Towards coarser scale spatial snow depth distribution modeling – in forested and alpine regions

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Whenever there is snow on the ground, there will be large spatial variations in snow depth. The snow cover is significantly influenced by topography due to wind, precipitation, shortwave and longwave radiation, and even snow avalanches relocate the accumulated snow. Furthermore, in the presence of trees, snow interception by forest canopy can further lead to significant differences between forested and non-forested areas. Understanding these complex variations in snow depth is of crucial importance to a wide range of practical applications, such as in snow hydrology, avalanche forecasting or glacier mass balance. In this talk, I will present our efforts to develop various parameterizations to describe spatial snow distributions using readily available topographic parameters in combination with snow depth measurements. In particular, I will focus on recently developed snow interception models for mean and standard deviation of snow interception in coniferous forests and on the fractional snow-covered area (fSCA), i.e. the fraction of the ground that is covered by snow in alpine (treeless) terrain.