

Southeastern Section—55th Annual Meeting (23–24 March 2006)

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DOES PROCESS MATTER?: AN EVALUATION OF THE EFFECT OF SAMPLE PROCESSING TREATMENTS ON ALKALINITY MEASUREMENTS

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The concentration of bicarbonate, the dominant anion in river water, is calculated using measured alkalinity concentrations. Gran Titration is the standard method for measuring alkalinity, but controversy exists as to how surface water samples should be processed. In the standard method, alkalinities are measured within 24 hours of collection on unfiltered samples, with a maximum of 14 days refrigerated storage. However, filtered samples often are easier to work with when turbidity is high, and unrefrigerated filtered samples also can be analyzed for anions and dissolved organic carbon. Our goal was to determine whether variation in processing treatments leads to statistically significant differences in alkalinity concentrations. Accurate measurements of alkalinity concentrations are necessary for the calculation of charge balance, carbonate speciation, and partial pressure of carbon dioxide.

We collected one 16 L sample each from a headwater stream with known low alkalinity and a lake with known moderate alkalinity. A third locality with higher alkalinity will also be analyzed. The streams are located in the piedmont of South Carolina, and alkalinity can be assumed to be 100% bicarbonate. Aliquots of each sample were collected in triplicate and analyzed using four processing treatments: filtered and refrigerated (FR), filtered and unrefrigerated (FU), unfiltered and refrigerated (UR), and unfiltered and unrefrigerated (UU). All aliquots were analyzed within 24 hours using the Gran Titration method. The headwater stream had a concentration of 4.1 +/- 0.4 mg/L. The lake sample had a concentration of 17.9 +/- 0.4 mg/L. Two-way ANOVA indicates that there are no statistically significant differences among the various treatments for either sample. After 21+ days, the alkalinity concentrations of the UU and FU headwater stream samples were measured again to determine if concentrations changed over time. There were no statistically significant differences between the concentrations.

Our results suggest that processing treatment does not affect alkalinity concentrations measured on surface water samples from piedmont regions. The FR treatment is recommended for simplicity of sample processing. Although sample storage time does not seem to be a factor, we will re-analyze the UU and FU lake samples after 30+ days.

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Session No. 24--Booth# 39
[Undergraduate Research \(Posters\)](#)
Marriott Hotel: Georgia Ballroom
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