



Regionally snow water equivalent distributed model based on in-situ data and MODIS snow cover area

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Snowpack estimation in mountain is important for hydroelectric power supply since it allows to anticipate the water resources available during spring snowmelt and thus to optimize filling reservoirs. To achieve this estimate of the snowmelt contribution, EDF (the main French hydropower company) operates a large network of automatic snow gauges and in-situ core samplings for more than sixty years and develops methods for snow water equivalent modelling in the French mountains.

A degree-day model is used on a 1km grid to produce daily map of snow water equivalent over the French Alps. Calibration of the model is carried out in two steps: (i) Observed data are used during the snow accumulation period to estimate the snow correction factor needed at each location. A regional approach is used to reduce the strong variability of this factor. (ii) During the snowmelt, MODIS snow cover area is used to constraint snowmelt parameters.

Model outputs are then consistent with in-situ observed data and MODIS snow cover. Validation of the model is performed with independent observed data and concludes to the good agreement between modelled and observed snow water equivalent.

A snow water equivalent re-analysis over the French Alps for the last sixty years could then be produced on a 1km grid.