紀伊半島下フィリピン海スラブ内におけるスロースリップ発生前後の地震活動度、応力場、およびb値の変化
Changes in seismicity rate, stress orientations, and b-values before and after ETS events in the Philippine sea plate under Kii Peninsula

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The slip on the plate interface has the potential to affect the stress field and seismicity within the subducting slab. Several studies have examined the interaction of slow slip phenomena with intraslab earthquakes [Nankai and Tokai regions, Han et al. 2014; Mexico, Radiguet et al. 2018, 2018 JpGU meeting; New Zealand, 2018, Warren-Smith, 2018 AGU meeting]. Kita et al. [2018, SSJ meeting] reported the stress change in the whole slab associated with ETS times based on stress tensor inversion results. However, we find a clear double seismic zone under Kii Peninsula, as also noted in a previous study [e.g. Miyoshi and Ishibashi, 2004]. Therefore, we here examine seismicity rate variations, stress changes, and b-value variations of seismicity separately for the upper plane events and oceanic mantle ones relative to ETS timings beneath the Kii Peninsula. We use the JMA earthquake catalog, the NIED tremor catalog, the upper surface of the Philippine sea plate estimated by Shibutani and Hirahara [2016], P-wave polarity data by NIED, and a stress tensor inversion code [Vavrycuk, 2014].

We determined the timings of ~30 large ETS beneath the Kii Peninsula from 2001 to 2017, and categorized slab seismicity relative to the occurrence times of nearby the ETS (i.e., 60 days before or after). We then combined or stacked the slab seismicity based on these relative occurrence times. The rate of seismicity both in the upper plane events and in the oceanic mantle ones after the ETS timings clearly decreased, compared to the rate before the ETS timings. The peaks of b-values of seismicity both in the upper plane events and oceanic mantle ones were found to occur 1.5 months before ETS. A change in stress orientations before and after the ETS was seen in the oceanic mantle, and a relatively small change was seen for the upper plane events. The stress change in the upper plane events appears to be larger in the region updip of the ETS zone. The results of our study suggest that the aseismic slip on the plate boundary may affect the stress field and the occurrence of seismicity within the subducting slab beneath the Kii Peninsula. Fluid migration from the oceanic slab into the ETS zone on the plate boundary could be related to the interaction of slow slip phenomena with intraslab earthquakes.

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