

Rees, A., English, M., Derksen, C., Toose, P. and Silis, A. (2014), Observations of late winter Canadian tundra snow cover properties. *Hydrol. Process.*, 28: 3962–3977.

Abstract: Tundra snow cover is important to monitor as it influences local, regional, and global-scale surface water balance, energy fluxes, as well as ecosystem and permafrost dynamics. Observations are already showing a decrease in spring snow cover duration at high latitudes, but the impact of changing winter season temperature and precipitation on variables such as snow water equivalent (SWE) is less clear. A multi-year project was initiated in 2004 with the objective to quantify tundra snow cover properties over multiple years at a scale appropriate for comparison with satellite passive microwave remote sensing data and regional climate and hydrological models. Data collected over seven late winter field campaigns (2004 to 2010) show the patterns of snow depth and SWE are strongly influenced by terrain characteristics. Despite the spatial heterogeneity of snow cover, several inter-annual consistencies were identified. A regional average density of 0.293 g/cm^3 was derived and shown to have little difference with individual site densities when deriving SWE from snow depth measurements. The inter-annual patterns of SWE show that despite variability in meteorological forcing, there were many consistent ratios between the SWE on flat tundra and the SWE on lakes, plateaus, and slopes. A summary of representative inter-annual snow stratigraphy from different terrain categories is also presented.