

Submarine mass transport marked by mercury-bearing sediments and tephra in active fault zone, Yatsushiro sea, Japan

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The 2016 Kumamoto Earthquake was sourced from a part of active faults of the Futagawa-Hinagu fault zones. Although the southwest section of the Hinagu fault zone, which consists of submarine active faults in Yatsushiro sea, was not activated this time, it is a section with high risk potentially. Earthquakes are one of the major triggers for submarine landslides. With a small trigger, gravitational catastrophe can take place easily even in a very gentle slope angle of less than one degree if in subaqueous condition. Yatsushiro sea is therefore yet to be a place to be that, however, any record of submarine landslide in this area has not been reported.

Minamata bay, southern Yatsushiro sea, is known to be mercury pollution from a chemical plant drainage. A complex space-time distribution of mercury content in the sediments has been revealed (Tomuyasu et al., 2014). This suggests some secondary transportation of the sediments in this area. As the transportation of the mercury-containing clastics depends on sedimentation rate and/or water current, submarine landslide is a candidate for the factor of drastic change in benthic environment.

Here we conducted four-days research cruise Hakuho-maru KH-18-3 in July, 2018 to reveal submarine landslide records and benthic environment in Yatsushiro sea. We conducted subbottom profiling, piston coring at 11 sites, and multiple coring at 13 sites). Recovered cores are analyzed by X-ray CT scanner, multi-sensor core logger, core imaging apparatus, visual core description, color spectroscope, X-ray fluorescence core scanner (Itrax), and so do discrete samples by vane shear tester, picnometer with sediments and by Radon monitor with sea water and pore water. We focused the core at site PC02 and examined benthic foraminifera assemblage and tephra.

Our results show that the bottom of the core corresponds to the age of ca. 10ka and infers marine regression at the time. The volcanic glasses obtained from this horizon is originated from the Aira-Tn tephra (26-29 ka). These volcanoclastics is suggested to be a secondary deposit. The delivery process is unknown but can possibly be a flood or a submarine landslide. The two examples of secondary sediment transportation, present slow movement of sediments and the delivery of Aira-Tn tephra, suggest that the sediments in Yatsushiro sea is remobilized actively and some of them would potentially be assisted by the earthquake shaking.

Keywords: 2016 Kumamoto earthquake, mercury, Minamata bay, shallow marine deposits, turbidites