



Cities on Volcanoes 9
November 20-25, 2016
Puerto Varas, Chile

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



Breathable particulate matter hazard generated in the Calbuco eruption, 2015

Lizette Bertin¹

¹Servicio Nacional de Geología y Minería

Keywords: Particulate Matter, Calbuco volcano, volcanic ash, hazard, cristobalite.

Calbuco volcano (41 ° 25 ' S), Southern Volcanic Zone (ZVS), entered into subplinian eruption in April 2015, which was distributed in 2 pulses (22 and 23 April), with eruptive column of ~15 km, and emission of a weak plume (24-30 April) , less than 3 km . The eruptive event ejected into the atmosphere 0.35 km³ of tephra, and had a NE dispersion.

Particulate matter that can enter the respiratory system, and potentially be harmful to the health of humans and animals, corresponds to particles smaller than 15 microns (PM15), and smaller than 4 um (PM4) which are able to enter the breathing system. The occurrence of respirable particulate matter in tephra depends on volcanic and atmospheric factors.

The percentage of breathable ash deposited at different distances from the volcano was measured using the laser particle size analyzer Mastersizer 2000 from the University of Chile. The fine ash corresponds to glass and cristobalite, labradorite, augite and magnetite.

During the pulses 1 and 2, fine ash was deposited >200 km from the volcano with direct relation of the breathable fraction (22% <MP15) and the distance from the volcano due to the efficiency of wind transport of prevailing northern winds. During the weak plume, fine ash was deposited in proximal sites (15 km), with high concentration of respirable material (28% <MP15), due to wind selection was less efficient, produced by a lower wind speed.

The presence of cristobalite and the amount of respirable fine fraction ejected in the eruption was a potential health hazard in distal areas to the volcano. However, the short duration of the eruptive event and subsequent precipitation caused a short inhalation time and did not constitute a risk.