Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01025, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01025
EGU General Assembly 2008
© Author(s) 2008

On the role of snow sublimation in the alpine water balance

U. Strasser (1), M. Bernhardt (1), M. Weber (2), G.E. Liston (3), W. Mauser (1)

1. Department of Geography, Ludwig-Maximilians University (LMU), Luisenstr. 37, 80333 Munich, Germany (u.strasser@lmu.de / Fax: 0049-89-21806675)
2. Commission for Glaciology, Bavarian Academy of Sciences and Humanities, Alfons-Goppel-Str. 11, 80539 Munich, Germany (wasti.weber@kfg.badw.de)
3. Cooperative Institute for Research in the Atmosphere, Colorado State University, 1375 Campus Delivery, Fort Collins, CO 80523-1375 (Liston@cira.colostate.edu)

In alpine terrain, snow sublimation represents an important component of the winter moisture budget, representing a proportion of precipitation which does not contribute to melt. To quantify its amount we analyze the spatial pattern of snow sublimation at the ground, from a canopy and from turbulent suspension during wind-induced snow transport for a high alpine area in the Berchtesgaden National Park (Germany), and we discuss the efficiency of these processes with respect to seasonal snowfall. Therefore, we utilized hourly meteorological recordings from a network of automatic stations, and a distributed simulation framework comprising validated, physically based models. Meteorological data records were spatially distributed over the simulation domain by means of a quasi-physically based interpolation scheme that accountes for topographic influences on the distributed fields. The applied simulation tools were: a detailed model for shortwave and longwave radiative fluxes, a mass and energy balance model for the ground snow cover, a model for the microclimatic conditions within a forest canopy and related snow-vegetation interactions including snow sublimation from the surface of the trees, and a model for the simulation of wind-induced snow transport and related sublimation from suspended snow particles. For each of the sublimation processes, mass rates were quantified and aggregated over an entire winter season.