August 2008
VGP Section Newsletter #33

Dear Colleagues,
Here is the slightly belated August issue of the Volcanology, Geochemistry and Petrology Section newsletter. Please visit the VGP website for newsletter archives and further information on VGP activities. Send comments and feedback to Sarah Fagents at fagents@hawaii.edu.

In this issue:

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(1) NEW VGP OFFICERS

July 1st saw the inauguration of the new VGP Executive Officers. Your new leaders are:

President: ***Alex Halliday***
President-Elect: ***Steve Sparks***
Secretary, Geochemistry: ***Janne Blichert-Toft***
Secretary, Volcanology, Petrology: ***Paul Wallace***

We look forward to working with the membership to build a bright future for VGP activities.

(2) 2008 VGP HONORS

The VGP Executive Committee is delighted to announce the following sectional awards:

The **2008 Bowen Award** goes to ***Rick Carlson*** (Carnegie Institution of Washington).
The **first Kuno Award** has been made to ***Cin-Ty Lee*** (Rice University).

The Awards will be made at the VGP Reception at Fall AGU (Tuesday December 19th, 2008). Rick Carlson will also present the Bowen Award Lecture summarizing his recent research at a special session on the morning of December 19th

(3) MSA/GS SHORT COURSE ANNOUNCEMENT

A short course on Minerals, Inclusions, and Volcanic Processes will be held in San Francisco December 13-14 (immediately prior to the AGU Fall Meeting). The short course is jointly sponsored by the Mineralogical Society of America and the Geochemical Society.

Minerals and their inclusions provide a valuable archive of volcanic processes, ranging from the depths and temperatures of magma storage, to the rates of magma ascent and the history of magmatic evolution and eruption. The goal of this short course is to bring together scientists who use different methods to understand these highly related issues. Key areas to be covered are: 1) thermobarometry, 2) the geochemistry of fluid and melt inclusions, 3) isotopic studies and age-dating techniques applied to minerals, 4) the kinetics of mineral growth and the genesis of mineral textures, 5) the role of volatiles during magma evolution and ascent, and 6) the physics of mineral-melt segregation. We hope to spark new collaborations, which may initiate new avenues of research and possibly transform our understanding of how volcanoes work.

Further information available at http://www.minsocam.org/MSA/SC/ or from conveners *Keith Putirka* (kputirka@csufreso.edu) and *Frank Tepley* (ftepley@coas.oregonstate.edu).

(4) VGP SESSIONS AT THE 2008 AGU FALL MEETING

Abstract Deadline: 10 September 2008, 2359 UT

The 2008 Fall Meeting in San Francisco (**December 15–19**) will once again be packed with sessions of interest to VGP members. The 42 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 five 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 on the AGU website (http://www.agu.org/meetings/fm08/). We want to thank all of you who submitted proposals for special sessions – your effort is what makes the Fall Meeting such a big success each year.

---*Janne Blichert-Toft* and *Paul Wallace*

VGP Secretaries

VGP SESSIONS (see below for complete session descriptions and names of conveners)

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 Montserrat 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 Chaitén Volcano, Southern Chile
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 Mountain Building
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 Hawaii Scientific Drilling Project
V25 New Insights on the Formation and Evolution of Fast-Spreading Ocean 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 Kamchatka: 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 Alaska Volcano Observatory
V36 Interpretation of Spectroscopic Studies of Organic Species at the Mineral-Water Interface
V37 Puna Dacite Magma at Kilauea: 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: Antarctica Geological and Geophysical Research
V41 Minerals, Inclusions and Volcanic Processes 5: Volatile Diffusion and Degassing as Related to Crystal and Bubble Growth, Volcanic Gas Compositions, and Eruption Dynamics
V42 Geochemical Heterogeneities in OIB and MORB Sources: Implications for Melting Processes and Mantle Dynamics

UNION SESSIONS (see below for complete session descriptions and names of conveners)

U09 Different Views on One Asthenosphere
U18 Interaction and Co-evolution of Earth Reservoirs: Coupling of Mantle, Tectonic, Atmospheric, and Hydrospheric Dynamics in the Evolution of Earth
U20 Fluids at Convergent Margins: Synthesis of Observations, Experiments and Models
U21 Geologic, Seismologic, and Geodynamic Constraints on the 4–D Evolution of North America: Where are we now and Where are we going?
U25 Integrated Geohazards Along Continental Margins and Plate Boundary Zones

SESSIONS CO-SPONSORED BY VGP

B11 Developing Integrated Models for Mid-Ocean Ridge Processes at the Ridge 2000 East Pacific Rise Integrated Study Site
B12 Stress Response and Survival of Metal-Reducing Bacteria in the Environment.
B15 Life in the Deep Subsurface: A Decade of Peeking at the Unseen Majority
B25 Redox Processes in Iron-Bearing Soils and Sediments
B28 Biogeochemistry of Oxyanion-Forming Metals and Metalloids in the Environment
C22 Isotopic and Geochemical Insights Into Weathering Fluxes and Processes in Glacial Environments
DI02 Seismic Anisotropy and Mantle Dynamics - Observations and Modeling
DI06 The Ins and Outs of the Earth's core
DI08 Chemical Heterogeneities in the Earth's Mantle: Their Roles in the Early Earth Differentiation, Mantle Dynamics and Geochemistry
DI09 Models of the Mantle: Reconciling Mineral Physics, Geodynamics, Geochemistry and Seismology
DI10 Multi-Disciplinary Insights Into the Earth's Transition Zone
DI12 Interdisciplinary Implications of Recent Deep Earth Discoveries: From Mineral Physics to Seismology and Geodynamics

DI13 Linking Earth's Deep Interior to the Surface: Earth Evolution
DI14 Linking Earth's Deep Interior to the Surface: The Present Mantle
ED15 Teacher Professional Development Programs Promoting Authentic Scientific Research in the Classroom
G13 Ever Faster: Low-Latency Data Collection and Applications Across the Earth Sciences
G17 Understanding Geosphere and Cryosphere Processes Using Spaceborne Measurements of Deformation, Altimetry, and Topography
GC06 Deccan Volcanism, Chixculub Impact, Global Environmental Change, the KTB and Other Mass Extinctions
GP02 Mapping the Internal Architecture of Igneous Systems: Applications of Geophysical and Structural Techniques
H46 Who Knows How the River Flows? Understanding Sediment Movement Through Fluvial Networks
IN02 Visualizing Scientific Data Using KML and Virtual Globes
IN03 Emerging Cyberinfrastructure for Geosciences
IN04 Rich Collaboration Environments for Geosciences
IN05 Frontiers in Advanced Information Systems and Earth Observation Technology
IN08 Provenance Management for Large Scale Scientific Datasets
IN09 EarthScope and CyberInfrastructure
IN11 Environmental Sensor Networks: Real World Examples
MR01 Mineral and Rock Physics: General Contributions
MR02 Computational Approaches and Applications in Earth Materials Studies
MR03 Composition and Evolution of Iron-Rich Cores in the Earth and Other Planets
MR04 Planetary Ices - Cryo-mineralogy and Cryo-petrology
MR05 Life Under Pressure: Chemistry of Extreme Conditions
MR06 Diffusion and Related Transport Processes in Geomaterials
MR07 Minerals in the Early Solar System - From First Condensates to Planetesimals
MR08 Frontier Research in Earth Materials and Implications for Mantle Composition and Temperature
MR09 Properties of Silicates, Oxides, and Melts in the Mantle
MR10 Toward Quantifying the Interaction of Reaction and Deformation Processes
MR11 Melt and Melt Properties Under Pressure
MR13 New Views on Discontinuities, Composition and Temperature of the Mantle
OS34 Research Experiences of Undergraduates in Ocean Sciences
P02 Recent Advances in Planetary Volcanology
P03 Planetary Rings: Observation and Theory
P12 Organic and Inorganic Microbial Biosignatures
P16 Comparison of Basaltic Volcanism on Mars and the Earth
PP07 Mesozoic-Early Cenozoic Geochemical Records of Paleoclimatic and Paleoceanographic Variability
PP09 Constraints on Past Ocean Circulation and Climate from New and Traditional Geochemical Proxies
PP29 Novel Insights in Historical Geobiology
T04 Interactions Among Climate, Exhumation and Tectonics Through the Changing Climate of the Neogene and Quaternary
T05 Magmatic, Tectonic, and Hydrothermal Interactions at (Ultra-) Slow Spreading Mid-Ocean Ridges
T07 Evolution of Magma-Starved Rifts in Oceans, Continents and Backarcs
T08 Magma-Rich Extensional Environments: Evolution of Continental Basins and Rifted

Continent Margins
T13 Research Advances on the Geologic, Tectonic, and Geochemical Evolution of the Indian Ocean Seafloor and its Margins
T18 Transforming the View of Cascadia Through Interpretation of Multidisciplinary Data Sets
T23 Retro-Plate Deformation at Retreating and Advancing Subduction Zones
T25 Is Water Being Recyled into the Deep Mantle? If So, How?
T26 Microplate Geodynamics
T27 The Formation and Thermal Evolution of Convergent Orogens: Constraints From Geochronology, Thermochronology and Modeling
T31 Global Tectonics and the Paleocene ~62 Myr (~mid Danian) Plate Reorganization: Observed Signatures and Models
T32 Active and Reactivated Faults and Thrusts, Neo-Tectonic Feedback and Related Climate Change: Implications for Landscape Development in Young Orogens
T34 Exhumation of High and Ultrahigh-Pressure Rocks: The Cross-Disciplinary View

DETAILS OF VGP AND UNION SESSIONS

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, University of Oregon, USA, email: pwallace@uoregon.edu, and
Janne Blichert-Toft, École Normale Supérieure de Lyon, USA, 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:
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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:
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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:
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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
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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:
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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 Mount St. Helens, 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:
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Michael C. Rowe, University of Iowa, USA, email: michael-rowe@uiowa.edu, and John S. Pallister,

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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:

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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 Iceland 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:
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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 Argentina. 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:
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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:
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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:
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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 Mauna Kea 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:
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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:
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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
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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 Akutan, Alaska (1996). Arguable cases include Mount Baker, Washington (1975), Iliamna, Alaska (1996), Iwate, Japan (1998), Deception Island, Antarctica (1998), Fourpeaked, Alaska (2006), Huila, Colombia, (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:
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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:
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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:
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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 Kurile Islands. 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 Kamchatka 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 Russia in the past decade have made Kamchatka 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 Kamchatka 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:

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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:

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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:

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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:
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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 United States' 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 Alaska. 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:

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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:

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