

Episodic shallow tremor off southeast Mie prefecture and its monitoring

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We analyzed long-term continuous seismic records (from September 2015 to April 2016) of DONET deployed off southeast Mie prefecture and we investigated activity of shallow tremor near the trough axis with the envelope correlation method. We found that shallow tremor was active only in two periods of October 2015 and April 2016 and their durations were about 6 days and 2 weeks respectively.

In the episode of April 2016, migration property was observed. Because of the migration properties, it is inferred that slow slip events were related to activities of shallow tremor similar to the case of deep tremor. We observed three migrations with different speed (from several km per day to 20 km per hour). Triggering property was also observed after M7.3 Kumamoto Earthquake on 16 April. This is also the same with well-known triggering property of deep tremor by teleseismic wave.

This shallow tremor is sensitive to stress perturbation because it was triggered by teleseismic wave as is the case with deep tremor. Furthermore, shallow tremor in this research was located in the vicinity of the initiation points of past megathrust earthquakes in Nankai (M7.9 Showa-Tonankai earthquake in 1944 and M8.0 Showa-Nankai earthquake in 1946). Therefore, monitoring this tremor activity will be very important to reveal stress accumulation process of megathrust earthquakes.

We are now developing automatic monitoring system to detect shallow tremor in JMA. The system first determines candidate hypocenters of tremor using envelope correlation method and then excludes false detection such as regular earthquakes or artificial explosions by detecting spike-shaped waveform. We will introduce this method in the system as well.

Acknowledgement: We used continuous seismogram data of DONET operated by National Research Institute for Earth Science and Disaster Prevention (NIED) and Japan Agency for Marine-Earth Science and Technology (JAMSTEC).

Keywords: episodic shallow tremor, Nankai Trough, subduction

