A virtual community and cyberinfrastructure for collaboration in volcano research and risk mitigation

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VHub (short for VolcanoHub, and accessible at vhub.org) is an online platform for collaboration in research and training related to volcanoes, the hazards they pose, and risk mitigation. The underlying concept is to provide a mechanism that enables workers to collaborate online and to easily share information, modeling and analysis tools, and educational materials with colleagues around the globe. Collaboration occurs around several different points: (1) modeling and simulation; (2) data sharing; (3) education and training; (4) volcano observatories; and (5) project-specific groups. VHub promotes modeling and simulation in two ways: (1) some models can be implemented on VHub for online execution. This eliminates the need to download and compile a code on a local computer. VHub can provide a central warehouse for such models that should result in broader dissemination. VHub also provides a platform that supports the more complex CFD models by enabling the sharing of code development and problem-solving knowledge, benchmarking datasets, and the development of validation exercises. VHub also provides a platform for sharing of data and datasets. The VHub development team is implementing the iRODS data sharing middleware (see irods.org). iRODS allows a researcher to access data that are located at participating data sources around the world (a cloud of data) as if the data were housed in a single virtual database. Audio-video recordings of seminars, PowerPoint slide sets, and educational simulations are all items that can be placed onto VHub for use by the community or by selected collaborators. An important point is that the manager of a given educational resource (or any other resource, such as a dataset or a model) can control the privacy of that resource, ranging from private (only accessible by, and known to, specific collaborators) to completely public. VHub is a very useful platform for project-specific collaborations. With a group site on VHub collaborators share documents, datasets, maps, and have ongoing discussions using the discussion board function.

VHub is funded by the U.S. National Science Foundation, and is participating in development of larger earth-science cyberinfrastructure initiatives (EarthCube), as well as supporting efforts such as the Global Volcano Model. Emerging VHub-facilitated efforts include model benchmarking, collaborative code development, and growth in online modeling tools.