



## **Estimating Snow Water Equivalent in the Swedish mountains by scaling snow depth measurements based on in situ data and local topography using passive and active remote sensing**

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Estimating the snow water equivalent (SWE) of the seasonal snow pack in the Swedish mountains is key information for the prediction of spring flood rates and the contribution to water reservoirs in Hydro-power production. The snow pack properties determining the SWE (snow depth and snow density) show spatial variations caused by synoptic scale weather patterns (air temperature gradients, wind and precipitation patterns) topography and vegetation. By establishing the relationship between accumulation patterns and physical parameters in the landscape a model of the spatial organization of the snow pack and its change over the season can be determined. By identifying the frequency and amplitude of topography in the Swedish mountain regions and by measuring snow accumulation in these regions we can increase the accuracy of the estimation of SWE. By using multiple parameters sampled in the snow pack from four sites in the Swedish mountains we quantify the local variability of SWE. This information will then be up-scaled to local coverage based on interpolation weighted on topography and vegetation. By validation of satellite imagery and existing snow cover products the information can be up-scaled from high-resolution field data to regional scale covering the Swedish mountain range in order to derive new satellite algorithms.