Two year study of CO2, CH4 and N2O dynamics and fluxes in four rivers in Belgium (Meuse, Ourthe, Geer and Blanc Gravier)

A.V. Borges[1], F. Darchambeau[1], J.-P. Descy[2], A. Beulen[1]

[1] Chemical Oceanography Unit, Université de Liège, Liège, Belgium
[2] Unit of Research in Biology of Organisms, Université de Namur, Namur, Belgium

Two rivers and two streams close to the city of Liège in Belgium (Meuse, Ourthe, Geer and Blanc Gravier) were sampled to describe the dynamics of CO2, CH4 and N2O (for the first time in Belgium for freshwaters). The four systems were chosen to cover a gradient of size (stream to river) and of human influence (mainly forested to mainly agricultural watersheds). The study covers the period from February 2011 to March 2013 with weekly sampling in surface waters. The variables were very contrasted in the four systems, the Geer showing a strong enrichment in nitrogen and phosphorous, lower O2, and higher CO2, CH4 and N2O in relation to the other three systems. Marked seasonal variations were observed in the 4 systems, and in general the concentration of CH4, N2O and CO2 were higher in summer than in winter. Air-water CO2 fluxes varied from 24 to 607 mol m^{-2} yr^{-1}, diffusive air-water CH_4 fluxes varied from 28 to 8199 mmol m^{-2} yr^{-1}, air-water N_2O fluxes varied from 2 to 201 mmol m^{-2} yr^{-1}.