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A sedimentological and paleomagnetic study of deep-sea sediments collected from the Sagami trough

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Introduction

M7-8 class earthquakes occur repeatedly in the Kanto region, central Japan. We have studied earthquake history around the Kanto region using mainly distribution and geologic age of marine terraces so far (Shishikura, 2012). In contrast to the terrestrial study, we have discussed to identify any seismogenic events from deep-sea sediments (Ikehara, 2001). Recently, Noda et al. (2008) suggested that we could exclude mostly flood deposits by choosing the sampling site carefully. Thus, paleoseismology was developing by these previous studies.

In this study, we collected deep-sea sediments from west Sagami Bay. We described the sediments sedimentologically and paleomagnetically in detail. We discussed a sedimentary process and challenged to extract the earthquake history in the region from these data.

Studied specimens

We collected two cores from a gentle submarine slope (KT-12-35 PC01; 35:04.00N, 139:12.99E, water depth 991 m and KT-12-35 PC03; 34:58.30N,139:13.40E, water depth 1,235 m) using a piston corer during the cruise KT-12-35 of Tansei-maru in December 2012. Ikehara et al (2012) reported probable seismogenic turbidites nearby these coring sites.

Results and discussion

We described and measured the two cores PC01 and PC03 as follows.

1.Sample description using microscope: PC01 and PC03 were mainly olive black hemipelagic sediments including foraminifers and diatoms. Both core were observed several volcanic ash layers and sand layers.

2.X-ray CT analysis: Many sandy clay layers in the hemipelagic sediment layers were confirmed by the difference of CT value. These sandy layers would be event layers (e.g. seismogenic and/or flood events).

3.Physical properties: The porosities in PC01 and PC03 decrease from 72% to 58% and from 76% to 65% with increasing burial depth, respectively. The pososity decreases should result from burial consolidation.

4.Magnetic properties: We analyzed simply a paleocurrent direction using anisotropy of magnetic susceptibility and paleomagnetism. The paleocurrents were roughly judged from E to W in PC01 and PC03 throughout the cores.

5.Volcanic glass: Index properties of volcanic glasses was measured at two horizons at 11 cm and 95 cm below seafloor (hereafter cm-bsf) in PC03. We could identify the 1707 Fuji Houei eruption at 11 cm-bsf and the 838 Tentsujima Tenjyouzan eruption at 95 cm-bsf.

6.C14 dating: We measured C14 for age determination at two horizons at 136 cm-bsf in PC01 and 172 cm-bsf in PC03. We collected 30820±210BP and 2850±30BP, respectively. We could calculate the average sedimentation rates as 64 cm/kyr in PC03 and 4 cm/kyr in PC01, even though we could identify the geologic age only at one horizon in PC01.

Based on these results, we discuss the recurrence intervals of the event layers and its depositional processes.

Keywords: Sagami trough, Seismic deposit, XrayCT, Volcanic glass, C14 dating, Magnetic properties