A Warning System for Active Volcanoes and Response to Warnings

Dr. R.S. Punongbayan
Department of Science and Technology
Philippine Institute of Volcanology and Seismology

Abstract

The final and crucial component of all volcanic disaster mitigation efforts is the response of the public concerned (policy makers, civil defense officials/workers and endangered inhabitants) to long-, medium- and short-term warnings. Forecasts, no matter how accurate and timely, are meaningless and useless in mitigating disasters if these fail to stimulate appropriate protective actions. Our experience to date has shown that responses to long term forecasts and warnings which have windows of years to decades ahead usually vary from indifference, scepticism to outright hostility. Long term mitigation measures such as restricting land uses and development activities in active volcanoes with fertile or rich resources are often unpalatable. Similarly, medium term (weeks to months ahead) and short term (hours to weeks ahead) forecasts and warnings have been received with indifference, scepticism and hostility. However, our experience at Pinatubo Volcano in 1991 demonstrated that these initial responses could and should be overcome through painstaking public education and information dissemination efforts initiated by the scientists themselves and subsequently sustained by civil defense officials, the enlightened media representatives, non-government organizations and other sectors concerned.

The Pinatubo Volcano eruption experience in 1991 can be considered a success warning system story: the unrest was diagnosed early enough; the hazards were identified and the vulnerable areas were forecast, based on interpretation of the historical and geologic record of the volcano's past eruptions; the most destructive phase of the eruption was predicted; timely warnings were issued; key civil defense officials and disaster response workers, though sceptical at first, were eventually won over to the cause of disaster mitigation and helped to override/overcome the scepticism or hostility of their colleagues and those of the endangered communities; the majority of the inhabitants at risk were evacuated on time. Thus, the human losses were small despite the magnitude and violence of the eruption, which is one of the world's largest this century.

The factors that make the Pinatubo story a classic are not only its success factors but also its near-misses - the things that could easily have gone wrong but luckily did not, which provide valuable lessons for developing warning systems in particular and volcanic risk mitigation plans in general. The positive aspects of the experience highlighted the following: the value of state-of-the-art monitoring equipment/techniques, international co-operation and intensive public education on volcanic hazards; the active involvement of scientists in awareness promotion and warning dissemination; the open and speedy communication lines between the science people on the one hand and the civil defense officials on the other; and good relations between scientists and the media. The near-misses or the potentially negative aspects of the experience underscored the need to conduct geologic data base studies and hazard zonation on all active volcanoes long before the onset of unrest. We were lucky because Pinatubo gave us sufficient lead time to study and forecast its climatic eruptions and to warn/educate the sectors concerned into taking appropriate protective actions. We know that we will not always be as lucky. So we intend to pursue long-term studies of all our active volcanoes and try to design a Pinatubo education campaign that would erode indifference, scepticism and hostility to long-term volcanic disaster mitigation.