Hydrothermal circulation within modern sediment layer in submarine volcanoes, Wakaniko crater, south Kyushu, Japan

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Wakamiko Crater is a small depression (4kmx2km) at 200m depth seafloor located in the northern part of Kagoshima Bay in south Kyushu, Japan. The seafloor is covered with recent unconsolidated sediment, which thickness has reached up to 80m. Warm fluid shimmering from a sedimentary mound associated with fumarolic bubble emissions had been locater at the center of the crater (Ishibashi, et.al. in preparation). In Aug. 2005, NT05-13 cruise was conducted using ROV Hyper-Dolphine (JAMSTEC) to confirm distribution of hydrothermal circuration system within the crater by extensive measurements and samplings.

We collected seven surface sediment cores (up to 30cm) and extracted pore water at 5cm intervals. Chemical profiles of the pore waters showed wide variety site by site, which is classified in three types. Type A showed drastic decrease of SO4 associated with increase of alkalinity, which would reflect decomposition of organic matter within the sediment. Type B showed no changes in the vertical profiles up to 30 cmbsf from seawater composition, suggesting entrainment of seawater. Type C showed significant changes in several species, such as degrease of Mg, Cl and SO4 and the drastic increase of Si. There chemical profiles are attributed to mixing of ascending of the hydrothermal component as disscussed in the previous study. In addition to this, influence of hydrothermal alteration within the sediment is also noticed as different chemistry of the pore fluids between two fluid emission sites 0.8 km apart from each other. While Type A pore fluids were observed widely in the crater, Type B and Type C were confirmed only neighbor to the fluid emission sites. Together with the results of heat flow measurements, the variety of pore fluid chemistry would provide important keys for distribution of hydrothermal circulation driven by a magma of Wakamiko submarine volcano.