

2006 Philadelphia Annual Meeting (22–25 October 2006)

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AN EVALUATION OF THE EFFECT OF SAMPLE PROCESSING TREATMENTS ON ALKALINITY MEASUREMENTS OF RIVER WATERS IN A KARSTIC REGION

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The concentration of bicarbonate, the dominant anion in river water, is calculated using measured alkalinity concentrations. Although the Gran Titration is the standard research method for measuring alkalinity, there is some controversy as to how surface water samples should be processed. Previous data indicated that sample processing method (filtered/unfiltered, refrigerated /unrefrigerated) had no statistically significant effect on alkalinity concentrations in samples from dilute stream waters flowing over high-grade silicate metamorphic rocks. The purpose of this study was to determine whether variation in processing methods leads to statistically significant differences in alkalinity concentrations in stream waters flowing over carbonate rocks

We collected three 16 L samples near Chattanooga, TN, from streams flowing over limestone and dolomite. Aliquots of each sample were collected in triplicate using four processing treatments: filtered and refrigerated, filtered and unrefrigerated, unfiltered and refrigerated, and unfiltered and unrefrigerated. All aliquots were analyzed within 24 hours using the Gran Titration method. The Newman limestone water sample had a concentration of 0.9 +/- 0.1 mg/L and is affected by acid mine drainage. The Knox Dolomite water sample had a concentration of 106.6 +/- 2.4 mg/L. The Copper Ridge Dolomite water sample had a concentration of 96.3 +/- 10.1 mg/L. This large standard deviation is caused by a single anomalous alkalinity. Two-way ANOVA results indicate that there is no statistically significant difference among the various treatments for the Copper Ridge and Newman water samples. The Knox Dolomite water samples show a significant difference between the refrigerated and unrefrigerated treatments, but the difference between the means was less than 3%. The alkalinity concentrations of all samples will be determined again after 30 days of storage to determine if storage time affects alkalinity measurements.

Our results suggest that alkalinity concentrations measured on surface water samples collected in karstic regions are not dependent on processing treatment. Our recommended treatment of fresh surface water samples is filtered and refrigerated to maintain the chemical integrity of the samples.

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Session No. 227--Booth# 14
[Geochemistry, Aqueous \(Posters\)](#)
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