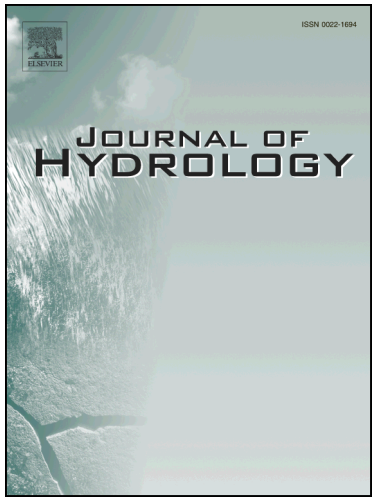

Research papers

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Qian Zhang, William P. Ball

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Improving Riverine Constituent Concentration and Flux Estimation by Accounting for Antecedent Discharge Conditions

Qian Zhang [a,*,1], William P. Ball [a,b]

[a] Johns Hopkins University, Department of Geography and Environmental Engineering, 3400 North Charles Street, Ames Hall 313, Baltimore, MD 21218, USA

[b] Chesapeake Research Consortium, 645 Contees Wharf Road, Edgewater, MD 21037, USA

[*] Corresponding author. Tel.: +1-410-267-5794; E-mail address: qzhang@chesapeakebay.net.

[1] Present address: University of Maryland Center for Environmental Science / U.S. Environmental Protection Agency Chesapeake Bay Program, 410 Severn Avenue, Suite 112, Annapolis, MD 21403, USA

E-mail addresses: qzhang@chesapeakebay.net (Q. Zhang), bball@jhu.edu (W. Ball).

Abstract

Regression-based approaches are often employed to estimate riverine constituent concentrations and fluxes based on typically sparse concentration observations. One such approach is the recently developed WRTDS ("Weighted Regressions on Time, Discharge, and Season") method, which has been shown to provide more accurate estimates than prior approaches in a wide range of applications. Centered on WRTDS, this work was aimed at developing improved models for constituent concentration and flux estimation by accounting for antecedent discharge conditions. Twelve modified models were developed and tested, each of which contains one additional flow variable to represent antecedent conditions and which can be directly derived from the daily discharge record. High-resolution (~ daily) data at nine diverse monitoring sites were used to evaluate the relative merits of the models for estimation of six constituents – chloride (Cl), nitrate-plus-nitrite (NO_x), total Kjeldahl nitrogen (TKN), total phosphorus (TP), soluble reactive phosphorus (SRP), and suspended sediment (SS). For each