

## Geology operations during the Endeavour Event Response cruise, TN177b, *R/V Thomas G. Thompson*, March 5-11, 2005

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### Multibeam sonar resurvey

The area of the Feb-March 2005 earthquake swarm was resurveyed during transits and between CTD operations during the event response cruise. The Simrad EM300 multibeam sonar system on the *R/V Thompson* was used to collect bathymetric data to look for changes in seafloor depth that may have occurred during the event (due to an eruption of lava on the seafloor, for example). The area that was analysed for changes was between 48°05'N to 48°15'N and 129°13'W to 128°58'W. This includes the area with the highest density of earthquake epicenters. The pre-event bathymetry that was used for the comparison was an EM300 survey collected in 2003 by University of Washington on the *Thompson* and provided courtesy of Debbie Kelley and Debbie Glickson. No significant depth changes were detected from the comparison of pre- and post-event bathymetry. Since the “before” and “after” datasets were collected with the same ship and sonar system and both were GPS navigated, the comparison was relatively straight-forward and there is a high degree of confidence in the results.

### Deepsea Camera Tows

A deepsea camera sled was provided by Dan Fornari at the Woods Hole Oceanographic Institution. WHOI's West Coast Round Towcam frame with a DPSL camera, Benthos strobe system and SBE25 CTD was used on this cruise. Because of the short notice, we did not have our normal complement of equipment, tools and supplies, and had to borrow and improvise as necessary. No corers or bottle samplers were used for this towcam setup. Greg Kurras helped mobilize and assemble the camera on board before the ship departed Seattle.

A new, never-wet SBE25 CTD was brought to service with no prior testing, which necessitated more preparation and setup than normal. An early model Benthos 383 strobe electronics bottle was prepared at WHOI, while the only available Benthos 386 strobe heads and spare 383 strobe electronics board were generously provided by NAVO (Pete Miller). Thompson loaned numerous items for our work, including their weak link, flatscreen monitor, Benthos 12kHz pinger for use on the Towcam (which proved highly valuable during the tow) and assorted mechanical and electrical parts.

Towcam operations shared use of Thompson's 0.322in UNOLS 3-conductor CTD seacable with the PMEL rosette, necessitating several exchanges of the prepared termination between the underwater units, which went smoothly. The electrical termination was prepared by the shipboard technicians, while the mechanical termination was made by Marshall Swartz. PMEL requested a special configuration of seacable conductors because of experience with this seacable and their CTDs. While this configuration worked for PMEL's rosette and worked for the towcam on deck, it was found not to support our CTD setup and resulted in the two aborted tow attempts. After rewiring the CTD termination end, we made our successful tow on March 10-11, 2005, during which we acquired over 1800 pictures in 7 hours on the bottom. In addition, CTD and MAPR data were recorded by instruments on the camera sled.

The camera tow was conducted between 48°06'N and 48°03'N, about 5-10 km north of the Endeavour hydrothermal vent fields along the ridge axis. This area had been identified as overlying a weak axial magma chamber reflector during a recent multichannel seismic survey on the Juan de Fuca Ridge (in addition to AMC reflectors under the Endeavour vent fields). The area of the camera tow was also directly south of the first CTD tow during this cruise (T05B01) and north of the last four CTD casts over the Endeavour vent fields (V05B04-07). The tow was conducted from north to south, starting at a small cones ~100-m high at about 48°06' and proceeding southward into a narrow valley ~300-m wide with 50-100-m normal faults on either side. No significant temperature or turbidity anomalies were recorded during the tow and no evidence for recent eruptive or hydrothermal activity was found. The photographs show mostly moderately to heavily sedimented pillow lavas and talus, often with sessile benthic biota (corals and sponges, etc). The lavas are fissured and faulted in many areas. This part of the ridge axis has not experienced volcanic activity in at least hundreds of years.