

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.

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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 | 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 | 11 “annual soil CO₂ efflux was larger IN the lowland ... than IN the montane forest.”

P8634 | 17: “on a decadal time-scale”

P8634 | 18f: in the 2nd and 3rd year N addition plots?

P8634 | 22: “, in which stem diameter growth was promoted.”

P8636 | 1: replace “question on” by “question of”

P8635 | 2: replace “but conflictive” by “however,” or “to the contrary”?

P8637 | 3ff: 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 | 6-7: Are the values in brackets averages?

P8642 | 14: Accordingly may be the wrong word here: I cannot see why moisture limita-

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

P8647 I20: "On the other hand" requires "On the one hand", consider deleting.

P8648 I20: I think that somewhere (either here or in the discussion) you should mention that the N rates applied are much higher than any anticipated N deposition rate (bearing 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 I 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.