



Space-time variations of low-frequency seismic and infrasound signals before and during the 2008 Mt. Etna eruption

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Long Period (LP) seismicity, including volcanic tremor and the LP events, has been recognized in several volcanoes as a precursory phenomenon for eruptive activity. Seismo-volcanic and infrasound records, collected on Mt. Etna volcano during 2008, show that the last eruption (still ongoing) starting on May 13, 2008, was preceded by significant variations both in the medium- and short-term of this kind of signals. The most significant changes are observed in the LP frequency content (monochromatic events show a spectral peak shifting from 0.7 to 1.5 Hz) and tremor locations, about two months before the onset of the eruption. Further changes were also recognized about 7 days before. After the beginning of the eruption LP events return polychromatic with a spectral content ranging from 1.0 to over 8.0 Hz. Locations of LP sources remained stable at shallow depth below the Bocca Nuova crater until May 11. Between May 11 and 12, some LP events and the infrasound transients were located below the North East crater at shallow depth, where on May 13 developed the upper part of the eruptive fissure. Successively, the number of deeper LP events, located up to 3 km below the summit area, sharply increased. The evidence here reported, also corroborated by ground deformation variations, help to develop a quantitative prediction and early-warning system for effusive and/or explosive eruptions.