# Title: Tsunami hazard form volcanic sources in the Mediterranean Sea

**Tutor: Prof. Jacopo Selva**

**Co-tutor(s): Prof. Mohammad Heidarzadeh, Dr.ssa Anita Grezio**

# Proposal

# Tsunamis can be originated by multiple sources such as earthquakes, volcanic eruptions, landslides, meteorological events, meteorite impacts, etc. Focusing on volcanic sources, there are different phenomena that, interacting with the sea, can generate a tsunami, such as eruptive phenome like explosions or pyroclastic flows, but also non-eruptive events, such as collapses and landslides. In recent times, many efforts have been made to characterize the tsunami hazard induced by seismic events. However, the potential tsunami hazard associated with volcanoes is less studies, particularly with regard to underwater volcanoes. This project is aimed at taking the first steps towards the quantification of the tsunami hazard from volcanoes in the Mediterranean Sea, considering all the potential phenomena and all the potential volcanic sources in the Mediterranean, with specific focus on submarine volcanoes. The aim is to provide the bases for the quantification of the associated short- to long-term hazard for the identification of potential risk reduction strategies such as the definition of potential mitigation actions as well as the development of early warning systems.

# Research Program

# The research program will start from a study of the tsunamigenic potential of the different volcanoes in the Mediterranean. This includes both the analysis of the potential for the different tsunamigenic phenomena and the characterization of the possible consequent tsunamis along the coasts. In a second phase, the analysis will focus on quantifying the probabilistic hazard associated with the sources with greatest impact, evaluating the potential application of these results for the design of potential risk reduction actions. The studies will focus on the geological and historical characterization of the different phenomena at different volcanoes; on the search for global analogues that can allow a better characterization of local systems; on the study of their tsunamigenic potential through the combined modeling of the tsunami generation and propagation process with numerical simulations, to be carried out on HPC (High Performance Computing) systems; the statistical study of all the data aimed at quantifying the hazard. The doctoral project will be carried out in collaboration with the University of Bath (UK) and the National Institute of Geophysics and Volcanology.

# =================