SNOW AND SNOWPACK DYNAMICS: EFFECTS ON CATCHMENT HYDROLOGY IN NORWAY

Jannes Stolte, Bioforsk Soil and Environment
Geoffrie Kramer, University of Minnesota
Helen French, Bioforsk Soil and Environment
Bioforsk Soil and Environment,
Frederik A. Dahl vei 20, NO-1432, Ås, Norway
jannes.stolte@bioforsk.no
Phone: +47 92264121

Climate changes will increase the frequency of extreme precipitation events, floods and snow melt periods. The anticipated climate change effects suggest that the potential for an increase in extreme runoff events will exist disproportionately during periods of soil frost and snow cover. For this reason, winter periods are emphasized within the Norwegian Research Council funded ClimRunoff project. Several factors combine during cold periods to increase the potential for large runoff events, including reduced infiltration capacity due to frozen soils and increased water stored on the landscape in the form of snow. Increasing runoff in spring period also might increase the losses of sediment and nutrients. The capability for accurately modeling catchment-scale hydrological processes during periods of snowpack creation and ablation is currently limited. Research into appropriate snowpack and snowmelt modeling tools is integral to gaining an understanding of the hydrologic processes which occur within a catchment during cold seasons. The project presented shows modeling results using the LISEM model coupled with snow and snowmelt modeling to create a model that can evaluate the run-off situations on small agricultural catchments in Norway for different scenarios. The measurement setup and data will be presented where runoff, sediment and P concentrations have been analyzed during a snowmelt period. The snow dynamics modeling is done using the UEB model. It showed that results from the snowmelt model to predict the snow water equivalent and melt water produces accurate input for the LISEM model to be able to calculate the hydrograph and sedigraph from single events.