INTRODUCTION

The Lac-À-la-Tortue (LAT) peatland, near Shawinigan, Mauricie, is the largest natural ombrotrophic complex in southern Quebec [1]. It developed approx. 8000 BP following post-glacial land emersion. Apart from native occupation during several millennia, the region has first been transformed over the last two centuries by lumber and agriculture followed for the past hundred years by local pulp and paper, chemical and textile industries. Ombrotrophic peatlands (peat bogs) have proved to be valuable natural and anthropogenic atmospheric and hydrologic archives. In order to reconstruct the impacts of the regional development over its natural conditions, we will be using multi proxy analysis to reconstruct vegetation succession, paleohydrology and peat geochemistry for the past 250 years [2,3,4].

MATERIAL AND METHODS

• Diachronic aerial photo analysis (1948–1960–1975–1990–2012) in order 1) to reconstruct land-use changes during the past decennia (lumber, drainage, construction, peat cut-over etc) and 2) identify the different levels of perturbation or natural conditions over the peatland.

FIELD

• Selection of coring sites (representative of bog complex, 2x) distributed in a gradient of disturbance intensity [5] and surface humidity microforms (hummocks, hollows) [8], and sampling six 1 meter cores using a box corer.

LAB

• Cutting cores at contiguous 1-cm intervals
• Sub-sampling into 5 segments for further analysis:

1) Geochemical analyses: 
- 210Pb dating and IRMS: δ13C and δ15N. (GEOTOP–UQAM) [10]
- Plant macrofossils
- Bulk density and Loss On Ignition (LOI)
- Testate amoebae
- Archive

Cores chronologies will be established with 210Pb and 14C methods

Plant macrofossil analysis will be based on ACCROTEL protocol (http://www2.glos.ac.uk/accretelm/macproto.html); Testate amoebae protocol will exclude microsieving [11]

OBJECTIVES

The aim of this project is to quantify the impact of land-use change over the LAT peatland complex. More specifically, we will:

1) Identify the recent (> 1940 AD) spatio-temporal changes across the peatland complex in order to document their effects surface morphology and vegetation composition.

2) Reconstruct the ecological changes (250 years) register in the peat profiles using plant macrofossil and testate amoebae analyses [5,6]

3) Measure the stable carbon isotopes and δ15N variations in the peat profile to validate links between the δ13C- δ15N signatures within Sphagnum moss and paleoecological and paleohydrological changes [7,8,9]

ANTICIPATED RESULTS

The diachronic analysis should illustrate the spatiotemporal land use changes and anthropogenic pressures surrounding the peatland.

The combination of testate amoebae assemblages and macrofossil analyses should document the recent hydrological variations (water table depth, acrotelm moisture) [8,9]

The δ13C analysis in Sphagnum should allow to identify a fluctuation between dry and wet episodes due to the differential isotopic fractionation of C: Thus, the geochemical analysis will be able to supplement the paleoecological analyses [7,9,12]

REFERENCES

3. MICHIELS et al. (2003). #92