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Characteristic of submarine topography and sediment left by 2011 Tohoku earthquake, case study of Okirai and Toni bay

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The recent 2011 Tohoku tsunami strongly affected the coastal area of the Pacific coast of Tohoku. The result of onshore features for tsunami impact is well researched, but offshore is only a few researches.

In this presentation, we will show about characteristic of submarine topography and tsunami origin sediment left by 2011 Tohoku earthquake at Okirai and Toni bay. We researched about tsunami origin sediment using acoustic equipments (Multi beam echo sounder, Sub bottom profiler and Side scan sonar), bottom sampler and ROV.

We got the submarine topography data at Okirai (water depth: 2-105 m) and Toni bay (2-112 m). Both bay have valley in valley (Okirai 75 to 90 m and Toni 70 to 90 m) and scattered irregularity bottom surface (Okirai 15-20 m and Toni 17-25 m). This irregularity bottom surface height is about 20-100 cm at Okirai. In SBP survey, this signature topography has a feature of non-bedding with strong reflector surface.

Characteristic of columnar core have thin lamina layer (0-16 cm) with woodchip, grading structure (fine to coarse) of sand sediment with shell piece (16-65 cm) have observed. Underlying layer of sand sediment is reddish brown clay and it has erosion structure between sand sediment (16-65 cm) and this layer. It was guessed that erosion structure was made by turbidity current by tsunami activity. This erosion boundary has continuous reflecting surface by SBP data, and confirm distribution of this reflecting surface and thickness. We were able to estimate the reflecting surface to depth of approximately 40 m. And, it was estimated that tsunami origin sediment was distributed with thickness around 20-100cm.

Keywords: Tsunami origin sediment, Sanriku coast