



Joint inversion of GPS, Leveling and InSAR datasets for 2013 Lushan earthquake, China and its seismic hazard implications

Zhicai Li, Peng Zhang, Junli Wu, Yongshang Wang, and Ming Chen
Geodesy Department, National Geomatics Center of China, Beijing, China

Abstract: On the 20th April 2013, a Ms 7.0 earthquake occurred in the region of Lushan of southwestern China, which caused more than 190 people lose their lives. In this paper, we used nearly 30 continuous GPS operating stations, two terms leveling data and Interferometric Synthetic Aperture Radar (InSAR) data to get the co-seismic deformation of Lushan area. The joint inversion is made to study the parameters of seismic fault using the GPS, leveling and the InSAR data. Further nonlinear inversions show that the dip angle of the seimogenic fault is approximate 45.0° , with a strike of 208° , which is similar with the strike of the southern Longmenshan fault. Our finite fault model reveals that the peak slip of 0.67 m occurred at a depth of ~ 12 km, with substantial slip at a depth of 6-20 km. The estimated moment magnitude was approximately Mw 6.6, consistent with seismological results. The calculated static Coulomb stress changes indicate that the 2013 Lushan earthquake may be triggered by the 2008 Wenchuan earthquake.

Key words: Co-seismic Deformation; Joint Inversion; Fault; Coulomb Stress;