The Study on Rupture Directivity of the 2016 Meinong Earthquake using Back-projection Method

*Chun Hao Hsu[1], Strong Wen[1], Chau-Huei Chen[1]

1. Institute of Seismology, National Chung-Cheng University Minhsiung, Chiayi, Taiwan

A M_L 6.6 seismic event was occurred on 6 February 2016 with a maximum intensity 7 in the Meinong area, Taiwan. However, the main damage area of the earthquake was not located in Meinong source area, but caused serious destroyed in Tainan area where is located at the west side of the epicenter. The disaster is the most serious in Taiwan after the 921 Chi-Chi earthquake. Such serious disaster may be caused by the source rupture directivity effect. The focal mechanism of the earthquake reveals strike-slip faulting and contains reverse component. In this study, we applied the S-wave waveform envelope data which was recorded by 12 strong motion stations with the epicentral distances are between 25 and 50 km around the source area. We obtained the more accurated travel time of S-wave by using pseudo-bending method under the 3-D velocity model. Thus, the seismic source spatiotemporal evolution was obtained by using the back-projection method. In our results, the high-frequency (HF) energy is located at about 10 km east-part of the epicenter in the rupture initiation. The HF energy propagated northwestward, and about 5 seconds later, the HF energy propagated westward. According to this results, these might suggest a westward rupture. The HF energy is transmitted from the epicenter of the Meinong area to the western coastal plain area, creating constructive interference in the plains of soft sediments and causing huge damage to Tainan area. This phenomenon reflects that the main disaster area is not always occurred around the source area.

Keywords: Back-projection, The 2016 Meinong earthquake, rupture directivity

