

Interactive comment on “Influence of feedbacks from simulated crop growth on integrated regional hydrologic simulations under climate scenarios” by P. E. V. van Walsum

Anonymous Referee #2

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The manuscript developed a new model by coupling three existing models. The model included the simulations of groundwater level, flux exchange, and crop growth. The model is suitable for the study area: agricultural plain, and is an effective tool for investigating the effects of climate change on hydrological cycles. The paper introduced the coupling methods in detail, and focused on the differences between results of the dynamic and static models. It pointed out the importance of introducing the feedbacks from vegetation growth. However, some problems (as follows) were found in the paper. I think this paper can be published pending major revisions.

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Specific comments: (1) As pointed by the author, the paper lacked of enough data to calibrate the parameters and validate the model. Although the author emphasized that the paper focused on the relative values (not the absolute values), are the relative values also sensitive to the parameters (because the simulated results were highly nonlinear to the parameters)? Therefore, further analysis is expected to do on the sensitivity of relative values to the parameters. If it is sensitive, do the relative changes still make sense on the condition that the parameters were not accurately determined? In the meantime, I encourage the author to do more literature surveys on the key parameters measured by other related studies. For example of the crop factor of transpiration, I noticed that Jayanthi et al. (2007) gave a relationship between LAI and crop coefficient.

(2) Section 2.1.3 was found to be difficult to follow because it introduced how the six parameters were determined. I suggest to create a table and list how they were determined one by one.

(3) Page 10156, L21-22. What is interception evaporation? For canopy or soil surface? Why soil evaporation was assumed to be zero when interception evaporation is active?

(4) Page 10158, L7. Please introduce the reasons for using Makkink reference crop evapotranspiration because the cited reference is hard to find for me. Moreover, in my experience, the Penman-Monteith equation is the most widely used equation for calculating reference crop evapotranspiration in hydrology. I am not quite convinced that the Makkink equation is better than the Penman-Monteith.

(5) Page 10160, L13-14. How do you get these vegetation-related parameters without the feedback from WOFOST enabled? Moreover, I don't know how Fig. 3 was determined. Please clarify how the crop factor-LAI function was postulated.

(6) Page 10161, L1-4. How were the parameters determined? Please explain more in details.

(7) Page 10161, L6-13. How is the paragraph related to the topic of the section?

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(8) Page 10161, L21-23. It is not clear on how you determine the interception capacity.

(9) Page 10161, L24. Why is the calibrated interception capacity (0.065) (the calibrated one is also for potatoes) lower than that for potatoes? Where did 0.25 mm/LAI come from?

(10) Page 10163, L2. What is the location of Kromme Rijn?

(11) Page 10165, L3-5. Section 3.1. I don't think the title of the section is appropriate (there are two introductions in the paper). The parameterization was not clear.

(12) Page 10166, L4. What is the second half of the summer?

Technical corrections (1) Page 10157, L9; Page 10162, L4; Page 10164, L4. "nett" should be "net".

(2) Page 10188, Fig.8. CIW+_LuGr_Stat in the caption is not consistent with that in the figure. The dash lines in the figure are hard to distinguish.

(3) Page 10189, Fig9. The dash lines in the figure are hard to distinguish.

Reference H. Jayanthi, C M.U. Neale, J L. Wright. Development and validation of canopy reflectance-based crop coefficient for potato. *Agricultural Water Management*. 88 (2007) 235-246.

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