

Interactive comment on “Role of CO₂, climate and land use in regulating the seasonal amplitude increase of carbon fluxes in terrestrial ecosystems: a multimodel analysis” by Fang Zhao et al.

Fang Zhao et al.

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My responses to the referee are listed below. Responses are in bold.

The paper addresses relevant scientific questions within the scope of BG and presents a novel analysis of the simulations of net terrestrial carbon flux to the atmosphere produced by nine models from the TRENDY dynamic global vegetation model project. Some substantial conclusions are reached. From my point of view, the most important is that some of well-respected models underestimate the magnitude of the flux seasonal cycle compared to atmospheric inversions. This result of the study is essential

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for stimulating further research which are necessary for better understanding of the factors that regulate the net terrestrial carbon flux to the atmosphere. The scientific methods and assumptions are valid and clearly outlined.

Thank you for the positive statements.

However, I am not sure that the results could be easily reproducible. The data set of the outputs of TRENDY dynamic global vegetation model project, which are available at <http://dgvm.ceh.ac.uk/node/9>, includes simulations made with Hyland, JULES, LPJ, LPJ-GUESS, NCAR-CLM4, ORCHIDEE, OCN, SDVGM, VEGAS, whereas the study analyses the simulations made with CLM4.5BGC, ISAM, JULES, LPJ, LPX-Bern, OCN, ORCHIDEE, VEGAS, VISIT. Perhaps, it would better to clarify that the study analyses the new set of TRENDY models in the first lines of the article, and provide some information about the expected date of the data set publication at the TRENDY website.

Thanks for raising this issue. The TRENDY project has been an important component contributing to the highly influential annual reports of Global Carbon Budget. Right now only TRENDYv1 data is publicly available online, and the data analyzed here is from TRENDYv2, which is the latest TRENDY version with S1-S3 experiment set up (the latest version with S2 and S3 only is v4). We have mentioned this on P3 in L24-26: “Site-level model-data comparison of seasonal carbon fluxes has been performed extensively in Peng et al. (2015) for the first synthesis of TRENDY models. Using both the second synthesis of TRENDY models simulations and observations,” The TRENDYv2 dataset will be made available on request by the end of this year. There are also plans to make this publicly available via the global carbon atlas (possibly other websites, to be arranged). We now added this sentence at the end of appendix A: “Results of TRENDY models analysed in this study will be made available on request by the end of 2016 (please contact S. Sitch at S.A.Sitch@exeter.ac.uk for further updates and details).”

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Besides, it would be better to update some references. For example, Alexandrov, G. a.: Explaining the seasonal cycle of the globally averaged CO₂ with a carbon cycle model, *Earth Syst. Dyn.*, 10 5(1), 63–81, doi:10.5194/esdd-5-63-2014, 2014.

could be changed to Alexandrov, G. A.: Explaining the seasonal cycle of the globally averaged CO₂ with a carbon cycle model, *Earth Syst. Dyn.*, 5, 345–354, doi:10.5194/esd-5-345-2014, 2014

and

Sitch, S., Friedlingstein, P., Gruber, N., Jones, S. D., Murray-Tortarolo, G., Ahlström, A., Doney, S. C., Graven, H., Heinze, 20 C., Huntingford, C., Levis, S., Levy, P. E., Lomas, M., Poulter, B., Viovy, N., Zaehle, S., Zeng, N., Arneth, A., Bonan, G., Bopp, L., Canadell, J. G., Chevallier, F., Ciais, P., Ellis, R., Gloor, M., Peylin, P., Piao, S., Le Quéré, C., Smith, B., Zhu, Z. and Myneni, R.: Trends and drivers of regional sources and sinks of carbon dioxide over the past two decades, *Biogeosciences Discuss.*, 10(12), 20113–20177, doi:10.5194/bgd-10-20113-2013, 2015.

could be changed to

Sitch, S., Friedlingstein, P., Gruber, N., Jones, S. D., Murray-Tortarolo, G., Ahlström, A., Doney, S. C., Graven, H., Heinze, 20 C., Huntingford, C., Levis, S., Levy, P. E., Lomas, M., Poulter, B., Viovy, N., Zaehle, S., Zeng, N., Arneth, A., Bonan, G., Bopp, L., Canadell, J. G., Chevallier, F., Ciais, P., Ellis, R., Gloor, M., Peylin, P., Piao, S., Le Quéré, C., Smith, B., Zhu, Z. and Myneni, R.: Trends and drivers of regional sources and sinks of carbon dioxide over the past two decades, *Biogeosciences*, 12, 653–679, doi:10.5194/bg-12-653-2015, 2015.

I would also recommend to check carefully the list of the authors. It seems to me that "Ito Akihiko" should be changed to "Akihiko Ito" at the Page 1, line 5

Thank you for the catching this error and noting a need for reference updates. We have made the suggested changes in the text.

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Interactive comment on *Biogeosciences Discuss.*, doi:10.5194/bg-2016-121, 2016.

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