

Public justification (visible to the public if the article is accepted and published):

Dear Authors,

Thank you for your careful revision in response to all comments and suggestions of the three reviewers. Two of the same reviewers provided overall positive evaluations of your revised manuscript. Based on their positive evaluations accompanied by a small number of comments, I am pleased to recommend your revised manuscript for acceptance after some technical corrections. Please refer to the following comments offered by the reviewers and additional ones from my own reading:

- Additional comments

Title: Please check which one grammatically and semantically suits better - “Effects (The effect) of A on B” or “Roles (The role) of A in B”.

REPLY: Thank you for this comment; we changed ‘Roles’ for ‘The Role’.

Line 8: Please include “agricultural” before “headwater catchments”.

REPLY: Done.

- Reviewer 1

The authors addressed my comments. However, one point struck me right away. The average molar ratio DOC/Fe(II) must be similar to the slope of a regression line through data points presented in Figure 4a. My visual assessment of the slope from the figure would be: $(50\text{mgDOC/L} - 25\text{mgDOC/L}) / (12\text{mgDOC/mmolDOC}) / ((25\text{mgFe/L} - 10\text{mgFe/L}) / 55.85\text{mgFe/mmolFe}) = 7.8$, which one order of magnitude different to the average ratio of 142 reported in the revised manuscript. Please check if the reported ratio of 142 is correct.

REPLY: We verified our calculations, using the same molar ratio as the reviewer, and we can confirm that the mean ratio of 142 is correct. Please note that the standard deviation is high, about 285, reflecting a large variability in DOC:Fe(2) ratio owing to field conditions. Thus, the mean ratio is influenced by high values and this is not reflected in the DOC versus Fe(2) plot.

- Reviewer 2

General comments

The authors did a good job addressing the reviewer’s points. There are only very few technical corrections needed from my point of view.

Specific comment

Introduction

L36ff: Check this sentence. „Flushing... represents ... loads“. It is the process of flushing that is responsible for the majority of exported loads?

REPLY: Yes, but for clarity we modified the sentence. We replaced ‘Flushing’ by ‘Subsurface flow through’ and ‘typically represents’ by ‘is responsible for’. The sentence now reads: ‘Subsurface flow through shallow organic-rich soil layers during storm events (at the daily scale) is responsible for the majority of annual DOC loads [...]’

Methods

Figure 1: Consider to place the stream network above the hydromorphic soil layer.

REPLY: Done.

L139: Can you check the manuscript for DOM vs. DOC? Not sure if there is a consistent rule when to take what term. Just make sure you have a consistent principle.

REPLY: In the manuscript, we used DOM for referring to the dissolved organic material in general (that is all organic molecules, including those that do not contain C) and DOC to specifically refer to the concentration of organic carbon in the filtered samples. DOC is commonly used as a proxy for DOM content. We take care to apply this rule in the whole manuscript.

L208ff: I now better get the point why averaging was done. However, this is not fully clear from the text since you write that you want to cluster to show temporal patterns of each cluster. For this reason you average over time. This is a bit misleading in this order. You may explicitly write that “only” for the sake of clustering a temporal averaging was done. After classification you display and interpret the time series of each cluster. Not sure if that is more clear though...

REPLY: We try to make our purpose better in the material and methods: ‘For this reason, data (DOC, NO₃, SRP and Fe(II) concentrations and the relative contribution of PARAFAC components) were averaged for each lysimeters then normalized **in order to group spatially the lysimeters before investigating temporal patterns.**’

Thank you for submitting your work to Biogeosciences.

Sincerely,

Ji-Hyung Park
Associate Editor, Biogeosciences