

Waveform Analysis on Induced Earthquakes after the 2017 Nuclear Test and Detected Mining Events in DPRK

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After the DPRK September 2017 nuclear test event, several earthquakes were occurred near the test site. The scale of these induced earthquake events was fairly very small, therefore there were a few CTBT IMS seismic stations (e.g. KSRS, USRK, KLR) which could detect earthquake signals. Japan NDC-1 (National Data Center-1) tried to locate and discriminate these events utilizing non-IMS data such as IRIS (Incorporated Research Institutions for Seismology).

Analyzing waveform data of these events, S-wave (Sn, Lg-Phase) amplitude of waveform at close stations is larger than that of P-wave (Pn, Pg-Phase) and the feature of these events is presumed to be natural earthquake rather than man-made explosion. Near the DPRK test site, there are two open-pit mines at Chung-gang city and Musan city which locates DPRK-China border. We also compared with past mining explosion event there and we discriminated events with the indexes such as regional P/S ratio, P/S Spectral Ratio.

It was quite difficult to make event discrimination using only IMS seismic waveform data. IMS seismic network is not designed for detecting small-scale nuclear test far less than 1kt. Therefore, local and non-IMS seismic network data could largely contribute to refine event location and event discrimination.

Keywords: Waveform Analysis, Event Discrimination, Nuclear Test, Induced Earthquake