



Ten years monitoring ground temperature at Iztaccíhuatl Volcano (México).

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In this work we present the air and soil thermal data collected between the years 2001 and 2011 on the South-western slope of Iztaccíhuatl volcano (Mexico), between 4137 m and 5020 m asl. Iztaccíhuatl (19°10'20"N, 98°38'30"W; 5.230 m asl) is a stratovolcano situated less than 70 km to the Southeast of Mexico City and remains inactive since the end of the Pleistocene. Therefore it has the best glacial record of Mexico. Currently, glaciers are reduced to the summit area above 5000 m asl, but in the past they occupied extensive areas, reaching ~4300 m asl during the Little Ice Age (LIA).

The aim of this work is to determine the soil thermal behaviour of the Southwestern slope of Iztaccíhuatl volcano and on this basis to establish the distribution of periglacial processes. The lack of knowledge on the dynamics of periglacial processes and on the existence and distribution of permafrost in tropical mountains makes this research pioneer for periglacial studies. The method is based on the analysis of air and soil temperature data recorded by the stations installed on the volcano. For each station we have calculated the temperature distribution in relation to depth and for the entire slope we have modelled the variation of the air temperature with altitude. The results indicate that discontinuous permafrost appears around 4900/5000m asl and isolated permafrost can be found around 4600/4700m asl, depending on slope aspect. The intensity of the freeze-thaw cycles is sometimes very strong on the surface but decreases sharply with depth and disappears after a few centimetres into the soil as the action of frost penetrates minimally into the ground. The snow has a minimal influence on periglacial activity as explained by the records of surface temperature of the soil which show that the snow does not remain very long, many years less than 15 days even above 4900 m asl.

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