The restoration of precipitation record of iron hydroxide about seven years in Nagahama Bay, Satsuma Iwo-jima, Kagoshima.

*Naoya Sakamoto[1], Shoichi Kiyokawa[2]

1. Department of Earth and Planetary Sciences, Graduate School of Science, Kyushu University, 2. Department of Earth and Planetary Sciences, Faculty of Science, Kyushu University

Satsuma Iwo-jima, located 38km south of Kyusyu island, Japan, is volcanic island in the northwestern rim of Kikai caldera. In Nagahama Bay the acidic mineral-rich hot springs cause various tonal changes of seawater. And oxidation of Fe^{2+} ions discolors the seawater into a reddish brown (Shigaura and Tazaki,.2001). This Bay is a semi-closed environment, iron hydroxide precipitation and deposition are likely to occur and precipitation rate of 33 cm/year. (Kiyokawa and Ueshiba, 2015). We restored the depositional record from10 m diameter and 1 m long acrylic plastic cores (total 50 core) that collected in Nagahama Bay from 2009 to 2018 (about 9 years). In this study, we revealed that the relationships precipitation of iron hydroxide and weather and seafloor environment in Nagahama Bay. the following studies were conducted: (a) Observation of sediment trap (CT image and observation of sediments using polarizing microscope and electronic microscope). (b) Meteorological observation and a survey of typhoon records in the past in Nagahama Bay. (c) Seafloor observation (Temperature in sediments and water pressure). By combining the sediment records in traps (34 Traps) from seven years from 2011, the stratigraphy of the total layer thickness of 5 m 70 cm was restored. From the CT image, it is divided into a high-density layer (iron hydroxide layer containing sand particles: 35 layers), a low-density layer (iron hydroxide layer: 28 layers), a high-density low-density alternate layer (7 layers) Seven thick high density - low density layer - high density low density alternate cycle was seen. Also, from the observation of smear slides and SEM, in the high-density layer, there are a structure in which iron hydroxide particles of about 100 μm aggregate to several μm, a volcanic glass of several tens to 200 μm, diatoms, the low-density layer mainly contains 50 nm of the iron hydroxide particles agglomerated to several μm in size. 37 typhoons approached or passed near Satsuma Iwo-Jima from June 2011 to September 2018. 17 of them were huge typhoons (Under 960hPa, over 30m/s). From meteorological data in Nagahama Bay, there were six Typhoon approached or passed between April 2018 and September 2018. When the typhoon passes south or west side of Satsuma Iwo-jima, it becomes south wind. The thick white layer was precipitated by the influence of the typhoon. So, the April to October the thick fine-grained sand layers and iron hydroxide layer precipitated due to typhoon. It is considered that fine-grained sand iron hydroxide alternating layers precipitaed in November to March without the influence of typhoon. When the typhoon passes south or west side of Satsuma Iwo-jima, it becomes south wind, Thick fine sand layer containing about 20 to 70% quartz and volcanic ash. Observed trap sediments, Trap sediments are composed iron hydroxide particles, and we consider that it is a chemical precipitation. The low-density layer excluding the high-density layer and the thickness of the alternating layer are recorded as iron hydroxide as the formation layer, and its layer thickness is 220 cm. The iron hydroxide accumulated on the Nagahama Bay (about 6000 m^2) in 7 years and it reached 13,200 m^3. As the interstitial water of this sediment is about 80%, the dry weight of iron hydroxide has reached 8,976 tons in seven years. And about 1282 tons of iron hydroxide were recorded in the formation every year in this Bay.

Keywords: Satsuma Iwo-jima, precipitation of iron hydroxide

