Supplementary information to: The overlooked role of the stratosphere under a solar constant reduction

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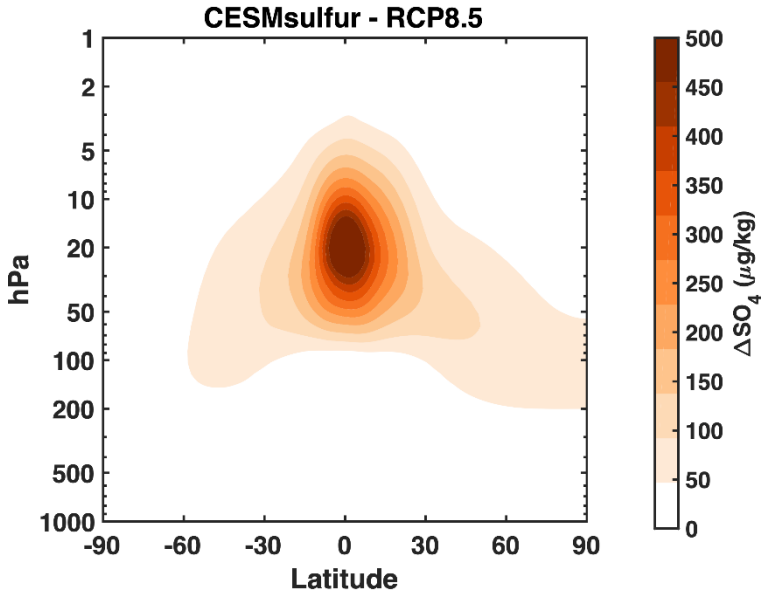

Figure S1. 2070-2089 yearly mean differences in sulfate aerosol mass mixing ratios (µg-SO_4/kg-air) between CESMsulfur and RCP8.5 experiments.

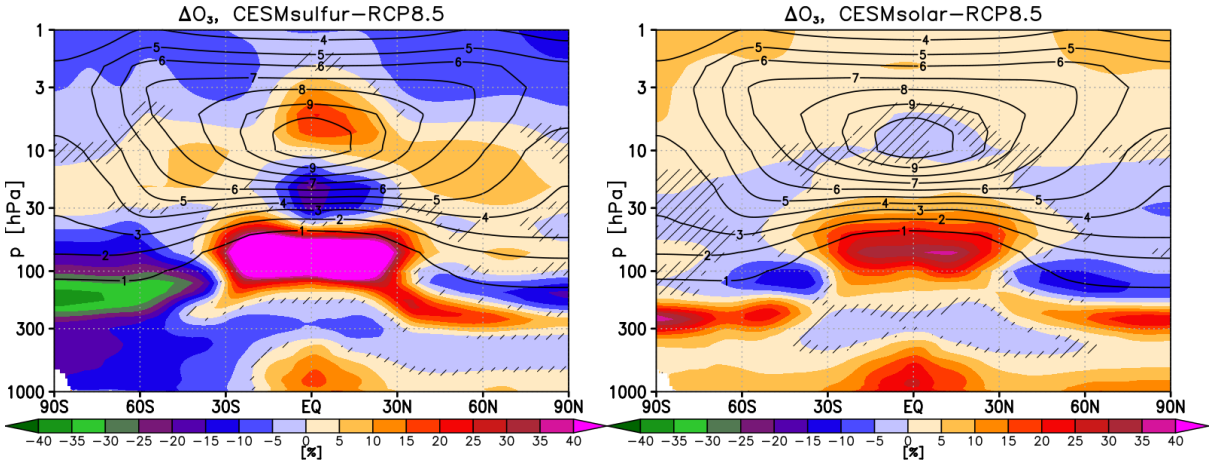

Figure S2. Shading: 2070-2089 yearly mean differences in ozone volume mixing ratios (%) between CESMsulfur and RCP8.5 experiments (left) and between CESMsolar and RCP8.5 (right). Hatching indicates regions where the difference is not statistically significant (±2 standard errors). Contours show the RCP8.5 ozone climatology (ppm) for reference.

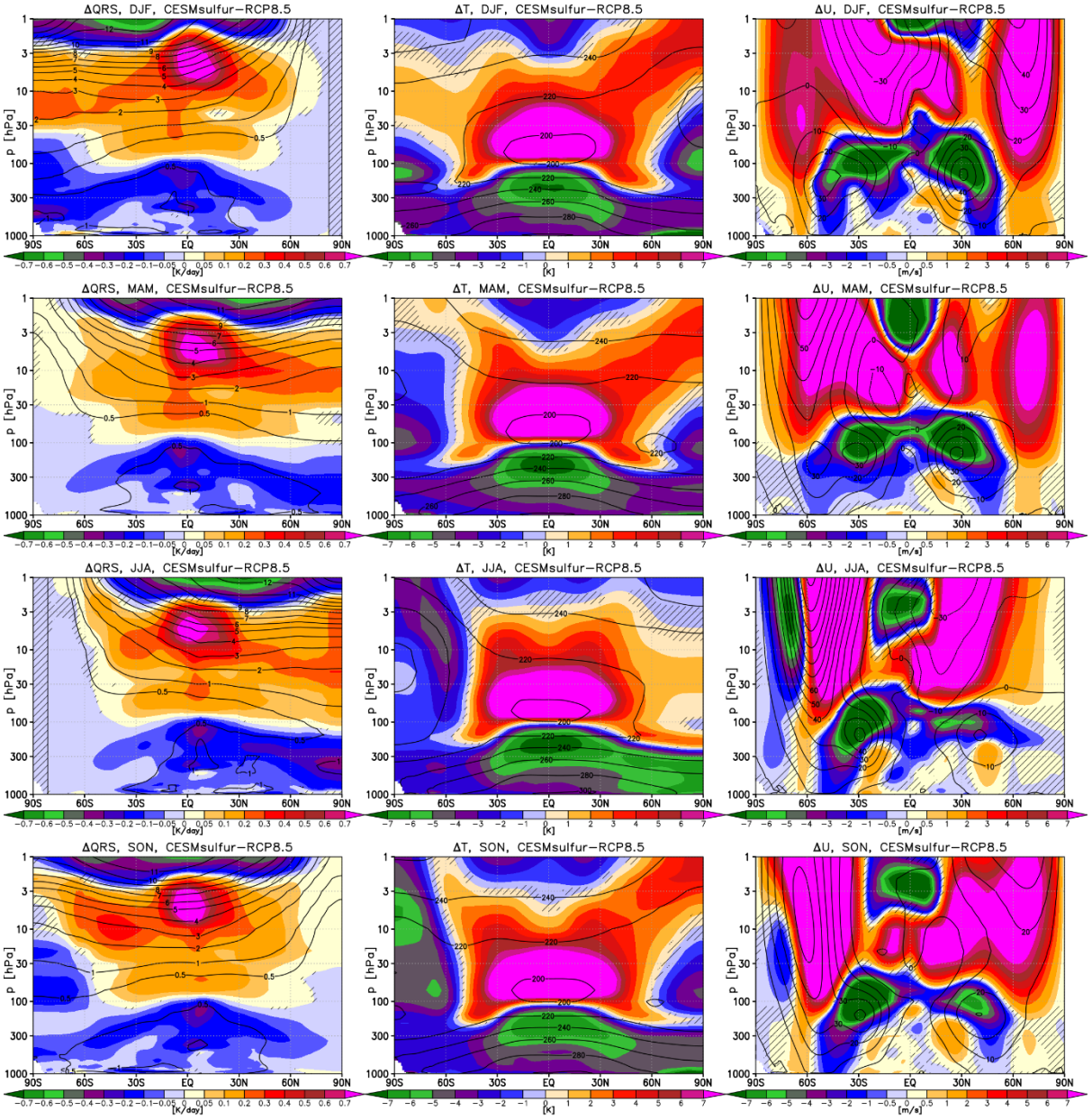

Figure S3. Shading: seasonal mean differences in shortwave heating rates (Kday^{-1}; left), temperature (K; middle), and zonal wind (ms^{-1}; right), averaged over 2070-2089, between CESMsulfur and RCP8.5 experiments. Hatching indicates regions where the difference is not statistically significant (±2 standard errors). Contours show the RCP8.5 climatology for reference.

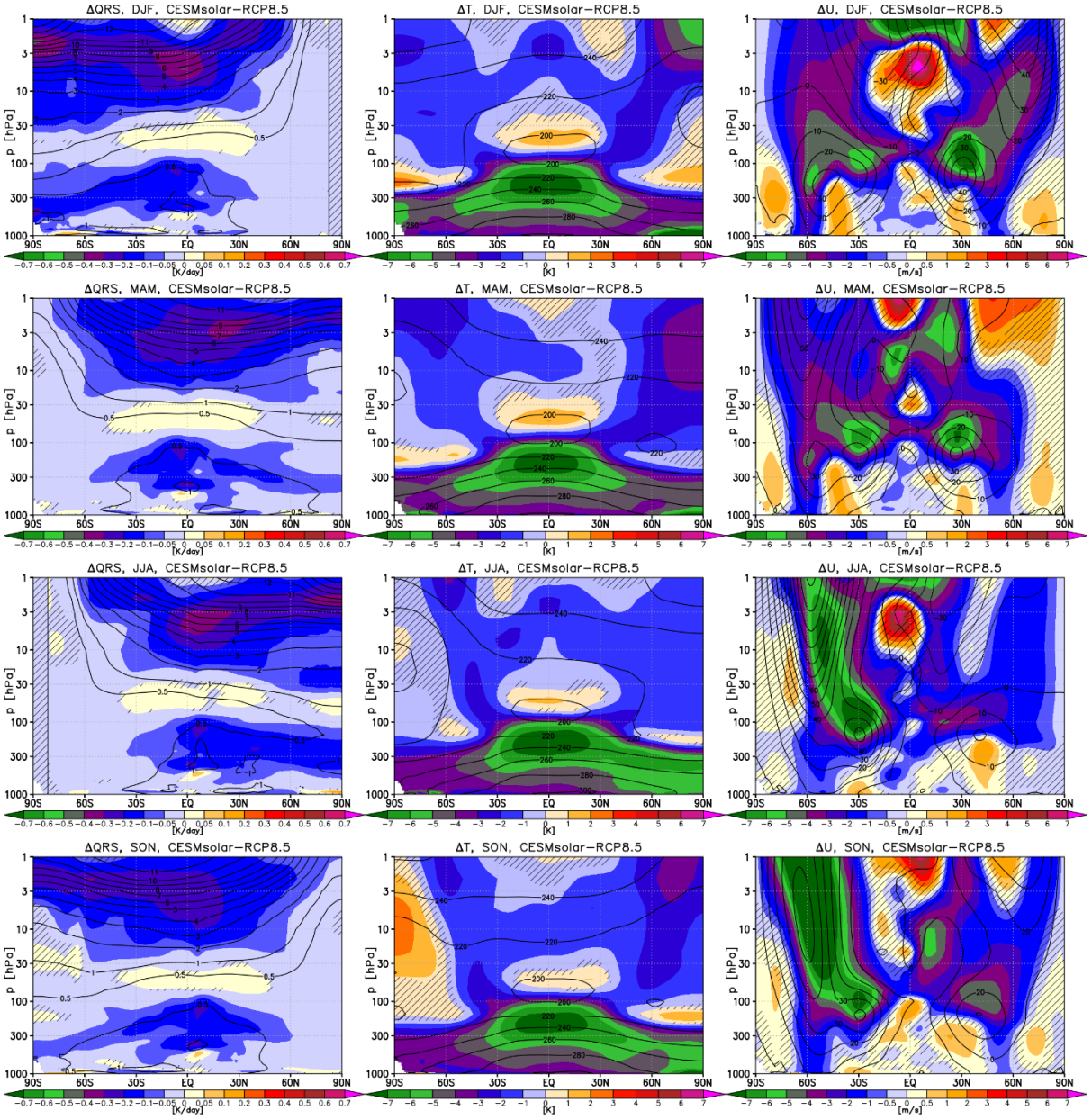

Figure S4. As in Fig. S2 but for the differences between CESMsolar and RCP8.5 experiments.

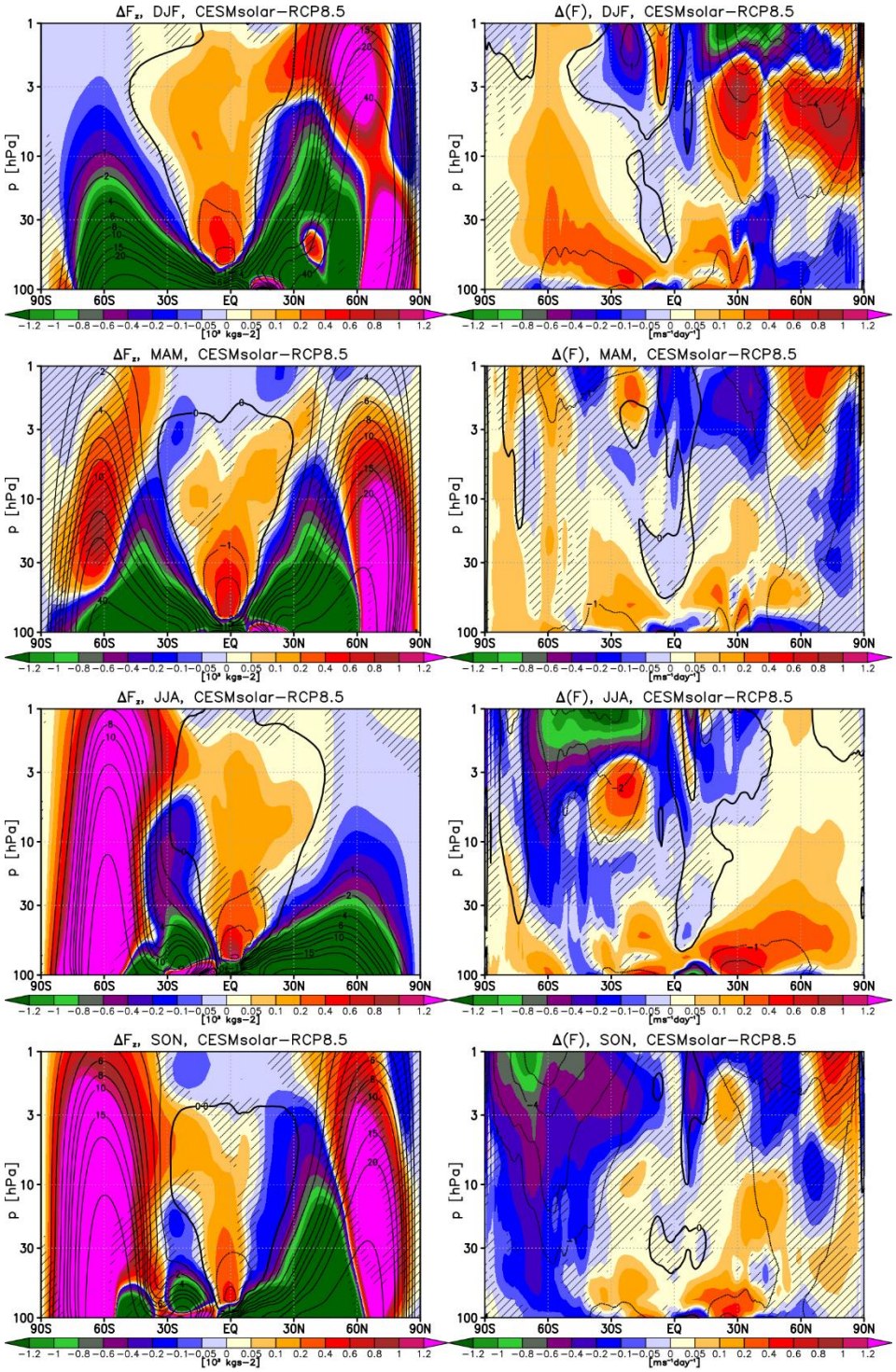

Figure S5. Shading: seasonal mean differences in vertical component of EP flux ($1x10^{10}$ kg s^{-2}; left), and EP flux divergence ($ms^{-1}day^{-1}$; right), averaged over 2070-2089, between CESMsolar and RCP8.5 experiments. Hatching indicates regions where the difference is not statistically significant (±2 standard errors). Contours show the RCP8.5 climatology for reference.

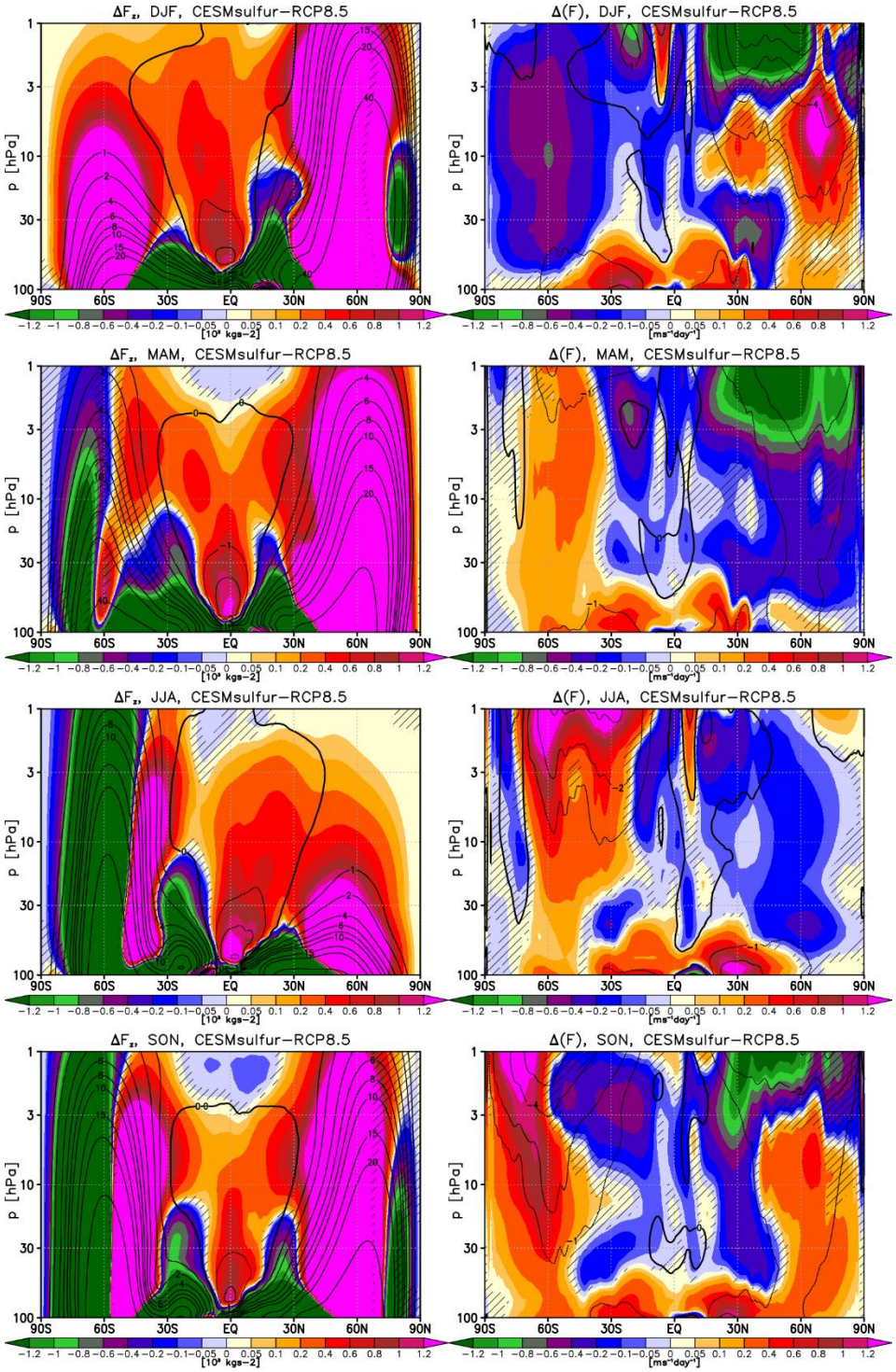

Figure S6. As in Fig. S4 but for the differences between CESMsulfur and RCP8.5 experiments.

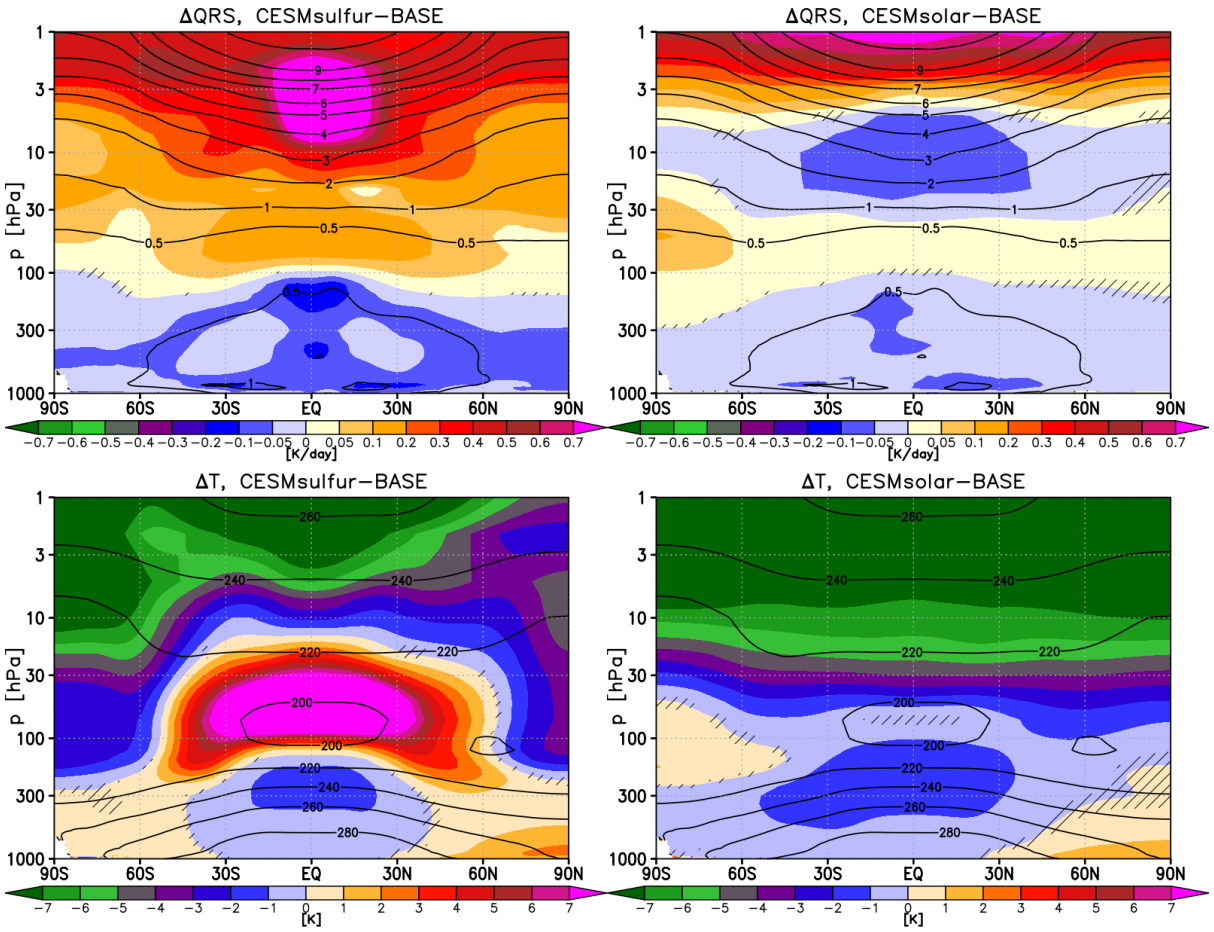

Figure S7. As in Fig. 1 in the main manuscript but for the differences against the present-day baseline conditions (i.e. 2011-2030 mean of RCP8.5).

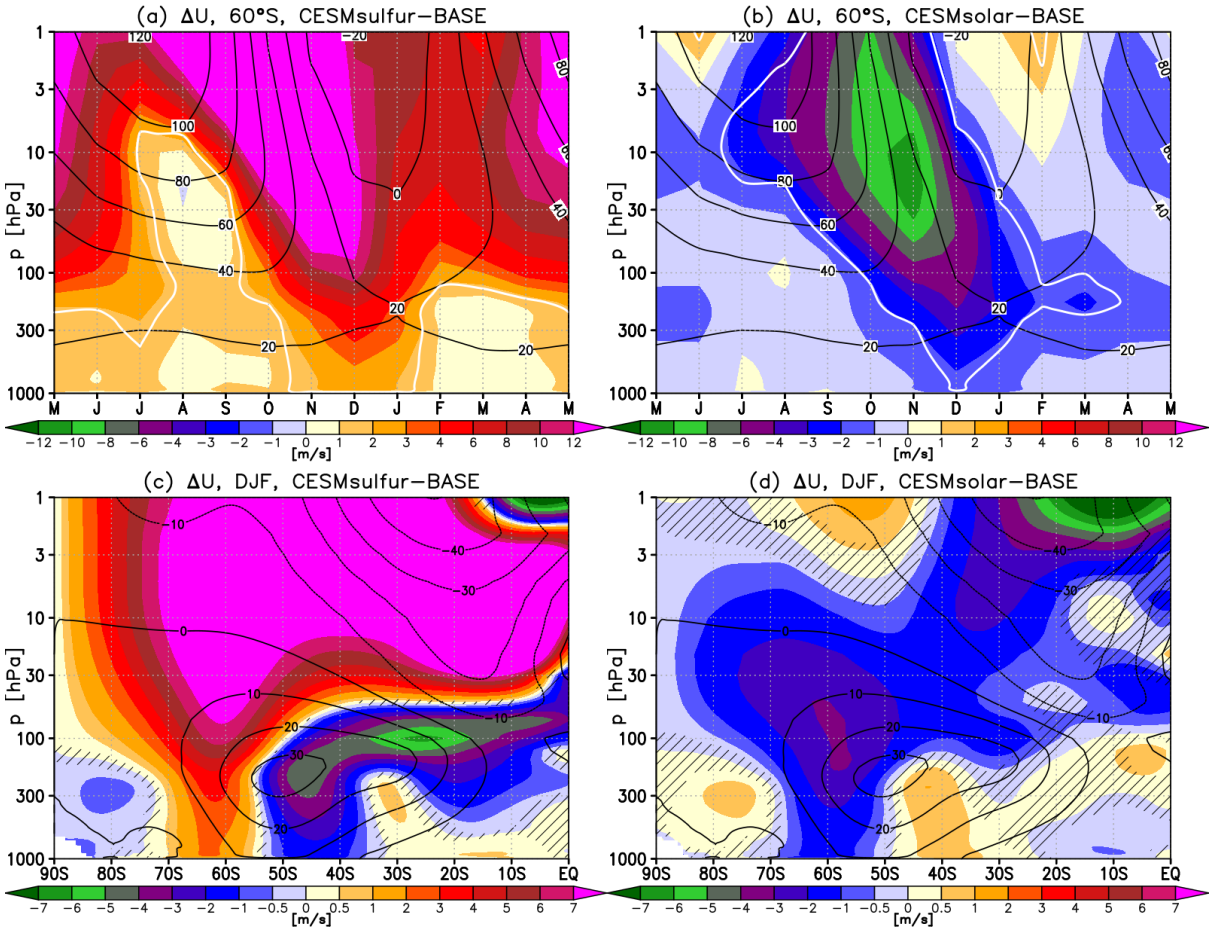

Figure S8. As in Fig. 2 in the main manuscript but for the differences against the present-day baseline conditions (i.e. 2011-2030 mean of RCP8.5).

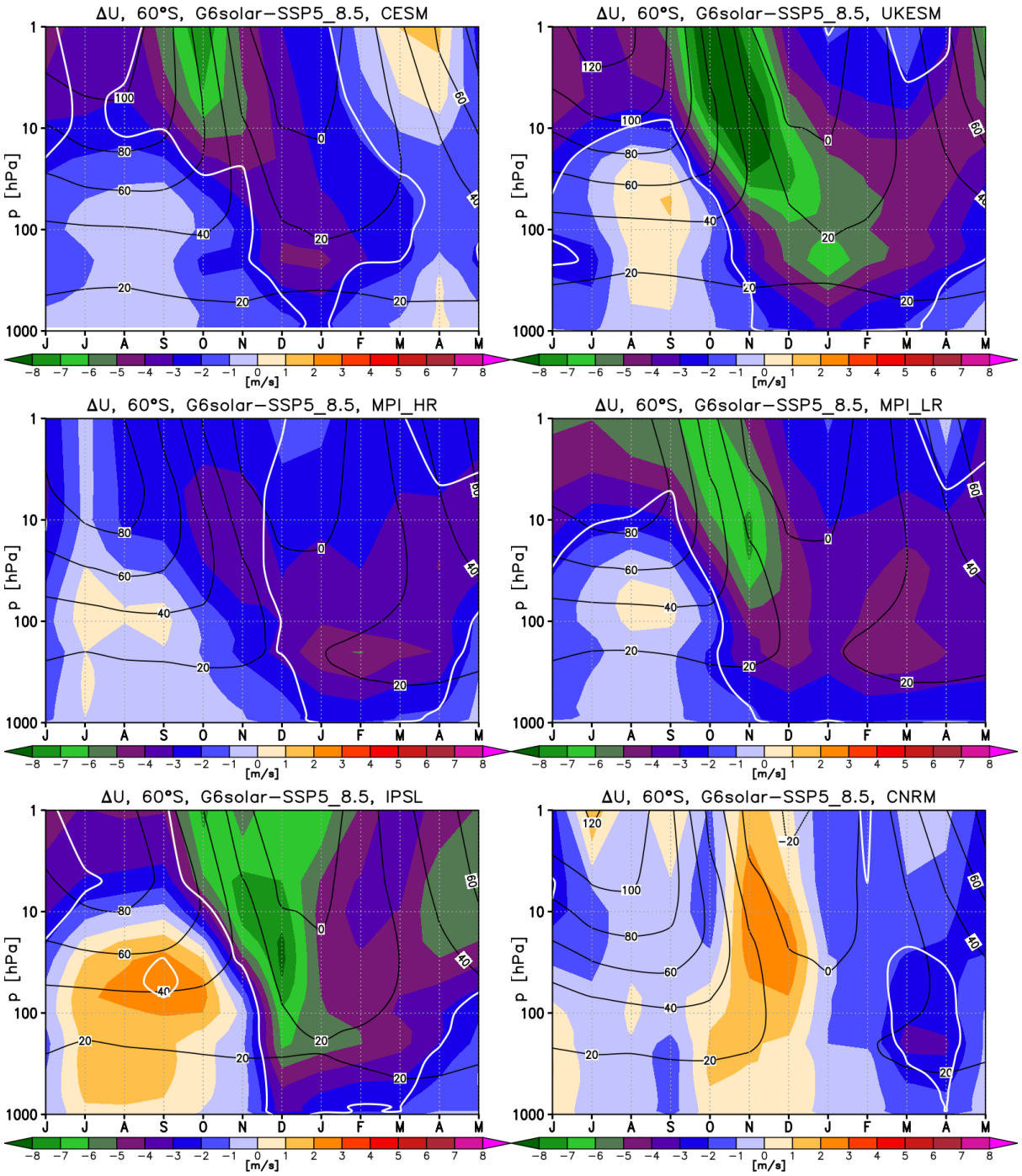

Fig. S9. Shading: Monthly mean differences in zonal wind (ms^{-1}), averaged over 2080-2099, between G6solar and SSP5-85 for each of the participating models. Thick white line indicates marks the regions where the response is statistically significant (±2 standard errors). Contours show the SSP5-8.5 climatology for reference.

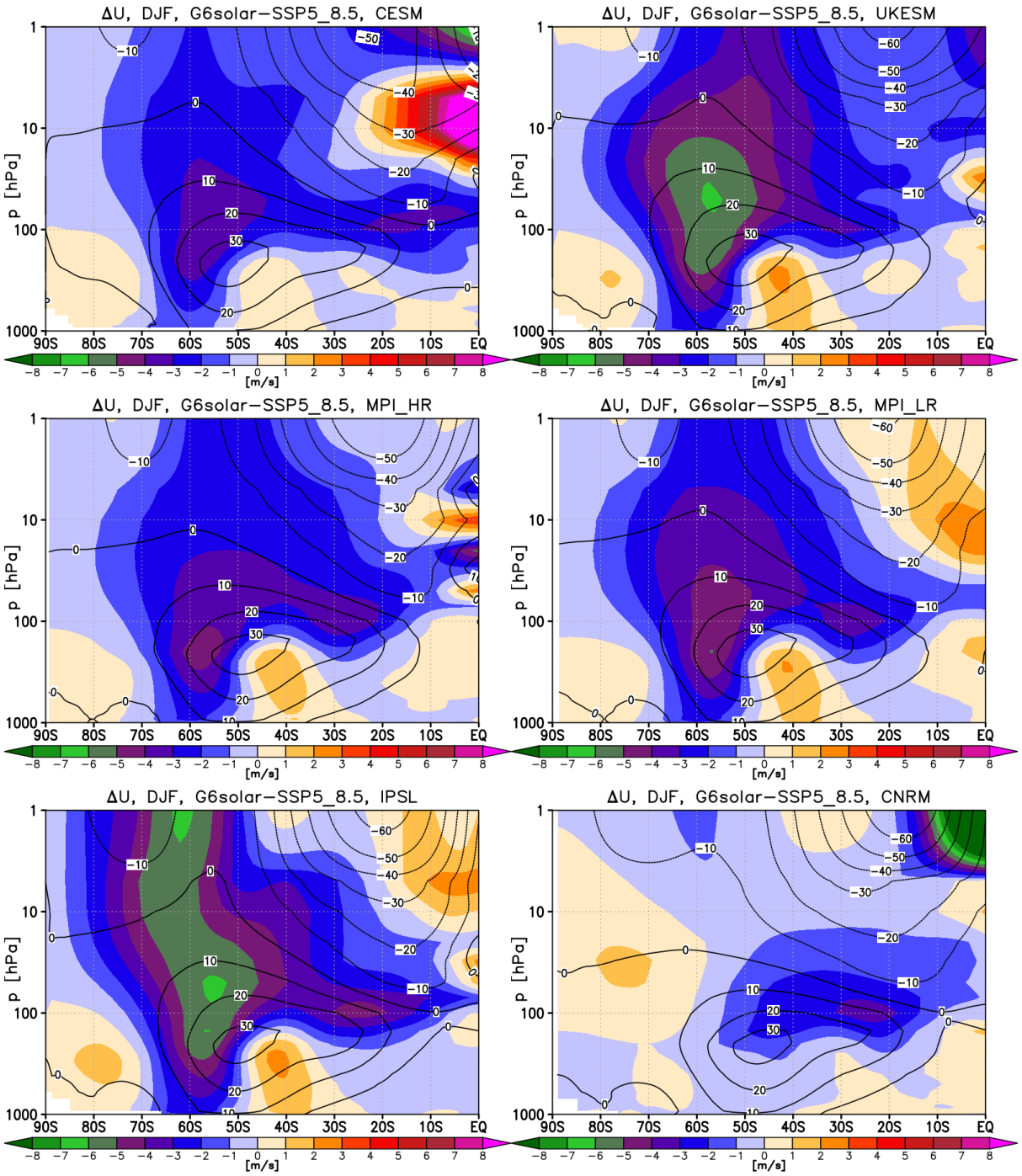

Figure S10. Shading: DJF mean differences in zonal wind (ms^{-1}), averaged over 2080-2099, between the G6solar and SSP5-85 experiments for each of the participating models. Contours show the SSP5-85 climatology for reference.

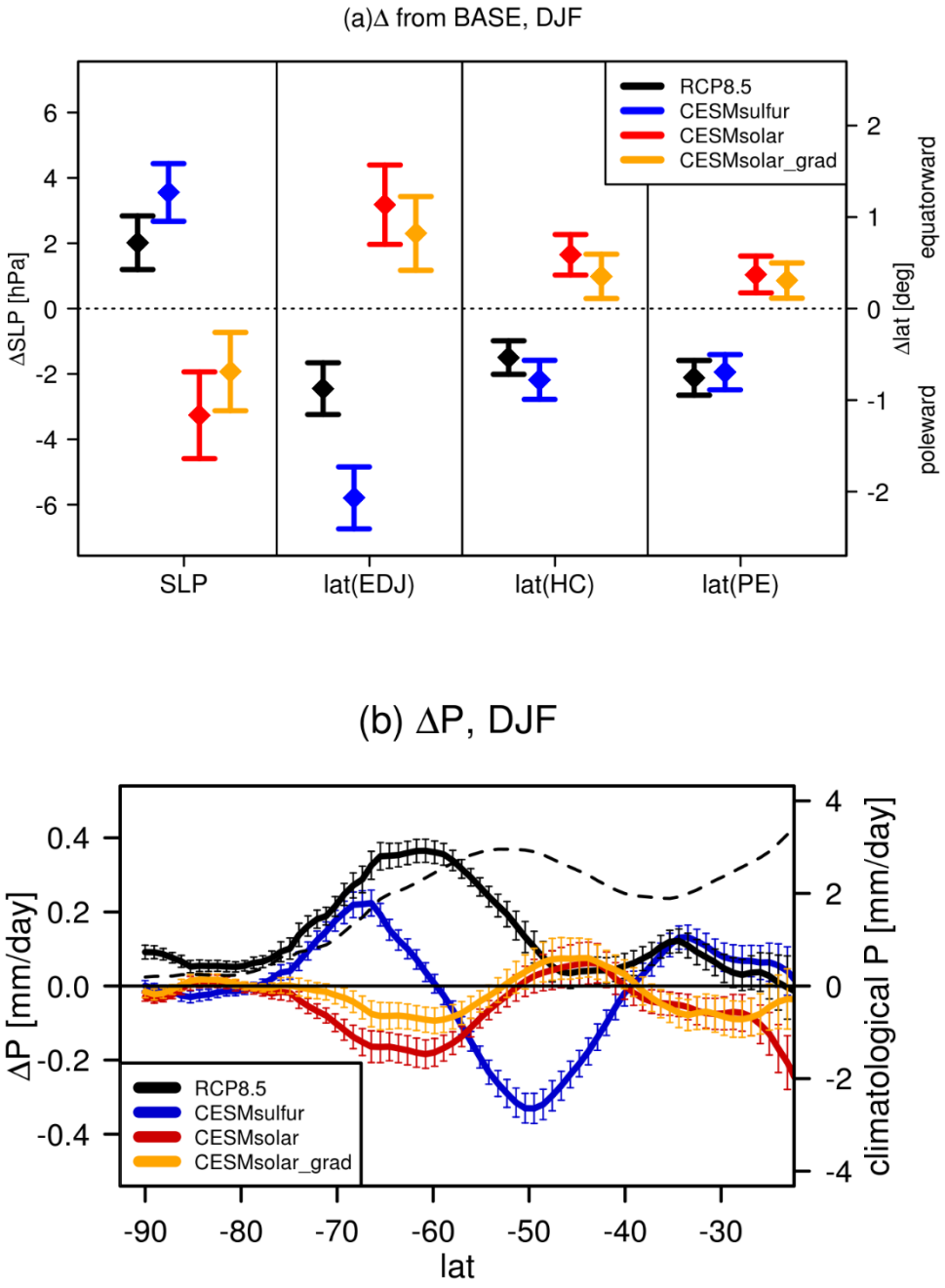

Figure S11. As in Fig. 3 but for the difference against present-day conditions (i.e. 2011-2030 mean of the RCP8.5 run). Dotted line, with the scale on the right-hand side illustrates the climatological precipitation in BASE.

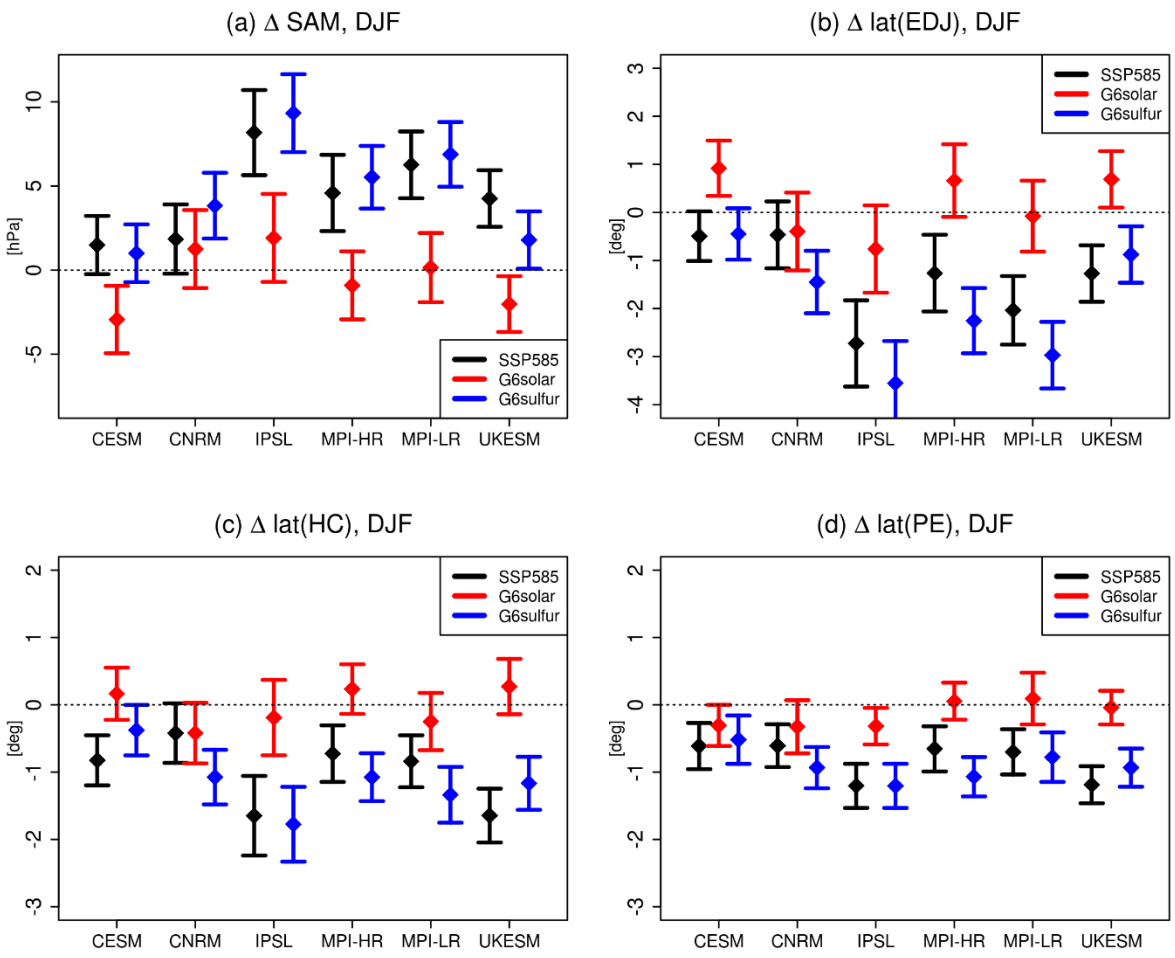

Figure S12. As in Fig. 4 but for the change in the 2080-2099 mean of each of the G6sulfur, G6solar, and SSP5-85 experiments and BASE (2020-2039 mean of SSP2-45).