

Response to Anonymous Referee#1 (gmd-2016-29)

However, I think the authors need to discuss 1) their results in relation to which aspects of the improvements in the new design may be resulting in the better model-observation comparison of each model output, and 2) the validity of the parameters in both wet and dry climatic conditions. The article as such is short and possibly benefit from expanding the evaluation of some of the model output using other available observations. I also feel a comparison to the original MATSIRO simulations wherever possible would certainly help to quantify the improvement in the newly proposed model version.

According to your and other referees' comments, we will add the results of two types of simulations into the revised manuscript: the effects of modifications from the original model and the validation of the model at the sites which are independent from the parameterization site.

The parameters given in the manuscript are not valid under dry climatic conditions, because the current version of the model is designed for irrigated rice. This is one major limitation of the current version of MATCRO-Rice. We have recognized the limitation and described it in the concluding remarks, P20 L23-24. The limitation will be addressed in the future paper, because it is out of the scope of the present study that focus on irrigated rice.

If the authors mean to validate the new model, the paper should include comparison of LHF and SHF (Fig. 7 & 8) to the original simulations of the parent LSM (without the present modifications or interactive crop growth and development). How different are the stomatal conductance and the moisture and temperature of the soil column in the parent LSM when uncoupled to the CGM?
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As we mentioned above, we will add the results of the simulations to evaluate the effects of modifications from the original model.

I wonder whether the authors have compared the water and energy flux terms on shorter time scales than daily, say, to look at the diurnal variations of LHF and SHF in both obs and simulations during the various stages of the crop growth. It would be useful to understand the impact of crop-climate interactions on the water balance on sub-daily timescales, which is an ongoing challenge in climate modelling.

We fully agree with your opinion and suggestion. We will add the results of the comparisons of hourly LHF and SHF between observations and simulations.

Section 1, L19: Expand MATCRO.

We will add brief explanation on the model and its name.

Section 2, L16-L17: Why only 2003-2006 was chosen instead of 2001-2006 (when the observations seem to be available according to the given website)? Justify here.

The flux tower was moved in the paddy field in April 2003. Thereafter the obtained flux data have been more representative of the field, where the rice sampling was conducted. We will add the above explanation in the revised manuscript.

Section 2.2, L1-10: Equations to calculate the soil state are missing here.

All the equations are shown in the model description paper. In our understanding of your comment, you pointed out that the discrete equations to calculate the soil state should be described in the manuscript. Therefore, we will add the discrete equations to calculate the soil state.

Section 3, L25-L26 & Section 4, L29: Either remove the last sentences or explain shortly how.

We will remove the sentences you pointed out.

Section 5, L22: Add here a couple of sentences on what changes in parameters/processes in the model may have resulted in the important feature of the model using a schematic of the processes represented in each module of the coupled model.

In the concluding remarks of the revised manuscript, we will discuss the important feature of the coupled model, referring the results of the new simulations to evaluate the effects of modifications from the original model.