

Reviewer #1

The article presents a modification in the way to compute the Combined Drought Index that serves to feed the European Drought Observatory. I will not enter into discussion about the CDI itself. I think it has some flaws in terms of flexibility to deal with environments of different characteristics that respond at different time scales to droughts, and I also prefer the inclusion of the evaporative demand into the computation of the climatic drought index. Said that I also see the value of this index and that is widely accepted, and used as reference for EDO.

We thank the reviewer for this thoughtful comment. As stated in the comment, here we focused solely on a revision of the structure of the CDI, without altering the forcing input datasets. We agree that exploring other base indicators (e.g. SPEI rather than SPI) and temporal scales may lead to further improved performances, but we believe that such modifications should be addressed separately in order to quantify the added value of each change. We plan to investigate further some possible improvements of the index, and we will add considerations on potential further analyses in the conclusions of the revised manuscript.

The proposed modification is rather logical and it implies an improvement in the capability of the index to deal with reversal conditions happening during the evolution of specific drought events. This is why I think that is good to publish the paper, in order to inform to potential users on the characteristics of the modified index.

We appreciate the support shown to the proposed revision of the index.

About the paper itself, I do not have much specific comments to provide, the objective is clear, and it is well structured and written. I would suggest a more critical introduction of the CDI compared to other drought index implemented in monitored systems at large scales,

We will expand the introduction to include references to similar indices including those based on hybrid and combined approaches.

and I would also try to perform a more quantitative assessment of the improvement associated to the modified CDI index, in the current manuscript is merely descriptive (it is true that the case studies suggest a certain improvement compared to CDI-1).

We thank the reviewer for this suggestion. As can be imagined, it is not straightforward to quantify the improvement for the revised index, due to the lack of an obvious reference dataset for the evolution of a past drought event. This is why we focused more on qualitative considerations, and we quantified the improvements (see Table 1) only in terms of number of inconsistencies from the theoretical framework.

Nonetheless we will try to improve the quantitative analysis, by exploring the relationship with other independent sources of data related to agricultural drought impacts.

The Figures showing the area affected by drought under CDI1 and CDI2 should present labels in their axis to facilitate the reading.

We will revise the Figure(s) to improve the readability.