

Absolute Yields of Underground Nuclear Explosions

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The framework developed and presented here provides a new and transportable method to determine the yields of seismically recorded underground nuclear explosions. The key advantage of this method over other methods which estimate absolute explosive yields is that this method does not require any a priori calibration and can be immediately applied to any region of interest. This method uses the source information obtained from the spectral ratios of envelopes of measured seismic coda waves to simultaneously invert for the source parameters describing a set of seismic events including both explosions and earthquakes. The only requirement of this method is that the source region must contain several (>3) seismic sources which have been well recorded ($\text{SNR} > 2$) by a set of shared stations. For regions with only a few events and/or extremely band-limited observations, for which the depths of burial are unknown, an earthquake with a known magnitude may be required to obtain accurate and robust yield estimates. We apply this method to the six declared Democratic People's Republic of Korea nuclear tests and report new independent absolute yield and depth of burial estimates which are commensurate with previously determined source parameters.

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Promotional text

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Oral preference format

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