

## ***Interactive comment on “Validation of two precipitation data sets for the Rhine River” by C. S. Photiadou et al.***

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General Comments “The paper presents a valuable analysis of precipitation data sets over the Rhine river basin. The paper is clearly written. In general it would be interesting if the authors could discuss more whether they suspect logical explanations (perhaps physically based) for some of the consistent performance differences between CHR08 and E-OBS for wet/dry seasons and short/long return period events. “

Reply to General Comments: We would like to thank the Anonymous Referee #3 for his comments. The issues concerning the interpretation of the differences between the wet/dry and short/long CHR08 and E-OBS we didn't analyze in details. Since this is a subject for future research, we did some speculations in the first version of C3716

the manuscript in the discussion section. The speculations were removed after the suggestion of Anonymous Referee #1.

Detailed Comments “Title: Perhaps the title could be a bit more descriptive, e.g. by adding something about the validation method: “.... through streamflow simulation”

Reply to Detailed Comment concerning the Title: We liked the suggestion of the Anonymous Referee #3. The new title will be: “Evaluation of two precipitation data sets for the Rhine River using streamflow simulation”.

p5466, l 1: suggest replacing “number” with “two” Reply: The phrase “a number of” has been replaced by “two”.

p5466, l 6: The extended data set permits.. Reply: The phrase “The length extension” has been replaced by “The extended data sets permits”.

p5466 - 5470 l18, Introduction: I think the introduction is too long, especially the general sections about climate change impact research. It is also not clear from the beginning why these sections are written. I suggest introducing in the beginning that some of the limitations of current data sets are going to be discussed, illustrating the need for extended data sets of high quality. Then still I think readers will understand the value of the research and hence I suggest making these sections much shorter.”

Reply: The introduction has been rewritten. We focused in the limitations of current data sets and removed irrelevant paragraphs.

p5468 l6: this is also just mentioned in p5467 l28. Reply: This is part of the introduction that has been rewritten.

p5470 l20: ..space.. consider “.. satellite-based..” Reply: The word “space ” is change into “satellite-based”

p5471 l21: “These data sets..” Reply: The phrase “This data set” is change into “These data sets”.

“p5470 I23: From this sentence it is not clear whether the authors also present the development of the extended datasets. My impression is that the authors also developed the extended datasets and present them here, hence I suggest mentioning that in this sentence. (If not than in other parts of the paper when development of datasets is discussed, it should be made clear that this is not part of the present work)”

Reply: We did develop the extended version of CHR (CHR08). In the introduction, an extended paragraph has been added, describing the three main purposes of the present study. Summarizing here, we refer to 1) the extension of the CHR precipitation data set until 2008, 2) assess of the effect of the length extension of the CHR and E-OBS and 3) assess the performance of the HBV-96 model while force with the CHR08 and E-OBS precipitation data sets.

“p5471 I12: “..consistent..”

Reply: “Consistence” is change into “consistent”.

“p5472 I10-15: Are fixed monthly values used, averaged over the years (e.g. every June has the same potential evap)? Or is every month different, averaging the 30/31 days of temp and sunshine measurements for estimating the month average potential evap. Please make clear in text.”

Reply: The paragraph concerning the set-up of the HBV-96 model has been rewritten and comment on the monthly values of the potential evaporation has been added.

“p5472 I28: “A full description..” “

Reply: “A fully description” is replaced by “A full description”.

“p5474 I9: This has been also written in p5473 I24”

Reply: The sentence “The REGNIE grid has a spatial resolution of 1x1Km2.” has been removed from the revised version and the paragraph was rearrange.

“p5474 I4: “..resolution of 25 km encompassing..” “

C3718

Reply: The phrase “resolution of 25 km encompasses” is changed into “resolution of 25 km encompassing”.

“p5476 I21: Not sure if this is clearly/properly formulated. Consider “..based on estimates of the magnitude of a discharge event of a given probability.” “

Reply: The sentence has been rephrased using “bases on estimates of the magnitude of a discharge event of a given probability”

“p5481 I10: “Secondly..” in stead of “In addition” “

Reply: The suggestion is added in the revised version.

“p5481 I23, I25: “the error of the..” or the confidence interval itself is reduced”

Reply: The sentence has been rephrased to: For the CHR08, the 95% confidence interval of simulated discharge is reduce by approximately 5% and the corresponding interval of the 10-day annual precipitation sum by 4%.

“p5481 I5-7: consider leaving out (already in discussion of results)”

Reply: The sentence is removed from the revised manuscript.

“p5482 I12: “..in almost every catchment.”

Reply: “..in almost everywhere” is replaced by “..in almost every catchment..”.

“p5482 I13-15: consider leaving out, (already in discussion of results).”

Reply: The sentence in page 5482 line 13-15 is removed as it was already mentioned in section 3.2 Annual cycles of mean discharge.

“p5482 I29-: Finally... Firstly.. but “secondly” seems to be missing.”

Reply: This paragraph is rephrased and moved at section 2.1, where the set-up of the HBV-96 model is described.