

Correlation among the deep low-frequency tremors, the unsteady crustal movement and seismicity in the Tokai region

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Recent enhancement of seismic networks in Japan has revealed the occurrence of low-frequency continuous tremors of a belt like distribution beneath a non-volcanic region in the southwest Japan. In the Tokai region, near an east end of the source area of tremors, the Tokai slow slip and a decrease of the earthquakes around the lake Hamanako are reported recently.

We compare the cumulative number and the cumulative seismic moment of the deep low-frequency tremors to those of the earthquakes in the crust and on the slab and an unsteady movement of the crust detected by GPS observations.

We find that accelerating processes of the cumulative seismic moment of the tremors beneath the Tokai region corresponds temporally with increasing processes of the Tokai slow slip monitored at GPS stations, Hamamatsu, Hamakita. We also find that the earthquakes whose magnitude are greater than 2.0 on the slab in this region show quiescence after 2003.

A positive correlation in time between the activity of tremors and the unsteady movement of the crust and also a negative correlation between those and the activity of earthquakes on the slab suggest a causal relationship, which is controlled by fluids dehydrated by the subducting Philippine Sea plate, between the occurrence of the tremors and the Tokai slow slip.