

***Interactive comment on “Importance of crop varieties and management practices: evaluation of a process-based model for simulating CO<sub>2</sub> and H<sub>2</sub>O fluxes at five European maize (*Zea mays* L.) sites” by L. Li et al.***

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GENERAL COMMENTS The paper presents a well-done modelling study of crop management impacts on carbon and water fluxes at a range of European sites. The study is novel, interesting and well presented, and fills an important gap - assessing interactions between crops, climate, hydrology, carbon and management. Several recent papers cite the need for such approaches, but there are very few studies which actually look at this. The paper assesses model performance in various aspects, and points out areas for future development. I recommend it is published subject to minor revisions,

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outlined below.

**SPECIFIC COMMENTS**

1. The introduction doesn't really adequately introduce the need to look at interactions between crops, climate and management, which is what the paper investigates; most of the discussion is on carbon only, and not water-related aspects. The authors could cite Falloon & Betts (2010) and references therein, where appropriate, and broaden the introduction to discuss crop-climate interactions more generally, supporting their approach.
2. Table 1 - it would be useful to add some summary environmental data e.g. mean annual temperature, precipitation, soil type/texture etc.
3. Section 2.1 - it is unclear whether all sites have continuous maize in the data actually used for the modelling?
4. Page 2919 line 25 - briefly describe what the CarboEuropeIP data filling method is.
5. Page 2921 - discussion of yield overestimation in general - is this related also to the absence of pest and disease impacts (presumably) in ORCHIDEE-STICS? Please clarify.
6. Page 2928, line 21 - mention that the model mostly underestimates TER.
7. Page 2930, line 3 - can the assumption that climate differences modulate the NEE sensitivity to crop varieties amongst sites be tested, and quantitatively assessed?
8. Page 2933 line 27/28 - uncertainties in the response of soil respiration might also be important here (Falloon et al. 2011), and in the points made earlier on heterotrophic respiration.

**TECHNICAL COMMENTS**

Abstract - line 5 - hydraulic - do you mean hydrological?

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REFERENCES Falloon P.D., Betts R.A. 2010. Climate impacts on European agriculture and water management in the context of adaptation and mitigation - the importance of an integrated approach. *Science of the Total Environment* 408 (2010) 5667-5687 (doi 10.1016/j.scitotenv.2009.05.002).

Falloon PD, Jones CD, Ades M., Paul K 2011. Direct soil moisture controls of future global soil carbon changes ; an important source of uncertainty. *Global Biogeochemical Cycles*, (accepted)

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