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Dealing with snow accumulation in high mountains - A simple conceptual snow drift model

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Using a temperature index based snow melt model often leads to snow accumulation in high altitudes where temperature seldom rises above zero degrees. However, due to non-temperature driven processes like snowdrift, in these altitudes no extensive accumulation of snow can be observed in nature but snow rather accumulates in shallower, maybe forested elevation zones.
There are different approaches to deal with this problem. Often wind speed and -direction are used to model snow drift. Unfortunately, wind fields are afflicted with errors, especially if generated by regional circulation models (RCM) for climate change scenario studies. Also, for an adequate modelling of windblown snow drift, besides a high resolution DEM, many parameters are necessary leading to a high complexity of the model.
We present a simple conceptual method to estimate snow drift using a snowfall distribution approach coupled with a conceptual, semi distributed rainfall runoff model working on daily time steps. This model is based on the HBV model and is used for climate change studies on the catchment scale, i.e. several hundreds to few thousands of square kilometres in Austria including high mountain regions in the Austrian Alps. Using only three parameters, this snow drift method could be easily implemented without generating too much model complexity.
Using this snow drift approach it was possible to achieve a better model efficiency along with a better fitting of modelled snow covers compared to satellite images (MODIS). But more importantly, the extensive snow accumulation in high mountainous areas above 2800 m a.s.l. could be reduced to a more realistic level.