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Managing a volcanic crisis using Exupery

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Despite ever increasing efforts to monitor historically active volcanoes many of those are still very poorly or unmonitored, even in highly populated areas. In case of volcanic unrest or even a volcanic crisis quickly assessing the situation is therefore often very difficult due to the little information that is available for that specific volcano. With vastly increasing possibilities in communication technology and managing huge data volumes mobile systems become more and more an option to be used as a crisis management tool in volcanology. This is going to supplement different programs that have supported volcanic crisis management efforts in third world countries in the past that includes sending experts and improving or even installing new instruments around the volcano. One of the main problems especially when quickly upgrading the monitoring system during a crisis is that each instrument usually comes with its own acquisition and processing system. This makes it very difficult to manage the monitoring network and provide an interdisciplinary interpretation of the data with respect to the activity status of the volcano.

Here we present a newly developed volcano fast response system which overcomes several of these shortcomings. The core of the system is a novel database (SEISHUB) that allows for the collection of data of various kinds, i.e. simple time series data like seismic data, gas measurements, GPS measurements, as well as satellite data (SO2 flux, thermal anomaly, ground deformation). Part of the collected data may also come from an already existing network. Data from new field instruments are transmitted through a wireless network that has been specifically designed for the volcano fast response system.

One of the main difficulties with such a multidisciplinary data set is an easy access to the data. This is provided through a common Web based GIS interface which allows various datalayers being simultaneously accessed through a Web Browser. The underlying software is designed in such a way that it only uses open source software, so it can be easily installed on other systems not having to deal with purchasing proprietary software. Aside from this the system provides tools to analyze the incoming data (e.g. earthquake classification, rapid moment tensor inversion, deformation modeling, an automatic alert level system) which are currently under development.