

Effects of April 2015 Calbuco volcano eruption in surface and rain waters

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The Calbuco volcano eruption started in 22 April 2015, producing pyroclastic flows and lahars, which were channelized along diverse valleys, where abundant surface run-off flow downslope are present. The increasing in the sedimentary load of those surface run-offs produced an increment in the total of dissolved solids (TDS), especially in elements and compounds as sulphate, chlorine, calcium and sodium. However, the highly relevant effect was the increment in the arsenic concentration in Blanco and Este rivers (NE and S flanks of the Calbuco volcano, respectively), the former strongly affected by the pyroclastic flows. The concentration reaching up to 0.026 and 0.015 mg/l for Blanco and Este rivers, respectively, 20 days after that eruptive activity started, exceeding the value recommended by the World Health Organization (WHO) for the arsenic in the water, corresponding to 0.01 mg/l. Additionally, rainfall water was sampled before and during the eruption process, being observed slight increments in the acidity of water, TDS values and concentration of chlorine, sodium, iron and zinc in samples taken during the eruption. A rainwater sample taken directly under the gas/ash plume, presented diverse elements not detected in other rainwater samples, corresponding to copper, aluminium, lead and boron. No elements presented concentrations over the limits recommended by the WHO in the rainwater samples, with the only exception of the arsenic, which concentrations ranged 0.072-0.22 mg/l. However, the high concentrations of As have been observed also in pre eruption samples, and there is no evident increment in the As contents for rainfall water samples taken during the eruption. New samples have been taken after that eruptive process ceased, in order to control the changes in surface and rain waters, and verify if the changes have been permanent or temporary.