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Biogeosciences Discussions

Interactive comment on "Technical Note: The Simple Diagnostic Photosynthesis and Respiration Model (SDPRM)" *by* B. Badawy et al.

Anonymous Referee #3

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1 General comments

The authors present the SDPRM model, which will be be used in an inversion system. The model is simple and based on existing concepts. The objective of this technical note is to present the model and show that it can simulate the carbon surface fluxes on a global scale with a small number of parameters.

The used methods and data are described clearly. The results are presented less clear, the relation with the objective is at times difficult to understand.

After reading the paper I am not convinced that the model is capable of simulating the carbon fluxes. This impression is probably due to the presentation of the results; see

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below for my specific comments. The uncertainties and sensitivities of the simulated fluxes and model parameter are missing, which will be important to know when the model is used to provide a-priori fields. These are derived using different drivers, but there is no concise conclusion in the paper about them. The analysis of the climate limitations seems not to be related to the objectives of the paper. The relevance of this analysis should be explained.

I suggest improving the results and discussion section by addressing the different possible sources of uncertainty. The results are already in the paper, but a logical structure will improve it, and will make it much easier to understand why the different analyses have been done. Also the English needs to be carefully checked, below I have mentioned a few suggestions, but not all.

2 Specific comments

1: I suggest taking out the references from the abstract.

2: P 15128, L 12-14: "The estimated . . . models." This is the main point. But the abstract does not really convince me of it. For instance, how is the analysis of the climatic controls related to this? Does it show anything about the quality of the simulations or uncertainties?

3: P 15129, L 2-3: can you add some references?

4: P 15129, L 6: isn't there more recent literature than this?

5: P 15129, L 18: also here there is more recent literature available.

6: the introduction jumps from one subject to the next, I would suggest helping the reader by adding a few lines explaining why you are mentioning them at the start of an paragraph.

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7: P 15130, L 20: this cannot be the only reference here.

8: P 15131, L 1-2: delete “some”. Aren’t net fluxes and NPP the same thing?

9: P 15131, L 6: which model? Yours or BETHY?

10: P 15131, L 9: what do you mean with a “more involved process”?

11: P 15131, L 17-22: “By later”, this is not English, subsequent lines are also difficult to understand, please rewrite.

12: P 15131, L 23: “devoted to the description of”, why not replace this with “describes”?

13: P 15132, L 1-15: in this paragraph the references are again mostly more than 10 years old. 14: P 15133, L 6: delete “much”

15: a general comment, both past and present tense are used throughout the paper, could you improve this?

16: P 15134, L 10: can you give a definition of x, y and later t. I can guess them, but I want to know if this guess is correct.

17: P 15136, L 7-13: move these lines to where the variables are first mentioned.

18: P 15132, L 21: “R” in the eq. should be “Reco”?

19: P 15137, L 1-4: can you add a reference here?

20: P 15137, L 4: delete “got”.

21: P 15137, L 4-7: why is it better? Where is this biological variation in the model? I might have missed it, but could you explain this here a bit further?

22: P 15138, L 9: replace “analysis mainly focus” with The main focus of the analysis”.

23: P 15138, L 20: Figure 11 here confuses me. Could you change the order of the tables and figures in the order they are mentioned in the text?

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24: P 15138, L 21: I might have missed it, but what is the box-car filter?

25: P 15139, L 13: these lines give you a reason of why it is important to know what the uncertainties in your estimated fluxes are. If you cannot show them, could you at least discuss them?

26: P 15140: section 3.2.1 is difficult to read. Could you rewrite it? What is the main result? The word “the” is used too many times as well.

27: P 15141, L 7-10: I do not understand what these lines are doing in this results section. These belong in the discussion.

28: Is the main conclusion of section 3.2.1 that CfAPAR is better then VfAPAR? Because that is what you use in the following section.

29: The figures 4-7 are extremely difficult to read (very small), and understand. From these figures I can only guess how the different models compare. These results would be must easier to understand when presented in scatter plots and tables. Could you improve this?

30: P 15142, L 15-24: I do not understand the reasoning in these lines. Could you rewrite them? Why is this important?

31: P 15143, L 3: The results in figures 4-7 do not convince me that the model is capable enough.

32: P 15143: can you add an explanation of why section 3.3 is needed to address the objectives of the paper?

33: P 15143-15144, from L 21: this section should be moved to the methods.

34: P 15145, L 11-12: delete the lines “On the other hand. . . 2

35: P 15145, L 21-23: there is no need to repeat the results from the table in the text. What is the main finding?

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36: I suggest to rewrite the results, shorter and clearer, with explanations of the analyses are needed to address the objectives.

37: P 15147, L 13: "... to some extent, is mainly..." yes or no? Is NEE driven by climate, or not? What is the percentage explained by the climate variables?

38: P 15147, L 14-16: why have tested these sensitivities?

39: P 15147, L 27: this is the first time PFT versus global parameters are mentioned. What is shown in the figures? Or is this the difference between CfAPAR is better then VfAPAR? Is this the main result? I am confused now.

40: Can you end with the main findings? And restructure this last section?

Table 2: where do the numbers in this table come from?

Table 4: I might have missed it, but is this table mentioned in the text?

Fig 4-7: see above. These figures are difficult to interpret. Could you combine them in scatter plots and a table?

Fig 8: How does this figure compare with Fig. 2 in Beer et al. Science (2010). There is no overlap in the red zones in the 3 panels, they could be combined in one figure.

Fig 9: the 2 panels of this figure could be combined, they are exactly the same, only the colour scales are different.

Fig 10: When this figure is not mentioned in the text (I could not find it), please remove it.

Fig 11: this should be figure 3.

Interactive comment on Biogeosciences Discuss., 9, 15127, 2012.