

Multi-hazard risk assessment of Vulcano island, Italy

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Context

La Fossa cone (Island of Vulcano, Southern Italy) is a 391 m-height composite cone that has been active for the last 6000 years. Volcanic activity has included phreatic, phreatomagmatic, Vulcanian and subPlinian style eruptions. Since the last eruption on 1888-90 the quiescent La Fossa volcano has been characterized by the occurrence of "crises" with strong increases of the fumaroles temperatures, of the gas flux and characterized by variations of the chemical compositions toward more magmatic signatures caused by the release of magmatic gas from the magmatic reservoir. These recent signs of volcanic unrest combined with a complex vulnerability of the island due to uncontrolled urban development and significant seasonal variation of the exposed population result in a high degree of volcanic risk. A multi-hazard risk assessment is, therefore, needed to reduce future potential impacts.

Objectives and Methods

In order to carry out a comprehensive multi-hazard risk assessment of Vulcano island, a variety of key steps are required including:

- *identify the main hazards that characterize the different eruptive styles of the la Fossa volcanic system;*
- *model the vent opening probability based on detailed topographic and bathymetric data;*
- *compile a hazard assessment of the key identified hazardous processes at the most probable vent locations;*
- *assess the exposed elements that could be affected by future eruptive events;*
- *assess various vulnerability dimensions (i.e. physical, functional and territorial) of various systems (e.g. residential buildings, infrastructures);*
- *combine hazard, exposure and vulnerability to compile a multi-hazard risk assessment of Vulcano island.*

Literature

- Biass S, Falcone JL, Bonadonna C, Di Traglia F, Pistolesi M, Rosi M, Lestuzzi P (2016) Great Balls of Fire: A probabilistic approach to quantify the hazard related to ballistics — A case study at La Fossa volcano, Vulcano Island, Italy, *Journal of Volcanology and Geothermal Research*
- Biass S, Bonadonna C, Di Traglia F, Pistolesi M, Rosi M, Lestuzzi P (2016) Probabilistic evaluation of the physical impact of future tephra fallout events for the Island of Vulcano, Italy, *Bull Volcanology*



View of the island of Vulcano

Sites WEB

<https://www.unige.ch/sciences/terre/en/research/physical-volcanology-and-geological-risk/>

Choice of orientation : Geological Risks