



Assimilating high-frequency data in a hydro-biogeochemical model of river systems, the ProSe-PA approach

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The coupling of high frequency data of water quality with physically based model of river systems is of great interest for the management of urban socio-ecosystems. It offers the opportunity to manage on-line Waste Water Treatment plant depending on the quality status of river systems and also to re-analyze river water quality data with a focus on fluxes of carbon and oxygen within the river system.

We present here a first implementation of a data assimilation method that couples a particle filtering algorithm with the hydro-ecological model ProSe, the full structure being called ProSe-PA. The procedure is designed based on the results of a sensitivity analysis of the ProSe model that allows for the identification of the twelve most sensible parameters of the model (Wang et al., 2018). Those parameters are both physical (water re-aeration by fluvial navigation) and physiological (for instance growth rates of heterotrophic bacteria and phytoplankton).

The performances of ProSe-PA are assessed on a synthetic case study that mimics 66 km of the Seine River based on a reference dataset generated with ProSe on the well validated Seine River (Vilmin et al. 2015, 2016, 2018). ProSe-PA identifies over time the ranges of each parameter values properly, and therefore the uncertainty on dissolved oxygen concentrations and inner system fluxes.

References :

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