Hydrol. Earth Syst. Sci. Discuss., 8, C1084–C1085, 2011
www.hydrol-earth-syst-sci-discuss.net/8/C1084/2011/

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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Received and published: 21 April 2011

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. The first years of the analysis (1958-1962) were not taken into account since it is considered as the warming period for the model. In the revised version a line will be added to explicitly mention this in the paragraph (Line 19, Page 622). For the contiguous drought analysis only the years from 1976 onwards were significantly different for the extreme events. This was mentioned on page 631, but will be revised accordingly.

2. (a) For an overall drought representation of the different regions of the earth it was important to defined one unique criteria. We agree that the uncertainty analysis of the thresholds would be a step forward, but at this stage this paper only focuses on the development of the methodology and further studies are being developed in parallel to answer this question. We will add a line that helps on the understanding of this.

   (b)Minor droughts lasting 3 days or less have been removed from the analysis (pg. 625, L20-21). Furthermore, we expect that mutually dependent and minor droughts 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.

   (c) A discussion on the neighboring cell separation and its possible implications on the results will be added.

3. The use of hydroclimatic information is important to delimit regions with physical properties, although as it is mentioned by the reviewer spatial drought events do not necessarily follow the boundaries exactly. In this paper, where we illustrate the developed methodology, the hydroclimatic regions are just an example and as it is mentioned by the reviewer other regions could be also contemplated. However, in this sense to explore the spatial drought events with a non fixed region (non rigid boundary) the CDA method is what we believe should be used.

4. The text will be updated in the revised version.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 619, 2011.