

Northeastern Section (39th Annual) and Southeastern Section (53rd Annual) Joint Meeting (March 25–27, 2004)

**Paper No. 8-8**

**Presentation Time:** 10:40 AM-11:00 AM

## **DISSOLVED CARBON SPECIES AND FLUXES IN TWO LOWER PIEDMONT WATERSHEDS IN SOUTH CAROLINA**

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The distribution of dissolved carbon in rivers is important to understanding the transport of carbon to the world's oceans. Although carbon transport has been studied fairly extensively in small montane watersheds, relatively little is known about the carbon dynamics of watersheds in the piedmont of the eastern United States. The purpose of our study was to examine the distribution of dissolved carbon in the 600 km<sup>2</sup> Little River and 300 km<sup>2</sup> Bush River watersheds in the piedmont of South Carolina.

Weekly water samples were collected at a total of 63 localities in the Bush River and Little River watersheds during June-July of 2002 and 2003, respectively. Samples were filtered and analyzed for dissolved organic carbon (DOC) and alkalinity. We used a thermodynamic model to calculate the dissolved inorganic carbon (DIC) and partial pressure of carbon dioxide in each sample from alkalinity, pH, and temperature data.

As for other river systems, all localities in both watersheds had partial pressures of carbon dioxide as much as 100 times in excess of atmospheric pressure. On average, the partial pressures were 40 times greater than atmospheric for the Little River watershed and 30 times greater than atmospheric for the Bush River watershed, but individual samples varied considerably about these means. In the Little River watershed, total dissolved carbon (TDC) concentrations averaged about 22 mg C/L with an average composition of 55% DIC and 45% DOC. In the Bush River watershed, TDC averaged about 35 mg C/L with an average composition of 65% DIC and 35% DOC. The tributaries and headwaters typically had more DOC than DIC in the Little River watershed but not in the Bush River watershed. Rain events appeared to influence substantially the distribution of carbon in the Little River watershed and were associated with higher partial pressures of carbon dioxide. Discharge of effluent from wastewater treatment plants either had little impact on carbon distribution or diluted DOC. Average carbon fluxes during the sampling periods are estimated to have been 12,325 kg C/day in the Little River watershed and 725 kg C/day in the Bush River watershed. However, direct comparison of carbon fluxes in these two watersheds are complicated by widely differing amounts of rainfall, with extreme drought in 2002 and above-average rainfall in 2003.

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Session No. 8

[From the Mountains to the Sea: Fluvial Processes in the Eastern United States I](#)

Hilton McLean Tysons Corner: Gunston A

8:00 AM-12:00 PM, Thursday, March 25, 2004

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