

Interactive comment on “The impact of atmospheric CO₂ and N management on simulated yields and tissue C : N in the main wheat regions of Western Europe” by S. Olin et al.

Anonymous Referee #2

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General. I recommend publication after minor revisions. I find the model testing thorough. The model structure does not appear unique to me and seems fine for this type of model. I find the model documentation sensible and well explained. Much of what I see here is reminiscent of the CLM-CN algorithms.

Specific. 1) Abstract suggests to me more of an evaluation paper. Title suggests an impacts study. I think the problem is with the abstract not saying much about the impact as advertised by the title.

2) p. 4 line 26: pls correct "the reasons ... is"

3) p. 9 first paragraph on Development Stage: my perception of the difference between
C211

DS and HU is subtle (possibly even non-existent) because HUs can have thresholds for DS transitions, as they do in AgrolBIS and CLMcrop as far as I know. So pls clarify or correct.

4) p. 10 line 19: you say "e.g." which means "for example" and I wonder whether this applies also to heat and cold stress or whether you really mean "i.e." which would limit the list to water and nitrogen. Pls clarify or correct.

5) p. 10 line 23: I suggest replacing the vague statement "can be treated as conserved" with "is treated as constant" unless I have misunderstood, in which case pls reword as you see best fit. Similarly with "can be established." Do you mean "is established" or even "is calculated" in this model?

6) p. 11 line 13: add "fig 1b" after "above" if it seems appropriate to you. My impression is that you need to change "fig 1b" to "fig 1a" in line 14. And change "were" to "was" in line 13.

7) eq. 6 is reminiscent of the CLM-CN allocation equations. If there's any connection, then pls add corresponding reference(s).

8) Carbohydrate retranslocation: maybe should compare to the Drewniak et al. approach in the CLM, mentioned in one of her recent papers.

9) p. 15 line 5: change "Sect. 2.1" to "Sect. 2.1.1"

10) p. 18 line 10: correct "these fraction"

11) p. 18 line 17: maybe I missed it; did you define pF earlier?

12) p. 19 line 20: you say "were changed" and do you mean permanently or temporarily for this particular case?

13) p. 19 line 24: change "data ... was" to "data ... were" and explain your choices of 100 vs later 200 kgN/ha/y and "applied on day 150 from the time of sowing."

- 14) p. 20 line 14: do you mean spring or winter cereals? Or both?
- 15) p. 26 lines 1 and 7: so is the modeled in fact more accurate than the observed?
- 16) p. 26 line 3: change "despite of" to "despite the" and in line 17 clarify "relative to C-only" or do I misunderstand?
- 17) CLMcrop now includes a representation of variable C:N. I think Oleson et al. (2013) mentions this and probably Drewniak et al. in a recent paper.
- 18) Table 4: C:N here is whole plant? grain? leaf?
- 19) Figures 2d and 3: are there better ways of presenting this information?
- 20) Figure 7: by "red dots" do you mean "red triangles"
- 21) Check the year in the Rosenzweig reference. I thought it was 2014...

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