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Waveform and Dispersion Modeling Using DPRK Regional Seismograms Recorded by the High Sensitivity Seismic Network of Japan

In this study, we analyze long-period (5-20s) surface waves recorded from all DPRK nuclear explosions by the open stations of the High Sensitivity Seismic Network of Japan (HSSNJ), including the stations in region around the DPRK nuclear site. The purpose of this study is to understand the influence of the Sea of Japan (SOJ) on surface waves, the effect of multi-path due to the three-dimensional structure, and how these effects influence the source parameters determination. Both Rayleigh and Love wave dispersion curves were processed after removing the instruments response and rotating the horizontal traces. We invert the Rayleigh-wave dispersion curves using a fixed water layer on the top and those of the Love waves without. The HSSNJ stations cover an azimuthal range from 65o to about 195o over the distance range from 670 to 1465 km. We also use these surface waves to investigate source parameters i.e., the RDP (reduced displacement potential) and depths of individual explosions by implementing the waveform equalization technique. We are combining both path model and source parameters to model the P waves observed at the stations in this dataset.

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