

SCG059-15

Room:105

Time:May 26 15:45-16:00

Relation between sediment and meteorological event for 10 years in Nagahama Bay, Satsuma Iwo-Jima Island, Kagoshima

Takuya Ueshiba^{1*}, Shoichi Kiyokawa², Tomoaki Nagata¹, Tomomi Ninomiya¹, Kazumasa Oguri³, Takashi Ito⁴, Minoru Ikehara⁵, Kosei E. Yamaguchi⁶, Shusaku Goto⁷

¹Kyushu University, ²Kyushu University, ³JAMSTEC, ⁴Ibaraki University, ⁵Marine Core Research, Kochi University, ⁶Toho University, ⁷GSI, AIST

Satsuma Iwo-Jima Island, with active rhyolite volcano (Iwo-Dake), is located about 40 km south of Kyushu Island, Japan. Nagahama Bay, which is partly isolated from pelagic sea, is located in the south of Satsuma Iwo-Jima. The seawater is red color attributing to the presence of suspended ferric hydroxide produced by the mixing of volcanic fluids and seawater (Ninomiya and Kiyokawa, 2009).

In this study, the Fishermans port of Nagahama Bay was divided into two areas as E-site and W-site by the T-shaped breakwaters. The breakwaters were extended at W-site in 2000 and 2004. Big breakwater at the entrance of Nagahama Bay was built in December 2006. In March 1998, W-site experienced wide and deep dredging construction. Since then, the thick sediments at W-site have accumulated during the last 10 years. To understand mechanisms of sedimentation in the Bay, we observed stratigraphy of core sample from the Fishermans port in detail and investigated a relation of the stratigraphy of core samples to meteorological and volcanic activity records for the past 10 years.

I) Stratigraphy: 12 cores are collected from E-site (1 core) and W-site (11 cores). These cores consist of ferric hydroxide, sand and tuff bed. Four units are identified from these cores. 1) The Basement unit contains coarse sand bed. 2) The Lower unit contains ferric hydroxide beds and a 1 to 7 cm-thick pink-tuff bed (T1). 3) The Middle unit mainly contains ferric hydroxide bed with a 2 to 8 cm-thick gray-tuff bed (T2) and a 1 to 9 cm-thick gray-tuff bed (T3). Within ferric hydroxide bed, we observed a few sheets of thin tuff beds. 4) The Upper unit contains thick sand and ferric hydroxide beds. Smear slides and SEM observation shows that 1) ferric hydroxide bed contains very fine ferric material, 2) sand bed is composed of terrigenous clastics, volcanic glass and very fine ferric material, and 3) tuff bed contains volcanic glass.

II) Volcanic activity: At Iwo-Jima Island, volcanic ash has fallen intermittently from September 1997 (Shinohara, 2002) to October 2004 (The Meteorological Agency, 2010). The thickness of the tuffs deposited in the Iwo-Jima village near Nagahama Bay was only a few millimeters. After October 2004, volcanic Mt. Iwo-Dake dropped down, and volcanic ash has not been reported at the village.

III) Meteorological records: We compiled record of rainfall, air pressure, wind velocity, wind direction and typhoon date from March 2000 to March 2010, and found the following events. A) Rainfall: Three heavy rain events were identified in the rainy season of 2000 (precipitation 189 mm/day), 2001 (124.5 mm/day) and 2002 (122 mm/day). B) Typhoon: Three strong typhoon events, with maximum wind velocity over 20 m/s, came in 2004 (40.3 m/s, 54.3 m/s and 44.6 m/s), 2005 (43.3 m/s) and 2007 (50.2 m/s). C) Other notable events: Typhoon did not come in 2006 and there is no rainy day, which is precipitation of more than 40 mm/day, in 2003 and 2007.

Conclusions: We identified events in the ferric hydroxide-rich sediment in Nagahama Bay. 1) Based on the record of dredging in Nagahama Bay, we identified that the sediment just above the Basement unit was accumulated in 1998. 2) Three thick tuff beds (T1, T2 and T3) may be correlated to heavy rain events in 2000, 2001 and 2002. 3) Sand bed in the Upper unit may have formed by strong typhoon event during 2004.

Keywords: Iwo-Jima Island, hydrothermal water, ferric sediment, weather, Kikai caldera