



Project acronym: LEACH

Project title: Lateral Export of Arctic Carbon coupled to Hydrology

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Discipline: Earth Sciences & Environment: Ecosystems & Biodiversity

Station(s): Churchill Northern Studies Centre (Canada)

‘The Lateral Export of Arctic Carbon coupled to Hydrology’ project aims to quantify the lateral carbon flux from lowland tundra landscapes into inland water systems, specifically low-order fluvial systems and small lakes. The focus is on elucidating the impact of rainfall on the carbon export from Arctic peatlands to inland waters and including exports during the understudied shoulder season of early fall. The Hudson Bay Lowlands (HBL) is the largest wetland in North America and stores and estimated ~ 30 Pg C. The northern HBL, which is underlain by continuous permafrost, contains the final stretch of the Churchill River and is perfectly suited for the proposed research. The methods described in the research proposal are a combination of continuous high temporal resolution measurements recorded by sensors and soil pore-, stream and lake water sampling for chemical analysis. Both organic and inorganic carbon will be considered in order to gain a thorough understanding of the terrestrial-aquatic hydrological connectivity of small-order fluvial systems and small lakes in the region. In addition DOM composition will be investigated as it provides insights into its source, the processing it has undergone, and could potentially further undergo along the terrestrial-aquatic continuum. The improved quantification and understanding of the lateral terrestrial carbon export in Arctic lowlands will aid estimating future carbon release, which facilitates the prediction of the permafrost carbon feedback strength and timing, and global carbon budgets.