Press Releases

April 30, 2013
JAMSTEC

Successful Retrieval of Temperature Observatory from Deep Sea Borehole in Japan Trench for Research on Tohoku Earthquake

The Japan Agency for Marine-Earth Science and Technology (JAMSTEC: Asahiko Taira, President) research vessel Kairei has successfully retrieved the sensors from the deepest borehole observatory ever installed from the extreme ocean depths of nearly 7000 meters on 26th April, 2013. The R/V Kairei carried out the complex sequence of operations in the Japan Trench using the remotely operated vehicle *KAIKO 7000-II* to locate, detach and reel-in the array of 55 temperature sensing loggers from a borehole that straddles the plate boundary where the fault slipped ~50 m during the magnitude-9 2011 Tohoku-oki earthquake. The Scientific Drilling Vessel *Chikyu* installed the observatory in a dedicated borehole that penetrated 855 meters below the seafloor in a water depth of 6897.5 meters during the Japan Trench Fast Drilling Project (JFAST) for the Integrated Ocean Drilling Program (IODP) Expedition 343/343T; April-July 2012.

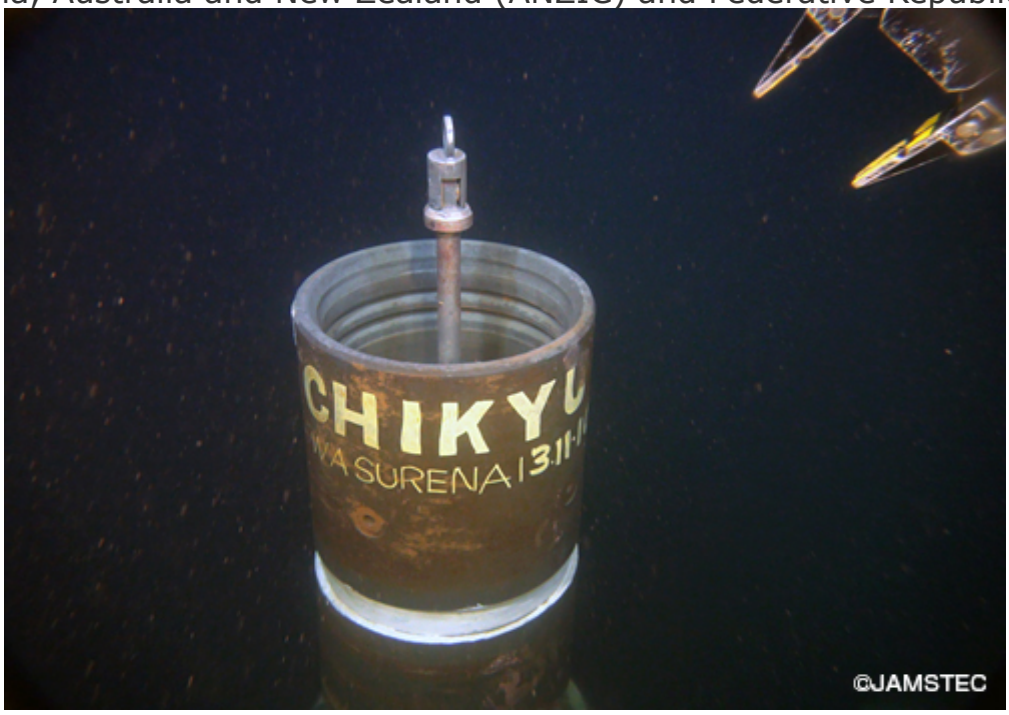
The recovered sensors provide data that will be used to determine the frictional heat generated by fault slip during the Tohoku-oki earthquake. Scientists will infer the forces on the fault during the earthquake from these measurements of dissipated energy. The new data are critical to understanding the causes of the large, shallow displacements during earthquakes that can generate devastating tsunamis. The JFAST observatory provides the first temperature measurements at a subduction plate boundary fault immediately after an earthquake. Further research results are expected to follow careful analysis.

Schedule of the Research vessel *Kairei*
9th May: Arrive at Shiogama or Sendai Port for loading materials and embarkation/disembarkation of crews
10th May: Depart Shiogama or Seandai Port
23rd May: Arrive at JAMSTEC, off load materials
The above schedule is subject to change depending on operational requirements and weather.

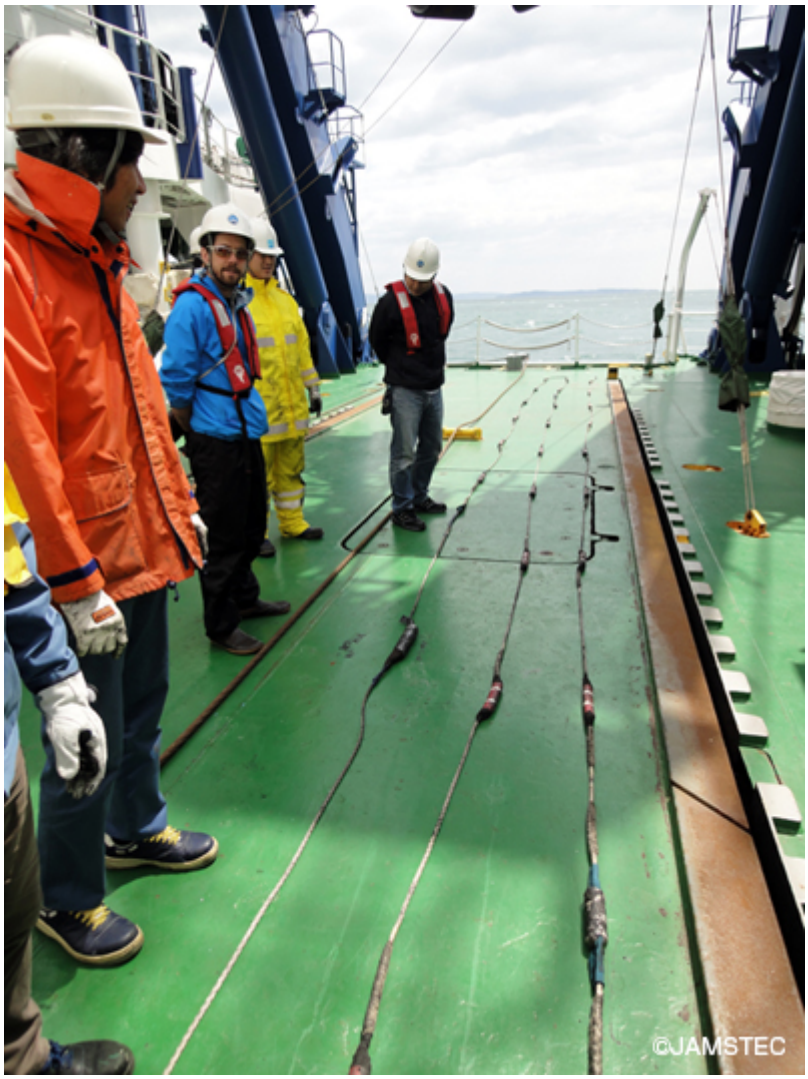
*1. The Japan Trench Fast Drilling Project (JFAST)
The goal of JFAST is to understand the physical mechanisms and dynamics of large slip earthquakes that produce devastating tsunamis. During the main JFAST expedition (IODP Expedition 343, April and May 2012), a logging-while-drilling borehole was drilled to 850.5 meters below seafloor (mbsf) to locate the fault that slipped during the earthquake, and a coring hole was drilled to 844.5 mbsf to

acquire core samples from the fault. Because of delays associated with severe weather and technical challenges of operating in great water depths, completion of the observatory hole was not achieved during the main expedition; however, the observatory hole was completed to 855 mbsf and the temperature observatory sensors were successfully deployed during the short technical extension (IODP Expedition 343T, in July 2012).

*2. The Integrated Ocean Drilling Program (IODP)
IODP is an international marine research drilling program dedicated to advancing scientific understanding of the Earth by monitoring and sampling subseafloor environments. Through multiple platforms, scientists explore IODP's principal themes: the deep biosphere, environmental change, and solid Earth cycles. IODP has been in operation since October 2003, funded jointly by the Japan Ministry of Education, Culture, Sports, Science and Technology and by the U.S. National Science Foundation. Additional support is provided by the 18-member European Consortium of Ocean Research Drilling (ECORD), the People's Republic of China, the Republic of Korea, India, Australia and New Zealand (ANZIC) and Federative Republic of Brazil.



Underwater image shows the top of installed temperature observatory in the borehole on deep seafloor. Image was taken by the KAIKO 7000-II on 26 April 2013.



Picture shows the retrieved temperature sensing loggers on deck of R/V Kairei.
Picture was taken on 27 April 2013.

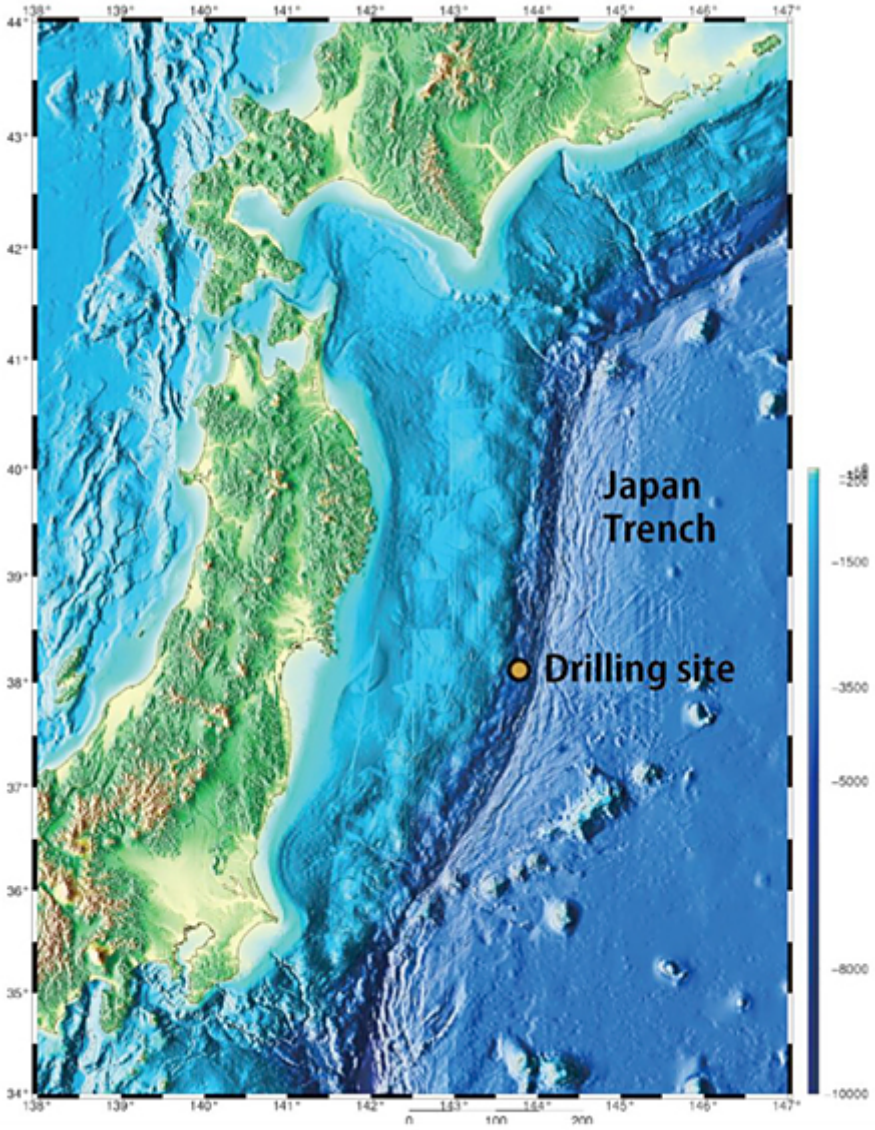


Figure shows the drilling site of IODP Expedition 343/343T.

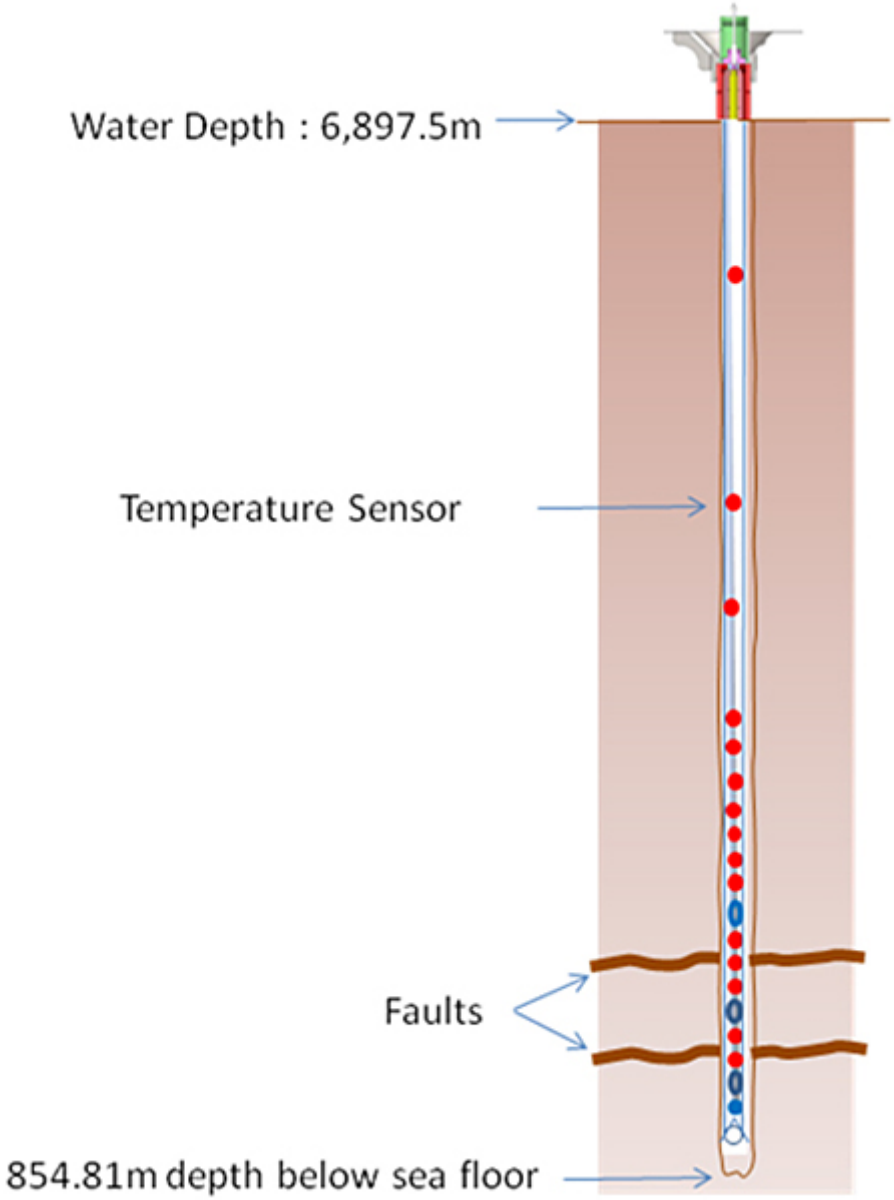


Figure shows the temperature sensor assembly in the borehole. Total 55 temperature sensing loggers were installed and successfully retrieved after about nine-month measurement.

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