

## ***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.***

**Anonymous Referee #1**

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Climate change impact on water resource extremes in a headwater region of the Tarim basin in China. This paper looks at the impact of climate change on hydrological extremes of Kaidu river subbasin of Tarim basin in China. It makes use of the results of 18 GCM models and 3 SRES scenarios A1B, A2 and B1 together making 36 GCM runs. These results are passed through a perturbation process to produce new time series data precipitation, temperature and ET. The base climatic data and the new time series are used as inputs of two models: a lumped and a spatially distributed model to produce an ensemble of results. The results are then analysed and presented in graphical form illustrating the relative impact of the different GCM models, the scenarios and the hydrological model structure. The research was well executed and the paper well written and it will no doubt contribute greatly to the understanding of the impact of climate

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change on water resources.

Corrections: Page 6596 line 9: summarized Page 6596 line 12: thereafter Page 6596: line 15-25 and Fig. 1: Show clearly where the flow gauging stations BYBLK and DSK are located. I found it difficult to find them and other readers may be confused. Put a scale on the map in Figure 1. Explain in the text the items 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? 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. Page 6600 line 23-26: refer to literature e.g. Moriasi et al. to indicate whether the goodness of fit is acceptable. Page 6601 line 10: How did you decide on a crop coefficient of 0.2? Page 6607 line 2: compared instead of comparing 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. 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? Page 6609 line 18-18: edit the paragraph to avoid two line paragraphs. Page 6610 line 2: Where can one see that the three emission scenarios give similar results? Page 6613 line 8: should read "Only for the VHM results at DSK station are stronger changes found." Page 6613 line 13: Delete Mainly at the beginning of the sentence. 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 perturbation factor means two different things in Fig 8 and 9. Consider how you can improve the labelling of the y-axes to reflect the truth more closely. Page 6629 Fig 9: The legend indicates 5 series but the graph shows 4 (if I have seen clearly). 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 (vertical lines) on this graph? Page 6633 Fig 13: It is not correct to join the lines here. Consider if this graph can be presented in a different way. 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? Page 6637 Fig 17: Consider

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presenting this graph differently. I find it difficult to distinguish all the lines in this graph due to congestion. Why did you only display results of the lumped model?

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