

Contribution of Volcano Monitoring to Public Health, Education, Tourism and Economic Development in Argentina.

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Volcano monitoring does not necessarily imply a research study. Monitoring involves the attention to instrumental maintenance-control, measurement and analysis for 24 Hrs, the 365 days a year. Each volcano has its own characteristics and signatures that combine the features of the cyclicity of eruptive episodes, geochemistry of magma and gas, seismicity, and deformation. To understand their behavior, not only geological and geochronological research are necessary but a permanent seismological monitoring record for at least two years even during inactivity. If previous long term monitoring had been developed, the harmful effects of the eruptions of the Volcanoes Hudson (1991), Copahue (2000 and 2012-presently active), Chaiten (2008-2009), Cordon Caulle (2011-2012) could have been diminished or prevented. The duration of the activity and the likely volumes of ash fall, based on the direction of prevailing winds, (according to the seasonal meteorological conditions, could have prevented farmers and cattle breeders to reduce exposure of livestock and crops to ashfall. Human health impacts affected a large population living in the regions of the extra-Andean Patagonia. Moreover, psychological assistance could have been planned for vulnerable families in schools and hospitals. Preventive health care, integrated with a civil protection preparedness in communication with the scientific monitoring center, should be programmed. The self-evacuations, homes and workplaces abandonment, livestock losses, tourism and flights cancellations affected the imbalance of regional economies, mainly in the Argentine Patagonian provinces of Santa Cruz, Chubut, Neuquen and Rio Negro. In 1991 the Hudson Volcano expelled between 4 to 6 km³ of ash from August 11th to 15th, leaving tephra deposits covering an area between 80,000 and 150,000 km², one of the largest deposits of tephra in history. During 2008, Chaiten volcano ejected about 0.2 km³ (DRC) of tephra and Cordon Caulle Volcanic Complex during the first 27 hours of the start of its activity in 2011, expelled from 0.2 to 0.4 km³ of magma (DRE). The Civil Protection system, the provincial government authorities and the Nation can work in coordination with a National Volcano Observatory (still inexistent in Argentina) led by professionals and technical specialists in the various areas comprising the volcanic monitoring. During the 2011 Meeting of the VOBP and WOVO held in Sicily, it was stated that every volcano should be monitored by seismology, deformation and gas, ash and water geochemistry. None of these parameters is independently sufficient diagnostic as an eruptive volcanic forecast. The volcano monitoring in permanent interaction with Civil Protection applied to public health, education, tourism and the regional economies is an outstanding debt on Argentina society.