**Supplemental Information for:**

**Vegetation greening in Spain detected from long term data (1981-2015)**

This document contains Supplemental tables and figures

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Supplemental Figure 1. Box plots showing the annual and seasonal Pearson’s correlation between the Sp\_1km\_NDVI and other NDVI datasets. Dashed red lineS indicate the significant values (p < 0.05).



Supplemental Figure 2. Spatial relationship between the seasonal and annual NDVI magnitude of change between Sp\_1km\_NDVI and other datasets. Given the high number of points, the significance of correlation was obtained by means of 1000 random samples of 30 cases from which correlations and p-values were obtained. The final significance was assessed by averaging of the obtained p-values.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Sp\_1km\_NDVI vs. GIMMS3g** | | | | **Sp\_1km\_NDVI vs. SMN** | | | | **Sp\_1km\_NDVI vs. MODIS** | | | |
| **Annual** | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) |
| Negative (<0.05) | 0.12 | 0.17 | 0.29 | 0.25 | 0.07 | 0.00 | 0.16 | 3.39 | 0.25 | 0.74 | 0.48 | 0.04 |
| Negative (no sign.) | 0.27 | 0.63 | 1.25 | 1.55 | 0.02 | 0.09 | 0.47 | 8.71 | 1.27 | 11.54 | 9.88 | 0.84 |
| Positive (no sign.) | 0.64 | 1.67 | 4.09 | 8.26 | 0.02 | 0.27 | 1.31 | 27.20 | 0.99 | 14.28 | 40.47 | 5.56 |
| Positive (<0.05) | 0.60 | 2.44 | 15.82 | 61.89 | 0.09 | 0.53 | 3.52 | 54.15 | 0.13 | 1.60 | 7.59 | 4.17 |
| **Winter** | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) |
| Negative (<0.05) | 0.07 | 0.10 | 0.17 | 0.08 | 0.08 | 0.13 | 0.16 | 0.09 | 0.49 | 5.39 | 3.96 | 0.32 |
| Negative (no sign.) | 0.21 | 0.64 | 1.10 | 1.40 | 0.17 | 0.57 | 1.37 | 1.89 | 1.66 | 28.79 | 29.21 | 2.31 |
| Positive (no sign.) | 0.29 | 2.04 | 6.71 | 10.92 | 0.54 | 1.34 | 5.83 | 14.93 | 0.28 | 6.25 | 17.31 | 2.61 |
| Positive (<0.05) | 0.47 | 2.72 | 18.29 | 54.75 | 0.64 | 2.27 | 11.87 | 58.12 | 0.01 | 0.15 | 0.74 | 0.40 |
| **Spring** | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) |
| Negative (<0.05) | 1.01 | 0.99 | 0.71 | 0.39 | 1.81 | 0.70 | 0.29 | 0.28 | 0.01 | 0.17 | 0.18 | 0.02 |
| Negative (no sign.) | 1.02 | 2.35 | 2.87 | 2.26 | 3.48 | 2.36 | 1.36 | 1.38 | 0.35 | 4.79 | 5.19 | 0.72 |
| Positive (no sign.) | 0.86 | 3.16 | 10.07 | 11.08 | 5.37 | 6.90 | 5.44 | 7.43 | 1.26 | 16.75 | 17.97 | 2.49 |
| Positive (<0.05) | 0.72 | 3.40 | 18.17 | 40.89 | 3.25 | 7.37 | 11.04 | 41.52 | 0.21 | 2.88 | 2.78 | 0.37 |
| **Summer** | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) |
| Negative (<0.05) | 0.40 | 0.80 | 0.65 | 0.18 | 1.03 | 0.49 | 0.24 | 0.17 | 0.11 | 0.19 | 0.07 | 0.00 |
| Negative (no sign.) | 0.81 | 4.32 | 3.98 | 2.05 | 6.12 | 2.26 | 1.20 | 1.18 | 0.72 | 5.96 | 3.00 | 0.12 |
| Positive (no sign.) | 0.97 | 6.58 | 11.84 | 9.16 | 10.13 | 7.23 | 5.35 | 6.14 | 1.30 | 21.68 | 40.44 | 2.24 |
| Positive (<0.05) | 0.99 | 4.98 | 16.89 | 35.34 | 8.98 | 10.78 | 13.24 | 25.42 | 0.32 | 4.75 | 15.66 | 3.35 |
| **Autumn** | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) | Negative  (<0.05) | Negative  (no sign.) | Positive  (no sign.) | Positive  (<0.05) |
| Negative (<0.05) | 0.34 | 0.43 | 0.33 | 0.29 | 0.25 | 0.34 | 0.37 | 0.59 | 0.36 | 2.03 | 1.43 | 0.14 |
| Negative (no sign.) | 0.61 | 1.38 | 1.87 | 2.31 | 0.33 | 0.71 | 1.44 | 2.87 | 1.14 | 14.22 | 17.92 | 1.98 |
| os. (no sign.) | 0.93 | 2.31 | 5.66 | 7.50 | 0.49 | 1.52 | 3.85 | 11.66 | 0.40 | 7.56 | 35.19 | 8.33 |
| 0.05) | 0.94 | 4.94 | 20.97 | 49.14 | 1.81 | 5.10 | 13.53 | 55.11 | 0.03 | 0.67 | 4.82 | 3.62 |

Supplemental Table 1. Contingency tables showing the relationship between the sign and significance of the NDVI trends between the Sp\_1km\_NDVI and other NDVI datasets.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Annual | Winter | Spring | Summer | Autumn |
| GIMMS3g | 0.32 | 0.28 | 0.47 | 0.44 | 0.34 |
| SMN | 0.46 | 0.27 | 0.52 | 0.41 | 0.19 |
| MODIS | 0.43 | 0.31 | 0.37 | 0.37 | 0.45 |

Supplemental Table 2: Coefficients of contingency summarizing the spatial agreement between trend categories.



Supplemental Figure 3: Box-plot showing the annual and seasonal NDVI magnitude of change.



Supplemental Figure 4. Scatterplots showing the relationship between the NDVI magnitude of change and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 5. Box plots showing the values for precipitation, temperature and aridity corresponding to the recorded seasonal and annual NDVI trends.

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Supplemental Figure 6: Scatterplots showing the relationship between the NDVI magnitudes of change observed in irrigated lands and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 7: Scatterplots showing the relationship between the NDVI magnitudes of change in arable dry lands and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 8: Scatterplots showing the relationship between the NDVI magnitudes of change in fruit trees and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 9: Scatterplots showing the relationship between the NDVI magnitudes of change in olive groves and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 10: Scatterplots showing the relationship between the NDVI magnitudes of change in vineyards and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 11: Scatterplots showing the relationship between the NDVI magnitudes of change in vineyards-olive groves and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 12: Scatterplots showing the relationship between the NDVI magnitudes of change in grasslands and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 13: Scatterplots showing the relationship between the NDVI magnitudes of change in pastures and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 14: Scatterplots showing the relationship between the NDVI magnitudes of change in shrubs and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure15: Scatterplots showing the relationship between the NDVI magnitudes of change in pastures-shrubs and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 16: Scatterplots showing the relationship between the NDVI magnitudes of change in coniferous forests and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 17: Scatterplots showing the relationship between the NDVI magnitudes of change in eucalyptus and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 18: Scatterplots showing the relationship between the NDVI magnitudes of change in leaf forests and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 19: Scatterplots showing the relationship between the NDVI magnitudes of change in mixed forests and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.



Supplemental Figure 20: Scatterplots showing the relationship between the NDVI magnitudes of change in vineyards-fruit trees and the average climate conditions (precipitation, temperature and aridity) at seasonal and annual scales.