

Synthetic Seismograms of Explosive Sources Calculated by the Earth Simulator

We calculate broadband synthetic seismograms using the spectral-element method (Komatitsch & Tromp, 2001) for Jan. 6 2016 DPRK event (Mw(USGS) 5.1). We use Earth Simulator system in JAMSTEC to compute synthetic seismograms using the spectral-element method. The simulations are performed on 8,100 processors, which require 2,025 nodes of the Earth Simulator. We use one chunk with the angular distance 40 degrees to compute synthetic seismograms. On this number of nodes, a simulation of 10 minutes of wave propagation accurate at periods of 3.0 seconds and longer requires about 2 hours of CPU time. We use CMT solution of Rozhkov et al (2016) as a source model for this event. This source model has 43% CLVD component, 19% double couple component and 38% isotropic component. The hypocenter depth of this solution is 1.4 km but we put the hypocenter at the surface for this computation. Comparisons of the synthetic waveforms with the observation show that the arrival time of Pn and Pg waves matches well with the observation. The surface waves observed are also modeled well in the synthetics, which shows that the CMT solution we have used for this computation correctly grasps the source characteristics of this event.

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