



Seismogenic conjugate strike-slip fault underlying the Songliao basin, NE China

Zhe Su (1), Er-Chie Wang (2), and Shan-Shan Liang (3)

(1) Institute of Crustal Dynamics, China Earthquake Administration, (2) Institute of Geology and Geophysics, Chinese Academy of Sciences, (3) Department of Seismic Networks, China Earthquake Networks Center

Blind strike-slip fault system underlying the Songliao Basin, NE China has been considered secondary in accommodating regional extensional deformation. Over there, two pure strike-slip faulting earthquake events (M_L 5.3 and M_L = 5.7) occurred on 2017 July 22 and on 2018 May 27 and struck the Songyuan city successively. The reasons for why there exists an inconsistency between the seismogenic shearing structures buried underlying the Songliao basin and its surrounding extensional environment remain unclear. Despite no coseismic deformational signal captured on surface, we relocated a total of 427 aftershocks after the occurrence of these two earthquakes. Relocated aftershock distribution investigations indicate that the southern end of the NE-SW striking right-lateral strike-slip Fuyu-Zhaodong fault (FZF) and the central segment of the NW-SW left-lateral Songhuajiang fault (SHF) triggered the 2017 and the 2018 Songyuan earthquake events, respectively. Their average coseismic dextral and sinistral displacements could reach to 0.034 m and 0.15 m, with the estimated rupture areas of 2.81×10^6 m² and 2.43×10^6 m² individually. The FZF and the SHF are assembled into an x-shape conjugate fault system underground. We speculate that this conjugate strike-slip fault system should play an important role in accommodating the north-south elongation and the east-west compression in the Songliao basin, just in response to the shifting subduction direction of the West Pacific Ocean Plate farther to the east. Furthermore, unlike the role that the large-scale conjugate strike-slip fault system plays in the interseismic accommodation, the small scale one (length <5 km) has played a different role in absorbing not only the active shearing movement along the seismogenic strike-slip fault, but also its motivated coseismic slip along another conjugate structure during their separated rupture process in the Songyuan 2017-2018 earthquake sequence.