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'Understanding volcanoes and society: the key for risk mitigation'



The Eruption Forecasting Information System (EFIS) database project

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The Eruption Forecasting Information System (EFIS) project is a new initiative of the US Geological Survey-USAID Volcano Disaster Assistance Program (VDAP) with the goal of enhancing VDAP's ability to forecast the outcome of volcanic unrest. The project seeks to:

- 1) move away from relying on collective memory and towards probability estimation using databases for volcano-forecasting;
- 2) create databases useful for pattern recognition and for answering common VDAP questions;
- 3) create generic probabilistic event trees using global data for different volcano 'types';
- 4) create volcano-specific probabilistic event trees for frequently active or particularly hazardous volcanoes in advance of a crisis;
- 5) quantify and communicate uncertainty in probabilities;
- 6) and support, complement, and leverage existing databases.

A major component of the project is a global relational database, which contains multiple modules designed to aid in the construction of probabilistic event trees and to answer common questions that arise during volcanic crises. The primary module contains chronologies of volcanic unrest. This module allows us to query eruption chronologies, monitoring data, descriptive information, operational data, and eruptive phases alongside other global databases, such as WOVODat and the GVP. The relational database will be populated initially using chronologies of historical eruptive activity from Alaska eruptions. The EFIS database is in the early stages of development and population; thus, this contribution also is a request for feedback from the community. Preliminary data are already benefiting several research areas. For example, VDAP provided a forecast of the likely remaining eruption duration for Sinabung volcano, Indonesia, using global data taken from similar volcanoes in the DomeHaz database module, in combination with local monitoring time-series data. In addition, EFIS seismologists used the beta-statistic test and empirically-derived thresholds to identify distal volcano-tectonic earthquake anomalies preceding Alaska volcanic eruptions during 1990–2015 to retrospectively evaluate Alaska Volcano Observatory eruption forecasts.