



## **Main controlling factors of low flow in boreal region**

Leo-Juhani Meriö (1), Hannu Marttila (1), Pertti Ala-aho (1,2), and Bjørn Kløve (1)

(1) Water Resources and Environmental Engineering, University of Oulu, Finland (leo-juhani.merio@oulu.fi), (2) Northern Rivers Institute, University of Aberdeen, United Kingdom (pertti.ala-aho@abdn.ac.uk)

With recent climate projections, snow resources may decline in boreal region due to increased air temperature and decreased snowfall/total precipitation ratio. These changes can be reflected in hydrology as increased discharge in winter and a time shift and decrease in maximum discharge due to snowmelt, consequently decreasing the groundwater recharge and early summer discharge. Here, we evaluate how low flow conditions in winter and summer are related to the climate and catchment characteristics using existing data from long (over 30 years) and spatially well represented time series of meteorology and hydrology monitored at 64 headwater catchments in Finland. Multiple statistical and classification methods are used to investigate the relationships between numerous catchment characteristics and streamflow indicators. Deep storage, storage sensitivity and climate elasticity are calculated to study the catchments sensitivity on changes in climate and vegetation. Our preliminary results indicate that climate, geographical location and topography dominate the spatiotemporal variability of low flow conditions during winter and summer. Snow fraction of total precipitation was strongly positively correlated with winter and summer low flows. Coastal areas were more prone to low flow conditions with also relation to climate elasticity. Peatland were indicated to maintain the winter and summer base flow with negative relation also with storage sensitivity while forests on peatlands were positively related only with winter base flow. The study provide a more refined understanding of climate change and spatial responses in snow accumulation and melt.