

Interactive comment on “Imbalanced phosphorus and nitrogen deposition in China’s forests” by E. Z. Du et al.

Anonymous Referee #2

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Review:

This is an interesting paper, discussing a previously not available dataset on phosphorus and nitrogen deposition fluxes on forests (through fall and bulk deposition). The paper is well written, and the context and relevance are well explained. The issue of increasing dis-balance of phosphorous to nitrogen ratios may further worsen, if fire from coal and biofuel use in China will be reduced, and/or particulate emissions will be better controlled. This issues could warrant some further discussion.

I see some major weaknesses of this study:

1) The assumption that bulk minus through equals dry deposition is rather challenging. Throughfall measurements are easily compromised by input from the canopy, it is not clear what was done to prevent this. For N bulk deposition may not capture input

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potential significant input from gaseous nitric acid- and may in this sense not be a good proxy for total deposition. Some discussion on the specific situation in China is warranted. I guess the applicability of the approach to estimate phosphorus deposition is even less well known. At any rate a better quantification of errors is needed.

2) the constraint of only using bulk deposition and throughfall observations (where both are available), is providing a very limited amount of observations, and raises questions about representativity for larger regions. I understand that a wider dataset of deposition measurements are available in other ecosystems (e.g. the authors mention that N-dep is relatively well known), and I would recommend to analyse also these in the context of this core set of depositions over forests. To what extent are the forest observation consistent with nearby depositions over other regions? Are the same urban-rural decay of depositions observable also in other datasets? What would wet-versus bulk versus throughfall tell?

3) As the motivation of the study is to point to a dis-balance in P:N ratios- I wonder how the numbers in this study compare to published and modeled deposition maps of N and P, used as input to vegetation models. For instance p6/l3 mentions a number of 4.6 Tg N/yr deposition on Chinese forests. In my impression this is not very different from model estimates, but this can be corroborated. How would the estimate of P deposition compare to current estimates (e.g. Wang 2015; Mahowald; 2008).

Nevertheless, altogether an important dataset and analysis, which I would recommend to publish in ACP, after duly accounting for these comments.

Minor comment:

P 3/l 9: what is taken city-centre or city-boundary? How defined?

p. 6 l 24 were is this number coming from?