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# Regional Source Scaling of North Korea Underground Explosions: Yield and Burial-Depth Relationship

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Two suspicious events, which were claimed as underground nuclear tests by North Korea, were detected in the northern Korean Peninsula on October 9, 2006 and May 25, 2009. The KIGAM and Korea-China Joint seismic stations are distributed uniformly along the boundaries between North Korea and adjacent countries. In this study, ten broadband stations with the distance of 194 to 550 km from the test site are used to analyze the spectral ratios and estimate the scaling relationship of yield and burial depth of two tests. The combined epicentral determination of the 1st and 2nd test data showed that the 2nd test site was moved approximately 2 km westward from 1st site. This test-site shift is negligibly small even compared to the distance of the nearest station. The spectral ratios were evaluated below 20Hz due to the relative low signal to noise ratio at the higher frequency. The ratio between 1 to 5Hz is stable with small variation. Above 5Hz the ratio is fluctuated with high variation. The estimated mean spectral ratio was compared to Mueller-Murphy source model. The spectral ratio is best fitted: the yield of 2nd test is four to six times larger and the burial depth is deeper roughly 20$\sim$30% than 1st one.