ENGLISH

Topic/Title

Multi-hazard model for volcanic islands

Proposer (Tutor)

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Research proposal

The research will be focused on the multi-hazard analysis generated by various eruptive and non-eruptive volcanic phenomena in volcanic islands. Indeed, volcanoes generate various hazardous phenomena that may be eruptive, such as pyroclastic flows, tephra dispersion, lava flows, etc., and non-eruptive, such as earthquakes, deformation, tsunamis, etc. Volcanic islands tend to concentrate such phenomena in narrow areas, often generating chains of interconnected phenomena of different natures, which may significantly influence their development and increase their overal impact. Volcanic islands are also often densely inhabited and heavily touristed, generating high risk. Multi-hazard quantification requires quantifying the hazard of different phenomena taking into account potential interactions, considering that the different processes may have peculiar temporal and spatial behaviors, and that may occur both independently and in connection. The project will focus on the development of the methodologies necessary for multi-hazard risk quantifications, through spatio-temporal statistical modeling of different phenomena, quantification of the effects of possible interactions, and physical modeling of different processes through numerical modeling. The project will start with an initial case study centered on the island of Ischia, and then extend to other volcanic islands.

Research Plan

I° year

- Analysis of multi-hazard methodologies.
- Analysis of the state of the art on volcanic hazards at Ischia

- Development of a hazard model for eruptive phenomena in Ischia (tephra, pyroclastic flows, lava flows)

II° year

- Development of a hazard model for non-eruptive phenomena in Ischia (earthquakes, landslides, tsunamis)
- Development of the possible chains of interaction between natural events, and a conceptual model defining the potential intercorrelations

III° year

- Developing a multi-hazard model in Ischia
- Potential extension of the developed methods in other contexts