Geophysical Research Abstracts
Vol. 20, EGU2018-8056, 2018
EGU General Assembly 2018

Which effect has topography at DPRK's test site on the emitted wave-field?

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The Democratic People's Republic of Korea has conducted its sixth underground nuclear explosions on 03-Sep-2017 at 03:30 (UTC). The explosion was clearly detected and located by the seismic network of the International Monitoring System (IMS) of the Comprehensive Nuclear-Test-Ban Treaty (CTBT). Additional seismic stations of international earthquake monitoring networks at regional distances, which are not part of the IMS, are used to precisely estimate the epicenter of the event in the North Hamgyong province (41.3° N / 129.1° E). It is located in the area of the North Korean Punggye-ri nuclear test site, where the previous verified nuclear tests in the years from 2006 to 2016 have been conducted. The comparison of the measured amplitudes results in the increasing magnitude with the chronology of the explosions from 2006 (mb 4.2), 2009 (mb 4.8), 2013 (mb 5.2), 2016 (mb 5.1 and 5.3) until 2017 (mb 6.2); whereas the yield of the recent explosion in 2017 is in the order of a few hundreds kt TNT equivalents.
The analysis of both the recorded seismic signals and spectral characteristics provide the evidence, that this event was also originated by an explosive source. Furthermore, the similarity of the signals with those from the five former nuclear tests suggests a very similar source type. The seismograms at the 8200 km distant IMS station GERES in Germany, for example, show the same P phase signal for all four explosions, differing in the amplitude only. Nevertheless, moment tensor inversions of previous nuclear explosions conducted at the North Korean test site as well as the recent event have provided results showing consistently a considerable amount of shear wave energy beside the major isotropic explosive proportion. Moreover, the current explosion has generated strong infrasound signal which has been clearly recorded at the neighboring IMS infrasound station. These observations lead us to study the effect on the local topography, which might be supportive for both phenomena. We are presenting results obtained with a 2-D numerical modeling approach using the Chebyshev pseudo-spectral method and accounting for topography along 41.3° N crossing Mt. Mantap. Overall, we find surface reflections increased up to a factor of 4 due to topography by analyzing various geological settings, source depths, and energy radiation patterns.