



VeWa: Investigating effects of Vegetation on Water flows and mixing in northern ecosystems using stable isotopes and conceptual models

Doerthe Tetzlaff and the VeWa Team

University of Aberdeen, School of Geosciences, Aberdeen, United Kingdom (d.tetzlaff@abdn.ac.uk)

The lack of comprehensive tracer data sets still hinders the development of a generalized understanding of how northern catchments function hydrologically. Here, we use stable isotope records from precipitation and stream flow to examine the effects of soils and landcover along representative landscape transects in six high-latitude experimental catchments located in the UK, USA, Sweden and Canada. Precipitation and stream flow at each site occupies space on the meteoric water line that broadly reflects latitude. The annual variability of stream water isotopes at each site reflects both the nature (rate and duration) of the spring snowmelt and the relative importance of near-surface and deeper flow paths. This hydrological partitioning also acts a fundamental control on the influence of summer evaporation on stream waters. After accounting for differences in radiation inputs, strongest fractionation is most evident at sites where wet riparian soils with near-surface runoff processes can mobilize evaporated soil water during summer and autumn storms.