

Primary Investigator: Maurice Tivey

Institution: Woods Hole Oceanographic Institution

Project: Collaborative Research: Hydrothermal and Microbiological Exploration of the Active Brothers Volcano in the Kermadec Arc

Co-PIs: Susan Humphris, Anna-Louise Reysenbach, and Cornel de Ronde

NSF Division: OCE **Solicitation Info:** Marine Geology and Geophysics

Ocean Drilling Program **Submission Date:** 08/15/2014

Overview: We propose to investigate the hydrothermal deposits at Brothers volcano in the Kermadec Arc to establish their setting within a volcanic framework, deploy thermal blankets for heat flux measurements, and sample fluids, hydrothermal mineralization, and microbes in this arc volcano environment.

Data description: HROV dives and a night time CTD program. Data will consist of: 1) HD video imagery for mapping the volcanic architecture of the caldera walls and vent sites, 2) volcanic rock and sediment sampling of hydrothermal deposits and sediments for geological and biological investigations, 3) hydrothermal fluid sampling, 4) conductive heat flux measurements using thermal blankets, 5) underway high resolution geophysical mapping (bathymetry and magnetics).

Data analysis summary: HROV imagery and geophysical data will be processed by Tivey/Humphris and de Ronde to provide maps and mosaics of the hydrothermal sites, caldera wall stratigraphy and potential drill sites. Heat flux data will be processed by Tivey. Rock/mineral samples will be processed by Humphris and de Ronde and geochemical analysis will be undertaken at GNS. Biological samples and subsequent analysis will be the responsibility of Reysenbach. Hydrothermal fluid and CTD samples will be analyzed by both WHOI and GNS as appropriate. Ship-based CTD and underway geophysical data will be processed at GNS.

Includes field work? Yes

Description of field work: The cruise plan includes 11 HROV dives over a 12-day period on station. Daily operations include 12 hrs of HROV operations with the nighttime for battery recharge and surface ship operations. Night operations will include both ship-based CTDO plume mapping and magnetometer/gravity surveys.

Expected data product #1

Data type: Observational, Processed Data

Responsible investigator: Tivey and Humphris

Product description: HROV navigation and dive data

Intended repository: MGDS

Timeline for data release: Two Years from acquisition/analysis

Expected data product #2

Data type: Observational, Processed Data

Responsible investigator: Tivey and Humphris

Product description: HROV video data and mosaics

Intended repository: MGDS

Timeline for data release: Two Years from acquisition/analysis

Expected data product #3

Data type: Observational, Processed Data

Responsible investigator: Tivey

Product description: HROV Conductive heat flux maps and profiles

Intended repository: MGDS

Timeline for data release: Two Years from acquisition/analysis

Expected data product #4

Data type: Observational

Responsible investigator: Tivey and de Ronde

Product description: Standard shipboard geophysical and marine environmental data

Intended repository: NGDC

Timeline for data release: Two Years from acquisition/analysis

Expected data product #5

Data type: Observational, Analytical

Responsible investigator: Humphris, de Ronde and Reysenbach

Product description: Rock/mineral samples split between de Ronde (GNS-NZ), Reysenbach (PSU) and Humphris (WHOI)

Preservation plan: The samples will be archived at WHOI and GNS. Geochemical and isotopic analysis will be done at GNS and results uploaded to the relevant databank (EarthChem, PetDB).

Timeline for data release: Two Years from acquisition/analysis

Expected data product #6

Data type: Observational, Analytical, Processed Data

Responsible investigator: Reysenbach

Product description: Microbiological samples and processed data

Preservation plan: Sequence data will be submitted to GenBank. Strains of isolates will be deposited in culture collections (ATCC, DSMZ and Reysenbach's in-house OCM culture collection).

Timeline for data release: Two Years from acquisition/analysis

Expected data product #7

Data type: Analytical

Responsible investigator: Humphris and de Ronde

Product description: Hydrothermal and CTD plume fluid samples

Preservation plan: Fluid samples will be split and returned to WHOI/GNS for processing and archiving. CTD data will be analyzed and archived by GNS.

Timeline for data release: Two Years from acquisition/analysis