Examining Directivity of the 2016 Meinong Earthquake Using Doppler Effect

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This research is to examine the directivity and the rupture direction of the 2016 M6.6 Meinong Earthquake by comparing spectrums of different directions from the epicenter. The seismic waveform data are from the acceleration seismic station networks in Taiwan. To eliminate the interference from effects other than source effect, this research uses a smaller earthquake as a reference event, getting spectrum ratios of each stations by dividing the spectrum of the Meinong Earthquake to the spectrum of the reference event. When the earthquake's rupture direction is towards a station, the spectrum ratio of the station will deviate to higher frequency due to Doppler effect. For any station pair whose two stations are in the opposite direction from the epicenter, the more the two spectrum ratios differ, the more likely the earthquake's rupture direction is on that of the station pair. This research also compares the spectrum ratios of different distances from the epicenter to check if distance affects spectrum ratio. The results show that the spectrum ratio index of a station pair is linear with its distance from the epicenter within about 70 kilometers, and that the rupture direction of the Meinong Earthquake is approximately 320° (N40°W), with little changes during rupture. This study is practicable to find an earthquake's rupture direction, and it doesn't require the earthquake's fault system. Therefore, this study is appropriate for disaster prevention and reduction.

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