



## **Analysis of a highly energetic tremor phase at Mt. Etna, Italy, during the 2002-2003 lava effusion: a dynamical approach.**

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By 26 October, 2002, a 95 days-long lava effusion started at Mt. Etna volcano, Italy. After the beginning of the volcano unrest, a phase of intense volcanic activity occurred in November, 2002, during which volcanic tremor was characterized by highly energetic seismic radiation. This phase of eruptive activity was mostly effusive, interrupting the dominant effusive-and-explosive style of the 2002 - 2003 eruption. Based on the records of a few stations belonging to the permanent seismic network of Mt. Etna, this phase was analyzed using a dynamical approach. Particularly, we computed a significant number of parameters, spectral, stochastic and coming from the theory of non-linear dynamical systems, over 1 minute-long time windows. The time evolution of these parameters was then examined in order to highlight coherent eruptive regimes and transitions between them. Moreover, these transitions were correlated with visual observations from field surveys and images of video cameras collected in 2002, in the framework of the multi-disciplinary monitoring carried out by INGV staff. Our choice of this particular phase of the eruption, with such an evident change in the eruptive behavior, aims at highlighting possible relationships between the volcanic system dynamics and eruptive style. The dynamical approach - based on the "simple" study of volcanic tremor - may provide benefits for the hazard mitigation, in this case at a relatively short timescale.