

Interactive comment on “Stratified analysis of satellite imagery of SW Europe during summer 2003: the differential response of vegetation classes to increased water deficit” by A. Lobo and P. Maisongrande

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Response to Anonymous Referee #2

We strongly disagree with this review: our article makes clear statements that are based on numerical analysis. Results of the analysis are presented as graphics because (i) we believe that this is the best form to communicate not only our conclusions but also, to some extent, our data, thus providing the readers with a material for thinking over and promote discussion; (ii) statistical graphics including error bars provide more information and include statistical tests. R^2 values are included in the text where required.

Detailed answers to the comments by Referee #2 are included below.

Comments by Referee #2 are reproduced *in italics*

1. *“The methods are unclear. . .”*

(a) *“It would be helpful to have a clear and rigorous set of equations that describe the analysis”*

We did not think that equations were needed, as the explanation of the methods is very simple, but we can add some equations to further clarify the analysis.

1. *“I am unsure about the years used. . .”*

Pg. 2029, line 27 in the article: “We used a data set of S10 products from 1999 to 2003. . .”

Is that vague? Perhaps an equation is needed?

1. *“. . . the averaging. . .”*

“We computed an average annual series of monthly mean NDVI images for the period 1999 to 2002, which we used as the “normal” reference” (Pg. 2029, lines 28 – 30).

While this statement might seem confusing to Referee #2, is not vague. May be some readers, as Referee #2, would find easier to understand an equation, but we think that at least as many would prefer the phrasing. In any case, the equation would be:

$$\bar{V}_m = \text{mean}(V_{i,m})$$

where V stands for NDVI, m for month, \bar{V}_m for the reference NDVI value of month m , and i for the year, ranging from 1999 to 2002.

1. "... *the spatial scale,*"

"... from 52° 40' N, 11° 0'W to 30° 21' N, 6° 51' E, with a resolution of 32" (Pg. 2029, line 28).

1. "*The definition of the anomalies is vague and non-rigorous*"

"... and an annual series of monthly mean NDVI images for 2003. Also, we calculated the images of NDVI anomaly for June, July and August 2003".

We could add "... as the difference between the monthly 2003 images and the monthly images of the reference period", along with the equation

$$\Delta V_m = V_{2003,m} - \bar{V}_m$$

where ΔV_m stands for the anomaly of NDVI of month m in 2003.

(although we think that the term anomaly in this context is self-explanatory)

1. "*The Thornwaite method is too primitive of a choice for estimating PET. More appropriate would be a radiation based estimate, such as Priestly Taylor*"

Compiling the meteorological information has been a challenging task, because of the number of years, the extent of the region, the resolution of the grid and the restrictive policy of data distribution featured by Meteorological Institutes in Europe. Radiation data were not made available to us.

1. "*Too much space is spent describing well-known issues about the NDVI products*"

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We think that the few details that we provide about the NDVI products and their time series are not known by the average reader of HESS. Also, the concerns that we address are particularly meant considering the use of the data in this article.

1. *“The vegetation classification seems excessively ad hoc”*

We are astonished by this comment (which, actually, cannot be more vague and unclear). We classify vegetation in terms of the variable under study, of course. And we use the most up to date and finest land cover data base that is available in Europe.

1. *What is the possible roll of grazing in the results?*

Considering the extent of the region, the fact that most of it is in Western Europe and the nature of the phenomena under study, negligible.

1. *How exceptional was this period, in the broader climatological record?*

We provide two key references for this question. We can also remind the main conclusions of these studies, although we believe that the average reader of HESS will be much more familiar with this issue than with the NDVI.

1. *The figure labels do not match those in the text (see for example Section 3.1 and the talk of P-PET)*

The talk on P-PET in Section 3.1 (Pg. 2031, lines 15 to 19) refers to Fig. 3 and mentions “Deciduous forests” and “Broadleaf evergreen forests”, exactly matching labels in Fig. 3.

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1. *“The discussion of the amount of effect on the different vegetation classes is excessively qualitative (exp, Pg. 2031, lines 15-19)”. Again, there is too much discussion of how things look to the eye, and no substantial quantitative analysis”.*

First, why does Referee #2 say “Again”? Where is the first instance?

Second, this statement is simply not true. Lines 15-19 in Pg. 2031 refer to Fig. 3, which is the result of an analysis (stratified density distributions) and not the raw data. The paragraph refers to the figure and notes the obvious differences in shifts among vegetation classes. The fact that these differences are statistically significant is discussed later, by reference to Fig. 11, where the error bars of the anomalies are included. We can include a reference to Fig. 11 in this paragraph as well.

1. *“There is an inadequate connection made to the published literature on the effect of drought on vegetation cover”*

Our article is not a review of the subject of drought on vegetation cover. We provide references that are meant for our discussion of this event as a case of study.

1. *“The discussion of Spring green and Summer green is odd, and at times contradictory from looking at the figures (at times summer green is higher NDVI in spring than spring green?)”*

Original things may seem odd at first. We use a terminology that fits the type of data that we use: annual courses of NDVI. As stated in the Methods Section (Pg. 2030, line 20), it is the shape of the NDVI annual course and in particular the “timing of the NDVI maxima” what makes the difference, not the average value. In other words, “summer green” refers to vegetation that is greenest in summer, while “spring green” refers to vegetation that is greenest in spring. We can stress this fact in the aforementioned

paragraph to ensure that the reader does not miss this point. We also considered using a longer terminology (i.e., vegetation with summer peak vs. vegetation with spring peak), but this option made too complicated sentences. Anyway, we are open to suggestions on this regards, as our ultimate goal is to communicate our results in the most efficient way.

1. *There is much redundancy in the figures*

Which ones are mutually redundant? Such a vague diagnostic is inappropriate in a review. Our figures are not included for aesthetic reasons or to accompany the text: our figures do carry essential quantitative information.

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