Supplementary Figures for “Seasonal and Regional Variations in Long-Term Changes in Upper Tropospheric Jets from Reanalyses”

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1. PDF Maps and Sections, Subtropical and Polar jets Separately

Figures S1 through S4 show the climatologies and first and last ten year differences for subtropical jets only. Figures S5 through S8 show the same PDF plots for the polar jets only.

2. Permutation Analysis

Figures S9 through S11 show the detailed results of the permutation analysis summarized in the main text, for the trends (slopes) shown in Figures 7 through 9 in the main text (1−p-value is shown to indicate the significance level). Figures S12 through S14 show the results for the trends shown in Figures 12 through 14 in the main text. In general, relatively few regions or time periods show trends in jet latitude or windspeed that are significant at the 95% level, though there are considerably more that reach the 90% level. As discussed in the text, and consistent with expectations, the instances that are most significant according to this test are also ones with large slopes. In most, but not all, of the cases with significant slopes most or all of the reanalyses agree well.

3. Equinox Season Figures

For reference and completeness, the diagnostics in Figures 5, 6, 8, 9 (for the subtropical jet) and 10, 11, 13, and 14 (for the polar jets) in the main text are shown here for the equinox seasons, MAM and SON, as well as the bar charts for the permutation analysis during the equinox seasons corresponding to Figures S10, S11, S13, and S14 (Figures S15 through S26).
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Fig. S2. As in Figure S1, but for JJA; compare with Figure 2 in the main text.  

Fig. S3. As in Figure S1, but for MAM; compare with Figure 3 in the main text.  

Fig. S4. As in Figure S3, but for SON; compare with Figure 4 in the main text.  

Fig. S5. As in Figure S1, but for the polar jets only; compare with Figure 1 in the main text.  

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Fig. S8. As in Figure S5, but for SON; compare with Figure 4 in the main text.  

Fig. S9. Bar charts showing 1−p-value from the permutation tests for the slopes shown in Figure 7 in the main text for subtropical jet NH/SH separation, latitude, altitude, and windspeed as a function of month and season. The horizontal line is at 1−p-value equal to 0.90.  

Fig. S10. As in Figure S9, but for the cases shown in Figures 8 in the main text for the subtropical jet NH/SH separation, latitude, altitude, and windspeed as a function of longitude in DJF.  

Fig. S11. As in Figure S10, but for the cases shown in Figures 9 in the main text for the subtropical jet NH/SH separation, latitude, altitude, and windspeed as a function of longitude in JJA.  

Fig. S12. As in Figure S9, but for the polar jet cases shown in Figures 12 in the main text, and showing subtropical/polar jet separation.  

Fig. S13. As in Figure S10, but for the DJF polar jet cases shown in Figures 13 in the main text, and showing subtropical/polar jet separation.  

Fig. S14. As in Figure S11, but for the JJA polar jet cases shown in Figures 14 in the main text, and showing subtropical/polar jet separation.  

Fig. S15. Time series of subtropical jet latitudes for five reanalyses, 2 hemispheres, MAM & SON. The lower panel of each pair shows the fits to slopes and the 1-sigma uncertainty envelope in those fits.  

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Fig. S22. As in Figure S21, but for polar jet altitudes. 

Fig. S23. Bar charts of global polar jet and subtropical/polar jet latitude separation trends as a function of longitude in 20° bins, for MAM. Layout is as in Figure 13 in the main text. 

Fig. S24. Bar charts of global polar jet and subtropical/polar jet latitude separation as a function of longitude in 20° bins, for SON. Layout is as in Figure 13 in the main text. 

Fig. S25. As in Figure S13, but for MAM. 

Fig. S26. As in Figure S13, but for SON.
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