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# of Source Parameters and Their Uncertainties of Explosion Sources Using Equalization Technique: Application to the SPE Chemical Explosions at NNSS

In this paper, we use equalization of seismograms from nearby explosions recorded at common stations to estimate source parameters. Expressing waveforms O1(t) and O2(t) from two explosions of yield W1 and W2 with corresponding DOB of H1 and H2 as S1(t,W1,H1)*G1(t,W1,H1) and S2(t,W2,H2)*G2(t,W2,H2), respectively where S and G represent the source and Green's functions, we can argue that seismograms constructed by convolving the first event seismogram O1 with S2 and the second event seismogram O2 with S1 are nearly identical provided the DOB and distance differences between events are small. Green's functions in this algorithm are empirical and can include the effect of lateral structure, complex geology, and attenuation along the wave-propagation paths. When source parameters W and DOB of one explosion are known, this equalization algorithm will allow to solve for the yield and DOB of the other event, employing a grid-search technique. One can further use a specified tolerance to equalize seismograms and estimated the uncertainties in the source parameters. Results will be presented from our on-going study in which we have successfully examined the validity of the algorithm using waveforms from five chemical explosions of the PHASE I Source Physics Experiment with known yields and DOBs.

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