Response to Reviewer #1

The authors wish to thank anonymous referee #1 for their kind words and positive evaluation of our work. We are pleased to know that both the manuscript and the dataset have been considered relevant, timely, and useful for a wide range of potential users. We have carefully considered the comments and revised the manuscript accordingly.

Please, find a detailed response to the comments below. Original comments are in black and our response is in blue.

**

Near-real-time vegetation monitoring and historical database (1981-present) for the Iberian Peninsula and the Balearic Islands

This work and its associated dataset include spatio-temporal series of vegetation índices for Iberian Peninsula and Baleraric Islands during 1981 to date. The authors also provide a link to visualize and download the trend of the indices. All of these resources are highly relevant for researchers, managers, land-owners, policy-makers as well as other stakeholders working on forestry, agriculture and other environmental sciences. Therefore, both the paper and the data are highly timely and potentially useful.

Overall, the manuscript is well-written and it is easy to follow. I recommend accepting it for publication.

Below, you can find some minor comments:

L107-108: why do the layer represent the highest value? Why not the mean or the median?

We thank the reviewer for this pertinent question. The layers represent the maximum NDVI value within each compositing period because we applied the Maximum Value Composite (MVC) method, which is a widely adopted technique in remote sensing for vegetation monitoring (Holben, 1986). This approach minimizes the effects of cloud contamination, atmospheric interference, and low solar angle conditions, which typically lead to underestimated NDVI values. By selecting the maximum value, we ensure that the NDVI is more representative of actual vegetation activity during the period, as it is less affected by transient atmospheric or observational artifacts. In contrast, using the mean or median could retain such distortions, leading to less reliable indicators of vegetation health.

L112: please add the EPSG as you do at the end of the manuscript.

We have now added the EPSG code (EPSG:23030) to Line 112 to ensure consistency with the information provided at the end of the manuscript.

L144: what is the difference between the average here and the highest NDVI in L107-108.

We appreciate the reviewer's question and the opportunity to clarify this point. The difference lies in the compositing method used and the stage of data processing. In Lines 107–108, we refer to the Maximum Value Composite (MVC) method applied to the AVHRR dataset, where the highest NDVI value within each semi-monthly period is selected to minimize cloud and atmospheric effects.

In contrast, at Line 144, we are referring to the linear interpolation process used to temporally resample MODIS and VIIRS data. In this case, daily NDVI values are estimated through interpolation, and the average NDVI is then calculated over the same semi-monthly periods used in the AVHRR data. This ensures temporal alignment across sensors. Therefore, while the AVHRR

uses the maximum observed value in each period, the MODIS and VIIRS NDVI values represent the average of interpolated daily values.

This difference reflects the original compositing methods and data availability for each sensor, and our harmonization approach accounts for these differences to ensure consistency in the final time series.

L254: I have some concerns on the map used. In my opinion, authors should provide some details such as map spatial resolution. On the other hand, is the map temporally dynamic? I mean, do the land uses change over time? I wonder how changes in land uses (or the lack of the changes in the map) have been considered in your study.

Thank you for this insightful observation. The land cover information used in our assessment is based on the Mapa de Cultivos y Aprovechamientos de España (MCA), developed by the Spanish Ministry of Agriculture. The version used in our study corresponds to the 1980–1990 edition, which was digitized in the 1990s and has a cartographic scale of 1:50,000. The minimum mapping unit is a polygon (patch), representing areas of homogeneous land cover. We have now added this information to the manuscript to clarify the spatial resolution of the dataset.

Regarding temporal dynamics, the MCA is not a time-varying product and therefore reflects land use for the reference period of the 1980s. Consequently, it does not capture land cover changes that may have occurred during the full study period (1981–present). However, the goal of this analysis was to assess the performance of the NDVI harmonization across different land cover types, not to quantify land use changes. We acknowledge that future work could benefit from integrating dynamic land cover datasets to account for land use transitions over time.

We have modified the paragraph in the manuscript as follows (new text in bold italics):

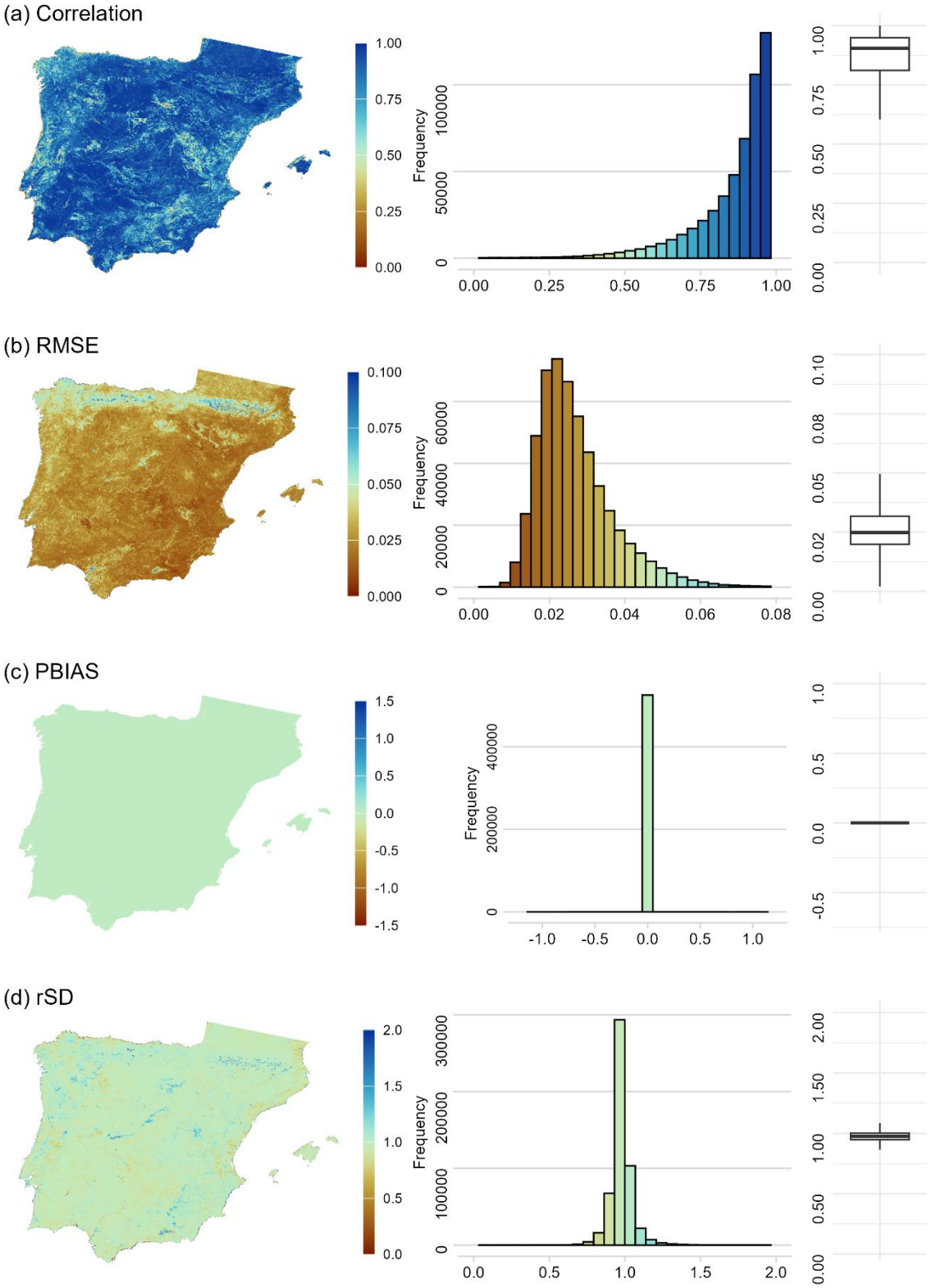
The harmonization's efficacy was further explored across various land cover types (i.e., irrigated crops, non-irrigated crops, orchards, olive groves, vineyards, mixed vineyards-olive groves, meadows, grasslands, shrublands, mixed shrublands-pastures, coniferous forests, riparian forests, eucalyptus crops, deciduous forests, mixed coniferous-eucalyptus, mixed coniferous-deciduous forests, unproductive lands and mixed vineyards-orchards), leveraging the Mapa de Cultivos y Aprovechamientos de España (https://sig.mapama.gob.es/Docs/PDFServicios/Mapadecultivos.pdf, last accessed July 2024), to identify discrepancies among different vegetation and land use categories. ***This land cover dataset corresponds to the 1980–1990 period and was digitized in the 1990s, with a cartographic scale of 1:50,000. Each mapping unit, or patch, represents a polygon with homogeneous land use. As the MCA is not temporally dynamic, changes in land use over the study period were not accounted for. Nevertheless, it provides a consistent reference for evaluating harmonization performance across major land cover classes***. Given the pixel-by-pixel accuracy analysis, we also present d index maps, offering a spatially detailed view of the harmonization's effectiveness both overall and across seasons within the study area.

L365. The color ramps of the maps do not correspond with the color ramps of the histogram. I mean, for instance in Fig 6a, correlation values equal to 1 are represented in blue in the map but these values are red in the histogram. Please, be consistent.

Thank you for raising this issue. We have revised all histograms to ensure full visual consistency with the corresponding maps. Specifically, we now apply the same continuous color palette (roma) to both maps and histograms. Each histogram bar is colored according to the value it represents, using the same color scale as in the maps. This ensures that high or low values are

visually represented in the same way across both spatial and statistical plots, thus improving interpretability and consistency.

Please find the revised figure below:



L377 and Figure 8. Well, there is a positive relationship between NDVI and kNDVI but it seems that a model including a squared effect would improve the quality of the fit. Therefore, I would not state that “the data reveal a linear relationship”.

We appreciate the reviewer's insight regarding the nature of the relationship between NDVI and kNDVI. While the association is clearly positive, we agree that it is not strictly linear and that a non-linear (e.g., quadratic) component might improve the model fit. To reflect this more accurately, we have revised the manuscript text and figure caption to avoid referring to the relationship as linear. We now describe it as a positive association between the indices, without specifying a particular functional form.