



## **New research project for the next Nankai trough mega thrust earthquakes -Integration of Observation, Simulation and Disaster Mitigation researches-**

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The Nankai trough located off Southwestern Japan is well known as mega thrust earthquake seismogenic zone. In the Nankai trough, there are three mega thrust earthquake rupture zones such as Tokai, Tonankai and Nankai earthquake rupture zones, around there mega thrust earthquakes are occurring with an interval of 100-200 years. In past three mega thrust earthquakes around the Nankai trough, 1944/1946 (Showa earthquake), 1854 (Ansei earthquake) and 1707 (Hoei earthquake), these occurrence patterns are quite differences. In the 1944/1946 Showa earthquakes, the first rupture started from the Tonankai earthquake rupture zone a head of the Nankai earthquake with a interval of 2 years, however, in the 1854 Ansei earthquakes, time difference between the Tonankai/Tokai earthquakes and the Nankai earthquake were about 32 hours, and in the 1707 Hoei earthquakes, time differences among these earthquakes are estimated as almost same. According to results of these historical earthquakes, we understand that there quite diversities in the mega thrust earthquake recurrences around the Nankai trough.

To understand and estimate the diversities among ten next Nankai trough mega thrust earthquakes, we have to improve the structure model and 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. The new research project for the next Nankai trough mega thrust earthquakes is starting as the MEXT project which is

a kind of Japanese government.

In this project, we will propose research plans as follows,

- 1) Construct the detailed crustal medium around the Nankai trough using controlled sources and seismic tomography using dense seismic lines and OBS network arrays.
- 2) Observations of crustal activities around the Nankai trough using seismometers and pressure gauges.
- 3) Construct the database of long term plate coupling dynamics. And study the diversity of recurrence pattern and scale of next mega thrust earthquakes.
- 4) Develop the advanced simulation methods.
- 5) Improve the large scale recurrence cycle simulation model based on theoretical and experimental analyses.
- 6) Evaluate the precise strong motions and tsunamis for the disaster mitigation.
- 7) Develop the reliable risk management system for next mega thrust earthquake.
- 8) Develop and construct the real time monitoring system around the Tonankai earthquake rupture zone. This system is called as DONET (Dense Ocean floor Network for Earthquakes and Tsunamis).
- 9) Apply scientific results of Nankai seismogenic zone drilling to recurrence cycle simulation.

Finally, we will progress these researches and integrate these results for the next Nankai trough mega thrust earthquakes.

We will introduce these researches in the detail.