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Multiparametric approach to unravel the mechanism of Strombolian activity at a multivent system: Mt. Etna case study

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On 5th July 2014 an eruptive fissure (hereafter referred to as EF) opened at the base of North-East Crater (NEC) of Mt. Etna. EF produced both Strombolian explosions and lava effusion. Thanks to the multiparametric experiment planned in the framework of MEDSUV project, we had the chance to acquire geophysical and volcanological data, in order to investigate the ongoing volcanic activity at EF. Temporary instruments (2 broadband seismometers, 2 microphones, 3-microphone arrays, a high-speed video camera and a thermal-camera) were deployed near the active vents during 15-16 July 2014 and were integrated with the data recorded by the permanent networks.
Several kinds of studies are currently in progress, such as: frequency analysis by Fourier Transform and Short Time Fourier Transform to evaluate the spectral content of both seismic and acoustic signals; partitioning of seismic and acoustic energies, whose time variations could reflect changes in the volcanic dynamics; investigation on the intertimes between explosions to investigate their recurrence behaviour; classification of the waveforms of infrasound events. Furthermore, joint analysis of video signals and seismic-acoustic wavefields outlined relationships between pyroclasts ejection velocity, total erupted mass, peak explosion pressure, and air-ground motion coupling.
This multiparametric approach allowed distinguishing and characterizing individually the behavior of the two vents active along the eruptive fissure via their thermal, visible and infrasonic signatures and shed light in the eruptive dynamics.