



Some considerations about landslide susceptibility analysis of coastal slopes coming from the case study of the Albano Lake (Rome, Italy)

G. Bianchi Fasani, F. Bozzano, C. Esposito, M. Floris, P. Mazzanti

“La Sapienza” Università di Roma – Dipartimento Scienze della Terra, Roma, Italy

Researches dealing with landslide hazard analysis of coastal areas have to face a peculiar problem since such environments are composed by both subaerial and subaqueous slopes; several studies in the last few years have highlighted the often close relationship between subaqueous and subaerial coastal landslide phenomena (Longva et alii, 2003; Bozzano et alii, 2006) and the frequent instability of both submerged lacustrine and marine slopes (Schnellmann et alii, 2002; Bacon et alii, 2002, Bohannon & Gardner 2004).

The hereby presented case study of the Albano lake is mainly focused on the attempt to improve the landslide susceptibility analysis of one of the above mentioned environments, whereas susceptibility analysis is a synonym of spatial hazard and has to be intended as an evaluation of the weights of the several factors on landsliding. The Albano lake, located about 25 km southeast of Rome, is featured by a volcanic maar depression partially filled with water: its slopes are thus represented by the inner slopes of the multiple maar crater and are composed by volcanic sediments.

The main problem in this kind of analysis is then represented by the difficulty to achieve the same set of information about both the submerged and the subaerial portions of a given slope. The most important input factors are represented by morphometric, geomorphologic, geologic, structural and and geomechanical parameters. While these datasets are quite easily obtainable for the subaerial slopes by common and well-established surveying methods, for the submerged slopes there is usually a lack of information about many of these input data. In fact, only sometimes it is possible to make use of morphometric and geomorphologic data obtained through more or less detailed bathymetric reconstructions and rarely indirect geological data (derived from

side scan sonar surveys or high resolution seismic surveys) or punctual stratigraphic data (from boreholes) are available.

Based on the necessity of considering the whole system submerged-subaerial slope, the possibility of achieving a complete and reliable susceptibility analysis depends on the feasibility of a landslide susceptibility analysis for the submerged slope.

For the case of the Albano lake, in a first step a landslide susceptibility analysis for the subaerial slope has been carried out according to one among the several methods widely tested in the scientific literature (J. Chacòn et alii, 2006). In particular, a GIS based method has been applied taking into account the relations between landslides, geology, structural setting, slope, curvature and aspect. For the submerged part we disposed of a high resolution bathymetry (Lacustrine Digital Elevation Model with a maximum 50 cm resolution) obtained through a multi-beam sonar survey performed in the frame of the project “INGV-DPC V3_1 Colli Albani” by the RU8 (Responsible: F. Riguzzi). Thus we had enough detailed morphometric and geomorphological data regarding the submerged slopes, but no affordable geological and structural data were present. This situation implied an effort to make an attempt to verify the feasibility of a susceptibility analysis of the submerged slopes based only on the available data, but by considering the availability of the subaerial analysis that can be used as a point of reference for evaluating the results. The pros and cons of this attempt will be discussed, considering this case study as a starting point for possible further generalizations.

This research has been funded by the project “INGV-DPC V3_1 Colli Albani” –Task 4-RU12 Università Roma “La Sapienza - Responsible: F. Bozzano.

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