

EGU2020-11001

<https://doi.org/10.5194/egusphere-egu2020-11001>

EGU General Assembly 2020

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## Volcanic Jet Noise from the Kilauea Fissure 8 Lava Fountain

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Seismic and acoustic signals are important for remote real time and post-eruption analysis of volcanic eruptions. To properly interpret these signals it is critical to connect their characteristics with eruption parameters. In this study, we present an analysis of the infrasound emissions by the sustained lava fountain at Fissure 8 during the 2018 eruption of Kilauea Volcano, Hawaii. This eruption was one of the largest and most destructive events in Hawaii's historic times. Large (35.5 km<sup>2</sup>) lava flows covered much of the Lower East Rift Zone (LERZ) and destroyed property and infrastructure. This activity was dominated by high lava effusion rates at Fissure 8 and lava fountains up to 80 m tall. The energetic output of gas and lava produced sustained, broadband acoustic waves which were recorded by a four-element infrasound array deployed 0.6 km northwest of the fountain. The spectrum of the infrasound is similar to that of man-made jets and is termed volcanic jet noise. We compare the spectrum of the recorded infrasound signal with models developed for man-made jets such as rockets and jet engines. These models predict different spectral shapes for fine scale turbulence (FST), produced by incoherent movement of the gases, and large scale turbulence (LST), produced by coherent instability waves. The dominance of one or the other turbulent noise source is highly directional. We compare the infrasonic signals with observations of fountain properties, such as pyroclast velocity and height, to help understand the jet noise signals and determine quantitative fountain properties from the infrasound. The results of this work will contribute to the understanding of the physics of lava fountain sound generation, its dependence on eruption parameters, and ultimately provide a tool for rapid assessment of eruption style and dynamics.