Geophysical Research Abstracts, Vol. 8, 00950, 2006
SRef-ID: 1607-7962/gra/EGU06-A-00950


# Lava-flows hazard zonation through a statistical approach

**D. D'Ambrosio** (1,2,*), M.V. Avolio (3), G.M. Crisci (1,3), S. Di Gregorio (1,2), G. Iovine (4), V. Lupiano (3), G. Niceforo (3), R. Rongo (1,3), W. Spataro (1,2)

(1) Center of Excellence for High Performance Computing, University of Calabria, Italy, (2) Department of Mathematics University of Calabria, Italy, (3) Dept. of Earth Sciences, University of Calabria, Italy, (4) CNR-IRPI, via Cavour, 6 - 87030 Rende (CS) Italy, (*) d.dambrosio@unical.it, tel. +39.0984.494875

The specific objective of this work is the definition of a zonation map, showing the susceptibility to lava invasion on the SE Etnean flank (Sicily, Italy), in the area comprised between Zafferana Etnea, Santa Venerina, Mangano, Pozzillo, and "Bocca 1972", Nicolosi, Pedara, Via Grande, Acicatena. The area of study has been chosen according to previous hazard studies, which describe the area as one of the most dangerous (due to possible fracture reactivations). Hazard maps have been obtained through a statistical approach, by simulating a high number of lava flows through the Cellular Automata model SCIARA. Recently, the same model has been applied to cases of lava flows occurred at Mt. Etna, with satisfactory results: simulations in fact correctly predicted the areas affected by the considered real cases. By the way, the model SCIARA was applied for predictive purposes during the eruptive crises of 2001 and 2002, aiming at real-time hazard evaluation. In the present study, to each performed simulation, a weight value (depending on the probability of occurrence of the simulated event) was assigned, based on location and altitude of the source, event duration, lava volume, and event history. The location of the areas characterised by highest probabilities of opening of eruptive vents was first evaluated, on the base of historical, prehistoric and geological records. Such zones were assumed as potential sources of lava flows to be simulated. Subsequently, the main volcanological characteristics were set through proper selection of eruption typology (summit, flank) and location; the most representative physical parameters to be used for simulation were derived from mentioned records. Once source areas and volcanological parameters were defined, a large num-

ber of simulations of lava flows were carried out, in order to realize maps depicting the relative frequency of lava flows affecting the considered areas. The relative weights of the areas involved in the simulations were summed by superposition, thus obtaining a lava invasion hazard map at a resolution of about 65 square meters (i.e. the area of the available DEM hexagonal cell). Obtained results demonstrated the usefulness of the approach in assessing lava flow hazard.