



## **Can we trust machine learning for automatic early warning systems on Mt. Etna?**

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Volcanic eruptions are usually not easily predictable and this poses a significant hazard not only for exposures to the local population but due to possible presence of tephra also for airline traffic.

The significant investments of the last years in new monitoring techniques and networks have improved our capabilities to sense volcano health, but the path to automatically recognize signs of potentially hazardous unrest is still long.

On the other hand, machine learning is currently living a period of tumultuous growth and it is possible to find its applications practically in all the contexts where there is an overflow of data to be interpreted.

Our aim is to exploit the capability of some innovative algorithms in machine learning to test their reliability in early detecting anomalous signals from the monitoring network before eruption events on Mt. Etna (Italy).

In particular, we evaluate the effectiveness of using long short-term memory models (LSTMs) to learn from the measured signals the complex dynamics of the Etnean volcanic environment. Such models are then tested against real eruptive cases to assess their performance.