Multi-objective fitting of concentration–discharge relationships (loads and concentrations)

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Abstract

Concentration–discharge (C–Q) relationships are widely used to assess the link between hydrological and biogeochemical processes at catchment scale. They can be fitted to represent either concentrations or discharge-weighted concentrations (i.e., load). In this technical note, we test a multi-objective calibration using both concentration and load, and compare it to a mono-objective calibration applied on either concentrations or load: although widely used in hydrological modeling, multi-objective calibrations are rarely applied to fit C–Q relationships. The multi-objective calibration yielded parameters which were more representative of the concentration behavior during the rarest high-flow events, avoiding issues of under-representation of high-discharge, low-concentration periods. In this technical note, we use the multi-objective calibration on a high-frequency dataset acquired on the ORACLE-Orgeval Observatory (France).

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