Hydrology and Earth System Sciences Discussions

Interactive comment on "Streamflow allocation in arid watersheds: a case study in Northwestern China" *by* C. He et al.

Anonymous Referee #1

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Dear Authors,

Basically, the manuscript presents i) an application of the Distributed Large Basin Runoff Model (DLBRM) to a large arid waterhsed in Northwestern China, in order to support a water allocation plan there, and ii) a discussion about this water allocation plan and management.

You propose and discuss an allocation framework, but do not describe any data and, consequently, any analysis, which allow a scientific evaluation of this framework. Therefore, the part of the manuscript related to the allocation framework should be summarized, but focusing on the necessary information from the hydrological modelling to the implementation of the proposed allocation framework.

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Then, you should make clear and stress how the simulation results of DLBRM, including their uncertainties, can support the water allocation plan and also when the model fails and why.

However, your hydrological modelling has also to be improved:

1) The concept of the dominant hydrological is not clear and must be detailed (L.22 P.8948 to L.13 P.8949) based on data analysis and previous experimental works. Also, your assumptions about the hydrology of the agricultural fields are not clear to me (groundwater pumping, infiltration into unsaturated zone, evapo-transpiration and return flow to the river). Please note that the symbols G_u and G_m are transmission losses and ΔG_l is river-aquifer interaction, and not simply groundwater.

2) Although the poor description of the hydrological processes, it seems that the middle reach is dominated by the river-aquifer interaction (mainly channel transmission losses) and the unsaturated zone hydrology. I really wonder how DLBRM, which may be suitable for riverine watershed in saturated areas, could mimic those processes in arid regions.

3) You must detail the presentation of calibration and validation results for the four streamgauges and discuss them in depth. It is interesting to known how the model works for the sub-watersheds with different scales and dominant processes.

4) You describe the different sources of model uncertainty, but the manuscript lacks any uncertainty analysis. I think that the stakeholders should be informed about the uncertainties associated in the model prediction.

Regards

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