

Interactive comment on “Variability of low flow magnitudes in the Upper Colorado River Basin: identifying trends and relative role of large-scale climate dynamics” by M. Pournasiri Poshtiri and I. Pal

Anonymous Referee #1

Received and published: 4 September 2014

General comment

The paper by Pournasiri Poshtiri and Pal deals with the topic of natural low water flows variability and predictability, through their connection with large-scale climate forcing. The paper is clearly in the scope of the journal of Hydrology and Earth System Sciences.

The text makes enjoyable to read and is well written.

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Interactive Discussion

Discussion Paper

The aim of the paper is clearly stated through a couple of science questions. But despite interesting subject and data quality and quantity, the paper lacks in research depth and is far from being perfect in form. Some methodological aspects are not presented/argued by authors (e.g. the use of the power spectrum wavelets). While the authors try to find correlations between large scale predictors and low flows variability, their conclusions are somewhat inconclusive and no clear hypothesized process cascade linking large-scale climate patterns and low flow magnitudes in the UCRB emerges from their experiment. Science questions of the introduction do not really get clear answers from the environment-to-circulation approach adopted by authors. In addition, the study area is not presented and the physiographical context of the study basins remains largely unknown to the reader. Major changes are necessary to produce a well-documented and solidly built paper and to make the manuscript fit the standards of the journal of Hydrology and Earth System Sciences.

Specific points

The abstract might be more informative about research findings of authors on research questions they raised in italics.

p.8781 line 28 : is it an enhancement of potential or actual evapo-transpiration which is expected ?

p.8781 line 28 : at least one reference drawn from the scientific literature should be provided by authors.

p.8783 2 Data : A detailed list on hydro-climatological databases treated by authors is presented. Little details were provided about the homogeneity/quality of those databases : are they potentially containing spatial and/or temporal biases ? As those biases could impact the trend analysis and regional flow variability study performed by authors, they should provide arguments in favour of using those databases to match the goal of their experiment.

The methodological framework of time series analysis is not sufficiently detailed and argued. Without providing a complete presentation of the Mann-kendall test and the power spectrum wavelet method, for a sake of understanding authors should at least explained a little bit more how these widely-used time series analysis tools are working and to what extent they might be help them to answer their scientific questions.

p. 8789 line 9 : If I am not mistaken, nowhere in their paper, authors refer to phys-iographical factors for explaining spatial variability of trends. This point should be dis-cussed.

Technical points

p.8782 line 17 : spatial instead of spacial

Table 1 : HESS Manuscript Preparation Guidelines for Authors mentions that the use of SI units is mandatory. Please use cms instead of cfs. Content of the Note below the table suggests that columns LAT_GAGE and LONG_GAGE are missing in the table. From Table 1, it would be appreciable to get for each station, the drainage area, the altitude of the hydrometric station, streamflow time series length as well the time period covered by the streamflow series. Table 2 : Please give in the title the time period for which the correlation coefficients were calculated. Table 3 : the last column should be removed.

Figure 1 : the design of the map is really poor. Authors should improve the content/quality of the map through additional information like topography, geographical details (e.g. parallels of latitudes and meridians) and hydrographic network (main rivers and catchment limits). Moreover, the map is too small and no graphical scale is provided ! It is suggested to authors to use a GIS and couple on the same figure a big map at a regional scale presenting the study area and an other small one at a larger scale (continental scale). This will help non expert reader to better locate the region of interest and check that hydrometric stations are indeed controlling headwater basins.

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Figure 2 : the use of different symbols for time series makes them undistinguishable. The authors should find a way to improve the readability of the figure. Grouping time series with the same symbology per natural regions might be a solution. A fragmented time serie figured with red crosses and representing constant standardized values appears on the figure but is not labelled in the caption. . . This point should be clarified.

Figure 3 : Quality is poor. Among things to change : increasing image resolution, banning abbreviations like lat, insig; adding a graphical scale to the maps ; representing trend magnitude using light blue/dark blue or light red/dark red instead of a color ranges. In addition, Title of Figure 3 do not clearly explains what is represented on the Figure. . . is it the kendall tau ?

Figure 4 : What is the meaning of the CFC abbreviation used in the figure captions ?

Figure 5 : completely unreadable !!

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 8779, 2014.

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