EGU24-20681, updated on 20 May 2024
https://doi.org/10.5194/egusphere-egu24-20681
EGU General Assembly 2024

QUANTOM – QUANTification of dissolved Organic Matter and the metabolic balance in river networks: mechanisms and model simulations of CO2 emissions

Benoit Demars[1], Maeve McGovern[1], Leah Jackson-Blake[1], James Sample[1], Magnus Norling[1], Kjell Høgda[2], Stein Karlsen[2], Peter Dörsch[3], Marc Stutter[4], Barry Thornton[4], Jim Junker[5], and Juliana D'Andrilli[5]

[1]Norwegian Institute for Water Research, Freshwater Ecology, Oslo, Norway (benoit.demars@niva.no)
[2]Norwegian Research Institute, Tromsø, Norway
[3]Norwegian University of Life Sciences, Ås, Norway
[4]The James Hutton Institute, Aberdeen, UK
[5]University of North Texas, Denton, Texas, USA

QUANTOM aims to quantify how changes in quality and quantity of dissolved organic matter (DOM) supply alter the metabolic balance of rivers, i.e. the contribution of in-stream DOM degradation to CO2 emissions. QUANTOM will determine the coupling between land vegetation growth from satellite observation and DOM delivery and transformation in streams using in-situ sensor technology and whole stream metabolism. QUANTOM will characterise the molecular transformations (reactive pathways) of DOM, from riparian soils to the Barents sea, through the river continuum at control points (hot spots and hot moments) using carbon stable isotope ratios and FT-ICR-MS. QUANTOM will formalise mathematically our novel understanding into a parsimonious river basin model for DOM with in-stream processes. QUANTOM's vision is to have a model applicable across the natural northern rivers around the globe and transform the way we see and study rivers.

We have completed three years of fieldwork in the river Tana (Northern Norway), draining 16,000 km2 of north boreal and sub-arctic landscapes and discharging in the Barents sea (70°N). We will present the outline of the project, our conceptual approach and preliminary results such as satellite and in-situ sensor data, carbon fluxes and metabolic balance of the river network.