Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

MIS32-07 Room:304 Time:May 24 10:30-10:45

Introduction to the International Continental Scientific Drilling Program in the Samail Ophiolite, Sultanate of Oman

KELEMEN, Peter[2] ; MORISHITA, Tomoaki[1*]

[1]Kanazawa University, [2]Lamont-Doherty Earth Observatory

The Samail ophiolite in Oman is the largest, best-exposed, and most-studied ophiolite in the world. The Scientific Drilling in the Samail Ophiolite has been approved by the International Continental Drilling Project. In the presentation, we introduce the scientific objectives, geology of the potential sites, and practical and educational perspectives of the proposal. The scientific objectives are as follows: quantify 1) the nature and timing of solid upwelling beneath a spreading ridge using crystal shape and lattice preferred orientation data systematically collected on core from the periphery of a mantle diaper, 2) the nature and structural relationships of melt transport features in the shallow mantle, to evaluate mechanisms that focus transport from a melting region to the ridge, 3) chemical variability deformation structures in the crust-mantle transition zone and plutonic lower crust, to determine the depth of crystallization, the nature of ductile flow, and mechanisms of melt transport to the lower crust through the MOHO, 4) hydrothermal alteration and cooling of the plutonic lower crust using mineral compositions, diffusion profiles, and stable isotopes to determine the importance of hydrothermal convection in heat and mass transfer and 5) investigate processes in the critical dike-gabbro transition via study of cross-cutting igneous relationships, metamorphic mineral assemblages, and geochemical alteration, for igneous and metamorphic processes at oceanic spreading centers. The drillings can also adders 1) mass transfer from subducted sediments into overlying peridotite via petrologic and geochemical studies, with special focus on carbon cycling, and 2) ongoing-subsurface alteration of mantle peridotite, including fluid compositions, hydrology, characterization of fracture and vein spacing, studies of mineral assemblages formed by carbonation, hydration (serpentinization) and oxidation and resulting mass transfer, and characterization of the subsurface microbial biosphere that derives energy from catalysis of low temperature alteration.

Lead proponents are Peter B. Kelemen, Jurg Matter and Damon A. Teagle. Other principal investigators are Raeid Abed, Ali Al Rajhi, Shoji Arai, Wolfgang Bach, Kier Becker, Francoise Boudier, Georges Ceuleneer, Laurence Coogan, Kathyrn Gillis, Marguerite Godard, Steve Goldstein, Philippe Gouze, Greg Hirth, Albrecht Hofmann, Benoit Ildefonse, Bjorn Jamtveit, Frieder Klein, Jurgen Koepke, Charles Langmuir, Chris MacLeod, Craig Manning, Katsu Michibayashi, Jay Miller, Sumio Miyashita, Sobhi Nasir, Adolphe Nicolas, Matthew Schrenk, Barbara Sherwood-Lollar, Everett Shock, Satish Singh, Rob Sohn, Martin Stute, Eiichi Takazawa, Alexis Templeton, Susumu Umino, Jessica Warren.

Keywords: Oman Ophiolite, Mid-Ocean Ridge, Island Arc, Serpentinization, Carbonation, Subsurface microbial biosphere