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Benthic foraminiferal faunas in the sediment into OBSs off Miyagi after 2011 earthquake of the Pacific coast of Tohoku

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After the earthquake of the Pacific coast of Tohoku with mega-tsunami on March 11, 2011, the ocean bottom seismographs (OBS) installed on the Pacific Ocean bottom off Miyagi Prefecture were recovered urgently to analyze the record (Miura et al, 2011). Unconsolidated sediment was found inside the hard hat to protect OBS, and we have analyzed the depth distribution of benthic foraminiferal assemblages.

Several OBSs were installed on the land side of Japan Trench for the natural long-term seismometry. As far as an OBS is placed in right position at sea-bottom, sediment is not easily to be injected inside the hard hat. Therefore, sediment in the hard hat was possibly brought by water flow with sediment, which was raised up in bottom-water in the OBS-arranged area (Miura, 2011). After the earthquake, it has reported that muddy sediment covers in the large area from shelf-edge to trench slope (300-5940 m in water depth) off Sanriku region (Ikehara et al., 2011) , and this sediment is assumes to be transported by low density turbidity current (Arai et al., 2011).

Foraminifera are a kind of Protista with shell, and inhabit in every sea-bottom, from brackish coastal waters to ocean floor and trenches. A lot of species live every favorite environment. Many of species are generally good depth-indicators, and, an assemblage in association with some species is recognized in a certain depth range (depth zone) to some extent. Therefore, displacement of sediment by turbidity current, for example, should be detected as an abnormal distribution of foraminiferal assemblage. On the abnormality in the OBS-installed area off Miyagi Prefecture, foraminiferal distribution reported by Matoba (1976) provides a suitable reference for the present comparative study.

The 14 samples are obtained from the OBS stations of 299-2773 m in depth range. Among six assemblages recognized in this study, five are comparable with five ones of Matoba (1976) from 220-1980 m in depth range, and another one is deeper than the Matoba's deepest station. Compared with Matoba's assemblages, those of shallower depth than ca.1500 m are almost coincident, except for a boundary of deeper assemblages at ca.2000 m of this study. Its comparable boundary of Matoba's assemblages is drawn at ca.1800 m, 200 m deeper.

This difference of faunal boundary at deeper sites suggests more large dislocation of sediment at deeper part of trench slope. We will discuss the mechanism of sediment intrusion into hard hat, origin of suspended sediment, and trigger of turbidity current, as well as magnitude of turbidity current.

Keywords: earthquake, tsunami, OBS, benthic foraminifera, turbidity current