Biogeosciences Discuss.,
doi:10.5194/bg-2017-107-RC4, 2017

Biogeosciences Discussions

Interactive comment on "Complex controls on nitrous oxide flux across a long elevation gradient in the tropical Peruvian Andes" *by* Torsten Diem et al.

Anonymous Referee #4

Received and published: 11 May 2017

Diem et al. present a comprehensive set of lab and field data relating to controls of soil nitrous oxide flux across an elevation gradient in the Peruvian Andes. As both long-term field measurements and lab-based manipulations are included, they are able to approach the discussion of N2O fluxes in these ecosystems from several different directions. This was excellent work that will be a valuable addition to our current knowledge of N-oxide fluxes and tropical montane ecosystems. However, the authors could really improve the paper by taking some additional time to craft a more integrated presentation/summation of their study. The results section, in particular, should be revised. A well-designed table or figure (or combination) could provide a fascinating and useful summation of the different experiments, while eliminating the repetitive text. Instead,

the text of the results section should highlight the most important results – much of this could be moved from the discussion section, which can then be condensed and re-focused to provide a bit more literature context about the different aspects of the results being discussed.

Minor comments: Line 105: substrates for ____? Line 138: give average temperature range over the course of the study Line 161: change 'because of' to 'due to' Line 172: provide volume of chamber Line 179: specify intervals Line 187-192: were zeroes included? Line 227-230: provide more detail: soil samples were taken in the field, air-dried and then re-wetted to target WFPS? Line 231-233: needs clarification: 0-10 cm depth included the organic layer at all elevations, except in the upper montane forest where 0-10 cm depth included only mineral? If 0-10 sometimes included the organic layer, what was the thickness of the organic layer at those elevations? What was the thickness of the organic layer at the upper montane site; how deep did you go to access the 0-10 mineral sample? explain reasoning behind this sampling decision; could this have affected your results? Line 297-307: clearly distinguish between 'soil core' and 'soil sample'; "core" implies that the soil is still intact – once it has been mixed and added to the jars, the soil samples are no longer soil cores Line 300-301: unclear; the five cores were mixed and then split into four equal parts? was the subsample and WFPS adjustment done on the cores or on the mixed soil in the jars? Line 375: change 'with' to 'and' Line 462: followed by topography Line 473: change 'is' to 'was' Line 474: define the fluctuation or refer to a table or figure where it is defined Line 585: change 'for' to 'from' Line 761: change semicolon to comma Line 768: between soil temperature and ___? Line 779: change 'as' to 'at' Line 782: change 'are' to 'is' Line 836: remove 'and'

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