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# Acoustics of a short strombolian eruption

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Many Strombolian eruptions are characterized by relatively short but intense blasts. The acoustic properties of such eruptions are totally different from the volcanic jets with longer duration because of different physical phenomena generating the sound. The dominant feature responsible for the emanated sound is a front vortex ring which interacts with the emerging shock wave pattern. The strength of both depends strongly on the initial overpressure. The interaction between the high vorticity region of the vortex ring, the emerging shockwaves and the shear layer, make the eddies from the shear layer detach from the supersonic region into the subsonic one, emanating high amplitude pressure perturbations predominantly in a specific direction. The amplitude is observed to reach up to 160 dB during a short period of time. Direct Numerical Simulations of a supersonic impulsively starting jet are performed, analyzing the main structures present in the flow field that lead to the phenomena described.

Unterstanding the relationship between sound wave patterns and vortex strenght will help to find out the overpressure that generated the specific eruption. The results will also be applicable to eruptions which develop into a steady blowing jet.