



Seismicity controlled by a frictional afterslip during a small magnitude seismic sequence ($M < 5$) on the Chihshang Fault, Taiwan

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Afterslip is a phase of postseismic relaxation for moderate to large earthquakes ($M > 6$) and occurs on the fault plane in response to the stress change imparted by a coseismic stress drop. Observations of afterslip following smaller earthquakes remain rare, mainly due to sensor limits in detecting the postseismic phase. We report evidence for a frictional afterslip at shallow depths (< 7 km) during a small magnitude seismic sequence (with $M < 5$) along the Chihshang Fault, a main active structure of the Longitudinal Valley, in southeast Taiwan. The afterslip, which has been recorded by a nearby borehole dilatometer, lasted about a month with a cumulative geodetic moment magnitude of 4.8 ± 0.2 . The cumulative geodetic moment of the postseismic phase is at least equivalent to the coseismic moment of the sequence. Afterslip is made of two stages and controls the aftershock sequence. The first postseismic stage which follows a M4.6 earthquake, lasts about six hours, and mostly controls the ruptures of neighbouring asperities (e.g. multiplets) near the hypocenter. Then, a 4-week duration large afterslip which follows a M4.9 earthquake, controls the rate of aftershocks during its first two days through brittle creep. The study shows a rare case of seismic-seismic coupling during a small magnitude seismic sequence.