

Yield estimates for the DPRK's sixth nuclear test with radar and seismic analysis

The mb 6.1 event related to the 2017 DPRK's sixth nuclear test occurred in DPRK's Punggye-ri test site on September 3, 2017. After 8 minutes 32 seconds from the origin time of the event, the second event of mb 3.6 was followed. Three-dimensional surface deformations from the ascending and descending radar observations were retrieved for the nuclear test. From the upward deformation component, we could clearly identify the collapse of the Punggye-ri test site's facilities as well as the collapse related to the second event. And, from the horizontal deformation component, we were also able to recognize that the shape of the nuclear source is spheroidal. The location, depth and cavity radius of the event were calculated from the horizontal component by using Yang's dislocation model after the landslide-feasible deformations were removed from the horizontal deformations. The epicenter of modeled explosion was similar to those calculated from previous studies. However, the depth and cavity radius were slightly different, which were about 492 m and 68 m, respectively. The yield calculation from compressive strength of Cretaceous Bulguksa Granite and the estimated cavity radius was 298 ± 27 kton which was relatively bigger than results of other studies approximately by 100 kton.

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