

Interactive comment on “Acid-base characteristics of the Grass Pond watershed in the Adirondack Mountains of New York State, USA: interactions between soil, vegetation and surface waters” by K. M. McEathron et al.

Anonymous Referee #1

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The study ‘Acid-base characteristics of the Grass Pond watershed in the Adirondack Mountains of New York State, USA: interactions between soil, vegetation and surface waters’ evaluates stream and soil characteristics as related to the presence or absence of acid tolerant or intolerant tree species. This study furthers some of the work already conducted by Mitchell’s group and others in the northeastern US who have looked at the presence of, in particular, base-rich indicator species as related to soil and water characteristics. The novelty lies in it being a more in depth analysis that attempts to find

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specific acid-base indicator variables that result in (correlate with) base tolerant versus intolerant tree species being present at certain places in Grass Pond watershed. Also very little research has been conducted to assess whether or not black cherry is an acid tolerant species. There are a few issues that need attention:

1. The Introduction needs further development. The last paragraph in particular needs development and more references to literature. Page 10777, lines 17-21 should be clearer. There is mention of trees being different in their ability to cycle base cations and may result in differences in soil base cation concentrations in forest stands (p. 10777 line 17-19). By 'forest stands,' you really mean soil under the trees (I think). Expand on this. This paragraph discusses relationships among acid intolerant species, specifically, looking at relationships among sugar maple basal area and stream and soil characteristics. It does not talk about predicted relationships concerning acid tolerant species, such as black cherry, with stream and soil characteristics. This should be included here since this is the focus of the manuscript. Why do we care about sugar maple and black cherry in particular? The mention of Grass Pong is sort of out of the blue. Might want to include a little text context about Grass Pond here (I know some is in the methods). Maybe talk about it in the context of the Adirondacks and it being a sensitive area to acid deposition.
2. The two types of statistics in this manuscript seem redundant. A disclaimer that I am not a statistician. However, first a correlation analysis is done whereby relationships among basal area, and soil and water characteristics are assessed. Then a CCA is performed where the same information seems to be gleaned. Could the results of the CCA be presented both in the graphs (as already done) and in a table form, where specific correlations could be examined? Also it is not clear from the description of the CCA if environmental variables and basal area are more highly correlated if they are physically closer to each other?? For example, p. 10785 lines 5-8 claims that there is a strong positive association between sugar maple and stream water ANC, BCS and pH. The environmental parameters are physically far from sugar maple on the graph

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shown in Figure 5c. Does this matter?

3. Correlation between certain variables is highlighted throughout this manuscript that are not significant. Results and discussion of these correlations should be done cautiously and major conclusions should not be drawn from non-significant correlations. Specific instances of this are indicated in the detail below. Although the paragraph on page 10787 lines 5-15 highlights the limited statistical power, this needs to be more strongly stated in the abstract, results, and conclusions. See more detail below.

More detailed comment:

Title: 'between' should be replaced with 'among'

P. 10777 line 11: Change 'does' to 'grows'

P. 10779 Section 2.3.1: An inset figure to Figure 1 would be helpful in describing Grass Pond and its subwatersheds. Use something like Figure 4 for the main figure and show Grass Pond in NY as an inset to Figure 1.

P. 10783 Section 3.1: Figure 3a and 3b should be switched since 3b is referred to first.

Line 20-21: elaborate on the statement 'indicating elevated nitrogen levels'

Lines 21-23: What constitutes high AI? Based on what reference?

Lines 25-28: Same thing. What is a low nitrate value and high DOC value? Based on what reference?

P. 10784 Lines 5-6: BCS and pH are not significantly correlated with sugar maple. P is $> 0.05!$

Lines 11-14: Again black cherry is not significantly inversely correlated with BCS, pH, NO₃, and ANC nor is stream water DOC significantly correlated with black cherry basal area.

Page 10785 lines 4-8: Is there a strong association between sugar maple and pH in

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the forest floor? And is there a strong association between black cherry and pH in the mineral soil?

Lines 26-27. Again, these relationships are not significant and conclusions are being drawn here.

Page 10786 Line 6: Citation needed after this sentence.

Line 9: Citation needed after this paragraph.

Line 25: add 'associated' before C:N

Page 10787 Lines 5-16: Develop this paragraph more. Line 8: Aren't you looking for variation in Ca among plots as related to species composition? Also change 'between' to 'among'. Line 8-9: Why would lack of soil development results in low statistical power? Lines 12-13: Very few significant correlations have been identified in this study!

Table 1 and 2 could be combined

Figure 4: In my version, the legend is unreadable. The circles are not very distinguishable from the small to large sizes. Caption should not be discussing correlations. Rather, describe the figure pictured.

Figure 5: Make axes the same range. Font size is too small.

Figure 6: Why is hydrology mentioned here? Remove.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 10775, 2012.

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