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Time Functions of North Korean Events of 9 October 2006 and 25 May 2009

The announced nuclear tests of 9 October 2006 and 25 May 2009 of the Democratic People's Republic of Korea are located close to each other, on a global scale, and the Green's functions at a teleseismic receiver are essentially the same. The differences in the seismograms, apart from the noise, are caused by the difference in the source time functions – the first event (mb(IDC)=4.1) had a lower magnitude than the second (mb(IDC)=4.5). If the amplitude and period of the source time functions of the events scale in proportion to the cube-root of their energies, it follows that the source time functions of the events are scaled versions of each other. The two seismograms and the scaling law provide three equations which can be solved for the three unknowns: the two source time functions and the Green's function. IDC data are used to obtain the two source time functions and the Green's functions for a number of sites. The method of solution requires spectral ratios of seismograms of the two events. Averaging spectral ratios at different sites increases the signal-to-noise ratio, yielding better estimates of the source time functions. The Green's functions are then obtained by deconvolution.

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