Geophysical Research Abstracts
Vol. 18, EGU2016-14071, 2016
EGU General Assembly 2016

Evaluation strategies for vertical profiles of physical properties simulated by multilayer snowpack models

Samuel Morin, Pascal Hagenmuller, Marie Dumont, and Matthieu Lafaysse
Météo-France - CNRS, CNRM - GAME, CEN, Grenoble, France (samuel.morin@meteo.fr)

Multilayer snowpack models aim at representing processes responsible for the layering of a one-dimensional snowpack, and its time evolution. Their evaluation should ideally not only rely on observations of vertically integrated properties (depth, albedo, snow water equivalent, surface temperature) but also vertical profiles of properties such as density, liquid water content, specific surface area, penetration resistance etc. However, even at well-documented sites where meteorological conditions are monitored with the highest possible accuracy, the direct comparison of simulated and observed profiles has proven challenging. This is due, not only to intrinsic model errors and snow observation uncertainties, which are classically considered, but also to errors of the meteorological observations used to drive the snowpack models and snowpack heterogeneity. These sources of errors stratigraphic mismatches, i.e. a layer at the same depth in the simulated and observed snowpack may not necessarily correspond to the same stratigraphic horizon. In addition, such errors accumulate during the course of a snow season. Altogether, this makes it particularly difficult to disentangle errors due to the snowpack model itself (which is the primary goal of such comparisons) from other sources of errors.

This presentation will review various approaches already developed (e.g. Lehning and Fierz, CRST 2001) and introduce yet-to-implement methods, with the aim to provide a framework allowing improved comparisons between observed and simulated snow profiles, which is a long-lasting need of the snow modelling community.