

OCGC Seminar

New Isotopic Approaches to Understanding Carbon Cycling in Freshwater Sediments

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Chambre 233

Freshwater environments, including rivers, lakes, and wetlands, cover a relatively small portion of the planet, but are increasingly recognized as a key component of the global carbon cycle. Freshwaters provide the critical plumbing between the terrestrial and marine carbon cycles, and encompass important reservoirs of organic matter and greenhouse gas fluxes in their own right.

Furthermore, freshwater sediments provide a valuable temporal archive of changes in both aquatic and terrestrial carbon cycling at the catchment scale. Isotopic measurements have a key role to play in gaining a better understanding of freshwater carbon cycling, and new developments in isotope geochemistry have the potential to accelerate this understanding. In this talk I will discuss two relatively new isotopic techniques and their application in understanding carbon cycling in freshwater sediments.

First, I will discuss using compound-specific radiocarbon analyses in lake sediments to understand changes in the residence time of soil organic carbon on millennial timescales, with a focus on the effects of ancient land use change in Central America. Second, I will discuss measurements of methane with multiple rare stable isotopes, or clumped isotopes, and what they can tell us about microbial methanogenesis in Arctic and Subarctic lakes. Finally, I will conclude with my vision of how these and other isotopic measurements can be integrated to gain a clearer picture of the processes controlling freshwater carbon cycling.

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