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Modelling the snow water equivalent and snow melt using the distributed HBV hydrological model

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Modelling the dynamics of the snow water equivalent and snow melt process is crucial in regional water resources management.
In this study, the distributed version of HBV hydrological model (DHBV) was implemented to model the hydrological processes in an alpine basin of Austria. Clear-sky solar radiation, potential sunshine duration, precipitation and near surface air temperature were the input variables of the model. Land cover classification and river networks were considered to separate the distributed units of the basin in the model structure. Daily moderate resolution imaging spectroradiometer (MODIS) snow cover data and hourly gauged discharge data were used to calibrate the model parameters against the simulated snow cover images and runoff at the basin outlet. A new optimization algorithm, Shuffled Complex Evolution Hamiltonian, was applied to select the high-freedom parameters effectively and efficiently with multiple objective screening method.
Results showed the DHBV model is satisfactory in modelling the spatial and temporal evolution of snow in this study area.