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

## Total ice volume on the most active volcanoes of Chile

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In Latin-America there are 42,368 inventoried glaciers in 2015 with a total area of 31,173 km<sup>2</sup> of ice. Nearly 45% of this glaciated area is located at the Southern Patagonia Icefield (SPI) shared between Chile and Argentina, and nearby glaciers. Apart from these ice masses, Chile has 18,869 glaciers with a total area of 12,583 km<sup>2</sup>. Among these glaciers, many are located on top or at the flanks of volcanoes, including near 50 of the most active volcanoes listed by SERNAGEOMIN of Chile. Up to now, there are preliminary estimations of the glacier areas, and in many cases, their changes in recent decades, but very little is known about the ice volume storage on each volcano. To tackle this knowledge deficiency, we have estimated the total ice volume storage on the Chilean active volcanoes, by applying different models including area scaling approaches that relates glacier areas, altitudinal ranges and glacier lengths with total ice volumes. This approach has been applied to global data sets based upon the Randolph inventory, however, we have detected that when applying this inventory to Chilean glaciers this database has high uncertainties due to the use of satellite images with too many temporal snow areas that can be misinterpreted as glaciers. In order to estimate a more constrained model, we have used the most recent glacier inventory in the country and all available ice thickness measurements (utilized for calibration purposes), including tens of glaciers measured by CECs using helicopter-borne systems. By analyzing historical data (mainly satellite imagery) we have also estimated the ice volumetric changes undergone by these ice-capped volcanoes in recent decades.