Integration of data from Ocean floor observatories, borehole observatories, seismic experiments, drillings and simulations -Towards understanding of mega thrust earthquake seismogenic southwestern Japan-

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In the Nankai trough south western Japan, mega thrust earthquakes are occurring with an interval of 100-200 years. Therefore, research projects such as ocean floor observatories, boreholes observatories, seismic experiments, drillings and simulations have been carried out focusing on the Nankai trough seismogenic zones.

In previous simulation researches based on a detailed structure model, the result of recurrence cycle simulation indicates the difference patterns and intervals of mega thrust earthquake recurrences in each cycle around the Nankai trough. These results are consisted with recent historical mega thrust earthquakes in 1854, 1944/46 around the Nankai trough. However, only this simulation model is not yet enough to understand of the next mega thrust earthquakes around the Nankai trough. So, we are developing ocean floor network observatories (DONET：Dense Oceanfloor Network for Earthquakes and Tsunamis) and borehole observatories to estimate crustal activities in seismogenic zone precisely around the Nankai trough. In DONET system, 20 observatories are deployed and multi kinds of sensors such as an accelerometer, a broad band seismometer, a pressure gauge, a differential pressure gauge and a thermometer are equipped in each observatory. With these precise sensors, we could observe broad band phenomena such as strong motions, slow earthquakes and ocean　floor crustal deformations around the Nankai trough. Using these sensors, we can detect earthquakes and tsunamis very early rather than the land stations. This advantage is very important for a disaster reduction of earthquakes and tsunamis. Furthermore, data of broad band phenomena around seismogenic zone are very useful and significant to understand mega thrust earthquake recurrence system around the Nankai trough. Especially, vertical components of ocean floor crustal deformations obtained from pressure gauges are very significant to study the coupling between plate boundaries. Using these data, we could improve the recurrence cycle simulation model with higher reliabilities. Especially, the estimation of recurrence cycle between the Tonankai and Nankai earthquake is very important for disaster preventions in Japan.

Furthermore, to understand the seismic linkage around the Nankai trough seismogenic zones, we are carrying out dense seismic surveys, broad band observations and developing advanced simulation researches.

This project for seismic linkage on mega thrust earthquakes around the Nankai trough and DONET project are entrusted by MEXT.

Finally, we will integrate seismic research results and data from observatories to elucidate the mechanism of recurrence cycle of mega thrust earthquakes, and to estimate seismic hazard damages precisely.

We will explain new research projects for the next Nankai trough mega thrust earthquake seismogenic zones in details.