

## ***Interactive comment on “Assessment of climate change impact and difference on the river runoff in four basins in China under 1.5 °C and 2.0 °C global warming” by Hongmei Xu et al.***

**Anonymous Referee #3**

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General comment This study attempts to investigate climate change impact on river runoff in four river basins across China, using hydrological model simulations forced by meteorological data representing 1.5 and 2 C global warming based on 5 global climate models (GCMs) under 4 emission scenarios (RCPs). The objective is further to quantify the uncertainties in the projected changes given by the GCMs and RCPs.

There are a couple of general problems in the study that need to be addressed in order to be accepted: \* There is very little information about how the hydrological model was calibrated. Which parameters were calibrated, and which criteria were used for the calibration? The inconsistent response in river runoff to the increasing precipitations

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over the study basins suggests that the results are strongly controlled by changes in evapotranspiration (as a result of changes in temperature and water availability). Thus we need to know more about how evapotranspiration is simulated in the model, and if and how parameters related to evapotranspiration were part of the calibration. There is also a lack of evaluation of how well the model manages to explain the observed changes in river runoff, which are referred to in the introduction. As a summary, it is doubtful if the current model is adequate for the impact study presented in the paper.

\* A related problem is the selection of meteorological forcing data used in the study. First of all, there is no assessment presented of the agreement during the historical period between the data used for the model calibration (WFD) and the data used for the climate projections - thus we cannot assess to what extent the calibrated model is suitable for assessing the climate change impact with these data. Secondly, there is very little motivation or details given regarding the selection of the GCM models, or the selection of the 30 year periods representing 1.5 and 2.0 C warming, respectively. The selection of GCM models should be crucial for the quantification of uncertainties, which is pointed out as one of the objectives of the paper.

\* In addition to the methodological and presentation issues, the paper is very uneven in the quality of the English writing, which makes it difficult to understand some of the statements.

Specific comments

Figure 1: I would assume that the dark grey areas represent the study basins, but what is represented by the light grey area? I would further assume that the basin locations following the position of the surrounding graphs, but I cannot be sure without consulting the text. What is presented in the small embedded graph? It looks like some mistake.

Methodology section: \* How was the model calibrated? Which model parameters? Which objective function was used in the calibration? \* Please give some more explanation how the 30 year periods were selected for the different global warming thresh-

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olds - as well as how the standard deviations referring to the GCMs and the RCPs, separately were quantified. How was the standard deviation originating from the GCMs and the RCPs aggregated into the values presented in Table3?

Results section: I would prefer not to use sentences that only refer to a table or a figure without describing any of the results. Describe the result in the text and use the tables and figures as support. For instance, I would recommend to refer more directly to the specific results in Table 3 that supports the various statements in section 4.1.

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