

地質学セミナー

Rupture process during the 2015 Illapel Chile earthquake: Zigzag-along-dip rupture episodes

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I will present a seismic source model for the 2015 Mw 8.3 Illapel, Chile, earthquake, which was carried out with the kinematic waveform inversion method adopting a novel inversion formulation that takes into account the uncertainty in Green's function, together with the hybrid back-projection (HBP) method enabling us to track the spatio-temporal distribution of high-frequency (HF: 0.3–2.0 Hz) sources at high resolution by using globally observed teleseismic P-waveforms. A maximum slip amounted to 10.4 m in the shallow part of the seismic source region centered 72 km northwest of the epicenter and generated a following tsunami inundated along the coast. In a gross sense, the rupture front propagated almost unilaterally northward from the hypocenter at less than 2 km/s, however in detail, the spatio-temporal slip distribution also showed a complex rupture propagation pattern: two up-dip rupture propagation episodes, and the secondary rupture episode may have been triggered by the strong HF radiation event at the down-dip edge of the seismic source region. HF sources tended to be distributed at deeper parts of the slip area, a pattern also documented in other subduction-zone megathrust earthquakes that may reflect the heterogeneous distribution of fracture energy or stress drop along the fault. Rupture terminated without the intense HF bursts at the northern edge of co-seismic slip area, representing the gradual deceleration of rupture velocity at the transition zone of frictional property or stress state between the megathrust rupture zone and the region where the intense interplate-swarm earthquakes were observed in 1997–1998.

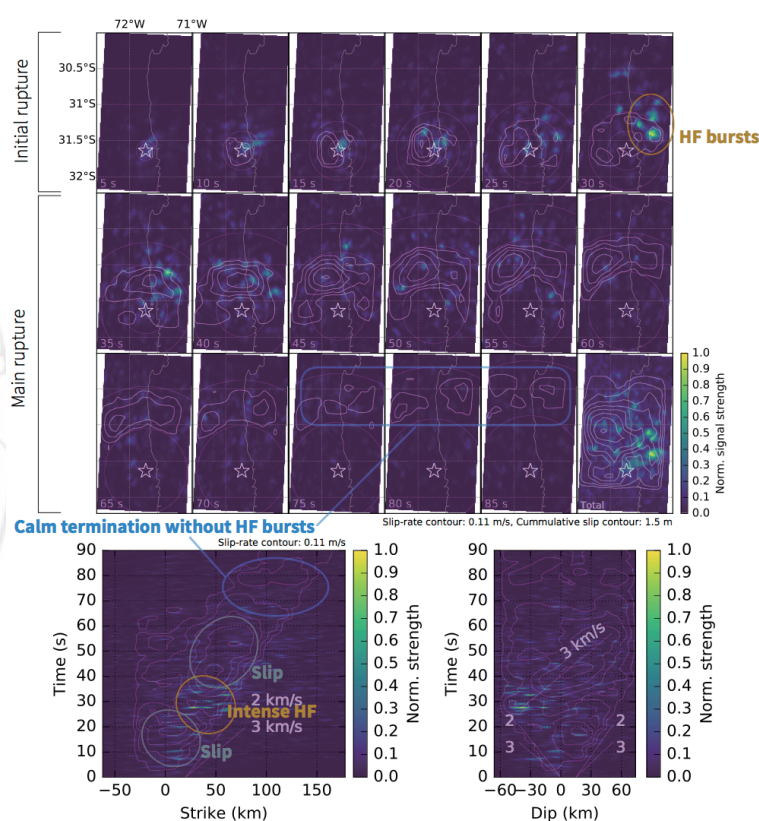


Fig. Summary of the rupture evolution during the 2015 Illapel Chile earthquake.

【次回予定】

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