REFEREE 1

Authors: We are very grateful to the referee for the comments and suggestions to improve the study.

Specific Comments

Ln 14. Can you explain why you are using the term “water soil moisture” in the following phrase “We aim to study the feasibility of using water soil moisture (soil drought)”

Authors: There is a mistake in the phrase. It says:

“We aim to study the feasibility of using soil moisture anomalies as a warning index for vegetation or agricultural drought.”

Ln 18. Please choose between using ZVCI or ZVCI. You should keep one of those and don’t change through the manuscript.

Authors: We have corrected these typos throughout the manuscript. Apologise.

Ln 22. VCI = ZVCI? Please be consistent with acronyms throughout the manuscript.

Authors: We are talking about VCI anomalies. VCI anomalies are calculated using the VCI's Z-score.

VCI anomalies = Z-score of VCI = Z_{VCI}

English comments

Ln 24. Precipitation leads TO vegetation growth. OR precipitation grows vegetation.

Authors: Thank you very much. We have corrected the mistake. Now it says: “In these months, given the low temperatures, precipitation leads to vegetation growth.”

Ln 37. Please use “soil water content”. Please modify all the rest by yourself.

Authors: Thank you very much. We have changed the concept “soil water content” by “soil moisture content” because it is more adequate in this study.

Ln 46. I think a reference is needed for the types of droughts.

Authors: We have arranged the introduction. Now you can find it in Ln 32.

“Drought is the principal climatic hazard to arid and semiarid Mediterranean grasslands and causes physical suffering, economic losses, and environmental degradation. Droughts are often divided into four major types: meteorological, agricultural, hydrological, and socioeconomic

(Allaby, 2014; American Meteorological Society, 2004, 1997; Wilhite and Buchanan-Smith, 2005). Meteorological drought is defined as an accumulated departure of precipitation from normal or expected. Agricultural drought is related to soil moisture availability affecting vegetation growth. Precipitation and temperature directly influence water balance, causing changes in soil moisture regime, which, in turn, influences plant growth. Thus, soil moisture is widely recognised as a critical parameter that links precipitation, temperature, evapotranspiration, and vegetation status. At the same time, temperature also affects plant phenology and growth directly. Therefore, agricultural drought constitutes a combination of climate, soil, and vegetation factors.

Hydrological droughts occur when the water moving through the ground is significantly reduced. Finally, socioeconomic droughts occur when a drought affects a community's supply of goods and services. These droughts are sequential in time, increasing the complexity of their impacts and conflicts."

We are open to any suggestion to add more adequate references.

Ln 73. In line 46 you mention four types of droughts. Now, you are using a "new term," edaphic drought. Why is it not mentioned before?.

Authors: We have eliminated the term edaphic drought in all the manuscript (including the title) and only keep agricultural or vegetation drought defined in the introduction.

The aim of this study is not to introduce a new concept (edaphic drought) but to study the relationships between vegetation and soil moisture anomaly indices.

Ln 101. They use using?. Please correct.

Authors: Thank you very much. We have corrected the mistake.

Ln 100. It is not clear why they choose those pixels.

Authors: Tragsatec company, in collaboration with Entidad Nacional de Seguros Agrarios (ENESA), depending on the Agricultural Ministry of Spain, selected these pixels as semiarid rangelands to be used in the context of the National Rangeland Insurance. Firstly, pixels categorised as rangeland were selected using the SIGPAC. From this previous selection, pixels with a tree coverage higher than 15% were discarded to ensure a low tree coverage based on the MFE (Spanish Forest Map).

Ln 110. (Appendix 1- PONER ALGO MAS?). This is not the first one, I think this research paper needs to be resubmitted. There are too many typos; see above.

Authors: Thank you very much. We have corrected the mistake.

Ln 115. You defined the vegetation condition index with ZVCI in the abstract and have now changed it to VCI.

Authors: In the abstract, we were talking about VCI anomalies measured by the Z-score of VCI, i.e. Z_{VCI}. We have improved these definitions to clarify the concepts better.

Ln 118. Eq 1 is dependent on NDVI and Eq. 3 is dependent on NDVI. Do you think this is tricky if you are looking for a correlation between them (WCI and VCI)?

Authors: We have tried to clarify this point with the following paragraph added to the text:

"Note that W depends on STR and ultimately from SWIR. NDVI is only a scale factor to determine STR_{min_i} and STR_{max_i}. Even there is a linear relationship between STR and W (Eq. 3), this is not found between NDVI and W, as the dry and wet edges are not parallel lines (Fig. 2). A time-lagged cross-correlation analysis was performed to check that W estimation does not impose a significant relation with NDVI that could bias the estimation of the probabilities applied in this work."

Ln 132. What does the soil water content of one mean?. Is it possible to have soil water content of 0?

Authors: The formula of W is: $W_i = \frac{STR_i - STR_{min_i}}{STR_{max_i} - STR_{min_i}}$

Therefore W = 1 means that $STR_i = STR_{max_i}$, the maximum moisture contents in the studied soils (wet edge). By contrast, W = 0 means that $STR_i = STR_{min_i}$, the minimum moisture contents in the studied soils (dry edge).

Ln 144. Which anomalies? I think it is explained below. Please correct the entire paragraph.

Authors: We have corrected the paragraph. Now it says:

"The probabilities of surpassing different thresholds were calculated for WCI anomalies (Z_{WCI}) and VCI anomalies (Z_{VCI}) every 10 days throughout the time series."

Ln. 151 See acronyms.

Authors: We have reviewed all the section 2.4.

Ln 153. Instead of A or B, you should use the acronyms presented before.

Authors: We have reviewed all the section 2.4.

Final comments.

Why do you not use a method to evaluate the precision of W computation? Measuring surface soil water content is not difficult.

Authors: The aim of this study is to show relationships between vegetation and soil moisture based on accepted remote sensing indices such as NDVI and W, and their condition indices, VCI and WCI, respectively.

Section 2.4 is not well written and is essential for the manuscript.

Authors: We have reviewed all the section 2.4.

The methodology does not specify how to verify the results. The methodology is only based on indexes previously published; where is the novelty? On the conditional probability?

Authors: In this study, we try to show a relationship between vegetation and soil moisture anomaly indices depending on months. This can be used to increase the probability of predicting an anomaly in vegetation indices (agricultural drought) and work as an earlier warming index. Though conditional probability is a classic in statistical terms, we have only found a close study to our work that we have mentioned in the introduction: Hao et al. (2021).