GIS-based automatic system for volcanic hazard assessment

A. Felpeto, **J. Martí**

Instituto de Ciencias de la Tierra 'Jaume Almera, CSIC. c/Lluís Solé i Sabarís s/n 08028 Barcelona, Spain

Assessment of volcanic hazard requires a great amount of information in order to constrain the characteristics of a future eruption, evaluate the spatial probability of hosting a new vent, . . . etc. Furthermore, if later risk analyses are to be performed, a huge amount of socioeconomic data is required. Logically, for all this information to be managed in an efficient way, it should be stored in a Geographical Information System (GIS) framework. But for a GIS to become a useful tool for the assessment of volcanic hazard/risk it is necessary that the system also includes numerical models to simulate the effects of the different types of eruptions.

In this paper, we present a GIS-based automatic system specifically develop for volcanic hazard assessment. The GIS used is ArcView^{TM} 8.2 (ESRI®) due to its widely spread use and to the fact that it allows a high degree of customization through Visual Basic for Applications© (VBA). Numerical models of different volcanic hazards have been integrated into the system. The user can access the numerical models through a customized toolbar. Once one hazard is chosen, the input parameters required by the model can be interactively selected, both over different maps of the volcanic area and numerically. The user can then choose between computing a volcanic scenario (i.e. one single vent) and a hazard map (usually multiple possible vents with different susceptibility). The system then launches the corresponding numerical model and, when it finishes the computation, the result is shown as a new layer in the original map.

The automation of the generation of volcanic scenarios and hazard maps inside a GIS system allows subsequent automation of many risk analyses, as evaluation of economic losses in buildings, crops, ..etc, status of the main roads (for testing evacuation routes), . . . etc. Therefore, integrated systems as the one presented in this paper, will

make GIS a really useful tool for managing volcanic risk.