

KEYNOTE LECTURE

ANDEAN GLACIER CHANGES DURING RECENT DECADES AND THEIR IMPACTS ON WATER RESOURCES

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ABSTRACT

The Andes have experienced strong and increasing glacier retreats since their maximum neoglacial position that was reached during the Little Ice Age (~150 years BP). Some glaciers along the region have experienced small changes, but in some areas they have almost disappearing like Chacaltaya in the Cordillera Real of Bolivia. The main driving force behind this glacier wastage is climate change, characterised by rising temperatures observed at high elevations where glaciers are located. However, many glaciers are capping volcanoes of the Northern, Central and Southern Volcanic Zones (respectively NVZ, CVZ and SVZ) and thus, have proven also vulnerable to geothermal fluxes and eruptive or explosive events recorded in historical times. As a result, glacier response to climate is amplified by the regional volcanism, usually in the form of enhanced retreat mainly due to surface albedo changes by tephra deposition. The sudden melting of glacier ice and snow taken place in the region is having an increasing hazard to the surrounding human settlements. On-going glacier changes are also affecting long term water runoff availability especially in the areas highly dependent on summer runoff originated by glaciers. Overall, high-altitude tropical glaciers are among the most vulnerable mountain ice masses to ongoing climate changes. In this talk a synthesis of present glaciers scientific knowledge will be presented including a discussion of the possible impacts of glacier area reductions for the hydrological resources availability.