**Hydrology and
Earth System
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Discussions**

Interactive
Comment

Interactive comment on "Climate change impact on water resource extremes in a headwater region of the Tarim basin in China" *by* T. Liu et al.

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Received and published: 29 September 2011

Thank you for your comments. Some modification, improvement and explanations have been made according your comments. The modified version can be found in supplement file. Thanks once more for your valuable advices.

Page 6596 line 9: summarized This has been corrected.

Page 6596 line 12: thereafter This has been corrected.

Page 6596: line 15-25 and Fig. 1: Show clearly where the ïňĆow gauging stations BYBLK and DSK are located. I found it difiňĄcult to ïňĄnd them and other readers may be confused. Put a scale on the map in Figure 1. Explain in the text the items

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Interactive Discussion

Discussion Paper

in the map legend e.g. what is XJ, what is meant by the study area, where are the two important gauging stations BYBLK and DSK? OK, the plot has been improved (the legends are clarified, labels are added for the flow gauging stations and a scale is added). More explanation is also added to the figure caption.

Page 6597 line 27: Are there really several dry and wet periods in all the time series data selected? Some are very short! e.g. the calibration and validation time series data for the distributed model. While for the lumped conceptual model input needs, data was available for the periods 1958-1962 and 1980-2002, the data availability for the detailed spatially distributed model was limited to 2 years (2000-2001). Only that period had most required input and calibration data for the distributed model.

Page 6600 line 23-26: refer to literature e.g. Moriasi et al. to indicate whether the goodness of ïňA̧t is acceptable. Thank you for the suggestion. The reference has been added.

Page 6601 line 10: How did you decide on a crop coefïňA̧cient of 0.2? This coefficient should be called "pan coefficient". The pan-evaporation at BYBLK station is around 1200mm/y, while the potential evapotranspiration is around 270mm/y. The pan coefficient therefore has been selected around 270/1200=0.225.

Page 6607 line 2: compared instead of comparing This has been corrected.

Page 6607 line 11 and 16: It looks as if the second time Fig 9 (line 16) is used in the text erroneously. Check and edit if necessary. The repetitive description has been removed.

Page 6609 line 14: are three months enough for a warm up? Some models recommend a longer period. What is recommended for the two models used in this study? Since the simulation period is short in this study (for the spatially distributed model), a different method was selected in this study to find good initial conditions. The method is based on a first model run with assumed initial conditions. It was found that more or less

stable results were found after a simulation period of three months. The simulation results after these three months but at a time step where the catchment hydrological conditions are similar to the ones of the start of the simulation, were taken as new initial conditions and the simulated restarted. This explanation has been added to the paper.

Page 6609 line 18-18: edit the paragraph to avoid two line paragraphs. This paragraph has been modified as suggested.

Page 6610 line 2: Where can one see that the three emission scenarios give similar results? Similar results can be seen in Figure 12. The line represents the impact results of the A1B scenario, while the small bars represent the max and min impact results of the 3 scenarios (A1B, A2 and B1). More explanation has been added to the figure caption to better explain this plot.

Page 6613 line 8: should read "Only for the VHM results at DSK station are stronger changes found." This sentence has been corrected as suggested.

Page 6613 line 13: Delete Mainly at the beginning of the sentence. This has been changed.

Page 6628 - 6630 Figs. 8- 10 The y-axes labels of the three graphs do not agree well with the caption of the graph. The term precipitation pertubation factor means two different things in Fig 8 and 9. Consider how you can improve the labelling of the y-axes to reïňĆect the truth more closely. The captions have been improved.

Page 6629 Fig 9: The legend indicates 5 series but the graph shows 4 (if I have seen clearly). The legend has been corrected.

Page 6632 Fig 12: How do I know from this graph that results of 3 GCM scenarios are shown on this graph? What is the meaning of the short droplines (verticle lines) on this graph? The line represents the impact results of the A1B scenario, while the small bars represent the max and min impact results of the 3 scenarios (A1B, A2 and B1). More explanation has been added to the figure caption to better explain this plot.

Page 6633 Fig 13: It is not correct to join the lines here. Consider if this graph can be presented in a different way. This plot has been improved.

Page 6636 Fig 16: Let the y-axes labels run from 0.8 to 1.3 for all graphs. How do I know from this graph that results of 3 GCM scenarios are shown on this graph? The Y-axes have been changed such that they cover a more uniform range. The legend also has been extended to better explain the scenarios.

Page 6637 Fig 17: Consider presenting this graph differently. I ïňĄnd it difïňĄcult to distinguish all the lines in this graph due to congestion. Why did you only display results of the lumped model? The plots have been changed; presented in another way. Because the simulation period of the distributed model is short, the empirical return period of the distributed model results goes only up to 2 years, which is hard to compare with the return period plot derived from the lumped conceptual model

Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/8/C4259/2011/hessd-8-C4259-2011-supplement.pdf

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 6593, 2011.

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