

### Poster Presentation

Theme 3.1: Biogeochemical Processes - Processes Understanding and Human Impacts

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## The importance of terrestrial and in-stream derived POC for limnic carbon storage in a tropical reservoir

**Snöälv, Jo Tara Caroline\* (1); Fernandes Mendonça, Raquel (2,3); Quine, Timothy Andrew (1); Sobek, Sebastian (2)**

1: University of Exeter, Department of Geography, Exeter, United Kingdom; 2: Uppsala University, Department of Ecology and Genetics, Limnology, Uppsala, Sweden; 3: Federal University of Juiz de Fora, Department of Biology, Minas Gerais, Brazil

Particulate organic carbon (POC), commonly defined as the organic carbon fraction  $>0.45 \mu\text{m}$ , contributes to limnic storage of carbon in local to regional sediment traps in the landscape, such as wetlands, deltas, lakes and manmade reservoirs. Deposited POC can be buried or, after mineralisation, fuel vertical emission of greenhouse gases such as carbon dioxide ( $\text{CO}_2$ ) and methane ( $\text{CH}_4$ ) into the atmosphere. POC is contributed from different carbon pools (soil, litterfall, aquatic plants etc.) and the importance of these inputs for limnic storage, downstream export and local mineralisation respectively, are yet to be identified.

This work aims to describe the relationship between soil erosion rates and the seasonal input of allochthonous sediments in drinking water reservoir João Penido, Brazil, in order to quantify the sedimentation of aggregate-bound POC derived from eroding soils, and litterfall from vegetation. Two field techniques have been used to investigate soil erosion and sediment yield in the catchment: 1) measurements of the activity of fallout radionuclides (FRN)  $^{137}\text{Cs}$  and  $^{210}\text{Pb}_{\text{ex}}$  in soil and sediment (sampled in May–June 2016) reveal soil redistribution rates for the sampling sites, and are further used to validate results from 2) hydro-acoustic sub-bottom profiling (survey performed in June 2016) which is a non-destructive survey technique that can be used to measure sediment thickness, and in combination with sediment coring, organic carbon (OC) burial. Incubation experiments were further performed to determine mineralisation rates of POC in sediment from different locations within the reservoir.

The results, together with other parameters, e.g. total organic carbon (TOC) and carbon-nitrogen ratio (C/N), show the seasonal input of POC from the catchment soils and vegetation in relation to the in-stream produced POC that goes into sediment storage or is evaded after mineralisation. Results from incubation experiments indicate varying mineralisation rates and burial potential of POC in the reservoir. Ultimately, the differentiation of sources and fate of POC are used to simulate change in carbon burial and mineralisation rates in lakes and reservoirs with respect to increased soil erosion due to human perturbation of the landscape, for instance growing agricultural practices in the catchment area.

Poster Session (see poster session schedule)