



## **Impact of thawing ground on subsurface water flow and transport in a modelled permafrost system**

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Long-term simulations representing warming temperature trends in cold regions indicate that the temporal and seasonal variability characteristics of groundwater and its discharges into surface waters is expected to decrease in a warming climate. A compelling question for waterborne transport of substances relevant for climate feedbacks, biogeochemical cycling and/or water pollution is how different scenarios of hydro-climatic change influence permafrost formation and degradation dynamics and through that also the residence times of subsurface water, from land surface recharge to surface water discharge. In this contribution, heat transport and water flow in permafrost systems which include the active layer are simulated and changes in water fluxes and associated travel times of water parcels through the subsurface are investigated. Initial results indicate that the geological setting can notably impact the spread and change in travel time distributions during warming. Also, for all cases investigated the median and minimum travel times of solute transport consistently increase, indicating longer flow pathways and greater attenuation potential as permafrost thaws. Possible related effects on carbon transport and subsequent climatic feedbacks are highlighted.