First we like to thank the reviewer for the very careful reading and for pointing out important questions regarding this publication.

Reviewer's comment:
The manuscript may be improved in several places. The authors should also take into account recent research that addresses global multi-model hydrological studies with several GCMs and global hydrology models (GHMs) conducted within the EU project WATCH (see, e.g. Haddeland et al. 2011; Hagemann et al. 2013). In this way sentence as "Nevertheless …" (abstract line 6-7) and "However, …" (Introduction, p. 851, line 19-21) are not really true anymore as WATCH (and later ISIMIP) provided a consistent setup for GCMs-GHM studies that allow to create a more complete picture of uncertainties, and first studies already started to deal with this topic (e.g. Hagemann et al. 2013).

Haddeland et al. 2011 Multi-Model Estimate of the Global Terrestrial Water Balance: Setup and First Results. J. Hydrometeor. 12, 10.1175/2011JHM1324.1, 869-884.
Hagemann et al. 2013 Climate change impact on available water resources obtained using multiple global climate and hydrology models. Earth Syst. Dyn. 4, 129-144, doi:10.5194/esd- 4-129-2013.

Answer:
We agree that the references on the mentioned publications should be included into the manuscript. Therefore we added the references in the introduction. However, the abovementioned publications rely on the global-scale modeling approaches. Our study differs from that, as it is a regional-scale model application. Still, a comparison between the global-scale and regional scale impact assessments makes sense.

Reviewer's question:
What is the motivation to focus in exactly these catchments?

Answer:
From the general set of possible basins we selected three, which belong to different climatic zones. Besides, the chosen basins belong to the ISI-MIP Phase 2 river basins chosen for intercomparison of climate change impacts on water using the regional-scale models.

Reviewer's question:
Why only smaller sub-basins of Niger and Yellow river are considered?

Answer:
This was done for pragmatic reasons:

1. The complete Niger River basin could not be properly calibrated/validated with HBV and VIC since there is no inundation module included in those models. The flow of the Niger is very much altered by the existence of the Inner Niger Delta and related inundation processes, and the applied hydrological models should be able to model all the relevant processes.
2. The Yellow River in its lower reaches is heavily influenced by human water use (irrigation, abstraction for industry and municipal purposes), and therefore

hydrological modelling of the total river basin requires a lot of water management information, which is not easily available. Therefore, the headwater part, which is crucial for water supply to the whole river basin, was chosen in our case.

3. Besides, the sizes of the three chosen basins are comparable, which is also good for consistency of the study.

Reviewer's question:
Why do they authors do not focus on catchments that have been addressed previously in WATCH or ISIMIP to allow an intercomparison of results?

Answer:
Actually, the chosen basins (and models) belong to the set of the ISI-MIP Phase 2 river basins chosen for intercomparison of climate change impacts on water using the regional-scale models.
Also, there is one major difference between the applied regional approach and the global-scale approach, and that is the model calibration to the observed river discharge which is always applied at the regional scale, but very rarely at the global scale. The global models often fail to represent the measured runoff for the regional-scale basins (Hattermann et. Al, 2013).

Hattermann, F.F., Ch. Müller, V. Krysanova, J. Heinke, M. Flörke, S. Eisner, V. Aich, Sh. Huang, T. Vetter, J. Tecklenburg, S. Fournet, S. Liersch, H. Koch and S. Schaphoff. Bridging the global and regional scales in climate impact assessment: an example comparing two river basis located in humid and semi-arid climate zones. . In: Impacts World 2013 Conference Proceedings. Potsdam : Potsdam Institute for Climate Impact Research, pp: XXX. DOI: 10.2312/pik.2013.001

Reviewer's question:
Why does the study only take into account three different hydrology models? This likely leads to an underrepresentation of uncertainty originating from the hydrology models. This question needs to be properly addressed, especially as the data of more hydrology models are available since within ISIMIP, many more hydrology models have been used to conduct simulations using the ISIMIP forcing.

Answer:
This study is a kind of a pilot study of the ISI-MIP Phase 2, where more river basins (11) and more hydrological models (10-11) will be included. We added a sentence to the discussion:

"In the present study only three hydrological models have been used. This might underestimate the overall uncertainty related to hydrological models. A larger number of models (11) and more river basins (11) will be considered in the second phase of the ISI-MIP project allowing for a more detailed intercomparison of climate change impacts. "

Reviewer's comment:
With regard to the representation of results, i.e. impacts: Instead of describing the differences between single GCM driven simulations it may be more useful to focus on the mean changes and the ranges/spreads between the models.

Answer:
In our point it is important to highlight both aspects: the spread/ranges between the models, and the differences caused by the single GCMs and the hydrological models. We also pointed out some results related to single GCMs, because they represent such an important source of uncertainty. The spreads and averages can be seen e.g. in several figures (e.g. Fig. 7 Fig. A.1- A.3), and they are also discussed.

Reviewer's comment:
At several places the figure caption is repeated in the main text (e.g. p. 866 line 7-12). Please avoid this as this is redundant and unnecessary.

Answer:
The descriptions of Figures in the text are checked, and redundant text in several parts was shortened or removed.

Minor comments

C1 (p. 850 – line 14-16)

Comment: "Sentence is difficult to read. Please rewrite."

Answer: Modified:

"The objectives were to analyze and compare climate impacts on future river discharge and to evaluate uncertainties from different sources"

C2 (p. 850 – line 18)

Comment: … basins. *Robust* results …

Answer: Changed

C3 (p. 850 – line 24)

Comment: … in *the* future …

Answer: Changed

C4 (p. 854 – line 14)

Comment: … providing *scenarios, hydrological* models ….

Answer: Sentence was changed.

C5 (p. 858 – line 10-12) & C6 (p. 858 – line 13-14)

Comment 5: Sentence is difficult to read. Please rewrite.
Comment 6: Sentence is a partial repetition of lines 9-10. Please shorten.

Answer: Rewritten and shortened:

In our study a modified semi-distributed version of the HBV model (HBV-D, Krysanova et al., 1999), with a finer spatial disaggregation into subbasins and 10 elevation zones and up to 15 land cover types, was applied. The modification was based on the Nordic HBV version (Saelthun, 1996).

C7 (p. 859 – line 1-4)

Comment: Sentence is difficult to read. Please rewrite.

Answer: Done:

"The hydrotopes are created by overlaying three maps: subbasins, land use and soil. At the hydrotope level all soil water flows, nutrient cycling in soil and vegetation growth are simulated, based on the principle of similarity, i.e. assuming that units within one subbasin that have the same land use and soil types behave similarly."

C8 (p. 861 – line 4-7)

Comment: *… the model, eight for SWIM and 19 for HBV*. Four of *the HBV* parameters are …

Answer: Improved:

"For VIC only five parameters were used to calibrate the model, *eight for SWIM and 19 for HBV*. For the Upper Niger Basin a reduced number of calibration parameters was used, as all snow related parameters were excluded. "

C9 (p. 863 – line 4)

Comment: It is written: "But in two three cases …" Two or Three?

Answer: Three. The text was changed.

C10 (p. 863 – line 13)

Comment: … number *of* GCMs …

Answer: Included

C11 (p. 863 – line 20-21)

Comment: " … subsampled *in* a way … …models, *five* GCMs and *four* RCPs …"

Answer: "in" included. The numbers (underlined) are correct. Always three hydrological models, three GCMs and three RCPs were combined.

New: "Following the general approach from Bosshard et al. (2013) in the present study the five GCMs, four RCPs and three hydrological Models are subsampled **in** a way that all possible combination of **three** hydrological models, three GCMs and three RCPs are fulfilled."

C12 (p. 864 – line 13)

Comment: What are the calibration and validation periods?

Answer: They are given in Tab. 3.

C13 (p. 868 – line 23)

Comment: …, respectively. *The* trends …

Answer: Changed

C14 (p. 868 – line 26 and p. 869 - line 3)

Comment: It is written: … Figs. ??-8 …

Answer: Corrected.

C15 (p. 872 – line 2)

Comment: For Q90, ***C****Ms* and …

Answer: Corrected

C16 (p. 872 – line 22)

Comment: … of *the* hydrological *model* is …

Answer: Corrected

C16 (p. 873 – line 9)

Comment: … of CMs *is* highest …

Answer: Corrected

C17 – (Fig. 2)
Comment: Insufficient quality. I cannot see the grey line. I suggest using thicker lines and replacing the grey line by a black line.

Answer: Improved

C18 – (Figs. 4, 6, 10)

Figs. are too small and the content can hardly be recognized (especially for Fig. 6).
In Fig. 10, I can't separate some of the colours/curves given in the tiny panels below each small panel.

Answer: Fig. 4 and 6 are now larger because of different format compared to discussion paper layout. Font sizes in Fig 10 have been improved. Single lines have been removed and replaced by bands.