

Cruise Summary

1. Cruise Information

Cruise ID: NT13-19

Name of vessel: NATSUSHIMA

Title of the cruise: Tsunami Prediction system: Research Cruise in Japan Trench

Chief scientist [Affiliation]: Toshiya Kanamatsu [IFREE-JAMSTEC]

Lead proponent [Affiliation] : Toshiya Kanamatsu [IFREE-JAMSTEC]

Title of proposal: Tsunami Prediction system: Research Cruise in Japan Trench: Coring research cruise 3 piston coring

Cruise period: 16th, Aug – 4th, Sept 2013

Ports of call: JAMSTEC, Sekinehama -Otaru

Research area: Off Tohoku

Map of research area: Fig.1

Background and purpose

A long term prediction for earthquake in a subduction zone should be based on its recurrence interval and past displacements of a megathrust. Unfortunately no such research has been conducted in the deep Japan Trench subduction zone before the 2011 Tohoku earthquake. The recurrence of earthquakes could be understood by evaluating timing of event deposits in the sequences. In this study, not only in the trench axis where the most prominent displacement occurred, in the forearc basin and the landward slope areas. We first aim to document the evidence of the 2011 Tohoku-oki earthquake in the surface sediment, and then establish the earthquake recurrence in Tohoku-oki by identifying similar evidences in the past strata.

Overview of the Observation

Sampling and analyzing of event deposits formed by submarine landslides, displacement of faults, and strong motion during earthquakes, were planned to understand distribution of event deposit, and recurrence of earthquake. Sampling sites for piston corings were planned with referring to bathymetric and subbottom image records previously acquired in so-called mid slope terrace, Japan Trench. 24 cores were obtained (Fig.1).

Major characteristic lithology recovered is Turbidite (Fig.2). These deposits are composed of very fine grained sand and coarse silt laminae and lenses and have sharp basal contacts above, the sandy deposit there is homogenous mud rich in silt and this homogeneous deposit has a top gradational contact that tends to be heavily bioturbated. In the central working area, we discovered fulidilizatio or slump chaotic structure and overlaid by it is strikingly homogeneous with no evidence of bioturbation or sedimentary structures probably induced during 2011 earthquake.

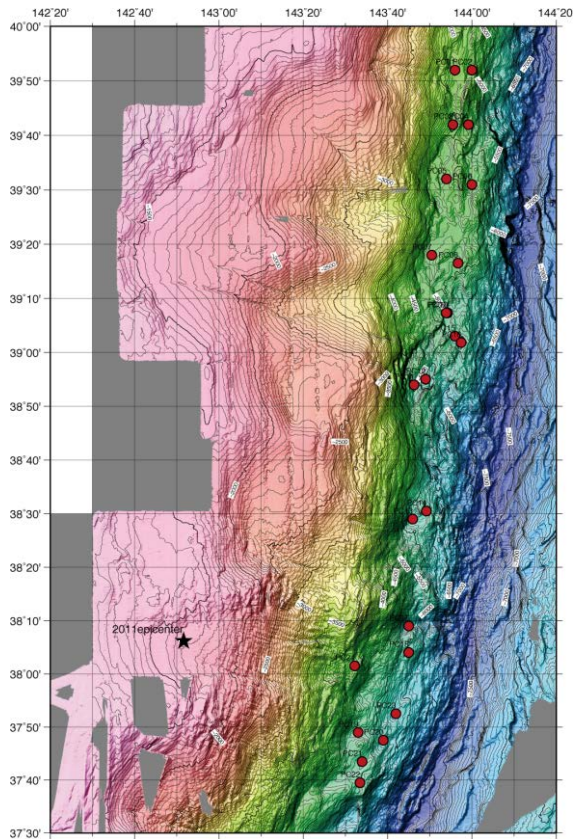


Fig.1: Locations of piston cores.
 Red circle: pistoncore position,
 black star shows location of
 2011 tohoku earthquake
 epicenter.



Fig.2: Frequent occurrence of
 turbidite layers observed in PC21
 (core diameter = ca. 74mm)