



From models to advanced 4D visualization tools: Developing a comprehensive framework for collaborative research in physical modelling and hazard assessment of volcanic phenomena

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The use of numerical models in volcanological research and volcanic hazard assessment is indispensable to cope with the variety of processes and interactions characterizing magma evolution and eruption dynamics, which are dominated by non-linear phenomena and cannot be modelled at full scale in the laboratory. However, new multi-disciplinary problems arise when dealing with complex mathematical formulations, numerical algorithms and their implementations on modern computer architectures, so that new tools are needed for sharing knowledge, software and datasets among scientists.

Additionally, the need of communicating the results from complex, physical-based models to the public and authorities requires a further effort to present them in an effective and easy way, while highlighting the strengths and limitations of the approach.

Finally, availability of Geographic Information System (GIS) data represents an issue when numerical models have to be applied to real volcanoes for impact studies.

We are carrying on several initiatives, started during former and ongoing national and European projects, to develop an electronic infrastructure for promoting information transfer in this field of research.

In particular, a web portal, based on a dynamic Content Manager System (CMS), is under construction to host and present physical models and their applications in an extensive way (what is usually not possible in research papers), share numerical codes and simulation datasets and discuss model validation and calibration tests. Moreover, advanced 4D visualization tools have been developed to present model results in a synthetic and effective form. Finally, a web interface to GIS databases has been implemented to share and navigate geographic data. Within this framework, it will be possible to integrate physical model outcomes into a geographic context and access them via an interactive web engine such as Google-Earth.