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Biogeosciences Discussions

Interactive comment on "Chronic nitrogen addition causes a reduction in soil carbon dioxide efflux during the high stem-growth period in a tropical montane forest but no response from a tropical lowland forest in decadal scale" *by* B. Koehler et al.

Anonymous Referee #2

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Koehler et al. report results from two N addition experiments in contrasting tropical forest ecosystems. They find that N additions in nutrient rich low land forests have little effect on soil C losses, while they do suppress C emissions from a nutrient poor montane forest ecosystem, which they attribute to a shift from belowground to aboveground C allocation. These results are an important contribution to our understanding of the interactions of nutrient cycling with the C cycle in tropical ecosystems, on which so far only few studies have been conducted.

The manuscript is carefully written and should appeal to the general audience of Biogeosciences. I do not have any concerns that haven't already been raised by Reviewer#1. My own comments are mostly editorial.

Minor comments:

How did the N treatment affect aboveground productivity (foliage and wood)? This is mentioned in the Discussion, however, I think it would be good to mention these effects already either in the site description (Section 2.1), or Section 3.3, to place the changes in soil CO2 efflux into perspective.

P8644 l 27ff: How can you rule out that changes in root respiration/growth/turnover confound the increase soil CO2 efflux with increasing temperature?

Suggested edits:

P8634 l11 "annual soil CO2 efflux was larger IN the lowland ... than IN the montane forest."

P8634 l17: "on a decadal time-scale"

P8634 l18f: in the 2nd and 3rd year N addition plots?

P8634 l22: ", in which stem diameter growth was promoted."

P8636 l1: replace "question on" by "question of"

P8635 l2: replace "but conflictive" by "however," or "to the contrary"?

P8637 l3ff: It is maybe true that this is the first study to compare results from a three year experiment to a decadal one, but why is this relevant – and it this a good experimental design? I would rather state that you used experimental results from two complementary study sites to assess the very important questions posed.

P8642 l 6-7: Are the values in brackets averages?

P8642 l14: Accordingly may be the wrong word here: I cannot see why moisture limita-

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6, C3128–C3130, 2009

tion of soil CO2 efflux necessarily leads to a regression model that includes a moisture-temperature interaction term?

P8647 l20: “On the other hand” requires “On the one hand”, consider deleting.

P8648 l20: I think that somewhere (either here or in the discussion) you should mention that the N rates applied are much higher that any anticipated N deposition rate (baring in mind that even the most polluted sites in Europe receive not significantly more than 50 kg N ha-1 yr-1), such that for lowland ecosystems based on your results one should not expect any significant impact for the next decades to come.

P8648 l 24: replace “should be” by “will be”

Figure 3 is referred to in the text only after Figure 4 and 5; consider merging Figure 3 with Figure 2 or revise Figure order.

Interactive comment on Biogeosciences Discuss., 6, 8633, 2009.