

Activity of low-frequency tremor in 1997-98

Meiko Tanoue[1]; Ryoko Nakata[1]; Naoki Suda[1]; Hiroshi Tsuruoka[2]

[1] Earth & Planet. Sys. Sci., Hiroshima Univ.; [2] ERI

Low-frequency tremors occur in a non-volcanic region in southwest Japan. Their epicenters are distributed over the belt-like region along the Nankai trough. From characteristics of their waveforms and epicenter migrations, it is thought that the occurrence of tremor is related to fluid liberated from hydrous minerals in the subducting Philippine Sea plate. It is therefore important to investigate tremor activity in view of fluid role in the subduction zone, which might be related to the occurrence of great earthquakes.

It is known that slow slip events also occur in the tremor area. Recent studies show that there is some relationship between slow events and activities of low-frequency tremors (Obara et al., 2004; Hirose and Obara, 2005). All the studies on the tremor in southwest Japan uses records from the High Sensitivity Seismograph Network (Hi-net) installed by the National Research Institute for Earth Science and Disaster Prevention (NIED), so that the tremor activities so far investigated are those occurred after 2001. In this study, to elucidate the activity of low-frequency tremor before the installation of Hi-net, we analyze the records from the commutation-satellite seismic telemetry system. The analyzed period contains the latter half of the 1997 Bungo channel slow event (Hirose et al., 1999), and also it is before the Tokai slow slip, which started in 2001.

We use vertical components of continuous seismic records from short-period seismographs in Tokai, Kii Peninsula, and Shikoku regions installed by Japanese Meteorological Agency (JMA) and several national universities. The analyzed period is the ten months from July 1, 1997 to April 30, 1998. The records are loaded from a total of 709 backup tapes in Earthquake Research Institute, University of Tokyo. For each region we create waveform images of continuous records bandpass filtered with the cutoff frequency of 2-10 Hz to detect tremor intervals with visual inspections. We determine the frequency of tremors in units of 1-hour periods and use them as tremor activity. The tremor activity in the Tokai region is low compared to the recent activities associated with the slow slip. On the other hand, the activity in the Bungo channel region is high: several high activities with long durations and with a lot of short-duration activities in between. These results suggest the strong relationship between slow events and tremor activities.