

Interactive comment on “Landscape elements and river chemistry as affected by river regulation – a 3-D perspective” by E. Smedberg et al.

Anonymous Referee #1

Received and published: 28 April 2009

This manuscript evaluates the relative importance of specific land class contributions to river export of dissolved constituents. This is an important topic that is of general geochemical and hydrological interest, especially in the context of land-use and climate change. The paper focuses primarily on Total Organic Carbon (TOC) and Dissolved Silica (DSi) exports. For the watersheds evaluated, TOC and dissolved organic carbon exports can be assumed nearly equal or at least very similar.

This paper couples previously measured water discharge and water chemistry data with land class characterization data identify and quantify the effect of hydrologic and landscape alterations on watershed biogeochemical exports. The paper presents important new information, but is sometimes difficult to follow. This can be corrected by

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



moderate editing to more straightforwardly state the hypotheses tested and the study objectives and to identify and more fully explain the data sources for water discharge and water chemistry (Humborg et al. 2002 and SLU?) and the analytical approach.

Abstract – The abstract should be a stand-alone document that does not assume prior knowledge of the setting or of the paper that follows. For instance, sentence two discusses “22 river catchments in Northern Sweden” and then sentence three discusses the Luleälven drainage without stating how the Luleälven drainage relates to the 22 catchments. How many of the 22 catchments reside in the Luleälven drainage and why is it important to specifically discuss Luleälven in the abstract? Also, soil generally refers to the developed soil horizons that overlie other unconsolidated deposits and bedrock, whereas “regolith” includes the soil plus those other unconsolidated deposits. Throughout the paper, the authors commonly use “soil cover or depth” when they are actually referring to regolith thickness or the thickness of the unconsolidated deposits (including soil). This needs to be explained. Just state that “soil” in this paper refers to everything overlying bedrock. Finally, the last sentence contains an important conclusion of the paper that needs to be more strongly stated. For instance: “Hydrological alternation of these relatively small headwater areas significantly impacts downstream flux of dissolved constituents and their delivery to receiving water bodies”.

Introduction – line 2: number of dams **is** consistently growing...; lines 18-22: ... thus making vegetation, the ultimate source of total organic carbon (TOC) in these catchments, a vital land class component, Humborg et al. (2002) suggested that altered.

Paragraph 3357, line 27: Clearly state that you are discussing discharge-weighted mean concentrations and not discretely measured concentrations.

Paragraph 3358, lines 3 & 4: Specific runoff has units of length per time (mm yr^{-1}), not length per area per time. Line 9: “Thus the question arises: How can a change in such a relatively small area cause such a large reduction in DSi and TOC

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



yield or concentration?

Note: Use terms and units consistently. For instance, in paragraph 3358, “specific runoff” is used with one set of units and in paragraph 3363, “specific discharge” is used with another set of units.

Italicize genus names: *Betula* and *Salix*.

Table 1: Although data are presented from which TOC and DSi yields can be calculated, it would be informative to add those values to the table. Are there enough spatially discrete hydrologic and concentration data available to also calculate specific constituent yields for the different land classification types?

Figure 2: The small panels in figure 2 are difficult to view. Could all of the different panel information be put into one large panel that includes all of the different land cover classes?

Figure 4: Caption – Be sure to reiterate that you are plotting discharge-weighted mean concentrations. How many discrete measurements of water chemistry does each plotted point represent?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 3355, 2008.

HESSD

5, S2678–S2680, 2009

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper