

# Postglacial vegetation dynamics and environmental change recorded at Scotstown bog, located in the basin of a former proglacial lake, southern Québec, Canada

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## Study goals:

- reconstruct the late-glacial paleo-environments of the region of Mont Mégantic on the edge of the Appalachian upland, southern Quebec;
- as well as describe the postglacial succession of the local vegetation

## Study area:

The Appalachian region was among the first deglaciated areas in Quebec. Pollen records reach back to 13600 cal y BP (Muller & Richard 2001) and the oldest plant remains in the region date to >13000 cal y BP (Lavoie & Richard 2000).

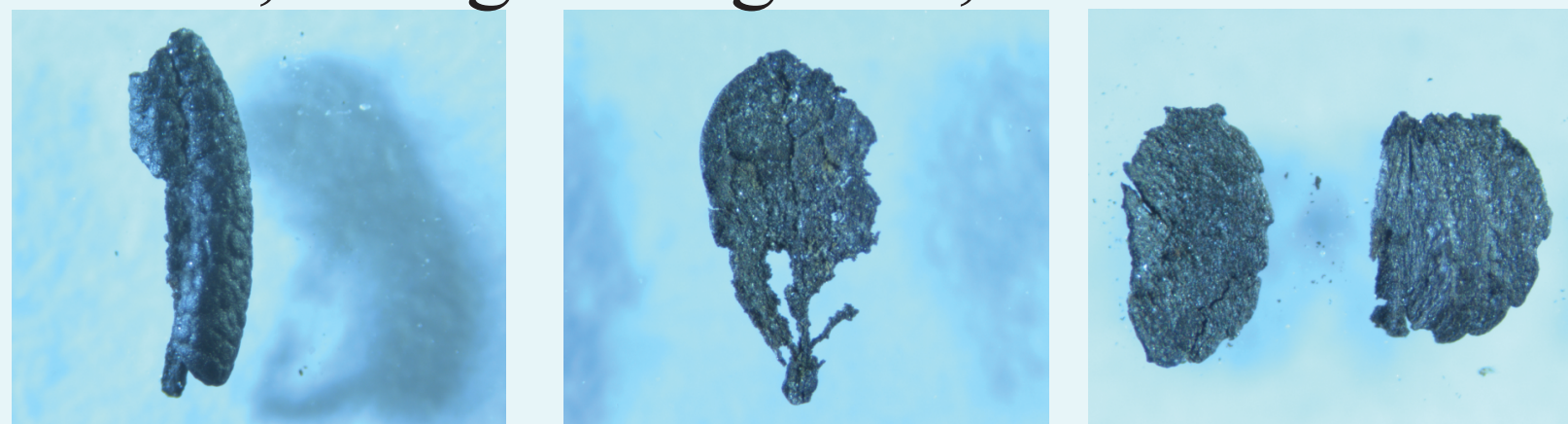


## Multi-proxies analysed:

### Plant macrofossils

Plant remains in the sediment reflect the past local dominant vegetation.

Based on plant macrofossil assemblages it is possible to detect different stages in the development of the study site: tundra, a lake surrounded by the forest, overgrowing lake, mire.



### Sedimentology

Loss-on-ignition, grain size analysis

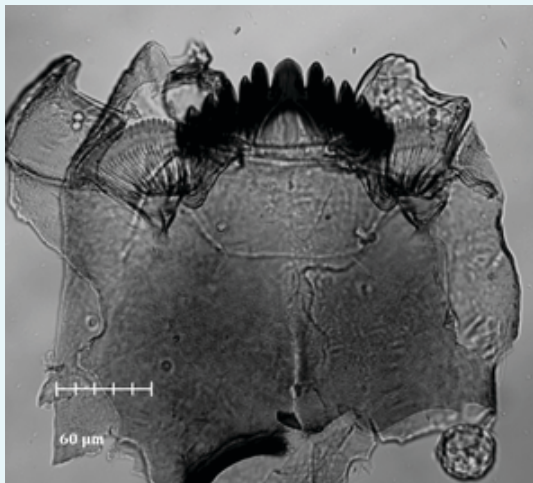
Changes in the sediment type and composition gives information on the type of the sedimentary basin, catchment etc.

Scotstown sediment changes record the probable drainage of proglacial lake and later overgrowing.

### Subfossil chironomids

Non-biting midges or chironomidae (Insecta: Diptera) have an aquatic larval phase, with many species living within narrow ecological optima, and thus they may be indicators of a variety of lake conditions, e.g., available lake oxygen, lake depth, temperature.

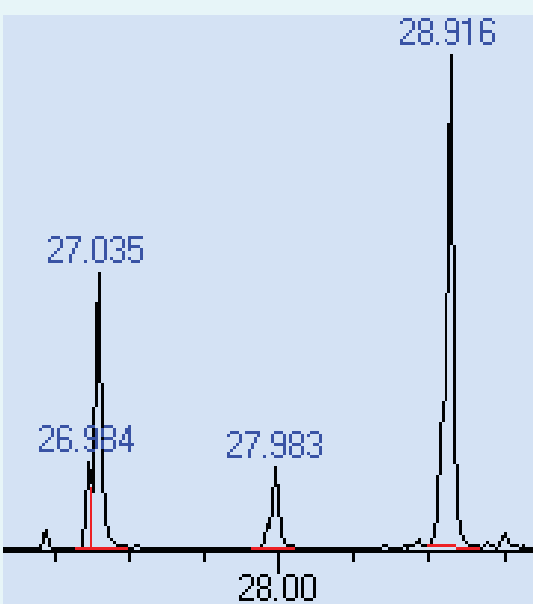
In Scotstown sediment the chironomid assemblage changes abruptly at 550 cm, possibly at the Holocene transition.



### Lipid biomarkers (*n*-alkanes)

Leaf waxes contain *n*-alkanes that preserve well in the sediments.

The Late-glacial-Holocene transition of Scotstown sediments are analysed for *n*-alkanes.



## Conclusions and future directions:

- We partition the Scotstown stratigraphy into 4 stages: part of the proglacial lake – lake/pond – overgrowing – mire;
- Various floral communities: tundra – boreal forest (around the lake) – mixed forest (around the lake) – expansion of wetland/marsh vegetation – mire;
- A transition to high abundances of littoral chironomid taxa at 550 cm occurs at the culmination of the proglacial lake, coinciding with the disappearance of arctic plant remains and change in sedimentary parameters;
- The rise in the amount of lipid biomarkers is likely connected to the sediment organic content and less to the amount of plant macrofossils;
- In the future: build the complete chronology and measure hydrogen isotopes from the alkanes.

### Sediment type

clay gyttja peat

### Scotstown stage

PROGLACIAL LAKE LAKE

- Tundra species
- Aquatic species
- Trees
- Wetland/marsh/bog species

- $nC_{23}$  alkane
- $nC_{25}$  alkane
- $nC_{27}$  alkane
- $nC_{29}$  alkane
- $nC_{31}$  alkane
- $nC_{33}$  alkane

- % of organic matter (LOI)
- Mean particle size, microm.

- *Dicrodentipes nervosus*-type
- *Polypedilum*
- *Sergentia coracina*-type

cm 600 550 500 450 400  
<sup>14</sup>C dates (calibrated, median value) cal y BP  
555 cm/ 12711 cal y BP 516 cm/11837 cal y BP  
552 cm/13537 cal y BP

number of macroremains per 100 cm<sup>3</sup>

micrograms per gram of dry sediment

Organic matter content, %  
Particle size, micrometers

Relative abundance, %