

Interactive comment on “A high-resolution spatial assessment of the impacts of drought variability on vegetation activity in Spain from 1981 to 2015” by S. M. Vicente-Serrano et al.

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Reviewer 2

The authors present a very detailed, innovative analysis (fine-scale spatial resolution) of the relationships between SPEI and NDVI measurements in the Iberian Peninsula. A large number of interesting figures, tables and supplementary figures are presented. I think that this data paper is very informative and the methods are robust. I would suggest to the authors to address the following points, if possible and easily achievable:

We would like to appreciate the positive assessment of our manuscript by the re-

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viewer#2. We have followed most of his/her recommendations in order to improve our manuscript.

Major comments - The manuscript is very interesting but lacks a clear focus.

We do not exactly agree with this comment since we think our manuscript has a clear focus, which was detailed in the objectives stated in the introduction:

“The overriding objectives of this study are: i) to determine the possible differences in the response of vegetation activity to drought over Spain, as a function of the different land cover types and climatic conditions; and ii) to explore the drought time scales at which vegetation activity highly responds to drought severity. An innovate aspect of this study is that it provides –for the first time– a comprehensive assessment of the response of vegetation activity to drought using a multidecadal (1981-2015) high spatial resolution (1.1 km) NDVI dataset over the study region.”

A very large number of results, hypotheses and figures are described and commented. Please consider somehow reducing the number of main figures and tables in the main manuscript, providing more focus, and shortening the manuscript. Please focus on the more interesting results and move some of the non central figures and the associated text to the supplementary materials.

According to the comments by the reviewers 1 and 2, we have reduced the number of figures but also the length of the manuscript.

- Please clarify in all the figures which SPEI temporal scale/s are considered. for example, in Fig 8 it not clear to me which SPEI time scale are considered. –

The reviewer is right. This was not detailed in the original manuscript and it can be a source of confusion for the readers. We have clarified this point in the methods section:

“Given that it is not possible to know a priori the best cumulative period to explain the response of the vegetation activity to drought variability, we retained for further analysis the maximum correlation, independently of the time scale at which this is obtained.”

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Please define sNDVI on line 217. –

This was described previously in line 150, in which it is indicated that the sNDVI corresponds to the standardized NDVI:

“Herein, it is noteworthy indicating that the data from the Sp_1Km_NDVI dataset was standardized (sNDVI),”

Please clarify this sentence. Line 163. "The spatial distribution (not shown here) of these pixels concurs well with the areas identified in earlier studies over Spain (e.g. Lasanta and Vicente-Serrano, 2012; Vicente-Serrano et al., 2018)."

This has been rewritten and detailed in the revised manuscript:

“The spatial distribution of these pixels (not shown here) concurs well with the areas identified in earlier studies over Spain in which it was an abrupt modification of the land cover type (e.g. creation of new irrigated lands) (Lasanta and Vicente-Serrano, 2012; Vicente-Serrano et al., 2018).”

Minor comments: - Figure 10. if easily achievable, using a unique name for the response variable would clarify the figure (increasing at the same time the font size). This may apply to many other figures in the suppl. mat and the main manuscript. –

We have improved the figures of the manuscript including Figure caption in the cases in which this was not available and increasing the font size of some of the figures.

Figure 10. There is a typographic error in the legend. Please check this detail. –

Corrected in the revised manuscript.

Please simplify/clarify the following sentence: On line 290: "This pattern is mostly recorded in the period between May and July (Supplementary Figure 5), in which the sNDVI variability is more sensitive to drought. Nevertheless, there are no general spatial patterns in the response of the NDVI to SPEI, indicating that there is a dominance of the maximum correlations associated with a certain SPEI time scale (Supplemen-

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tary Figure 6). Interestingly, this , this pattern is not driven by the presence of different land cover types, given that the correlation coefficients between the sNDVI and SPEI are quite similar, irrespective of the land cover type (Supplementary Figures 7 to 17)"

This section has been removed from the revised manuscript in order to improve readability.

Line- 204. please correct the following typographic error. "... to drought It is well recognized that natural systems can show different responses to the time scales of drought (Vicente-Serrano et al., 2011, 2013)."

Corrected.

Line 295. Please correct the following typographic error: "Interestingly, this , this pattern is not driven by the presence of different land cover types,"

This paragraph has been removed in the revised manuscript.

Line 61. Check the following sentence. "Several space-based products allow for quantifying vegetation conditions, given that both health and dry vegetation biomass respond dissimilarly to the electromagnetic radiation received in the visible and near-infrared parts of the vegetation spectrum (Knipling, 1970)"

Rephrased.

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