Interactive comment on "Soil CO$_2$ efflux from two mountain forests in the Eastern Himalayas Bhutan: components and controls" *by* Norbu Wangdi et al.

Anonymous Referee #3

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This manuscript entitled "Soil CO2 efflux from two mountain forests in the Eastern Himalayas Bhutan: components and controls" by Wangdi et al. provides interesting, relevant and valuable information on a poorly studied region. Manuscript is mostly well written and easy to read. The use and comparison of different techniques of measurements and different models is interesting. Nevertheless, aspects of the methods and then of the results remained unclear because it was not easy to distinguish and understand when and also why measured or modeled results were used to suit the purpose.

Major revisions would be necessary to clarify the manuscript and to develop more explicitly the objectives of the comparison between different measurements/models.

General comments ————————- I am not convinced that 2014 field Rs data should be presented in the ms as they are not relevant because influenced by pressure effects. In the same way given the trenched plots in 2015 didn't produced meaningfull values, what does these data bring to the analysis? If retained, the trenched plot results could be better discussed.

Important care must be given to distinguish between measured and modeled results. Authors should explain why and when each was performed and also why and when they are referring to each

Specific comments ———————— 1) l.23-24 : unclear. I can't see why the variability of Ra indicates a methodological issue with the trenching

2) l.272 : prefer effect of sites rather than of forest type

3) l.190 : discuss how constraining the model with the temperature in the soil at 5cm depth is sufficient and relevant. What about the deepest contributions to Rs ?

4)l.190 : The same parameters (of Eq1) are used to model Rs over the year without any discussion whether or not the Q10 could vary with the temperature range over the year.

5)l.205-212 : agreed with reviewer #2 point 11. Indicate the uncertainties rather than that corrected value.

6) l.218: what is Fig S1 ?

7) l.246 : report and discuss the method used to estimate fine root biomass

8) l.259 : How can you be convinced that it 'indicates that a three-week interval is sufficient' although you didn't measured with a higher frequency ? Restrain the purpose.

9) l.278 : useful ?

10) l.308-319: I have issues with the analysis presented here because I am concerned

about the definition for the terms intrinsic and apparent sensitivities. Recently, Sierra et al. 2015, JAMES 7: 335-356 proposed consistent and formal definitions for intrinsic and apparent sensitivity. It would be nice if the authors referred to that definition or explained how they defined these conceptual sensitivities.

11) l.345: albeit ?

12) Figure 4: The figure is really confusing. Caption doesn't help. . .

13) Figure 5: not easy to understand that the lines are cumulative. Indicate by filling with different colors that the bottom area is Rh (10 − 30), the second area is Rh (0 − 10), the third (upper) one Rh litter and the highest Ra.