



An Analysis of T-phase observed from the 2nd and 3rd underground nuclear explosions of North Korea

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On February 12, 2013 the third underground nuclear explosion by North Korea was detected in the northeastern part of Korean Peninsula, where North Korea executed their first and second underground nuclear explosions. Through analysis on the data recorded at seismic stations of Korea Institute of Geoscience and Mineral Resources (KIGAM) we found that the T-phase generated from the second and the third underground nuclear explosions was recorded a seismic array located in an island of East Sea. The T-phase was converted from the P and S waves originated from the nuclear explosions and their group velocity in water is around 1.5km.s. A detailed study was performed with spectrogram analysis and envelopes analysis applied high-pass filter ($f \geq 2\text{Hz}$), spectrogram and progressive multi-channel correlation method (PMCC). The maximum cross correlation coefficients between two events were calculated around 0.7 and the results of the azimuth angles through PMCC were about 320-330 degree.