

## Source mechanism of deep low-frequency tremor and earthquake

# Akio Katsumata[1]; Noriko Kamaya[2]

[1] Meteorological Research Institute, JMA; [2] JMA

There have been some reports on source mechanism of deep low-frequency tremor and earthquake (ex., Ohmi and Obara, 2002; Ueda et al., 2002; Katsumata et al., 2003). But source mechanisms of those phenomena are still unclear. We discuss difference of source mechanisms between deep tremor in southeast Japan and deep low-frequency earthquake in volcanic regions.

We estimate source-force direction from particle motions of S-waves with a method by Ukawa and Ohtake (1987) assuming single-force and double-couples models. Solutions of single force show relatively clear foci than those for double couple model. Source force directions of the tremor are distributed along NW-SE direction which is parallel to the direction of the Philippine Sea plate motion. This indicates that the motion of the Philippine Sea plate is related to the tremor activities.

On the other hand, many of source-force directions of events around Mt. Fuji are nearly vertical. Source-force direction of the earthquakes in volcanic region is clearly different from that of tremor along the subduction zone of the Philippine Sea plate. There are activities of deep low-frequency earthquakes in Kyoto Pref., Osaka Bay and etc. Estimated mechanism of those areas is similar to that of volcanic areas.

It is pointed out that the deep low-frequency tremor is related to slow-slip events. The analysis of S-wave particle motion is consistent with the slow-slip motion. It was observed that some slow-slip events were preceded by shortening of quiescent periods of tremor. It is unknown whether that the tremor activities really precede slow-slip events, or that all of tremor activities are accompanied by slow-slip which may be lower than detectable level. If the slow-slip is continuous long-lasting phenomena, it would be inconsistent with the tremor which show intermittent activities.

We used seismic data from the National Research Institute for Earth Science and Disaster Prevention, Hokkaido University, Hirosaki University, Tohoku University, University of Tokyo, Nagoya University, Kyoto University, Kochi University, Kyushu University, Kagoshima University, the National Institute of Advanced Industrial Science and Technology, Tokyo metropolitan government, Shizuoka prefectural government, Kanagawa prefectural government, the City of Yokohama, the Japan Marine Science and Technology Center, and the Japan Meteorological Agency.