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Regional measurements of infrasound signals from ARIANE-5 engine tests in Southern Germany

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A well-controlled source of repetitive infrasound emissions was previously identified and has been related to development and acceptance tests of the European Space Agencies ARIANE-5 main engine. The propulsion testing facility of the German Aerospace Agency (DLR) near Heilbronn, Southern Germany, is a distance of about 320 km away from the International Monitoring System (IMS) station IS26 in east-southeasterly direction. In the past, signals associated with these propulsion tests could normally be detected at IS26 during winter months, but not during summer months, reflecting the changes in atmospheric conditions between winter and summer.

Over the last year, DLR has prepared to conduct a series of seven propulsion tests which started in November 2011; with interim times between tests of 3-4 weeks it will last until late March or early April 2012. With mobile infrasound recording equipment available at BGR we planned to record the infrasonic wavefield along the path to IS26 at regular distances starting as close as 20 km from the source. Our aim is to study sound propagation from direct paths mainly involving the tropospheric layer through the "zone of silence" to distances close to IS26, where paths through stratospheric layers are followed.

Preliminary results show that during the relevant winter season direct path propagation can be observed to some 40 km from the propulsion test source, even at seismographic stations where the acoustic wave couples into the ground. The tests are also observed at IS26, and waveform duration and f-k-analysis confirm the signals to be associated with the GT-type propulsion tests.