# Shallow-water hydrothermal system in Nagahama Bay, Satsuma Iwo-jima Island, Kagoshima

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Satsuma Iwo-jima Island, located 40 km south of Kyushu Island, Japan, bears a shallow-water hydrothermal system with vents and crusts. The coastal seawaters are stained ivory and red colors because of the presence of suspended aluminous and ferric precipitates produced by the mixing of volcanic fluids and seawater. In Nagahama Bay, which is partly isolated from the pelagic realm, carbonated springs (pH4.6) containing iron ion (151mg/l) flows out along the shore and the seawaters are dark reddish brown, attributing to concentrated ferric precipitates (Kamada, 1964). To understand the relationships among the ferric deposits, hydrothermal ventings, and the sea tide in the bay, I conducted the following studies; (a) measurement of the seawaters from the surface to the bottom of the bay for two weeks (Sep.-Oct. 2007 and Aug. 2008), using a multiple sensor, (b) time-series observation of color changes of the surface water by automatic acquisition system modified from OGURI-View,system (an automatic underwater digital camera system; Oguri et al., 2005), (c) analysis of a core sample of the sediment, and (d) XRF analysis of the core and sediment trap samples.

The reddish brown water exhibited both daily and lunar cycle changes in turbidity corresponding to the tidal inflow of pelagic seawaters. The images of the surface seawater also showed the changes. The water lost its ferric precipitates during the high tide within a day, and during the spring tide when there was a major difference in sea level between high and low tides. During under an influence of a Typhoon passing through the region, however, the water was significantly cloudier with suspended particles than on normal days due to sediment re-suspension caused by big waves. The sediment of 85.7 cm core sample had layers consisted of clay-sized reddish ferric oxides, quartz, volcanic ashes, and rock fragments which were the size of silt to fine sand. According to XRF data, the volcanic ashes were from the top of Iwo-dake that erupted during 1997-2002. Silty-clay layers were richer in iron than silt and sand layers, 15.07-19.79 wt% and 7.44-14.64 wt%, respectively. The highest value of iron (36.71 wt%) was shown in the sediment trap sample. Precipitation of ferric particles was one factor contributing to the high sedimentation velocity in the bay.