North American rivers are a sizable source of atmospheric carbon

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To fulfill the need for an ever more accurate and complete understanding of the flow of carbon through the Earth system, a flurry of research has taken place in the past decade on previously overlooked aspects of the carbon cycle. Researchers have investigated the roles of rivers, lakes, and streams in transporting carbon, often with mixed, or only broadly constrained, results. Further, many investigations have traditionally focused on a small number of sites. Though such focused measurements are important for pinning down spatial and temporal changes in the local exchange of carbon, they make expanding the results to broader regions difficult.

To address both sets of issues, Lauerwald et al. used a carbon flux model, trained by a broad set of high-resolution chemical and physical measurements drawn from rivers across North America, to determine the physical watershed properties that are the strongest predictors of dissolved organic carbon fluxes and to provide a rough estimate of continental-scale carbon exchange. They find that runoff volumes, tree cover, watershed slope, and the areal extent of wetlands are the strongest independent determinants of watershed dissolved organic carbon fluxes. The authors find that from North American rivers that lay south of the 60th parallel, 5.9 megatons of carbon are transferred to the atmosphere each year.

The authors acknowledge the broad diversity of North American watersheds, and they suggest that the model likely underestimates carbon fluxes in cold regions and overestimates the flux for warmer regions.

The model also looks only at the natural transport of carbon through the ecosystem and does not represent anthropogenic point sources of carbon. As such, the authors suggest that their estimate likely represents a lower limit on the contributions of North American rivers to atmospheric carbon dioxide concentrations.

More information: Assessing the nonconservative fluvial fluxes of dissolved organic carbon in North America: *Journal of Geophysical Research-Biogeosciences,* doi:10.1029/2011JG001820 , 201

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