
V34 Flow and Fracture of Magma: Bringing Together Experimentation, Modelling and Monitoring
V35 Advances in Volcano Monitoring and Research at the Volcano Observatory
V36 Interpretation of Spectroscopic Studies of Organic Species at the Mineral-Water Interface
V37 Puna Dacite Magma at : Unexpected Drilling into an Active Magma
V38 Minerals, Inclusions and Volcanic Processes 4: Crystal-scale Records of Magma Dynamics
V39 Arc Crustal Cross-Sections: Studies in the 4-d Evolution of Arcs
V40 International Polar Year: Geological and Geophysical Research
V41 Minerals, Inclusions and Volcanic Processes 5: Volatile Diffusion and Degassing as Related to and Bubble Growth, Volcanic Gas Compositions, and Eruption Dynamics
V42 Geochemical Heterogeneities in OIB and MORB Sources: Implications for Melting Processes and Mantle Dynamics

following are DETAILS OF VGP AND UNION SESSIONS (repeated from August newsletter)

V01 Volcanology, Geochemistry, Petrology: General Contributions
This session provides the opportunity for contributions that fall within the broad spectrum of Volcanology, Geochemistry, and Petrology.
Conveners:
Paul Wallace, , , email: pwallace@uoregon.edu, and
Janne Blichert-Toft, École Normale Supérieure de Lyon, , email: jblicher@ens-lyon.fr

V02 Innovations in Isotope Mass Spectrometry and Isotope Metrology in Geochemistry
Isotope mass spectrometry and Isotope Metrology are essential to geochemical research, and recent advances in technologies and methodologies have spawned new applications. 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. Additional ancillary topics may include calibration measurements, statistical evaluation, uncertainty budget, precision and accuracy, traceability, RMs and SRMs, results from interlaboratory comparisons.
Conveners:

Stephan Richter, Institute for Reference Materials and Measurements (IRMM), Retieseweg 111, Geel, 2440 BEL, Tel: +32-14-571-701,-652, Fax: +32-14-571-863, email: stephan.richter@ec.europa.eu, and
Jacqueline L. Mann, National Institute of Science and Technology (NIST), Analytical Chemistry Division 100 Bureau Drive, Gaithersburg, MD 20899 USA, Tel: 301-975-4472, Fax: 301-869-0413, email: jmann@nist.gov, and
Chuan-Chou (River) Shen, Department of Geosciences, National Taiwan University (NTU), No. 1, Sec. 4, Roosevelt Road, Taipei, 10617 TWN, Tel: 886-2-3366-5878, Fax: 886-2-3365-1917, email: river@ntu.edu.tw, and
Lars Borg, Lawrence Livermore National Laboratory (LLNL), Chemistry Sciences Division 7000 East Avenue L-231 , Livermore, CA 94550 USA, Tel: (925) 424-5722, email: borg5@llnl.gov

V03 Large Igneous Province Development and Environmental Impacts

Large Igneous Provinces (LIPs) - oceanic plateaus, volcanic divergent margins, and continental flood basalts - represent the most voluminous igneous events on our planet. Almost 1% of the Earth may have been covered with volcanism in Early Cretaceous time by the “Greater Ontong Java LIP Event”, which may have also included the Manihiki and Hikurangi oceanic plateaus. The formation of large igneous provinces has fundamental implications for the transfer of mass and energy from the interior of the Earth to its surface and for the growth and breakup of continents. LIPs may also have contributed to global environmental change (such as ocean anoxic events) and biotic adaptations/evolution. Despite considerable research conducted on LIPs, many open questions remain. Issues of particular interest that this special session on LIPs will address include (but are not restricted to): 1) Over what age ranges do LIPs form? Are these short events lasting a few millions of years or rather events encompassing tens of millions of years? Is there a main LIP phase lasting a few million years followed by tens of millions of years of low-level late-stage volcanism? 2) Are LIPs chemically homo- or heterogeneous? Do ranges in LIP composition typically correlate with that of ocean island basalts (OIBs)? Can there be multiple stages of LIP activity, for example a major tholeiitic event followed by a lower-volume, but longer-lasting alkalic event, for example on oceanic plateaus? 3) Under what paleo-environmental conditions did LIPs form? Did portions of oceanic LIPs form subaerially or completely submarine, and if so, at what water depths? 4) What are the links between LIP events and environmental changes? For example, did oceanic LIPs trigger anoxic events, marine biotic extinctions and speciations, oceanic acidification or other major changes in the composition of marine nutrients or isotopic composition of seawater? 5) What is the origin of LIPs? Endogenous lower and/or upper mantle upwelling (e.g., plume heads), exogenous mantle upwelling (e.g., bolide impacts), etc.? 6) Is there a relationship between LIP formation and continental break-up? Are oceanic plateaus inherently unstable and doomed to break-up? 7) What are the uplift and subsidence histories of oceanic plateaus and volcanic margins? 8) Did the Ontong Java, Manihiki and Hikurangi Plateaus form as a single or as multiple events? 9) Are the Paleozoic oceanic LIP fragments preserved in the circum-Pacific subduction-accretion complexes similar to or different from Jurassic and later LIPs in the present ocean? We encourage contributions from a wide array of disciplines including geophysics (geodynamics, tomography, seismology, paleomagnetics, remote sensing), paleoclimatology, paleoceanography, environmental modeling, micropaleontology, physical volcanology, planetary geology, tectonics, geochemistry (high- and low-temperature, geochronology, biogeochemistry), and petrology. Reports of future plans and strategies for LIP research are also highly encouraged.

Conveners:
Kaj Alexander Hoernle, IFM-GEOMAR Leibniz Institute of Marine Sciences, Wischhofstr. 1-3, Kiel, 24148 DEU, Tel: +494316002642, email: khoernle@ifm-geomar.de, and

Millard F. Coffin, National Oceanography Centre, Southampton, University of Southampton, Waterfront Campus European Way , Southampton, SO14 3ZH GBR, Tel: +442380599346, email: m.coffin@noc.soton.ac.uk, and
Elisabetta Erba, University of Milano, Dipartimento di Scienze della Terra "Ardito Desio" Via Mangiagalli 34 , Milano, 20133 ITA, Tel: +390250315530, email: elisabetta.erba@unimi.it, and
Akira Ishiwatari, Tohoku Univ., Kawauchi, JPN, Tel: +81-22-795-3614, email: geoishw@cneas.tohoku.ac.jp

V04 The Influence of Geologic Processes in the Lower Continental Crust and Upper Mantle on Crustal Formation and Mantle Geochemistry From Field, Petrological, Geochemical, and Geophysical Perspectives

Processes in the lower continental crust and the upper mantle are crucial in the formation of continental crust and the development of mantle heterogeneity over geologic time. Specifically, high pressure fractional crystallization, partial melting, and foundering of high density cumulates/restites have the potential to strongly modify the lower continental crust. However, our detailed knowledge of these processes is extremely limited and the lower crust/upper mantle remains the “black box” of crust formation. This session aims to bring together specialists to provide field, petrological, geophysical, geodynamical and geochemical constraints on the evolution of the crust and mantle through time. We encourage contributions from a variety of observational and theoretical studies which will help to shed new light on these problems.

Conveners:
Oliver Jagoutz, Massachusetts Institute of Technology, 77 Massachusetts Ave. , Cambridge,, MA 02139-4307 USA, email: jagoutz@mit.edu, and
Othmar Müntener, University of Lausanne, CHE, email: Othmar.Muntener@unil.ch, and
Mark Behn, Woods Hole Oceanographic Institution, USA, email: mbehn@whoi.edu

V05 Recent Advances in Lithium Isotope Geochemistry

There has been much effort expended over the past twenty years in the development of precise and accurate measurements of lithium isotopes in terrestrial and extra-terrestrial materials. As a consequence, our understanding of lithium isotope systematics has been greatly improved and gives rise to important new perspectives on a range of natural processes. It is now known that lithium isotopes can be significantly fractionated not only at low-temperatures, by fluid-rock interactions but also during high-temperature processes, associated with the anomalously high rate of lithium diffusion. Nonetheless, compared with other stable isotope systematics, many fundamental problems concerning Li isotopes are still not resolved. For example, the behavior of lithium isotopes during prograde metamorphism is debated; the lithium isotopic dataset on extraterrestrial materials is still very limited; experimentally calibrated equilibrium lithium isotope fractionation factors are rare; lithium diffusivity and the scale of lithium isotope fractionation by diffusion in solid phases are still not well-known. The promising application of Li isotopes to exploring large scale problems, such as tracking changes in continental weathering rates and the return of crustal material to the mantle are limited by some of these uncertainties. In this session, we welcome contributions that deal with lithium isotopes using analytical, experimental or theoretical approaches to address different processes including but not limited to low-temperature fluid-rock interactions, high-temperature diffusion, metamorphism of terrestrial and extraterrestrial materials, and continental and oceanic magmatism.

Conveners:
Fang-Zhen Teng, Department of Geosciences & Arkansas Center for Space and Planetary Sciences, University of Arkansas, Ozark Hall 113, Fayetteville, AR 72701 USA, Tel: 479-575-4524, Fax: 479-575-3469, email: fteng@uark.edu, and

Tim Elliott, Department of Earth Sciences, University of Bristol, Wills Memorial Building, Queen's Road, BS8 1RJ GBR, Tel: +44 (0) 117-954-5426, Fax: +44 (0) 117-925-3385, email: tim.elliott@bristol.ac.uk, and
Barbara L. Dutrow, Department of Geology & Geophysics, Louisiana State University, Baton Rouge, LA 70803 USA, Tel: 225-578-2525, Fax: 225-578-2302, email: dutrow@lsu.edu, and
Joris M. Gieskes, Scripps Institution of Oceanography, UCSD, 9500 Gilman Drive, La Jolla, CA 92093 USA, Tel: (858)534-4257, Fax: (858)534-2997, email: jgieskes@ucsd.edu

V06 Subduction Zones: Geochemical Processes and Geophysical Constraints
Subduction zones are one of the most geologically dynamic and scientifically exciting areas of the earth because they are the place where old crust is destroyed and new crustal material is created. They also are responsible for most of the volcanoes and produce most of the largest earthquakes and tsunamis. This session aims at evaluating the geochemical processes and budgets of subduction zones and the associated petrological processes. We welcome contributions focused on (a) the chemical and isotopic budget of the subducted material (the input sediments and crust), (b) the composition of the volcanic arcs, back-arcs and fore-arc basins and their origins, (c) the effects of the presence of volatiles on the melting conditions in the mantle wedge, (d) the seismic and other geophysical characteristics of the materials of the mantle wedge that constrain compositions and processes, and establish mass transfer estimations and (e) physical and numerical modeling of mass transfer in subduction channels and mantle wedge. Integration of these different approaches should help our community to decipher the complex processes occurring in key areas of our planet and by consequence to better understand long-term contribution of subduction processes to its evolution.
Conveners:
Catherine Chauvel, Grenoble University, LGCA BP53, Grenoble, F-38041 FRA, email: catherine.chauvel@ujf-grenoble.fr, and
Bruno Reynard, ENS Lyon, 46 Allée d'Italie, Lyon, F-69364 FRA, email: bruno.reynard@ens-lyon.fr, and
Roy D. Hyndman, Pacific Geoscience Centre, Geological Survey of Canada, CGC Pacifique, Centre géoscientifique du Pacifique 9860 W. Saanich Rd., Sidney, BC V8L 4B2 CAN, email: rhyndman@nrcan.gc.ca

V07 Abyssal Mantle: Origin and Surface Exposure Processes of Ultramafic Rocks
This session will focus on (1) the origin and evolution of the abyssal mantle based on major elements, trace elements, and isotopes; (2) the processes by which abyssal mantle is exposed at amagmatic spreading ridges; and (3) the tectonic evolution of megamullions and associated processes of serpentinization.
Conveners:
Akihisa Motoki, Department of Mineralogy and Petrology, Rio de Janeiro State University, DMPI/FGEL/CTC/UERJ, Rua São Francisco Xavier 524, Bloco A, Sala 4023, Maracanã., Rio de Janeiro, RJ 20550-990 BRA, Tel: (55)-21-2587-7102, Fax: (55)-21-2629-5931, email: akmotoki@gmail.com, and
Susanna Eleonora Sichel, Department of Geology, Federal Fluminense University, Departamento de Geologia, Universidade Federal Fluminense. Av. General Milton Tavares de Souza, SN., Gragoatá, Niterói, RJ 24210-346 BRA, Tel: (55)-21-2629-5920, Fax: (55)-21-2629-5931, email: akmotoki@gmail.com

V08 Early Earth Evolution: Geodynamics, Geochemistry, Geobiology
The aim of the session is to assemble information from three different but connected disciplines

that help us understand how the Earth operated through the Hadean and Archean. Input from mineral physicists and dynamic modellers provides a picture of how the early magma ocean crystallized and how the newly solidified Earth started to convect. Contributions from petrologists and geochemists provide constraints on how the mantle melted and evolved, and on the composition and nature of the earliest oceanic and continental crust; predictions that can be tested using geochemical data from the oldest minerals and rocks. Finally, inferences about the compositions of the crust, the oceans and the atmosphere, constrained by data from the oldest submarine volcanic and sedimentary rocks, provide the sole direct means to constrain the habitat(s) for early life on Earth.
Conveners:
Nicholas Arndt, University of Grenoble, 1381 rue de la Piscine, St Martin d'Heres, 38400 FRA, Tel: 33 4 76048116, email: arndt@ujf-grenoble.fr, and
Stephane Labrosse, ENS Lyon, FRA, email: stephane.labrosse@ens-lyon.fr, and
Stephen Mojzsis, University of Colorado, USA, email: Stephen.Mojzsis@Colorado.EDU

V09 Thirty Years of Mantle Recycling
Thirty years ago, the new idea that surface material is recycled into the mantle signaled the coming of age of mantle dynamics. The concept is that all the components of the oceanic lithosphere--sediments, basalts, gabbros, and residual peridotite--are continually injected into the mantle at subduction zones and profoundly modify its chemistry, temperature, and rheology. this concept, as pioneered by William White, has proved to be one of the most fecund in Solid Earth sciences. Recycling of lithosphere affects continental growth, plume instabilities, and basalt genesis. Recycling of water is critical to the convective regime of our planet, to the generation of magmas, and to the fate of surface volatile reservoirs. Beyond the specific processes taking place at subduction zones, across the transition zone, and in the sources of magmas, this session will be dedicated to the dynamic impact of deep geochemical cycles and their mineralogical and seismological signatures. It will also address the effect of recycling of surface material on the long-term evolution of the Earth's interior in comparison to that of other planets. We invite contributions from isotope geochemistry, experimental petrology, seismology, mineral physics and geodynamics.
Conveners:
Francis Albarede, Ecole Normale Supérieure, 46 allee d'Italie, Lyon, N/A 69007 FRA, Tel: +334 72728414, email: albarede@ens-lyon.fr, and
Albrecht W. Hofmann, Max-Planck Institute, Mainz, N/A 55020 DEU, Tel: +49 6131 305 280, email: ahofmann@ldeo.columbia.edu, and
Terry Plank, Lamont Doherty Earth Observatory, Palisades, NY 10964 USA, email: tplank@ldeo.columbia.edu, and
Jeffrey D. Vervoort, Washington State University, Pullman, WA 99164 USA, email: vervoort@wsu.edu

V10 Geological Fluid Dynamics
In this forum we will discuss recent advances in the fluid dynamics of compressible flows, turbulent flows, plastic flows, multiphase flows, and granular flows with a bearing on geological phenomena such as the rise and expansion of volcanic plumes; the formation and evolution of lava domes, channels and tubes; the propagation of landslides and avalanches; and the scouring of granular and rocky beds.
Conveners:
Gustavo Gioia, University of Illinois, Urbana, IL 61801 USA, email: ggioia@uiuc.edu, and
Pinaki Chakraborty, University of Illinois, USA, email: chakrabo@uiuc.edu, and

Susan Kieffer, University of Illinois, USA, email: skieffer@uiuc.edu

V11 Volcano Imaging Experiments at Montserrat and Other Arc Volcanoes

Since 1995 the eruption of the andesitic Soufrière Hills volcano (SHV), Montserrat, has been studied in unprecedented detail and the volcano has become an important natural laboratory for investigations of volcanic processes. Deep processes exert important controls on this eruption, but the structure of the island arc crust and upper mantle, and the magmatic system, are inadequately defined. The SEA CALIPSO project, implemented in 2008, was therefore devised to image the lithosphere and magma chamber at SHV using tomography and reflection seismology. Thus, geophysical investigations of arc volcanoes (e.g., Montserrat, Deception, Mount St Helens, Unzen) in the last few years have led to new information on the physical structure of the crust and upper mantle under and adjacent to the volcanoes, and on their magma storage and transport systems. Such investigations have been supplemented by studies of seismology, GPS and strain deformation, gravity, petrology, mineralogy, erupted lava budgets, and observational volcanology. These data are useful to develop models of volcanic processes, arc volcanism, arc crust evolution by igneous processes, and andesite magma genesis. We invite papers on geophysical studies of arc islands, and related sea or land investigations, including land and/or sea operations, active source tomography, Q and reflected ray tomography, passive source tomography, reflection profiling, magma generation and storage in arc settings, OBS data and modeling, streamer profiling of structure and stratigraphy of volcanic wedges in sea-floor sediments, implications of GPS and strain data on magma storage/transport systems, pluton xenoliths in relation to observed seismic velocities, petrology studies bearing on magma storage, focal mechanisms from dense seismic arrays.

Conveners:
Barry Voight, Penn State Univ, Deike Bldg, Univ Park, PA 16802 USA, Tel: 814 238 4431, Fax: 814 863 7823, email: voight@ems.psu.edu, and
Stephen Sparks, Univ Bristol, Geosciences, Bristol, BS8 1RJ GBR, Tel: xx, email: Steve.Sparks@bristol.ac.uk, and
Dannie Hidayat, Penn State U, Deike Bldg, Univ Park, PA 16802 USA, Tel: 814 235 0766, email: hidayat@geosc.psu.edu, and
Eylon Shalev, Univ Auckland, Auckland, NZL, email: e.shalev@auckland.ac.nz

V12 Nature and Role of Colloids and Nanoparticles in the Environment

With recent progress in sampling and nanoparticle characterization techniques, the traditional, operationally-defined limit of “dissolved“ fraction (<0.2µm) in natural waters has moved progressively to lower size fractions. Nanoparticles and colloids which are often defined as having at least one dimension of less than 100 nm, must be taken into account for accurate predictive modeling of the speciation of mineral and organic compounds. Molecular-scale processes and properties that control element transfer, the rates of geochemical processes such as weathering and element transport in soils and rivers, and the chemical reactivity of solids and organic matter are intimately related to their atomic-level structures. There is growing evidence that the structure-property relationships of nanoparticles can be significantly different than larger particles of the same material. Surface interactions in particular exert a disproportionate influence on the chemical properties and movement of natural nanogeomaterials. These surface effects also play an important role in the transport and bioavailability of metallic and organic contaminants. This symposium will deal with field, experimental, and modeling data showing how the presence of natural colloids and nanoparticles affect the rates of weathering, erosion, and elemental transport at Earth's surface. The following topics will be covered: * Nanoparticle formation in natural environments * Nanoparticle/colloid structure, aggregation, solubility, and transport properties *

Size effects on structure and properties (both thermodynamic and kinetic) * Redox and photochemical transformations of nanoparticles * Metal speciation and trapping mechanisms by nanoparticles * Source tracing, retardation of contaminant migration * Bacteria - nanoparticle interactions . Convener information Thierry Allard IMPMC 140 rue de Lourmel 75015 Paris France Tel : 33 1 44 27 75 04 Fax: 33 1 44 27 37 85 Email : thierry.allard@impmc.jussieu.fr Gordon E. Brown, Jr. Department of Geological and Environmental Sciences, Stanford University Stanford, CA 94305-2115 USA Tel: 650-723-9168 Fax: 650-725-2199 Email: gordon.brown@stanford.ed

Conveners:

Thierry Allard, IMPMC, 140 rue de Lourmel, Paris, 75015 FRA, Tel: 33 1 44 27 75 04, Fax: 33 1 44 27 37 85, email: thierry.allard@impmc.jussieu.fr, and

Gordon E. Brown, department of Geological and Environmental Sciences, Stanford university, Stanford, CA 94305-2115 USA, Tel: 650-723-9168, Fax: 650-725-2199, email: gordon.brown@stanford.edu

V13 The Rest of the Story: Mount St. Helens 2004-2008

The end of the most recent eruption of Mount St. Helens in January, 2008 offers the opportunity to present time-series research covering the entire eruption. This session invites papers that build on the chapters in the upcoming USGS Professional Paper 1750: "A Volcano Rekindled: The Renewed Eruption of Mount St. Helens, 2004-2006", as well as any other new research on the eruption and its eruption products. We also welcome new research relating to the historical development of , its tectonic and physical setting, and its potential hazards for future eruptions. Like the Professional Paper, we expect the session to be multidisciplinary, including but not limited to, geology, geochemistry, petrology, geodesy, geodynamics and geophysics.

Conveners:

Mark K. Reagan, University of Iowa, Department of Geoscience 121 Trowbridge Hall, Iowa City, IA 52242 USA, Tel: 319-335-1802, email: mark-reagan@uiowa.edu, and

Michael C. Rowe, University of Iowa, USA, email: michael-rowe@uiowa.edu, and John S. Pallister, USGS Cascades Volcano Observatory, USA, email: jpallist@USGS.gov

V14 From Subduction Zones to Mantle Plumes: High Field Strength Elements as Geochemical Tracers of Crustal Recycling

Large quantities of oceanic and continental crust are known to enter the mantle at subduction zones, and some of this material may become entrained in mantle upwellings, or plumes, imparting a geochemical signature on hotspot lavas. However, following injection into the mantle, the composition and fate of subduction zone-processed material is little known, making the signatures associated with recycled oceanic crust difficult unambiguously identify. This owes, in large part, to the complex processes that operate in subduction zones, including phase changes and dehydration or partial melting of the subducted oceanic lithosphere. Many of the elements frequently used as geochemical tracers for subduction are volatile and/or fluid mobile and appear to be largely lost from the subducted lithosphere during dehydration and/or partial melting. High field strength elements (HFSE), such as Ti, Zr, Hf, Nb, and Ta, are thought to behave conservatively during subduction zone processing, providing a unique tools for understanding subduction zone processes and identifying recycling signatures in hotspot lavas. This session is intended to bring together a confluence of information provided by experimental, dynamical and geochemical studies that helps to unravel subduction zone processes, and ultimately detect the signatures of the recycled materials in hotspot lavas. While the session will highlight experimental and geochemical studies that utilize HFSE as tracers of subduction zone processes and whole mantle recycling, presentation of other geochemical indicators that help constrain these processes

such as Ni in olivine as a proxy for eclogite melting, radiogenic isotope (Os, Sr, Nd, Pb, etc.) signatures for crustal recycling, noble gas and volatile signatures for crustal melting beneath arcs and recycling into hotspots, is very much encouraged.

Conveners:

Glenn A. Gaetani, Woods Hole Oceanographic Institution, USA, email: ggaetani@whoi.edu, and Matthew G. Jackson, Carnegie Institution of Washington, USA, email: mjackson@whoi.edu

V15 Minerals, Inclusions and Volcanic Processes 1: Thermobarometry and Implications for Magma Storage and Transport

There are few issues more central to igneous petrology than that of determining the pressures (P) and temperatures (T) at which magmas are stored and partly crystallize. P-T estimates are needed to test physical models of magma transport, and are central to any attempts to relate magmatism to tectonics. At present, P-T estimates are most commonly derived from fluid inclusions, fluid-saturated melt inclusions, and mineral-melt equilibria. Magma storage sites are also sometimes determined through seismic reflection profiles, or for volcanic systems from seismic tremor and earthquakes. A review of P estimates suggests that different methods may yield information about different aspects of the magma plumbing system: fluid-saturated melt inclusions largely yield P<5 kbar, and most volcanic-related earthquakes are similarly shallow, while P-estimates based on fluid inclusion densities or mineral-melt equilibria yield P as high as 10 kbar, and seismic tremors extend to equivalent depths. In this session, we are interested in contributions related to the estimation of magma transport or storage conditions by any means, including seismology. New methods of P-T estimation are welcome, as are new physical models of magma transport, and applications of existing methods and models to natural volcanic or plutonic systems. This session complements a pre-meeting RiMG shortcourse on Minerals, Inclusions and Volcanic Processes.

Conveners:

Andrew Barth, Indiana University-Purdue University, 723 West Michigan Street, SL118, Indianapolis, IN 46202 USA, Tel: 317-274-7484, Fax: 317-274-7966, email: ibsz100@iupui.edu, and Thor Hansteen, IFM-GEOMAR, Leibniz-Institut für Meereswissenschaften, 1-3, Geb. 8E, Raum 207, Kiel, D-24148 DEU, Tel: 49-431-600-2130, Fax: 49-431-600-2924, email: thansteen@ifm-geomar.de, and

Andreas Klügel, Universität Bremen, Postfach 33 04 40, Bremen, D-28334 DEU, Tel: 49-421-218-7767, Fax: 49-421-218-9460, email: akluegel@uni-bremen.de, and

Keith Putirka, California State University, Fresno, 2576 E. San Ramon Ave., MS/ST24, Fresno, CA 93740-8039 USA, Tel: 559-278-4524, Fax: 559-278-5980, email: kputirka@csufresno.edu, and

Pietro Armienti, University of Pisa - Dipartimento di Scienze della Terra, Via S. Maria 53, Pisa, 56126 ITA, Tel: +30 050 2215708, email: armienti@dst.unipi.it

V16 Oceanic Spreading Centers and Volcanic Rift Systems: Tracking Fluxes and the Interplay Between Processes from Mantle to Microbe

Recent years have been a watershed for research on oceanic and onshore rift systems. Current studies are now providing the first data that characterize and quantify the relationship between mantle melting, geochemical circulation, and biological diversity and activity both within and upon the seafloor. It has become increasingly apparent that oceanic spreading centers and associated hydrothermal vent systems are deeply complex, comprising several interconnected mass, fluid, thermal, and biological exchanges as energy fluxes from the mantle, through the crust, and into the overlying oceans. Mantle melting and volcanism along the spreading axis greatly enhances chemical exchange between the crust and the overlying seawater, nourishing chemosynthetic biological communities. These communities provide keys for exploring the

evolution of life on Earth, as they thrive in conditions that may have harbored the first organisms on Earth. Furthermore, recent studies of onshore rift systems in areas such as and Afar provide new insights into the distribution of melts within a spreading rift and relations between magma supply and surface tectonics. Assessment of the similarities/differences in host rock chemistry and geothermally-supported ecosystems between onshore and mid-ocean rifts may provide new avenues to explore controls on diversity and survival mechanisms. This interdisciplinary session aims to highlight recent results, to include a range of scientific approaches, and to explore the full scope of processes involved in rifting, hydrothermal venting, and development/evolution of geothermal biologic communities. We encourage submissions that cover all regions of the global mid-ocean ridge system and correlative subaerial rift systems. The goal is for session reports on magmatic, volcanic, hydrothermal/geochemical and microbiological processes to prompt discussion that can refine current models of rifting, volcanism, and hydrothermal systems.

Conveners:
Robert Dunn, University of Hawaii, Dept of Geology and Geophysics 1680 East-West Rd, Honolulu, HI 96822 USA, email: dunnr@hawaii.edu, and
Peter Girguis, Harvard University, Dept of Organismic and Evolutionary Biology 16 Divinity Avenue, Cambridge, MA 02138 USA, email: pgirguis@oeb.harvard.edu, and
William Seyfried, University of Minnesota, Department of Geology and Geophysics, Minneapolis, MN 55455 USA, email: wes@umn.edu

V17 The First Historical Eruption of Chaitén Volcano, Southern Chile

On May 2, 2008 Chaitén volcano (southern volcanic zone, Chile) erupted for the first time in many thousands of years, marking the first monitored eruption of rhyolite magma from a caldera and the first VEI 5 eruption of this century. Between May 2 and May 8, the volcano produced a series of ash plumes that rose to 10-20 km altitude, depositing pumiceous tephra and ash downwind and extending east to the Atlantic coast of . Following the initial plumes, simultaneous eruption of lower-level ash plumes and a large lava dome took place within the volcano's 4 km-diameter caldera. As of mid-June activity at Chaitén is continuing. The eruption has been monitored by the Chilean National Service of Geology and Mining (SERNAGEOMIN), supplemented by a response team from the USGS Volcano Disaster Assistance Program (VDAP). Contributions on satellite remote sensing, ground-based monitoring, petrological studies, the geologic context and impacts of this unusual eruption are solicited. Papers describing studies of analogous volcanic systems elsewhere are also welcome.

Conveners:
Simon Carn, Michigan Technological University, Houghton, MI 49931 USA, email: scarn@umbc.edu, and
Luis Lara, SERNAGEOMIN, CHL, email: lelara@sernageomin.cl, and
John Pallister, USGS Cascades Volcano Observatory, USA, email: jpallist@usgs.gov, and
Gustavo Villarosa, Universidad Nacional del Comahue-CONICET, Bariloche, ARG, email: gustavov@crub.uncoma.edu.ar

V18 Episodic Behavior of the Earth's Interior

While the 'present is key to the past', it is increasingly clear that there have been times in our planet's past when its interior behaved quite differently than it does today. Evidence for such episodic behavior includes large igneous provinces (LIPs), crustal growth peaks, geomagnetic superchrons and supercontinent cycles. Further afield, both the moon and Venus record planet-wide magmatic episodes. In this session we would like to explore the origins of these events in the Earth and other planetary interiors. What is the evidence for such events? How can we assess the quality of such data? What are the timescales of these events and do they show any periodicity? Is

there a link between mantle events and the evidence for episodic changes in the Earth's atmosphere-biosphere (e.g. rise of oxygen, S and C isotope excursions, mass extinctions/evolutionary radiations)? What effect do these events have on the long-term thermal and chemical structure of the planet? And what do geodynamic models of mantle convection and plate tectonics tell us about the possible origins of these events? We seek contributions from any field bearing on this subject including petrology, geochemistry, geophysics, and field studies.

Conveners:
Stephen Parman, Durham University, Science Labs, South Road, Durham, DH1 3LE GBR, Tel: +44 (0) 191 334 2331, email: stephen.parman@durham.ac.uk, and
Shijie Zhong, University of Colorado at Boulder, Dept. of Physics Campus Box 390, Boulder, CO 80309 USA, Tel: 1-303-735-5095, email: Shijie.Zhong@Colorado.Edu, and
John Rudge, Cambridge University, Department of Earth Sciences University of Cambridge Downing Street, Cambridge, CB2 3EQ GBR, email: jfr23@cam.ac.uk

V19 Mass-Independent Isotopic Fractionation in Natural Systems: Experimental and Theoretical Analyses

Mass-independent isotopic fractionations, originally observed in atmospheric ozone, have recently been reported for a number of new elements, including sulfur and mercury. These discoveries have already led to insights into the rise of oxygen in the Earth's atmosphere and the geochemical cycling of pollutants and reactive molecules, but it is clear that there is much left to understand. This session will focus on recent advances in understanding the mechanisms controlling mass-independent fractionation. We aim to bring together a diverse group of scientists applying a wide range of techniques, including experiments, theoretical studies, and measurements of mass-independent fractionations in natural samples. We seek submissions in topics including (but not limited to) discoveries of new mass-independent isotope effects, quantum mechanical calculations, reaction rate modeling, spectroscopic studies of self-shielding and other photochemical phenomena, laboratory-scale and field experiments, and geochemical modeling of the propagation of mass-independent signatures through coupled geochemical and cosmochemical reservoirs.

Conveners:
Frederic Moynier, Washington Univeristy in St Louis, USA, email: moynier@levee.wustl.edu, and
Edwin Schauble, University of California Los Angeles, USA, email: schauble@ucla.edu, and
Toshiyuki Fujii, Kyoto University, JPN, email: tosiyuki@HL.rri.kyoto-u.ac.jp

V20 Subduction Zone Metamorphism: Fluid-Rock Interaction in Time and Space

This session will explore the use of metamorphic geochemistry as a means of illuminating processes taking place beneath the surface within subduction zones, merging information regarding mineral reaction histories, fluid-rock interactions, and kinetics, in consideration of the generation and mobility of (ultra) high-pressure fluids. In contrast to the directly observable inputs (mostly seafloor sediments and altered basalt) and outputs (mostly lavas and volcanic gases) of subduction zones, the metamorphic portion of the subduction factory (the hinge upon which the transition from input to output turns) is at work entirely beyond our line of sight. What we can observe directly are the metamorphic underbellies of failed, rifted, or otherwise exposed subduction zones, which have invariably been subjected to complex sequences of pro- and retro-grade reactions that must be unraveled before we can address the important issue of just what fluid-forming and mobilization processes take place beneath the arc. Subduction-related metamorphic rocks record a wide variety of pressures, temperatures, and compositions. However, interpretation of metamorphic history from mineral assemblages is complicated by the fact that minerals in a subducting slab are not always able to achieve equilibrium as they descend. The rate at which reactions proceed is a function of subduction rate, temperature conditions, and the

amount of fluid in the system. Large-scale fluid-rock equilibration may be unlikely in colder regions of the subduction zone (i.e. in a fast-descending slab) but may occur more rapidly in hotter regions of the subduction zone (i.e. the lower mantle wedge), which in turn may cause chemical variation in subduction-related fluids. The chemistry of these subduction zone fluids may further be varied according to the timescales on which they are released – in particular, whether they percolate in a steady stream or travel in self-contained pulses. We solicit abstracts pertaining to the geochemistry of all subduction-relevant metamorphic rocks and minerals, with particular emphasis on studies pertaining to geochronology and spatially resolved geochemistry on all scales, from grain boundaries to field-scale investigations.

Conveners:

Maureen Feineman, Pennsylvania State University, Dept. of Geosciences, University Park, PA 16802 USA, Tel: 814-863-7400, email: mdf12@psu.edu, and

Gray Bebout, Lehigh University, Dept. of Earth and Environmental Sciences, Bethlehem, PA 18015 USA, Tel: 610-758-5831, email: geb0@lehigh.edu, and

Jay Ague, Yale University, Dept. of Geology and Geophysics, New Haven, CT 06520 USA, Tel: 203-432-3171, email: jay.ague@yale.edu, and

Ivan P. Savov, Leeds University, School of Earth and Environment Leeds United Kingdom , Leeds, LS2 9JT GBR, Tel: +44-113-343-5199, Fax: +44-113-343-5259, email: i.savov@see.leeds.ac.uk

V21 Frontier of UltraHigh-Pressure Metamorphism and Deep Subduction: From Atomic Scales to Mountain Building

UHPM is an integral characteristic of collisional orogens, recording transient or even permanent subduction of continental margins into the mantle. Recently, the emphasis of studies on microstructures, atomic scale mineral properties, experimentally established phase transformations, mineral reaction kinetic principles, the extent and rates of metamorphic and tectonic events during deep subduction, elements partitioning and geochemical diversity of mantle-crustal rocks-fluid interactions have provided new insights into global geodynamic processes operating in Earth's deep interior. The processes of tectonic accretion taking place under varying physico-chemical and thermo-mechanical conditions change the densities and mechanical behavior of the rocks transported through the subduction channel. The re-distribution of radioactive heat sources by crustal thickening, partial melting and melt transport to the upper crust defines metamorphic P-T-t paths and result in thermal stabilization of the lithosphere. Because thickened crust may become gravitationally unstable, leading to syn- or post-orogenic extension, such processes bridge together the exhumation of UHPM crustal and mantle rocks which are among the most enigmatic questions of UHPM geology. In this session we invite contributions presenting new developments in studies of mineral submicronic structures, mineral reactions, kinetics, thermobarometry, geochemistry, geochronology, and general topics of UHPM geology and tectonics which represent a frontier of knowledge in understanding the significance of UHPM for reshaping the lithospheric plates through mountain buildings, mantle convection, subduction, and exhumation of UHPM rocks in diverse geological situations. The session is organized by Task Force IV of International Lithosphere Program.

Conveners:

Simon Cuthbert, University of the West of Scotland, Paisley, PA1 2BE GBR, Tel: 44 141 848 3263, email: Simon.Cuthbert@uws.ac.uk, and

Larissa Dobrzhinetskaya, University of California at Riverside, Riverside, CA 92521 USA, Tel: 951-827-2028, email: Larissa@ucr.edu, and

Richard Wirth, GeoForschungsZentrum, Potsdam, 14473 DEU, email: wirth@gfz-potsdam.de, and

Hans-Peter Schertl, Ruhr-Universitaet Bochum, Bochum, D-44780 DEU, Tel: 49 (234) 32-23520,

email: hans-peter.schertl@rub.de

V22 Minerals, Inclusions and Volcanic Processes 2: Contrasting Views of the Origin of Large Volume Silicic Magma Chambers and Granitic Batholiths

Large-volume silicic ash-flow sheets and granitic batholiths are both widely regarded to be products of large silicic magma chambers in the crust. These phenomena are fundamental to understanding the origin and anatomy of the continental crust and its magmatic and tectonic recycling. However, fundamental unanswered questions remain regarding the connections between silicic volcanic and plutonic bodies, such the physical state of the magma body through time (e.g., convecting fluid, viscous mush, or solid framework with mobile pore melt); the temporal and spatial scales of the generation and extrusion of large volumes of eruptible material, and of the assembly of large granitic plutons; and whether granitic plutons represent refractory residua of melt extraction, unerupted samples of the same material that is erupted, or neither. This session aims at bringing together people investigating the volcano-plutonic connection from a wide range of perspectives, including field, laboratory, and theoretical investigations. This session complements a pre-meeting RiMG shortcourse on Minerals, Inclusions and Volcanic Processes.

Conveners:

Ilya Bindeman, University of Oregon, USA, email: bindeman@uoregon.edu, and
John Bartley, University of Utah, USA, email: john.bartley@utah.edu, and
Allen Glazner, University of North Carolina, USA, email: afglazne@email.unc.edu

V23 Minerals, Inclusions and Volcanic Processes 3: Melt Inclusions in Phenocrysts From Mafic and Ultramafic Magmas

The last two decades have witnessed a dramatic growth in interest in studies of melt inclusions – small portions of melt trapped by crystals growing during magma evolution. One important area of application for melt inclusion research is the study of primitive mantle-derived magmas. These are commonly modified prior to eruption by fractionation, degassing, assimilation and other processes, with melt inclusions potentially providing 'snapshots' of the early crystallisation environment. Increasing interest in melt inclusions has also stimulated theoretical, petrological and experimental studies aimed at understanding the processes that lead to melt inclusion trapping and post-entrapment modification. This session, complementing the short-course for the new Reviews in Mineralogy and Geochemistry volume "Minerals, Inclusions and Volcanic Processes", will focus on important and topical questions in the field of melt inclusions research: What does the melt inclusion record actually represent? How much is this record modified by post-entrapment processes? What unique information is provided by melt inclusions? How does this information tie in with broader topics in basaltic petrogenesis? We welcome contributions based on studies of natural samples and/or experimental and theoretical studies of melt inclusion formation and modification.

Conveners:

Leonid Danyushevsky, CODES, University of Tasmania, AUS, email: l.dan@utas.edu.au, and
Adam Kent, Dept. of Geosciences, Oregon State University, USA, email: adam.kent@geo.oregonstate.edu

V24 Results From the Hawaii Scientific Drilling Project

The Hawaii Scientific Drilling Project (HSDP), sponsored by NSF and ICDP, involved drilling and coring into a young Hawaiian volcano to develop an extended time-stratigraphic record of the lava output, geochemical- and structural evolution of a large hotspot volcano. The drilling also yielded unexpected results on the deep subsurface hydrology of the island. The coring into the volcano was completed in 2007 to a depth of 3518 meters. The basalt core represents a continuous

sequence of lava accumulation dating back to 600 – 700ka, and provides unique information on magmatic processes, the geochemical structure and origin of the Hawaiian mantle plume, growth and subsidence of the volcano, paleomagnetism, and subsurface hydrology and microbiology. The purpose of the session is to present the final data summaries and interpretations as well as the latest data from the deepest 450m of core. This session also welcomes contributions dealing with any aspect of Hawaiian volcanology, petrology, geodynamics, geochemistry and geophysics that relates to the objectives and results of the HSDP.

Conveners:
Donald DePaolo, University of California, Berkeley, Dept of Earth & Planetary Science McCone Hall Mail Code 4767, Berkeley, CA 94720-4767 USA, Tel: 510-643-5064, Fax: 510-642-9520, email: depaolo@eps.berkeley.edu, and
Edward Stolper, California Institute of Technology, Div. of Geological & Planetary Sciences, Pasadena, CA 91125 USA, Tel: 626-395-6504, Fax: 626-568-0935, email: ems@gps.caltech.edu, and
Donald Thomas, University of Hawaii, SOEST, Honolulu, 96822 USA, Tel: 808-956-6482, Fax: 808-956-2538, email: dthomas@soest.hawaii.edu

V25 New Insights on the Formation and Evolution of Fast-Spreading Ocean Crust from IODP Site 1256, Pito and Hess Deeps, and Active Ridges

Oceanic crust covers in excess of 60% of our planet. Half of that crust formed at fast spreading ridges. To understand the magmatic processes that generate this crust, and the hydrothermal circulation that cools it, we require contributions from an array of disciplines. Marine geophysical investigations have found that the internal structure of crust formed at fast-spreading rates is relatively uniform. Studies of lava eruption and diking events have refined understanding of episodicity in magmatic accretion of the crust. Knowledge of geological structure of the crust is required for testing theoretical models of crustal accretion of fast-spreading crust. Laboratory studies of spatially constrained samples are key to estimating the attendant fluxes of mass and heat. This session will focus on, but is not limited to, recent studies of fast spread ocean crust exposed in tectonic windows at Hess Deep and Pito Deep and recovered by deep drilling at Site 1256. We welcome all relevant geological, tectonic, geophysical, theoretical, hydrothermal, biological, and geochemical studies of the ocean crust formed at fast spreading rates.

Conveners:
Damon A. H. Teagle, National Oceanography Centre, Southampton, School of Ocean and Earth Science University of Southampton European Way , Southampton, SO14 3ZH GBR, Tel: +44-(0)23-8059-2723, Fax: +44-(0)23-8059-3052, email: dat@noc.soton.ac.uk, and
Kathryn Gillis, University of Victoria, School of Earth and Ocean Sciences P.O. Box 3055 University of Victoria, Victoria, BC V8W 3P6 CAN, Tel: 250-472-4345, Fax: 250-721-6200, email: kgillis@uvic.ca, and
John Maclennan, University of Cambridge, Department of Earth Sciences University of Cambridge Downing Street , Cambridge, CB2 3EQ GBR, Tel: +44 (0)1223 761602, Fax: +44 (0)1223 333450, email: jmac05@esc.cam.ac.uk, and
Jeffrey A. Karson, Syracuse University, Department of Earth Sciences 204 Heroy Geology Laboratory Syracuse University , Syracuse, NY 13244-1070 USA, Tel: 315.443.7976, Fax: 315.443.3363, email: jakarson@syr.edu

V26 Observations and Modeling of Volcanic Blasts and Jets

Explosive volcanic degassing consists of a combination of discrete blasts and more continuous jet flows, depending on the gas volume and overpressure. Well-developed turbulent jet flows can either transition with altitude into thermally buoyant plumes, or collapse to form pyroclastic flows.

This type of volcanic activity is amenable to direct observation by visual, thermal, radar, infrasonic, and seismic instrumentation. Numerical and analogue models, as well as analyses of pyroclastic deposits, provide further insight into the fluid dynamics of these processes. This session integrates observations and numerical and analogue modeling of volcanic blasts and jets. We encourage contributions that show observations or models that can provide constraints on jet flow structure, mass fluxes, vent overpressures, jet dimensions and velocities, the influence of vent and crater geometry, temperature or composition of ejecta, and ballistic velocities.

Conveners:
Robin Samuel Matoza, Scripps Institution of Oceanography, Institute of Geophysics and Planetary Physics 0225 University of California, San Diego , La Jolla, CA 92093-0225 USA, Tel: (858) 534-8119, email: rmatoza@ucsd.edu, and
David Fee, Infrasound Laboratory (ISLA), University of Hawaii, Manoa 73-4460 Queen Kaahumanu Hwy #119 , Kailua-Kona, HI 96740-2638 USA, Tel: (808) 327-6206, email: dfee@isla.hawaii.edu, and
Milton Garces, Infrasound Laboratory (ISLA), University of Hawaii, Manoa 73-4460 Queen Kaahumanu Hwy #119 , Kailua-Kona, HI 96740-2638 USA, Tel: (808) 327-6206, email: milton@isla.hawaii.edu

V27 "Failed" Magmatic Eruptions: When Unrest Leads to Quiescence

When a volcano becomes restless, one of the primary questions asked of scientists is whether the unrest and underlying processes will lead to a magmatic eruption. "Failed" magmatic eruptions, where magma comes close to erupting but ultimately fails to reach the surface, can have significant negative consequences, particularly if the associated unrest leads to erroneous forecasts. Over the last several decades "failed" magmatic eruptions have been preceded by various combinations of increased degassing and thermal output, phreatic eruptions, shallow earthquake swarms (some with felt and/or low-frequency events), and notable ground deformation. Unequivocal cases of failed magmatic eruptions include Soufrière Guadeloupe (1975-76) and (1996). Arguable cases include , (1975), , (1996), , (1998), , Antarctica (1998), , (2006), , (2007), and many others. A few such cases are well studied, but many are poorly documented in the literature; thus details of these events are often unavailable to scientists for comparison to an ongoing episode of unrest. One of the primary goals of this session is to highlight examples of volcanic unrest that ultimately failed to produce a magmatic eruption. Another goal is to explore possible discriminants that could indicate whether unrest will or won't lead to eruption, along with physical models for failure or arrest of ascending or convecting magma. We encourage contributions from both observational and theoretical perspectives.

Conveners:
Seth Moran, U.S. Geological Survey - Cascades Volcano Observatory, 1300 SE Cardinal Ct, Vancouver, WA 98683 USA, Tel: 360 993-8934, email: smoran@usgs.gov, and
Chris Newhall, Earth Observatory of Singapore - Nanyan Technological University, SGP, email: cnewhall@ntu.edu.sg, and
Diana Roman, University of South Florida, USA, email: droman@cas.usf.edu

V28 New Scientific Insights From Mining Geochemical and Geophysical Databases

In recent years, data - from real-time data collected in the field, to laboratory analyses, and experiments - have been produced at higher rates than ever before. Mining this data avalanche as an individual is time consuming and arduous, if not impossible. An increasing number of large digital data collections are now available to the Geoscience community that compile and integrate data generated from vast numbers of different studies. These data collections provide new powerful avenues for research, enabling synthesis and analysis of vast geochemical and

geophysical data sets. This session invites papers of studies that detail scientific advances resulting from the use of large digital data sets and databases, and new developments in data mining techniques.

Conveners:
Kerstin Annette Lehnert, Lamont-Doherty Earth Observatory, Columbia University, 61 Route 9W, Palisades, NY 10964 USA, Tel: 8453658506, Fax: 8453658162, email: lehnert@ldeo.columbia.edu, and
Vincent Salters, Department of Geological Sciences, Florida State University, P.O. Box 3064100, Tallahassee, FL 32306-4100 USA, Tel: 8506441934, Fax: 8506444214, email: salters@magnet.fsu.edu, and
Frank S. Spear, Department of Earth & Environmental Sciences, Rensselaer Polytechnic Institute, 110 8th Street, Troy, NY 12180 USA, Tel: 5182766103, email: spearf@rpi.edu, and
Karin A. Block, Lamont-Doherty Earth Observatory, Columbia University, 61 Route 9W, Palisades, 10964 USA, Tel: 8453658393, email: kblock@ldeo.columbia.edu

V29 Quantifying Surface Processes Using Noble Gases

The relatively simple behavior of He, Ne, and Ar in both solids and fluids has been exploited to study a variety of terrestrial and planetary surface processes. We solicit contributions that advance our understanding of basic physical properties of noble gases in geologic materials, as well as novel applications of noble gas measurements to understand tectonic processes, landscape evolution, groundwater systems, chemical weathering, sedimentation rates in the ocean, and planetary impacts. Of particular interest are applications that use noble gas measurements in conjunction with other geochemical observations such as: (i) combined cosmogenic 3He and 21Ne with 10Be and 26Al, (ii) groundwater/reservoir tracer studies, (iii) weathering geochronology, iv) He- and Ar-based thermochronometry, (v) ages and temperatures associated with planetary impacts.

Conveners:
David L. Shuster, Berkeley Geochronology Center, 2455 Ridge Road, Berkeley, CA 94709 USA, Tel: 510-644-9200, email: dshuster@bgc.org, and
Sujoy Mukhopadhyay, Harvard University, USA, email: sujoy@eps.harvard.edu

V30 Arc Dynamics of Kamchatka: Recent Volcanological, Geophysical, and Petrologic Results

Kamchatka, Russia is one of the most seismically and volcanically active regions on Earth, with one of the fastest subduction rates of any arc. The peninsula contains 29 active volcanoes, beginning in the north at the terminus of the Aleutian arc and ending in the south at the start of the . Many of these volcanoes are in a near-constant state of eruption threatening both the local populations as well as the numerous daily trans-Pacific flights of people and cargo. The volcanoes have a wide range of compositions, styles, and morphologies, which can range from hydrothermal systems, to fissure-fed basaltic flows, to composite volcanoes that produce lava domes, flows, and large ash columns. This diversity of volcanic activity and the openness of in the past decade have made an attractive location for numerous scientific studies. Investigators have initiated collaborative research projects with Russian scientists ranging from NSF-sponsored programs focused on specific volcanic systems to NASA-sponsored programs such as the Asia-Pacific Natural Laboratory (APNL), which is focused on regional-scale scientific questions. We seek to bring together investigators who have worked on volcanic arc processes in recently using methods ranging from geophysics of the subsurface to remote sensing of ongoing eruptions. We would particularly like to highlight larger-scale, longer time-line collaborative studies that combine several fields of geoscience in order to better understand the dynamics and volcanology of the

Kamchatka Arc, including comparison to other arcs.

Conveners:
Michael Ramsey, University of Pittsburgh, Department of Geology and Planetary Science, Pittsburgh, PA 15260 USA, Tel: 412-624-8772, Fax: 412-624-3914, email: mramsey@pitt.edu, and
Adam Simon, University of Nevada Las Vegas, Department of Geoscience , Las Vegas, NV 89154 USA, Tel: 702-895-2916, email: adam.simon@unlv.edu, and
Michael West, University of Alaska Fairbanks, Geophysical Institute Alaska Volcano Observatory, Fairbanks, AK 99775 USA, Tel: 907-474-6977, email: west@gi.alaska.edu

V31 Nanoscale Views on Geochemical Processes

Molecular-scale computational and spectroscopic approaches are increasingly contributing to our understanding of geochemical processes as diverse as nanoparticle surface chemistry, mineral and gas hydrate nucleation, solid rupture mechanics, and diffusion in silicate melts and in water-filled nanopores. For this session, we invite contributions that will capture the breadth of the expanding field of molecular computational geoscience. We particularly wish to highlight collaborative research that combines quantum- or molecular-mechanical simulations with experimental spectroscopic investigations for nanoscale understanding of geochemical processes, as well as research that investigates the laboratory- and field-scale implications of molecular-scale findings. The broad diversity of molecular computational geoscience topics has never been gathered in a single session at previous AGU meetings, to our knowledge.

Conveners:
Ian C. Bourg, Harvard University, Hoffman Labs # 304 20 Oxford Street, Cambridge, MA 02138 USA, email: ibourg@nature.berkeley.edu, and
Kideok Kwon, University of California, 140 Mulford Hall # 3114 , Berkeley, CA 94720 USA, email: kkwon@nature.berkeley.edu

V32 Hydrology of Marine Hydrothermal Systems

The subsurface hydrology of marine hydrothermal systems (mid-ocean ridges, submarine arc volcanoes etc.) is still poorly understood. In particular, the causes for the temporal and spatial variability as measured on active black smokers as well as submarine arc systems are subject of an active debate. Hydrologic tracer tests are technically challenging and expensive to perform, numerical simulations of these systems have been difficult to conduct due to the non-linearities in fluid properties and phase behavior, and studies on fossil examples usually reveal a time-integrated result, for example in the form of rock alterations. Recent improvements in simulation techniques now allow physically rigorous scenario testing studies, including the simulation of complex phase separation processes as well as high resolution representation of fluid flow in two and three dimensions. We invite contributions from measurement campaigns on active systems, studies on fluid-rock interaction in fossil systems, geophysical constraints on flow physics, and numerical simulation to facilitate a multidisciplinary view on the hydrology of these systems and to identify of the most relevant scenarios for further studies.

Conveners:
Dim Coumou, ETH Zurich, Institute of Isotope Geochemistry and Mineral Resources ETH Zuerich Clausiusstrasse 25 (now at: Potsdam Institute for Climate Impact Research (PIK) Telegraphenberg A 31 14473 Potsdam, Germany), Zurich, 8092 CHE, Tel: +41 44 632 0483, email: coumou@erdw.ethz.ch, and
Philipp Weis, ETH Zurich, Institute of Isotope Geochemistry and Mineral Resources ETH Zuerich NW F84 Clausiusstrasse 25, Zurich, 8092 CHE, Tel: +41 44 632 0483, email: weis@erdw.ethz.ch, and

Thomas Driesner, ETH Zurich, Institute of Isotope Geochemistry and Mineral Resources ETH Zuerich NW F81.3 Clausiusstrasse 25, Zurich, 8092 CHE, Tel: +41 44 632 68 03, email: thomas.driesner@erdw.ethz.ch, and
Robert Lowell, Virginia Tech, Virginia Tech Geosciences 4044 Derring Hall (0420) Blacksburg, VA 24061, Blacksburg, VA 24061 USA, Tel: +1.540.231.6004, email: rlowell@vt.edu

V33 Advances in Analyzing Rock Textures and Microgeochemistry

Igneous and metamorphic textures have attracted much attention because they provide detailed information about the crystallization history of rocks. Textures reflect the complex interaction between nucleation and growth that occurred in the rock as a result of changing physical and chemical conditions. Metamorphic and igneous petrologists as have studied these aspects from different perspectives. This session aims to shed light on advances in the analytical methods for textural and microchemical analysis, e.g. quantifying mineral textures, 2D and 3D analysis of rock textures (CSD) as well as the interpretation of such data in a variety of geological settings. To advance our understanding of the fundamental processes governing mineral formation, we invite contributions from all research areas that cover metamorphic and igneous aspects of texture formation and microchemical analysis. Contributions based on observations from the field and experiments, as well as theoretical and modeling studies, are welcome.

Conveners:
Thomas Mueller, Mineralogy, Ruhr-Universität , Universitätsstr. 150 Gebäude NA 05/689 , , 44780 DEU, Tel: +49 234 322 41 41, email: Thomas.H.Mueller@rub.de, and
W. Carlson, The of at , email: wcarlson@mail.utexas.edu

V34 Flow and Fracture of Magma: Bringing Together Experimentation, Modelling and Monitoring

Magma is ductile, magma is brittle. Structural analysis of volcanic conduit margins and the interior of lava domes reveals a wide spectrum of behaviour from slow, fluid-like deformation to rapid, brittle fracturing and progressive development of fault gauges. It is increasingly apparent that this contrasting rheological behaviour plays a key role in controlling ascent dynamics, eruption styles and monitored indicators of unrest, especially since we now have experimental proof that high-temperature magma fracture is seismogenic. This new evidence suggests that careful monitoring of seismicity, ground deformation and degassing can potentially be used to track the transition from ductile to brittle flow behaviour, and therefore to forecast the transitions of eruptive styles. We propose a multidisciplinary session in which field observations, laboratory experiments, multi-parameter modelling and numerical simulations will improve our understanding of magma ascent and eruptive processes, with the aim of developing a viable eruption forecast method. This session aims to draw together multi-disciplinary contributions in order to illuminate new approaches, methodologies and results. We encourage a diverse range of submissions encompassing magma rheology and fracture mechanics, textural studies, conduit dynamics, lava dome growth, brittle-ductile structures, multi-parameter modelling and forecasting methods.

Conveners:
Yan Lavallée, LMU-Munich, DEU, email: lavallee@min.uni-muenchen.de, and Hugh Tuffen, Lancaster University, GBR, email: h.tuffen@lancaster.ac.uk, and
Alina Hale, Australian Computational Earth Systems Simulator, NZL, email: alinah@esscc.uq.edu.au, and
Arthur Jolly, GNS Science, NZL, email: A.Jolly@gns.cri.nz

V35 Advances in Volcano Monitoring and Research at the Alaska Volcano Observatory

The Alaska Volcano Observatory (AVO) was founded in April 1988, and has monitored over 40 eruptions in the North Pacific Region. In this time AVO has been on the forefront of developing new monitoring techniques for volcanoes in remote and harsh environments. Though the volcanoes are remote, their hazards to local infrastructure and air traffic are great, and AVO has focused its efforts to meet the needs of these communities. At its peak over 30 seismic networks have been installed, telemetering data from more than 180 stations. This array is now supplemented by continuous GPS, video and infrasound sensors. Insights to the processes of the ' most active volcanic arc span the petrogenesis of magmas in the transition from a continental to oceanic arc to eruption triggering mechanisms and the generation of pyroclastic flows, debris flows and other hazardous surficial processes. Satellite remote sensing was implemented for the first time operationally not only to look for precursors to activity, but to track potentially dangerous volcanic ash plumes throughout the region with new quantitative tools. The eruptions in concert with AVO's personnel and facilities have created unique research opportunities in and beyond . We invite abstracts that not only highlight the achievements of the observatory, but the research that has sprung up around the AVO's efforts and collaborations worldwide.

Conveners:

Stephen McNutt, Alaska Volcano Observatory, Geophysical Institute University of Alaska Fairbanks , Fairbanks, AK 99775 USA, Tel: (907) 474-7131, Fax: (907) 474-7290, email: steve@giseis.alaska.edu, and

Thomas Murray, Alaska Volcano Observatory, United States Geological Survey 4200 University Drive, Anchorage, AK 99508 USA, Tel: (907) 786-7443, Fax: (907) 786-7450, email: tlmurray@usgs.gov, and

James Begét, Alaska Volcano Observatory, Geophysical Institute University of Alaska Fairbanks, Fairbanks, AK 99775 USA, Tel: (907) 474-5301, Fax: (907) 474-7290, email: ffjeb1@uaf.edu, and

Jonathan Dehn, Alaska Volcano Observatory, Geophysical Institute University of Alaska Fairbanks, Fairbanks, AK 99775 USA, Tel: (907) 474-6499, Fax: (907) 474-7290, email: jdehn@gi.alaska.edu

V36 Interpretation of Spectroscopic Studies of Organic Species at the Mineral-Water Interface

Interactions that occur at the interface between molecules and mineral surfaces in the presence of water are integral to many chemical and physical processes, including the behavior of pollutants in the environment, the effects of metal implants in the human body, and perhaps the origin of life. In the mineral-water interface community, there is an ongoing effort to understand the adsorption of organic molecules at mineral surfaces using advanced in situ spectroscopic techniques and molecular calculations that can be used to describe the coordination chemistry in the interfacial region. However, the interpretation of such spectroscopic results is subject to uncertainty. This session focuses on the different types of spectroscopic techniques and molecular calculations that can be used to describe the mineral-organic species-water interface interactions at a molecular level. The aim is to enhance the awareness within the community of what can currently be done and what needs to be done within this research field. We encourage presentations based on experimental and theoretical studies.

Conveners:

Caroline M. Jonsson, Johns Hopkins University, Department of Earth and Planetary Sciences 3400 N Charles St Olin Hall 301, Baltimore, MD 21218 USA, Tel: 2024155581, email: cjonsson@ciw.edu, and

Christopher L. Jonsson, Johns Hopkins University, Department of Earth and Planetary Sciences 3400 N Charles St Olin Hall 301, Baltimore, MD 21218 USA, Tel: 2024153542,