

## **infrasound propagation following the Ingolstadt explosion (September 1, 2018) recorded by the AlpArray seismic network with high (40km) spatial resolution**

On the first of September 2018, a devastating explosion occurred on the facility of an oil refinery near Ingolstadt, Germany. We analyzed data of 400 permanent and temporary seismic stations within 400 km radius from the explosion site and find strong seismo-acoustic signals on more than 80 seismic stations. Thanks to the dense spatial coverage of the AlpArray seismic network, the infrasound signal generated by the explosion is detectable within 10 - 400 km from the source, with high spatial resolution. The high spatial sampling reveals a pronounced spatial pattern. The event can be localized both by seismic and seismo-acoustic picks, yet the seismo-acoustic location results are significantly more precise. Seismo-acoustic amplitudes are strongly station-dependent, and are affected by the type of installation. Still, the uniform spatial coverage allows us to study the regional infrasound attenuation. We identified three separate acoustic phases with celerities of 332, 292 and 250 m/s, respectively; they probably represent tropospheric, stratospheric, and thermospheric phases, with each of them having its particular propagation direction. Our findings highlight that regional infrasound propagation can be strongly anisotropic due to winds, and that the detection of such events strongly depends on station density and geometry

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