



Tim Shank, WHOI, WHOI, [tshank@whoi.edu](mailto:tshank@whoi.edu)  
Santiago Herrera, WHOI, WHOI, [shererra@whoi.edu](mailto:shererra@whoi.edu)

#### Purpose of the Dive

The plans for Dive 03 are, if possible, to complete characterization of the Von Damm vent-site and then, as time permits, commence off-site reconnaissance. To that end the dive plan should include:

- 1) Dive to central pinnacle for navigation orientation and ensure internal consistency from Dive 01;
- 2) Proceed south to outermost line that has not yet been completed from Dive 01 plan.
- 3) Proceed, counterclockwise around entire site to complete all 4 lines remaining from Dive 01 and ending due south of the Spire.
- 4) If, under (3) there were still hydrothermal systems/communities encountered (particularly to South and East of Spire), add in additional survey lines a further 15m out from those already planned for Dive 01.
- 5) Once outermost survey lines have been completed, proceed to detailed studies within the Von Damm "box".
- 6) Head north, to East of Spire, to vestimentiferan sites (to understand their setting and seek for live animals).
- 7) Study outer "patches" of shrimp on way north, look for suitable sites for flow study (Jill McDermott request).
- 8) Head to main spire for detailed biological study.
- 9) If time permits, conduct single transect South and East away from Central Spire along SE trending ridge in Connelly et al map.
- 10) Reserve right to modify all the above upon discovery of trilobites (or live T-rex)

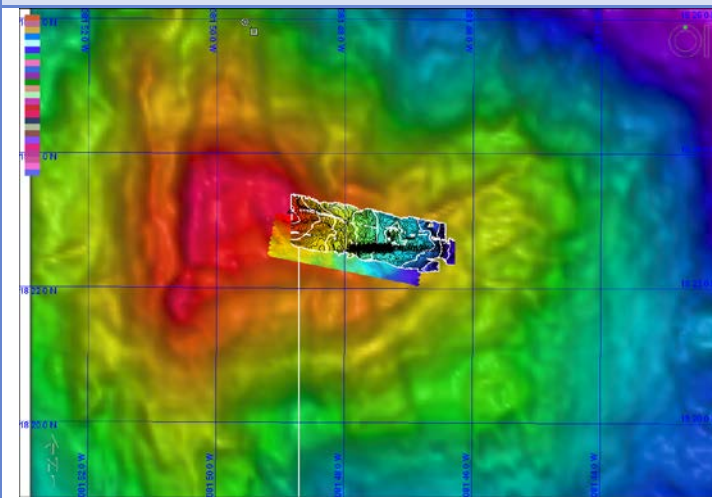
#### Description of the Dive:

Little Herc was redeployed and landed at the top of the Von Damm hydrothermal site at 2292m depth. From that point the ROV proceeded south for ~75m to complete the expanding square-spiral survey started on Dive 1. At the southern most point the ROV intercepted the same community of shrimp hosted in diffuse flow identified toward the end of the previous day's dive and then turned east continuing the box to the southeast corner before repositioning to move northwards along the east side of the Von Damm site. As the ROV moved northwards a small vent site with shrimp was found and waymarked MCR017. Further along this east flank transect there were significant outcrops of rock but no further associated fauna (MCR018). As the ROV approached the NE corner of the box transect a few tubeworm tubes were observed and careful examination of these revealed one that we were able to confirm was alive with its tentacles extended (MCR019). This was carefully video-recorded as the first hydrothermal tube worm to be located anywhere in the Atlantic\*. No other tubeworm individuals at this site had their tentacles extended or could be confirmed to be alive. Slightly further on, just as the ROV was about to turn, the sedimentary part of the seabed contained a number of dead shells of possibly vesicomysids and bathmodiolins (MCR020). The transect from east to west, north of the main edifice, was partly covered with hemipelagic sediment, with rock extending southwards up the edifice slope. As the ROV approached the southwest corner of the transect an area of broken rock was observed surrounded by sediment. On the rock were living and dead gorgonian corals and careful examination suggested weak hydrothermal flow between rock and sediment (MCR021). A small sponge, ? *Asbestopluma*, was found either in or close to this flow. In the nearby sediment were a number of pits with holes at the bottom. We could not identify the occupants but attached to one of the pits was the dandelion siphonophore ? *Rhodalia* sp. (Family Rhodaliidae) similar to that found in the Pacific. As the ROV progressed along the southern part of the transect from west to east a small patch of shrimp was seen (MCR022) close by MCR 017. Having completed the square spiral survey - including an extra line along each of the Southern and Eastern flanks, the dive was completed by following upslope along the northern most section of the Von Damm cone's East flank, following an apparent debris flow rich in dead bathymodiolus shells. Progressing E-W up-slope we encountered more worm tubes (MCR023) and some significant rock outcrops with evidence for hydrothermal flow (MCR024) but no live mussels until we reached a shoulder, downslope immediately to the NE of the central spire. From there, Little Herc proceeded uphill towards the southwest, climbing until we reached the massive shrimp populations (MCR025) that characterize the shallowest portion of the cone. The ROV over-flew both the main areas of shrimp abundance and the

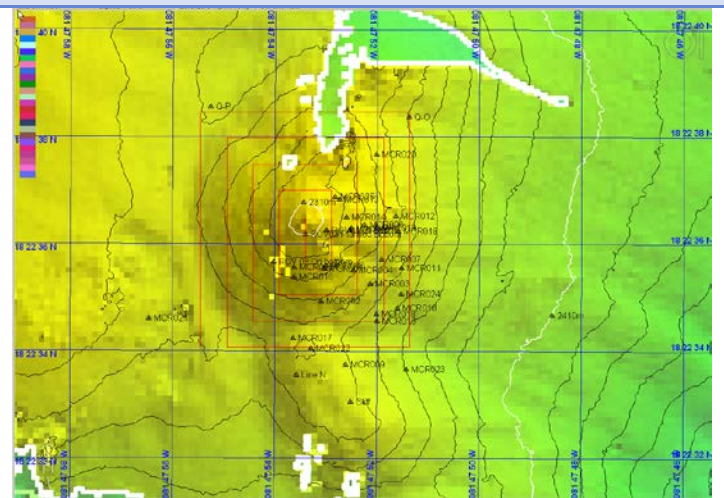
central hydrothermal spire, dropping one final USBL marker at the summit, before commencing its return to the surface.

\*Later in the cruise we were reminded that a hydrothermal tube worm is known at Marsili Seamount offshore Italy, but none others are known outside of the Pacific.

**Overall Map of ROV Dive Area**

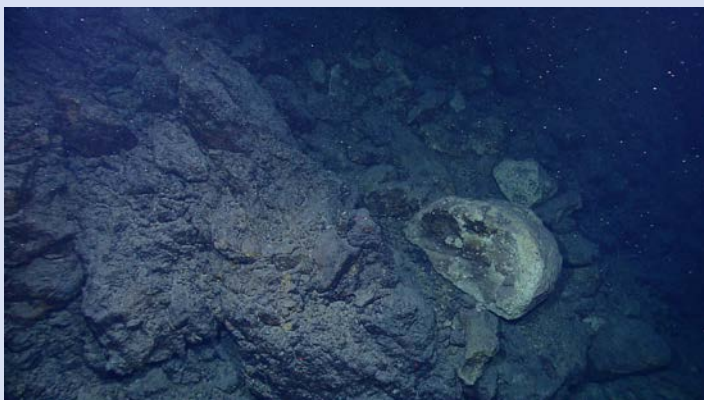


**Close-up Map of Main Dive Site**



Bathymetry data courtesy of D.P.Connelly et al.

**Representative Photos of the Dive**



Hydrothermal rubble on the side of the main vent at Von Damm hydrothermal vent site



The rare small hydrozoan siphonophore from the family Rhopalidae held in position by fine tissue next to the burrow of an unknown animal

**Please direct inquiries to:**

NOAA Office of Ocean Exploration & Research  
 1315 East-West Highway (SSMC3 10<sup>th</sup> Floor)  
 Silver Spring, MD 20910  
 (301) 734-1014