Geophysical Research Abstracts
Vol. 20, EGU2018-16224, 2018
EGU General Assembly 2018

Spatially-averaged sky view factors for snow interception over forest canopy

Nora Helbig (1), David Moeser (2), and Michaela Teich (3)

(1) WSL Institute for Snow and Avalanche Research SLF, Davos Dorf, Switzerland (helbig@slf.ch), (2) USGS, New Mexico Water Science Center, Albuquerque, (3) Utah State University, Logan, US

A snow-covered forest canopy has considerably different surface charcacteristics than a snow-free forest canopy. The fractional-snow covered area of forest canopy is therefore an interesting parameter to derive surface characteristics, such as the effective albedo.

We therefore investigated the link between measured snow interception below a forest canopy with computed sky view factors with the goal to develop a subgrid parameterization for fractional snow-covered area of forest canopy in coarse-scale models. We used several thousands interception measurements collected after nine storm events in a coniferous forest in the Eastern Swiss Alps and numerically exact sky view factors computed directly from a high-resolution LiDAR digital terrain model. By scaling open area precipitation with computed sky view factors, we derived mean canopy interception and obtained similar performance statistics compared to previously suggested parameterizations applying forest metrics derived from hemispherical photographs. We also validated the parameterization with interception data from a different snow climate at a study site in Utah, US. Overall, our results suggest that a subgrid parameterization for fractional snow-covered area of forest canopy based on the sky view factor might be feasible.