The effect of sea tide on the ferric deposit in the Nagahama-bay, Satsuma iwo-jima island, Kagoshima

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Satsuma Iwo-jima island has hydrothermal activity around its coastline surrounding the active volcano Iwo-dake. The sea-water along the island is partially pigmented in ivory or red, due to suspending Al- and/or Fe-bearing particles that are formed upon mixing of hydrothermal fluids and seawater. Such process causes the reddish color of the Nagahama-Bay of the island (Kamada, 1964). In order to understand how sedimentation of Fe-oxide occurs in the Nagahama Bay, we conducted a series of studies including: a) sediment core; b) sediment traps; c) seawater analyses; and d) field observations (two weeks in Apr.-May and Sep.-Oct.). We obtained the following results.

1) **Sediments**: Sediments at W site was 1.0-1.5m in thickness. We divided the 85.7cm-long core, recovered at W site, into two units. Unit1 (0-70cm) is mostly reddish clay. Unit2 (70-85.7cm) is reddish clay containing alternated white/pink volcanic ash layers. Iwo-dake volcanic ash erupted during 1997-2004, and May 1998 ash was pink (Shinohara et al., 1998). The bay was constructed by dredge in 1997. Based on these observations, we could estimate the sedimentation rate to be 8.6cm/year.
2) **Sediment traps**: The sediment traps (two locations for one month and six months) in the bay revealed a sedimentation rate of 4cm/month.
3) **Hot spring water**: Hot spring flowing out along the bay has pH 5, temperature 35 degrees Celsius, salinity 0%, and Fe concentration of 0.1-0.2mg/l.
4) **Seawater**: The surface water showed high turbidity and low pH, whereas the bottom water showed low turbidity (almost 0) and high pH (up to 8.3).
5) **Storm**: The turbidity in the bay increased remarkably upon attacks of typhoon storms.

These results suggest that suspending Fe-oxides to form reddish water in the bay accumulated rapidly. The sea tide, i.e., input of open ocean water, repeatedly changed the turbidity of the bottom water of the bay. Typhoon storm caused vigorous mixing of the bottom water and the underlying surface sediments to result in the increase of turbidity. Re-precipitation of coarse particles that were re-suspended by tides and typhoons would have resulted in changes of sediment sorting.