Volcano Observatory Best Practices workshops: First results and future possibilities

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The ISDR system is responsible for:

- Developing a matrix of roles and initiatives related to the Hyogo Framework;
- Facilitating the coordination of actions at the international and regional levels;
- Developing indicators of progress to assist States in tracking their progress towards implementation of the Hyogo Framework;
- Supporting national platforms and coordination mechanisms;
- Stimulating the exchange of best practices and lessons learned; and,
- Preparing reviews on progress toward achieving the Hyogo Framework objectives.
Volcano observatories

- Whether a building or a virtual entity, are the central component in any system for volcano disaster reduction.

- Observatory functions have become vastly more complex over observatories’ 1.5 century history.
Compelling reasons for VOBP workshops

• Volcanic events provide case studies of observatory operations from preplanning through monitoring, event detection, data analysis, messaging, and external interactions that had positive or negative effects on outcomes.

• For many individual observatories, volcano unrest and eruption events are rare, but globally crises are common, so lessons learned need to be shared globally.

• This requires a workshop format with extensive discussion emphasizing procedures and decisions rather than science.

• Additionally, observatories vary in strengths and weaknesses. VOBP workshops will develop a network of observatories to provide mutual support in crises.

• The playing field is level for sharing: Whereas developed countries tend to have more infrastructure, developing countries often have more crisis experience.
Volcano Observatory Best Practices Workshop, September 11-15, 2011 Erice, Italy

- A joint project of USGS and INGV with additional support from USAID and IAVCEI and endorsement by GEO and UNESCO.

- Volcano observatory scientists from 27 countries participated – effectively a first World Organization of Volcano Observatories (WOVO) meeting

- Objectives of this effort, intended to become a series on operational themes including instrumentation, communication, risk assessment, etc.
Why there and then?

- Recent eruptions (Eyjafjallajokal, Merapi, Grimsvotn, Cordon de Caulle/Puyehue) highlight volcano risk as an international problem, suggesting the need for a more internationally integrated approach.
- Interest for global experience-sharing among observatory scientists, of a sort that is difficult to accomplish at scientific meetings.
- Growing complexity and cost of modern volcano-monitoring and hazard communication, precluding a go-it-alone approach.
- Availability of an ideal venue, Erice, for an in-depth discussion.
Plan of meeting

• Focused on near-term eruption forecasting, the most critical observatory function that may be actionable in terms of either initiating or averting evacuation.

• Discussions were divided among categories: 1) long dormant volcanoes; 2) frequently active volcanoes; and 3) calderas.

• A comprehensive report on deliberations and conclusions is in preparation.

• Assumed essential criterion: Make certain that scientists directly involved in rapid data interpretation and communication during a crisis are there, rather than the best known scientists from the richest countries.
Some agreed-upon best practices (not yet reviewed by participants)

• Use risk-based prioritization of monitoring investments to establish resilient (minimally redundant), multi-parametric monitoring networks.

• Regularly populate open-access databases to provide efficient access to up-to-date knowledge of unrest dynamics.

• Maintain research-grade monitoring at laboratory volcanoes, where new techniques can be developed and shared internationally.

• Carefully communicate the uncertainties in a forecast along with the forecast (e.g., probabilistic forecasts if culturally appropriate) to civil and/or military authorities responsible for crisis management.

• Recognize and protect the role of observatories as the single authority for public information concerning hazards and forecasts.
Some general characterizations from discussions

- Long dormant volcanoes: Usually reliable precursors; extended period of unrest involving rock fracturing and drying-out of hydrothermal system; high CO$_2$ flux and deep LPs appear diagnostic of recharge following dormancy; past history is still best guide to size of impending eruption.
Some general characterizations from discussions

• Frequently active volcanoes: Time-scale for onset of eruption can be minutes; forecast of start and stop may not be possible; main challenge is to forecast dangerous change in eruptive style due to new magma from depth.

EVACUATION END: 5 MINUTES BEFORE ERUPTION
Some general characterizations from discussions

• Calderas: Problems are frequency and strength of unrest and huge range in size of eruptions; false alarms are likely and progressive steps of warning and response are required; the strongest unrest experienced previously without eruption is not a level that can be considered safe.
What comes next?

• Writing and publication of a document representing our consensus on best practices in short-term forecasting.

• This meeting is a “proof of concept experiment”. If successful, this can begin a series on best practices workshops.
The future of VOBP workshops

• Besides near-term forecasting, many other topics deserve global discussion among observatories: best practices in instrumentation, hazard assessment, messaging, eruption modeling, scenario development, response planning, etc.

• Exchanging information globally and encouraging adoption of best practices among observatories requires a global organization, logically WOVO or GVM.

• A model exists for more proactive coordination than WOVO has thus far been able to provide: World Meteorological Organization (WMO), which promotes performance of Volcanic Ash Advisory Centers (VAACs) as satellite-based observatories for aviation.

• GVM, an internationally funded entity, could among its functions similarly promote development of best practices among ground-based observatories who serve both impacted communities and as an early warning to aviation.
SUMMARY

• Erice 2011 was a successful “proof of concept experiment”.
• Continuation as a workshop series will require pooling of resources internationally.
• For this and for other functions, we need an international organization for volcanic disaster risk reduction that can deal with other international organizations as a peer.