

Supporting Information for Modulation of Atmospheric Rivers by the Arctic Stratospheric Polar Vortex

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1. Figures S1 to S6

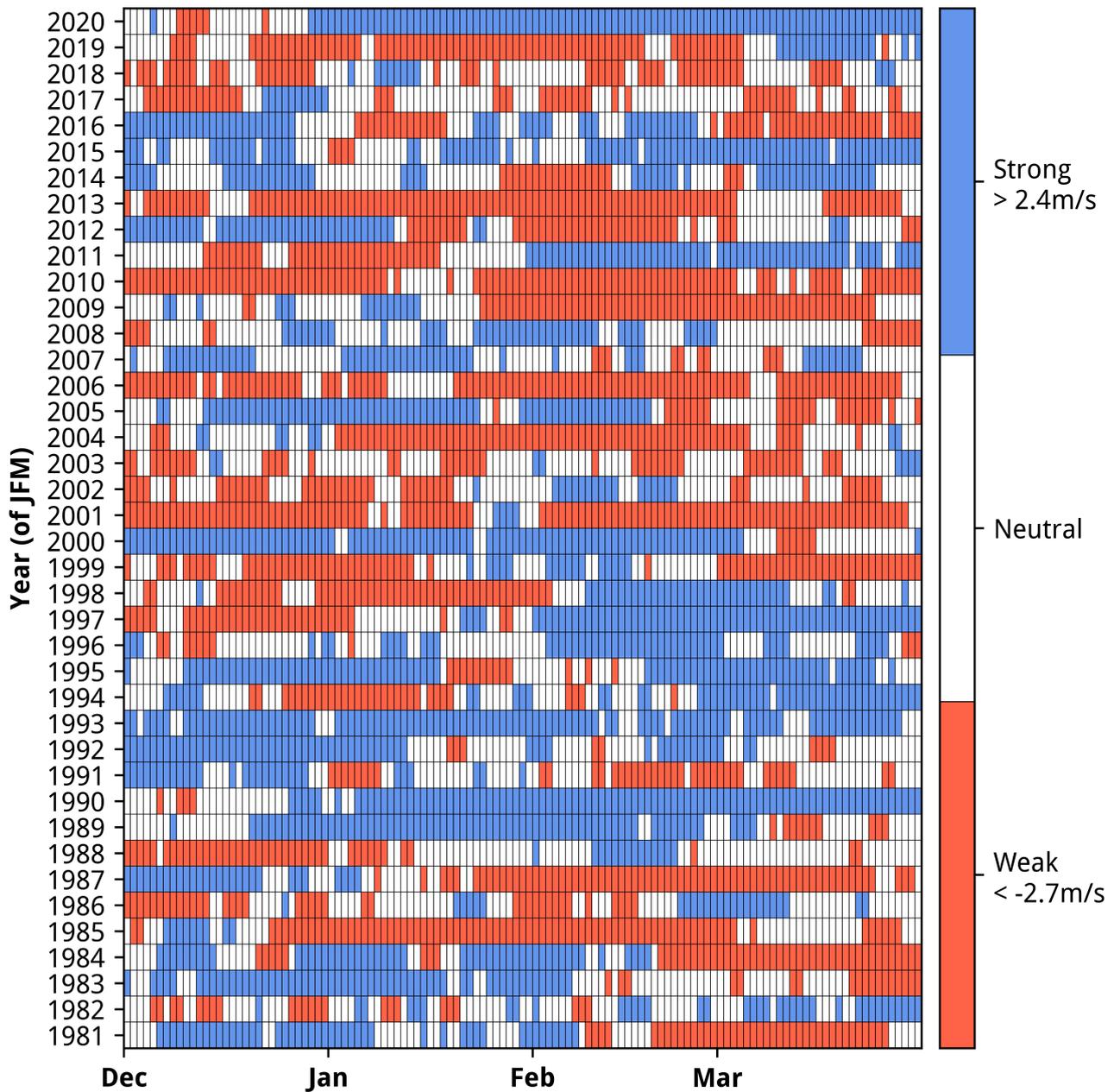


Figure S1. Classification of the daily-mean 100 hPa 60°N zonal-mean zonal wind anomalies over DJFM 1980/81-2019/20 according to MERRA-2 reanalysis. Each day is assigned into the ‘strong’ (blue), ‘neutral’ (white) or ‘weak’ (red) category based on the terciles of all anomalies in the dataset (shown in the colorbar labels). The y-axis years refer to the year of the January.

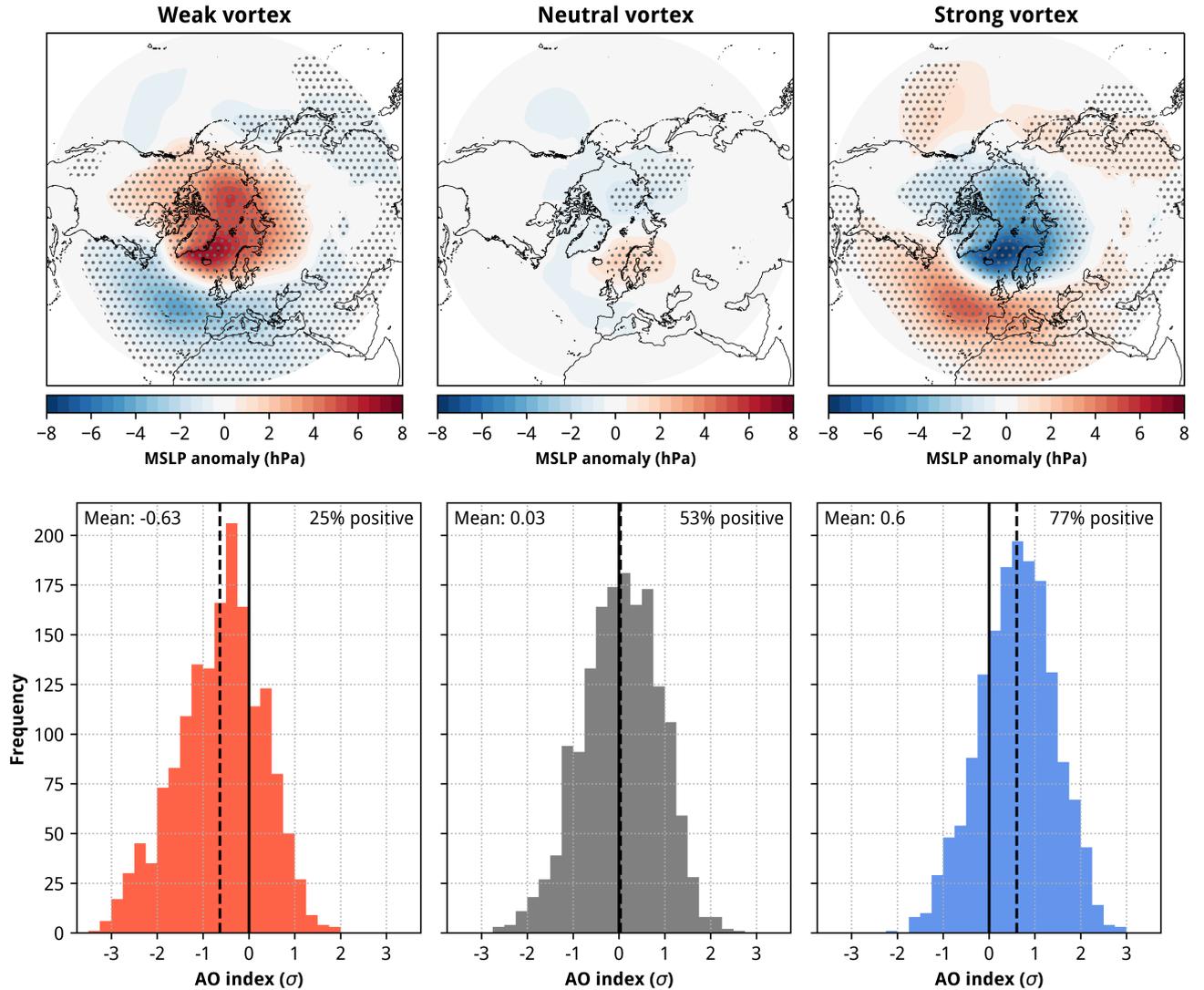


Figure S2. Average MERRA-2 mean sea-level pressure (MSLP) anomalies (top row) and Arctic Oscillation (AO) index distribution (bottom row) during (left) weak, (center) neutral, and (right) strong vortex (U100) conditions (as shown in Figure S1). Stippling indicates the average is significantly different from random sampling at the 95% confidence level (see main text for details). The AO is defined as the leading empirical orthogonal function of daily-mean MSLP anomalies poleward of 20°N during DJFM. The AO index has been standardized by dividing by the square-root of the eigenvalue. The vertical dashed line shows the mean AO index in each tercile, which corresponds to the AO index of the MSLP anomalies in the top row.

September 14, 2022, 2:21pm

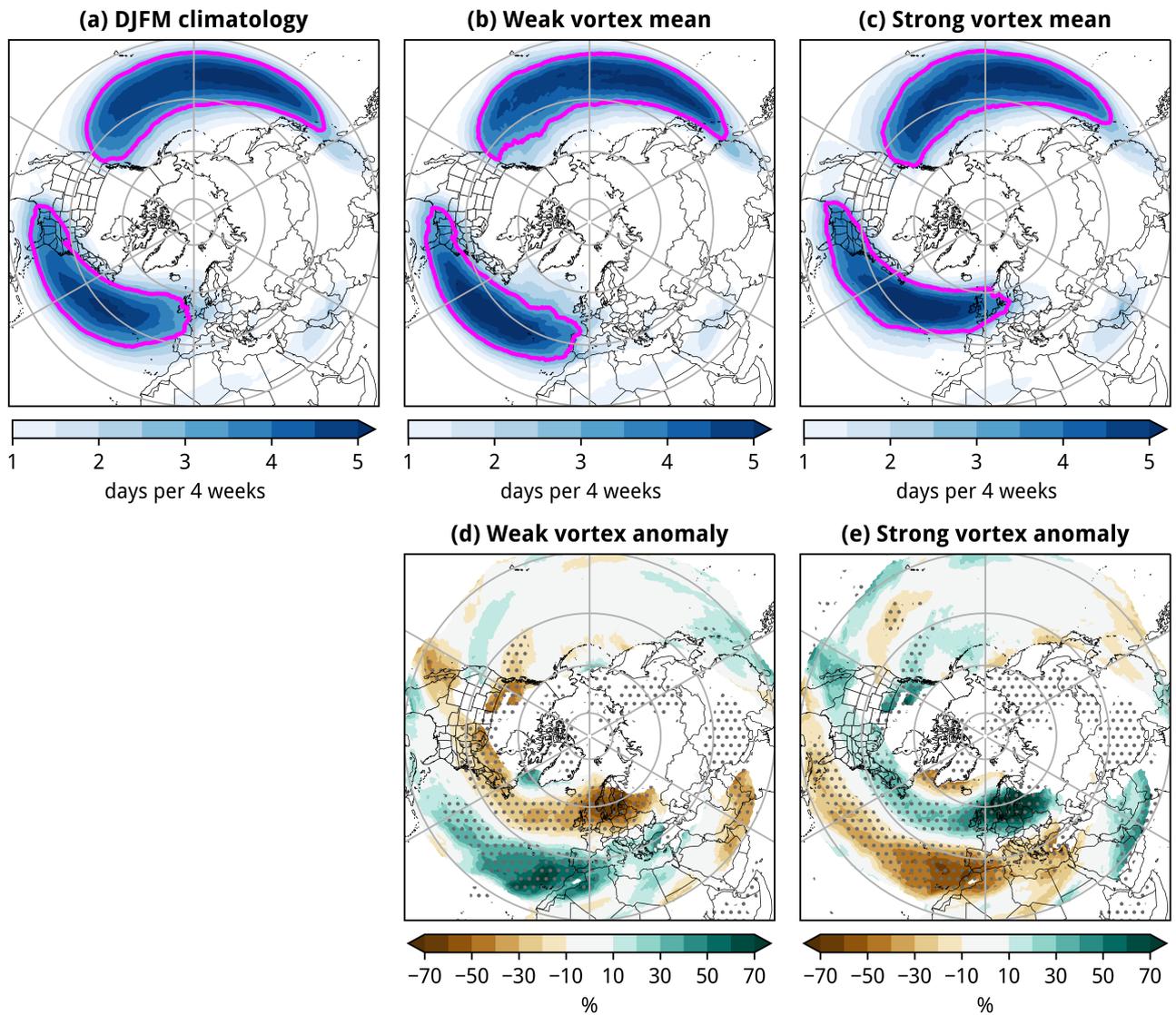


Figure S3. As in Figure 1 in the main text, but using the Mundhenk v3 contribution to ARTMIP Tier 1 over DJFM 1980/81–2016/17. In panels (d) and (e), anomalies are only shown where the DJFM climatology in (a) exceeds 0.5 days per 4 weeks.

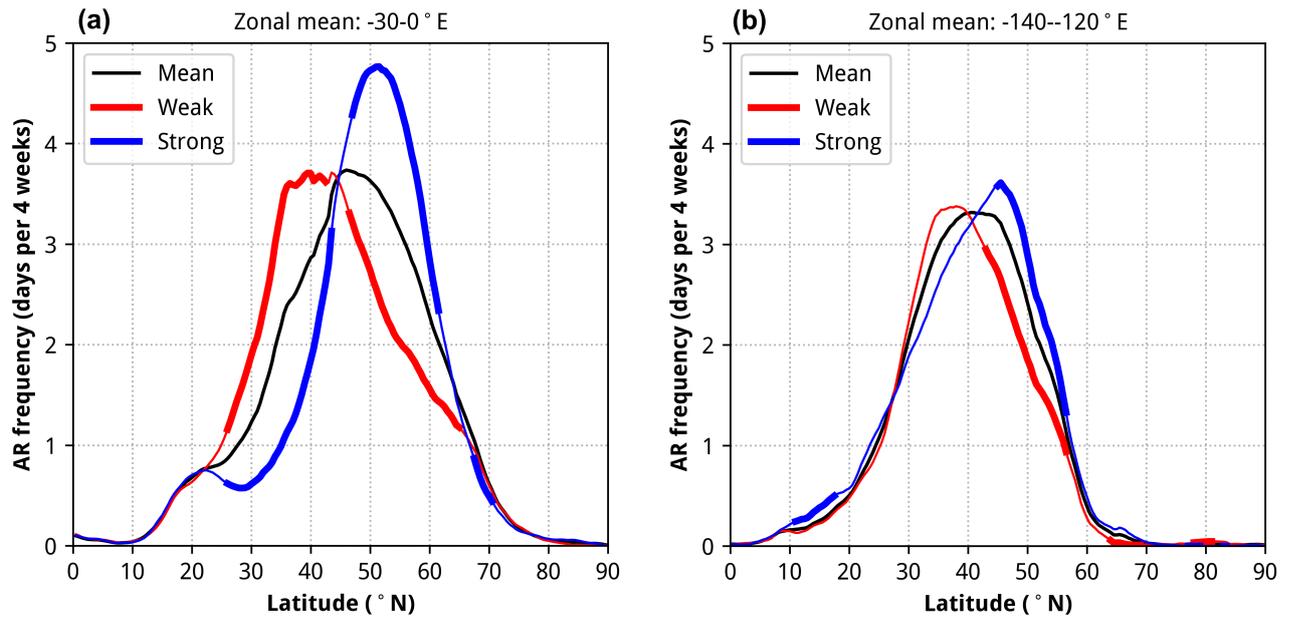


Figure S4. As in Figure 2 in the main text, but using the Mundhenk v3 contribution to ARTMIP Tier 1 over DJFM 1980/81–2016/17.

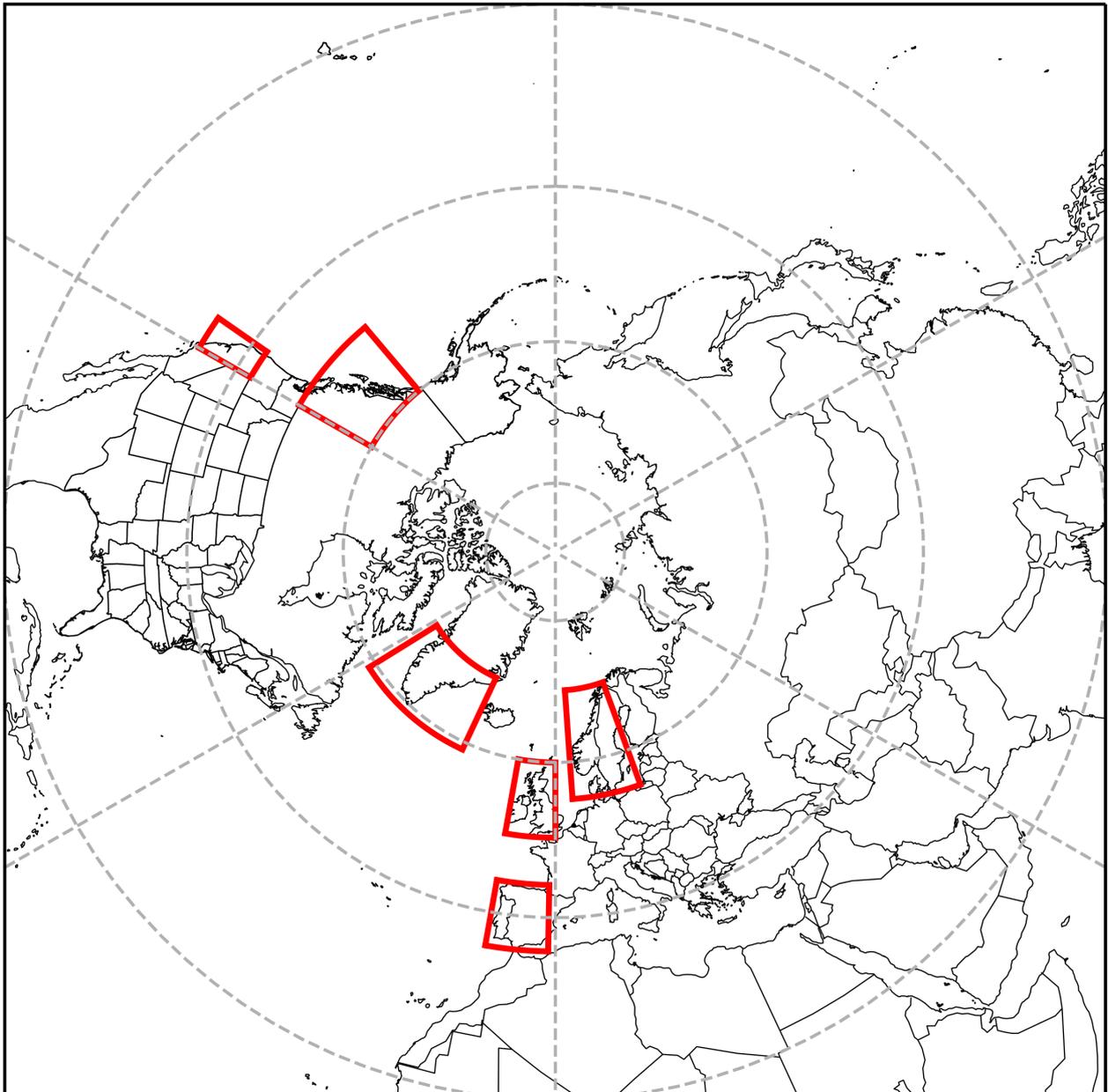


Figure S5. Red boxes denote the regions used for landfall proportion analysis in Figure 3 in the main text.

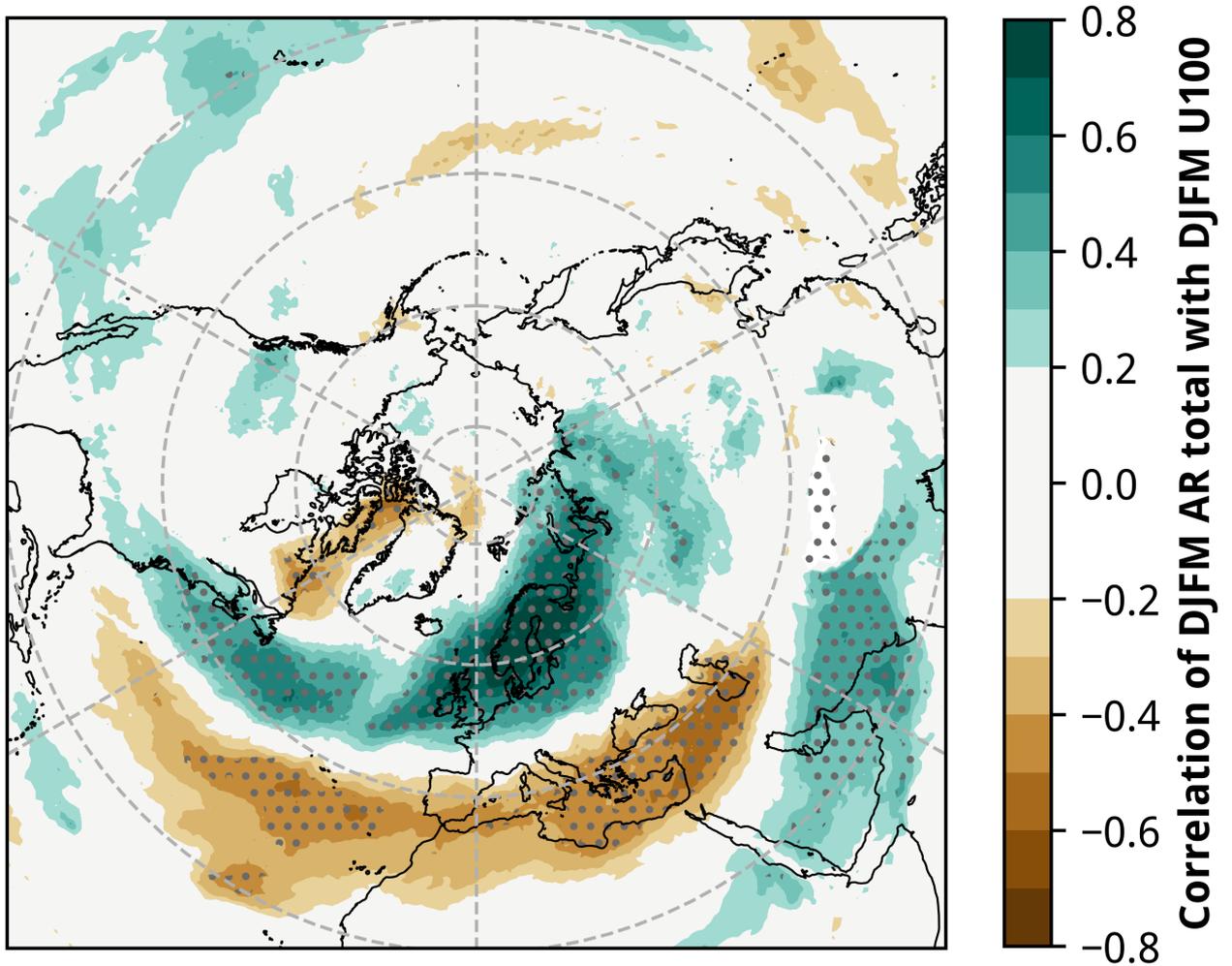


Figure S6. Correlation between the DJFM-total AR frequency and the DJFM-mean U100. Stippling indicates the correlation coefficient is significantly different from zero at the 95% confidence level (with FDR correction) according to a bootstrap re-sampling test with 10,000 iterations (with replacement).