Supplementary Material to:

Potential non-linearity in the high latitude circulation and ozone response to stratospheric aerosol injection

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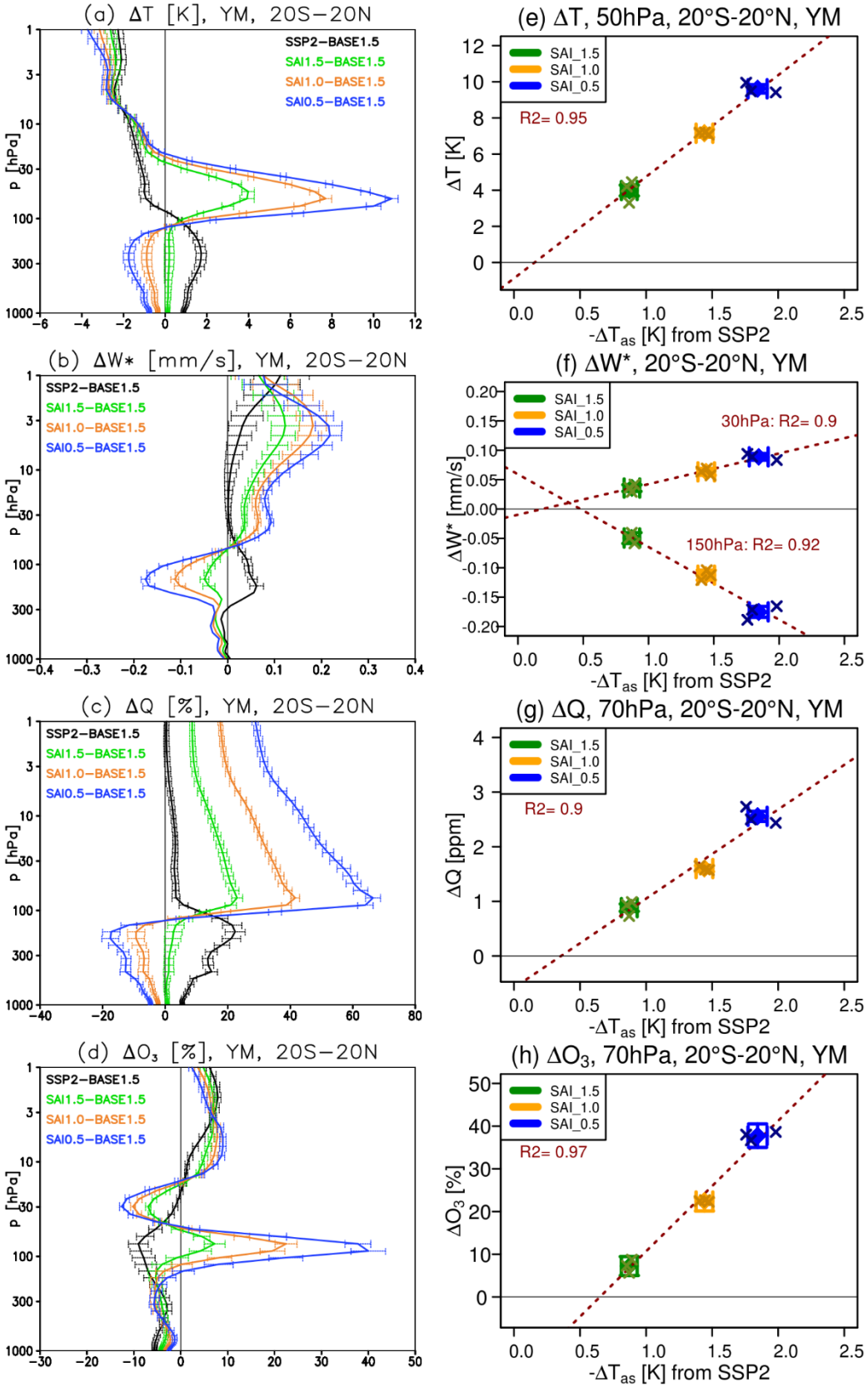

Figure S1. As in **Figure 1** of the main text but for the responses compared to the present day (2020-2039) baseline period BASE1.5.

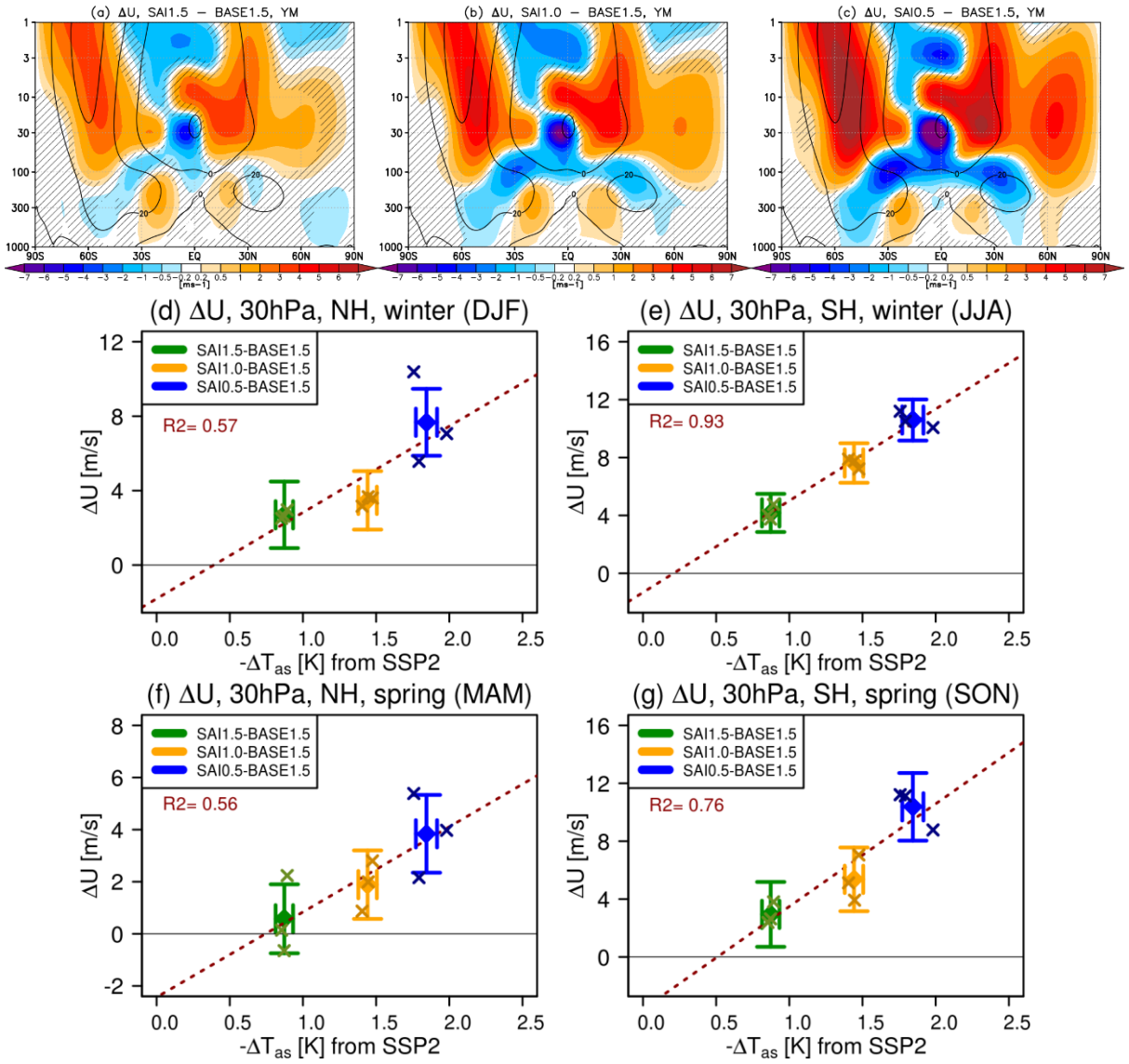

Figure S2. As in **Figure 2** of the main text but for the responses compared to the present day (2020-2039) baseline period BASE1.5

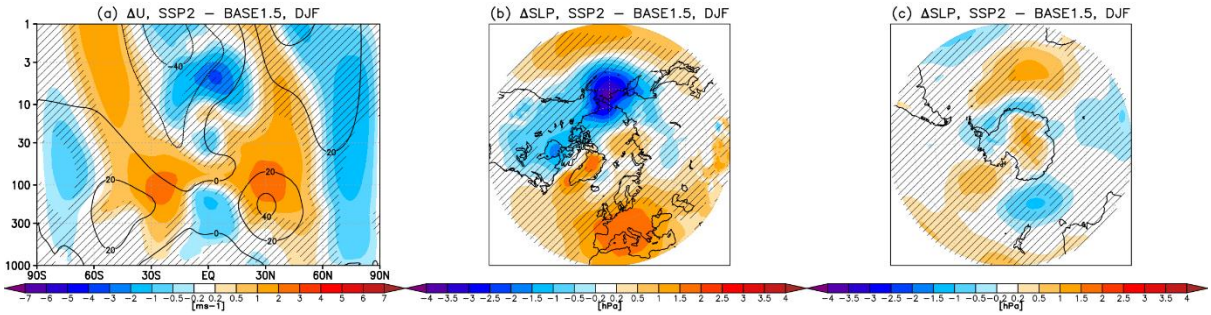

Figure S3. DJF mean changes in (a) zonal wind, (b) sea-level pressure northward from 30N, and (c) sea-level pressure southward of 30S for SSP2-4.5 averaged over 2050-2069 compared to the present day baseline period BASE1.5. Hatching marks the regions where the response is not statistically significant (taken as ±2 standard error of the difference in means).

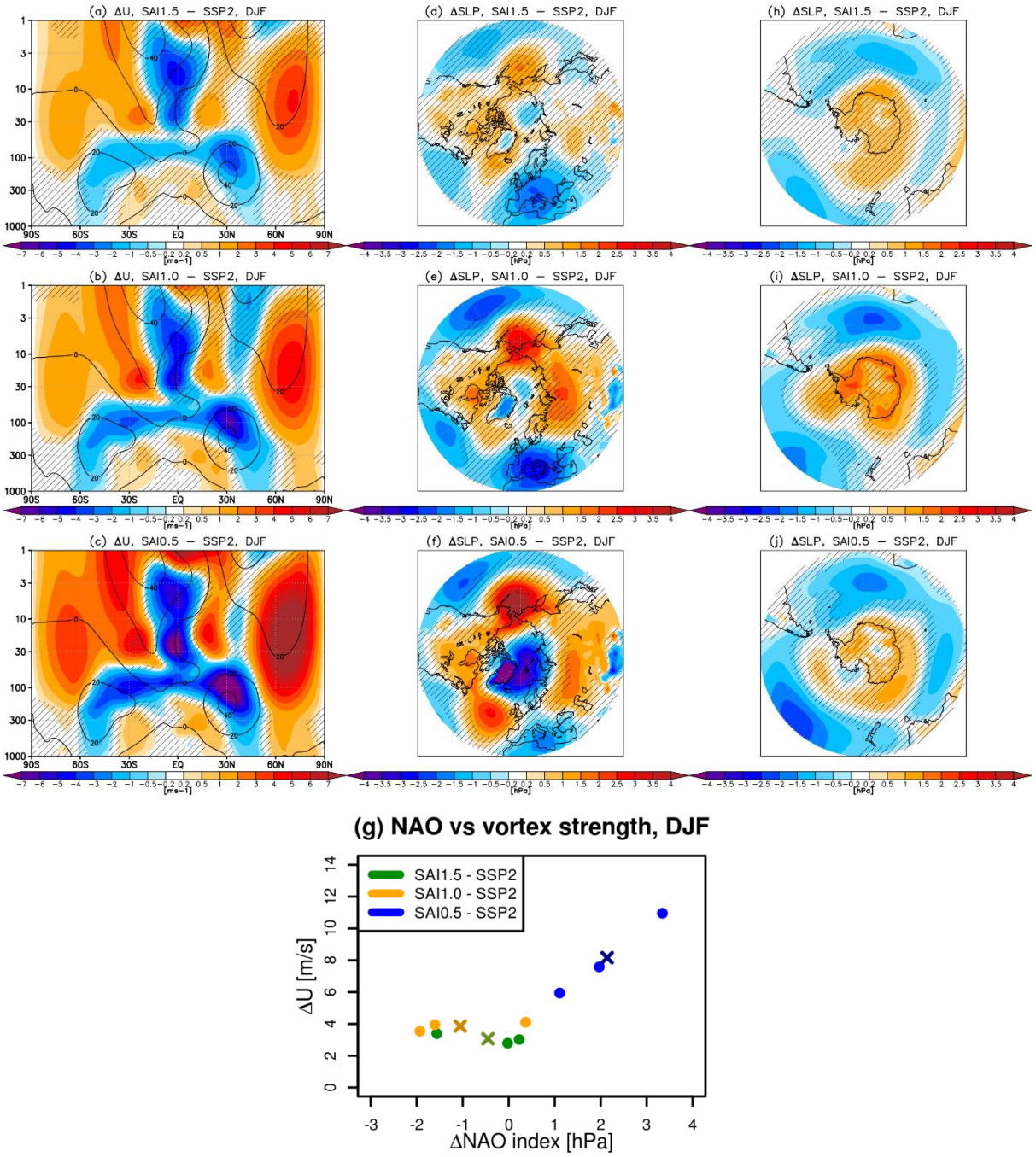

Figure S4. As in **Figure 3** of the main text but for the responses compared to SSP2-4.5.

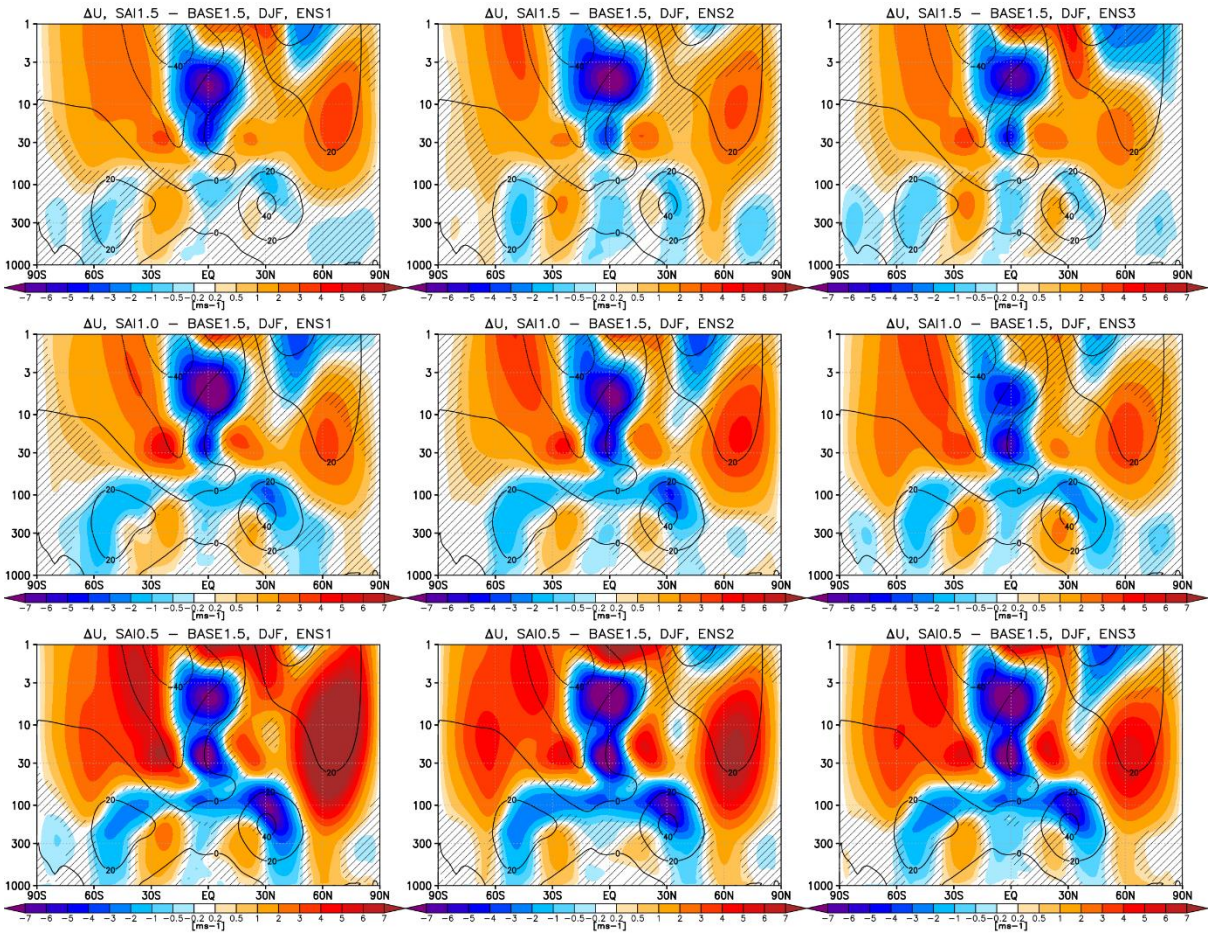

Figure S5. Shading: DJF mean changes in zonal wind simulated in each of the induvial ensemble member (ENS1-ENS3, columns) of the SAI1.5 (top), SAI1.0 (middle) and SAI0.5 (bottom) simulations compared to the ensemble mean of BASE1.5. Contours show the BASE1.5 climatology for reference. Hatching denotes the regions where the response is not statistically significant (±2 standard errors)

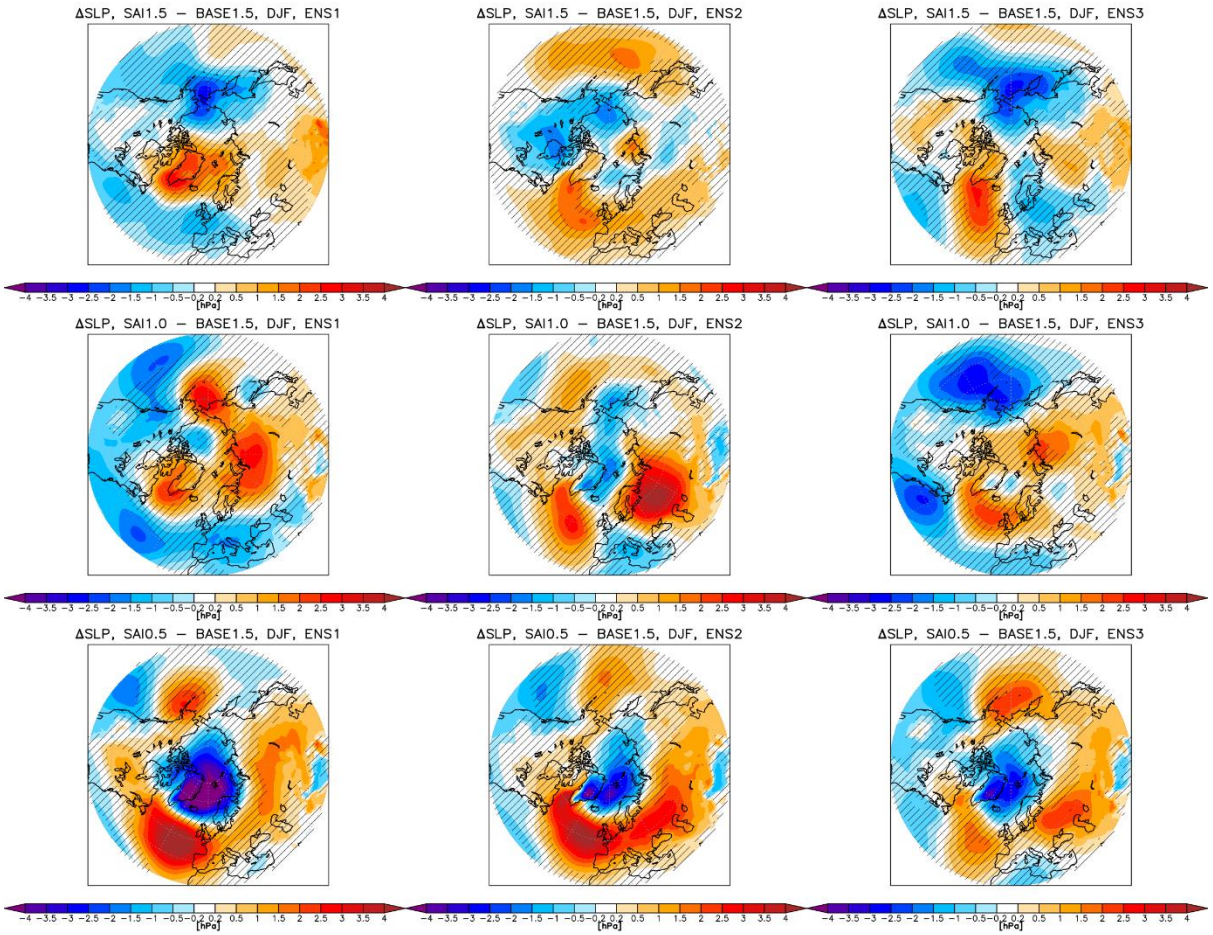

Figure S6. Shading and hatching as in Fig. S5 but for the sea-level pressure response.

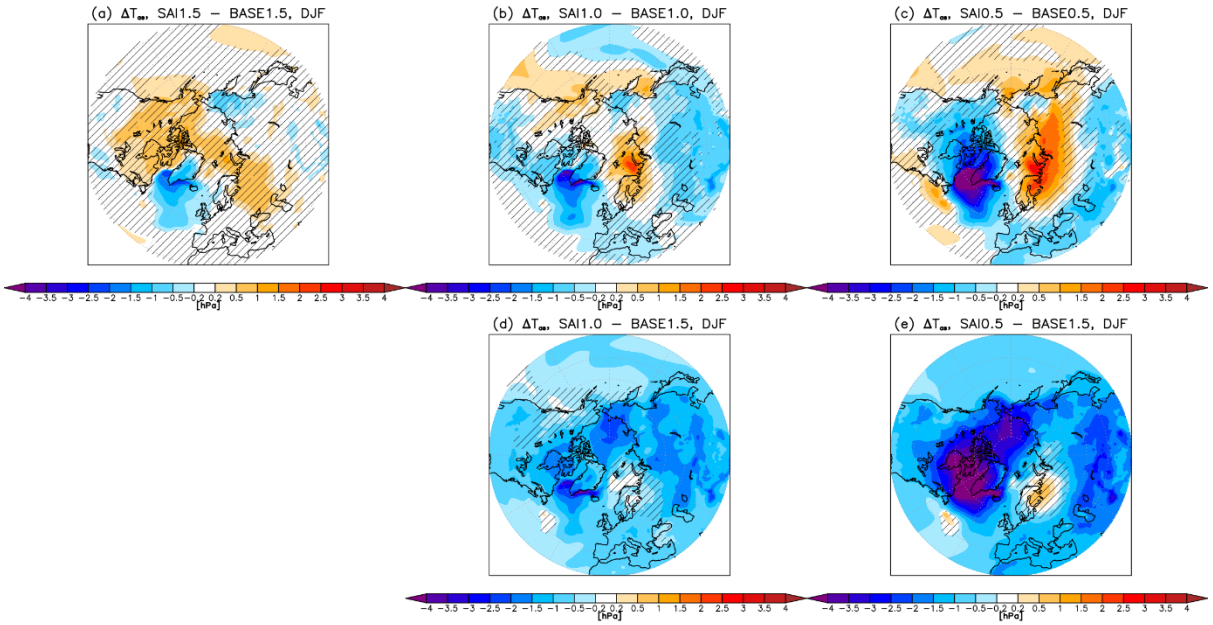

Figure S7. DJF changes in near-surface air temperatures northward of 30°N for each of the SAI scenario (columns) compared to (a-c) each respective baseline period and compared to (a, d-e) the same quasi-present day BASE1.5 baseline period. Hatching as in Fig. 2.

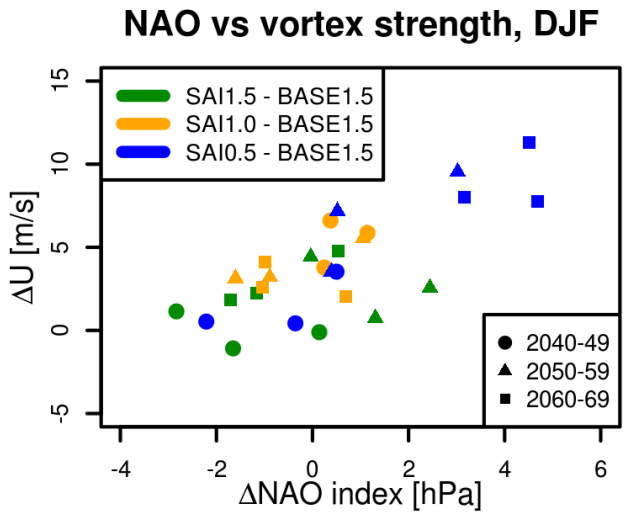

Figure S8. Correlation between the DJF changes in the strength of the NH stratospheric polar vortex (60°N, 30 hPa) and the NAO sea-level pressure index for each of the SAI scenarios and ensemble members, averaged over 10-year-long intervals, compared to BASE1.5.

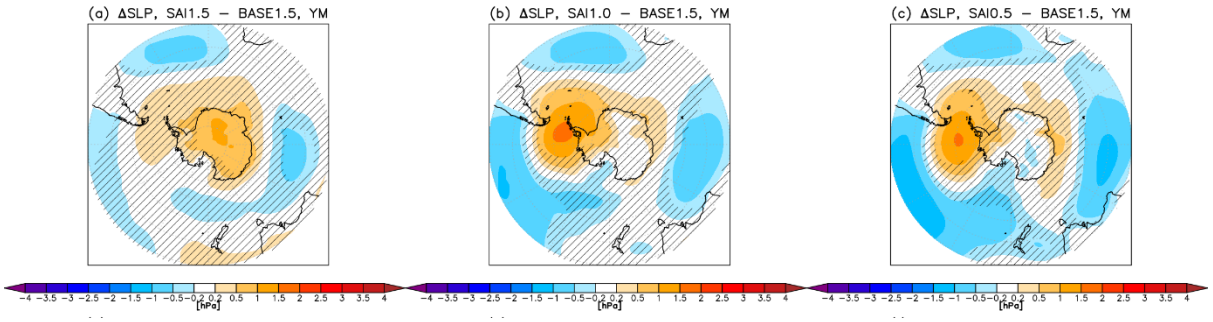

Figure S9. Yearly mean changes in sea-level pressure southward of 30°S for each of the SAI scenario (columns) compared to BASE1.5. hatching as in Fig. 2.