

Interactive
Comment

Interactive comment on “Modelling basin-wide variations in Amazon forest productivity – Part 1: Model calibration, evaluation and upscaling functions for canopy photosynthesis” by L. M. Mercado et al.

Anonymous Referee #2

Received and published: 20 April 2009

1. General comments This is a high-quality paper, worthy of publication in this journal

2. Specific comments

2.1. Ecosystem respiration is determined by different methods in Manaus and Jaru from that in Tapajos and Caxiuana, but we are not told why. Generally, I think a plot of $\ln R_n$ against night respiration in the Appendix would be a good idea as a means of telling us about the quality of the night flux data, which I presume is the reason behind the decision to have two approaches. This is all glossed over, and more detail ought to

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be included.

2.2 On the calculated isotopic composition of leaves, the approach is to boldly go with Farquhar et al 1982. I think that rather small amounts of re-fixation of soil-respired C and plant-respired C will spoil the "pure" Farquharian estimate. At the very least, the authors ought to mention the problems. There is a paper by Lloyd on this, which shows how much C is likely to have been refixed.

2.3 I know that Mercado has worked with canopy light response curves under direct versus diffuse light, and I wonder why this is not an integral part of the simulation. Perhaps it is. The terms "sunlit and shaded" as applied to leaves has no meaning when the sun is not shining, as is touched upon on page 2973. But how do we know whether the sun was shining. I don't think the solarimeters included a direct+diffuse instrument.

2.4 Are the forests C-sinks? This question is avoided. Ideally, one would like to do an error analysis on the models and observations to see whether the question can be addressed.

2.5 Limitations of soil hydraulics. My understanding from the work of Fisher at Caxi-uana is that soil hydraulics are rate-limiting, and cause stomatal closure towards the end of the day. Her work should at least be cited: it seems relevant to the basin-wide analysis.

3. Editorial/typographic errors

Phosphorus is frequently misspelled Page 2969/line 6 "thus refine" should be "thus to refine" Page 2973/line 5 "two sunlit and shaded components" is poor English as it suggests 4 components altogether. Better would be <two components, "sunlit" and "shaded">.

Interactive comment on Biogeosciences Discuss., 6, 2965, 2009.

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