Coseismic and postseismic velocity variation caused by the 2016 Mw 6.5 Meinong, Taiwan Earthquake

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The 5 February 2016 M_w 6.5 Meinong earthquake occurred in Meinong, Kaohsiung, Taiwan. Based on the seismic and GPS observations, we found the maximum vertical PGA was about 170 gal and the maximum coseismic vertical displacement reached about 95 mm and then the GPS postseismic deformation continually slipped about 15 - 20 mm for three months. These three phenomena concentrated in the Hsinhua area, which is 25 km WNW of the epicenter. The Hsinhua fault appears to be a major boundary for both PGA and co- and postseismic GPS deformation.

We use passive image interferometry to detect velocity variation of subsurface structure associated with the earthquake. We collected 11 continuous broadband seismic station data from Central Weather Bureau and Academia Sinica and reconstruct the Green's functions from cross-correlation function of ambient seismic noise between two sensors from January 2014 to April 2016. Analysis of six different frequency ranges from 0.01 to 2 Hz yielded time series for different station pairs. We found similar coseismic velocity drop of about 0.20% at the Hsinhua region, but the differences in postseismic variations existed between north and south of the Hsinhua fault. The time series in velocity change presented non-recovery in the north but recovery in the south of the fault for 3 months. During the three months postseismic period, based on the GPS observations, the southern block continuously moved 15 - 20 mm along southwest direction while the north part remained stationary. We considered that the shorter recovery time and thus velocity increase in the southern block was resulted from the reactivation of the Hsinhua fault, which resulted in the stress increases and the porosity decreases in the southern block of the fault.

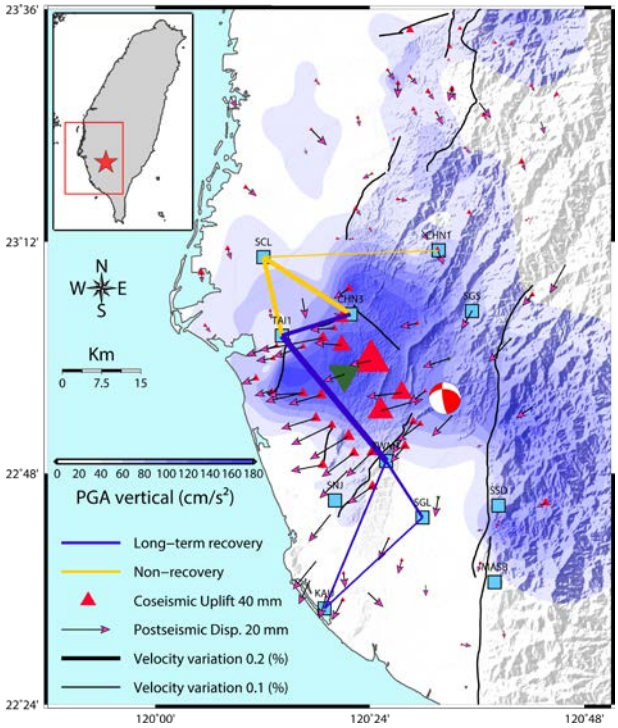

Fig. 1.Velocity variation and GPS observation caused by the 2016 Meinong earthquake.