Natural Hazards
and Earth System
Sciences
Discussions

Interactive comment on "The impact of drought on the productivity of two rainfed crops in Spain" *by* Marina Peña-Gallardo et al.

This manuscript examines the spatial and temporal relationships of crop yield to a suite of drought indices in Spain. Two different crop yield datasets are used and seven drought indices are used including the multi-scalar SPEI, SPI, and SPDI and the uni-scalar PDSI, z-index, PHDI, and PMDI. Main findings were that then multi-scalar drought indices were most strongly related to crop yield and that spatial patterns varied depending on time of year and drought index time scale.

This paper is well written and of interest to the community. Overall, I did not find any major issues with the paper, but a few parts of the methods and analysis do need a bit more clarification. Once these methods are clarified the paper should be accepted for publication.

Comments:

1. Figures 3-5 show the strongest correlations to crop yield but don't discuss the ending month of the strongest correlations. I realize month is discussed in other figures but I don't think it specifically highlights the ending month of those maximum correlations. Please clarify how the ending month is accounted for. An additional figure showing the spatial distribution of the ending months associated with max correlations could be useful.

2. Throughout the paper the "impact of drought" on crops is mentioned several times. However, all data for the period is used which includes droughts, wet years, and average years. I would think additional analysis would be needed to justify that wording that looks specifically at drought episodes. I would suggest somehow rephrasing that throughout the manuscript to more of a general "climate" impact of droughts as drought events are never discussed.

3. It is not completely clear how the monthly drought indices are correlated to ANNUAL crop yield. Months in Figures 7-9 begin in October so is that the October prior to the crop yield year? Also, can you explain what correlations of drought index to crop yield in say, December, actually means. By December all of the growing season and harvest is finished so what does this physically mean? Or, is this the December prior to the crop yield year? Please clarify some of these issues.

4. Line 147: The "atmospheric humidity demand" is only considered if using a Penman-Monteith or other physical evaporative demand formula. Palmer's original paper on used temperature and no humidity. I suggest changing just to "atmospheric demand".

5. Figures 2 and 3: Please clarify in the captions that the box plots are showing the distributions for all districts or provinces.