

Project Title:

Spatiotemporal variability in chromophoric dissolved organic carbon in rapidly warming discontinuous permafrost peatlands

Title(s) of All Included Datasets:

- Water chemistry data from small lakes in the Taiga Plains, Northwest Territories, Canada
- Subfossil diatom assemblages in the surface sediments of small lakes in the Taiga Plains, Northwest Territories, Canada
- Subfossil diatom assemblages from ~1850 in sediments of small lakes in the Taiga Plains, Northwest Territories, Canada
- ²¹⁰Pb radioisotopic dating of sediment cores from small lakes in the Taiga Plains, Northwest Territories, Canada

Study Site:

Small, shallow lakes were sampled in the southern Northwest Territories, Canada, distributed in the Taiga Plains Mid-Boreal Level III Ecoregion (South Mackenzie Plain, Tathlina Plain) and the Taiga Plains High Boreal Level III Ecoregion (Cameron Uplands).

Project Objectives

The project objectives were to (1) characterize spatial patterns in water chemistry in small, shallow (0.5-3 m) lakes in the Taiga Plains ecoregion, and (2) assess the extent to which recent permafrost thaw may have resulted in lake browning using a diatom-based paleolimnological approach for a subset of 23 lakes. Insights generated through studies such as this one are foundational for improving estimates of the role that small permafrost peatland lakes play in global elemental cycles and landscape hydrological processes.

Abstract:

Lake browning has been widely projected for northern lakes affected by permafrost thaw, but the inherent heterogeneity in permafrost landscapes coupled with a paucity of data for many regions makes it challenging to develop circumpolar-scale assessments. This dataset provides surface water chemistry from 35 small, shallow (0.5-3 m) lakes in discontinuous permafrost peatlands of the Taiga Plains (Northwest Territories, Canada), which were distributed across two Level IV ecoregions (Cameron Uplands, Tathlina Plain). This dataset also provides a comparison subfossil diatom assemblages between present-day (2012-2018) and ~1850 in 23 Taiga Plains lakes distributed across three Level IV ecoregions (Cameron Uplands, Tathlina Plain, South Mackenzie Plain).

Responsible Parties

Project Lead/Contact:

- Jennifer Korosi, Faculty of Environmental and Urban Change, York University, Toronto, Ontario, Canada, M3J1P3 (jkorosi@yorku.ca)

Other parties who contributed to the dataset:

- Kristen Coleman, Faculty of Environmental and Urban Change, York University, Toronto, Ontario, Canada, M3J1P3
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- Joshua Thienpont, Faculty of Environmental and Urban Change, York University, Toronto, Ontario, Canada, M3J1P3

Dataset Title: Water chemistry data from small lakes in the Taiga Plains, Northwest Territories, Canada

Column Name	Description	Units
MonitoringLocationID	Unique sampling location identifier code	
MonitoringLocationName	Name of sampling location	
MonitoringLocationLatitude	Latitude	NAD83/decimal degrees
MonitoringLocationLongitude	Longitude	NAD83/decimal degrees
MonitoringLocationType	Type of water body sampled	
ActivityType	Type of monitoring activity (e.g. routine sampling)	
ActivityMediaName	Type of sample collected	
SamplingDate	Date of sample collection	DDMMYY
ActivityDepthMeasure	Water depth where sampling occurred	
ActivityDepthUnit	Unit of measurement for the ActivityDepthMeasure	
SampleCollectionEquipmentName	How samples were collected	
CharacteristicName	Water Quality Parameter Analyzed	
ResultValue	Result of the analysis for the water quality parameter	
ResultUnit	Unit of measurement for the ResultValue	
ResultDetectionCondition	Identification of samples where the result was below the analytical method detection limit	
MethodDetectionLevel	The analytical method detection limit	
MethodDetectionLevelUnit	The unit of measurement for the method detection limit	
ResultComment	Additional comments from the analytical lab on the result/analysis	
ResultAnalyticalMethodID	Method ID used by the analytical lab	
AnalysisDate	Date the sample was analyzed by the lab	DDMMYY
LaboratoryName	Name of lab where samples were analyzed	

Dataset Title: Subfossil diatom assemblages in the surface sediments of small lakes in the Taiga Plains, Northwest Territories, Canada

Column Name	Description	Units
LakeID	Unique lake location identifier code	
Location	Name of the Level IV Ecoregion where the lake is located	
Latitude	Latitude	NAD83/decimal degrees
Longitude	Longitude	NAD83/decimal degrees
ActivityType	Type of field sampling activity	
SampleCollectionEquipmentName	How samples were collected	
ActivityMediaName	Type of sample collected	
SamplingDate	Date of sample collection	DDMMYY
SedimentIntervalDepth	Midpoint of sediment core depth interval that diatom subfossils were analyzed from	
ActivityDepthUnit	Unit of measurement for the SedimentIntervalDepth	
²¹⁰ PbYear	Approximate year the sediment interval corresponds to based on the ²¹⁰ Pb dating model	YYYY
210PbDatingMethod	Method used to establish core chronology based on ²¹⁰ Pb radioactivity	
DiatomSpeciesName	Taxonomic name of the diatom species identified	
RelativeAbundance	The relative (percent) abundance the diatom species contributes to the total assemblage	%
LaboratoryName	Name of lab where samples were analyzed	

Dataset Title: Subfossil diatom assemblages from ~1850 in sediments of small lakes in the Taiga Plains, Northwest Territories, Canada

Column Name	Description	Units
LakeID	Unique lake location identifier code	
Location	Name of the Level IV Ecoregion where the lake is located	
Latitude	Latitude	NAD83/decimal degrees
Longitude	Longitude	NAD83/decimal degrees
ActivityType	Type of field sampling activity	
SampleCollectionEquipmentName	How samples were collected	
ActivityMediaName	Type of sample collected	
SamplingDate	Date of sample collection	DDMMYY
SedimentIntervalDepth	Sediment core depth interval that diatom subfossils were analyzed from	
ActivityDepthUnit	Unit of measurement for the SedimentIntervalDepth	
²¹⁰ PbYear	Approximate year the sediment interval corresponds to based on the ²¹⁰ Pb dating model	YYYY
210PbDatingMethod	Method used to establish core chronology based on ²¹⁰ Pb radioactivity	
DiatomSpeciesName	Taxonomic name of the diatom species identified	
RelativeAbundance	The relative (percent) abundance the diatom species contributes to the total assemblage	%
LaboratoryName	Name of lab where samples were analyzed	

Dataset Title: ²¹⁰Pb radioisotopic dating of sediment cores from small lakes in the Taiga Plains, Northwest Territories, Canada

Column Name	Description	Units
LakeID	Unique lake location identifier code	
Location	Name of the Level IV Ecoregion where the lake is located	
Latitude	Latitude	NAD83/decimal degrees
Longitude	Longitude	NAD83/decimal degrees
ActivityType	Type of field sampling activity	
SampleCollectionEquipmentName	How samples were collected	
ActivityMediaName	Type of sample collected	
SamplingDate	Date of sample collection	DDMMYY
SedimentIntervalDepth	Sediment core depth interval that diatom subfossils were analyzed from	
ActivityDepthUnit	Unit of measurement for the SedimentIntervalDepth	
Instrument	Name of instrument used for radioisotope analysis	
Software	Software used to establish the chronology based on radioisotopic activity	
CumulDryMass	Cumulative dry mass of the sediment	g/cm ²
²¹⁰ Pb	Result of the analysis for ²¹⁰ Pb radioisotopic activity	Bq/kg
²¹⁰ PbError	Estimated error for ²¹⁰ Pb radioisotopic activity	Bq/kg
²¹⁴ Pb	Result of the analysis for ²¹⁴ Pb radioisotopic activity	Bq/kg
²¹⁴ PbError	Estimated error for ²¹⁴ Pb radioisotopic activity	Bq/kg
²¹⁴ Bi	Result of the analysis for ²¹⁴ Bi radioisotopic activity	Bq/kg
²¹⁴ BiError	Estimated error for ²¹⁴ Bi radioisotopic activity	Bq/kg
¹³⁷ Cs	Result of the analysis for ¹³⁷ Cs radioisotopic activity	Bq/kg
¹³⁷ CsError	Estimated error for ¹³⁷ Cs radioisotopic activity	Bq/kg

241Am	Result of the analysis for ²⁴¹ Am radioisotopic activity	Bq/kg
241AmError	Estimated error for ²⁴¹ Am radioisotopic activity	Bq/kg
YearCRS	Modeled year of sediment deposition based on the constant rate of supply model	YYYY
ErrorCRS	Calculated error of modeled age based on the constant rate of supply model	Years
LaboratoryName	Name of lab where samples were analyzed	