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# From annual to daily sediment fluxes modelling at global scale

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Availability of measured river fluxes is decreasing globally particularly for sediment. The riverine transport of sediment yet represents a key pathway in the global geochemical cycle. Indeed, sediment-associated transport accounts for most of the total river-borne flux of elements such as nutrients and heavy metals. With the growth of interest in global environmental change, it is important to evaluate our ability to describe and understand the functioning of the geochemistry of the earth system.

Despite the significance of sediment fluxes, only a limited number of models aims at quantifying them at a global scale and daily time step. Recently, the hydrological model HYPE (Lindström et al., 2010) has been set up and calibrated for streamflow discharge at a global scale (Arheimer et al., 2018). This semi-distributed model with about 100,000 catchments (median size of 1000 km2) is established from open global data sources (WW-HYPE, http://hypeweb.smhi.se/). We extended this global model to simulate sediment production and transport from source to sea.

Here we present (1) a global dataset that includes sediment loads, concentrations, and reservoir sedimentation rates from global and national sources; (2) main drivers and spatial patterns in relations to physical, meteorological and hydrological descriptors as they affect sediment at an annual scale; (3) and finally, considering the simplified modelling inherent to global models, we will discuss the ability of WW-HYPE to describe intra-annual variability of sediment fluxes at a monthly and daily time step.

References

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