

Strength of tremor patches along deep transition zone of a megathrust

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Deep low frequency tremors are indicators of slow slip transients in the brittle-ductile transition zone along subducting plates. Investigation of comprehensive tremor activities is therefore an important issue for understanding the seismic/aseismic characteristics in transition zones. Here, we focus on the radiated energy from tremors to reveal the along-strike heterogeneity in the strength of tremor patches. Based on a tremor catalog that more accurately evaluates radiated energy (Annoura et al. 2016), we examine the spatio-temporal activities of tremors accompanied by slow slip events in western Shikoku, southwestern Japan. The new findings of this analysis is that the energy radiation of tremor is positively correlated with the migration speed and slip velocity inferred from tilt records (Hirose and Obara, 2010). This can be qualitatively explained by a stress diffusion model (Ando et al., 2012) consisting of along-strike heterogeneities in the effective strength of tremor patches within a background ductile shear zone. This strength contrast is supported by a lateral variation in the stress drop; it is consistent with the fluid pressure distribution along the plate boundary fault (Nakajima and Hasegawa, 2016) and the tidal sensitivity of tremors (Ide, 2010). Accurate evaluation of tremor activities, especially the radiated energy, can be used to infer the spatial distribution of the strength of tremor patches in the worldwide transition zones.

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