

Second review of “Linking European droughts to year-round weather regimes” by Savary et al. submitted to Weather and Climate Dynamics

General comments

I would like to thank the authors for carefully responding to all the comments raised by the reviewers, and for making all this additional analysis. In my opinion, this additional analysis now gives a more comprehensive picture and helps the reader to understand sensitivities and weaknesses of the approach. I therefore only have a set of minor comments left, which should be considered before the manuscript can be accepted. Note that my line numbers below refer to the tracked-changes version of your revised manuscript.

Minor comments

Your response to my comment 2 (about the role of persistence and intensity of individual WR life cycles):
Thanks for making this additional analysis. Could you maybe add one concluding sentence also to your discussion or conclusions in the manuscript – since you already did it?

L2: I would replace “large-scale dynamic circulation patterns” again with “large-scale atmospheric circulation patterns”. The former sounds like it could be anywhere, as dynamics happens in all kinds of spheres (above and below ground).

L7-8: Can you still say “seasonally consistent precipitation patterns” given your nice new analysis of the intra-regime precipitation variability? Or what exactly do you mean with “seasonally consistent” here?

L9-11: You mention the *partial* importance of weather regimes here. Given your additional analysis you made now also for your review replies, would it make sense to add one sentence here speculating what additional reasons might be important (convective situations during summer, larger intra-regime precipitation variability in summer etc.)? It should not be written to undermine the importance of the regimes, but maybe just for completeness/transparency. Or do you think it would be too speculative?

L21: “This is all the more true for extratropical regions” – I’m not sure if this sentence is grammatically correct...

L46-47: I would write “... throughout the entire year including intermediate seasons”

L76: I would rather say something like the domain is roughly similar to Grams et al. 2017 but extends more to the east to also capture region X and Y.

L90-93: Isn’t the step of the standardization of this anomaly missing in the sentence explaining how the SPI is computed?

L184: With “monthly” and “daily” you here mean the integration period of the SPI, i.e. monthly would mean the SPI1? But what is a daily SPI then – do studies really do this?

L208: “function”

L237: I would write “cyclonic anomaly” rather than “depression”

L317: There is a typo / grammatically incorrect part in this addition

Fig. 6 caption: It's not very clear what you mean with "and the frequency of occurrence". You mean the canonical/climatological occurrence independent of drought?

L416: "columns I and III" from where?

L437: "atmosphere"

L456: You should state which dotted lines you mean, because there are also dotted lines dividing the four quadrants.

Section 4.1 / Fig. 11: I would write / repeat more explicitly that this section / figure looks at the resemblance of zg500 and precipitation patterns *before drought events* with the canonical patterns of the corresponding weather regimes independent of drought, either in the caption or somewhere in the description. Of course it is somewhat clear from the fact that you try to understand the deltaC term. But when reading the text, it sounds a bit like this is a general investigation of precipitation representativeness of weather regimes (independent of droughts).

L465: I would not write "question" but "reduces the representativeness"

L472: I would write "small- to meso-scale convection". I guess it can also be the classic (small) summer thunderstorms.

L475: "We may therefore question the relevance of using time (-> weather?) regimes to link circulation and precipitation" -> I would rephrase / "weaken" this a bit, because if written like this, you basically question your whole paper and weather regimes as a concept. Of course the representativeness of surface weather by weather regimes is not perfect, but this is by design, because at the cost of the representativeness of surface weather we get other advantages by using weather regimes which we would not have by looking at surface weather directly (categorization, more predictability, persistence etc.).

L483: "stability" of what?

Section 4.3, seasonality of the reconstruction: Could you put the findings of this section back into the context of the paper? What would this bias (seasonal vs. annual) mean for your terms alpha 1 and 2? Would it mean that one of these might be under- or overestimated for the regimes that have a strong bias (seasonal vs. annual)? It would help the reader to put that discussion into context...

L566: "WR frequency anomaly"

L568: You deleted the reasoning sentence for why the WRs explain more droughts in winter than in summer, but I would find it nice if you still wrote a sentence about it. Maybe just something like that this is because weather regimes explain precipitation variability less well in summer than winter (related to convection etc.) (or something in this direction)?

Figure E1, caption: "Frequency anomalies" of what? I guess of weather regimes?