

## Cruise Summary

1. **Cruise ID/Name of vessel** : KY10-07/Kaiyo
2. **Title of the proposal** : Deployment of dense oceanfloor network for earthquakes and tsunamis (DONET)  
**Representative of the Science Party [Affiliation]** : Yoshiyuki Kaneda/JAMSTEC/J10-12
3. **Chief Scientist [Affiliation]** : iichiro Araki (Leg1)/Hiroyuki Matsumoto (Leg2)/JAMSTEC
4. **Science party (List) [Affiliation, assignment etc.]** :  
Eiichiro Araki, Takashi Yokobiki, Hiroyuki Matsumoto, Shinichiro Kamiya (JAMSTEC)  
Akira Soh, Yuuki Miyazima, Hiroyuki Hayashi, Naohito Mori, Asuka Kawamura (MWJ)  
Toru Kodera, Hiroyasu Momma (NE).
5. **Research area** : Off Kumano, Off Shionomsaki
6. **Ports of call** : 2010/5/1(Yokosuka JAMSTEC) - 2010/05/09(Shingu)-2010/05/18(Yokosuka JAMSTEC)

### Overview of the Observation

Since 2006, Japan Agency for Marine-Earth Science and Technology (JAMSTEC) has started to develop a new dense network system using sub-marine cable off Kii-peninsula, where the last mega-thrust earthquake named Tonankai earthquake took place in 1944. According to the recent report from the Headquarters for Earthquake Research Promotion in the Ministry of Education, Culture, Sports, Science and Technology (MEXT), it is estimated that the probability of the mega-thrust earthquake, i.e., the Tonankai earthquake is 70 to 80 % in the next 30 years, because the recurrent interval of the plate boundary earthquake is approximately 100 to 150 years in this segment. Thus, the offshore seismic monitoring system for the forthcoming Tonankai earthquake is urgently needed to mitigate future disasters from the earthquake and resulting tsunami. The monitoring system developed by JAMSTEC is called "Dense-Ocean-floor Network for Earthquake and Tsunamis (DONET)". This cruise was conducted as a part of construction of DONET system deployment.

In DONET, the seismic sensors are buried into the seabed. We need to have a shallow hole in the seafloor to bury the seismic sensor by ROV. Perforating shallow hole in the seafloor is planned by two steps, installing a caisson with a root using gravity corer, and sweeping mud which is enclosed in the caisson using a hydraulic pump with ROV Hyper Dolphin. During the former half of the KY1007 cruise, we conducted installation of the caissons using piston corer. We conducted 15 piston coring operation to install seafloor casing for seismic sensor installation in the Kumano area of the Nankai Trough. Among 15 coring attempts, 12 coring shots released the casing in the seafloor and 9 of the released casing penetrated in the seabed enough for seismic sensor installation. These installed seafloor casings will be utilized to house buried ocean bottom seismic sensor for DONET.

Latter half leg of KY10-07 cruise conducted seafloor camera survey using "Deep-Tow" as a route clearance survey before ROV Hyper-Dolphin dives. The present survey aims to complete route clearance along the science link cable by using 6000 m Deep Tow camera system before deploying science cable between science node and observatory. Three route clearances, i.e., for A-2, A-4, and E-17 observatories have been completed during the present KY10-07 cruise. It should be noted that "Deep-Tow" seemed to be captured by something in the deep sea westward at A-4 observatory but out of science link cable route. We tried to remove the obstacle by two dives (DT-4C and DT-5C dives), but we could not finished yet. During the KY10-07 cruise,

we also checked the location of two terminal units (TU\_D and TU\_E) by using acoustic instrument (ROV-Homer system). This is because all TUs of DONET have been deployed from the cable ship with no positioning system, we have to look for TUs at first in order for deployment of science node by ROV dive. We plan to establish 20 observatories in total by this fiscal year. We have checked no problems for ROV dive and its operation for A-2, A-4, and E-17 observatories at least after the present KY10-07 cruise.