

Response to the reviewer 2

We would like to thank the reviewer for his/her comments and appreciate the time he/she had dedicated to reviewing our manuscript. Here, we provide our responses to the reviewer's comments, in [blue font](#).

The investigation of drought periods, their beginning, end and duration is interesting. Dividing the study area into several sections for analysis is a good idea. However, several improvements are needed in each section of the manuscript. Therefore, I reject the manuscript at this stage.

1) The introduction lacks a thorough review of the literature on droughts, their processes and the relationship with the NAO in Europe. Important publications for Europe are also not mentioned. The author mentions droughts in India that are related to ENSO. But that is a completely different area with a different climate. It does not fall within the scope here.

Thanks for your comment. We focused more on introducing past studies on drought onsets and terminations (O&T) regardless of the region, emphasizing how these studies relate drought O&T to large-scale circulation patterns. Few studies specifically investigated on soil moisture drought O&T, especially in Europe, which is the main research topic of our study. Therefore, we disagree with the reviewer's comment that the scope of some papers is off-topic, as we found it necessary to include diverse past research on drought O&T. However, we agree with the reviewer that more discussion of drought studies in Europe needs to be included. We can correct this problem in the revision phase.

2) In the methods, I find no reference to how the data sets with different grid sizes are made comparable. This is an important point. The difference in results could be due to this very difference.

Since all five datasets with different horizontal grid sizes show similar timing of O&T when regionally averaged (Fig. 6 in the manuscript), it is unlikely that the difference in the grid size contributes to the observed difference in the duration of O&T on a regional scale. Therefore, these differences are likely due to the models' internal physics related to soil moisture. However, when the duration is compared between the individual grid points, the difference is more visible as shown in Fig. 2 and also in Figs.4 and 5 for the occurrence timing, indicating that the grid sizes contribute to the differences on a local scale.

3) The relationship between droughts and the NAO is not very strong. The start and end of a drought could also be more of a local phenomenon.

Thanks for your comment. In our analysis, as the datasets show very similar onset timing corresponding to the periods with more frequent positive NAO (Figs. 6 and 13), there could be a large-scale influence of NAO on drought generation, especially over western Mediterranean regions. While it is true that the start and end of droughts can be localized phenomena, we attempt to examine O&T on a regional scale for each of the subregions in Fig. 1. We will clarify these points in the next phase.

4) *A U-test to complement the t-test might be more appropriate.*

We will consider it for the next phase.

5) *The results section needs to be restructured to improve readability.*

We will adjust that in the revision phase.

6) *The discussion section lacks a thorough discussion of the underlying processes based on previous findings. Also, convincing arguments for the link with the NAO are missing.*

As reviewer 1 also commented, we will add a separate discussion section and include more quantitative details and extensive discussion in the revised version.

7) *Many sentences are too general and lack a quantitative measure.*

As mentioned in our response 6, we will correct this in the next phase.

8) *The English language is in great need of improvement.*

We will adjust this problem in the next phase.