



Analysis of the fine sediment dynamics in the River Thames catchment (UK) using a sediment rating curve approach

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The effect of natural and anthropogenic disturbances on sediment transport in lowland rivers is a relevant factor in river management, especially in the context of changing climate and environment. Nevertheless, many of the processes that cause alterations in the sediment cycle are poorly understood, often due to lack of accurate data. In this study, we use a low-frequency suspended sediment sampling dataset to assess the spatial and temporal variations of sediment fluxes in the River Thames (UK). Several sediment rating curves (SRCs) were built in order to analyse spatio-temporal variations of catchment erodibility and sediment transport. First, changes in SRC coefficients in nine different sub-catchments were analysed and related to environmental factors including land cover, geology and vegetation. Then, the temporal variability of SRCs was investigated, both on a seasonal and inter-annual basis. Lastly, a simple dynamic SRC model was implemented in order to provide an estimation of the of sediment transport in the River Thames, and its performances were evaluated. The results quantify the spatial variability of sediment transport within the catchment and reveal a seasonal flushing effect, in which sediment loads are typically substantially higher during the first floods after the summer dry period. We estimate that, for the River Thames, the sediment loads of the first floods after summer are around double that of other floods. We also observed a decrease in the flushing effect which began in the late 1990s.