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Long-range infrasound detections from explosions occurred in the Mediterranean area in 2020 as tools to evaluate the IMS network detection capability

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IS42 is one of International Monitoring System (IMS) infrasound stations, located in the Azores islands in the North-Atlantic Ocean.

Stromboli volcano is located in a small Italian island in the Mediterranean Sea. It is probably the world's best-known volcano due its spectacular basaltic explosions interspersed by lava fountains up to 250 m occurring every ≈ 10 minutes. Following the far-field characterization of its continuous explosive activity on infrasound-based analysis, we present here IS42 detections at a source-to-receiver distance of $\approx 3,700$ km and a back-azimuth of $\approx 76^\circ$.

Beirut, located on the Mediterranean coast, is the capital and the largest city of Lebanon. On 4th August 2020 at 15:08 UTC, the city harbour was almost completely destroyed by an enormous explosion caused by the combustion of 2700t of ammonium nitrate. This event was detected in various IMS infrasound stations, including IS42, at source-to-receiver distances ranging from approximately 2,400 km to 8,900 km. We present here the IS42 infrasound detections from this event, as well as from other IMS infrasound stations and compare the detections obtained with the events listed in the Reviewed Event Bulletin (REB) of the CTBTO, in order to evaluate the potential of the IMS network the IMS network capability.

Promotional text

The use of ground-truth data from natural and man-made atmospheric extreme events offers the opportunity to evaluate long-range detection capabilities of the IMS infrasound network. We present here an IS42 study case for the 2020 Stromboli Volcano and Beirut Harbor explosions.

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