

Review 2 - Linking European droughts to year-round weather regimes

The authors have addressed the reviewer comments thoroughly, and the manuscript has significantly improved in my opinion. In only one instance, the response of the authors was not quite convincing. I would recommend the paper to publication, but would like to see the minor comment below addressed.

It is great to see that you conducting the targeted clustering using MCA. The clusters do look different and might warrant further analysis however I agree that this is beyond the scope of this paper. As a comment, the results in Spuler et al 2024, 2025 show that you can improve the informativeness of the targeted clusters using non-linear dimensionality reduction, compared to linear methods such as MCA or CCA, while retaining their predictability.

I am not quite convinced by the response given to the comment regarding the year-round regimes, in blue below. The dominant circulation patterns, as well as their relationship with precipitation, vary from season to season.

Authors' reply: The main advantage is that they reduce the dimensionality of the problem, as the study does not need to be repeated separately for each season. Similarly, classic weather patterns are well established for the winter (DJF) and summer (JJA) seasons, but not for the intermediate seasons (MAM and SON - spring and fall). Finally, the phenomenon under study – droughts – can occur at any time of the year. Any division of the year into sub-periods will most certainly lead to discontinuity in the study of the link between zg500 and drought.

The plot introduced in response to Reviewer 1 (Figure 9 in the reviewer response) is a great plot summarizing correlations of individual days with both the canonical precipitation patterns and cluster centers. However, it shows that there are perhaps (in the case of Figure 9) a third of days where the canonical precipitation response has an $ACC < 0$, and perhaps a seventh of days where this is true for zg500. This would most likely be significantly improved if the regimes were computed for each season - the fact that " any division of the year into sub-periods will most certainly lead to discontinuity in the study of the link between zg500 and drought" is in the opinion of this reviewer precisely the point of investigating the regimes specific to the season. Of course, the seasonal cycle is continuous rather than being composed of discrete 'seasons', but in the absence of a model which introduces seasonality as a covariate, studying discrete seasons is a reasonable approach. Since computing year-round regimes is one of the primary premises of this paper, I am not asking the authors to redo the analysis, but rather to perhaps offer a more precise reflection on the benefits of a year-round analysis, alongside the benefits of a season-wise study in the discussion section or in line 45-47.

In particular, the current paper text reads in this section "which hinders a systematic analysis of the drought-circulation relationship throughout the entire year especially intermediate seasons" which is not a convincing argument as the intermediate seasons could be very well analysed in a seasonal regimes study.