Snowpack property variations below the canopy

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Abstract. The canopy of individual trees has a negative affect on the accumulation of snow around tree boles, resulting in a decrease in snow depth inward from the edge of the canopy to the tree trunk. The relationship between the canopy and the distribution of snow depth has been modeled in various methods, including a Monte Carlo technique, and incorporate factors such as snow-ground interface temperature, air temperature, and shape of the tree well profile. The influence of trees on snow distribution has an effect on the total volume of water available in the snowpack of a forest stand and is important when determining the overall water budget of the forest.

Experiments were conducted during the winter of 2007 near Cameron Pass, Colorado to investigate variations in snowpack characteristics between individual conifer trees and adjacent forest clearings. Measurements of depth, density, snow profile temperature and snow water equivalent (SWE) were taken in eight cardinal directions around ten trees (five *Picea engelmanii*, four *Abies lasiocarpa* and one *Pinus contorta*) and in the clearing to determine a) if there are significant variations in these characteristics around an individual conifer with respect to direction, b) how these characteristics (namely SWE) compare with those in the opening, and c) what correlations can be made between SWE around an individual tree and SWE at the stand scale.

Underlying the snow measurements are auxiliary tree data, including diameter at breast height, estimated tree height, distance of canopy edge from the tree bole, elevation, and distance as well as direction to neighboring trees. Meteorological data from the adjacent Natural Resources Conservation Service Joe Wright SNOTEL station were used to evaluate consistency and reliability of the data.