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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Future shift of the relative roles of precipitation and temperature in controlling annual runoff in the conterminous United States" *by* Kai Duan et al.

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The overall academic content of this paper is sound, exploring the possible future runoff across the coterminous United States under conditions that may develop as predicted global climate changes unfold. However, my concerns with this paper relate to the way this material is presented. The authors appear to be unaware that they are writing to a global audience, and not to a group who, like themselves, are very familiar with the geography of the coterminous USA and with the systems used for identifying watersheds and location in the USA. I list below a series of points to illustrate my concerns.

P 1 Lines 5-6: The use of the phrase "hydrologic paradigms" seems inappropriate here.

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What is at issue here is the strength or intensity of different hydrological processes. Paradigms are something rather different.

P 1 Line 7: “intensification of hydrologic cycle“. What does this phrase mean?

P 1 Line 12: The use of “sustainably” in this context seems rather out of place. There are a lot of surface water sources and shallow aquifers that are being used very unsustainably.

P 4 Lines 16-17 “the rate of decadal change of temperature over the CONUS has reached -0.03∼+0.28 °C since 1960s”. I’m not sure what this means, it needs to be more clearly stated.

The authors assume that the readers have an intimate knowledge of some of the materials they are working with. So, for example, they use the term “8-digit Hydrologic Unit Code (HUC-8) watersheds“ and “2-digit HUC Watershed”. I have no idea what these are and I suspect I’m not the only one. The paper needs to be written for an international audience and not a just a group of those specialising in North American hydrology.

P 8 I do not follow the discussion from Line 3 to Line 17. Especially this term (Line 12) - R(C1t1 ,. . .,Ci t2 ,. . .,CNt1) − R(C1t1 ,. . .,Ci t1 ,. . .,CNt1). What is going on here needs to be explained more clearly, or is there a misprint?

P 8 Line 20 “statistically downscaled” What does this mean? Is this a way of saying that the means or the medians were used?

P 9 lines 1-2 “RCP4.5 and RCP8.5 were adopted as representatives of the intermediate and high emission scenarios respectively”. At this point in the paper the readers have no idea what RCP4.5 and RCP8.5 are. There is some explanation later in the paragraph but it is not particularly clear. These terms need to be defined before they are used.

Similarly, in Section 3, where the results are presented, Water Resource Regions

(WRR) are referred to by their numbers and sometimes also the name of a general region, such as Midwest, Mountain West or coastal regions, in this case with no indication which bits of the coastal US are being referred to.

The writing style is rather unsatisfactory with frequent lack of the definite article and missing and incorrect words. Here is an example: “For example, slight decreases in P but somewhat increases in R are projected in south Texas due to the alteration of inner-annual climate variability.” I suspect that this, and the many similar cases in the text, come about from reviewing the text using the word processor’s spelling check rather than careful reading by the authors.

In Section 4.3 the authors argue that the results presented here indicate that “Additional water storage such as reservoirs and flood prevention measures may be needed in regions expecting more R”. That may be the case but there is no evidence in this study that relates to flood behaviour and simply an increase in runoff does not say anything one way or the other about how floods will behave.

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