

# Mobility of elements in sugar maple xylem along a gradient of soil acidity



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Simon Bilodeau Gauthier (1,2), Daniel Houle (2,3), Christian Messier (1), Christian Gagnon (2) & Benoît Côté (4)

- (1) Département de Biologie, Faculté des sciences, Université du Québec à Montréal, Montréal, QC  
(2) Centre Saint-Laurent, Environnement Canada, Montréal, QC  
(3) Direction de la Recherche Forestière, Forêt Québec, Ministère des Ressources Naturelles du Québec, Sainte-Foy, QC  
(4) Department of Natural Resource Sciences, Macdonald Campus of McGill University, Ste-Anne-de-Bellevue, QC

## Context

1) Acid Deposition: decline of sugar maple trees has been often linked to soil acidification, leaching of nutrients, and mobilization of toxic metals.

2) Problem with Dendrochemistry: Tree-rings might not be a direct reflection of the environment's chemistry, due to the mobility of some elements.

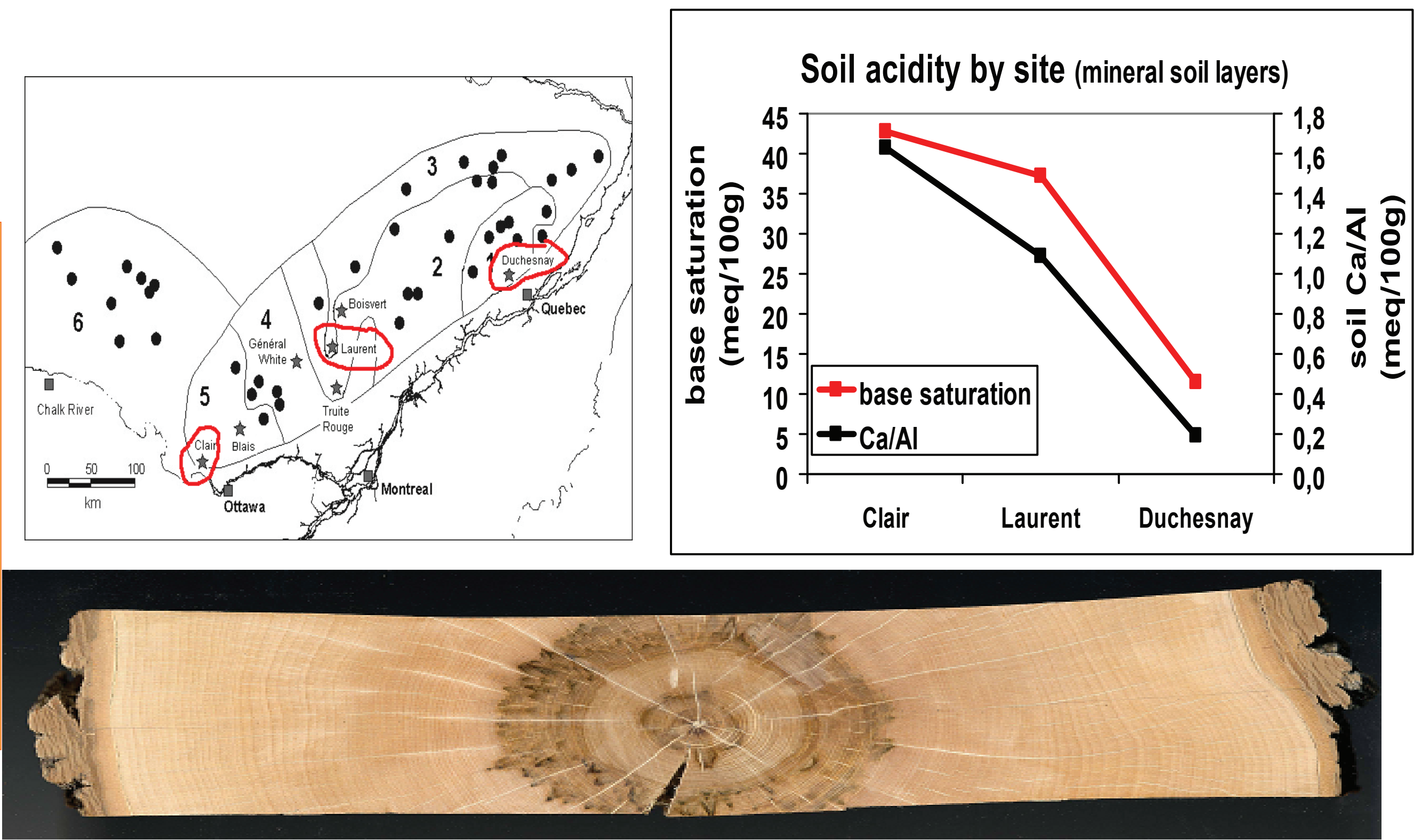
## Objective

- Assess the behavior of elements (Al, Ca, K, Mg, Mn) in sugar maple xylem.
- Evaluate their potential utility for dendrochemical monitoring of soil acidification.

## Methods

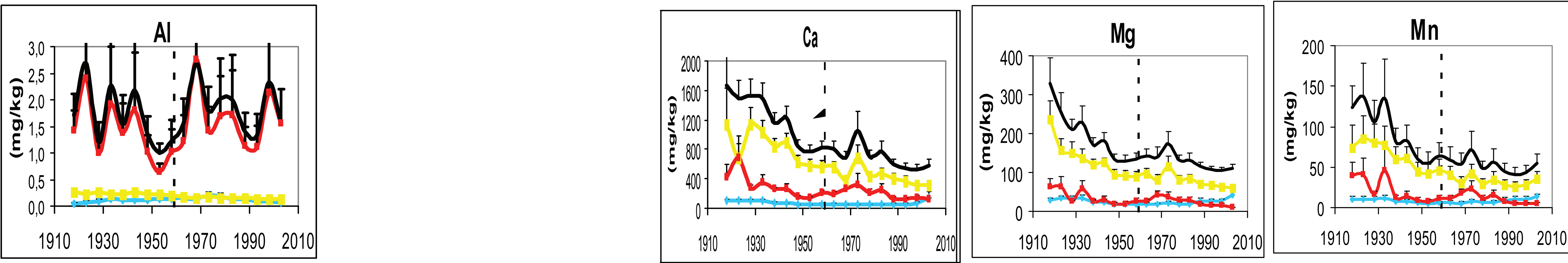
Sequential extractions on sapwood of 9 trees from 3 forested watersheds

- H<sub>2</sub>O deionised (soluble fraction)
- HCl 0.05 N (exchangeable fraction)
- HNO<sub>3</sub> ultrapure (residual fraction)

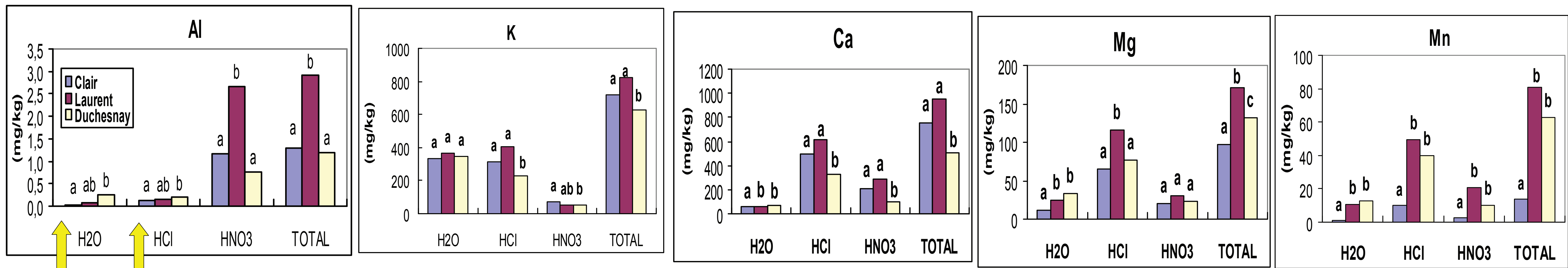


## Results

### Radial Trends



### Response to soil acidity (sapwood only)



Mobile fractions of Al are responsive to variations in soil acidity.

Monovalent and divalent cations are very mobile, and respond weakly to soil acidity.

Further analysis on 7 watersheds

## Conclusions

Mobile fractions are suitable for spatial, not temporal, monitoring of soil acidity.

On very acid soils, Al is more mobile in xylem than previously thought.

Care must be taken when using an element for environmental monitoring, for which end sequential extractions may prove very useful.

Mn shows more potential.

