



## **Reconstruction of glacial changes on HualcaHualca volcano (southern Peru) from the Maximum Glacier Extent to present.**

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Little is known about glacial area changes in the Peruvian glaciers and how responds to climate fluctuations especially in the arid region where ice masses represent the major water supply. In this research, we present the results related to glacier area, volume and minimum glacier altitude evolution from the Maximum Glacier Extent (MGE) to 2000 on HualcaHualca volcano ( $15^{\circ} 43' S$ ;  $71^{\circ} 52' W$ ; 6,025 masl), a large andesitic stratovolcano located in the south-western Peruvian Andes approximately 70 km north-west of Arequipa.

We focused the study in four valleys (Huayuray, Pujro Huayjo, Mollebaya and Mucurca) because preserved a complete and well-defined sequence of glacial deposits. Moreover, these valleys, with the exception of Mucurca, still retain ice masses relegated to active cirques on summits areas so has been possible to reconstruct glacier recent dynamics.

To reconstruct former glaciers, we used frontal and lateral moraines while delimitation of recent ice masses was based on the analysis of aerial photographs (1955) as well as Landsat satellite scene (2000). Geographical Information System (GIS) allowed map and quantify with high accuracy glacier spatial parameters.

The magnitude of glacial expansion was highest during MEG in Huayuray, where the glacier reached 22.7 km<sup>2</sup> of extension and the front ice was situated at 3,650 masl, than in Pujro Huayjo (23.8 km<sup>2</sup>; 4,300 masl), Mollebaya (17.8 km<sup>2</sup>; 4,315 masl) and Mucurca (8.0 km<sup>2</sup>; 4,350 masl). The cause of this difference has been associated to the control exercised by topography. Glacier of Huayuray flowed by a steep slope while mass ices of Pujro Huayjo, Mollebaya and Mucurca slipped to the Altiplano. In the other hand, the data from 2000 show that the intensity of deglaciation was more drastic in Mucurca, where glacier has already disappeared, than in Huayuray (1.2 km<sup>2</sup>; 5,800 masl), Pujro Huayjo (1.8 km<sup>2</sup>; 5,430 masl) or Mollebaya (0.95 km<sup>2</sup>; 5,430 masl) as a consequence of it's lesser glacier entity.

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