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



A new generation of volcano hazard maps in Chile: the Villarrica and Osorno case-studies

Felipe Flores; Luis Lara¹

¹Servicio Nacional de Geología y Minería

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As mitigation of risk becomes more complex, the hazards assessment has to evolve and new ways should be explored. Here we discuss a new series of volcano hazard map intended to help on both crisis management and land planning at local scale. In this new series we try to get together the best of the existent methodologies. Thus, from more traditional hazards maps (based on field geological evidence and worst scenarios) we take the relevance of a good stratigraphic record from what we obtain frequency-magnitude relations. From the most recent modeling tools we take the advantage of forward analysis based on controlled border conditions. As a result, these new 1:25,000 scale maps (for basins or half a volcano) are envisioned as useful tools based on eruptive scenarios, which in turn are defined from geological evidence. Quality and potential use of these maps depend on the accuracy of digital elevation models, (2) the existence of basic knowledge about the geological evolution of a volcano; and (3) the availability of a high resolution stratigraphic record from what relative probabilities can be obtained. In order to generate a more useful map for decision makers we also incorporate data representing exposure (population, infrastructure) in the area. We test this new kind of cartographic representation with two case-studies: the lahar inundation (micro-zoned hazard) map of the northern flank of Villarrica Volcano; and the map for Las Cascadas village in the southern flank of Osorno Volcano. The results show that, in general, very high and high level hazard zones are smaller (in area) than those of the current regular hazard maps. And as a consequence, some crisis in the future can be managed with minor disruption for the local communities keeping the restrictions at a level supported by data and models.