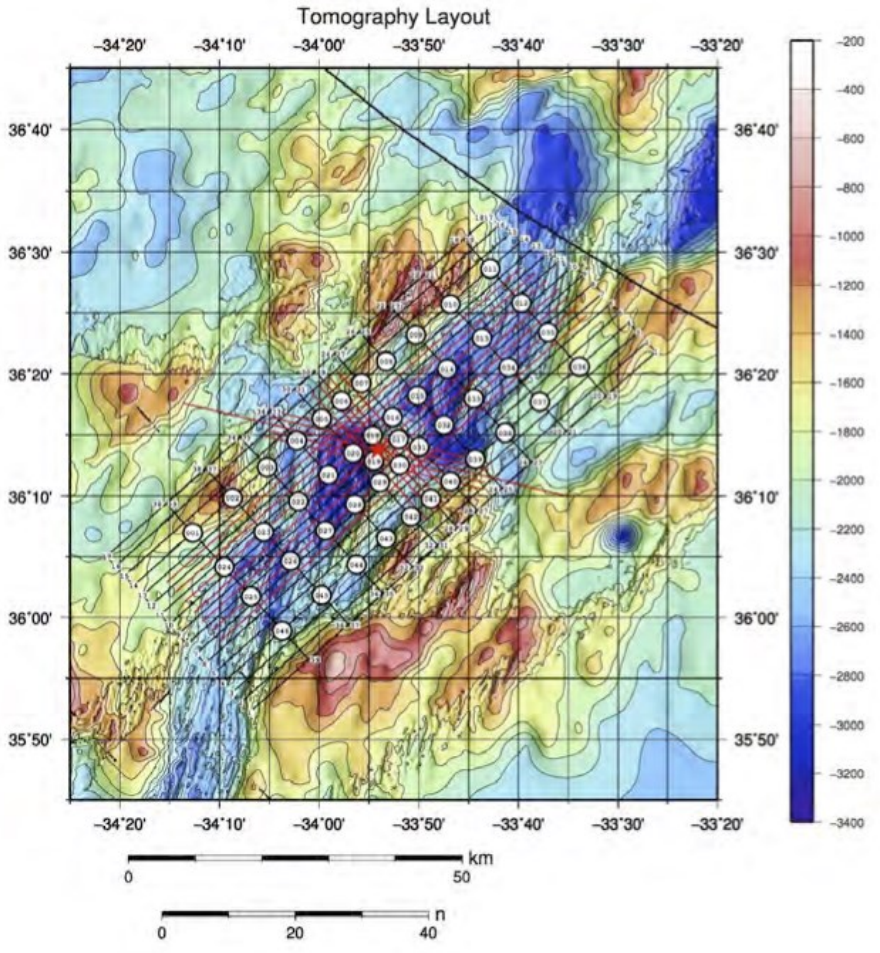
OBSIP Experiment Archive

Year:	2013
Experiment Name:	MARINER (Seismic Investigation of the Rainbow Hydrothermal Field and its Tectono/Magmatic Settings, Mid-Atlantic Ridge 36° 14'N)
Principal Investigator(s):	J. Pablo Canales (WHOI) Robert Dunn (University of Hawaii) Robert Sohn (WHOI)

Experiment Summary: (NSF Award # 0961680, Summary taken from MARINER website) Heat extraction from the Earth via hydrothermal systems along mid-ocean ridges (MORs) is a fundamental process affecting the Earth: hydrothermal systems extract approximately one third of the global yearly heat loss through ridges and are a primary means of chemical exchange between the solid Earth and the oceans. It is generally believed that sections of MORs with greater magma supply host a greater abundance of hydrothermal systems. While this simple conceptual model provides a framework within which to understand hydrothermal heat generation, the relative roles of magmatic heat input, tectonic heat advection, and faulting in controlling ridge thermal structure and hydrothermal circulation are still poorly understood. This is particularly important for hydrothermal circulation at slow- and ultra-slow spreading ridges, where venting occurs in a variety of host-rock lithology and tectonic setting. The Rainbow hydrothermal field (RHF) is a methane-, hydrogen- and iron-rich system located on an ultramafic massif within a tectonized non-transform discontinuity (NTD) of the Mid-Atlantic Ridge, where current models predict that long-term magma supply should be very low. Yet Rainbow vents high-temperature fluids at high flow rates, which is difficult to explain without a magmatic heat source.



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Experiment Summary: ... This conundrum stands in the way of our ability to develop general models for the roles of magmatic heat input and tectonic faulting on controlling ridge thermal structure and hydrothermal circulation, particularly for hydrothermal systems located in regions dominated by ultramafic lithologies, which are common at slow and ultra-slow MORs.

Cruises:

4/10/2013 - 5/19/2013:
In the beginning of 2013, 46 short-period ocean-bottom seismometers were deployed in the Rainbow hydrothermal field. 15 of the short-period instruments were left on the ocean floor for a 6 month deployment. The R/V Marcus Langseth was employed to shoot airguns over the array.

1/3/2014 - 1/13/2014 :
Recovery of the 15 short-period instruments that were left on the seafloor.

Data:

Data from all OBSIP instruments deployed is archived under temporary network code X3 and assembled data set ID #13-007 at the IRIS DMC.

Downloads/Links:

MARINER Experiment Website

Cruise Report