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2.3-P19. Source-Time Function Scaling of Underground Nuclear Explosions

In 1993 Ziolkowski developed an equation for the scaling of source-time functions of explosions. This theory has been applied successfully to the three North Korean nuclear tests of 2006, 2009 and 2013, recorded at the seismic station at Mudanjiang, China. When two underground explosive devices of different size are detonated at different times but at the same location and recorded at the same seismic station, the paths through the Earth are identical. Exploiting this fact, and using the scaling law equation and the two equations for the recorded seismograms, the two source-time functions and the Green's function may be extracted from the data. Using the same theory, we present results using data from a set of underground nuclear tests conducted at the Degelen Mountain Test Site in Kazakhstan, recorded at the UK arrays at Eskdalemuir, Scotland, and Yellowknife, Canada. The source-time functions and the Green's function are extracted from the seismograms of two closely located explosions. This theory is put at risk by comparing the measured seismograms from a third near-by event with synthetic seismograms obtained by convolving the Green's functions with a scaled source-time function. The source-time functions of all three events are those of explosions, not earthquakes.

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