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Baumgarten and Ingolstadt explosions: infrasound observations from ground truth sources in Eastern Austria and Southern Germany

Two heavy explosions occurred in Eastern Austria and Southern Germany at gas/oil facilities within less than one year, being detected at dense surrounding seismic networks and remote infrasound arrays. The Baumgarten explosion on 12 December 2017 showed clear seismoacoustic arrivals to distances of 150 km at the seismic AlpArray network and sparse, and hence weak, seismic signals, and an isolated infrasound arrival at an Hungarian array. The Ingolstadt explosion on 1 September 2018 generated clear seismic phases at the nearby GrÃ¤fenberg Array (GRF) as well as AlpArray network stations to larger distances. Infrasound phases at several arrays in Central and Easter Europe complemented these observations. In our presentation we report on the analyses of the available infrasound signals using frequency-wavenumber techniques as well as cross correlation analysis to extract relevant waveform parameters of the observed arrivals. With 3D propagation modeling using the ECMWF forecast model for atmospheric specification these parameters are validated as belonging to the respective source. Furthermore the seismic arrivals are used to estimate the seismic magnitude of each explosion to finally compare the seismic and acoustic features generated by both explosions in order to assess our capability for accurately modeling the acoustic arrivals.

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