

Poster Presentation

Theme 3.1: Biogeochemical Processes - Processes Understanding and Human Impacts

Keywords: coupled Earth system, sediment erosion, POC fluxes

Sediment erosion as a component of the global Carbon cycle; assessing the sediment erosion fluxes at the European scale

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Soil erosion transports fine particle soil material from the hillslopes down to low-lying land areas, which leads to an established carbon loss from the topsoil layer. Sediments mobilized by erosion are often highly enriched in soil organic carbon on their way towards the stream and within the river system. Although exhaustive studies of the drivers of carbon transport by means of sediment erosion can be found in the literature, the exact mechanism of the sediment movement is still not fully explored. As a consequence, small or regional scale erosion models do not provide a proper spatial representation of POC erosion and deposition, especially with regards to the stability of the organic matter in the sediment and the emission of greenhouse gases.

We have developed a European scale sediment erosion model as a transport agent for POC to simulate the hillslope carbon losses and loading into the river network. We are aiming to better understand the role of lateral sediment and carbon fluxes at the continental level as a key component of the global carbon cycle across the Land-Ocean Aquatic Continuum. Our study is based on the RMMF model, where sediment transport is driven by sediment mobilisation processes in relation to the calculated transport capacity of the surface runoff. The model uses validated soil class maps, as well as crop cover and slope estimates from EDIT geoplatform and HydroSHEDS & GMTED2010, respectively. The Hydrology was derived using the HYPE model dataset (SMHI, 2008). Calculated annual fluxes of sediments entering the inland water network depict the variety in erosion rates for the 32 European catchments modelled in this research. The interannual variability of particle fluxes for iconic river systems such as the Rhine and the Danube is analysed as well. The output of the pan-European model is compared against field data collected by different national and international authorities (i.e. Waterbase.nl, ICPDR, UPMC) and will be the basis for the simulation of fluvial POC exports to the coast.

Poster Session (see poster session schedule)