Ocean slab seismicity and stress state affected by episodic slow slip near a subduction-zone megathrust

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Slow slip phenomena sometimes occur at the timings of large intraslab earthquakes, but detailed relationships between intraslab earthquakes, slow slip phenomena and geofluids are not known. We examined time variations in seismicity rates, b-values, and stress regimes in the Philippine sea slab associated with times of episodic tremors and slip (ETS) beneath Kii peninsula, southwestern Japan. At 1 month before the ETS times, seismic rate and b-value become high, which is similar to characteristics of fluid-induced seismicity. Stress regimes in the oceanic crust suggest that the plate boundary just beneath the slow slip zone is partially coupled before the times and the plate coupling degree decreased after that, whereas updip of the zone, it increased after ETS. Results of 200 times bootstrap resampling tests of focal mechanisms support that stress after the ETS times change from that before the ETS times. Results of our study show that monitoring of intraslab earthquakes would be a new approach to detect time change of plate coupling degree and slow slip phenomena.