

Interactive comment on “Estimation of nitrogen budgets for contrasting catchments at the landscape scale” by E. Vogt et al.

Anonymous Referee #1

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Dear Professor Billen,

Thank you very much for the opportunity to review the paper by Vogt et al. entitled “Estimation of nitrogen budgets for contrasting catchments at the landscape scale”. Authors have presented a very nice paper fully in the scope of Biogeosciences and its Special Issue on nitrogen. In my opinion, this work is particularly valuable for the next reasons: i) Authors present two highly detailed and contrasted budgets based on intensive field measurements and suitable modeling approaches; ii) the surpluses of a traditional budget have been properly split in several compounds and this is very useful and also unusual at this scale; iii) some results are very interesting and new, for example the relationships between stream DON and DOC and peat cover or peat cutting, and the importance of DON in the share of stream dissolve nitrogen in the

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moorland catchment; iv) it is shown how a not very impacted catchment such as the moorland catchment can be N saturated; v) the typical uncertainties of this kind of approaches have been properly described by the authors.

I have, however, one general comment and some suggestion and specific questions.

In conclusion, I certainly recommend its publication in BGS after considering next comments:

General comment: I do not feel comfortable with the concept “landscape NANI” proposed by the authors in this paper. The strength of the NANI approach (recently overviewed by Swaney et al. 2012) lies in the fact that only “new nitrogen” is accounted. With this approach all double counting related to N recirculation is avoided. On the other hand NANI approach has not the power of resolution achieved by authors in this work. The budget presented in the paper (Section 3.9) is practically the same as a regular soil balance approach on agricultural soils but including the estimation of deposition in the entire catchment surface. The result of the subtraction is the agricultural surplus + deposition in non-agricultural areas. In a relative equilibrated catchment NANI and agricultural surpluses should be quite comparable because NANI (new N) will replace that N that is being lost or not used. If the catchment is populated (not the case) we should also add point sources. As conclusion: I would clearly avoid the use of the term “landscape NANI” because highly differs from the original and will generate misunderstandings. The “catchment retention” estimated by authors can be therefore perfectly compared with the estimations carried out by Billen et al. (2011) for large catchments, indeed there are two papers in this special issue performing similar comparisons (Bartoli et al. and Lassaletta et al.). Finally, N fixation in managed grasslands needs to be included as anthropogenic input.

Minor comments: P8990 L9 In croplands and managed grasslands N-fixation must be also considered as an agricultural input.

P8991 L5. Despite being similar, N budget and N balance are not exactly the same.

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Budgets provide a full record and account of all N flows as is generally done in the cited literature. Please substitute balances by budgets.

P8992 L2-5 Expressed like this, objectives look like conclusions of the study.

Section 2.1 Please provide information on PP and temperature on the studied area.

Fig 1. It could be obvious, but a label indicating each catchment name (Grassland – moorland) in this first figure would be the useful to facilitate the reading.

P8894 L6 Do you mean section 3.8?

P8996 Herridge et al 2008 have estimated 150 kgN/ha for clover grasslands and 50 kgN/ha for legume-grass pastures. Despite there is no much clover in this pastures, 1kgN/ha it could be a too low value for any grassland.

P9000 L15 No NH3 emissions for animal excreta?

P9004 L2 “originated from direct agricultural land inputs” because a proportion of the atmospheric deposition comes from volatilized and redeposited N.

P9005 L17-19. In my opinion, this sentence is unnecessary.

P9006 L15 Do you mean section 3.9?

Fig 6 and 7. Please put y-axis in the same scale.

P9009 L13 For my part, the accuracy of stream fluxes estimation performed in this study is pretty good. I agree with authors and levels of PON are probably very low when compared with DIN and DON. I would not be so critical with stream fluxes estimation in the conclusions.

Interactive comment on Biogeosciences Discuss., 9, 8989, 2012.