Geophysical Research Abstracts, Vol. 8, 09596, 2006
SRef-ID: 1607-7962/gra/EGU06-A-09596

Multi-criteria parameterisation of a numerical forest snow processes model: analysis of parameter uncertainty and governing processes

D. Gustafsson (1), M. Stähli (2), A. Lundberg (3)

(1) Royal Institute of Technology KTH Stockholm, Department of Land and Water Resources Engineering, (2) Swiss Federal Research Institute WSL, (3) Luleå University of Technology, Sweden (davidg@kth.se /Fax-Nr: +46-8-4110775)

Forest snow processes such as snow interception evaporation and the influence of the canopy on snow cover melt are important for the land surface water and heat balance. Difficulties to model snow interception are due to both limitation in the understanding of the governing processes and in parameter estimations. In this study we parameterise a numerical simulation model (Alpine3D) using multiple calibration variables - snow water equivalent, snowmelt, throughfall, and runoff - through a Monte-Carlo procedure, which enables parameter uncertainty estimations and identification of the sensitivity in the model to different processes. The analysis is based on a data from a sub-alpine spruce forest in Alptal, Switzerland. Results show how the multi-criteria approach is able to reduce the number of parameter combinations that fulfil the critera. Further more, it is shown that parameters governing the turbulent exchange from the canopy and the snow cover were most important for the simulation of the snow cover evolution, whereas the runoff and throughfall was more sensitive to direct throughfall and interception capacity parameterisations.