Biogeosciences Discuss., 6, C577–C580, 2009
www.biogeosciences-discuss.net/6/C577/2009/

Biogeosciences Discussions

Interactive comment on "A comparison of CO_2 fluxes via eddy covariance measurements with model predictions in a dominant subtropical forest ecosystem" *by* J.-H. Yan et al.

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Received and published: 2 June 2009

Dear Referee 1,

We would like to express our sincere thanks to you for the comments about our manuscript. We have incorporated your suggestions into our revised manuscript. Here are our detailed responses to the relevant comments.

A) Responses to the Referee's general comments

Comments:

The authors show results of EC flux measurements and modelling in terms of NEE and

NPP of a subtropical forest in South China. Based on a 12-month measurement period the calculated NEE was around -250 g C m-2 yr-1. This value has been validated using previous studies. In general, use of the EC technique above forests is linked with huge efforts but it is a valuable tool to measure/validate atmospheric exchange of heat fluxes and trace gases above terrestrial ecosystems. The basis for proper analyses is an appropriate flux calculation and correction procedure. Concerning this matter I miss a more detailed description of the flux calculation. In this case the EC setup contains an open-path gas analyzer (LI-7500). But there is no statement in terms of the WPL correction needed. According to BURBA et al. (2008) there is an adapted density correction procedure for open-path gas analyzers to avoid overestimation of net CO2 sinks or underestimation of CO2 sources, respectively. This correction could result in major changes of e.g. the CO2 budget. Was this correction applied? Furthermore, the use of an open-path gas analyzer (LI-7500) complicate the calculation of CO2 budgets due to frequent data gaps during wet conditions. The authors consider this by applying a gap-filling procedure on daytime flux data. Otherwise, gaps in the nighttime flux data of more than 40

Response:

Thanks a lot for your valuable comments on our manuscript. This work is just a beginning of eddy flux measurements in Southern China; we need more time to rich our experiences in CO2 flux measurements and analyze those data. A more detailed description of the flux calculation has been added including WPL correction. A more detailed explanation of the chosen procedure has been given in revised version. Just like you said, there is a good paper BURBA et al. (2008) that showed the methods how to avoid of overestimating or underestimating CO2 budget. Followed your good suggestion, we checked the night time flux data again and involved the measured and modellled values so that it will give us a clear picture about the CO2 flux in Southern China. Up to date, we found less paper that reported eddy flux measurements in this region, especially for evergreen monsoon forests which play an important role of po-

tential carbon sink; hence, more research should be done about this topic, especially in the subtropics in the future. As suggested by your reviewers, we will incorporate the following years measurements that we have worked out from original eddy date (e.g. from 2003-2005) into our analysis and make it more readable and reliability.

B) Responses to the Referee's specific comments

1. Comments: P2918L2-4: It is not clear for me which the level of the CO2 flux measurements is (38m or 27m?).

Response: It was measured at the height of 27m, while the eddy tower was 38 meters high. The sentence has been re-organized.

2. Comments: P2918L9: "CO2 mixing ratio" instead of "mixed ratio of fluxes"

Response: Agreed. It has been replaced.

3. Comments: P2919L24: Please indicate the formula of the empirical functions.

Response: There are two empirical functions, we indicated in the revised text.

4. Comments: P2921L2-4: How did you parameterise the dependency of daytime CO2 flux on PAR (several periods, VPD or Tair classes?).

Response: Tair classes is more sensitive to the daytime CO2 flux, we parametrise it with Tair, Actually, we found if we separated by morning period and afternoon perriod, the dependency of daytime CO2 flux on PAR is getting more credible.

5. Comments: P2925L14: Baldocchi instead of Baadocchi

Response: Yes, it has been corrected.

6. Comments: P2935, legend of Fig. 4:"...of monthly daytime CO2 fluxes ..." instead of "...of monthly CO2 fluxes ..."

Response: Agreed, it has been replaced.

7. Comments: P2937, legend of Fig. 6: "...half hour records for daytime CO2 fluxes ..." instead of "...half and hour records for CO2 fluxes..."

Response: Agreed, it has been replaced.

C) Summary

We wish to thank the Referee for the valuable comments, which help us to improve the manuscript considerably. We hope that you would find our revised ms to be satisfactory for the publication in Biogeosciences.

Sincerely, Yuelin Li

Interactive comment on Biogeosciences Discuss., 6, 2913, 2009.