



Volcanic and related hazards at Ischia Island (Italy): state of knowledge and future perspectives

Jacopo Selva (1), Valerio Acocella (2), Marina Bisson (3), Stefano Caliro (4), Antonio Costa (1), Prospero de Martino (4), Marta Della Seta (5), Sandro de Vita (4), Cinzia Federico (6), Guido Giordano (2), Salvatore Martino (5), and Chiara Cardaci (7)

(1) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Bologna, Italy, (2) Università di Roma Tre, Dipartimento Scienze, Roma, Italy, (3) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Pisa, Pisa, Italy, (4) Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Vesuviano, Napoli, Italy, (5) Università La Sapienza, Dipartimento di Scienze della Terra, Roma, Italy, (6) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Palermo, Palermo, Italy, (7) Dipartimento della Protezione Civile, Roma, Italy

The management of long-term volcanic risks 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.

Here, we discuss the experience gained in one working group in charge of reviewing the state of knowledge about volcanic hazards for Ischia, Italy. Ischia is an active volcanic island within the Neapolitan volcanic district (Italy), along with the Campi Flegrei caldera and Vesuvius. The Ischia volcano has a long eruptive history, lasting more than 70 ka. Last eruption occurred in historical times, in 1302 AD. As most volcanic islands, a long list of potential interdependent natural hazards is related to its volcanic system. Here, we review the state of knowledge regarding the volcanic system of Ischia, with the goal of building an up-to-date and organic picture of all volcanic hazards. We follow a general reviewing scheme based on three steps: i) review of geological/historical activity and the present state; ii) review of available hazard quantifications; iii) development of a conceptual model to provide an interpretative framework in which contextualizing the hazards. The results highlight that quantitative hazard assessments are almost absent for Ischia, even if its historical volcanic activity has been quite intense and many volcano-related hazardous phenomena have affected the island also in very recent times. The conceptual model highlights the central role played by the structure of the Ischia intracaldera resurgent dome in controlling and connecting the different hazards, in terms of both spatial distribution of the sources and temporal cluster of their occurrence. The resulting picture represents an up-to-date, organic, and original synthesis of the state-of-the-art about volcanic hazards of the Ischia Island that highlights the need for deepening the scientific knowledge required for quantitative hazard assessment for both eruptive and non-eruptive phenomena.