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Biogeosciences Discussions

Interactive comment on "Coupling land surface and crop growth models for predicting evapotranspiration and carbon exchange in wheat-maize rotation croplands" *by* H. Lei et al.

Anonymous Referee #1

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General Comments:

This paper has coupled the Simple Biosphere model 2 (SiB2) with a crop phenology and physiology scheme based on SiBcrop (Lokupitiya et al., 2009, this journal). The new coupled model (a name is expected) was then rigorously evaluated at two agricultural sites (both having wheat-maize rotation croplands) in North China Plain against both satellite-based LAI and comprehensive in-situ observations, with a particular emphasis on the simulating latent heat and carbon fluxes. The topic of this manuscript is quite important, since the dynamical vegetation descriptions are indispensable for land surface models to assess climate-change impacts. In my opinion, this study should

be encouraged, since it can be very helpful to the climate change adaptation for crop production in China. However, the differences between the new coupled model and the previous SiBcrop should be further discussed and clarified. The unique features of the new coupled model should be emphasized in the abstract and the conclusions. In general, this manuscript is well written and organized; and the conclusion is convincing and interesting to me. Based on my review, I would like to recommend this manuscript be accepted for publication in Biogeosciences after minor revision.

Specific comments:

1) Page 5158, line 26 “more” should be “much”

2) Page 5159, line 26 “Wang et al., 2007” is missing in the reference list.

3) Page 5160, lines 15-18 Further discussions are needed to clarify the physical differences between the new coupled model with the SiBcrop. As we know, SiB2 has incorporated a realistic canopy photosynthesis-conductance model, which is a significant improvement over SiB. As a result, the advantage of the new coupled model over the SiBcrop is expected. Please make some quantitative and/or qualitative comparisons between the two models.

4) Page 5162, line 1 How is the vegetation cover change represented in the study? Please clarify it.

5) Page 5162, line 8 “emergency” should be “emergence”

6) Page 5165, lines 1-2, “the groundwater table was deeper than 30 m because of well irrigation”. Does the irrigation water come from groundwater in this region? If not, the groundwater table should be relatively shallow due to lots of irrigation recharges.

7) Page 5165, line 12 “analyze” should be “analyzer”

8) Page 5166, lines 5-6 “the ability to use the model to simulate . . .” should be “the ability of the model to simulate . . .”.

BGD

7, C2084–C2086, 2010

9) Page 5166, lines 7 “concerning the impact” should be “concerning over the impact”

10) Page 5167, lines 7-10, “The 1km/monthly NDVI-based LAI has much lower peak value and was worse synchronous with the observed LAI (Fig. 2). This could be attributed to the interpolation scheme from monthly to daily values”.

What is the temporal resolution of the LAI observations? How did you compare the observed LAI with the simulated LAI (hourly or half-hourly) as well as satellite-based LAI values (8-day or monthly), which have quite different temporal scales? Did you interpolate all the values into daily values for the comparison?

11) Page 5167, line 26 Suggest changing “The seasonal variation . . .” into “For both sites, the seasonal variation . . .”

Interactive comment on Biogeosciences Discuss., 7, 5157, 2010.