

## **Melt water run off estimations from snow pack and soil for improved flood risk forecasts**

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An important process for predicting flood risks is the interaction between a snow cover and the soil. The timing of snow melt and successive melt water run-off is determined by the capacity of the snow cover to retain melt water and rain. Also the soil moisture plays a role, as it determines the capacity of the soil to store snow melt water leaving the snow pack. Within the IRKIS project, the operational use of the physical based SNOWPACK model, which is used to assess the snow pack development at about 200 high alpine weather stations (IMIS), is improved to be used for flood risk assessment in summer in the Canton of Grisons. To improve the model performance with respect to the interactions between the snow cover and the soil, the SNOWPACK model has been extended with a module solving the matrix flow in both the snow pack and the soil. The model results have been validated against lysimeter measurements for snow pack base run-off at the Weissfluhjoch in Davos, and soil moisture measurement in the Davos landscape. It will be shown that the new module improves the modelling capabilities of the timing and amount of the snow pack melt water run-off. The model also helps to understand processes that are important for flood risk assessment. An example will be shown where a heavy snow fall, followed by intense rainfall, caused flooding in some parts of Switzerland in October 2011. The complex interaction between rain fall, the snow pack and the soil can be better understood with the new module.