



## **Communication between scientists and civil authorities, and the links with Knowledge and Responsibility**

Paolo Papale

Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Pisa, Italy (paolo.papale@ingv.it)

The issue of communicating volcanic hazard evaluations to civil authorities is becoming increasingly relevant, as the world itself is evolving towards more complex relationships in the process of understanding, anticipating, and reacting to natural disasters. Although different cultures and societies may largely differ in their perception of the roles of scientists, there is an increasing need for an international reference, or shared best practice, for communications by scientists to the society. I review the current methods adopted for volcanic hazard communications worldwide, and analyse them in terms of their informative contents, that I refer to as Knowledge, and the implicit Responsibility they involve. In general, volcano scientists' communications do not allow to discriminate between observations and inferences, providing messages that can be misleading; furthermore, the level of responsibility implicit in those communications appears unjustified given the scientific and technical competence of volcanologists. Discrete alert level systems, such as colour codes, bring about much of that criticism: they can be useful as a quick and synthetic means of communication when they refer to pure observations, but dramatically miss to communicate the large uncertainties which dominate scientists' forecasts, over which most alert levels are based; de facto giving to scientists, when they change level, the role of decision makers. I conclude that different means of communication should be established, fully accounting for the uncertain nature of volcanic hazard evaluations; and that decisions on current alert levels, especially when they significantly impact people and infrastructures, should be made by politicians, after they are fully and correctly informed by a variety of experts far exceeding just volcano scientists. One immediate consequence is that preparedness implies the set up of much more complex systems with respect to those put in place at most potentially dangerous volcanoes in the world.