

Model-Data Comparison in River Hydrochemistry

MARK A. TORRES, J¹. JOTAUTAS BARONAS², TREVOR COLE¹, NOOR OSMANI³

¹Department of Earth, Environmental, and Planetary Sciences, Rice University (mt61@rice.edu)

²Department of Earth Sciences, Cambridge University

³Department of Computational and Applied Mathematics, Rice University

The chemical composition of river waters holds valuable information about weathering fluxes and their controlling factors. Extracting this information requires the use of models for both solute source apportionment and inferring reaction kinetics. Despite the numerous challenges that exist with these model-based approaches, they have provided important constraints on the impacts of weathering on the long-term carbon cycle. In this contribution, we revisit models for solute source apportionment and concentration-discharge (C-Q) relationships and explore the effects of various model assumptions as well as data visualization approaches using both real and synthetic data. From these observations, we suggest new approaches for model-data comparison that take into account spurious correlation in ratio-ratio plots as well as allow hydrological constraints to be more easily incorporated into the evaluation of C-Q behavior.