Hydrogeologic framework of cold seepage, off Hatsushima.a transection profile survey using ROV: Hyper Dolphin

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Off Hatsushima site is the most significant site of the cold seepage along the topographic boundary zone between the Izu peninsula and the basin floor of the Sagami trough. The water depth of the site reaches 1200 m. In Feb., 2002, a transect examination across the Hatsushima hydrothermal site was performed to better understand the hydrogeologic framework of the area. Here we take ROV (Hyper Dolphin) of JAMSREC to deploy four benthic flux meters (CAT meter) together with four heat flow meters (subbottom thermometer), one pressure gauge and one bottom water current meter for the long term monitoring (more 50 days). In addition, we performed the ordinary heat flow and CTD measurements by ROV with superHARP camera observation.

Based on the detailed camera observation, the zonation comprising the patched reddish bacteria mat, the varicolored (mostly gray and white colored) bacteria mat and Vesicomyid (Calyptogea) clam colony, from the center to the margin, can be recognized in the seepage site. The dimension of the zonation reaches approx. 30 m in diameter and it shows a round shape. Simultaneously the heat flow data demonstrated that it reachese more than 25 K/mr and decreases toward the margin of 0.8 K/m. The heat flow profile we measured in the cruise does decrease toward the margin and it shows non-linear in relation with distance. The heat flow profile is obtained from the both wings whereas the slope gradient is quite different; the western wing is gentler than that of the eastern wing. However the carbonate precipitation takes place only in the western wing side.

A surface of the reddish bacteria mat is covered by floc of particles of bacteria mud (very permeable) and looks so soft whereas the clam colony site is relatively stiff (less permeable). It is possible to interpret that the downwelling takes place in the clam colony site as the counter flow although the center of the zonation shows to be very active upwelling. It will be sure by further long term the CAT meter monitoring analysis, which is to be recovered in the mid April, 2002.