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Supplemental Material

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Climate Model Evaluation in the Presence of Observational Uncertainty: Precipitation Indices
over the Contiguous United States

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SUPPLEMENTARY MATERIAL

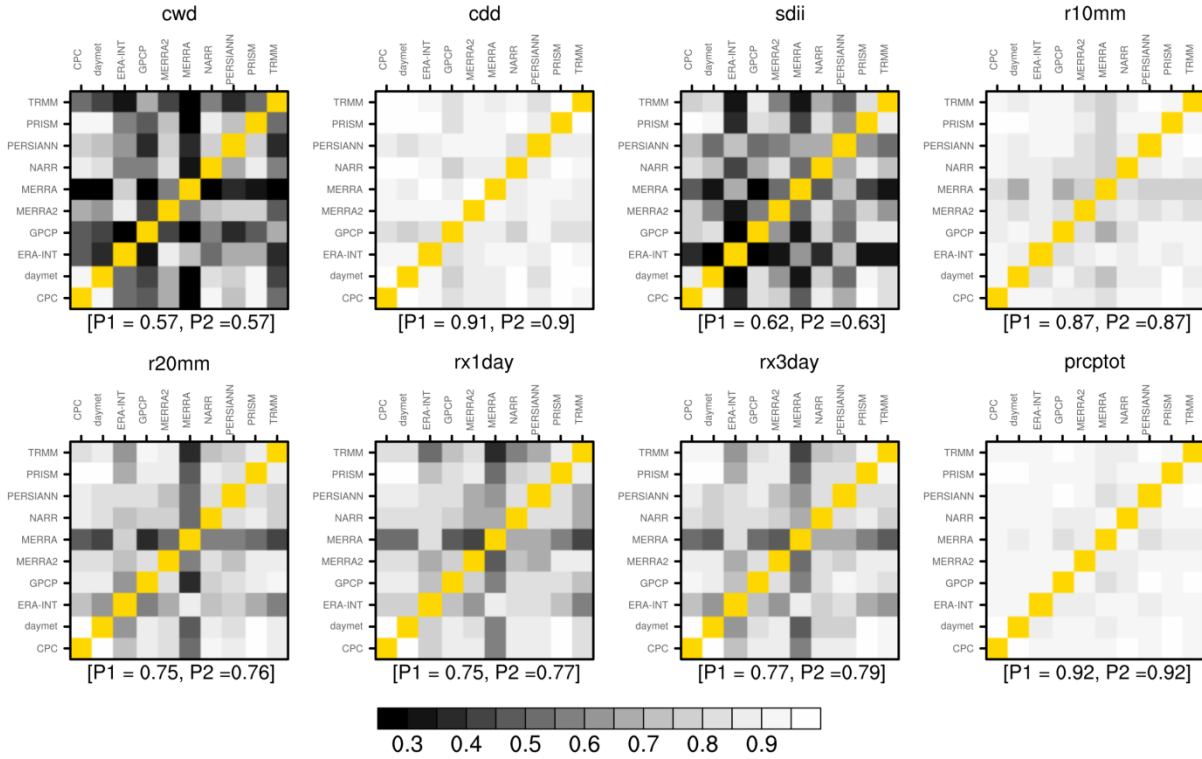


Figure S1: As in Figure 2 of main manuscript but here showing results where observations were first regridded (conservative remapping) to a common 1-degree grid prior to calculation of ETCCDI indices (i.e. first step regridding). In Figure 2 ETCCDI indices were calculated on their original grids then regridded (i.e. second step regridding).

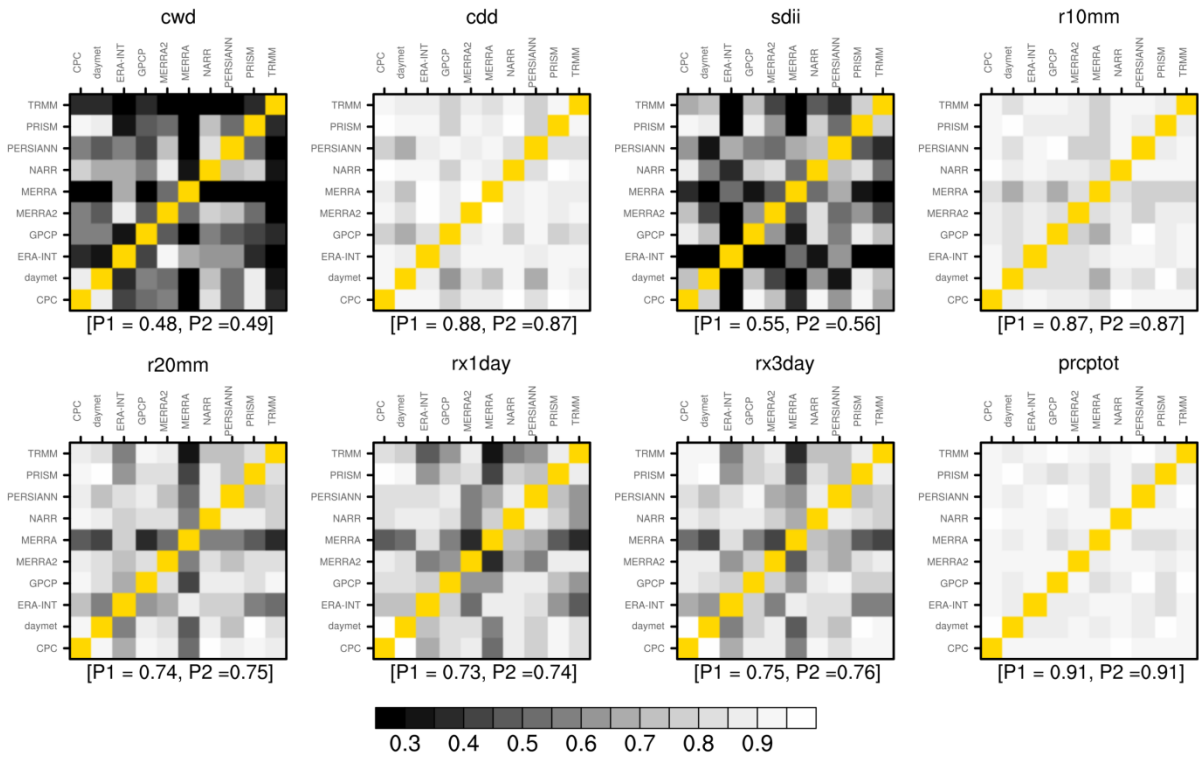


Figure S2: As is Figure 2 of main manuscript but here showing results where all products were regridded to 0.44-degree resolution (instead of 1-degree).

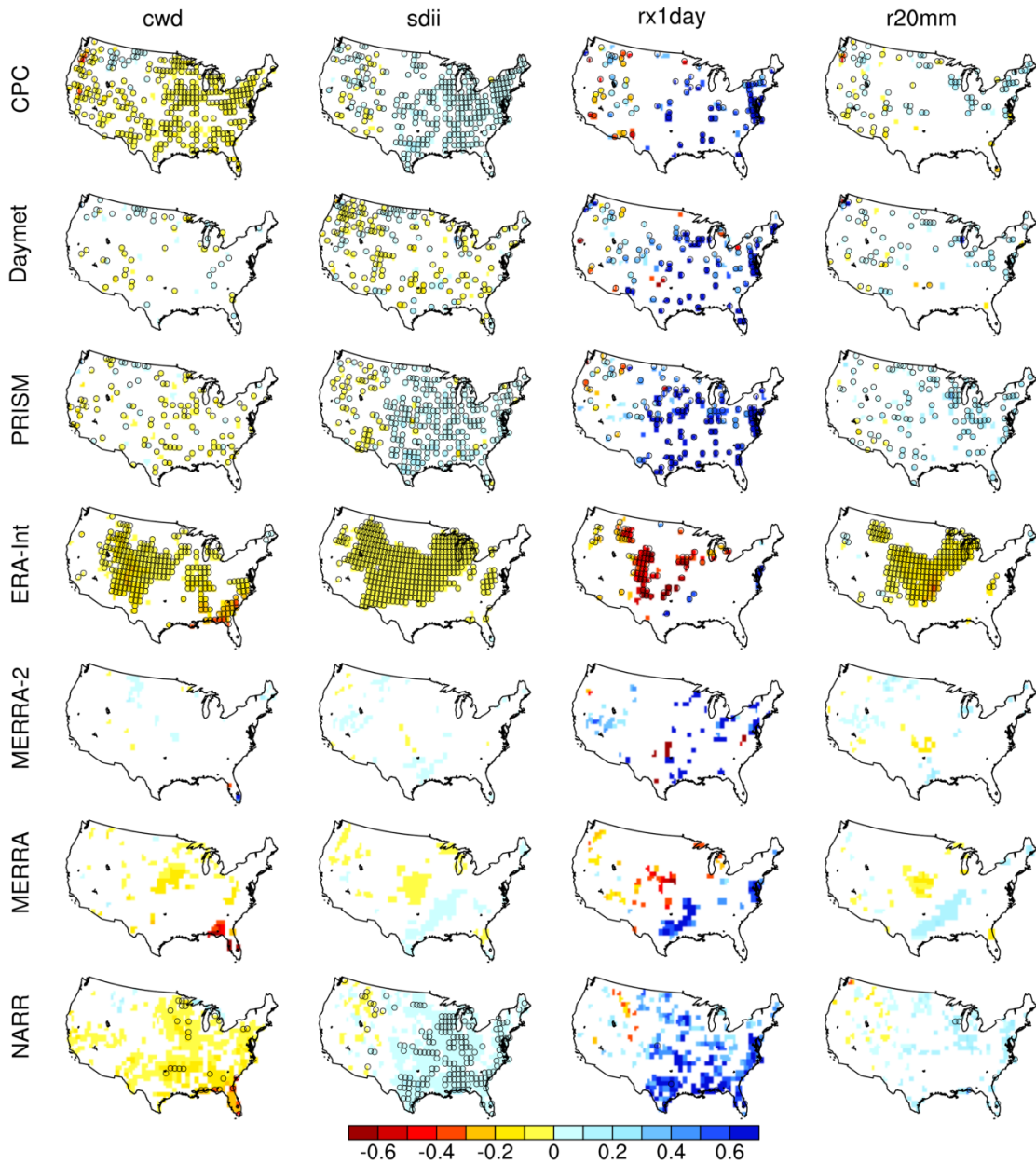


Figure S3: Mann-Kendall trends in various datasets for: cwd (days per year), sdii (mm per year), rx1day (mm per year), r20mm (mm per year). Trends are from annual data calculated over 1981-2016. Only local values where $p < 0.05$ are shown, circles further indicate field significance according to the False Discovery Rate (FDR: Wilks, 2016) at $p < 0.05$. Satellite datasets are not included here because of data length.

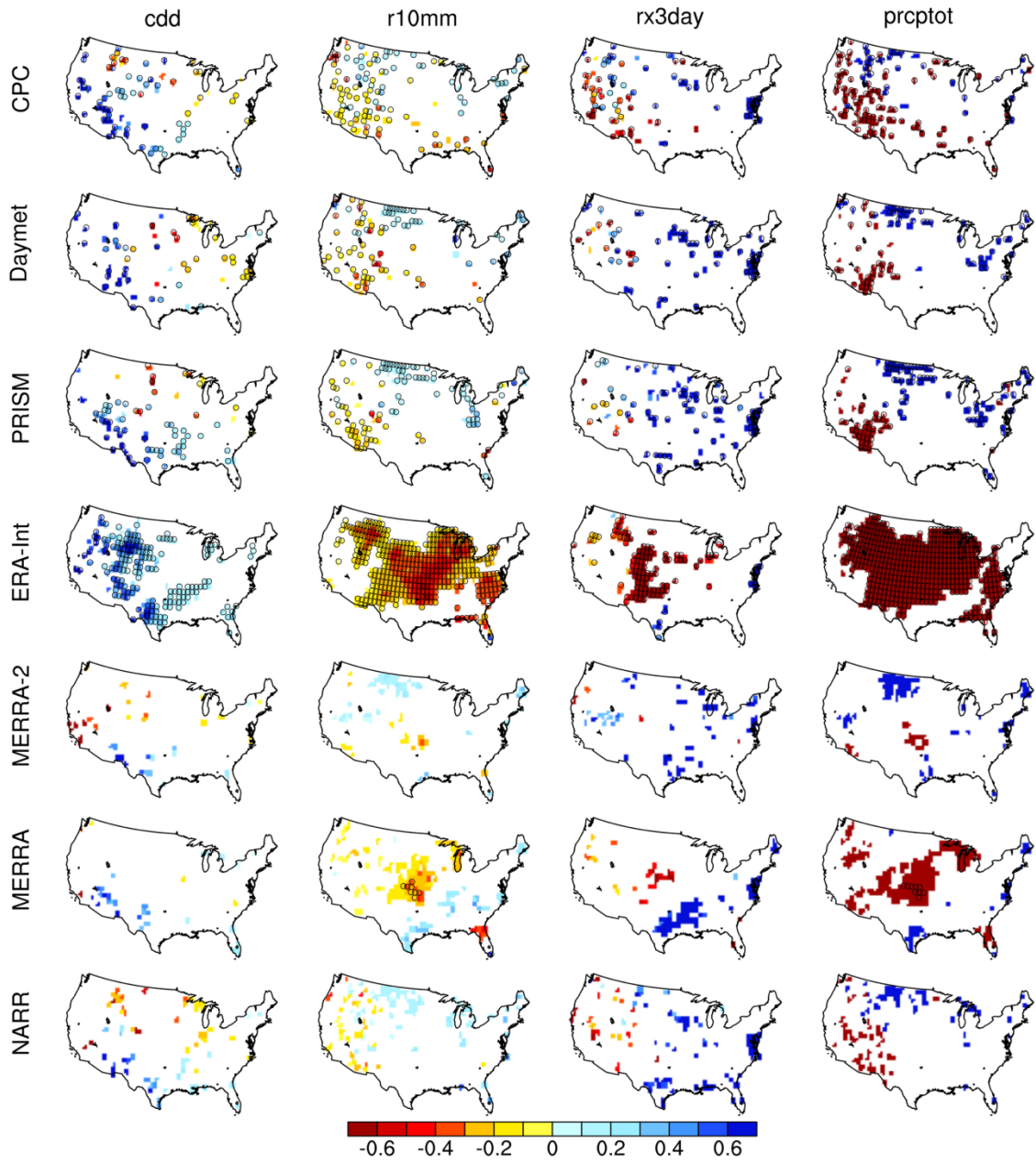


Figure S4: As in Figure S1 but trends for: cdd (days per year), r10mm (mm per year), rx3day (mm per year), prcptot (mm per year).

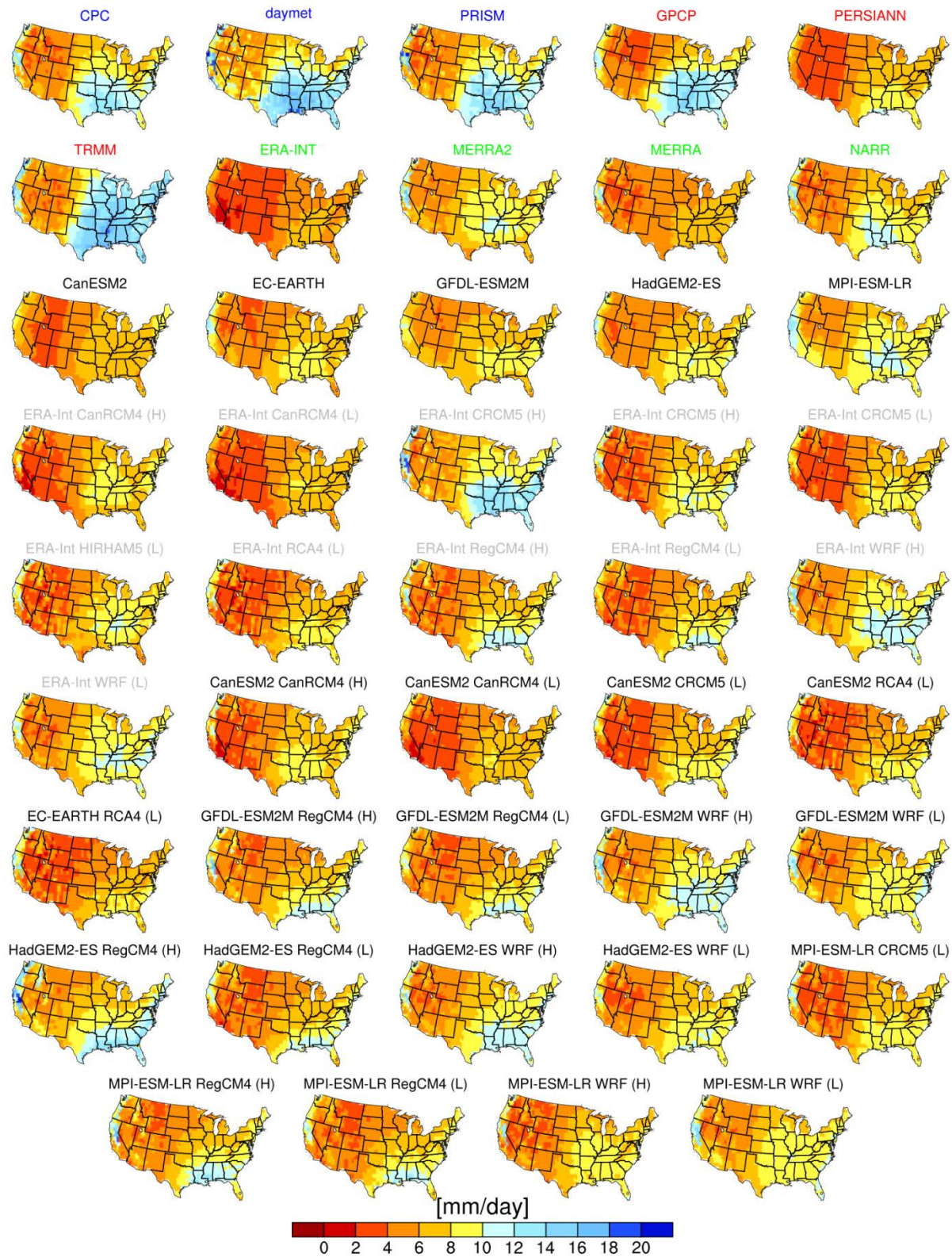


Figure S5: As in Figure 4 of main text but for sdi (average precipitation on wet days, units: mm/day).

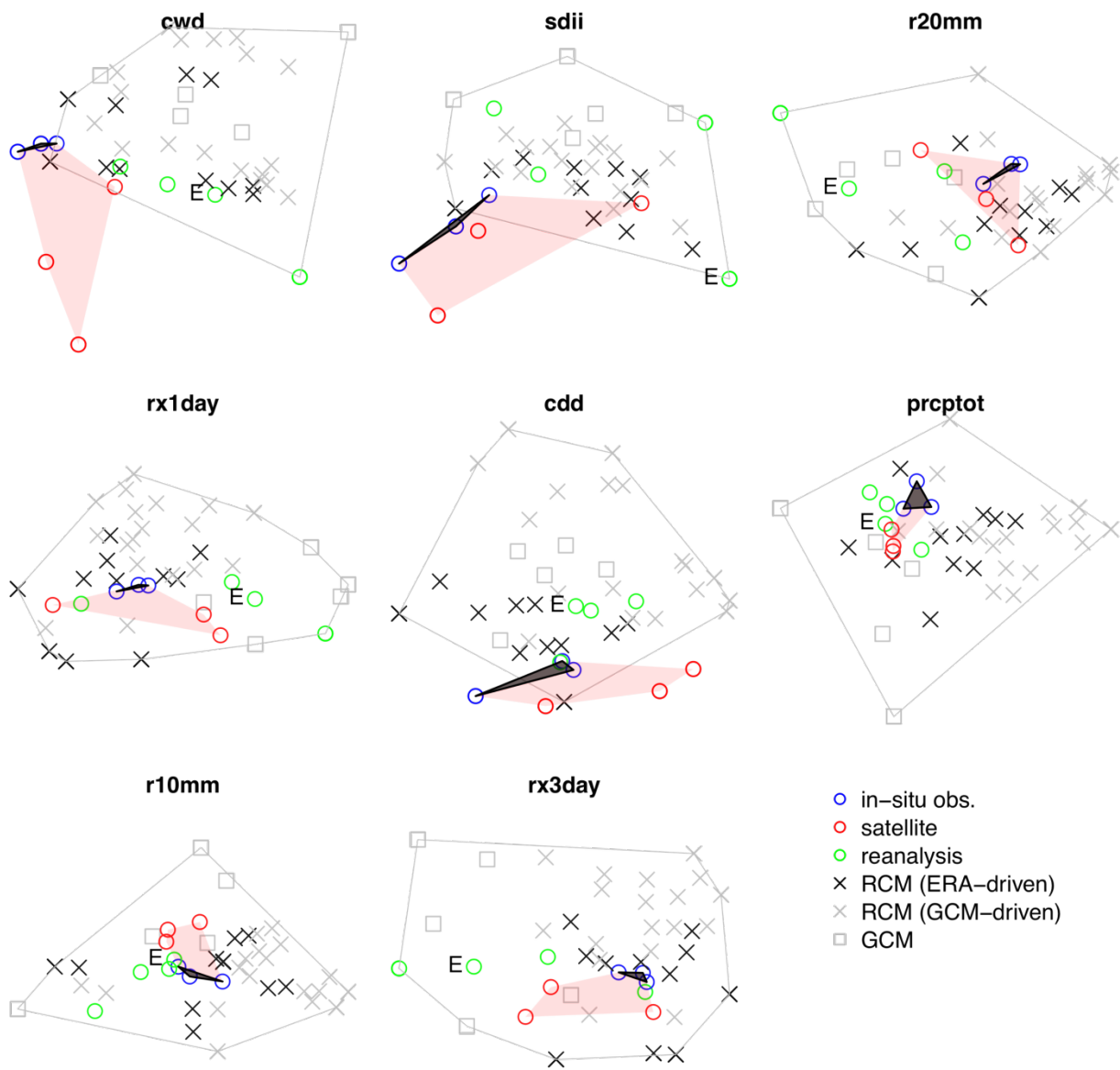


Figure S6: MDS plots from Figure 5 in main text but expanded to include all ETCCDI indices

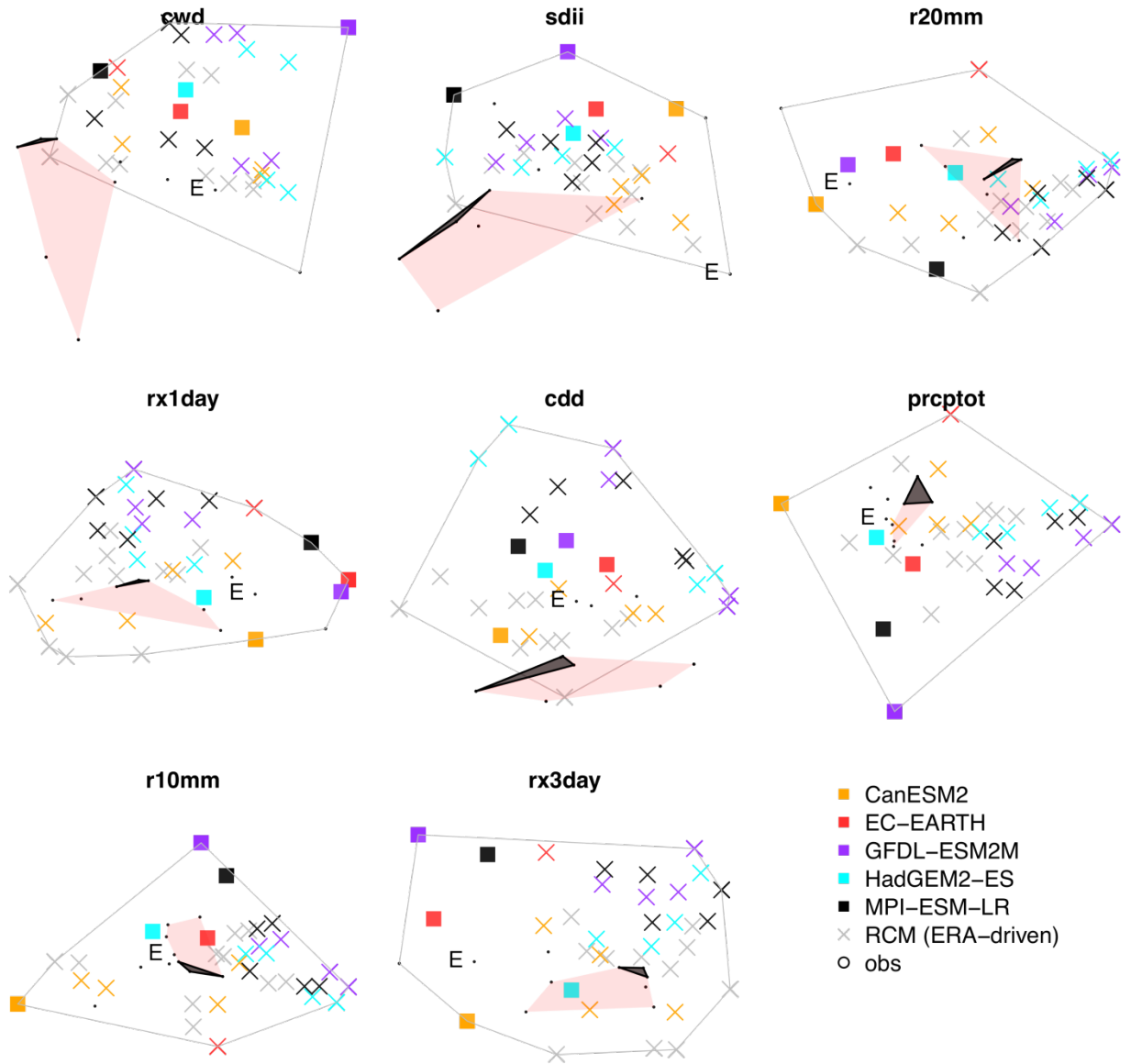


Figure S7: MDS plots from Figure 6 in main text but expanded to include all ETCCDI indices

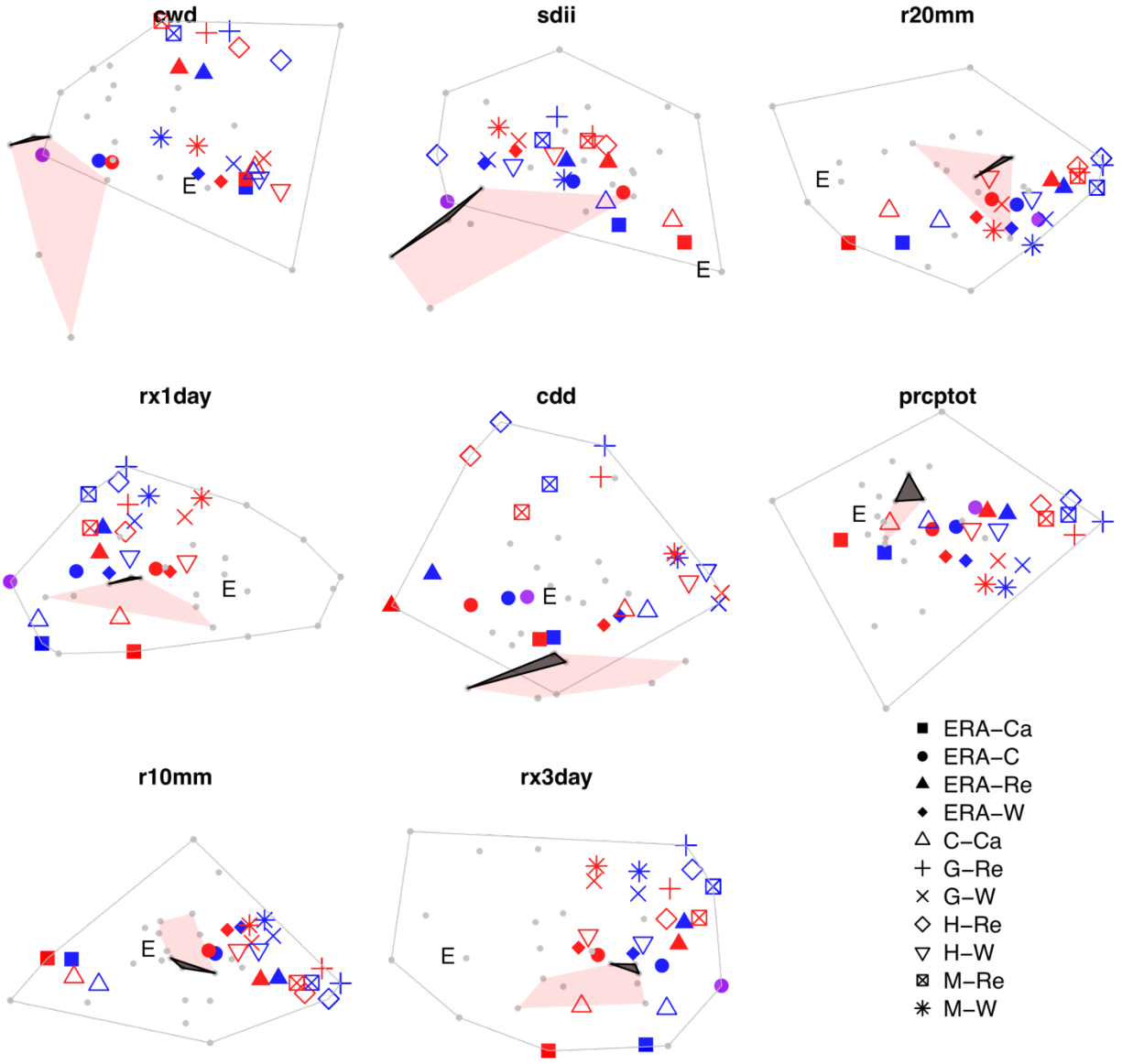


Figure S8: MDS plots from Figure 7 in main text but expanded to include all ETCCDI indices

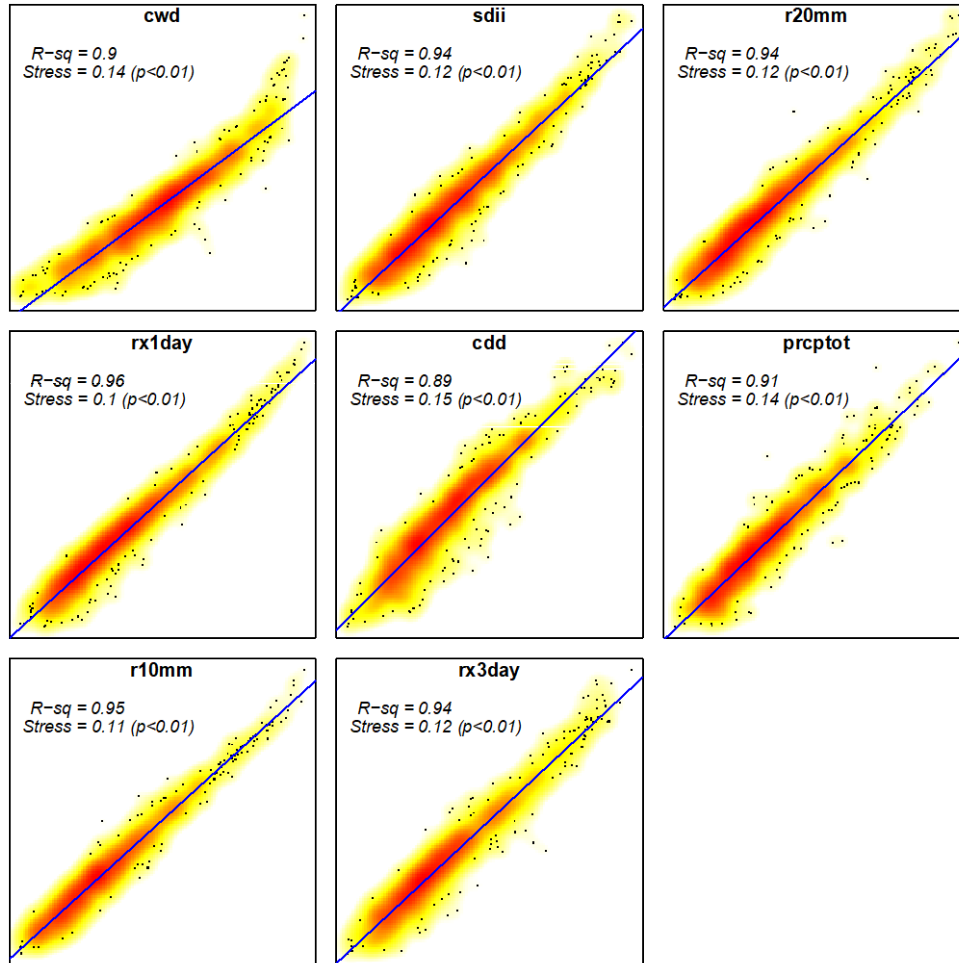


Figure S9: Scatter plots detailing how well MDS preforms in mapping original distances to 2-D MDS space for each of the ETCCDI indices. Due to the large sample size, regions of high density are shaded from yellow to red (highest density) while outliers are shown as individual points. The line $y=x$ is shown in blue, and R^2 values and stress-1 values are given. All MDS fits are shown to be significantly better ($p < 0.01$) than the null distributions based on permutations ($N=1000$) of the dissimilarity matrix.

Acknowledgements

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References

Wilks, Daniel S. (2016). "The stippling shows statistically significant grid points": How research results are routinely overstated and overinterpreted, and what to do about it. *Bulletin of the American Meteorological Society*, 97(12), 2263-2273.