Geophysical Research Abstracts
Vol. 16, EGU2014-10608, 2014
EGU General Assembly 2014

Hydrology controls dissolved organic matter (DOM) quality and dynamics

Christina Fasching (1), Jakob Schelker (1), Amber Ulseth (1), Gabriel Singer (2), Gertraud Steniczka (3), Tom Battin (1,3)

(1) Department of Limnology and Bio-Oceanography, University of Vienna, Althanstrasse 14, A-1090 Vienna, Austria (christina.fasching@univie.ac.at), (2) Department of Ecohydrology, Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB), Berlin, Germany, (3) WasserCluster Lunz GmbH, Dr. Carl Kupelwieser Promenade 5, 3293 Lunz am See, Austria

Headwater streams are major contributors to carbon cycling. It is therefore of utmost importance to understand the dynamics of dissolved organic matter (DOM) and its drivers in these ecosystems. Here we present data from more than 4,000 individual DOM measurements from Oberer Seebach, a 3rd-order stream draining a largely pristine alpine catchment (Lunz am See, Austria). We determined the concentration of streamwater and hyporheic dissolved organic carbon and a suite of optical properties of DOM based on a diurnal sampling design over almost three years; we also monitored various hydrological and climate parameters over that same time. Optical properties were determined from absorbance measurements and parallel factor analysis (PARAFAC) modelling of Excitation emission matrices. We also estimated DOM export fluxes from Oberer Seebach and the contributions of the various chromophoric and fluorescent components to these exports. Preliminary results suggest that DOM in Oberer Seebach was largely of terrigenous origin throughout the year. However during periods of low discharge autochthonous DOM export increased, indicating freshly produced DOM possibly from benthic algae. Hyphoreic and streamwater DOM composition and its dynamics were tightly coupled in time at baseflow, yet displaying higher variability as discharge increased. Our timeseries studies highlight the relevance of the flow regime on the dynamics, origin and composition of DOM in a headwater stream. We discuss these findings in the context of extreme hydrological events on carbon fluxes.