



Different seismic features of two moderate earthquakes on the Korean Peninsula and in the Yellow Sea

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The Korean Peninsula is located in the Eurasian (or Amurian) plate and known to be seismically inactive. It has had mainly small earthquakes with magnitude smaller than 5.5 for the last 30 years. Even though the seismicity is low, some moderate earthquakes have been observed in and around the Korean Peninsula. And the moderate earthquakes provide valuable information on seismic characteristics of intraplate earthquakes in the region around the peninsula.

We studied two moderate quakes in this region: one is the 2007 Odaesan event that occurred on land of the peninsula, and the other is the 2011 Yellow Sea event that occurred in the middle of the southern Yellow Sea. Their local magnitudes determined by the Korea Meteorological Administration (KMA) are 4.8 and 5.3, respectively. These two events were well observed by seismic stations operated by KMA and could give us information on seismic source parameters. So we investigated focal mechanisms, moment magnitudes, stress drops and fore- or after-shock activities of the two events.

The 2007 Odaesan event was found to be strike-slip event and the moment magnitude was 4.3. The stress drop was estimated using deconvolution of source time function with Empirical Green's function method and the maximum stress drop was about 28 MPa. We found 27 foreshocks and 91 aftershocks of this event investigating continuous waveforms. The 2011 Yellow Sea event was also strike-slip event and the moment magnitude was 4.6. The stress drop was about 1.2~2.0 MPa. No foreshock was observed but 16 aftershocks were found for this event.

Comparing the seismic features, the two earthquakes were strike-slip event implying that they might be affected by regional stress field. The 2007 Odaesan event had typical stress drop for shallow intraplate earthquakes, while the 2011 Yellow Sea event had somewhat lower value. It is difficult to compare the apparent numbers of fore- and after-shocks because we investigated waveform data of stations at largely different epicentral distances. Therefore we compared the seismic activity with magnitude greater than 2.0 which is large enough to be observed at distant stations for both events. Then we found that the aftershocks of the 2007 event followed for several hours, similar to those of two other inland small earthquakes on the peninsula. Meanwhile, the aftershocks of the 2011 event followed for at least 5 days. These results may indicate that earthquakes on the Korean Peninsula and in the Yellow Sea have different seismic source characteristics even though they are relatively close intraplate events.