

Shallow low-frequency tremor along the Nankai trough observed by the OBS

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Since the discovery of a deep low-frequency tremor along the Nankai trough in Japan, several kinds of low-frequency oscillation phenomena, such as non-volcanic low-frequency tremors and/or slow slip events, have been reported in other active subduction and transform fault zones like the Cascadia region and the San Andreas Fault zone. Anomalous very low-frequency earthquakes and many long-duration tremors have been observed near the trench axis along the Nankai trough, where megathrust earthquakes repeatedly occur along the plate boundary. The relationship between such earthquakes and tremors may hold the key to understanding fundamental processes at the shallow part of the active subduction zone. Here, employing seismic data of a dense ocean bottom seismometer network developed just above the source region of those events, we demonstrate that the epicenters of such tremors are distributed complementarily to those of the very low-frequency earthquakes. This result confirms that long-duration tremors and very low-frequency earthquakes are different phenomena, not different manifestations of a single process: we can call the former 'shallow low-frequency tremors'. The shallow low-frequency tremors could contribute to resolve the problem of the segmentation and synchronization of a big earthquake rupture zone in the Nankai trough.