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**ABSTRACT**

Infrasound is one of the most active volcanoes on Earth with a continuous explosive activity and persistent degassing close to or at 3-7 km (Roccato et al. 2008). Being an open conduit volcano, its spectacular basaltic eruptions is caused by tectonic phenomena occurring every ~10 minutes (Ripepe et al. 2005) make it probably the world’s best known and best monitored volcano.

On 31st July 2019 at the 14:43 UTC a parasutomatic explosion occurred with an an column that rose almost 5 km above the volcano. This strong acoustic event was detected in several IMS infrasound stations, including IAS42, located on the Aeolian islands in the middle of the South Atlantic, at a distance of about 3.750 km.

We present the large range infrasound detections that allowed us to locate the source based on infrasound with an estimated error of less than 5 km from the ground truth event.

**Keywords:** Stromboli volcano, paroxysm, Infrasound, IMS, IAS42

**1 INTRODUCTION**

Rising from the Tyrrhenian Sea, north of Vulcano (Eolian Archipelago Italy), with an area of 115 km², it is a stratovolcano with a central crater approximately 1.5 km wide and 120 m deep (Fig. 1).

This stratovolcano is characterized by a persistent background of activity, with an average of 100-200 explosive events per day (REPS 2017). The eruptions are mainly strombolian, characterized by plumes rising to 2-3 km above sea level, with the occasional occurrence of ash-laden plumes (Ripepe et al. 2005). The eruptions are usually accompanied by strong infrasound and seismic signals, which are used to monitor the volcanic activity and forecast future eruptions (Ripepe et al. 2013).

**2 METHODOLOGY**

The analysis was performed using the following steps and applications:

1. Data retrieved from the IMS infrasound network.
2. Interactive analysis with IAS-GNCC (http://ias42.mit.edu).
3. Event location based on IAS-GNCC.
4. Event display using Google Earth.

**3 LOCAL OBSERVATIONS**

Stromboli's eruptive behavior is characterized by a persistent moderate explosive activity, with a frequency of 0.35-0.45 Hz, and a duration of 10-15 minutes. The eruptions are mainly strombolian, characterized by plumes rising to 2-3 km above sea level, with the occasional occurrence of ash-laden plumes (Ripepe et al. 2005). The eruptions are usually accompanied by strong infrasound and seismic signals, which are used to monitor the volcanic activity and forecast future eruptions (Ripepe et al. 2013).

**4 DATA RESULTS**

**GPMCC parameters results**

**5 CONCLUSIONS**

- The results obtained for this parasutomatic explosion confirm that IMS infrasound stations are able to detect and locate long-range explosive volcanic eruptions, as enhanced by the collaboration work carried out by IMS and LGS on the behalf of the DMEB Project, by detecting explosive volcanic eruptions based on IMS stations at distances between 500 and 3,000 km from the source.

- Additionally, it was possible to determine a source location based on infrasound data, with the ground truth event located inside its uncertainty ellipse.

- The final results are in agreement with the USGS seismic networks.

**6 REFERENCES**


