The aim of this study is to establish a net carbon budget for two harvested/restored peatlands in 2 different regions from southern Quebec by:

- Quantifying the C stocks prior to exploitation.
- Measuring the contribution of peat extraction activities to C emissions.
- Evaluating restoration efficiency with the re-establishment of long-term C sink function.

Hypothesis

- C budget differs between the regions.
- Net C budgets depend on their interannual and spatial variations.
- C sink function can return to a natural rate estimated between 10 and 30 g m⁻² yr⁻¹ (Gorham, 1991) in a short time span (Waddington et al., 2010), however restoration cannot retrieve the amount of C lost during the exploitation.

Field samplings

- 4 campaigns of 7 days at each site between April and October 2012 and 2013
- 1 complete field season will be integrated (2011)

Material and methods

- Carbon sequestered (Peat cores taken from harvested and natural sections)
  - C past accumulation (bulk density) determined by loss-on-ignition (Dean, 1974) and ¹⁴C dating
- Carbon fluxes (from natural, harvested and restored sections)
  - CO₂ fluxes measured using clear static chamber, shrouds, EGM-4 infrared gas analyser
    - 1) CO₂ NEE (ecosystem respiration (ER) and gross ecosystem photosynthesis (GEP)) from the different microforms (e.g. hummock, hollow) and related vegetation assemblages
    - 2) Bare peat respiration from harvested sections
- CH₄ collected by dark static chambers and concentration measured with gas chromatograph
  - 1) from natural and 2) restored vegetation surfaces and 3) from harvested section along a transect perpendicular to the drainage system on bare peat
- Dissolved organic carbon (DOC) collected 1) in the drainage system from harvested section and 2) in an effluent from natural and restored sections

Environmental variables :

- PAR (photosynthesis active radiation)
- Air and peat temperature
- Water table level and fluctuation
- Vegetation surface