Geophysical Research Abstracts
Vol. 14, EGU2012-3755-2, 2012
EGU General Assembly 2012

The deglaciation of Iztaccíhuatl volcano (Mexico) from the Little Ice Age maximum to the present, determined by photogrametry and lichenometry

D. Palacios (1), L. García-Sancho (2), J.J. Zamorano (3), N. Andrés (1), and A. Pintado (2)

(1) Dep. AGR y Geografía Física. Universidad Complutense. Madrid. Spain, (2) Dep. de Biología Vegetal II, Universidad Complutense, Madrid, Spain, (3) Instituto de Geografía, UNAM, México Df. México

Iztaccíhualt Volcano (19º10'20"N, 98º38'30"W, 5230 m asl) preserves an important moraine complex from the Little Ice Age (LIA), which stretches to 4300 m asl. These moraines are different from former ones because they are not covered by ash fall from the last plinian explosive phases of the nearby Popocatépetl volcano. In fact, the last emission of those pyroclasts took place during the XI century (Vázquez-Selem, 2000). The summit area of the Iztaccíhualt volcano still has glaciers whose terminus are located around 5000 m asl. From the end of the LIA until present the glacier terminus have ascended 700 m.

To study the deglaciation process in Iztaccíhualt volcano from the LIA maximum to present, the Ayoloco valley was selected as it is the most important valley of the western slope of the volcano. Taking this valley as a reference, we determined the limits of glaciers in different dates by georeferencing the aerial and panoramic photographs (from 1897 to 2000) and analysing the 1958 field cartography of the glacial limits (Lorenzo, 1964). On the one hand, we carried out a statistical analysis of the size of the Rhizocarpon geographicum thallus and, on the other hand, we undertook a statistical study of the biodiversity of the lichen species through a number of cross-sections from the lowest LIA moraines to the current glacier snouts.

This methodology allowed dating the exact moment in which the glacier retreated over certain points of the analysed cross-sections and determining the ecesis and the growth curve of the Rhizocarpon geographicum specie. In the Ayoloco valley the average growth rate is of 0.23 mm per year. From this information, we could deduce the evolution of the glacier from the LIA maximum to present.

The results indicate that two main advances took place during the XVII and the XIX centuries. At the beginning of the XX century the glacier terminus were very close to the moraines of the maximum advance. An intense glacial retreat took place during the 40s and 50s, which was however interrupted during the 60s and 70s by a period of stabilization and re-advance. Since the mid-80s, we obreved an accelerated glacial retreat, that increased during the first decade of the XXI century. If this rate of retreat remains, the glaciers from Iztaccíhualt could disappear in 20 years.

Research funded by POL2006-08405 & CGL2009-7343 project, Government of Spain.