

Interactive comment on “Field data to benchmark the carbon-cycle models for tropical forests” by Deborah A. Clark et al.

Anonymous Referee #2

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General Comments:

Summary: The goal of the manuscript is to set a benchmark for observational data to be used for the improvement and validation of vegetation carbon cycle models.

The authors report on general challenges that occur in model-data comparison, and on the limitations of data and models at different temporal and spatial scales. These are used to identify criteria for benchmark field data in tropical forests such as landscape-scale sampling and long data series. The authors clarify, in detail, terms of carbon stocks and fluxes, and underline uncertainties that arise from observations. Exemplary for each stock and flux, well-documented field data of tropical forests are identified that fulfill the above-mentioned criteria.

C1

The manuscript summarizes needs of the modeler community and sets a starting point for the development of a benchmark-level field catalogue. The authors conclude that the development of such catalogues requires an active participation of field scientists and modelers and constant maintenance.

Article contribution and overall impact: The manuscript is very well written and gives a good overview and discussion on challenges that are confronted when comparing field data and results of vegetation carbon cycle models.

The manuscript seems rather like a review than a research article as it gathers data from literature and does not introduce new methods or analyses.

As the manuscript is very long, it may benefit from an additional figure in the second part (Chapter 4: Benchmark field data from lowland old-growth tropical forests). You could add a figure in which you demonstrate the different stocks and fluxes and their interactions. Such a figure does not only highlight the very precisely defined terms of different carbon stocks and fluxes, it may also draw attention to potential contributors for the community-consensus catalogue of benchmark-level field inventory.

Overall, the manuscript is an important contribution as it highlights that field researchers and modelers need to work actively together to improve large-scale carbon stock and flux estimates.

Specific comments:

Figure 1: Please add a legend or a description to the figure caption. I assume the different colors refer to the seven climate models and the black line is the mean? What does the grey area represent?

Chapter 2.1 (headers): Why do you need a subsection here, as there is no 2.2?

Page 4, line 16: What do you mean by “hybrid C-cycle”? Estimates that are derived as residuals?

C2

Page 6, line 33-end of paragraph: You here mention “one class” of models. I assume you refer to demographic models such as the ED model and individual-based models such as LPJ-GUESS or SEIB-DGVM. Individual-based DGVMs can also represent within-landscape heterogeneity. In the rest of the manuscript you only refer to “demographic models”. This term may not cover the full range of models that can display spatial heterogeneity.

Technical corrections:

Page 11, line 2: “underestimated” instead of “underestimate”.

Page 18, line 25: typo in R_eco

Page 22, line 22: “measurements” instead of “measurement”.

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2017-169>, 2017.