

Comparison between postseismic slip immediately after large earthquakes in northeastern Japan

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In general, postseismic deformation after large earthquakes consists of afterslip and asthenospheric viscoelastic relaxation. Many studies have estimated both effects from year-scale data. Alternatively, we focus on temporal evolution of postseismic deformation, which is almost due to afterslip, following large interplate earthquakes in northeastern Japan (2003 Tokachi-oki, 2005 Miyagi-oki, 2011 Tohoku-oki (March 9), and 2011 Tohoku-oki (March 11)). We obtain surface deformation data at an interval of 30 seconds about 2 days after the earthquakes, from RINEX files of GNSS data, using GSILIB. We invert slip velocities of sub faults at the plate interface from the surface deformation data. First, we find that early afterslip velocities positively correlate with magnitude of the mainshock. Second, we find that the early afterslip velocities are approximately 4 orders of magnitude lower than mean seismic slip velocities of their mainshock. Next, the early afterslips tend to decay almost linearly with time during the investigation periods.

Keywords: afterslip, GNSS, slip velocity