

Interactive comment on “Comment on “Solute specific scaling of inorganic nitrogen and phosphorus uptake in streams” by Hall et al. (2013)” by R. González-Pinzón et al.

Anonymous Referee #1

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The central point of this Note is to point out that correlation between two variables that are themselves BOTH a function of hidden underlying variable are spurious in nature, and so limited in enhancing mechanistic understanding. This general point is specifically anchored in a criticism of the Hall et al. 2013 paper where S_w (call it X) is correlated to Q/W (call it Y). The argument is made in this paper that both of these quantities are functions on u (call it Z), and hence any correlation between X and Y is then at least partially driven by velocity, u .

Since I am not an expert in the subject matter field, I cannot definitively assess the correctness of the scaling arguments leading the conclusion that u is a common factor (which Hall et al could rebut, or otherwise argue the centrality of this point). However,
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the logic about spurious correlation is correct: if X is a function of Z, and Y is a function of Z, there will be a spurious correlation simply due to the fact that Z imposes an underlying dependence (true even when they are random variables). Hence, the mechanistic usefulness of any relation between X and Y is limited.

However, there is really no reason for the paper to continue after the paragraph that includes equation (3) and (4). The basic point is well made by then in the context of the problem at hand. I feel the remaining material after that does not add much. It is an attempt to illustrate the well-established statistical concept of partial correlation, and it would be better just to reference that material directly. Similarly the scientific concept of externally forced non-coupled variables is well appreciated (e.g. what came to mind immediately is Example 1 in Sugihara et al. 2012, Science – as part of a study of causation vs. correlation).

There is no reason this could not be a 1-2 page Note (no Figures needed). This will clearly make the author's point, and so open it up to any rebuttal from the original authors or others.

Interactive comment on Biogeosciences Discuss., 12, 5991, 2015.