Geophysical Research Abstracts, Vol. 9, 06223, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-06223

Sensitivity of the energy balance to measuring height of input variables

R. Dadic (1), J.G. Corripio (2,1), P. Burlando (1)

(1) Institute of Environmental Engeneering, Swiss Federal Institute of Technology, 8093 Zürich, Switzerland (dadic@ifu.baug.ethz.ch), (2) Institute of Geography, University of Innsbruck, 6020 Innsbruck, Austria (Javier.Corripio@uibk.ac.at)

In the European Alps and in most other areas in the world, the retreat of glaciers is a widely observed fact. It is reflecting the climate change, which is best observable in the temperature rise. Valley glaciers represent storages of water over long timescales and therefore have a large impact on worldwide water resources. Energy balance models help us to understand processes that lead to glacier retreat. However, model results are dependent on the input parameters they are driven with.

In this study, we are analyzing a continuous record of meteorological data from Haut Glacier d'Arolla from 2001–2006. Haut Glacier d'Arolla is a small, temperate valley glacier in southwestern Switzerland. Our data set contains meteorological variables from three automatic weather stations, that are used to drive energy and mass balance models. Two of the weather stations are located outside the glacier and one is located on the glacier. Due to winter accumulation and summer ablation, the weather stations are not at a constant height above the surface, but vary from 1 to 4 m. We are applying corrections to temperature and wind speed using the bulk method to correct the measurements to a nominal height of 2 m. We then compare the energy balance using uncorrected measurements to the energy balance using corrected measurements.

Furthermore, the meteorological data is employed to asses the observed elevation change on the glacier, which is derived from a continuous monitoring of runoff and mass balance. The mass balance is evaluated through ablation/accumulation stakes, snow depth measurements, modeling techniques and the comparison of two recent DEMs.