

Sedimentary environment estimated from physical properties of sediment core collected during the cruise of Hakuho-maru KH-18-3 in the South Yatsushiro sea, western Kyushu.

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The research cruise KH-18-3 was carried out in the South Yatsushiro sea from 27th to 30th July 2018. The purpose of this cruise is to clarify the occurrence history of the submarine landslides in the Yatsushiro sea. In this survey, bottom surface sediment samples were collected by using Piston corer which is 6 meters long.

The study on physical properties of event sediment using core samples are conducted in ocean areas around the world. For example, Prior et al. (1984) reported that Mass transport deposits (MTD) commonly have a higher density than surrounding, sediments that are not submarine landslide origin. Therefore, in this study, the physical properties that serve as the basic information of the core samples were measured. In addition, we estimated the sedimentary environment in the survey area by applying tidal current, sedimentation rate, and bottom surface muddy rate in the south Yatsushiro sea (Rifardi et al.,1998) and conventional radiocarbon ages of piston core samples recovered in the same area reported by Inoue et al. (2011).

Core samples were collected from 11 sites (core name:PC01 to PC11) in the south Yatsushiro sea where the Taura-Tsunagi Oki fault group and Minamata Oki fault group are distributed.

All analyses other than the grain size distribution analysis were conducted at the Center for Advanced Marine Core Research, Kochi University. Initially, GRA density, Magnetic susceptibility and fractional porosity were measured using Whole round multi sensor core logger (MSCL-W). After the analysis, core samples were divided vertically and visual observation and color measurement of them were performed. Subsequently, a vane shear test and sub-samples which were used for MAD measurements and grain size distribution analysis collecting were performed at approximately 50 cm intervals, respectively, and the test and two sampling location were the same points.

Area 1 is under condition of rather stagnant water masses or rather weak tidal current system and is characterized fine-grained sediments. We estimated age of core samples by comparing physical properties reported by Inoue et al. (2011) because sampling point in this area matched with piston coring points of Inoue et al. (2011) and the behaviors of both physical properties were similar. As a result, a gap of more than 7000 years of sediment age is estimated at depth of 2 to 3 meters in area 1a (PC01 to PC03) and it is presumed that sediments indicating the age of about 10,000 years BP exist at depth of several tens of centimeters from the seabed surface in area 1b (PC06, PC07). In addition, K-Ah volcanic ash layer (7.3ka) could not be confirmed from sediments in both sea areas. From this, it is assumed that there was an event such as a submarine landslide or erosion with the lower part of the tephra as a sliding or eroding surface.

Since we could not obtain an index to estimate the age of the PC 08 to PC 11, we estimated the sedimentary environment using only the physical properties of sediments. PC08 and PC10 (Area 2) is located near the strait of Goshoura-jima and sisi-jima island, under influence of strong tidal and bottom currents, and is characterized by coarse sediments. Especially, upward grain refinement was observed and

the tendency that the porosity decreases within each monolayer is repeated in PC10. From this, it is assumed that the upper sediment functions as an impermeable layer against the lower sediment, and the drainage is difficult to proceed. PC 09 and PC 11 (Area 3) are relatively close to supply sources such as Minamata River and Komenotsu River, and are characterized as relatively coarse sediments. From the depth of 60 cm of PC09, and from the outermost surface layer in PC 11, the porosity does not decrease almost from around 60%. From this, it is estimated that the new sediment has been recently cleared recently.

Keywords: Piston coring, Yatsushiro sea