Sediment rating curves: some remarks for adequate nonlinear bias correction and uncertainty estimation of sediment loads.

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Sediment loads in streams are currently estimated using diverse kinds of sediment rating curves (SRC) that allow the interpolation and extrapolation of the discrete observations of sediment concentrations to the whole range of recorded discharges. Several authors showed that when non-linear equations are used, it is necessary to apply a bias correction factor, based on the residual analysis. More recently, some authors estimated the uncertainty of sediment loads using Monte-Carlo approaches based on the simulation of residuals or resampling the observations. Nevertheless, when these methods are to be applied in streams with a regime characterised by events, it is necessary to verify if different events have different discharge-concentration relationships; if this does occur, the role of events must be taken into account in the load analyses, as they modify the structure of the residuals.

Our results showed that when SRCs are used for interpolation between samples, paying attention to the role of events allows to avoid nonlinear bias overcorrection and to reduce the uncertainty associated with the sediment load estimates. When SRCs are used for extrapolation (prediction) for unsampled events, the role of events must be taken into account to avoid an underestimation of the uncertainty associated with load estimates.