



Ecohydrology interaction studies in Arctic Finland

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Arctic water cycle processes and catchment hydrology are essential to understand ecohydrological changes in seasonally snow covered systems in the North. We have implemented a new research program in the Pallas region of Arctic Finland to systematically monitor coupled atmospheric, ecosystem and ecohydrological processes. This integrated approach allows us to better understand and quantify how these complex systems interact and function today, and how they may alter in the future under shifting seasonal patterns of synoptic climate, weather, snow and sea ice in the Barents region. Our analyses identify three dominant hydrological processes operating in the Pallas catchment: i) strong seasonality in climate dominates ecohydrological regimes, ii) rapid responses to stream water input (i.e. snow melt and strong storms) reflect limited groundwater storage, and iii) the mean hydrological state of the system partially regulates local greenhouse gas (GHG) flux. This novel isotope hydrology experimental set-up provides a holistic and process-based understanding of the system at the catchment scale, and a framework for upscaling ecohydrological processes at the wider Boreal and Arctic basin-scale for more sustainable water and forestry management.