

## ***Interactive comment on “An observational constraint on stomatal function in forests: evaluating coupled carbon and water vapor exchange with carbon isotopes in the Community Land Model (CLM 4.5)” by Brett Raczka et al.***

**R. Keeling**

rkeeling@ucsd.edu

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Overall, very nice paper, which I found quite educational. I'm passing on here a few comments that I jotted down as I read through the paper. Most of these relate to communicating the framework by which nitrogen limitation is implemented in CLM. Admittedly, I didn't go back and consult the prior references. But I'm imagining a clearer presentation of the key concepts might be possible without doing this. The presentation in the paper gave me only a fuzzy gist. Perhaps it would be possible (?) to add a figure which diagrams the carbon flows from the atmosphere, through stomata to

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substrate formation for each of the three formulations. I'm imagining that the diagram would have arrows for each of these quantities:  $A_n$ , GPP,  $CF_{available\_alloc}$ ,  $CF_{alloc}$ ,  $CF_{GPPpot}$ , etc. Or maybe one figure would suffice, assuming the knobs to switch between formulations is clear enough. For example, where is the carbon that is fixed but not allocated ending up? Is it respired? If so, does this respiration return back from the stomata or return through some other pathway?

Page 6, line 28: I'm missing how  $A_n$  is related to terms in Eq. (6). It would very much help to include an algebraic expression for this.

Page 6, lines 29-30. From the wording it sounds like maintenance respiration is partly double counted. Page 7, line 11. What does the subscript  $psn$  signify? Perhaps could be omitted? Page 7, line 15: This formula suggests that  $A_n$  is not equal to the flux through stomata. So what is  $A_n$  equal to? Is it the same as potential photosynthesis? If so, needs stating. See earlier comment also.

Page 7, lines 22-23: This sentence is a bit ambiguous. Are both given in Eq. 9, or just one. If not both, then how is nitrogen limitation incorporated? Reading below, I see this is probably related to control of  $V_{cmax}$ . If so, this need stating more clearly earlier, i.e. how does nitrogen limitation influence  $N_a$  in Eq. (3)?

Page 8, line 22. I'm missing an expression for how  $\Delta_{GPP}$  is calculated from  $\alpha_{psn}$ . (Okay, I know enough to work this out for myself, but I'm not sure you should assume all readers would).

Page 8, line 28. It would seem important to clarify is meant here by GPP. Which of these is it:  $A_n$ ,  $CF_{available\_alloc}$ ,  $CFGPP_{pot}$ , etc. ? Also, Perhaps I missed it, but I think the symbol  $E_T$  hasn't been defined.

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