



The energy balance of tropical Glaciar Artesonraju, Cordillera Blanca, Perú - AWS-measurements and numerical modeling

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Like in most regions of the world, tropical glaciers in the Peruvian Andes have experienced considerable mass loss during the last decades. In order to better understand and correctly interpret the ongoing glacier changes in this region, we need to examine the driving processes behind these changes. Therefore we installed several automatic weather stations (AWS) in the Cordillera Blanca mountain range. Two of these stations are situated in the ablation area of Glaciar Shallap and Glaciar Artesonraju, while four other stations were established in the vicinity of the two glaciers. The resulting eight year record of meteorological data is analyzed and finally used as input for a physically based numerical energy and mass balance model, which in a first step was applied to the ablation zone of Glaciar Artesonraju (8.96° S / 77.63° W).

In July 2010, eddy covariance measurements were carried out on the glacier surface. The resulting data was used to calibrate the parametrization scheme for the turbulent fluxes of sensible and latent heat. Finally the model output was validated against ablation data from a sonic ranger and from single stake ablation measurements. The model results were interpreted with special respect to the seasonal fluctuation in atmospheric moisture (tropical wet / dry season).