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Unraveling the volcanic tremor source: the Mt. Etna volcano case of study.

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Although important steps have been made to develop techniques to locate the volcanic tremor sources, as well as to highlight relationships between changes in the volcanic tremor features and variations in the volcano activity, only a few attempts were made in order to constrain the volcanic tremor source mechanism. Indeed, the long lasting nature of volcanic tremor prevents the application of classical waveform inversion techniques used to model LP and VLP sources, especially in volcanoes where tremor is a continuous background signal (such as Etna and Stromboli). The study of volcanic tremor sources is important not only to improve our knowledge in the source processes leading to the volcanic tremor generation, but also to enhance our ability in reconstructing the geometry of the plumbing system.

To get insights into the volcanic tremor source mechanism, we developed a new method based on the comparison between observed and theoretical amplitude values. Here we show preliminary results of these analyses, by using the volcanic tremor data recorded at Mt. Etna, thought a dense 3-C broadband seismic network. In particular, we chose some time intervals with the following features: i) high number of seismic stations properly working; ii) energetic volcanic tremor; iii) high quality of volcanic tremor source locations.

The results obtained will shed further light on the source mechanism of volcanic tremor, a will provide a new method for constraining parameters that are relevant to monitor volcanoes and forecast their activity.