

Interactive comment on “Measuring ecosystem nitrogen status: a comparison of proxies” by M. Almaraz and S. Porder

Anonymous Referee #1

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This study presents a comparison of different proxies for assessing the nitrogen status of terrestrial ecosystems. Such proxies are essential if we are to assess the influence of nitrogen on these ecosystems, but various proxies exist and it is yet unclear which proxies are preferred above others, and how the different proxies relate to one another. The current study addresses primarily the latter. Although I find this a useful effort, I think especially the analyses require revisions to improve the quality of this study.

General comments: As the study is now it is only indicative of the relationship between different proxies of nitrogen availability, and although differences between biomes are discussed, I think additional analyses are required to be able to draw firm conclusions regarding the difference among e.g. boreal, temperate and tropical systems. So, I suggest that the authors test statistically if for example the relationship between soil d15N

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soil and foliar d15N differs between temperate and tropical systems (as suggested on l. 167-168).

Although I understand that the potential proxies are numerous and choices need to be made, I wonder why authors did not include soil C:N ratio. This ratio is often considered a good indicator of soil nutrient status (see e.g. Alberti et al 2015, *iForest* 8, 195-206). It is also an easy measurement to make so I advocate to include this ratio in the study.

I wonder if the authors could test for the influence of the distance between watershed and stream in the analysis of the correlation between soil proxies versus stream DIN:DON (perhaps with a subset for which this info is available).

Finally, I suggest that the authors make their dataset available. At minimum, a list of sites and coordinates should be given, but I hope authors can also provide the associated data for the various proxies.

Specific comments: l. 9: bracket after ‘correlate’ should come before ‘correlate’ l. 46: remove ‘in solution’ (dissolved is obviously in solution) l. 70: I suggest to rephrase ‘we asked which were correlated’ l.181-182: I disagree with this statement that category 1 and 2 proxies showed a robust relationship. In a dataset with huge variation (like this one), a significant correlation between 2 metrics does not necessarily imply a robust relationship, and visual inspection of the relationships in Fig. 3 does not support the statement. There is some correlation, but there is a lot of unexplained variance. l.194-198: How is d15N of soil (and plants) influenced by N deposition? If N deposition influences soil and plant d15N, the use of these proxies globally may not be ok because similarly rich sites would differ in d15N depending on the N source. l.211: ‘that’ after ‘seem’ and ‘to’ after ‘used’

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