

## **Review of multiple hazards in volcanic islands to enable the management of long-term risks: the cases of Ischia and Vulcano, Italy**

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The management of long-term volcanic risks represents a challenge that requires a close cooperation between science and decision-making. This is particularly crucial in volcanic islands, which are characterized by multiple hazards concentrated in a relatively small environment, often associated with a large seasonality of exposure due to tourism. The scientific challenges are mainly the quantification and the characterization of the interactions among the multiple hazardous phenomena that may occur during the different “states of the volcano” (quiescence, unrest, eruption) and the definition of robust methods to forecast the transition between these states. For these topics, the emerging scientific knowledge is often rather limited and uncertain and, also in case it was well constrained, difficult to communicate to decision makers due to its intrinsic complexity. On the other side, the challenge for decision making is to assimilate this uncertain knowledge and translate it into actions.

Here, we discuss the experience gained in two working groups (WGs) in charge of reviewing the state of knowledge about volcanic hazards for the Italian volcanic islands of Ischia and Vulcano to build the scientific ground for subsequent decision making. These WGs, formed within the agreement between INGV and the Italian Civil Protection Department, involved about 20 researchers from INGV and Universities, as well as representatives of the Italian Civil Protection, to facilitate the reciprocal understanding and to address the work toward useful results for decision making. The WGs reviewed all the potential volcanic hazards for Ischia and Vulcano based on literature, results of previous projects, as well as ad hoc audits of other experts on specific topics, and organized a workshop to present the results and receive feedbacks from the extended scientific community.