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## Distributed Acoustic Sensing to observe seismicity from underground chemical explosions

Several series of explosive experiments aimed at understanding the signals from underground chemical explosions have included seismic observations made using Distributed Acoustic Sensing (DAS). In all experiments, the spatial density of DAS provided an unprecedented context for exploring topics such as geomaterial response over the course of an explosive experimental series, the influence of geologic heterogeneity on the wavefield, and the relative influence of source versus propagation effects on measured seismic signals. These results have broadened scientists' empirical experience with DAS across a range of variables including chemical explosive type, yields, geologies, scaled ranges and scaled depths of burial. This work reviews DAS performance in three explosion series to explore the role of DAS for use in characterizing chemical explosion phenomenology. A comparison of select DAS results with traditional seismic measurements of the chemical explosions and historical theory for underground nuclear explosions revealed that the trends in the DAS observations may be valuable for enhancing seismic monitoring.

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