

# of the P/S Discriminant at Local Distances Using Simulated Waveforms

Wednesday, 21 June 2023 09:37 (1 minute)

The impact of wave propagation effects on the performance of the P/S ratio local discriminant is being evaluated during the third phase of the Source Physics Experiment, the Rock Valley Direct Comparison (RV/DC), conducted at the Nevada National Security Site. During the experiment a chemical explosion will be detonated near the hypocenter of a shallow earthquake. The direct waveform comparison on a dense network of seismic sensors will enable the investigation of seismic source signatures and discrimination between explosion and earthquakes sharing the same propagation path. We used high-frequency (0-10Hz) ground motion simulations to emulate the RV/DC experiment in order to investigate the generation and propagation of seismic waves at local distances, and the performance of the P/S source discriminant. The numerical experiments were performed using high-performance computing and a local velocity model with correlated depth-dependent stochastic velocity and density perturbations, that are needed for simulating wave scattering on a frequency range of monitoring interest. We found that at local distances the P/S discriminant is strongly affected by the degradation of the radiation pattern of source generated P and S waves due to wave path effects in the shallow crust, and that network averaging improves the overall discriminant performance.

## E-mail

pitarka1@llnl.gov

## Promotional text

The SPE RV/DC project addresses the goal of development and testing seismic source discrimination techniques. The experiment will provide ground truth data needed for calibrating existing source discrimination techniques and improvements of physics-based waveform modeling tools.

## Oral preference format

in-person

**Primary authors:** Mr PITARKA, Arben (Lawrence Livermore National Laboratory (LLNL)); Mr WALTER, William R. (U.S. Department of Energy, National Nuclear Security Administration)

**Presenter:** Mr PITARKA, Arben (Lawrence Livermore National Laboratory (LLNL))

**Session Classification:** Lightning talks: P2.1, P2.3, P4.4

**Track Classification:** Theme 2. Events and Nuclear Test Sites: T2.3 Seismoacoustic Sources in Theory and Practice