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Supplement of

A regime view of future atmospheric circulation changes in northern mid-latitudes

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Supplementary material

Table S1. Mean and standard deviation of the indices used in Section 4.2, before standardization.

| | UTW | AA | PST | TNAW | SPGW |
|---------|------|------|-------|------|------|
| mean | 1.61 | 1.88 | -0.25 | 0.95 | 1.05 |
| std dev | 0.16 | 0.22 | 0.41 | 0.07 | 0.35 |

Table S2. Cross-correlations of the standardized indices used in Section 4.2 and Global Warming (GW).

| | GW | UTW | AA | PST | TNAW | SPGW |
|------|-------|-------|-------|-------|------|------|
| GW | 1. | | | | | |
| UTW | 0.31 | 1. | | | | |
| AA | -0.40 | -0.15 | 1. | | | |
| PST | 0.026 | 0.008 | -0.18 | 1. | | |
| TNAW | -0.22 | 0.14 | 0.17 | 0.091 | 1. | |
| SPGW | -0.12 | -0.25 | 0.28 | 0.18 | 0.28 | 1. |

Table S3. Cross-correlations of the indices used in Section 4.2 and GW, before dividing by GW.

| | GW | UTW | AA | PST | TNAW | SPGW |
|------|--------|--------|--------|--------|------|------|
| GW | 1. | | | | | |
| UTW | 0.929 | 1. | | | | |
| AA | 0.839 | 0.756 | 1. | | | |
| PST | -0.077 | -0.073 | -0.175 | 1. | | |
| TNAW | 0.95 | 0.91 | 0.80 | -0.044 | 1. | |
| SPGW | 0.47 | 0.37 | 0.55 | 0.019 | 0.51 | 1. |

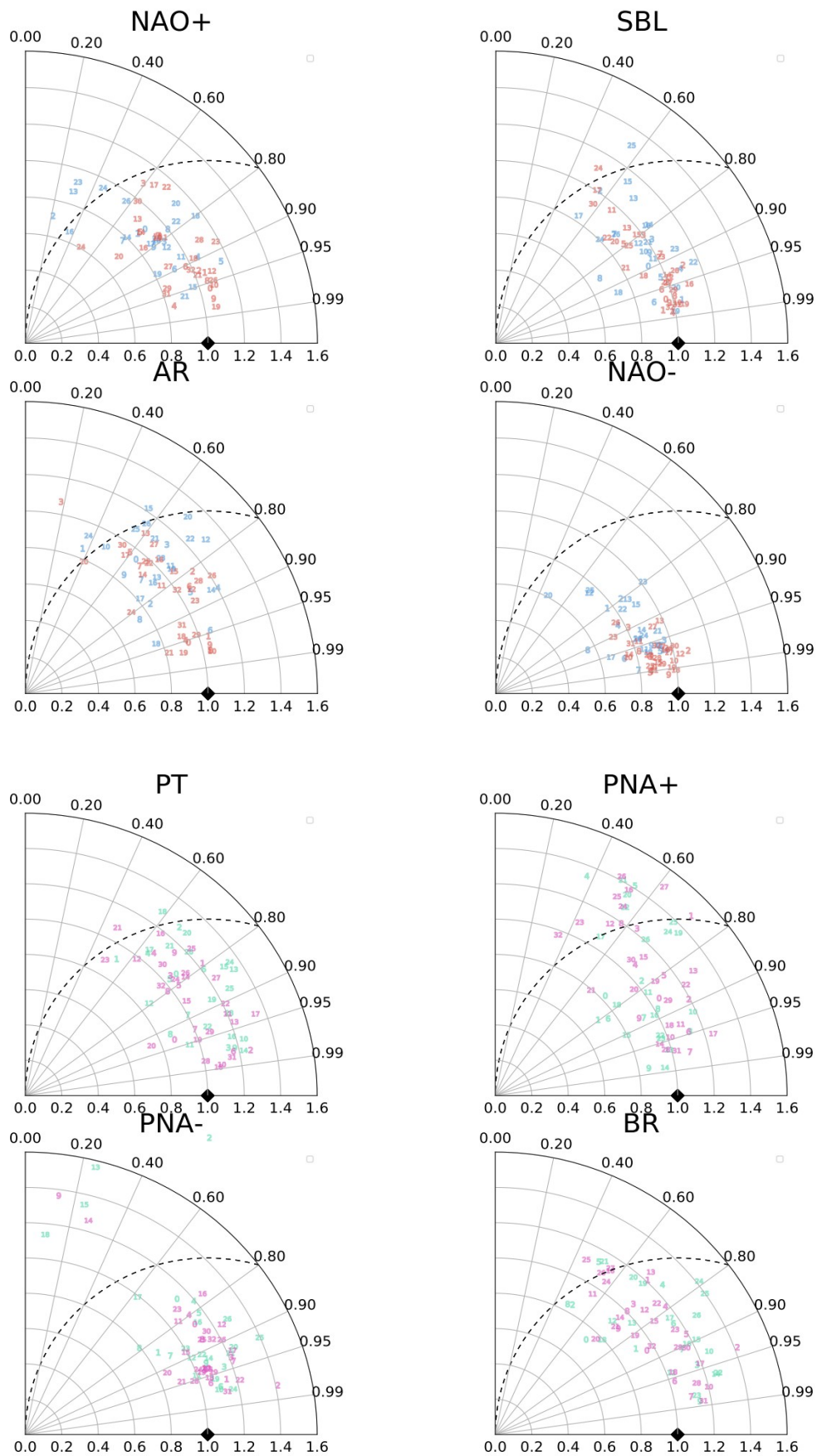


Figure S1. As Figure 2, with indication of the individual models, for EAT (top) and PAC (bottom). Numbers follow the order of Table 1, for both CMIP phases.

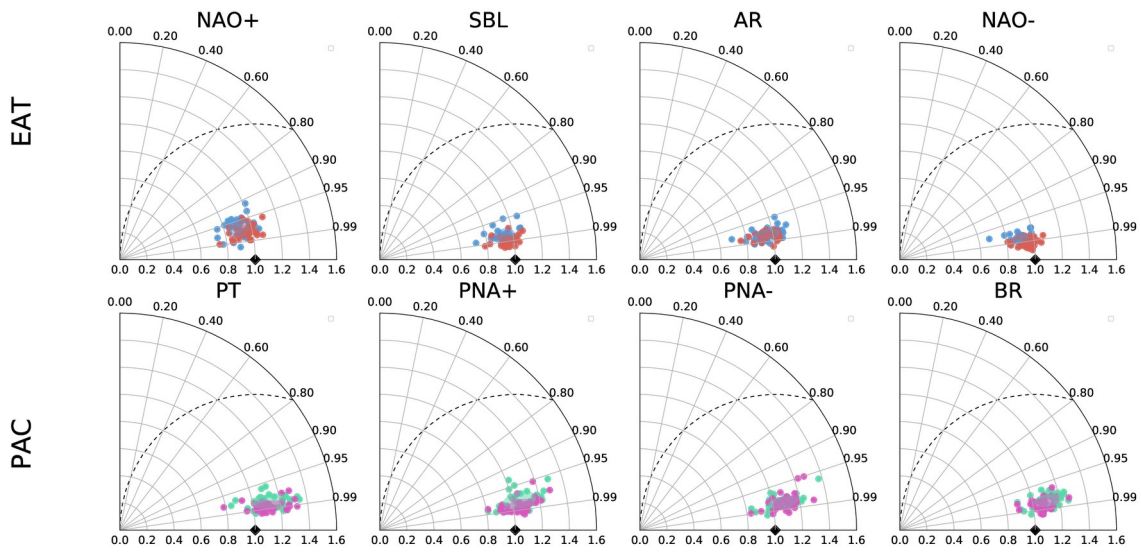


Figure S2. As Figure 2, but for the *projected regimes*.

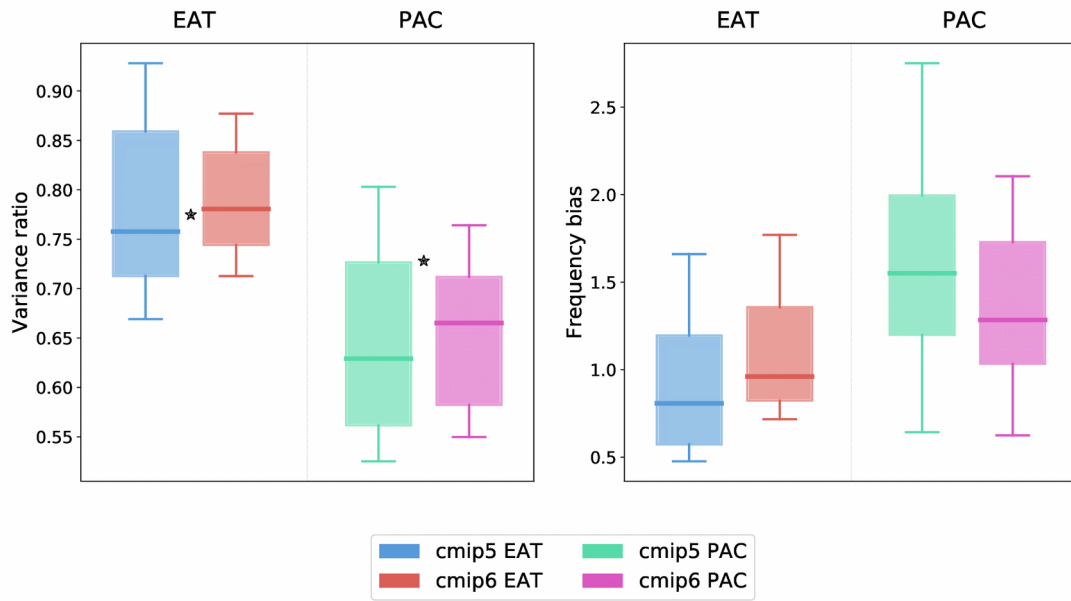


Figure S3. As Figure 3, but for the *projected regimes*.

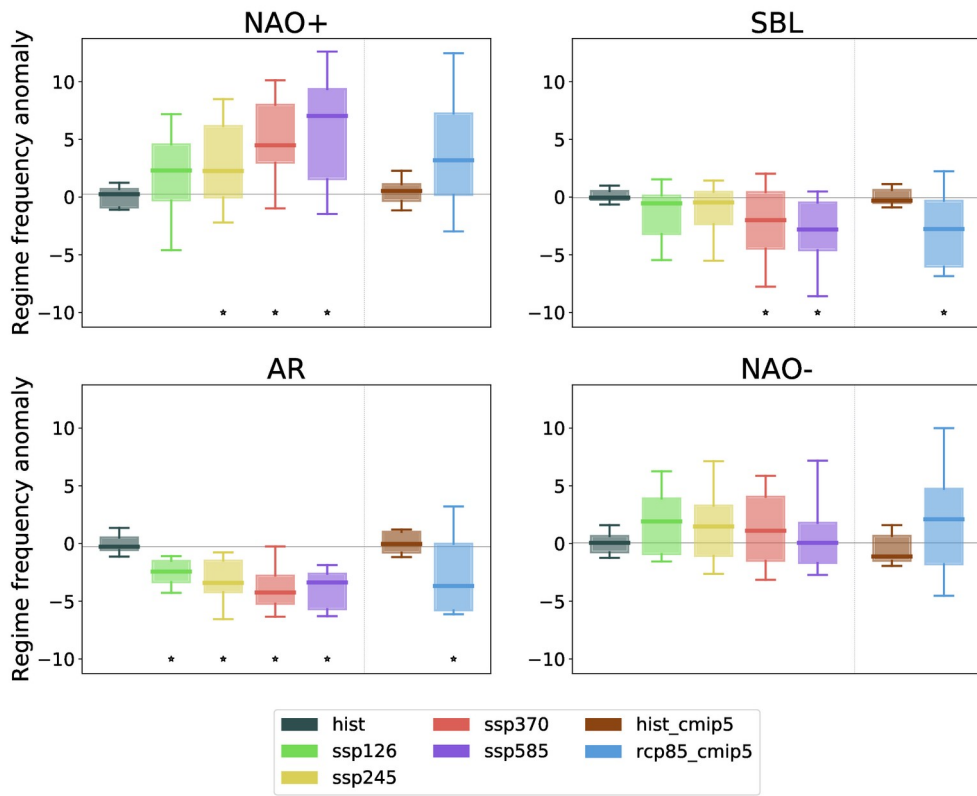


Figure S4. As Figure 4, with CMIP5 historical simulation (1964-2005).

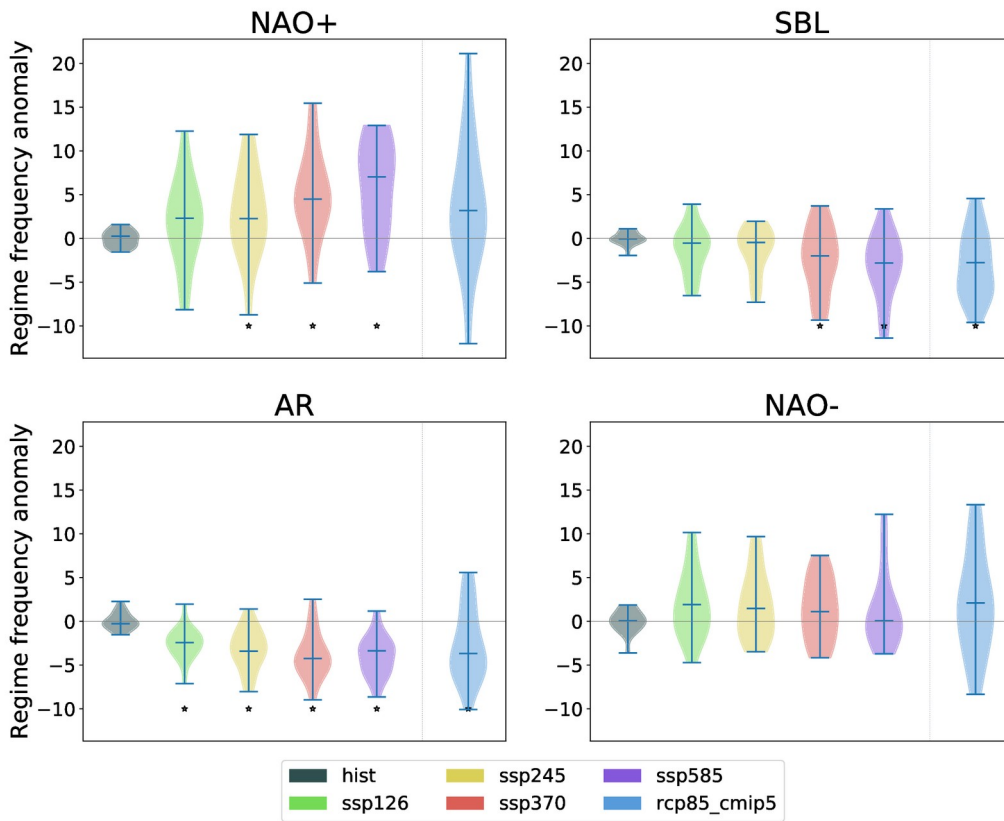


Figure S5. As Figure 4, but with violin plots.

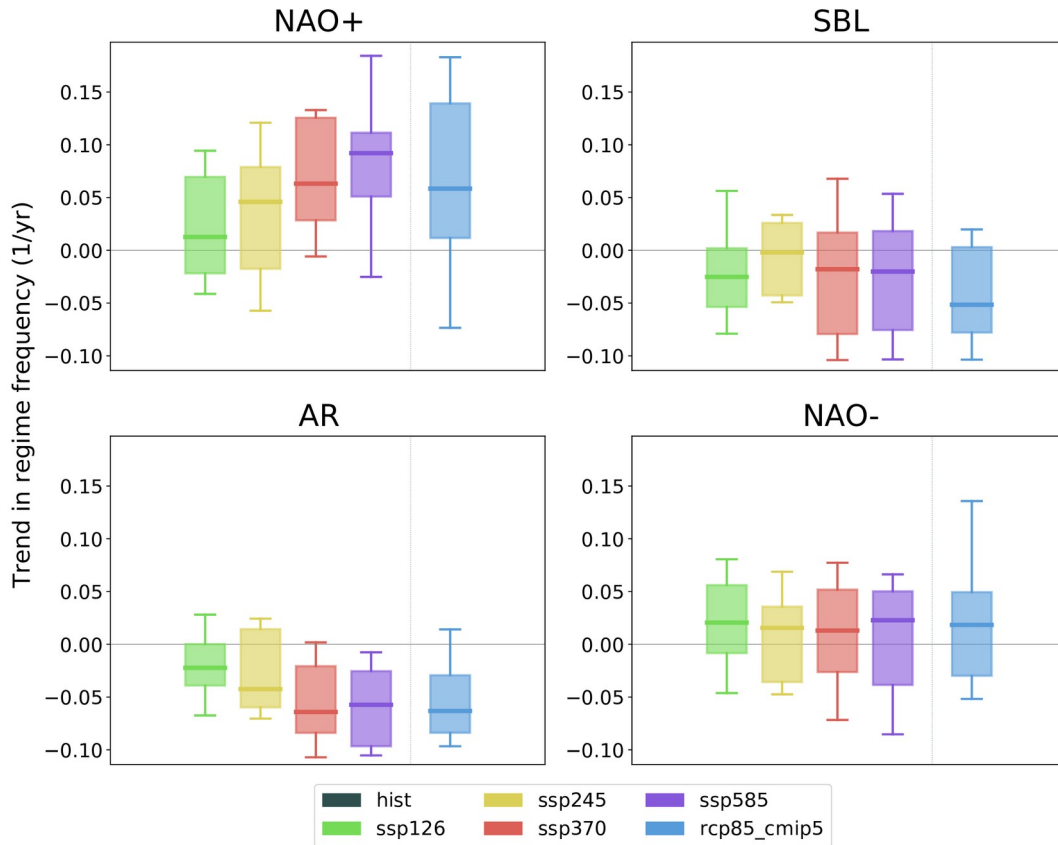


Figure S6. Trend of the seasonal regime frequencies (with 10-yr running mean) over 2015-2100 for EAT. The trend is in units of yr⁻¹.

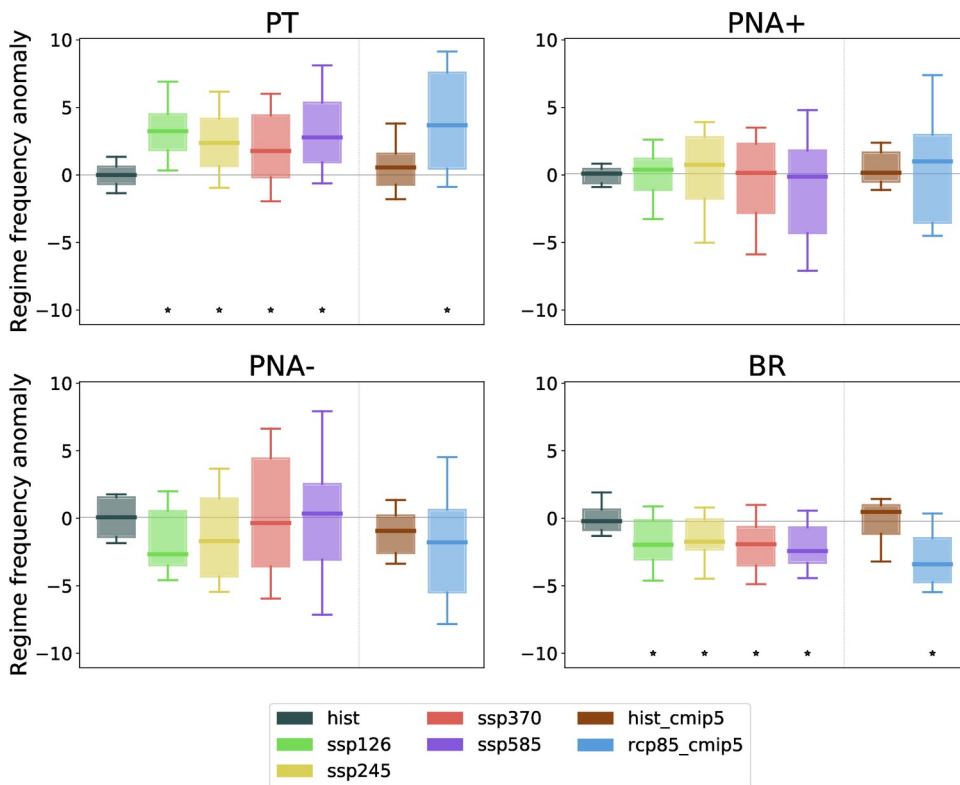


Figure S7. As Figure 6, with CMIP5 historical simulation (1964-2005).

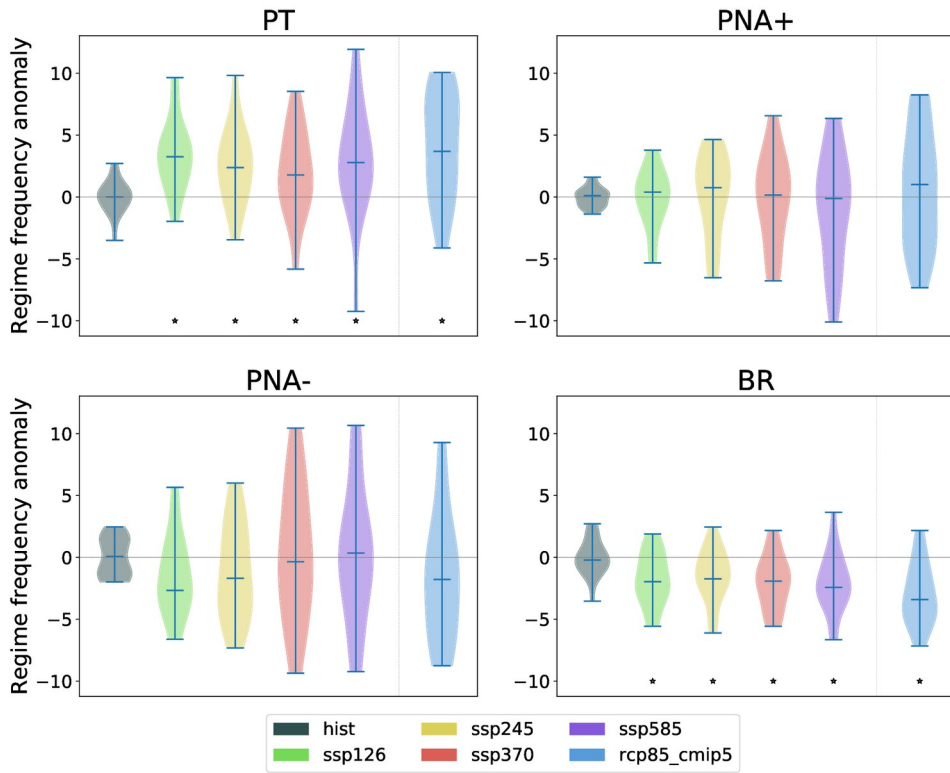


Figure S8. As Figure 6, but with violin plots.

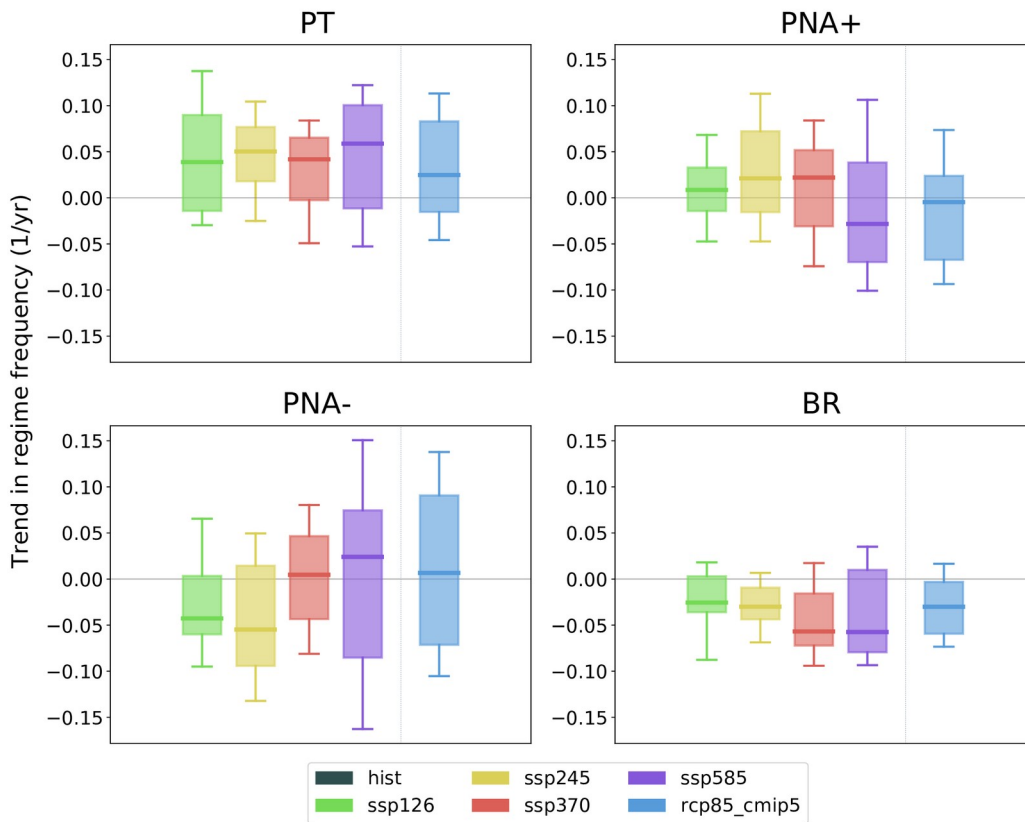


Figure S9. Trend of the seasonal regime frequencies (with 10-yr running mean) over 2015-2100 for PAC. The trend is in units of yr⁻¹.

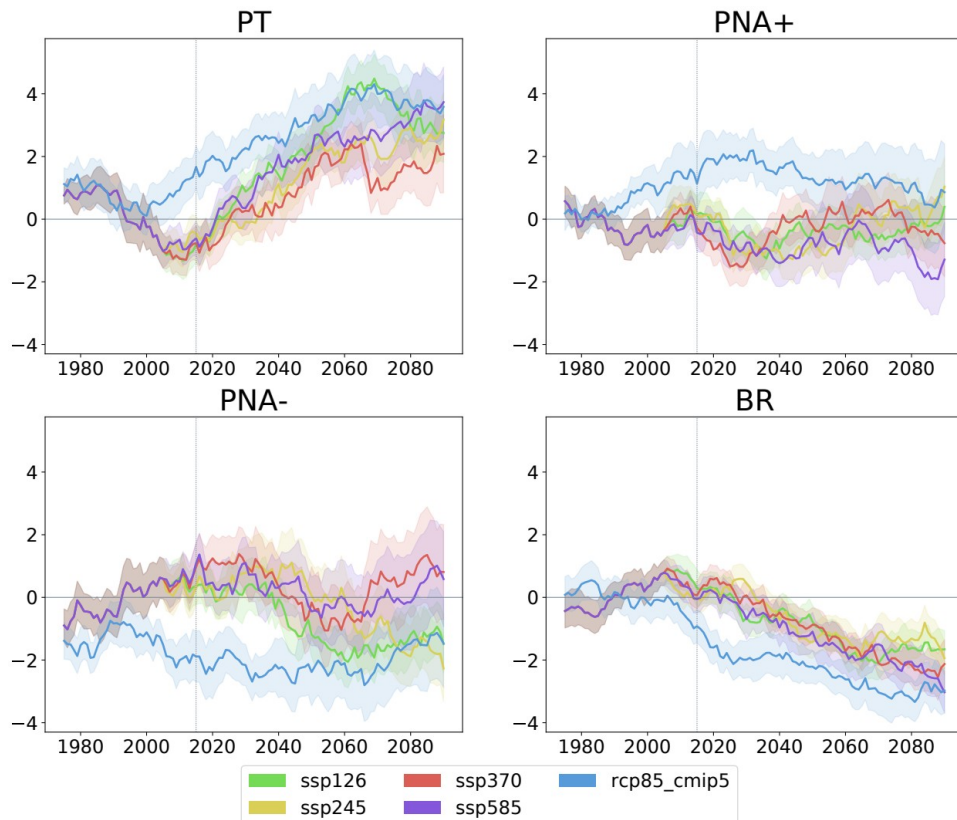


Figure S10. Analog of Figure 5 for the PAC sector.

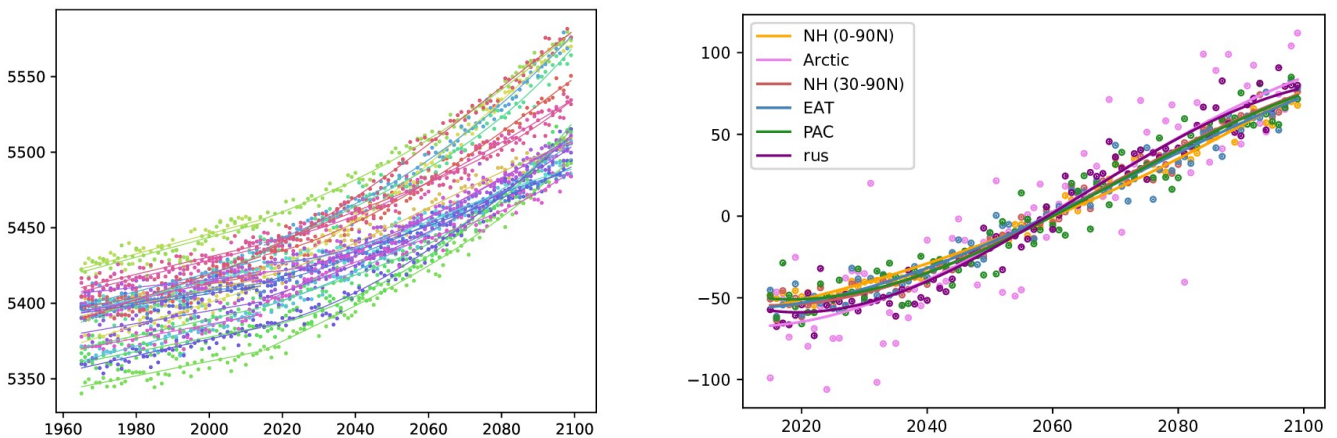


Figure S11. Left panel: average geopotential field at 500 hPa (meters) in the Northern Hemisphere (30-90N) for all model simulations in the ssp585 scenario and corresponding historical simulation (scatter) and the linear/polynomial fit for the historical/scenario periods respectively (lines). Right panel: detrending for the ssp585 scenario simulation with EC-Earth3 (r1i1p1f1), considering different areas for the average: NH (0-90N), Arctic (70-90N), NH (30-90N), EAT and PAC as in the paper, rus (30-90N, 40-140 E).

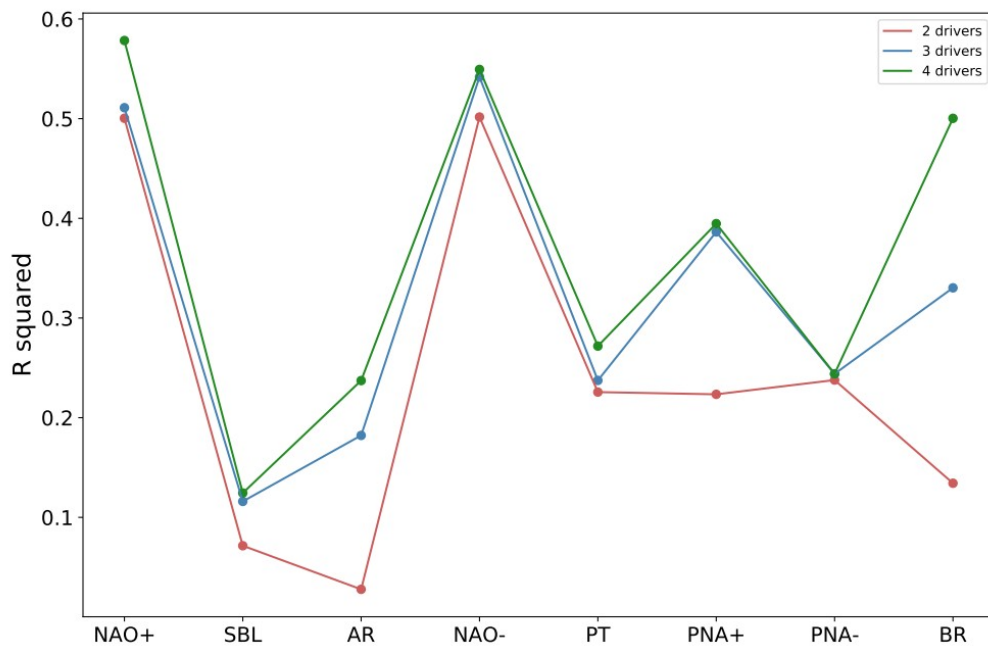


Figure S12. R2 score (fraction of explained variance) for the 2- and 3-indices regression models presented in Section 4.2.

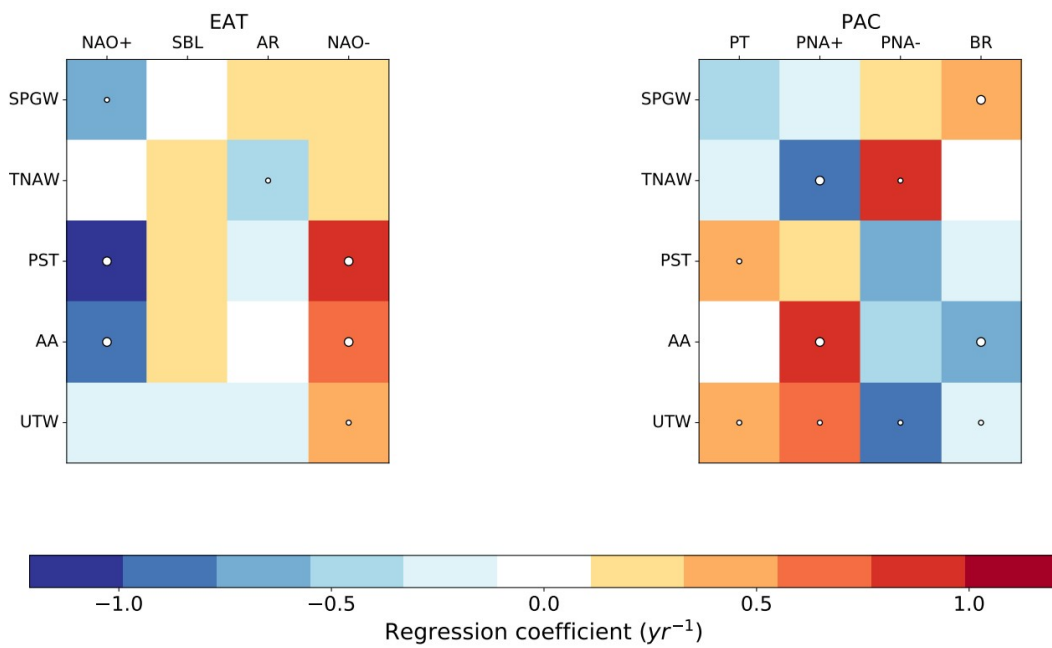


Figure S13. Regression models using all 5 indices.