Variation in vane shear strength and magnetic susceptibility in the cores recovered by Hakuho-maru KH-18-3 cruise in Yatsushiro sea

*Yujin Kitamura[1], Haruka Kageyama[2], Kaede Yamasaki[2], Ryoya Goto[2], Koki Hori[2], Yuta Ikebata[2], Kuniyo Kawabata[1], Daiki Oyama[2], Hakuho-maru KH-18-3 Scientists

1. Department of Earth and Environmental Sciences, Graduate School of Science and Engineering, Kagoshima University, 2. Department of Earth and Environmental Sciences, Faculty of Science, Kagoshima University

Introduction

The 2016 Kumamoto Earthquake was sourced from a part of active faults of the Futagawa-Hinagu fault zones. The southwestern part of Hinagu fault zone forms the Yatsushiro section as a group of submarine active faults. Earthquake shaking occasionally triggers submarine landslide, however, any record of submarine landslide in this area has not been reported. We therefore conducted research cruise with R/V Hakuho-maru and recovered sediment cores in Yatsushiro sea. As it is known that the shear strength decreases at the bottom of mass transport deposits, we conducted vane shear test with the cores. We also referred the variation of magnetic susceptibility to establish core correlation with previous works.

Method

Here we conducted four-days research cruise with R/V Hakuho-maru (KH-18-3) in July, 2018 to reveal submarine landslide records and benthic environment in Yatsushiro sea. We used six-meters-long piston corers and cored at 11 sites and recovered cores were cut into 6 sections onboard. Cores were analyzed at Kochi Kore Center using X-ray CT scanner, multi-sensor core logger (gamma ray density: GRD; and magnetic susceptibility: MS), core imaging apparatus, visual core description, color spectroscope, X-ray fluorescence core scanner (Itrax). Vane shear apparatus is used with split core section and tested every about 50 cm.

Results and Discussion

Sediments are dominated by matrices of olive gray to black sand or mud. CT value, MS and GRD generally increase with depth. As MS shows cyclic fluctuation, we classified into several MS units by defining units with each broad peak. Our MS units was correlated with previous studies of high resolution seismic profile by Yagi et al. (2016) and piston cores by Inoue et al. (2011). MS units was in good agreement with Yagi's seismic profile. It is inferred that our samples include the sediments during Late Glacial Maximum to Jomon Transgression below hiatus. MS data by Inoue et al. (2011) and this study are in accordance with each other. The event layers Inoue suggested are discriminable in our cores which are characterized as local maximum of MS. Iron shows high concentration around the event layers so that the iron is a candidate for indicator for searching the events. We assume that this iron anomaly is caused by the rapid deposition during eventic turbidites.

The results of vane shear test showed that the strength increases with depth with a change in its rate at assumed hiatus. This shows that the sediments below hiatus was further deeply buried and compacted. At sites PC04 to PC06, the strength is low at their surface, indicating that the hiatus at these sites are very shallow and thus the recent surface erosion is assumed.

Keywords: turbidites, shallow marine deposits, 2016 Kumamoto earthquake

