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Eruptive pattern classification on Mount Etna (Sicily) and Piton de la Fournaise (La Réunion)

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In the framework of the European MEDiterrranean Supersite Volcanoes (MEDSUV) project, Mt. Etna (Italy) and Piton de la Fournaise (La Réunion) were chosen as "European Supersite Demonstrator" and test site, respectively, to promote the transfer and implementation of efficient tools for the identification of impending volcanic activity. Both are "open-conduit volcanoes", forming ideal sites for the test and validation of innovative concepts, which can contribute to minimize volcanic hazard.
One of the aims of the MED-SUV project was the development of software for machine learning applicable to data processing for early-warning purposes. Near-real time classification of continuous seismic data stream has been carried out in the control room of INGV Osservatorio Etneo since 2010. Subsequently, automatic alert procedures were activated. In the light of the excellent results for the 24/7 surveillance of Etna, we examine the portability of tools developed in the framework of the project when applied to seismic data recorded at Piton de la Fournaise.
In the present application to data recorded at Piton de la Fournaise, the classifier aims at highlighting changes in the frequency content of the background seismic signal heralding the activation of the volcanic source and the imminent eruption. We describe the preliminary results of this test on a set of data of nearly two years starting on January 2014. This period follows three years of inactivity and deflation of the volcano and marks a renewal of the volcano activity with inflation, deep seismicity (-7km bsl) and five eruptions with fountains and lava flows that lasted from a few hours to more than two months.
We discuss here the necessary tuning for the implementation of the software to the new dataset analyzed. We also propose a comparison with the results of pattern classification regarding recent eruptive activity at Etna.