

Response to anonymous referee #1

Thanks for your recommendation and helpful comments. We have implemented the suggestions as described in detail below.

General comments

The manuscript attempts to address the role of different flavors of El Nino (CP/EP) on the surface runoff across the conterminous US using observation and CMIP5 data. In principle, the analysis and explanation of specific issue addressed in the manuscript is useful. The evidences provided in this manuscript are convincing. The manuscript has solid points to get published in HESSD; however the manuscript needs some clarification which needs careful evaluation with the available results. In view of the above points, I recommend this paper for publication in HESS after minor revision.

Major comments

1) There is sufficient evidence of diversity in types of El Nino events and its relative role in precipitation pattern over US. This should be highlighted in introduction section which will help multidisciplinary readers to get a clear impact of different types of El Nino over conterminous US.

Response: According to the comments, we have added sentences to highlight precipitation and temperature patterns over US in the *introduction* part (the first paragraph of Section 1).

2) Most of the arguments and findings are just reporting the facts, authors should try to argue the dynamical reasons rather than reporting the same. The dynamical mechanism should be introduced as a separate section to give a concrete idea towards the same. Which will certainly strengthen the manuscripts.

Response: We added a new section 4 “Discussion” in the revised manuscript to largely introduce the reasons of different runoff responses to the CP- and EP- El Nino events. We propose that the spatial pattern of runoff during the two types of El Niño in current climate are generally follow the pattern of precipitation. The dynamical mechanisms about the precipitation spatial pattern during the two types of El Niño are also added in the *Discussion* section of the revised manuscript (Section 4).

3) In addition to the mentioned features, distinct differences in the enhancement of temperature pattern in warming era may contribute towards the water balance. This requires more explanation since it is a very interesting result.

Response: We agree with the reviewer. Based on our analyses in section 3.4.2, the runoff patterns during the two types of El Niño in a warming climate are largely controlled by the precipitation patterns. However, ET will play a more important role than that in current climate due to higher temperature. We added a new figure showing the composite of runoff anomaly during the two types of El Niño by using NCAR-CCSM4 RCP4.5 outputs for the period of 2050-2099 (Fig. 7 in revised manuscript). The average temperature will increase by 2°C over 2050-2099 compared to current climate. Thus, Fig. 7 shows how the runoff will respond to the two

types of El Niño under a warming climate. Related discussion is given in the section 3.3.2 and 3rd paragraph of section 4 (*discussion*) in the revised manuscript.

4) Authors are not yet explicitly addressed, why runoff anomalies are distinctly different in different regions. There should be other reasons such as orography, land use land cover change, etc, in addition to the proposed discussion. This should be verified and include in the discussion through supporting literature evidence.

Response: Our results show that, in current climate, the runoff patterns are mainly determined by precipitation patterns (section 3.4.1). According to the comment, we added a paragraph in the Discussion section (Section 4, paragraph 1) to explain the precipitation patterns in the revised manuscript. Furthermore, local factors (such as land use, vegetation, local climate, etc) may also play a role and were discussed in the 2nd paragraph of section 4 in the revised manuscript.

5) Even though authors mentioned the runoff anomaly in the future based on RCP4.5, the discussion is completely missing in this direction. The spatial pattern of runoff in the future will be an interesting point which can easily be included in the discussion with supporting evidence.

Response: We added results of future runoff anomaly as suggested. Specifically, we added a new Figure (Fig. 7) to show the composite of runoff anomaly during the two types of El Niño by using NCAR-CCSM4 RCP4.5 output for the period of 2050-2099 in revised manuscript. Related discussions are given in section 3.3.2 and 3rd paragraph of section 4 (*discussion*) in the revised manuscript.

Minor comments

1) Abbreviations should be expanded at the first appearance.

Response: We have corrected this in the revised manuscript.

2) The selected CP and EP El Nino year should be mentioned in the text for better readability.

Response: We have added the specific El Niño years in the revised manuscript (section 2.2).