Geophysical Research Abstracts
Vol. 12, EGU2010-3524-2, 2010
EGU General Assembly 2010

Glacier contribution to flow in two high-altitude streams of the semi-arid Huasco Basin, northern-central Chile

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In the semi-arid north-central Chile, populated lowlands rely on runoff and groundwater recharge generated in the high altitude areas of the Andes mountain range. In spite of its importance in terms of water resources, the water balance in these areas is poorly known. In particular, the relative contribution of the cryosphere components (snowpack, glaciers, rock glaciers) to the regional water balance has not been thoroughly evaluated yet.

We examine the hydrological importance of glaciers in the case of two well-monitored high-altitude watersheds of the Huasco Basin in northern-central Chile (29°S). We use data from a five years glaciological monitoring program to assess the quantity of water that comes from glaciers fusion per watershed. Then, we compare it with the measured discharge at five stream gauge stations located between 2620 m and 3980 m. The results reveal a substantial contribution of the glaciers to the hydrological balance of the study area. At the regional scale, the water balance is dominated by the snowpack dynamics.