

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

E. Smedberg et al.

Received and published: 25 May 2009

As a response to the comments by Referee #1 we have made the following changes to the paper:

Comment: "...state the hypothesis and the study objectives..."

Response: Added to the Introduction: "In this study we wanted to test the hypothesis whether individual land classes within a river catchment contribute equally to river loading with dissolved constituents and whether some land classes act as "hot spots" to river loading and if so, are these land classes especially affected by hydrological alterations. This study aims to highlight such potential "hot spots" in catchments with regard to dissolved constituents, showing that alterations of a relatively small area can

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



result in major changes in river chemistry if vital areas are affected."

Comment: "...more fully explain the data sources for water discharge and water chemistry"

Response: Changed to: River chemistry data from monthly measurements since 1970, was obtained from the Swedish University of Agricultural Sciences databank (SLU, www.ma.slu.se) and from seasonal field sampling carried out in 1999-2001 for sub-catchments of the rivers Kalixälven and Luleälven (Humborg et al., 2004). Water discharge data is from Humborg et al., 2004 where a semidistributed conceptual runoff model, the HBV model (Lindström et al., 1997) have been used to estimate runoff.

Comment: "How many of the 22 catchments reside in the Luleälven drainage and why is it important .."

Response: For the heavily regulated Luleälven, with 7 of the studied subcatchments, only 3% of the headwater areas have been inundated by reservoirs, some 10% of the soils and aggregated forest and wetland areas have been lost due to damming and further hydrological alteration such as bypassing entire sub-catchments by headrace tunnels. Due to the extensive regulation the river Luleälven is a key river in this study that focuses on the effects of hydrological alterations.

Comment: "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"

Response: Added in the abstract "throughout this paper soil refers to everything overlying bedrock i.e regolith" and in the Methods section 2.4 "Throughout this paper soil and soil-depth refers to everything overlying bedrock i.e. both the developed soil horizons as well as the underlying unconsolidated deposits"

Comment: "Abstract...last sentence...needs to be more strongly stated"

Response: Changed it to "Hydrological alterations of these relatively small headwater

HESSD

5, S2713–S2716, 2009

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



areas significantly impacts downstream flux of dissolved constituents and their delivery to receiving water bodies."

Comment: Page 3357 line 2: "number of dams is constantly growing"

Response: Changed accordingly.

Comment: Page 3357 lines 18-22:

Response: Changed commas accordingly.

Comment: Page 3357 line 27: "clearly state that you are discussing discharge-weighted mean concentrations"

Response: Changed to "concentration levels of discharge-weighted means of total organic carbon (TOC) and dissolved silica (DSi)"

Comment: Page 3358 lines 2 & 3, and paragraph 3363: "Use terms and units consistently. Specific runoff is used with one set of units and specific discharge is used with another set of units. Specific runoff has units of length per time"

Response: Changed to "annual specific discharge (mm)" consistently throughout the paper

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

Response: Changed accordingly.

Comment: Table 1 "Are there enough spatially discrete hydrologic and concentration data available to also calculate specific constituent yields for the different land classification types?"

Response: In order to calculate specific constituent yields for different land classes one would need to have hydrologic and concentration data from sample points draining sub-catchments consisting of only one specific land class. Since we do not have that it can not be calculated.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



Comment: 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?"

Response: Figure and caption changed accordingly.

Comment: Figure 4.: "...reiterate that you are plotting discharge-weighted mean concentrations"

Resonse: Changed accordingly.

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

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper