Tsunami recurrence inferred from soil deposits on Ishigaki and Miyako islands along the Ryukyu subduction zone

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Estimate for the size and recurrence intervals of past tsunamis along the western Ryukyu trench was undertaken through excavation surveys of the Holocene deposits in Ishigaki (Fig.1), Miyakoa and Irabu islands. The excavated sites are located on the Holocene marine terraces and implemented using a geoslicer or backhoes at 10 sites on November 2011 and June 2012. Stratigraphic and foraminiferal assemblages of tsunami sediment were compared with shallow beach sand to gain information on sediment source and depositional style. Based on the excavations, two tsunami layers were identified at 5 sites and provided estimates of sedimentation ages. The results obtained from stratigaraphic and foraminiferal analyses (Fig.2) together with C14 dates of tsunami sediment indicated an event between 9-11th C (Fig.3). on Ishigaki and another or the same event occurred between 11th C. and 1771 on Miyako island. Consequently, if the 1771 earthquake is the only event that had occurred in the last 300 years, large earthquakes would potentially occur in the future along the rest of segments along the Western Ryukyu boundary (Fig.4).

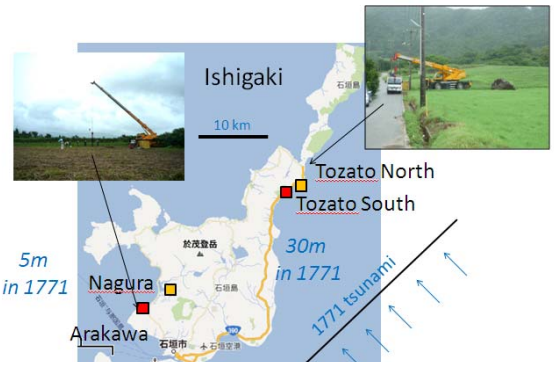

Fig.1 Excavation sites on Ishigaki island.

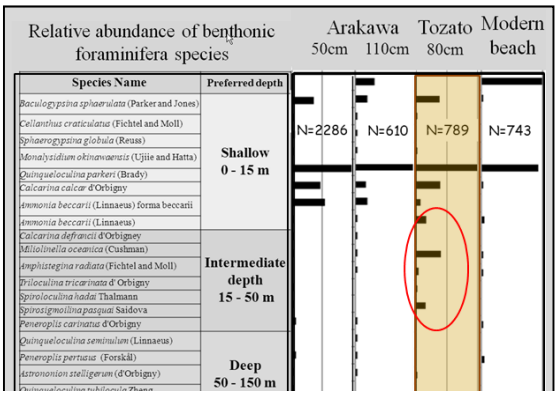

Fig.2 Benthonic foraminifera assemblage at the Ishigaki sites

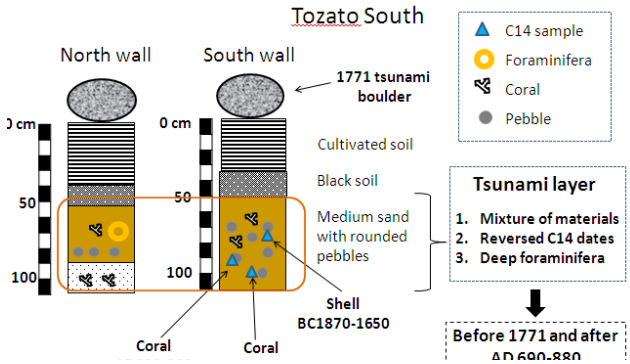

Fig.3 Columnar sections including a paleo-tsunami layer at the Tozato South site.

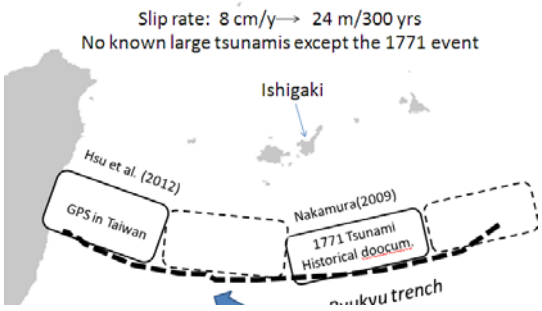

Fig.4 Potential rupture areas to generate large tsunamis in the westernmost segments of the Ryukyu subduction zone.