

Interactive comment on “Long-term nitrogen addition decreases carbon leaching in nitrogen-rich forest ecosystems” by X. Lu et al.

X. Lu et al.

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Response to Anonymous Referee #1

We would like to thank the Anonymous Referee #1 for the comments on our manuscript, which have helped to improve our manuscript greatly. In this new manuscript, we have addressed well about these comments and suggestions. Please see the following on our responses to the Referee’s comments, and also see our new manuscript attached with the highlight.

It is my pleasure to read the manuscript by Lu et al. entitled “Long-term nitrogen addition decreases carbon leaching in nitrogen-rich forest ecosystems”. In this study, the authors have experimentally manipulated N inputs in a subtropical forest for 7 years.

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They found that N addition decreased the concentration of dissolved organic carbon (DOC) in soil solutions, implying that this forest ecosystem might potentially sequester more C under enhanced N deposition scenarios. The experimental design is solid and the manuscript is well written. I'd support the publication of the work in this decent journal. I have a few minor comments, which I hope they'll help improve the manuscript.

[Response: Thanks a lot for these kind comments.]

1. It seems to me that this study was conducted in one site, so it might be good to change the title as " : : in A Nitrogen-Rich Forest Ecosystem".

[Response: We have changed the title as suggested in the new manuscript (e.g. Line 1-2).]

2. Page 4, lines 9-10. It might be not appropriate to say that "the purpose or objective of a study is to suggest mechanisms of ". So I'd suggest you delete the last sentence here.

[Response: We have deleted the last sentence here. Now the new sentence has become "The purpose of this study was to examine the effects of how long-term (7 yr) experimental addition of N affects DOC dynamics in the N-rich tropical forests." Also please see Lines 91-92 in the new manuscript]

3. Page 6, lines 3-4. You may need to justify why this experiment included two high N levels (100 and 150 kg N ha⁻¹ year⁻¹), given that the rate of N deposition is in the range of 20-40 kg N /ha/year as shown on Page 5 lines 13-16.

[Response: Our using this concentration gradient is based on the present atmospheric N deposition rate and the expected increase in the future due to the rapid development of agricultural and industrial activities. In addition, it has been suggested that any effects of chronic low level N addition are likely to be similar in direction, if not magnitude, to the short-term effects of high rates of N addition (e.g. Báez et al. 2007; Clark & Tilman 2008; Lu et al., 2010). Hence, results from our present concentration gradi-

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ents could be as a prediction for the future changes. We have pointed out this in “2.2 Experimental treatments”.]

4. Page 11, line 19. what depth? Which year?

[Response: We have added the information of sampling depth and year for the first measurements. Please see “Earlier measurements in the year 2005 at our site showed that N addition had no significant effects on soil solution DOC concentrations below the primary rooting zone (Fang et al., 2009). . . . ” in the new manuscript.]

5. Page 12, line7. You'd better specify a biological mechanism rather than say a general term "biological control".

[Response: Thanks. We have changed as suggested. Please see the new manuscript.]

6. It is good to make the tense be consistent throughout the text: for example, page 12, line10 “are” vs. page 12, line12 “was”.

[Response: Thanks. We have checked the tense and make it be consistent throughout the text]

7. So, in the Discussion Section, you basically proposed that: N addition decreased soil pH, increased Fe(III), then leading to lower DOC concentrations. How about the rate of the DOC production or decomposition of complex organic polymers? Did N addition also reduce that process?

[Response: Response: Thanks for this good suggestion. In this study, we have explored the biological mechanism, which could explain changes of DOC concentrations as a balance of production and decomposition from the view of the whole the upper soil layer. About the response of complex organic polymers to N addition in DOC production or decomposition, it can help clarify the biological mechanism in detail, and also is a good research direction, which merits our further study in the future.]

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8. Figures: I'd suggest you make the labels bigger in Fig.1, especially for the X-axis.
Overall,

[Response: Yes. We have made the labels bigger in the new Fig.1. Now it looks better.
Please see the new manuscript]

I think this study provides some interesting results, and merits its publication in Bio-Geosciences.

[Response: Thanks again. We deeply appreciate these kind and positive comments]

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/10/C328/2013/bgd-10-C328-2013-supplement.pdf>

Interactive comment on Biogeosciences Discuss., 10, 1451, 2013.

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