Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2019-87-AC3, 2019

Hydrology and Earth System Sciences
Discussions

Interactive comment on "A Comprehensive Quasi-3D Model for Regional-Scale Unsaturated-Saturated Water Flow" *by* Wei Mao et al.

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Received and published: 31 May 2019

Comments from Lele Shu:

Specific comments

Comment 1:

L362, Typo "Vaulin" should be "Vauclin".

Response 1:

Thanks for pointing that. We will correct the error in the revised manuscript.

Comment 2:

L498-L502: "Figure 10 further shows... water table depth ... The increase trend is obviously found from Fig. 10(a) to Fig. 10(c) in the farm land, during which the groundwater was consumed by crop transpiration and soil evaporation". Firstly, I suggest rephrasing to "... The increasing trend is obviously found in Fig. 10(a) to Fig. 10(c) in the farm land...", if what I discussed below is of misunderstanding. The trend is not very obvious via the three maps. You may add the "maps of spatial GTD change" to make it more intuitive. You explain that the "increasing" trend of farmland GTD resulting from crop consumption. Figure 9 shows the GTD increasing trend between 30d to 180d for all landuse types in observational data; water tables of farmland, village and bared land become deeper and deeper between 30d and 150d (the period from Fig 10(a) to Fig 10(c)) at the very similar magnitude, while the simulated results show different magnitude of decreasing water table. The water table of three landuse types increased after the autumn irrigation sharply, the model did not capture this trend accordingly. So I think the representative of landuse in the model is not competent to represent the characteristics of landuse, or issues from ET of different landuse, or the model configuration in MODFLOW did not capture the horizontal groundwater flow. So I think the words in L504-505 "These results indicate that our model can reasonably simulate the saturated water table depth in space and time" is too strong. I suggest the authors rephrasing these explanations.

Response 2:

Thanks for all the suggestions. There are 10 groundwater monitoring wells in this district, as shown in Fig. 7(a) in the current manuscript. Five wells are located in the farm land, two wells in the village, and three wells in the bared soil area. The calculated results at the 10 monitoring wells are averaged by the land type and shown in Fig. 9. As noted by the reviewer, it is not suitable because the averaged water table depth at the monitoring wells cannot represent the water table depth for different land use type due to different topography conditions. In the revised manuscript, we will

give the comparison results of the single well. The maps of spatial water table depth change will also be added in the revised manuscript for clarifying the change of water table depth. The simulated groundwater table for the farm land fits the observations well, while the results for village and the bared land are poor. The upper boundary conditions for village and the bared land was inappropriate since we ignored the plant in these areas. We will improve the results by carefully recalculate the upper boundary and consider the impact of parameters in the revised manuscript. Also, the explanation will be rephased.

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