



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.

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DETAILS

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