

Interactive comment on “Soil CO₂ efflux from two mountain forests in the Eastern Himalayas Bhutan: components and controls” by Norbu Wangdi et al.

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Anonymous Referee 1

General comments

This manuscript describes measurements of soil respiration (Rs) made in the field in two forests in Bhutan, supplemented by laboratory incubations, that looks at Rs fluxes, sources, seasonally-driven changes, as well as sensitivities to temperature and moisture. This is interesting and valuable, given the paucity of data from this region, if not groundbreaking. The ms is reasonably well written, although there are many minor English errors, and frequently insightful. I particularly liked the comparison between

C1

different techniques and measurements/models, even though this is not developed as fully as it could be. There are some problems. Aspects of the methods and results are unclear; in particular, the authors should be careful to distinguish between measured and modeled results, why and when each was performed, and when they're referring to each. I think the trenched plot results could be better discussed, particularly as the problems that occurred seem relatively straightforward to explain. Finally, and very importantly, the authors need in my opinion to post or include the data and code backing all their main results (see 9 below). In summary, this ms needs moderate to significant revisions in many places, but it's fundamentally a strong and interesting study.

We thank the anonymous referee for the constructive comments and suggestions. We revised the manuscript accordingly and incorporated all the comments and suggestions. The model code is also included as supplementary files to the manuscript as well as the data.

Specific comments

1. Lines 23-24: why does a discrepancy between modeled and measured Ra indicate trenching performed poorly? Clarify. Might also add “, probably because of the short time lag between trenching and measurement”?

We clarified that and added more discussion about the strengths and weaknesses of both methods (L259-303).

2. L. 27: “preceding”?

Changed to “prevailing”

3. L. 37: maybe “potentially feeds back on global climate change”. Also there are better citations for this, e.g. Frey et al. 2013 (10.1038/nclimate1796) or Wang et al. 2014 (10.1111/gcb.12620)

Changed and suggested citations added.

C2

4. L. 50: start a new paragraph

New paragraph set.

5. L. 67: “would show decreases in Rs during”

Changed

6. L. 118-: what was delay between trenching and starting measurements?

Plots were trenched in April 2014. The delay was 1 year accordingly. We stressed this in the revised manuscript (L80).

7. L. 172: better to say “Effects of site” rather than “forest type” since you can’t actually test forest type (as n=1)

Changed as “Effects of site” and we consistently use this term in the revised manuscript.

8. L. 190: perhaps “to calculate a projected daily field Rs” for clarity

Re-worded as suggested.

9. Availability of code and data? It’s 2016, and I expect all code and data (at least that backing the main results) to be included as supplementary info, or posted in a repository. It’s not acceptable to produce results from a black box

We have included the R-code as supplementary file and we will also upload the data to a repository.

10. L. 252-257: interesting!

Thank you

11. L. 278: “any meaningful Rh values”?

Trenching values from additional (2015) trenching plots were taken out (as suggested by reviewers 2 and 3) and discussion was adapted accordingly.

C3

12. L. 310-: “Q10 tends”; also should be “increase with decreasing temperatures”?

This discussion was taken out as we avoided Q10 for field Rs (suggested by reviewer 2 and 3).

13. L. 314: “than the ones”

Corrected

14. L. 327: “We intend to”

Corrected

15. L. 333: this is awkward English and unclear – why “ambivalent”?

Deleted.

16. L. 338: “Rs, falling well within”

Re-worded.

17. L. 345: “albeit”? What?

“besides” was the correct term

18. L. 348-353: interesting though unsurprising. Might mention this in abstract

In our opinion this is a little too specific for the abstract.

19. Figure 1: minor point but perhaps format x axis dates as “Apr 2014”, “May 2014”, or something like that to eliminate M/D/Y ambiguity (i.e. make consistent with Figures 4 and 5)

Incorporated in the final revised figures. Labels are consistent as we have removed the data for the year 2014 completely (suggested by reviewers 2 and 3). 20. Figure 3: necessary?

We removed the graph.

C4

21. Figure 4: this is confusing. At the very least, clarify the caption, and perhaps re-think how these data are displayed

We revised the graph and simplified the caption and data display.

22. Figure 5: perhaps note in caption that the Rh lines are cumulative

We improved the caption, it should be clear now.

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