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*Supplement of*

## **Inter-hemispheric asymmetry in the sea-ice response to volcanic forcing simulated by MPI-ESM (COSMOS-Mill)**

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## SUPPLEMENT

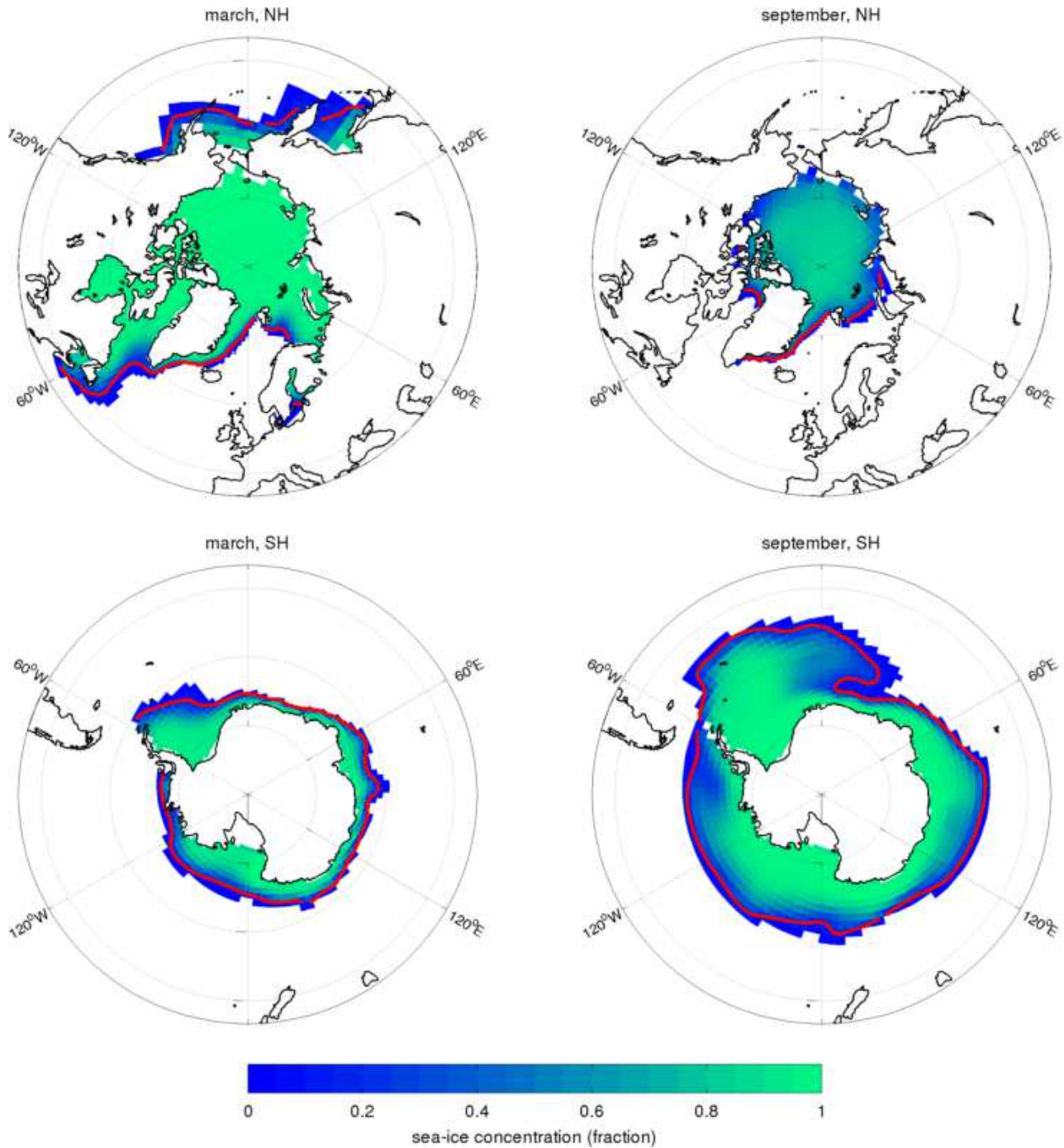


Figure S1 – Monthly-mean sea-ice cover climatology from the unperturbed MPI-ESM-COSMOS-Mill simulation (control run). Shading: mean; Red contour line: 0.15 level.

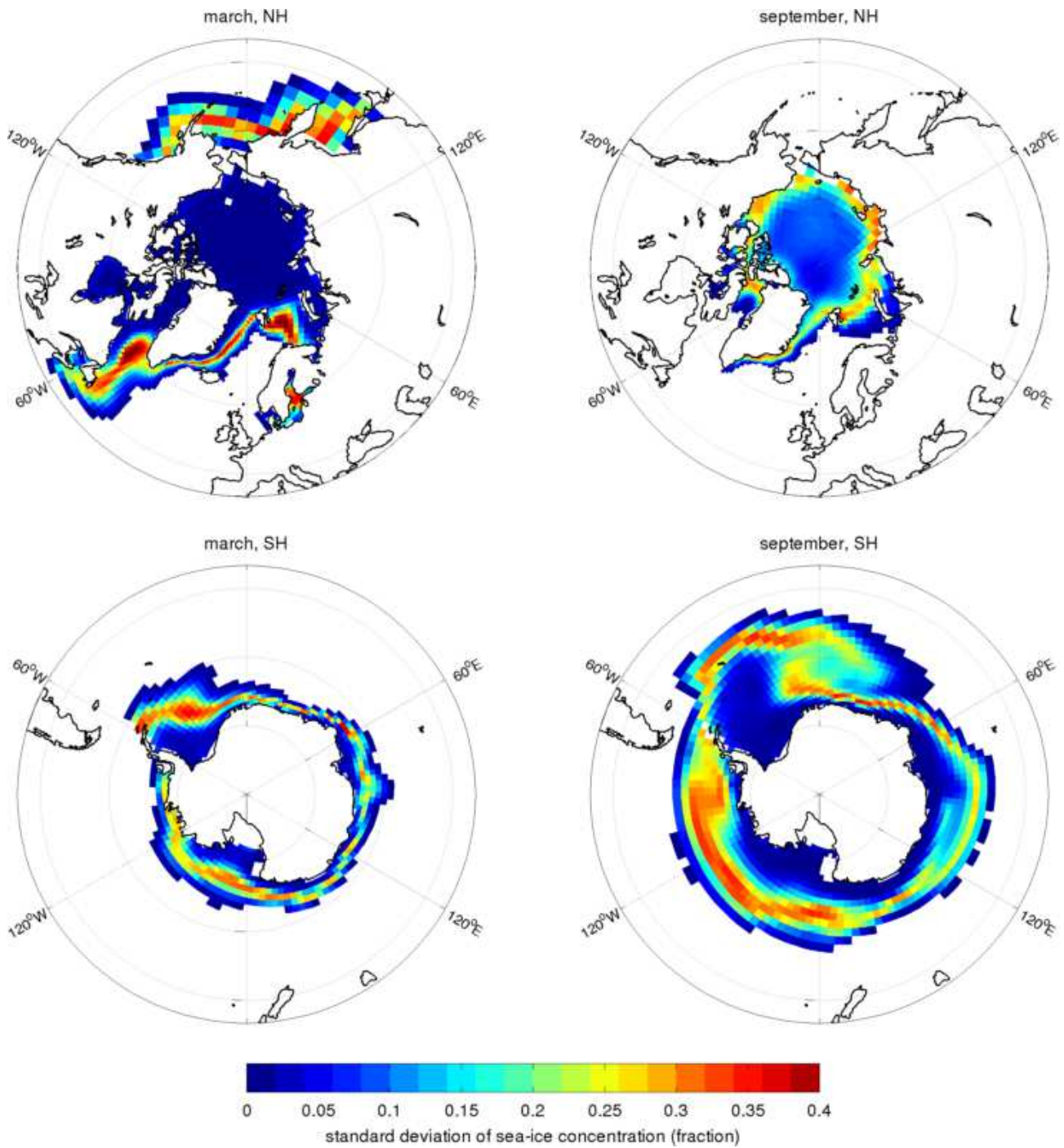


Figure S2 – Monthly-mean sea-ice cover standard deviation from the unperturbed MPI-ESM-COSMOS-Mill simulation (control run).

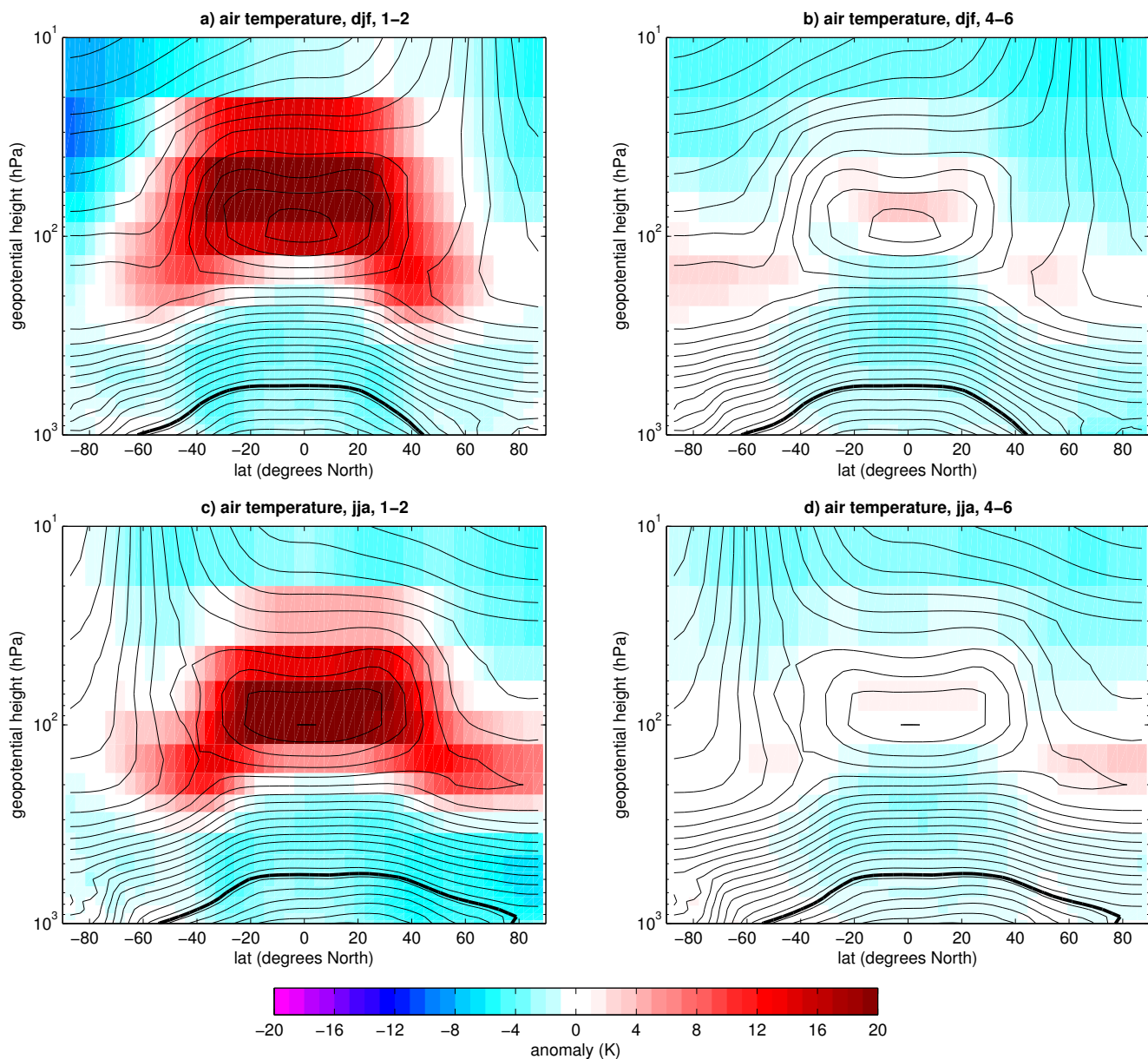


Figure S3 – Ensemble-mean simulated anomalies of zonal-mean air temperature for integration years 1-2 (panels a,c) and 4-6 (panels b,d) of the SUPER1 ensemble, for the boreal (top) and austral (bottom) winters. Only changes statistically significant at 95% confidence are shown. Line contours are the climatology from the control run; contours are drawn at 5 K intervals, the thick line is 273.15 K.

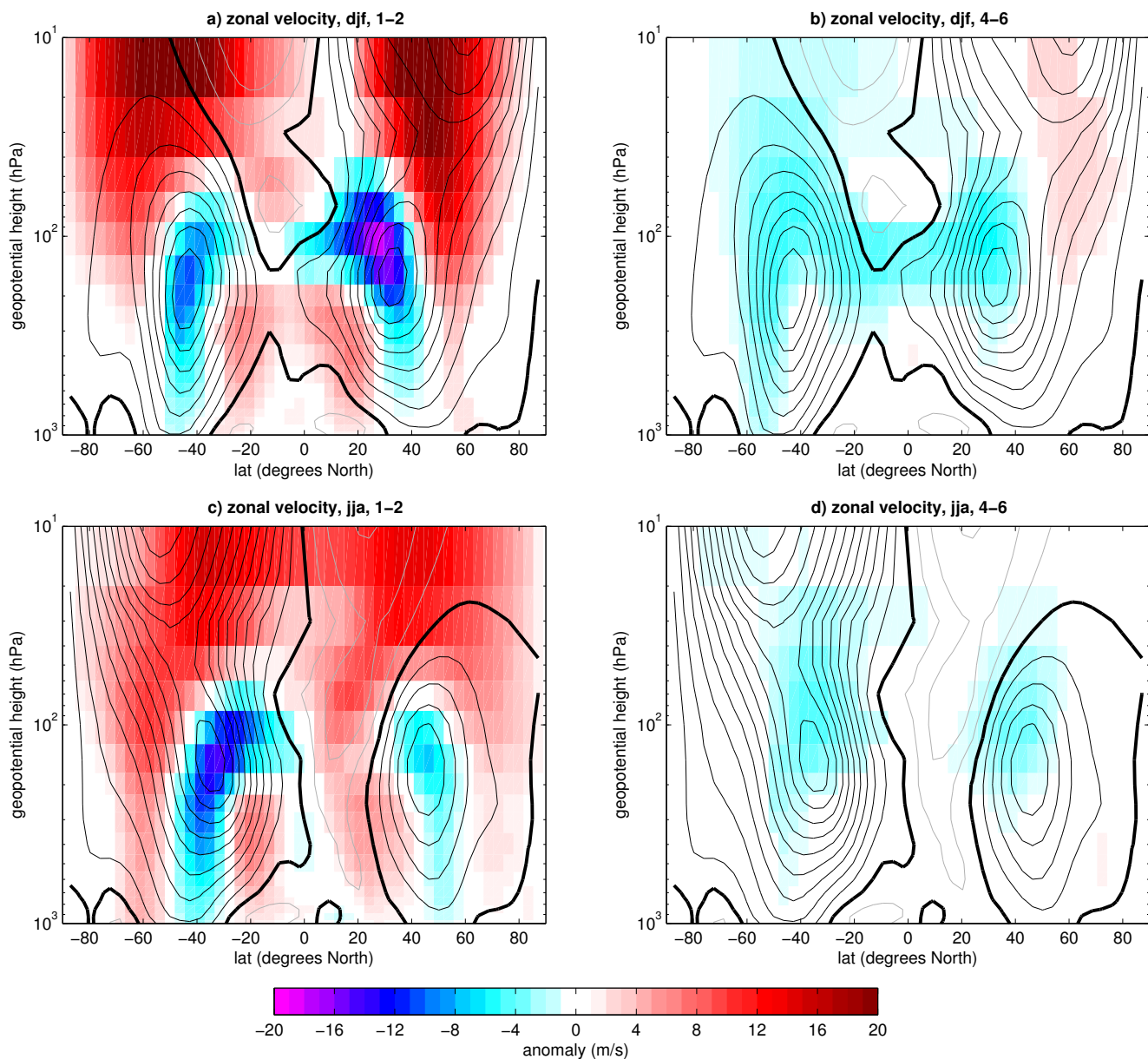


Figure S4 – Ensemble-mean simulated anomalies of zonal-mean zonal wind velocity for integration years 1-2 (panels a,c) and 4-6 (panels b,d) of the SUPER1 ensemble, for the boreal (top) and austral (bottom) winters. Positive values indicate eastward motion. Only changes statistically significant at 95% confidence are shown. Line contours (thin black: positive, thick black: zero, gray: negative) are the climatology from the control run; contours are drawn at 5 m/s intervals.

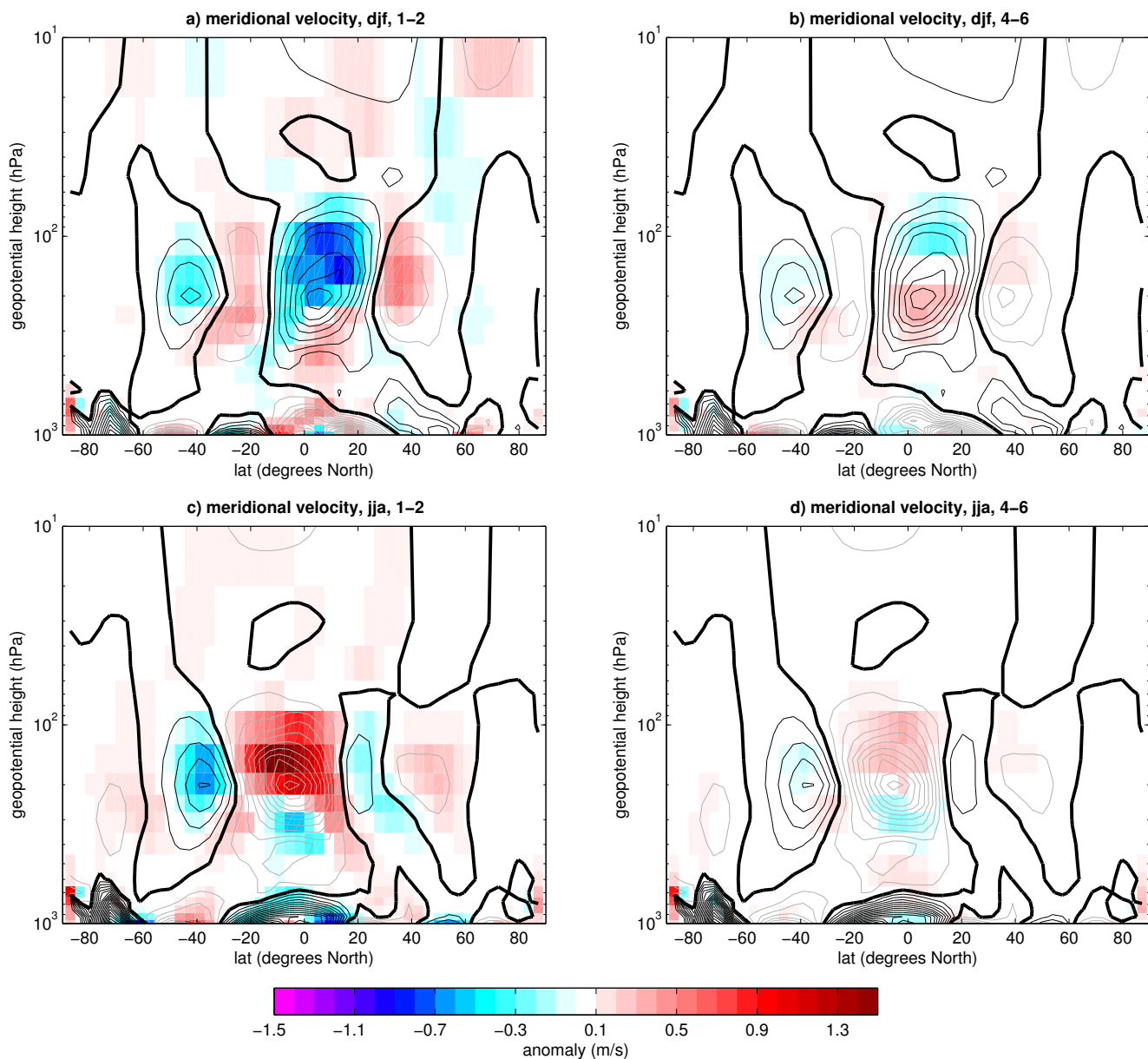


Figure S5 – Ensemble-mean simulated anomalies of zonal-mean meridional wind velocity for integration years 1-2 (panels a,c) and 4-6 (panels b,d) of the SUPER1 ensemble, for the boreal (top) and austral (bottom) winters. Positive values indicate northward motion. Only changes statistically significant at 95% confidence are shown. Line contours (thin black: positive, thick black: zero, gray: negative) are the climatology from the control run; contours are drawn at 0.25 m/s intervals.

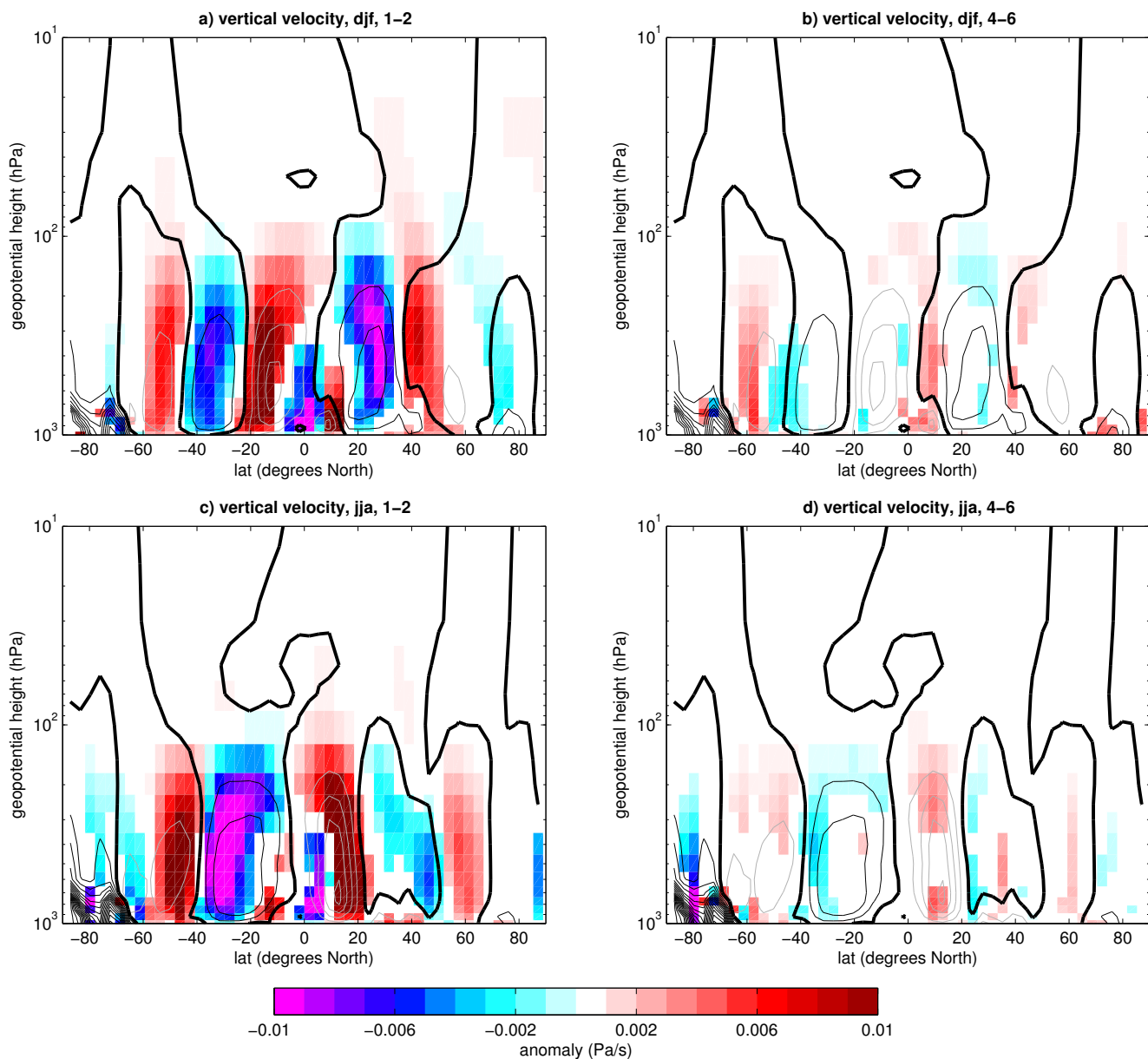


Figure S6 – Ensemble-mean simulated anomalies of zonal-mean vertical air velocity for integration years 1-2 (panels a,c) and 4-6 (panels b,d) of the SUPER1 ensemble, for the boreal (top) and austral (bottom) winters. Positive values indicate downward motion. Only changes statistically significant at 95% confidence are shown. Line contours (thin black: downward/positive, thick black: zero, gray: upward/negative) are the climatology from the control run; contours are drawn at  $10^{-2}$  Pa/s intervals.

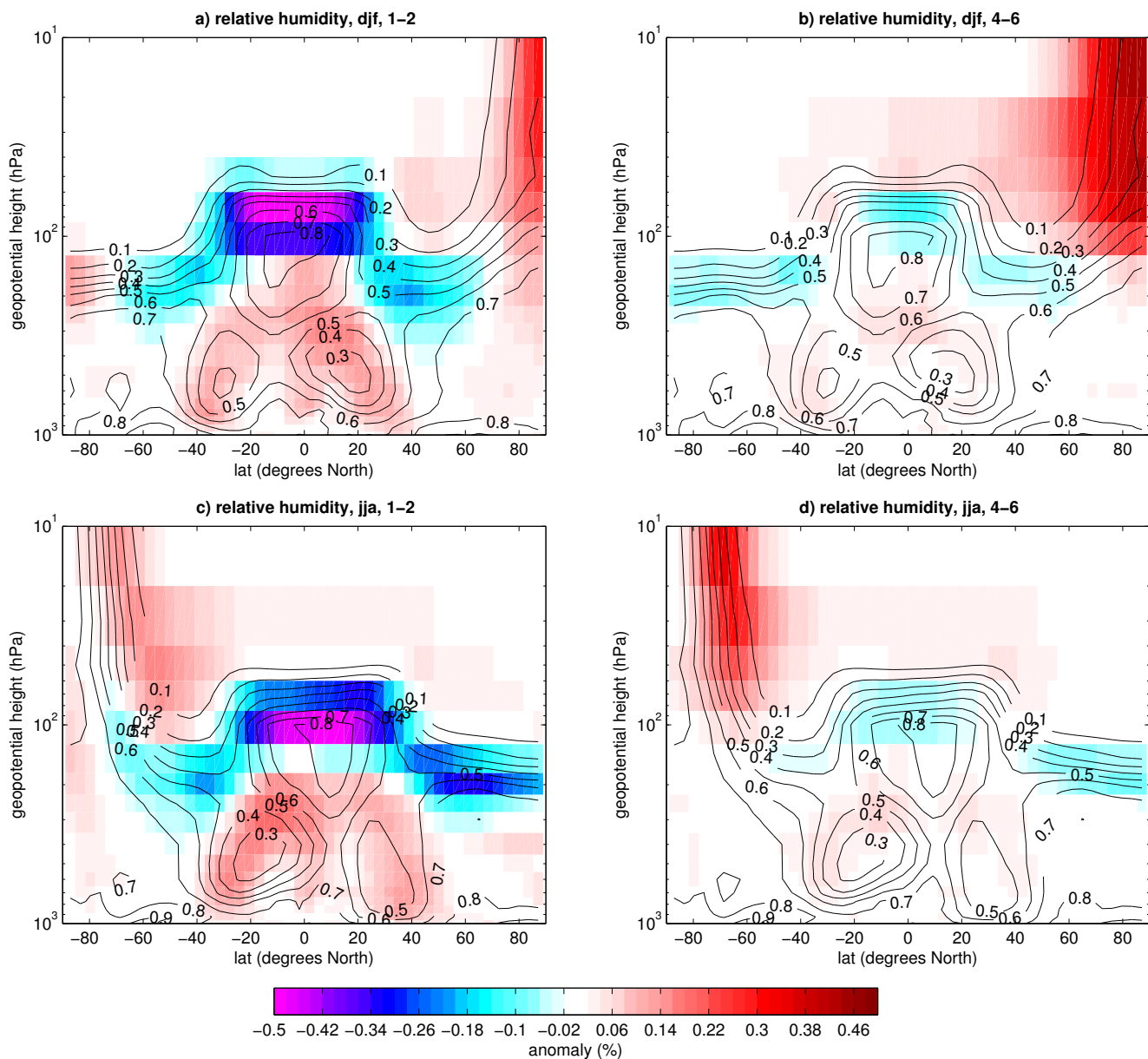


Figure S7 – Ensemble-mean simulated anomalies of zonal-mean atmospheric relative humidity for integration years 1-2 (panels a,c) and 4-6 (panels b,d) of the SUPER1 ensemble, for the boreal (top) and austral (bottom) winters. Only changes statistically significant at 95% confidence are shown. Line contours are the climatology from the control run.



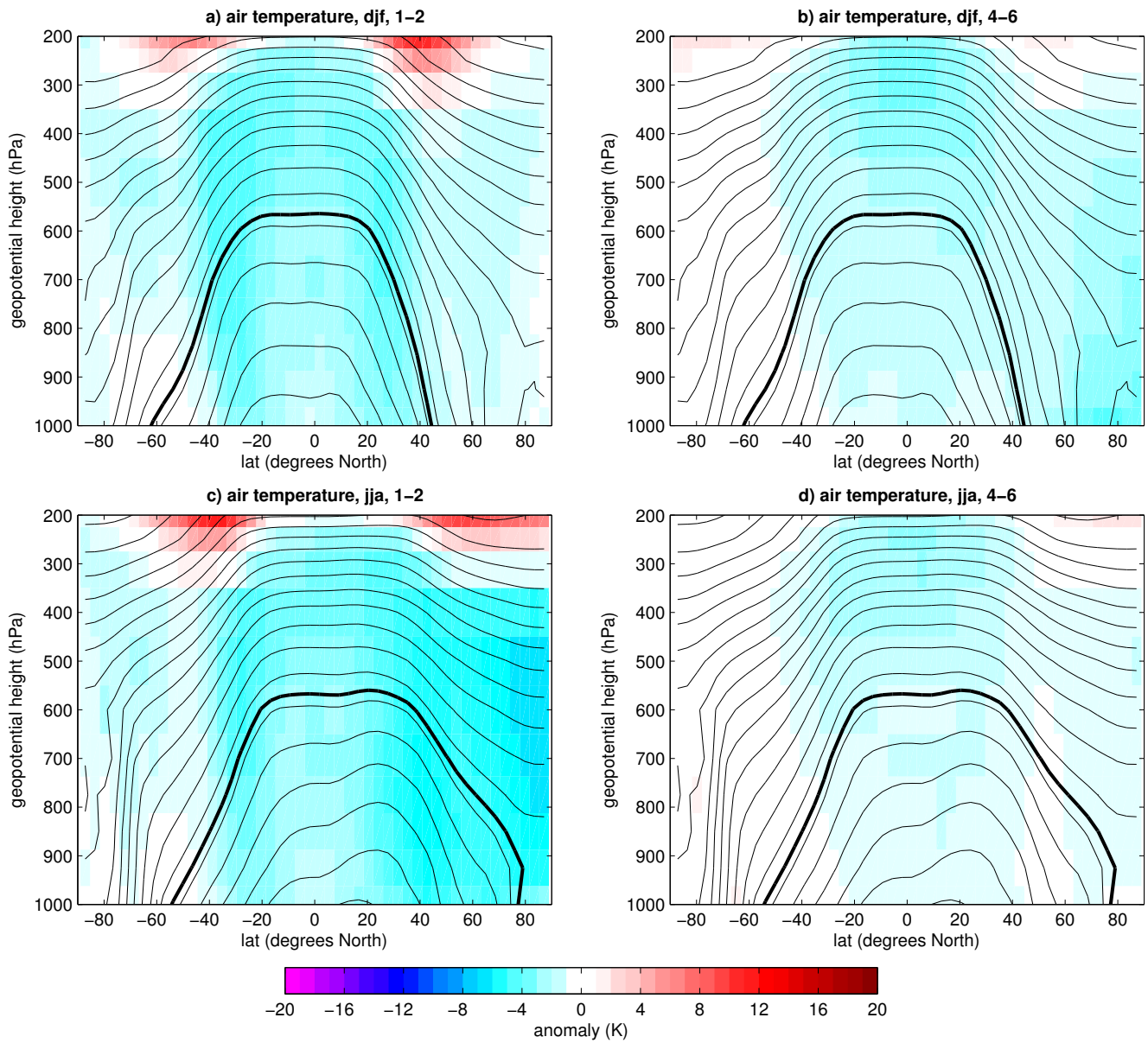


Figure S8 – Same as Figure S3, but for the tropospheric levels only.

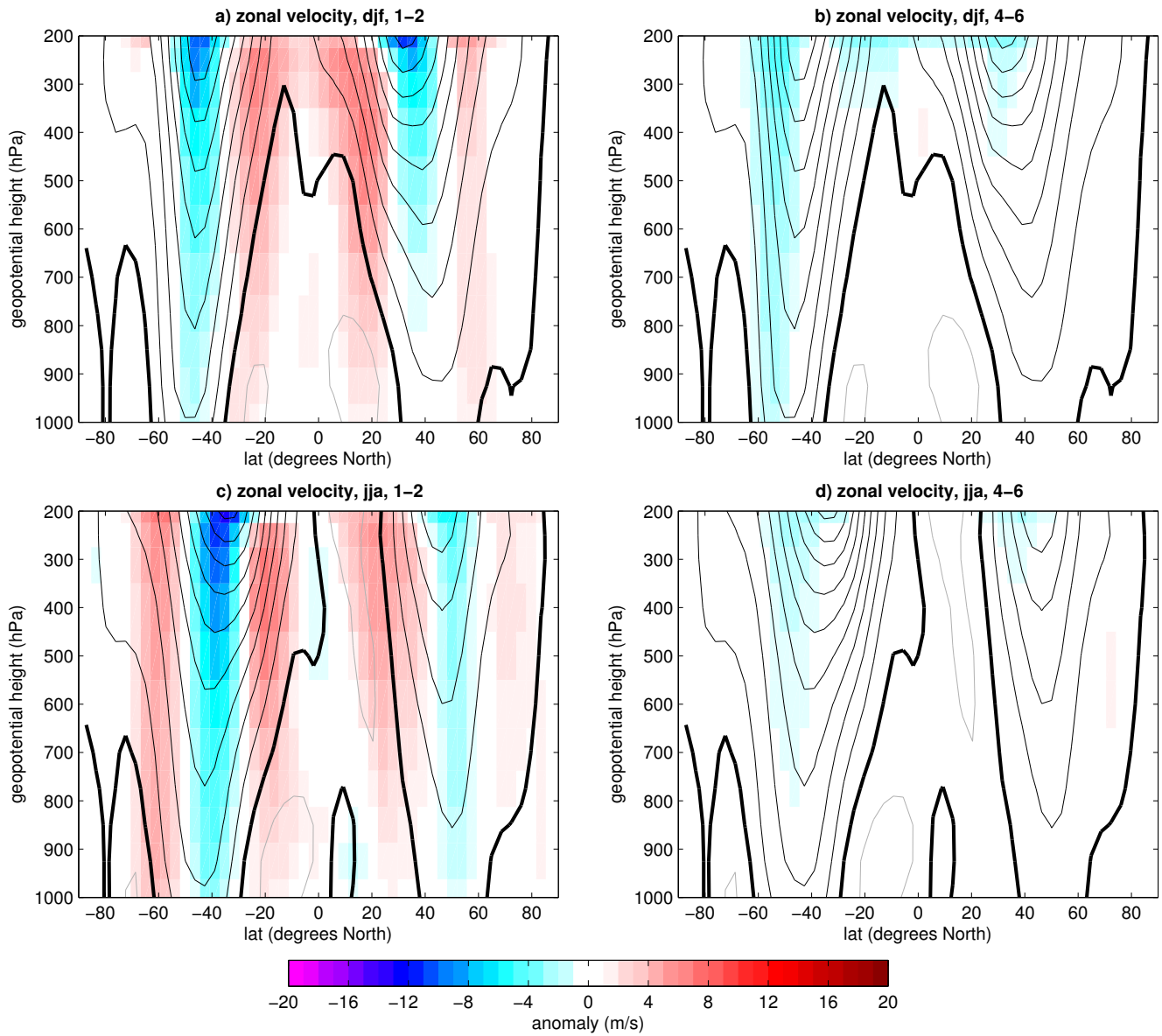


Figure S9 – Same as Figure S4, but for the tropospheric levels only.

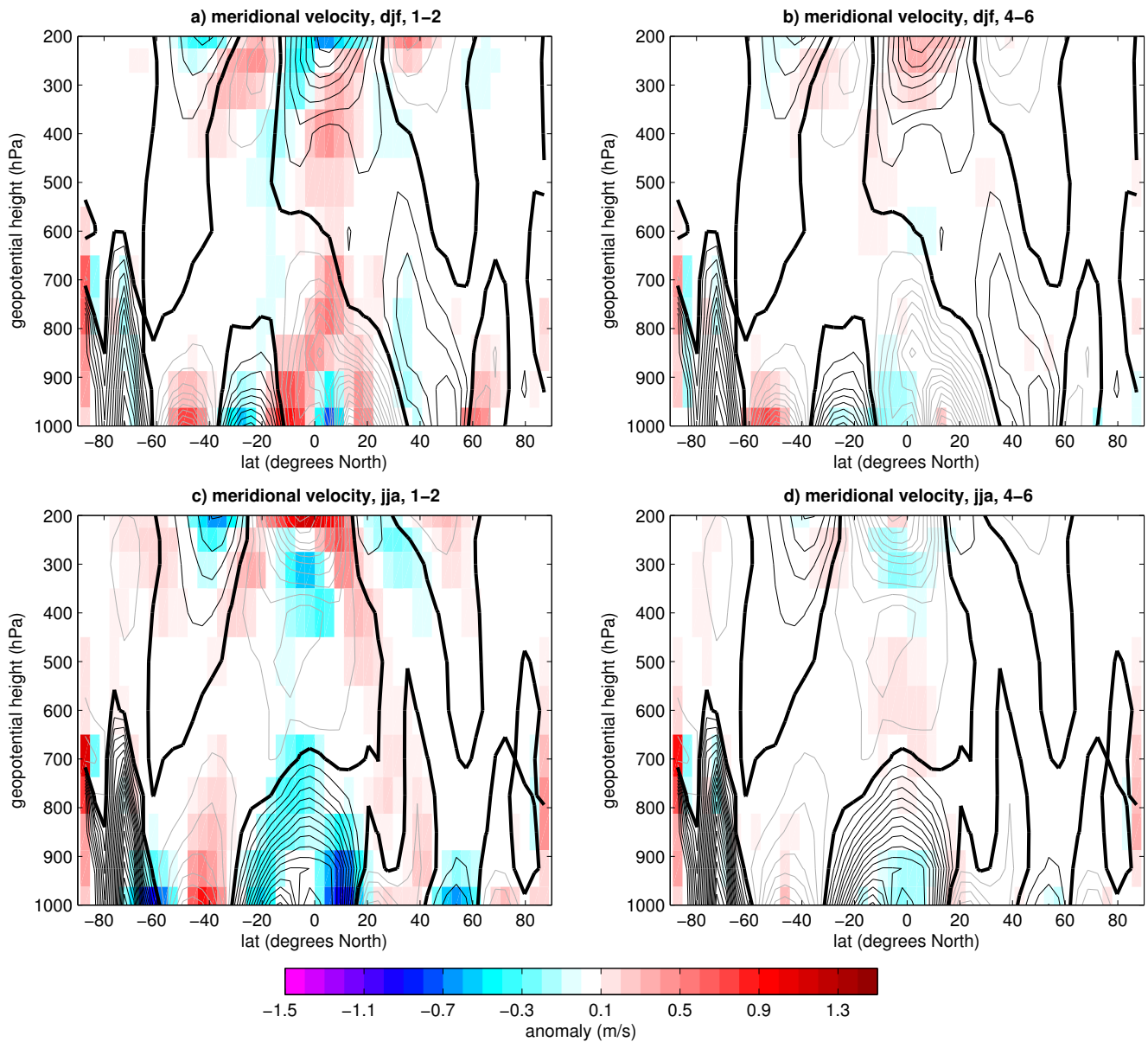


Figure S10 – Same as Figure S5, but for the tropospheric levels only.

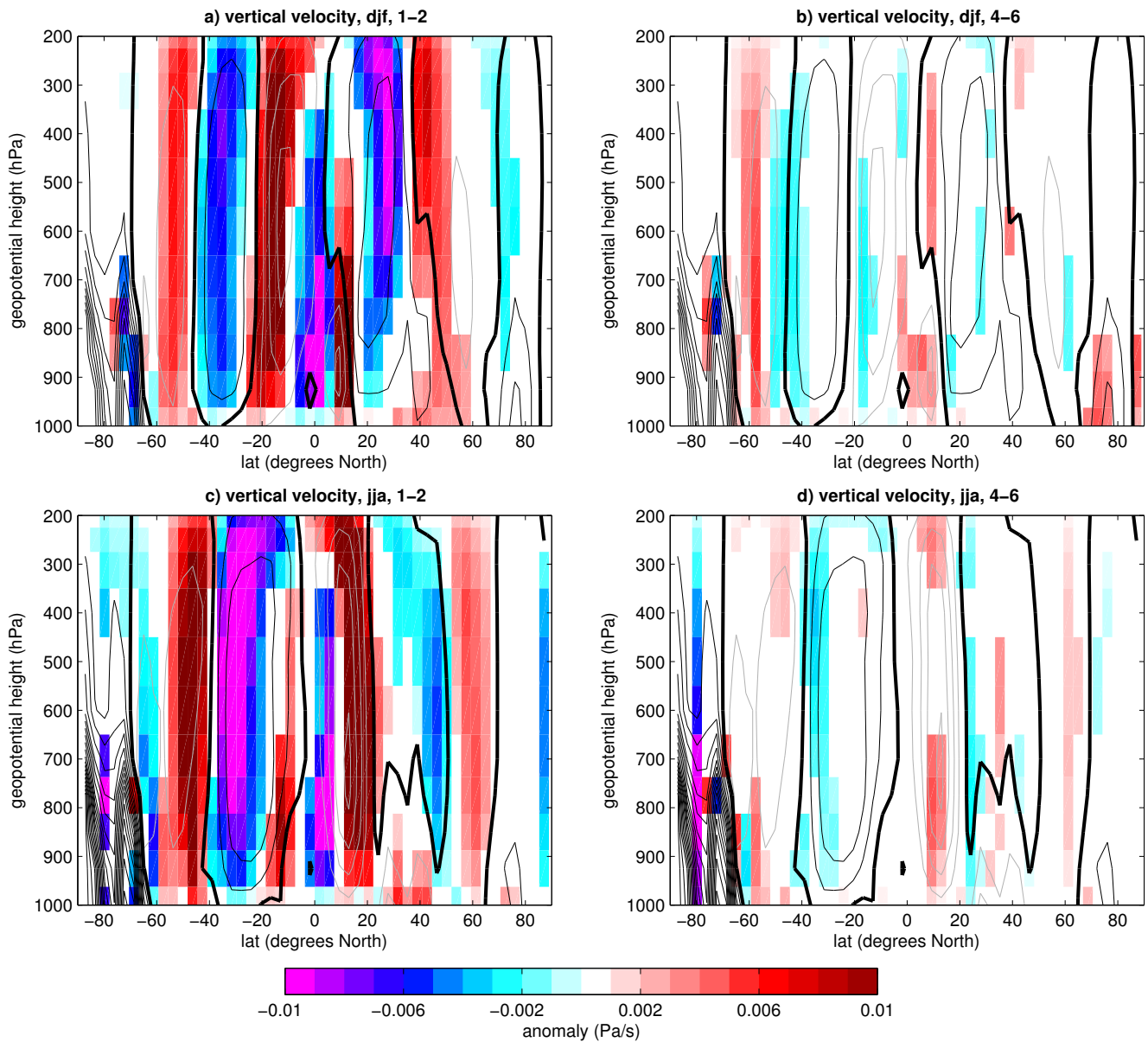


Figure S11 – Same as Figure S6, but for the tropospheric levels only.