

Comparing Modeled and Observed Infrasound Signals from the Source Physics Experiment Tests 2 and 3

Kyle R. Jones¹, Rod W. Whitaker², Stephen J. Arrowsmith²

Sandia National Laboratory¹ and Los Alamos National Laboratory²

Abstract

The overall mission of the Source Physics Experiment is to improve upon and develop new physics based models for underground nuclear explosions using scaled, underground chemical explosions as proxies. Jones et. al, (AGU 2013) previously presented results describing the use of the Rayleigh integral (RI) to model the source region of the SPE explosions. These results showed that the source region could be easily and accurately modeled using the RI. We follow-on to this work by analyzing and modeling infrasound data collected during SPE-3. This test was designed to be as similar as possible to SPE-2 and although the tests were similar in yield, we observed a reduction in peak acceleration and pressure amplitudes. We hypothesize that this could be due to the “damage zone” from the previous test.

This work was done under award number DE-AC52-06NA25946. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.