Hydrology and Earth System Sciences Discussions

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

Anonymous Referee #2

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General comments: Overall the topic of this paper is in general relevant, suitable for HESS and definitely of interest for the hydrological community due to the increasing interest in long time series of climatic parameters to be used in hydrological applications. The paper describes the extension of two precipitation data sets (CHR08 and E-OBS) for the Rhine basin. The authors compare the performance of these data sets using them as an input for a conceptual hydrological model (HBV-96) and evaluate the statistics of the model performance. The results indicate that both data sets show good agreement in terms of extreme discharges and the CHR08 perform well in reproducing hydrological regimes, and spatial distribution of correlations with observed discharges. In contrast the performance of the E-OBS data set regarding the hydrological regimes is rather poor.

The paper is structured, organized, and all tables and figures are helpful. The list of references should be updated according to the technical comments below.

To summarize, I am recommending moderate revision of the submitted paper according to the specific suggestions given below.

Specific comments: A) The major specific comment is about the way the different precipitation data sets were used in combination with the HBV-96 model. First of all a description of the model setup is missing and the length of a calibration and validation period is not indicated. In my opinion it is obvious that the CHR08 is performing well if the model was only calibrated based on the CHR precipitation and temperature data sets. It would be an improvement to use both data sets (CHR08 and E-OBS) for the model calibration.

B) The nomenclature of the three major sub-basins (German, Moselle, Swiss) is not very precise. The "Swiss" catchment (Station Basel) also includes parts in Austria, Lichtenstein and Germany; the "Moselle" catchment (Station Cochem) parts in France, Luxembourg and Belgium; and the "German" catchment incl. the Moselle catchment has also parts in France. Additional to that the delineation of the Moselle catchment in Figure 1 is not correct.

C) The introduction part of the paper could be shortened, because it contains not relevant information for the objective of the paper.

Technical corrections: 1)p. 5466, 26: "Munich Re, 2004" is missing in the reference list.

2)p. 5469, 5: "Leander, 2009" is missing in the reference list.

3)p. 5471, 19: Replace "basis" by "basin".

4)p. 5473, 27 to 5474, 2: Change sentence "...2008 daily sub-basin averaged precipitation are created from ..." to "...2008 a daily sub-basin averaged precipitation data set was created from ...".

5)p. 5475, 8: Delete ", in press".

6)p. 5476, 22: Replace "(above)" by "(upper part)".

7)p. 5477, 4: Replace "12 420 m3" by "12420 m3/s" and "16 669 m3" by "16669 m3/s".

8)p. 5477, 6: see comment 7); Change format of numbers and replace all "m3" by "m3/s".

9)p. 5477, 8: Replace "m3" by "m3/s".

10)p. 5477, 11: Replace "(below)" by "(lower part)".

11)p. 5477, 26: Replace "Figure 4a" by "Figure 4 (left part)".

12)p. 5478, 17: Replace "Fig. 4b" by "Fig. 4, right part".

13)p. 5478, 21: Replace "Fig. 5a" by "Fig. 5, left part".

14)p. 5478, 27: Replace "Fig. 5b" by "Fig. 5, right part".

15)p. 5479, 8: Replace "wires" by "weirs".

16)p. 5479, 11: Replace "R2" by "(R2)" and "RMSE" by "(RMSE)".

17)p. 5479, 12: Replace ", Nr" by "(Nr)".

18)p. 5479, 13: Replace "catchments" by "sub-catchments".

19)p. 5481, 28: Replace "wires" by "weirs".

20)p. 5482, 4: Replace "RMSE Nr" by "RMSE and Nr".

21)p. 5487, Table 1: Replace "...coefficient R2" by "...coefficient (R2)".

22)p. 5487, Table 1: Replace "... efficiency Nr" by "... efficiency (Nr)".

23)p. 5488, Figure 1: Location, scale and grid north are missing.

24)p. 5488, Figure 1: Display the major rivers.

25)p. 5488, Figure 1: Catchment delineation of the Moselle is not correct.

26)p. 5488, Figure 1: Selection of names for the three major sub-basin (German, Moselle, Swiss) is not well defined. Better use names like e.g.: Alpine/High Rhine, Upper Rhine, Middle Rhine, Lower Rhine, or use the river names of the sub-catchments directly.

27)p. 5489, Figure 2: Change "REGNIE Daily" to "REGNIE daily" in the upper part of the figure.

28)p. 5489, Figure 2: Enlarge font size of "REGNIE daily emulated" in the lower part of the figure.

29)p. 5490-5496, Figure 3-9: Correct unit for discharge from (m3) to (m3/s).

30)p. 5491, Figure 4: Change figure caption: "...(a) Lobith..." to "...Lobith (left)..."; "...(b) Cochem..." to "...Cochem (right)...".

31)p. 5492, Figure 5: Please be consistent with the order of the legend elements and the font size.

32)p. 5492, Figure 5: Please provide complete captions for the figure.

33)p. 5493, Figure 6: Change figure caption: "...(a) winter maximum..." to "...winter maximum (left)..."; "...(b) summer minimum..." to "...summer minimum (right)...".

34)p. 5493-5496, Figure 6-9: Please be consistent with upper and lower case in the axis label.

35)p. 5494-5496, Figure 7-9: Please provide complete captions for all figures.