

## ***Interactive comment on “Climate Change Impacts on Yangtze River Discharge at the Three Gorges Dam” by Steve J. Birkinshaw et al.***

**Steve J. Birkinshaw et al.**

s.j.birkinshaw@ncl.ac.uk

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We would like to thank the referee for their insightful comments which we address below and which will result in an improved paper.

Main comment. “My main concern is on the short study period for the river discharge (only ten years). For climate studies, a ten year period cannot show clear patterns of climate change and environmental change (land use/land cover). Yangtze River is a major river in China and it is a surprise that the authors couldn’t find more flow records beyond the ten year study period”

We agree that it not ideal for the simulated study period to consist of only ten years of measured discharge data. The three Chinese co-authors have tried to obtain longer datasets but have been unsuccessful.

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The problem is discussed in detail in Section 4.3. Within this section we considered some of the problems of using only 10 years of data by comparing the 10 years of precipitation used in this work against the 30 years of data from the GPCC dataset. Both show similar inter-annual variability. In the 30 year GPCC record there are no extremes of precipitation which are large outliers to the 10 year record.

Regarding changes in land use, for the revised paper we will have a look at global land cover maps to see if there have been any significant changes.

Comment 1 “More justifications/exploration on the Shetran model would be useful. As the authors have said Other hydrological models have previously been applied to the Yangtze basin (Hayashi et al. 2008, Woo et al. 2009, Xu et al. 2008), but in terms of grid resolution, this is the most detailed hydrological model that has been produced for a major part of this basin.’ It would be useful if the authors could try different model resolutions to show the resolution effect on the modelling result at this basin so that a high resolution model is justified. A comparison with other models from the aforementioned literature would also be useful”

For the revised paper we will run a coarser resolution of the Shetran model to test the effect that this will have on the results. A comparison with the result of simulations from the other models of the Yangtze will also be made.

Comment 2. “52 potential evapotranspiration stations’ Do you mean evaporation pans? Please Clarify”.

We will clarify this for the revised paper.

Comment 3. “Irrigation abstraction from the basin could be large. How is it considered in the model?”

Irrigation abstraction is not considered in the model. This is because the main crop growing area is in the Sichuan basin and within this part of the catchment the main growing season is during the warm wet season when water availability is not an issue

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and so abstractions are not significant.

Comment 4. “ ‘A hydraulic conductivity value of 15m/day for a 4m deep aquifer produced the best fit.’ This value seems quite large. Please comment on it. “

The problem of the lack of information about aquifers within the catchment is mentioned in the text. The calibrated value of 15m/day for a 4m aquifer gives a transmissivity of 60 m<sup>2</sup>/day which is a fairly typical value for an unconfined sandstone aquifer –which seems to be the main aquifer type.

Steve Birkinshaw (on behalf of the co-authors)

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