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Inland water transformation and stabilization of terrestrial organic carbon during transport from soil to sea

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Inland waters receive substantial amounts of organic carbon (OC) from surrounding terrestrial ecosystems, mainly in the form of dissolved organic carbon (DOC). A large fraction of this OC is mineralized in lakes, resulting in methane and carbon dioxide emissions, and the rest is either stored in the sediments over geological timescales, or transported downstream towards the sea. Recently, it has been shown that these processes result in fluxes of importance in the global carbon cycle. It is therefore important to understand what regulates OC cycling in inland waters, and how the inland water carbon cycle may change with climate and anthropogenic influence. This presentation will give an overview of transformations of OC in inland waters, such as flocculation and sedimentation, and microbial and photochemical mineralization. We will also discuss the constraints on the metabolism of OC, and how they may shift in the future; e.g. temperature effects on the mineralization of OC. In addition, I will present an attempt to upscale from local processes to the global inland water carbon cycle, and discuss the importance of different processes and fluxes.