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## Explosion Monitoring with Distributed Acoustic Sensing: Insights from the NORFOX Fibre Array

Distributed Acoustic Sensing (DAS) is revolutionizing seismology by repurposing existing and purpose-built fibre cables as seismic sensors. While DAS faces challenges, such as higher noise levels and single-component limitations compared to traditional sensors, it offers significant advantages. These include extensive sensing lengths, high sensor density, and fine spatial resolution. Curved cable paths further enhance sensitivity to various wavefield components, and integrating DAS with telecommunication infrastructure can strengthen traditional seismometer networks for regional explosion monitoring. This study explores the use of DAS for array-based beamforming to improve phase identification and signal-to-noise ratios. Data from the NORFOX fibre array in southern Norway, featuring five curved cable arms with a 3 km aperture, are compared to the co-located NORES broadband seismic array. Recordings of local and regional earthquakes, surface explosions, and thunderstorms show clear P, S, and acoustic arrivals. These events inform the development of array processing techniques, including Frequency-Wavenumber analysis, to estimate slowness and back azimuth of phases. DAS-specific factors like sensor directivity are addressed to optimize monitoring for different phase types. NORFOX demonstrates the potential of DAS as a powerful tool for explosion monitoring.

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