Hydrology and Earth System Sciences Discussions

Interactive comment on "On the spatio-temporal analysis of hydrological droughts from global hydrological models" *by* G. A. Corzo Perez et al.

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We thank the reviewer for his critical comments on our work, which we will certainly take into account in our revised version. In the following reply we shall express our opinion on the reviewers comments.

1. We are aware of the limitations of the model in the daily time scale and therefore a paragraph that states the limitations of the model selected to test the methodology will be included. This as well as a short observation on the results where the figure 10b is presented. However, it is not the target of this paper to explore the reliability of drought derived from daily results obtained through WaterGAP.

"WaterGAP has not been calibrated at a daily timescale, nevertheless we expect this to have no significant effect on our drought analysis. Time series of daily subsurface flow have been analyzed and there is no high intra-monthly flow variability for most of the regions. "

2. The definition will be moved in the revised version from the NCDA and the CDA chapters to the place where the first reference is made.

3. Paragraphs will be updated to reduce the parenthesis.

4. An additional line with the description of the drought intensity will be added in the new version of the manuscript.

   The drought intensity equals:

   $$DV_i/ADD \tag{1}$$

   In this context also the caption of Fig. 3 will be revised: "Fig. 3 Drought characterisitics calculated with variable threshold: (a) hydrological variable and variable threshold, (b) daily deviation, (c) ....".

5. The superscript will be removed from all the equations.

6. We believe that it is better to keep the index that refers to each event. This will help the reader to understand that there are many events per cell.

7. A paragraph will be added to improve the clarity of equation 2 and we will show that the threshold is not constant.

8. The total areas variable will be updated to Atot. 100/Atot will be taken out.

9. The paragraph will be updated as follows: "Therefore in this study we removed events with areas less than 5000 km^2"

10. The paragraph will be extended to discuss this conclusion.

11. The figure helps on the understanding of the different possible ways to explore the data as well as the important assumption on the direction of the analysis taken. We propose to keep it.

12. The colours in the map are used to visualize the diferente location of the cluster, the identification of each spatial event is not important for our results and has the complication that around 800 events are present. So in this case we believe is better to add a comment in the caption and not to modify the figure.

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