Realtime ocean bottom broadband seismograph array deployed by JAMSTEC in Nankai Trough, Japan

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**Earthquake & Tsunami Research Project for Disaster Prevention, JAMSTEC
DENSE OCEANFLOOR NETWORK SYSTEM FOR EARTHQUAKE AND TSUNAMIS (DONET)
Nankai
Tonankai
Tokai
Philippine Sea Plate
DONET target area
2-3 cm/y
4-5 cm/y
5-6 cm/y
DONET Observation Area
Hyuga-nada
Osaka
Nagoya
Tokai
Nankai
Seismogenic Zone
Tokyo
Hyuga-nada
Philippine Sea Plate
DONET Construction Work

ROV used in the submarine construction work: Hyper-dolphin

All twenty observatories are working.

Construction of Installation hole for seismometer

Installation of seismometer

Deployment of extension cable

Installation of sensors
20 ocean bottom observatories had been installed in To-Nankai earthquake rupture area.

Type of instruments:

- **Strong Motion Seismometer**: Metrozet TSA-100S
- **Broadband seismometer**: Guralp CMG-3TRH
- **Hydrophone**: High Tech HTI-99-DY
- **Differential Pressure Gauge**: Nichiyu Giken Kogyo MA-567000
- **Quartz Crystal Pressure Gauge**: Paro Scientific 8B7000-2-005
- **Precision Thermometer**: Nichiyu Giken Kogyo MA-565-2 series
Data Transfer System
the 2011 Tohoku earthquake (Mw 9.0)

- GMT 5:46 (JST 14:46)
- Mw 9.0
- depth 20 km
- thrust type

(from Global CMT solution)
the 2011 Tohoku earthquake (Mw 9.0)
Strong motion waveforms recorded at DONET (time axis based on the origin time)

vertical component
Water pressure waveforms recorded at DONET (time axis based on the origin time)

※filtered period: 100-10000 seconds
forward modeling for DONET data

black: observed waveform
red: synthetic waveform
North Korean event on February 12, 2013

2013/02/12 02:57:51UTC
41.3060N 129.0650E
Mw 5.1 (USGS)

Epicentral distance to DONET(KMA03): 1077 km
P-wave travel time: 140 sec
Surface wave (4.0 km/s) travel time: 267 sec
KMA01 broadband seismograph
vertical component

velocity

spectrum

Origin time
P-wave  Surface wave

Dispersion in low frequency

High frequency component
Broadband seismograph 3-components at KMA01

Before filtering

After filtering (2-9 Hz)
Vertical component broadband seismograph

2-9 Hz bandpass filter is applied
Vertical component of broadband seismograph 2-9 Hz bandpass filter is applied.
DONET, DONET2, and DONET3