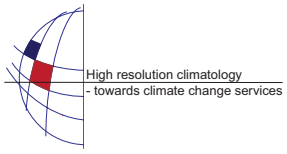
EMS Annual Meeting Abstracts
Vol. 7, EMS2010-295, 2010
10th EMS / 8th ECAC



Modelling sublimation of drifting snow in an Alpine catchment and investigating temperature and moisture feedbacks

C. Groot Zwaaftink and M. Lehning

WSL Institute for Snow and Avalanche Research SLF, Switzerland (groot@slf.ch)

In mountainous regions snow distribution, snow cover stratigraphy, avalanche risk and hydrology are strongly influenced by drifting snow. Several models have been developed to model drifting snow and the snow distribution within catchments. A weakness in most of the existing drifting snow models is the representation of sublimation of drifting snow. No field measurements exist and model estimates vary from a loss of 4 to 70 % of winter snowfall for the Alpine region.

We are improving an existing snow transport model, Alpine3D, by including a module for drifting snow sublimation. The sublimation model could partially be validated in a wind tunnel and accounts for the feedbacks of sublimation on particle concentration, air temperature and humidity.

The model will be applied to Wannengrat, a complex Alpine catchment with steep slopes. For this region, we will estimate the sublimation amounts and spatial variability and address the influence of the feedbacks on air temperature and humidity. Preliminary results show a decrease of deposited snow up to 35% in a lee slope. Averaged over the research area however, a reduction of deposition of only 2 % is seen. Including the temperature feedback influences the deposition on the same order of magnitude as the deposition itself and shows the significance of this feedback. The humidity feedback appears to have an even larger influence on snow deposition. The inclusion of these significant feedbacks will therefore allow us to give a more accurate estimate of drifting snow sublimation in the Alpine region.