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Assessing volcanic hazards with Vhub

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Vhub (online at vhub.org) is a virtual organization and community cyberinfrastructure designed for collaboration in volcanology research, education, and outreach. One of the core objectives of this project is to accelerate the transfer of research tools to organizations and stakeholders charged with volcano hazard and risk mitigation (such as volcano observatories). Vhub offers a clearinghouse for computational models of volcanic processes and data analysis, documentation of those models, and capabilities for online collaborative groups focused on issues such as code development, configuration management, benchmarking, and validation. Vhub supports computer simulations and numerical modeling at two levels: (1) some models can be executed online via Vhub, without needing to download code and compile on the user's local machine; (2) other models are not available for online execution but for offline use in the user's computer. VHub also has wikis, blogs and group functions around specific topics to encourage collaboration, communication and discussion.

Some of the simulation tools currently available to Vhub users are: Energy Cone (rapid delineation of the impact zone by pyroclastic density currents), Tephra2 (tephra dispersion forecast tool), Bent (atmospheric plume analysis), Hazmap (simulate sedimentation of volcanic particles) and TITAN2D (mass flow simulation tool). The list of online simulations available on Vhub is expected to expand considerably as the volcanological community becomes more involved in the project. This presentation focuses on the implementation of online simulation tools, and other Vhub's features, for assessing volcanic hazards following approaches similar to those reported in the literature. Attention is drawn to the minimum computational resources needed by the user to carry out such analyses, and to the tools and media provided to facilitate the effective use of Vhub's infrastructure for hazard and risk assessment.

Currently the project is funded by the US National Science Foundation and includes a core development team at University at Buffalo, Michigan Technological University, and University of South Florida, along with a group of collaborators from the international community. The VHub servers reside at Purdue University and the basic software infrastructure (see hubzero.org) is also maintained there.

We invite the volcanological community to get involved with improving and enlarging Vhub's capabilities through the use Vhub's resources and contribution of models, datasets, and any other items that authors would like to share.