Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)
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MIS25-18 会場:106 時間:5 月 24 日 15:00-15:15

The distribution of benthonic foraminifera in paleo-tsunamis sediments on Ishigaki islands

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In the last 250 years, the Ryukyu subduction zone had no known thrust earthquakes with Mw > 8.0. Because of the lack of large thrust earthquakes, a common idea that the Ryukryu trench is unlocked was commonly accepted. However, a large tsunami struck Ishigaki and Miyako islands with the wave height of up to 30-35 m in 1771.The source of this earthquake was suggested to be a tsunami earthquake with Mw=8.0 that occurred near the trench axis (Nakamura, 2009). In addition, slow-slip events at depths of 30km (Heki and Kataoka, 2009) and very-low frequency earthquakes at shallow depths near the trench axis (Ando et al., 2012) have been identified in the western Ryukyu trench. These findings suggest that the Ryukyu subduction zone should be locked and has the potential to generate large thrust earthquakes.

In order to estimate the size and recurrence intervals of paleotsunamis along the western Ryukyu trench, the excavation surveys of the deposits at 6 sites in Ishigaki Island was undertaken on November 2011, October 2012 and February 2013. The excavated sites are located on the lower Holocene marine terraces and implemented using a geoslicer or backhoes. According to the results of stratigraphy and C14 dating data, two tsunami events (1771 and one between 8 C. and 11C.) in this island were identified. Furthermore, comparing with shallow beach sand, the deep ocean benthonic foraminifera were found in the tsunami deposits and the value of deep/shallow species ratio were much higher than the sediments without tsunami events. Based on these results, through the analysis of benthonic foraminifera in the deposits could gain information on sediment source and depositional style. In addition, it also could provide more reliable evidence for the tsunami identification.

キーワード: tsunami deposits, benthonic foraminifera, Ryukyu trench, 1771
Keywords: tsunami deposits, benthonic foraminifera, Ryukyu trench, 1771