

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

### **Anonymous Referee #1**

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Major comment: (1) My major concern is regarding the temporal scales used in the calibration/validation of the hydrological model used and the time step used in the drought analysis as presented in this manuscript. I fully agree that Doll et al. (2003) carried out intensive calibration/validation of the WaterGAP GHM, but not on a daily time scale, as far as I know. Therefore, it is important that the authors discuss this issue particularly with respect to the analysis/interpretation of some of the results based on daily time step presented in this study. This may be one of the reasons, for example in Fig 10b, it seems to me that it shows too many number of drought days particularly in Asia in various years.

Minor comments (mainly for clarity): (2) The terms 'contiguous approach' and 'non-contiguous approach' should formally defined where they first appear.

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(3) It is recommended to minimize the presentation of information in parenthesis, e.g. in pages 623 and 624.

(4) The three drought characteristics are rightly identified in page 625 (line 25), but it is not clear how the drought intensity is derived. I suppose it is defined by the RADV (eq. 3), which needs to be specified.

(5) As far as I can see, the index  $c$  in superscript can be removed from all the equations by mentioning at the beginning that all the calculations are carried out per cell.

(6) The eq. (2) can be made simpler by defining the summation range as  $t= 1$  to  $n$  (for example), where  $n$  is the number of time steps for the given drought event.

(7) In eq. (2),  $X$  needs to be defined. It is also not clear if the threshold  $T$  is constant per cell and per event. It should be explained.

(8) In eq. (5), I would represent the total area by  $A_{tot}$  (for example) instead of  $Tla$ . Furthermore, I would take the  $100/A_{tot}$  out from the summation sign.

(9) In page 629, line 18-19: it not clear which are the "individual cells".

(10) In conclusions (page 637, line 7), it says "...drought event[s] tend to occur (April-May)": This should be discussed with respect to climatic characteristics of the region.

(11) I think Fig. 1 is not really necessary.

(12) Colour legends are missing for Fig 9a.

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