四国地方における SSE と微動活動の関係

Investigating the relationship between slow-slip events and tremor in the Shikoku region, Southwest Japan

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In the subduction zone of Southwest Japan, Obara (2002) discovered nonvolcanic tremor, which is characterized by longer duration than regular earthquakes. After this discovery, other new slip phenomena at the plate boundary, characterized as well by longer durations, have been discovered in subduction zones around the world. These phenomena are collectively known as “slow earthquakes”. Understanding of slow earthquakes is an important issue for understanding the physics of subduction zones and may help the risk assessment of huge earthquakes. Fortunately, by the strengthening in recent years of the observation networks, the routine analysis of slow earthquakes is becoming possible and open observation data are being made available.
In this study we analyze and discuss the characteristics of slow earthquakes by using catalog data which have been newly developed in the recent years in the Shikoku region. This area has a new catalog of SSEs (Nishimura *et al.*, 2013; Nishimura 2014) and tremor (Idehara *et al.*, 2014).
Our results show that in the Shikoku region, almost all of the short-term SSEs (S-SSEs), which were detected by Nishimura (2013, 2014), synchronize with tremor activity. Assuming that tremor activities reflect the destruction of small patches on the SSE fault, we observe a consistent relationship of linear increase in the duration of the activation of tremors with the moment of SSEs. This result is in agreement with the scaling law of SSEs (Ide et al., 2007) and observation case of long-term SSEs (L-SSEs) (e.g., Miyazaki *et al.*, 2006). In addition, the calculation of the magnitude of L-SSE by using the tremor activation period during the periodic L-SSEs at Bungo Channel and the scaling law obtained in this paper is consistent with geodetic observations (Yoshioka *et al.*, 2015).
The obtained results suggest that the space-time pattern of tremor is well explained by SSEs characteristics and that the tremor can be used as a proxy for the detection of SSEs.

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