

EGU2020-20637

<https://doi.org/10.5194/egusphere-egu2020-20637>

EGU General Assembly 2020

© Author(s) 2020. This work is distributed under the Creative Commons Attribution 4.0 License.



Early warning signals before paroxysmal activity at Stromboli volcano, Italy

Bellina Di Lieto¹, Pierdomenico Romano¹, Roberto Scarpa², Alan T. Linde³, and Agata Sangianantoni¹

¹Istituto Nazionale di Geofisica e Vulcanologia - Osservatorio Vesuviano, Napoli, Italy

²Università degli Studi di Salerno - Dipartimento di Fisica, Salerno, Italy

³Carnegie Institution of Washington - Department of Terrestrial Magnetism, Washington D.C., USA

Mt. Stromboli is an active volcano, located near the coasts of Sicily (Italy), in the Mediterranean Sea. Its volcanic activity is characterized by mild and frequent explosions, sometimes interrupted by occasional episodes of more vigorous activity, which can be accompanied by lava flows and more energetic eruptions, known as “major” or “paroxysmal” eruptions, according to the energy dissipated during the event.

Stromboli produced vulcanian eruptions in 2003, 2007 and July-August 2019, which were well recorded by the INGV monitoring network. In particular the last three events are studied through records from borehole strainmeters, which allow us to infer many details of source dynamics. These events are clearly preceded by a slow strain buildup, starting several minutes before the paroxysms, which can be used in future for civil protection purposes. The eruptions then consist of two or more pulses, with oscillations ranging from several seconds, as in 2007, to some minutes, such as in 2019 and lasting from several minutes to one hour after the explosions.

Mechanisms involved in the triggering process of the vulcanian explosions include an increase of magma flux ascending from sources located from 2 to 5-7 km depths and morphological complexity in the upper feeding system.

A preliminary early-warning algorithm, based on an evaluation of strain rate change, has been defined: it has shown itself capable of ascertain the occurring eruptions minutes before their summit onset.

Valuable information are embedded in the data used in the current work, which could be used not only for scientific purposes but also from civil protection for monitoring reasons. Such a variety of possible usage needs the setting of principles and legal arrangements to be implemented in order to ensure that data will be properly and ethically managed and in turn can be used and accessed from the scientific community.

Particular care is needed in order to harmonize the different rules regarding use of data/information, to identify any potential legal issues related to Intellectual Property (IP) and to

set up clear and consistent principles related to IP Rights.