

## ***Interactive comment on “ORCHIDEE-CROP (v0), a new process based Agro-Land Surface Model: model description and evaluation over Europe” by X. Wu et al.***

### **Anonymous Referee #1**

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#### General comments

In this manuscript, the authors proposed a new cropland process model, ORCHIDEE-Crop (v0), which simulates atmosphere-ecosystem exchange fluxes, carbon stocks, and yields of temperate croplands. Without doubt, it is important to simulate cropland processes that are significantly affected by human managements. The authors developed a new model on the basis of two existing models, ORCHIDEE and STICS, and examined model validity at seven sites in Europe. Compared with previous models, the new model showed better performance to capture ecosystem fluxes and yields, although the model lacks realistic treatment of irrigation and nitrogen fertilizer. The manuscript was well prepared but I have a concern about the advantage of the new

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model. Several models have been presented to simulate cropland processes (e.g., DNDC by Li et al., 1992; LPJmL by Bondeau et al., 2007; AgroIBIS by Kucharik et al., 2007; JULES-SUCROP by Van den Hoof et al., 2011). What are the characteristics and advantages of the model presented in this study? Please clarify the point in discussion. I conclude that the manuscript is acceptable for publication after minor revision including the point mentioned above and several minor points (see below).

#### Specific comments

Page 4655 Abstract In abstract, you mentioned about the comparison with ORCHIDEEv196 but not with STICS. Please add some statements.

Page 4656 Line 17 “ressources” should be replaced by “resources”.

Page 4657 Line 21 “Incomplete” should be replaced by “incomplete”

Page 4662 Line 19 I could not understand the statement “If the NPP available after the grain demand is satisfied is not sufficient to meet the allocation to grain, ...”.

Page 4665 Line 5 “long-wave incoming radiation” appears twice.

Page 4668 Line 7 Results section should be, in general, described with the past tense.

Page 4672 Line 1 The simplified root distribution could also account, at least partly, for the discrepancy in LE. Is it correct?

#### References

Bondeau, A., Smith, P. C., Zaehle, S., Schaphoff, S., Lucht, W., Cramer, W., Gerten, D., Lotze-Campen, H., Müller, C., Reichstein, M., and Smith, B.: Modelling the role of agriculture for the 20th century global terrestrial carbon balance, *Global Change Biol.*, 13, 679–706, doi:10.1111/j.1365-2486.2006.01305.x, 2007.

Kucharik, C. J., and Twine, T. E.: Residue, respiration, and residuals: Evaluation of a dynamic agroecosystem model using eddy flux measurements and biometric data,

Agricultural and Forest Meteorology, 146, 134-158, 2007.

Li, C., Frolking, S., and Frolking, T. A.: A model of nitrous oxide evolution from soil driven by rainfall events: 1. model structure and sensitivity, *Journal of Geophysical Research*, 97, 9759-9776, 1992.

Van den Hoof, C., Hanert, E., and Vidale, P. L.: Simulating dynamic crop growth with an adapted land surface model – JULES-SUCROS: Model development and validation, *Agricultural and Forest Meteorology*, 151, 137–153, doi:10.1016/j.agrformet.2010.09.011, 2011.

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