

Real Time Monitoring for Mega Thrust Earthquakes and Tsunamis Around the Nankai Trough Southwestern Japan

-Towards Understanding Mega Thrust Earthquakes and Disaster Mitigation-

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Abstract

Around the Nankai trough southwestern Japan, mega thrust earthquakes over M8 class such as the Tokai, the Tonankai and the Nankai earthquake are occurring with intervals of 100-200 years. In past two mega thrust earthquakes in 1944/1946 and 1854, first ruptures were starting from the Tonankai seismogenic zone. Therefore, to elucidate the recurrences of the Tonankai mega thrust earthquakes and mitigate geohazard, ocean floor network systems for the real time monitoring of seismogenic zone are quite important. We are starting to develop the Dense Ocean floor Network system for Earthquakes and Tsunamis (DONET) as Japanese government funded MEXT project during 2006-2010. Advantages of DONET system are as follows,

- 1) Early warning of mega thrust earthquakes and tsunamis
- 2) Precise observation of crustal activities around seismogenic zones using a dense network array with multi kinds of sensors
- 3) Data from ocean floor network system are quite important to improve recurrence cycle simulation

We are developing DONET system and will deploy around the Tonankai seismogenic zone. DONET is equipped with multi kinds of sensors such as accelerometers, broad band seismometers and precise pressure gauges etc. There are three important concepts in DONET as follows,

- 1) Redundancy of system by the looped backbone cable
- 2) Extendable and Replaceable system by nodes and brunch cables
- 3) Advanced technology and maintenance system by ROV / AUV applications

The dense array data from DONET will be applied to the early warning earthquakes and tsunamis. Furthermore, the precise data of crustal activities from DONET will improve the recurrence cycle simulation model using data assimilations. Furthermore, to understand the mega thrust recurrence system, expeditions by the drilling vessel [CHIKYU] are carried out around the Tonankai seismogenic zone. Finally, for 4 dimensional real time monitoring of the Tonankai seismogenic zone, borehole observatories by [CHIKYU] drilling will be connected to DONET system. These monitoring data will be applied to improve the simulation model and the advanced early warning system.