ESCIMO.spread v2: Parameterization of a spreadsheet-based snow model for inside-canopy conditions

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We have extended the spreadsheet-based point energy balance snow model ESCIMO.spread (version 1) with a set of parameterizations that enable to quantify the effect of a forest canopy on the meteorological conditions beneath the trees. Modified meteorological variables include precipitation, temperature, wind speed, relative humidity and radiative fluxes. If snow covers the ground, its accumulation and ablation are calculated by means of a simplified energy balance approach using the parameterized meteorological inside-canopy conditions. The model performance for both, the modification of meteorological conditions as well as the subsequent calculation of the seasonal snow cover evolution, are evaluated using in- and outside-canopy observations of meteorological variables and snow cover dynamics. For the measurements we utilized an innovative low-cost snow monitoring system (SnoMoS) at a site in the Schwarzwald region (Germany). The newly developed version of the model referred to as ESCIMO.spread (version 2) is provided for free together with one year of continuous hourly sample data, including the meteorological and snow observations used in this study.