



Volcanic hazard assessment at Ischia island

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The present research aims at the assessment of volcanic hazard and risk for the Ischia island areas exposed to the propagation of Pyroclastic Density Currents (PDCs).

The evaluation of volcanic risk is complex because of the lack of a central vent, consequently it has been necessary: a) to subdivide the Ischia island in 56 cells with different probability of vent opening; b) to identify the invaded area for each one of the 56 PDCs simulations; c) to define the risk classes.

Volcanological (past volcanic vents, faults, fumaroles, hydrothermal sources location), geophysical (pattern of ground deformation, Bouguer anomaly) and geochemical data (radon anomalies) have been used to define the probability of vent opening.

The influence of all parameters has been used to define the probability of opening of vents in each cell. The values of probability, normalized over the entire study area, have been subdivided into three classes, identified with the values 1 (low probability of vent opening), 2 (medium probability of vent opening) and 3 (high probability of vent opening).

For each cell, the overlay of the energy cone to the Ischia Digital Elevation Model has been used to automatically detect the invaded areas. In detail, two series of simulations with column collapse height of 50 m for eruptions of VEI = 2 and height of 100 m for eruptions of VEI = 3 energy cones have been used. The higher collapse height for eruptions of VEI = 3 is the main cause of the larger extension of the related hazard classes.

The intersection of hazard digital maps with the exposed value map (population in

2001/urbanized areas) allowed us to classify the whole Ischia area into three risk classes: the highest risk class, located in the northern sector, has an area of about 38 km²; the medium risk class, located in the North and East zone, has an area of 16 km² and the low risk class, located towards the West and South, has an area of 46 km².