

Goldschmidt conference, June 13-18 2010, Knoxville, Tennessee

Theme 05 sessions:

***05a*: Ridge-Crest Hydrothermal Systems: New Insights from Field, Laboratory, and Theoretical Studies**

Convenors: Jeffery Seewald, Jun-Ichiro Ishibashi Keynote: Stefan Arnorsson (University of Iceland)

Hydrothermal activity at oceanic spreading centers plays a critical role in the chemical, physical, and thermal evolution of the oceanic crust is strongly influenced by tectonic setting owing to large variations in substrate composition, structure, and thermal budgets. This session will provide an opportunity to present results of recent studies designed to examine geochemical processes associated with hydrothermal activity that includes (but not limited to) such topics as: fluid-rock interaction, phase-separation, magmatic degassing, the formation of metal-sulfide deposits, and biological modification of vent fluids and mineral deposits. We anticipate contributions from a broad range of hydrothermal systems hosted in basaltic, ultramafic, and felsic crust at mid-ocean ridge and back-arc spreading centers. Contributions focusing on the application of experimental and theoretical approaches that constrain models of hydrothermal circulation are encouraged.

http://www.goldschmidt2010.org/themes?theme=05#session_05a

***05b*: Hydrothermal Alteration of Oceanic Crust at Slow Versus Fast Spreading Ridges**

Convenors: Jeffrey Alt, Damon Teagle Keynote: Frieder Klein (Woods Hole Oceanographic Inst.)

Our understanding of the development of lithospheric heterogeneity that characterizes slow spreading ridges has increased greatly in recent years. Hydrothermal processes in crust formed at fast and intermediate spreading rates are reasonably well understood, but our understanding of subsurface hydrothermal processes at slow spreading rates lags behind. This session thus focuses on hydrothermal processes and alteration in crust formed at slow spreading rates versus processes at faster spreading rates. In particular, contributions focusing on the interplay of hydrothermal, tectonic, and magmatic processes, or concerning heterogeneous lithosphere at slow spreading rates are encouraged, but contributions about the geochemistry, structure, fluid flow, or biology of crustal alteration at all spreading rates are welcome.

http://www.goldschmidt2010.org/themes?theme=05#session_05b

***05c*: Dynamics and Energetics of Seafloor Hydrothermal Systems**

Convenors: Andrew McCaig, Mathilde Cannat, Fabrice Fontaine Keynote: William Wilcock (University of Washington)

Seafloor hydrothermal circulation is a vital part of the Earth System, conditioning both the lithosphere entering subduction zones and the chemistry of the ocean. Recent work has highlighted the diversity of hydrothermal systems both in the near-ridge high temperature environment and off-axis. Order of magnitude variations exist in the scale

(heat output) and longevity of circulation, related to factors such as spreading rate, magma chamber depth and geometry, and tectonics. Modelling such systems requires an understanding of the complex interplay between heat input, permeability structure of the lithosphere and the thermodynamic properties of seawater as it changes in P,T and chemistry during hydrothermal flow. We invite contributions on all aspects of the dynamics and energetics of seafloor hydrothermal circulation, including modelling and the testing of models, links between seismicity and hydrothermal circulation, controls on permeability including deformation and metamorphic reactions, and the longevity and episodicity of flow.

<http://www.goldschmidt2010.org/themes?theme=05#session_05c>

***05d*: Hydrothermal Organic Geochemistry**

Convenors: Everett Shock, Mitchell Schulte Keynote: Tom McCollom (University of Colorado)

Natural transformations of organic compounds at high temperatures and pressures often involve aqueous fluids, whether deep in sedimentary basins, hydrothermal systems or during low-grade metamorphism. Recently, experiments and observations have revealed evidence for abiotic organic synthesis, novel catalytic pathways, and unexpected reaction mechanisms all at hydrothermal conditions. Theoretical models now allow thermodynamic calculations for biomolecules involved in the central metabolism of the thermophiles and hyperthermophiles that live in hydrothermal ecosystems, as well as proteins encoded by their genomes. These topics and more are sought with results from field, experimental, analytical, and theoretical studies welcome contributions to this session.

<http://www.goldschmidt2010.org/themes?theme=05#session_05d>

***05e*: Geomicrobiology of Mid-Ocean Ridge Systems: Connections
Among Subseafloor, Plume, and Low-Temperature Alteration**

Environments Convenors: Brandy M Toner, Gregory Dick, Jason Sylvan Keynote: Anna-Louise Reysenbach (Portland State University) The goal of this session is to bring together microbiologists and geochemists having expertise in mid-ocean ridge systems to discuss connectivity of subseafloor, active vents, hydrothermal plumes, and low-temperature alteration environments from the perspective of geomicrobiology and biogeography.

<http://www.goldschmidt2010.org/themes?theme=05#session_05e>
