

# Use of charcoal analysis to distinguish between storm- and fire-related deposition

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### Introduction

Quantification of charcoal content in historic sediments can be compared with charcoal content in prehistoric sediment as a means of interpreting past fire activity. Lake sediments from Vermont and New Hampshire contain a record of historic human activity represented by increased charcoal content. Distinguishing sediments related to prehistoric fire activity from those related to storm events is a necessary distinction for paleoclimatic interpretation (Whitlock et al., 1997; Winkler, 1997).

### Methods

Short (30-50 cm) cores will be taken from Ogontz and Sandy ponds on October 26-27 and will be extruded in the field. Cores will be sampled every centimeter and analyzed for charcoal content (see below). Sites were chosen for logistical ease; Ogontz has the additional benefit of a high sedimentation rate. Two cores are being used to attempt correlation following charcoal analysis.

Winkler (1985) proposed using a combination of nitric acid digestion and loss on ignition techniques to measure relative charcoal content in sediments. Samples will be dissolved in nitric acid to remove organic material and subsequently ignited to remove charcoal traces from remaining sediment. This method has been shown to correlate well with the traditional technique of visual charcoal content evaluation (Winkler, 1985). Due to difficulties in measuring low charcoal content during loss on ignition as described by Brown (1999), an elemental analyzer will be used to quantify charcoal content.

### Future Work

These methods can be applied to deeper and more complete cores. This may allow regional paleofire interpretation during the entire Holocene by correlating identified fire layers with other layers in a regional context.

## Appendix A: Needed materials

centrifuge  
centrifuge tubes  
test tube racks  
concentrated nitric acid  
DI water  
Elemental Analyzer, tin capsules, tweezers, spatula  
balance, microbalance  
standards

(from Brown,1999)

## References

Whitlock, C., Bradbury, J., Millspaugh, S., 1997, Controls on Charcoal Distribution in Lake Sediments: Case Studies from Yellowstone National Park and Northwestern Minnesota; NATO ASI Series, v. 151, p. 367-387.

Winkler, M., 1985, Charcoal Analysis for Paleoenvironmental Interpretation: A Chemical Assay: Quaternary Research, v. 23, p. 313-326

Winkler, M., 1997, Late Quaternary Climate, Fire, and Vegetation Dynamics; NATO ASI Series, v. 151, p. 330-347