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Landscape determinants of the carbon sink-source balance in boreal watersheds

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Terrestrial and aquatic ecosystems are inextricably linked in the boreal landscape. One way in which this coupling is expressed is the opposite role they play in the exchange of carbon with the atmosphere. While forests and wetlands are generally sinks for atmospheric carbon dioxide, lakes, streams and rivers are most often significant sources. On a watershed scale, the balance between these counteracting processes is determined by the relative importance of the individual components. Using data and empirical models developed for Quebec's mid-boreal region, we analyze the sink-source balance in about 50 watersheds of the same region. Over large spatial scale, the landscape was essentially carbon-neutral with respect to the atmosphere. However, the sink-source balance varied greatly among individual watersheds, ranging from substantial sinks to significant sources. In this presentation, we explore the landscape determinants of this balance.