Supplementary Material to "Reversal in the Drought Stress Response of the Scots Pine Forest Ecosystem: Local Soil Water Regime as a Key to Improving Climate Change Resilience"

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This Supplementary material includes additional figures illustrating the results:

- An overview of remote sensing data including five multispectral bands considered in this work (Fig. S1).
- Boxplots indicating discrepancies between the local multispectral vegetation indices measured in areas with different soil water regimes (Fig. S2).
- Multi-scale cross-correlations between individual TRW data series (Fig. S3).
- Multi-scale conventional and DPCCA cross-correlation coefficients between individual TRW data series and local temperature variations for the five years preceding the tree growth period (Fig. S4).
- Multi-scale conventional and DPCCA cross-correlation coefficients between individual TRW data series and local PDSI variations for the five years preceding the tree growth period (Fig. S5).

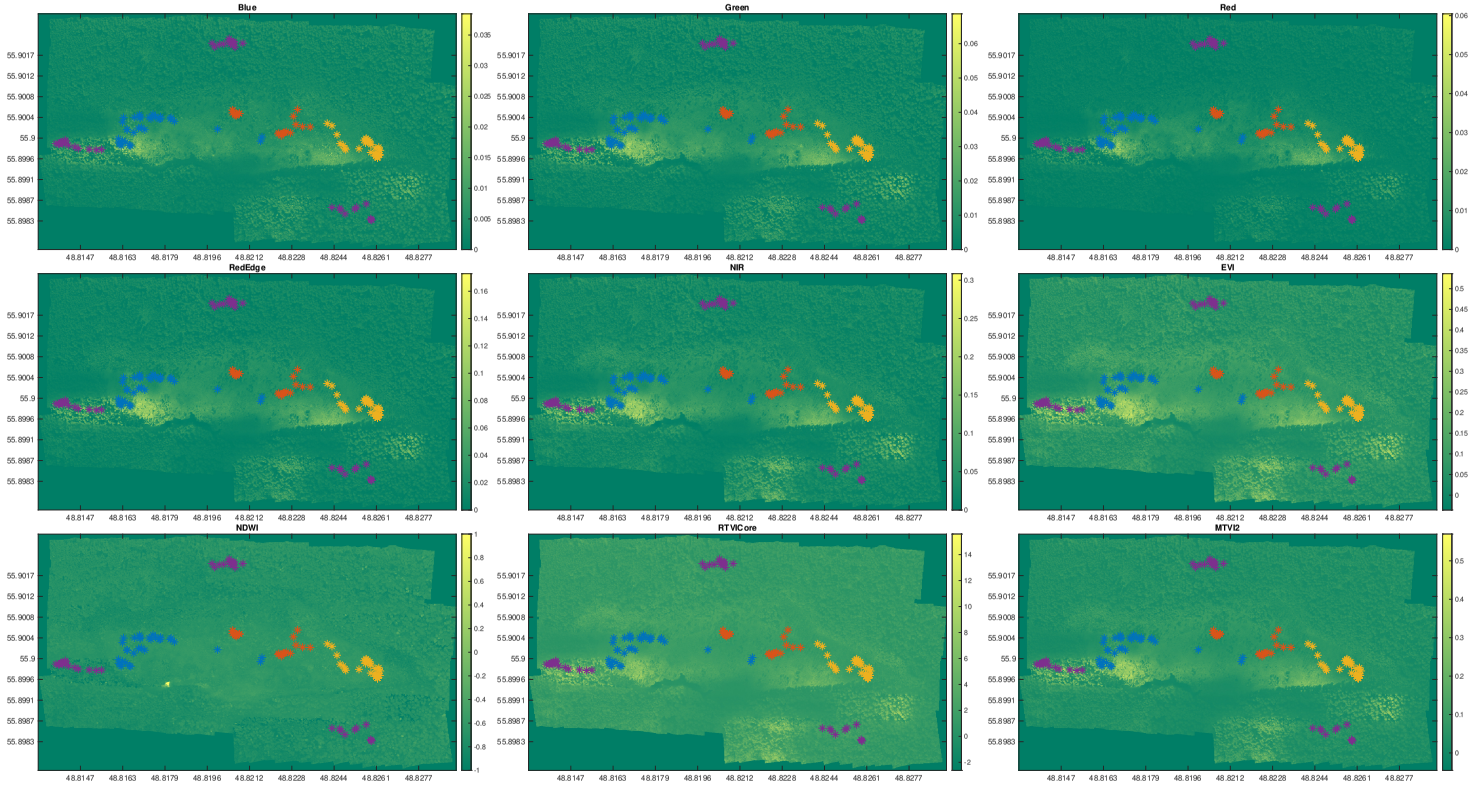

Figure S1: An overview of imaging data includes five multispectral bands (Blue, Green, Red, RedEdge, NIR), as well as calculated vegetation indices (EVI, NDWI, RTVICore, MTVI2). The locations of the trees are denoted by colored asterisks (similar to Fig. 1 in the main text of the article).

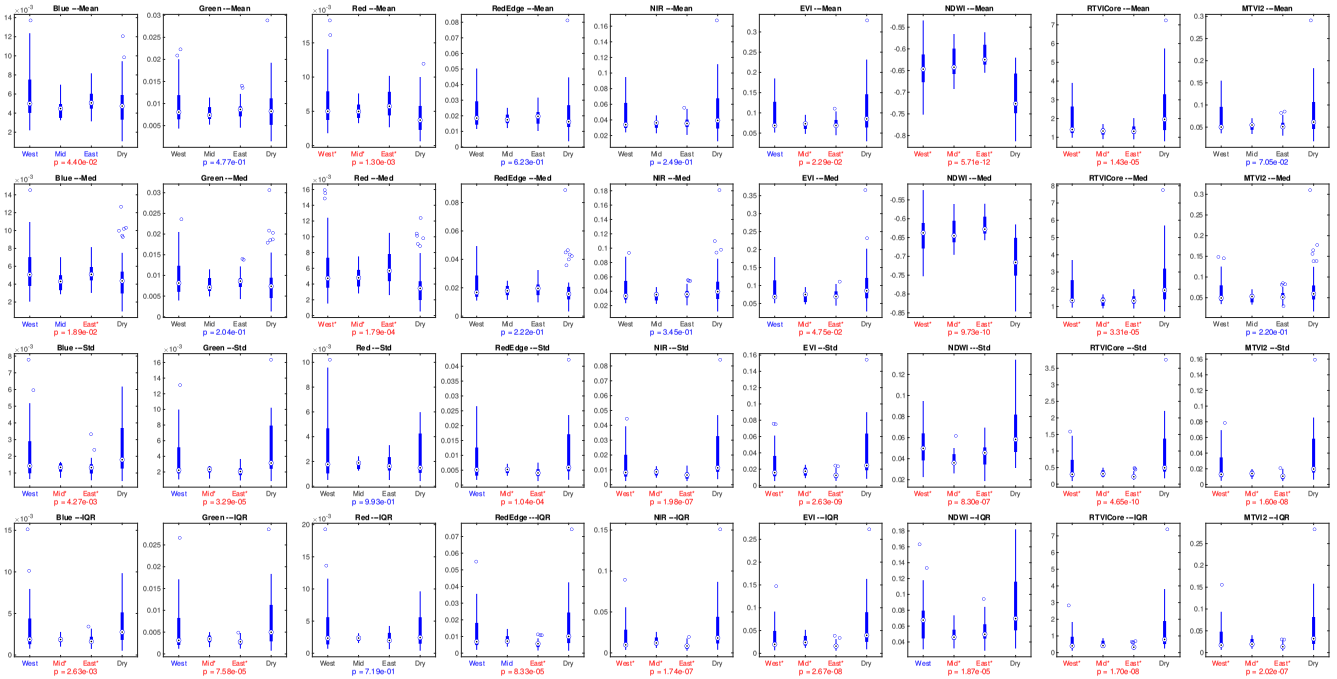

Figure S2: Boxplots indicating discrepancies between the local measurements in each of the four studied areas (western, middle, and eastern parts of the peat bog, with continuously reduced elevation, as well as dry land areas at surrounding elevations), including five multispectral bands (Blue, Green, Red, RedEdge, NIR), as well as calculated vegetation indices (EVI, NDWI, RTVICore, MTVI2). Statistically significant discrepancies are indicated by a red color, with annotated p-values according to a one-way non-parametric ANOVA (Kruskal-Wallis) statistical test. Particular areas that are different from dry land (acting as a control) are denoted by asterisks.

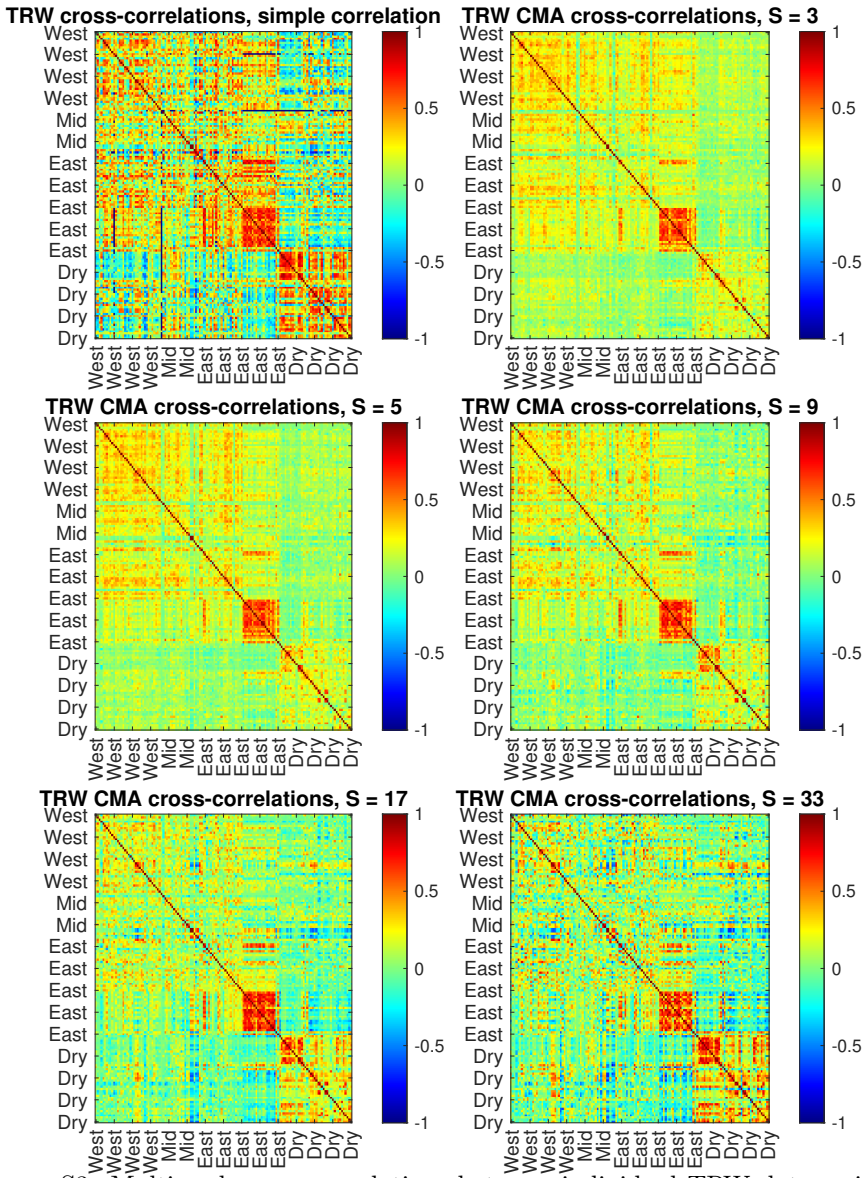

Figure S3: Multi-scale cross-correlations between individual TRW data series, altogether for $n = 140$ trees growing in different parts of the bog ($n = 32$ in the western, $n = 26$ in the central, $n = 42$ in the eastern), as well as in the surrounding elevated dry land area ($n = 40$ altogether in three surrounding locations). The upper left panel shows the conventional cross-correlation coefficient matrix, while the remaining panels show the multi-scale DPCCA cross-correlations (with CMA-based detrending) calculated for scales $s = 2^k + 1$, where $k = 1, 2, \ldots, 5$.

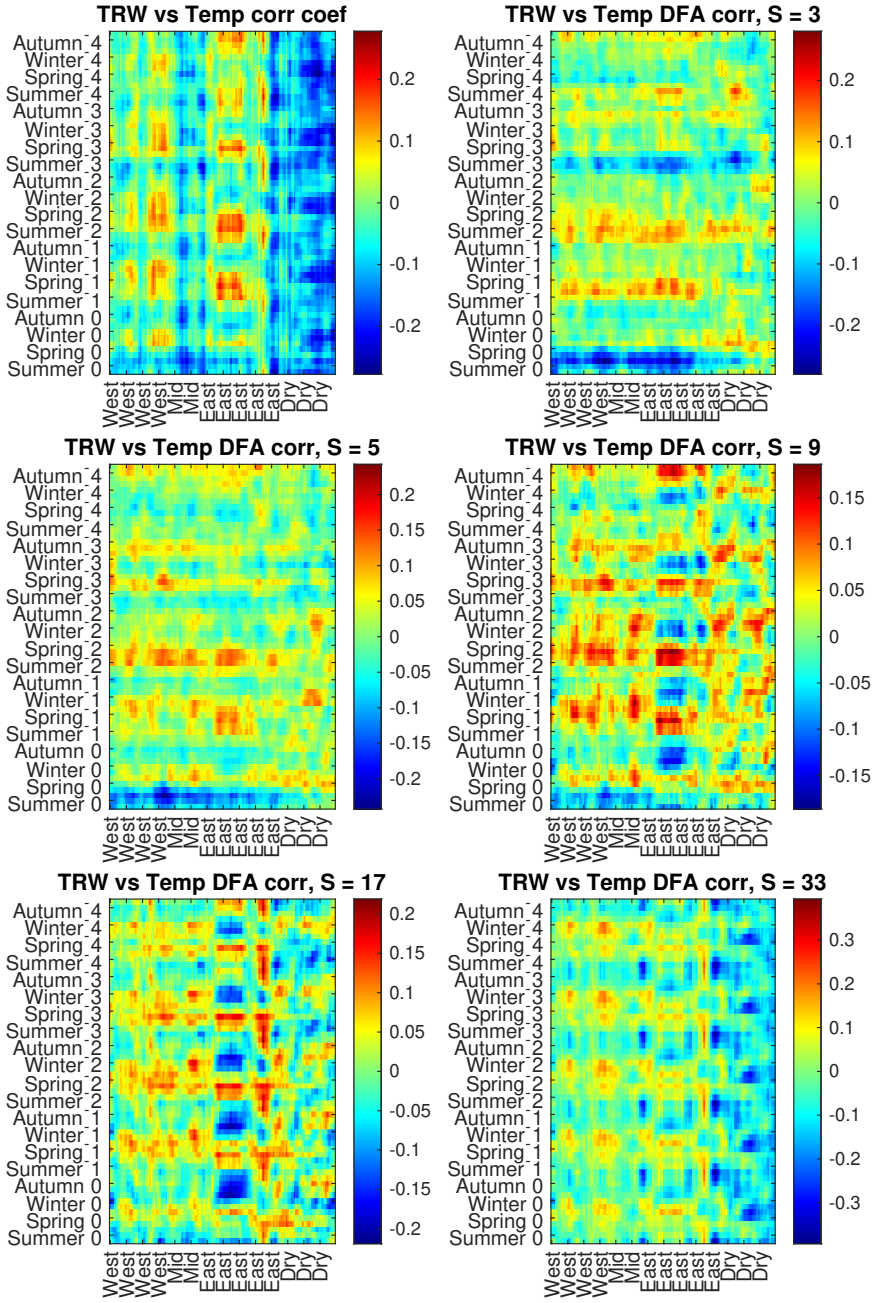

Figure S4: Multi-scale conventional and DPCCA (with DFA-based linear detrending) cross-correlation coefficients between individual TRW data series, altogether for $n = 140$ trees growing in different parts of the bog ($n = 32$ in the western, $n = 26$ in the central, $n = 42$ in the eastern), as well as in the surrounding elevated dry land area ($n = 40$ altogether in three surrounding locations), and the local temperature variations over five years prior and during the growth period for a given year (September to August). Monthly resolution data were analyzed, but for noise reduction and better visibility, they were displayed with seasonal resolution obtained by moving average in a 3×3 window over the entire heatmap.

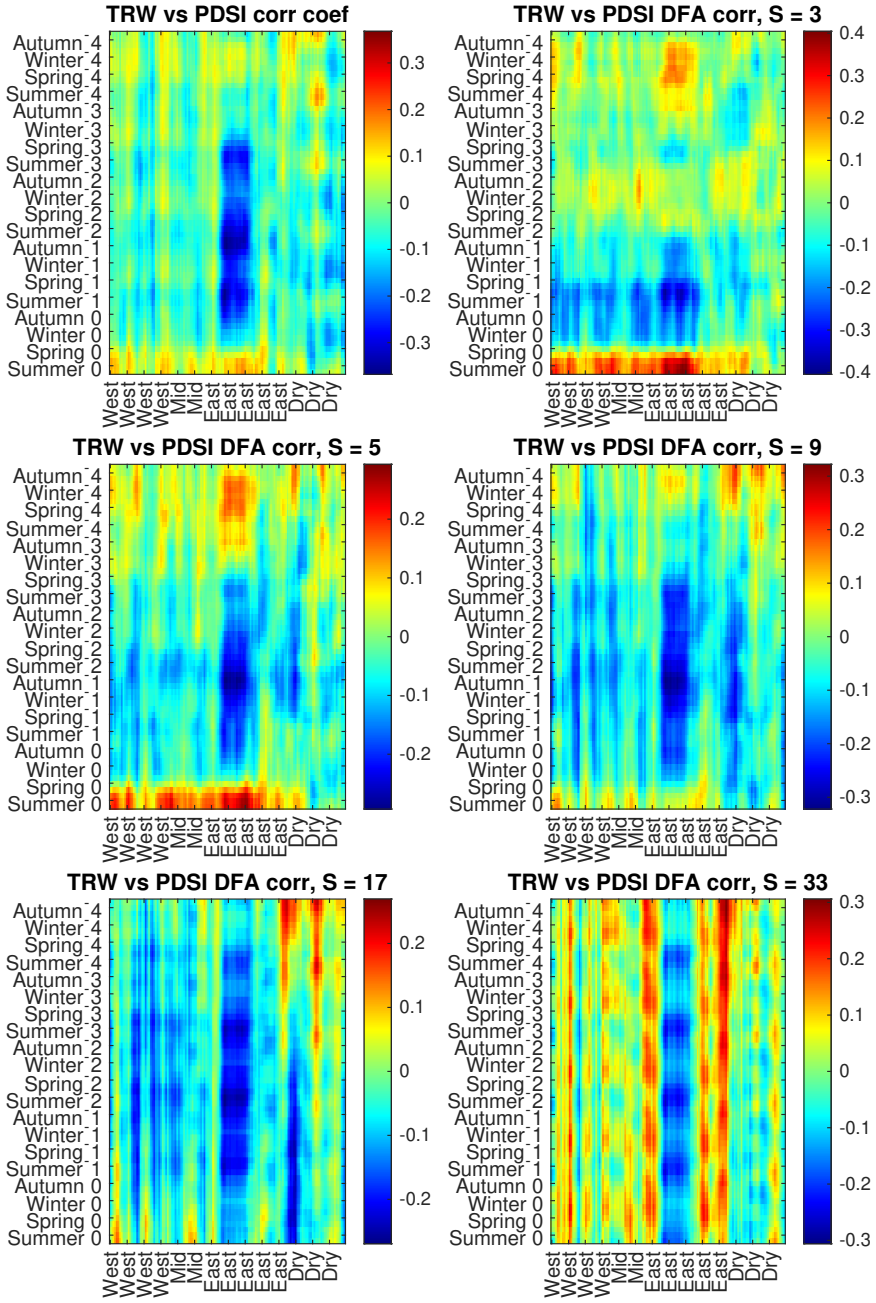

Figure S5: Multi-scale conventional and DPCCA (with DFA-based linear detrending) cross-correlation coefficients between individual TRW data series, altogether for $n = 140$ trees growing in different parts of the bog ($n = 32$ in the western, $n = 26$ in the central, $n = 42$ in the eastern), as well as in the surrounding elevated dry land area ($n = 40$ altogether in three surrounding locations), and the local PDSI variations over five years prior and during the growth period for a given year (September to August). Monthly resolution data were analyzed, but for noise reduction and better visibility, they were displayed with seasonal resolution obtained by moving average in a 3×3 window over the entire heatmap.