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# Aquatic carbon and GHG losses via the aquatic pathway in an arctic catchment

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Based in Northwest Canada, the HYDRA project ("Permafrost catchments in transition: hydrological controls on carbon cycling and greenhouse gas budgets") aims to understand the fundamental role that hydrological processes play in regulating landscape-scale carbon fluxes. The project aims to determine a) the role of vegetation functional type in carbon uptake, turnover and allocation, b) how the same functional types influence the delivery of soil-derived carbon to surface waters, and c) how important the aquatic carbon and greenhouse gas (GHG) losses are relative to catchment scale terrestrial fluxes. Here we focus on the magnitude of the aquatic concentrations and fluxes, presenting results from the first year of field sampling.

Concentrations of the greenhouse gases $CO_2$, $CH_4$ and $N_2O$, as well as dissolved organic and inorganic carbon (DOC and DIC), will be presented from a range of freshwater types within the tundra landscape; sites include lakes, polygons and the 'Siksik' stream which drains the primary study catchment. Eight sampling locations were selected along the approximately 2km long Siksik stream to allow carbon and GHG concentrations to be considered within a set of nested subcatchments. This synoptic sampling regime, in combination with stable isotopes and major ion concentrations also measured at each sampling point, will allow inputs of carbon and GHGs to be traced to source areas within the catchment.

Evasion and downstream export will also be calculated and preliminary results presented in the context of quantifying the relative importance of the aquatic pathway to the full catchment carbon and greenhouse gas budgets. This analysis will also allow an initial comparison between the relative importance of different water bodies within the catchment, highlighting spatial hotspots to be prioritized in future campaigns.