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Acoustic infrasound from activity at Volcan de Fuego, Guatemala, during 2018: a baseline for volcano monitoring

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Volcán de Fuego has attracted the interest of the scientific community during 2018 due to its frequent and intense activity, which culminated in a catastrophic eruption on June 3, 2018, the largest of the last century in Guatemala, and one of the largest worldwide. This event resulted in more than 190 casualties, over 250 people remain missing and, 12,000 were displaced. Local and national authorities were confronted with the importance of a reliable and comprehensive real-time volcano monitoring system. Significant efforts have taken place, to upgrade the monitoring network, over the past few months. The national institute responsible for earthquake and volcano monitoring in Guatemala (INSIVUMEH), saw the monitoring network at Fuego increasing from one short-period seismometer before June 2018 to a total of 7 broadband seismic stations and 4 acoustic infrasound array, streaming real-time information to their headquarters.

Here we characterise the infrasound signature of surface activity at Volcan de Fuego to stablish a baseline for volcano monitoring. We gathered infrasound data from two temporary deployments: i) a few days before the events of 3 June and; ii) during 26 November – 3 December, 2018. Moreover, 3 permanent infrasound arrays have been installed at Fuego, , from which data are telemetered s in real-time to INSIVUMEH's headquarters in Guatemala City. Preliminary analysis of these data allows us to identify different classes of signals including: i) Strombolian explosions; ii) Ash-rich Explosion; iii) Gas-rich Explosions; iv) Chugging; v) Tremor and; vi) Lahars. These signals are described here, and characterised in terms of amplitude, frequency spectrum, duration, and energy released, aiming to set a baseline for local scientists at INSIVUMEH to monitor future activity at Fuego.