

International Ocean Discovery Program



CALL FOR APPLICATIONS



Apply to participate in *JOIDES Resolution Expedition*

Application deadline: 1 April 2017

Brothers Arc Flux Expedition (376) Gateway to the Sub-Arc Mantle: Volatile Flux, Metal Transport, and Conditions for Early Life 5 May – 5 July 2018

Expedition 376 will investigate the fundamental, interrelated processes governing seafloor hydrothermal activity at Brothers Volcano, southern Kermadec Arc (IODP proposal 818-Full2). The primary objectives are to (1) Characterize the subsurface, magma-derived volatile phase for testing models predicting the existence of either a single-phase gas or a two-phase brine-vapor; (2) Explore the distribution of base and precious metals and metalloids at depth as well as the reactions that have taken place during their precipitation along fluid migration pathways to the seafloor; (3) Quantify the mechanisms and extent of fluid-rock interaction, and what this implies for the mass flux of metals and metalloids to the ocean as well as the role of magma-derived carbon and sulfur species in acting as agents for those fluxes; and (4) Assess the diversity, extent, and metabolic pathways of microbial life in an extreme, acidic, and metal-toxic (sub)volcanic environment.

The ultimate scientific goal of Expedition 376 is to discover the key processes that distinguish submarine arc-hosted hydrothermal systems from those linked to spreading centers, which results from the flux of magmatic fluid commonly being much higher in volcanic arcs. As a consequence of their shallow water depths and high volatile contents, the magmatic-hydrothermal arc signature gives rise to different fluid compositions and thus mineralization compared to submarine extensional settings. This likely has also consequences for the associated biota. Additionally, given the very acidic fluids and high metal concentrations, submarine arc hydrothermal systems are thought to be important analogs to porphyry copper, epithermal gold, and various volcanic rock-hosted massive sulfide deposits mined on land. Drilling Brothers Volcano will provide essential information for understanding the formation of those mineral deposits.

Operations will focus on discharge zones of geochemically distinct fluids in and around the caldera of Brothers Volcano by drilling and logging to 100s of m. The drill sites show variable impact of magmatic volatiles, which will enable the expedition to directly study the implications of magma degassing for the transport of metals to the seafloor and how this affects the functioning of microbial life.

For more information about the expedition science objectives and the *JOIDES Resolution Expedition Schedule* see

<http://iodp.tamu.edu/scienceops/> - this includes links to the individual expedition web pages that provide the original IODP proposal and expedition planning information.

WHO SHOULD APPLY: Opportunities exist for researchers (including graduate students) in specialties including (but not limited to) sedimentologists, petrologists (igneous/metamorphic/sulfide), structural geologists, paleomagnetists, petrophysicists, borehole geophysicists, microbiologists, and inorganic/organic geochemists.

WHERE TO APPLY: Applications for participation must be submitted to the appropriate IODP Program Member Office – see <http://iodp.tamu.edu/participants/applytosail.html>