Can remote sensing based products improve conceptual snow modelling in ungauged basins?

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Hydrological modelling in mountainous catchments can be a challenging task considering that there are often neither climate forcing nor streamflow data available. While gridded climate datasets can be used for deriving the forcing data, we do not get good estimates of snow melt and accumulation mainly because of biased temperature data. The main objective of the study presented here is to improve the quality of snow melt and accumulation estimates in ungauged basins.

The study is carried out for 321 catchments across the US which have discharge measurements for at least 15-years. A conceptual hydrological model with 7 parameters is combined with a temperature index snow melt module for comparing the overall performance of different approaches to snow modelling in ungauged basins. The study uses three climate forcing datasets as well as the SNODAS (SNOw Data Assimilation System) data provided by NOAA and explores different alternatives for obtaining time series of snow melt and rain for ungauged basins. These alternatives include using parameter default values from literature, calibration of the snow parameters to the SNODAS melt time series and using regionalized weights obtained by model averaging procedures.