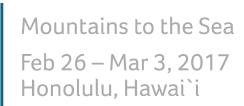
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VIEW ABSTRACT

CARBON DIOXIDE EVASION FROM THE SEINE RIVER: DRIVERS ANALYSIS AND SPATIOTEMPORAL RECONSTRUCTION (E)

Carbon dioxide evasion (FCO2) from rivers has been largely underestimated in global carbon budgets until the past 10 years and studies are necessary to provide a better quantification at regional scales. The Seine River basin (75,000 km2, France) is a typical example of intensively cropped and highly populated area (Paris conurbation: 18 million inhab.), where lateral flows of carbon and associated FCO2 need to be investigated. A sampling strategy of 40 river sites, including different water bodies (small streams in forested, grassland and crop areas, large urbanized river sections and wetland), over three contrasted hydrological periods, have been completed in 2016. The CO2 partial pressure (pCO2) was directly measured, using syringes headspace technique combined with infrared spectrometry, as well as particulate and dissolved, organic and inorganic carbon. Increase in pCO2 (from 1000ppmv to 6000ppmv) was found related to the hydrological conditions and land use, the highest values being observed for grassland and wetland. Dissolved organic carbon concentrations appeared strongly related with pCO2. Simultaneous, indirect pCO2 determinations using CO2SYS program showed a strong linear relationship with direct measurements. This relation allowed us to reconstruct the evolution of pCO2 over time, based on long and spatially explicit chronicles of measurements at the scale of the whole basin. Since 1976, the Seine River appears as a net source of carbon and the heterotrophy is more pronounced in the major urbanized branch (downstream Paris conurbation) than in its upstream sectors. The pCO2 evolved following the trends of domestic pollution progressively reduced since 1990.

AUTHORS DETAILS

Marescaux, A., Sorbonne Universités, UPMC, CNRS, IPSL, Oral presentation

UMR 7619 METIS, Paris, France,
Audrey.Marescaux@upmc.fr
Session #:001
Date: 03/03/2017

Thieu, V., Sorbonne Universités, UPMC, CNRS, UMR 7619 Time: 17:00 METIS, Paris, France, Vincent.Thieu@upmc.fr Location: 306 A

Borges, A. V., Université de Liège, Unité d'Océanographie Presentation is given by student: Yes

Chimique, Liège, Belgium, Alberto.Borges@ulg.ac.be

Garnier, J., Sorbonne Universités, UPMC, CNRS, UMR 7619 METIS, Paris, France, Josette.Garnier@upmc.fr

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