VolGIS: a new volcano-oriented GIS for multidisciplinary volcano analysis.

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VolGIS is a new volcano-oriented Geographic Information System that makes possible to model and visualize different volcano-related available data in a user-friendly high-resolution visualization environment.

The goal of this project is to create an open-source freeware platform where the user can apply a set of analysis tools to a specific volcanic dataset, or implement others algorithms to make new analyses, in an interactive 3D georeferenced and queryable environment.

Here we present the prototype of VolGIS and its application to a 16-years earthquakes dataset of Mt. Etna. VolGIS allows making a tridimensional earthquakes density analysis at a customizable cell size resolution. It generates 3D isosurfaces that constrain volumes of high earthquakes concentration using the Marching Cubes algorithm. Each analysis can be performed both on the entire area or in a specific zone inside it. VolGIS integrates the possibility to import any map in the system and easily switch from a perspective to an orthographic view, enhancing interpretation.

While at this stage the time analysis is not implemented, we are planning a 4D environment, more suitable to assist volcano monitoring. VolGIS will then be integrated with online available tomographic codes such as LOTOS (for velocity tomography) and MuRAT (for attenuation and scattering tomography) to enhance the ability of users to interpret their results.

We believe that this tool could sharply increase the ability to understand and communicate volcanological phenomena to different end-users such as media, decision and policy makers or the general public.