Impacts of environmental factors on dynamics of particulate organic carbon adsorption on sediments

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**Abstract:** Revealing particulate organic carbon (POC) dynamics with sediment transport can bear on our ability to predict conditions of aquatic ecosystems through time or across space. In this study, a mechanism-based approach was used to investigate organic carbon (OC) adsorption on river sediment. This study considered sediment particle properties (particle size, particle density, surface site density, and particle morphology) and environmental factors. Based on laboratory experiments and previous literature investigation, a total of four environmental factors were identified as key factors that affect OC adsorption. These factors include dissolved OC concentration, pH, sediment concentration, and temperature. It is realised that the impacts of the four environmental factors on dynamics of particulate organic carbon adsorption were different. OC adsorption on sediment was found to correlate positively with dissolved organic carbon concentration. As for pH, sediment concentration, and temperature, adsorption on sediment correlated negatively with these factors. Considering the pH in natural aquatic ecosystems may not vary very widely, factors of temperature and sediment concentration, especially the latter one, influence OC adsorption more profoundly. Such results enabled us to understand how POC dynamic correlates to different environmental factors. This study is helpful for the development of hydrological and hydrodynamic model in both theory and practice.

**Keywords:** adsorption; environmental factors; modelling; particulate organic carbon