Geophysical Research Abstracts
Vol. 16, EGU2014-6420, 2014
EGU General Assembly 2014

Impacts of glacier shrinkage on water resources of La Paz city, Bolivia (16°S) over the last four decades

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Under tropical conditions, water discharge from glaciers is crucial for water resources in the dry season, as it is the case for La Paz, Bolivia (16°S). In the current study, the glacier water supply of La Paz city has been assessed at annual and seasonal time-scale for the first time thanks to the mass balance analysis of 70 glaciers located within the drainage basins of La Paz between 1963 and 2006. The ice melting has contributed to about 15% of the water resources of the city at an annual scale, 14% in the humid season and 27% in the dry season. Despite the loss of about the half of the glaciers areas during this period, the runoff at La Paz did not change significantly. It reveals that ice melting rise compensated the surface areas decrease. Contrary, assuming that glaciers disappear in the future and precipitation does not change in the catchment areas, the runoff should diminish by about 12% at annual scale, 9% during the humid season and 24% during the dry season.