From Water-Sediment to All Material Fluxes in Large River Eco-Systems

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Abstract

Healthy river eco-systems are essential for sustaining the natural environment and human society. Understanding of the material fluxes in river basins, including those fluxes that are related to water, sediment, nutrients, trace materials, living organisms, and greenhouse gases, could enable to improve monitoring and restoration of river ecosystems. For such purposes, new perceptions and approaches necessary to account for all material fluxes in large rivers is thus of the utmost importance. Based on the concept of all material fluxes (AMFs) for better understanding of material interactions in rivers and integrated management in river basins, we implemented large-scaled monitoring on AMFs in the Asia's largest rivers (e.g. the Yangtze River, the Yellow River, the Lantsang River, and the Yarlung Zangbo River), the world's largest water diversion canals (e.g. the middle and the east routes of the South-to-North Water Diversion Project), and nationwide subsurface ecosystems (e.g. groundwater systems cross China). The big data derived from these big systems provide a very good platform to tell scientific stories through promoting international collaboration and interdisciplinary research on material fluxes in the world's large rivers.