**TERRA - Tackling seismicity at Etna using Repeating sources, Relocations and Ambient noise monitoring**

Our understanding of processes governing effusive and explosive eruptions has improved over the past decades, but understanding the nature of eruptive activity using seismicity is poorly constrained. Volcanoes produce a wide range of unique seismic signals, providing information on source depth, fluid migration and subsurface processes and structures. Hence, volcanic seismicity is a useful tool used by observatories to understand activity throughout eruptive and rest periods. Many volcanoes show a mixture of explosive and effusive activity, proving difficult for hazard assessment and risk mitigation due to the differing impacts of eruptive style. Mt. Etna is one of the most active volcanoes in the world, and produces a range of eruptive styles, with eruptions varying in length from days to months. Records of eruptions at Mt. Etna date back to 1500 BCE, with a noted increase in volcanic activity over the past 30 years. This high eruptive rate, longevity and variations in eruptive style provides an ideal location to understand links between eruptive processes and seismicity. A substantial seismic network operated by INGV has been in place since 2000, providing a vast catalogue of seismicity. The proposed project 'TERRA', will work alongside INGV to Tackle seismicity at Etna using Repeating sources, Relocations and Ambient noise monitoring. Repeating earthquakes are spatially localised groups of events that are commonly recorded at volcanoes with each type of signal. Ambient noise monitoring will allow a continuous record of velocity changes through several eruptions; this will complement results from relocated and categorised seismicity to further develop understanding of processes before eruptive episodes. The objective of this proposal is to provide novel quantitative constrains on the relationships between seismicity and volcanic processes that govern eruptive styles at Mt. Etna by looking at the temporal evolution of seismicity since 2000.

**UNIPD Supervisor:** Piero Poli

**MSCA Fellow**: Jade Eyles

**Department:** Department of Geosciences

**Coordinator:** Università degli Studi di Padova (Italy)

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