

Interactive comment on “Technical Note: A comparison of two empirical approaches to estimate in-stream nutrient net uptake” by D. von Schiller et al.

R. Hall (Referee)

Bhall@uwyo.edu

Received and published: 22 February 2011

This paper bridges two distinct ways of assessing the role of streams in regulating export of mineral nutrients. The first is a budget approach (Meyer and Likens 1979) which measures net transformations at the top and bottom of reach. The second is the spiraling method which typically measures gross removal of nutrients (Newbold et al. 1981) Here the authors used the mathematics behind spiraling to measure the net change in concentrations of nutrients within a reach. These approaches represent two ways to consider how streams can be net processors of nutrients. The authors founds that the approaches matched fairly well but tended to diverge at higher nutrient

C5142

concentrations. This paper fills a needed gap on how to interpret change in nutrient concentrations along streams.

I had some trouble understanding how N concentrations in groundwater were handled using the spiraling approach. I see on line 7536-3 that the groundwater concentration information is not required. I understand how conductivity is used to measure dilution by groundwater in nutrient addition experiments, but what are the assumed concentrations in the groundwater? The results might be different if it is assumed that zero conductivity and zero N water are diluting, or if the dilution water is about the same conductivity and concentration as the stream. I think the authors should provide more information on this point and possibly a mathematical proof/model showing how varying groundwater N or conductivity will or will not affect the estimate of kw.

Though beyond the scope of this paper (thus I am not asking for more data!) a large component of nutrient transformation is conversion of mineral nutrients into organic forms which are subsequently exported. A stream can have no net effect on total N or P export, yet it might have large net uptake of mineral nutrients, which are stored for some time and then exported as particles. This point should be mentioned in the paper.

Methods section needs a description of statistical approaches and justification. For example, it is unclear to me why non-parametric statistics were used.

Specific comments:

7529-5. I suggest nutrient release will be just as important in streams dominated by photoautotrophs.

7532-7. I am not sure I would use the word “significant” to describe the outcome of a sensitivity analyses on a mass balance model. Just say “different”.

7534-24. But does the spiraling approach consider variation in groundwater concentrations?

C5143

7534-29. Bu over annual time scales, perhaps net mineralization and net uptake cancel out

Fig. 1 1:1 line is easier to see if axes have same ranges and tick marks.

Interactive comment on Biogeosciences Discuss., 7, 7527, 2010.

C5144