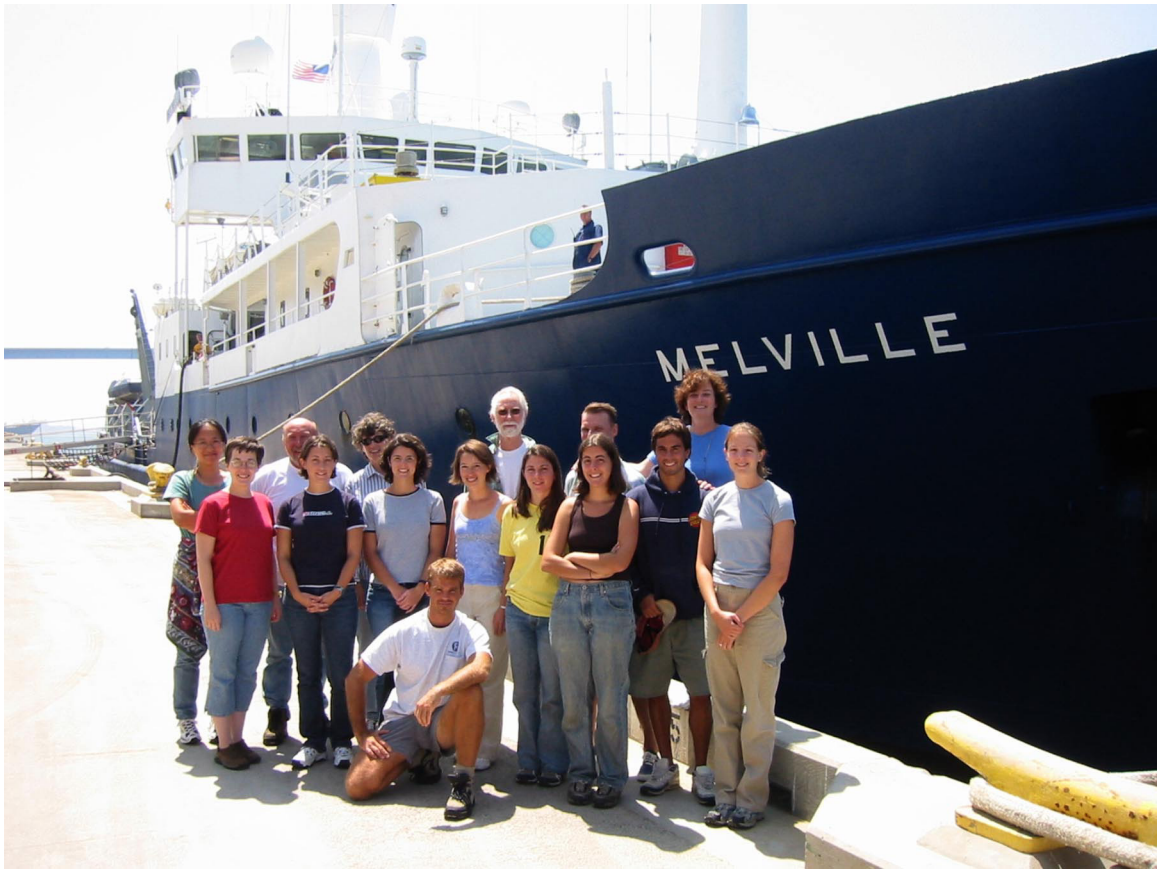
Cruise Report: Melville Vancouver, Leg 01

August 5th-September 2nd, 2002
Seabeam/Magnetics/Camera Tows/
Dredges/Wax Cores

Chief Scientists: Emily M. Klein and Deborah K. Smith



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Section 1: Cruise Overview

The primary goal of our study was to use magmatism of the Incipient Rift, the apparent northern boundary of the Galapagos Microplate, to explore the chemical systematics produced within the steady-state melting regime of the East Pacific Rise as a function of distance from the axis. Previous limited exploration by P. Lonsdale suggested that the Rift is a magmatically active, slowly diverging, spreading center separating the Cocos and Galapagos plates.

During our cruise (Aug. 5-Sept. 2, 2002), we performed the following:

1. Broadly mapped, using Seabeam, the Incipient Rift region from the EPR to ~ 135 km to the east. The Seabeam system provided not only bathymetry but also side-scan data useful in the identification of the locus of magmatism within the Rift.
2. Collected magnetic data along the survey tracks.
3. Sampled the Rift (53 dredges; 5 wax cores; additional wax balls deployed by the camera sled) for chemical analysis.
4. Performed 14 camera tows using the WHOI Towed Camera System, which provides digital images suitable for mosaicing, collects CTD data, and can deploy up to six wax balls for sampling.
5. Sought evidence of hydrothermal activity by deploying the NOAA MAPR on all dredges, wax cores, and camera tows.

At the time of this writing (transiting to port) the data we collected suggest the following:

1. The Incipient Rift is indeed magmatically active (as evidenced by magnetics, sampling, camera tow images, and side-scan maps).
2. The Rift can be viewed as having distinct tectonic and magmatic provinces; from west to east these are: The Linking Ridge (Lonsdale); the Magmatic Gore; and the Faulted Gore.
3. The locus of magmatism within the Rift, somewhat unexpectedly, is confined to a narrow zone that runs through the southern portion of the Rift, just north of the faults that define the southern boundary of the Rift.
4. In general, the freshness of basaltic glass (and whole rock) decreases eastward; although altered and interstitial fresh glass was recovered in our easternmost dredge 66 km from the EPR.
5. No evidence of hydrothermal activity was found along the Incipient Rift, although a hydrothermal plume at ~2850 m water depth was found over the adjacent EPR.
6. A brief SeaBeam survey of the area northeast of the Incipient Rift during our transit to port revealed the probable existence of a second, perhaps larger propagating rift, which further emphasizes the complicated nature of the microplate boundaries in this region.

Our work on shore will focus on understanding the tectonic and volcanic structure of the Incipient Rift and its surrounding area; exploring the geochemical systematics of lavas collected from the Incipient Rift; and interpreting these chemical systematics in light of models for the compositions of melts within the melting regime of the EPR.

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