Title:
Late Glacial and Holocene Deglaciation in the Cordillera Vilcanota-Quelccaya Ice Cap Region, SE Peru

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Abstract:
Rates of deglaciation were modeled for paleoglacier volumes by integrating moraine chronology with a digital elevation model. Three paleoglacier volumes were reconstructed for both the Huancane valley of the Quelccaya Ice Cap and the Upismayo Valley of the Cordillera Vilcanota. A large and small rate of deglaciation were calculated for each paleoglacier to depict the range of uncertainty inherent to the chronology and volume model. The fastest rates of deglaciation were calculated for the most recent paleoglaciers, corresponding to the last few centuries. These results are consistent with other observations in the Venezuelan Andes showing high rates of deglaciation since the Little Ice Age. Modern rates of deglaciation measured on the Quelccaya Ice Cap (Brecher and Thompson, 1993; Thompson, 2000) are accelerating, but do not exceed the rates of deglaciation for the last few centuries. These results also imply that rates of deglaciation may fluctuate significantly over time, and that high rates of deglaciation may not be exclusive to the late 20th century. Moreover, equilibrium line altitude depressions for the local last glacial maximum positions were computed as 220 m for the Quelccaya Ice Cap and 165 m for the Cordillera Vilcanota, significantly less than previously published. These lower values could imply a topographic control over paleoglacier extents.

Brecher, H. and L. G. Thompson, 1993: Measurement of the retreat of Qori Kalis glacier in the tropical Andes of Peru by terrestrial photogrammetry. Photogrammetric Engineering & Remote Sensing, 59(6): 1017-1022.

Thompson, L. G., 2000: Ice core evidence for climate change in the Tropics: implications for our future. Quaternary Science Reviews, 19, 19-35.