

**Supplementary Material to:**

**Impact of the latitude of stratospheric aerosol injection on the Southern Annular Mode**

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**Contents:**

Figures S1-S6.

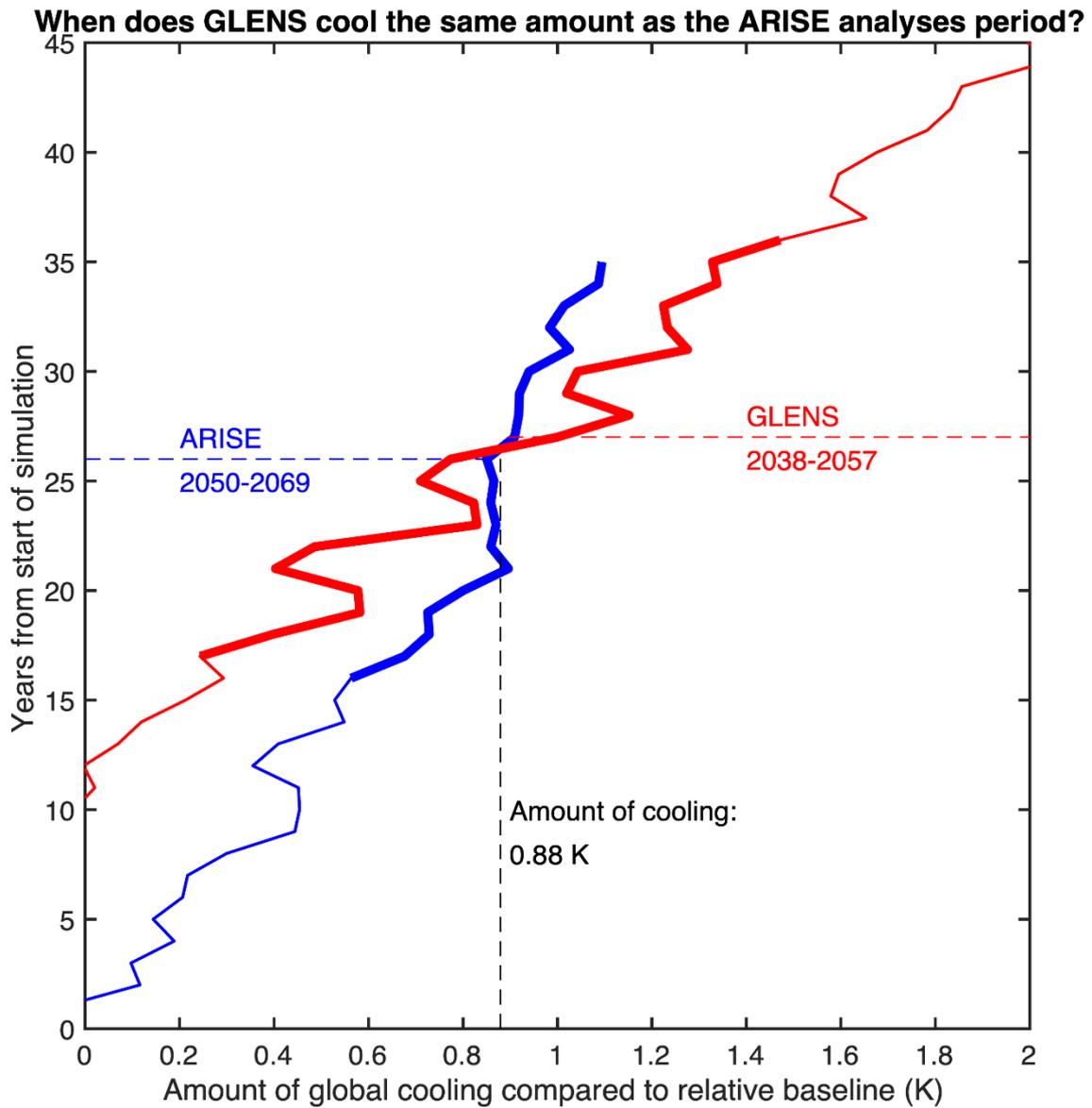


Figure S1. Change in global mean surface temperature simulated in GLENS (red) and ARISE-SAI (blue) compared to the respective baseline periods (2010-2030 and 2020-2039, respectively).

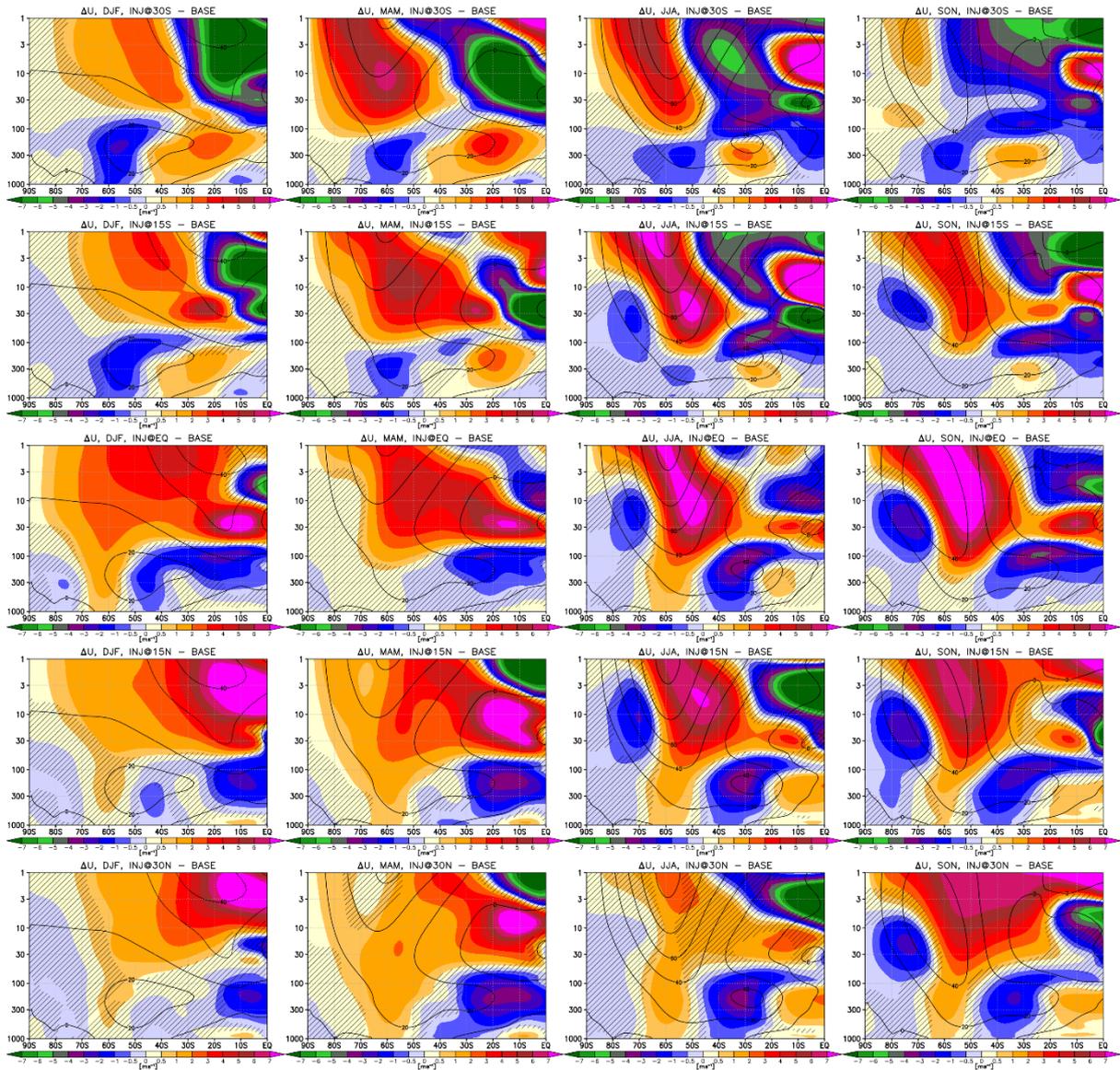


Figure S2. Seasonal mean (DJF, MAM, JJA and SON; columns) differences in SH zonal wind (m/s) between each of the single-point SAI simulations (rows) and the baseline. Contours indicate the corresponding values in the baseline for reference. Hatching indicates regions where the response is not statistically significant ( $\pm 2$  standard errors.)

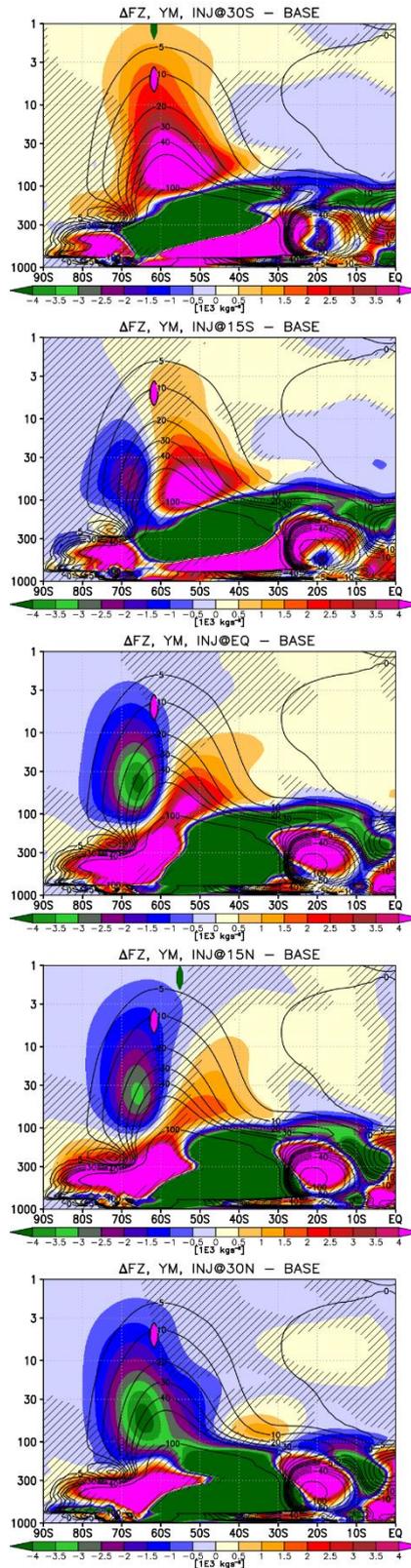


Figure S3. Shading: Difference in yearly mean vertical (upward) component of the EP flux ( $10^{-3} \text{ kgs}^{-2}$ ) between each of the single-point SAI simulations and the baseline. Contours indicate the corresponding values in the baseline for reference. Hatching indicates regions where the response is not statistically significant ( $\pm 2$  standard errors.)

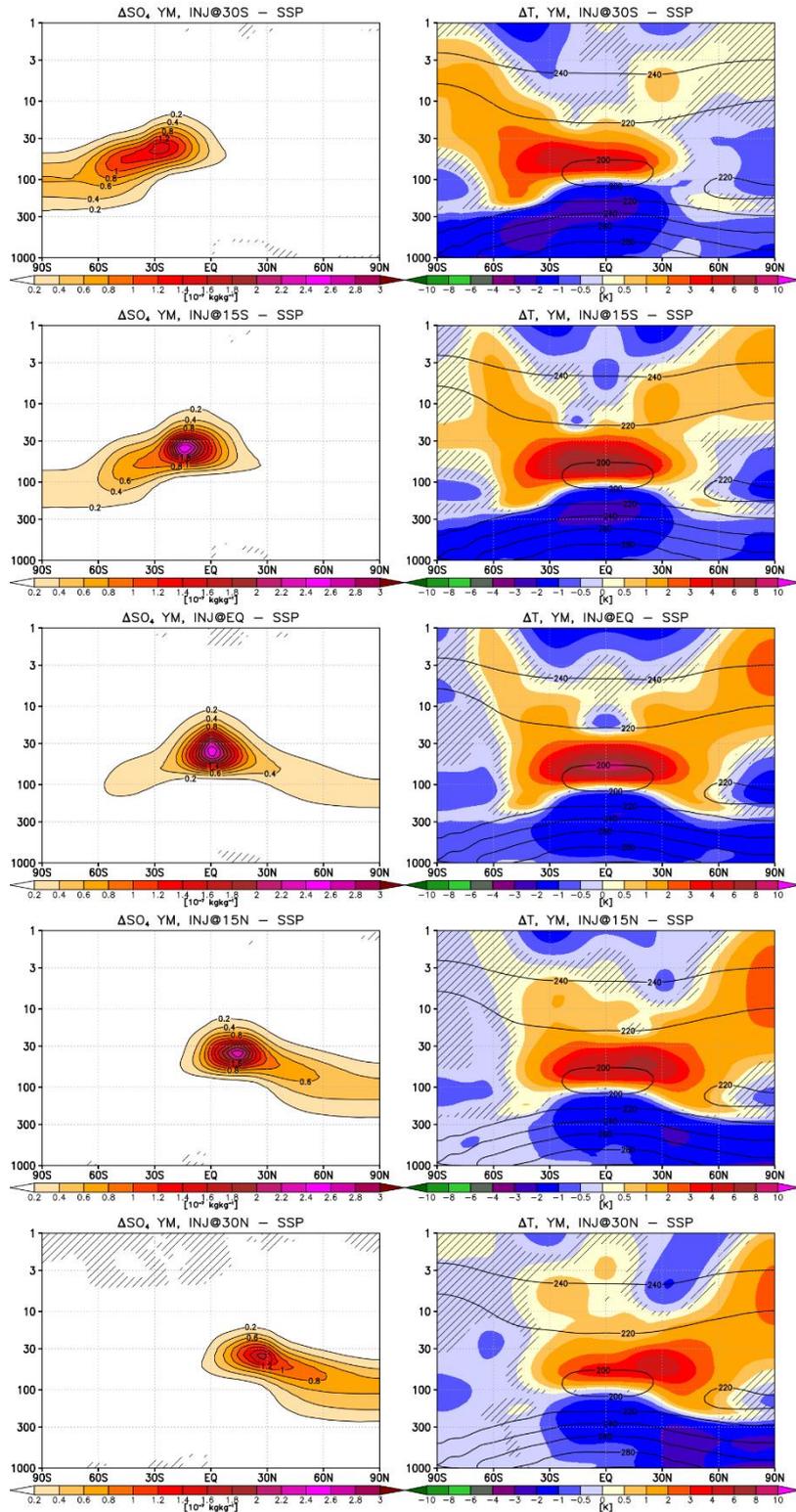


Figure S4. As in Figure 1 but compared against the same period of the SSP2-4.5 simulations.

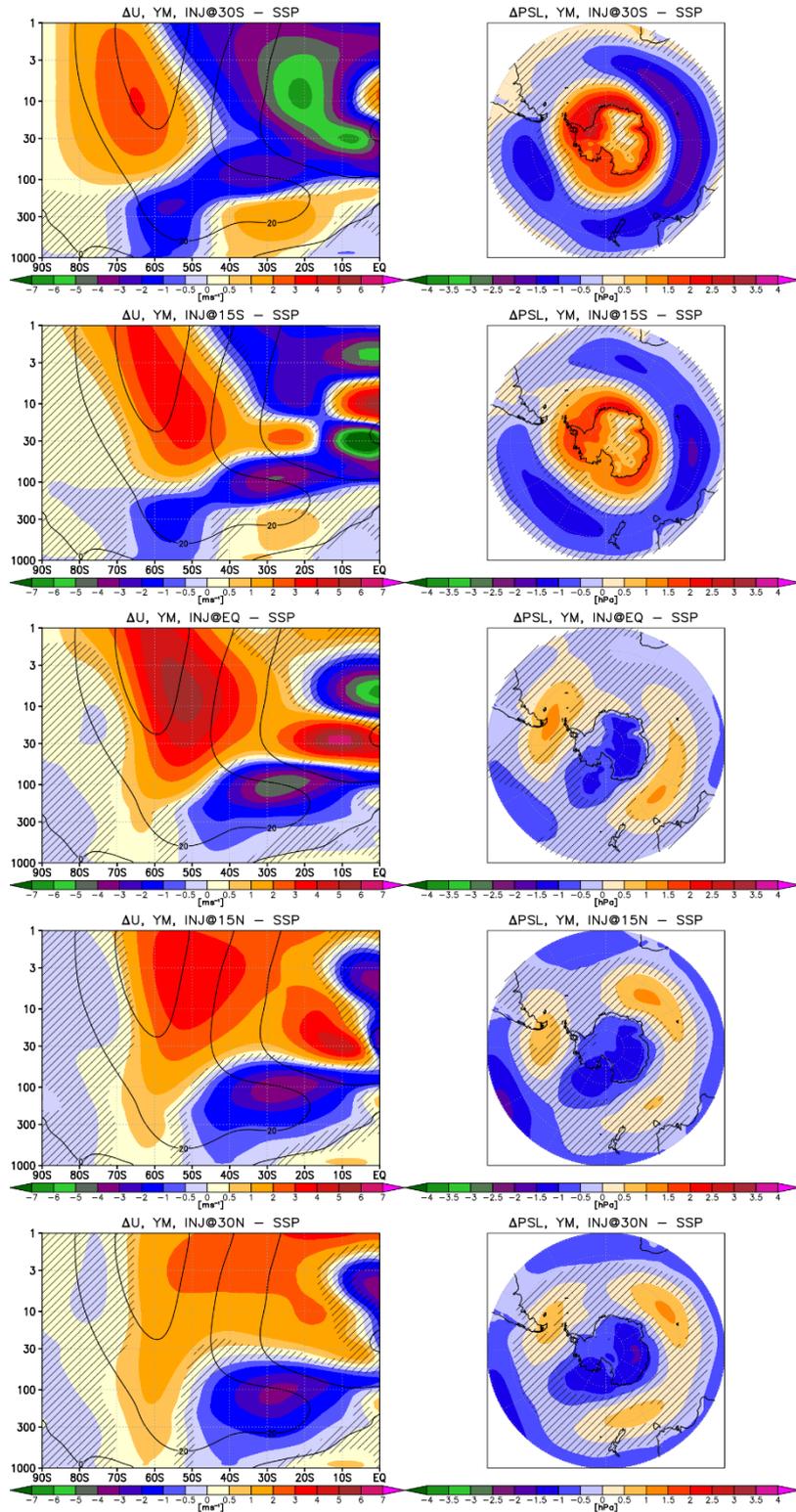


Figure S5. As in Figure 2 but compared against the same period of the SSP2-4.5 simulations.

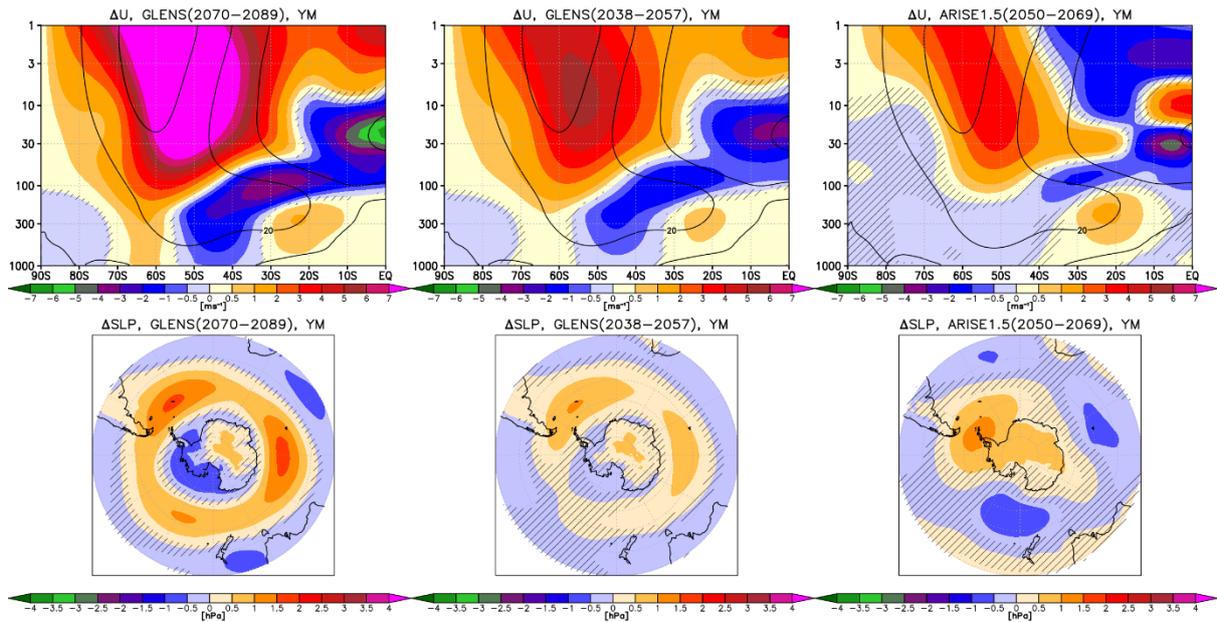


Figure S6. As in Figure 4 (row 2 and 3) but for yearly mean zonal wind and sea-level responses.