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Snow model design for operational purposes

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A parsimonious distributed energy balance snow model intended for operational use is evaluated using discharge, snow covered area and grain size; the latter two as observed from the MODIS sensor. The snow model is an improvement of the existing GamSnow model, which is a part of the Enki modelling framework.
Core requirements for the new version have been:
1. Reduction of calibration freedom, motivated by previous experience of non-identifiable parameters in the existing version
2. Improvement of process representation based on recent advances in physically based snow modelling
3. Limiting the sensitivity to forcing data which are poorly known over the spatial domain of interest (often in mountainous areas)
4. Preference for observable states, and the ability to improve from updates.
The albedo calculation is completely revised, now based on grain size through an emulation of the SNICAR model (Flanner and Zender, 2006; Gardener and Sharp, 2010). The number of calibration parameters in the albedo model is reduced from 6 to 2. The wind function governing turbulent energy fluxes has been reduced from 2 to 1 parameter. Following Raleigh et al (2011), snow surface radiant temperature is split from the top layer thermodynamic temperature, using bias-corrected wet-bulb temperature to model the former.
Analyses are ongoing, and the poster will bring evaluation results from 16 years of MODIS observations and more than 25 catchments in southern Norway.