



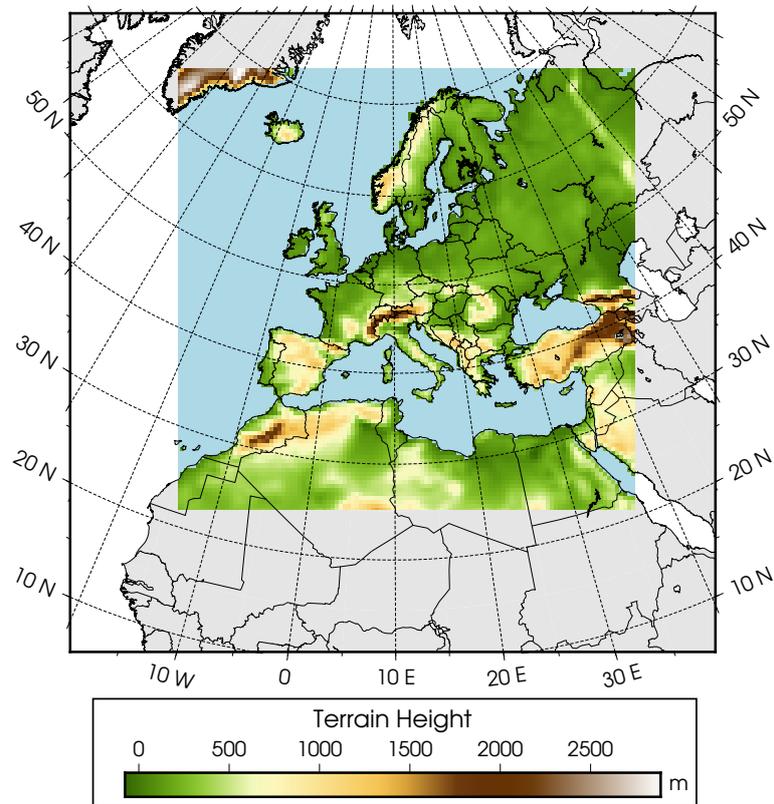
Supplement of

Sensitivity of surface solar radiation to aerosol–radiation and aerosol–cloud interactions over Europe in WRFv3.6.1 climatic runs with fully interactive aerosols

Sonia Jerez et al.

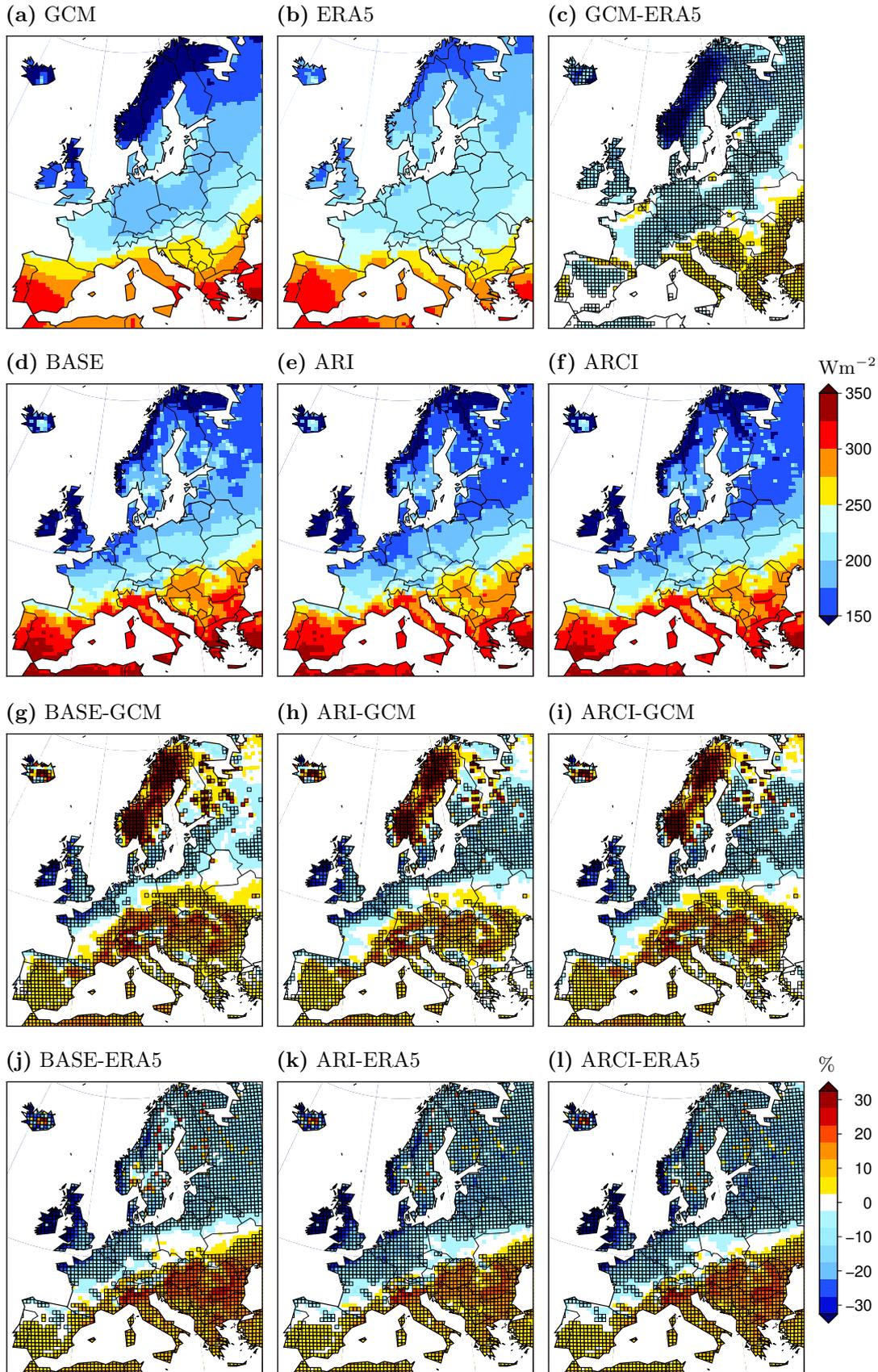
Correspondence to: Sonia Jerez (sonia.jerez@gmail.com)

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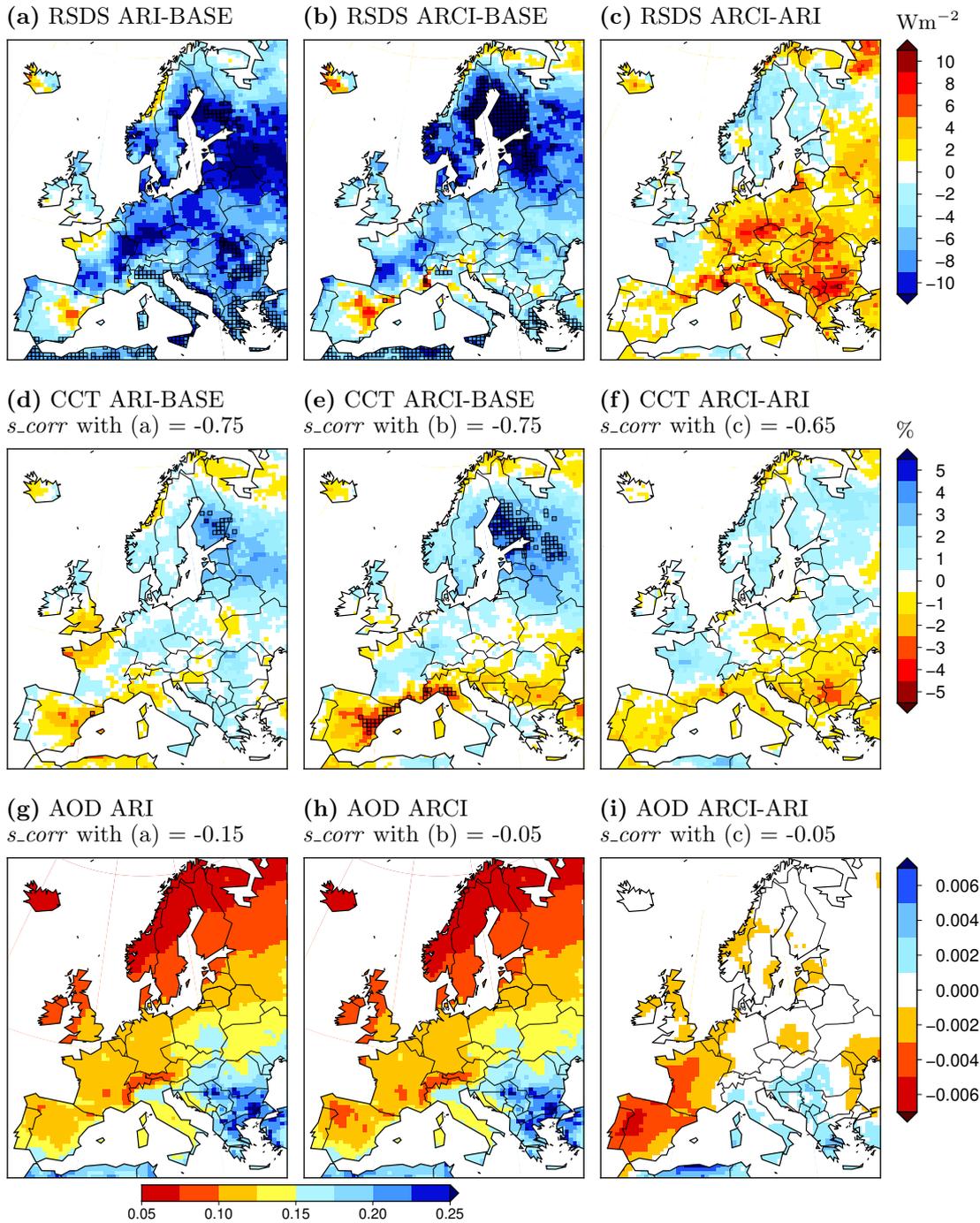
Supplementary Figure S1. Spatial domains used for the WRF simulations. The outer domain (gray shaded) has a horizontal resolution of 1.32° in latitude and longitude; the inner target domain (colored) of 0.44° (Euro-Cordex compliant). The nesting was one-way (outer-to-inner domain).

RSDS JJA climatologies for 1991-2010



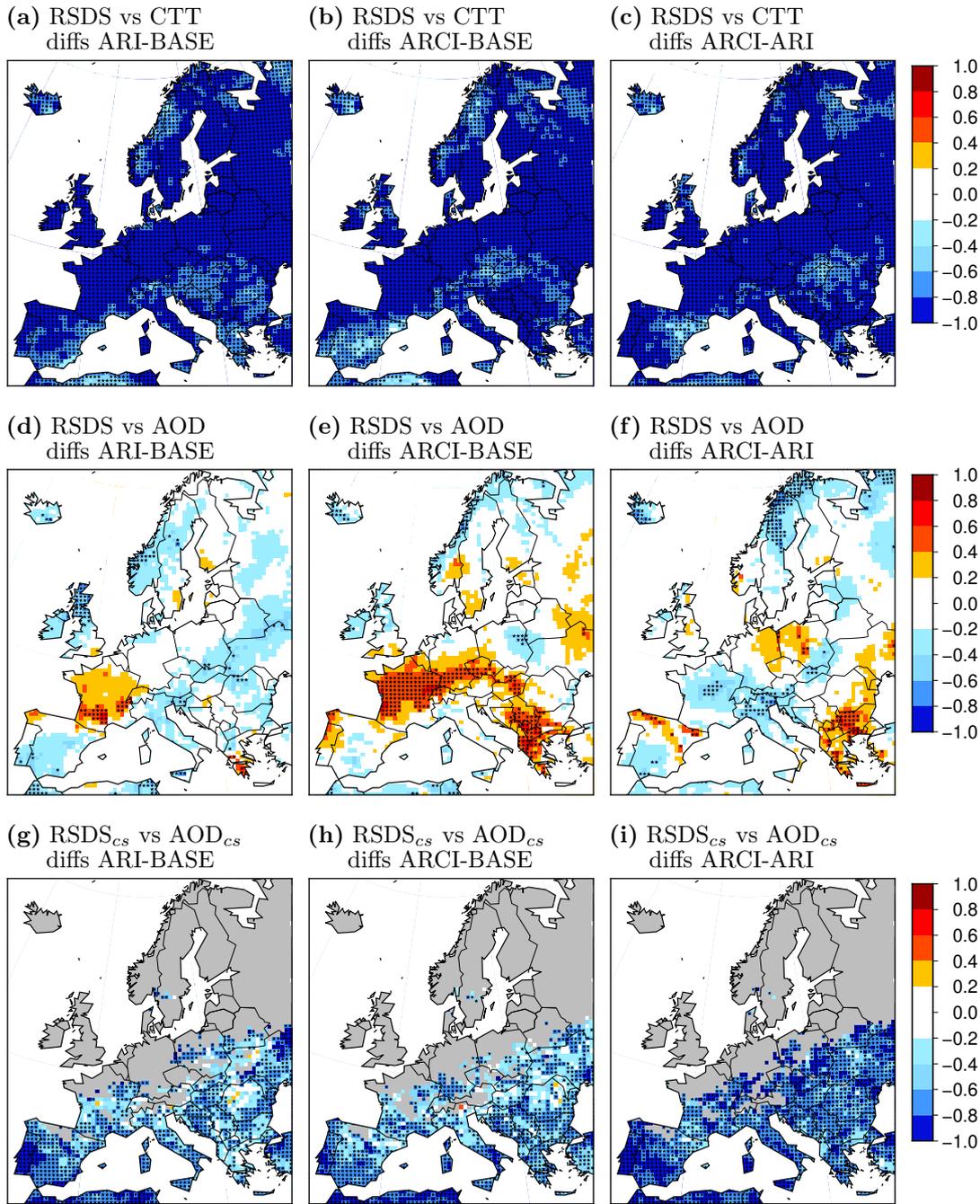
Supplementary Figure S2. RSDS summer climatologies in the historical period from the GCM (a), ERA5 (b) and the WRF simulations (d to f); units: Wm^{-2} , same colorbar in all cases (the upper one). Panel c depicts relative differences between the GCM and ERA5, panels g to i between each WRF simulation and the GCM, and panels j to l between each WRF simulation and ERA5, squared if statistically significant ($p < 0.05$); units: %, same colorbar in all cases (the bottom one).

**RSDS, CCT & AOD JJA climatologies for 1991-2010:
differences between experiments**



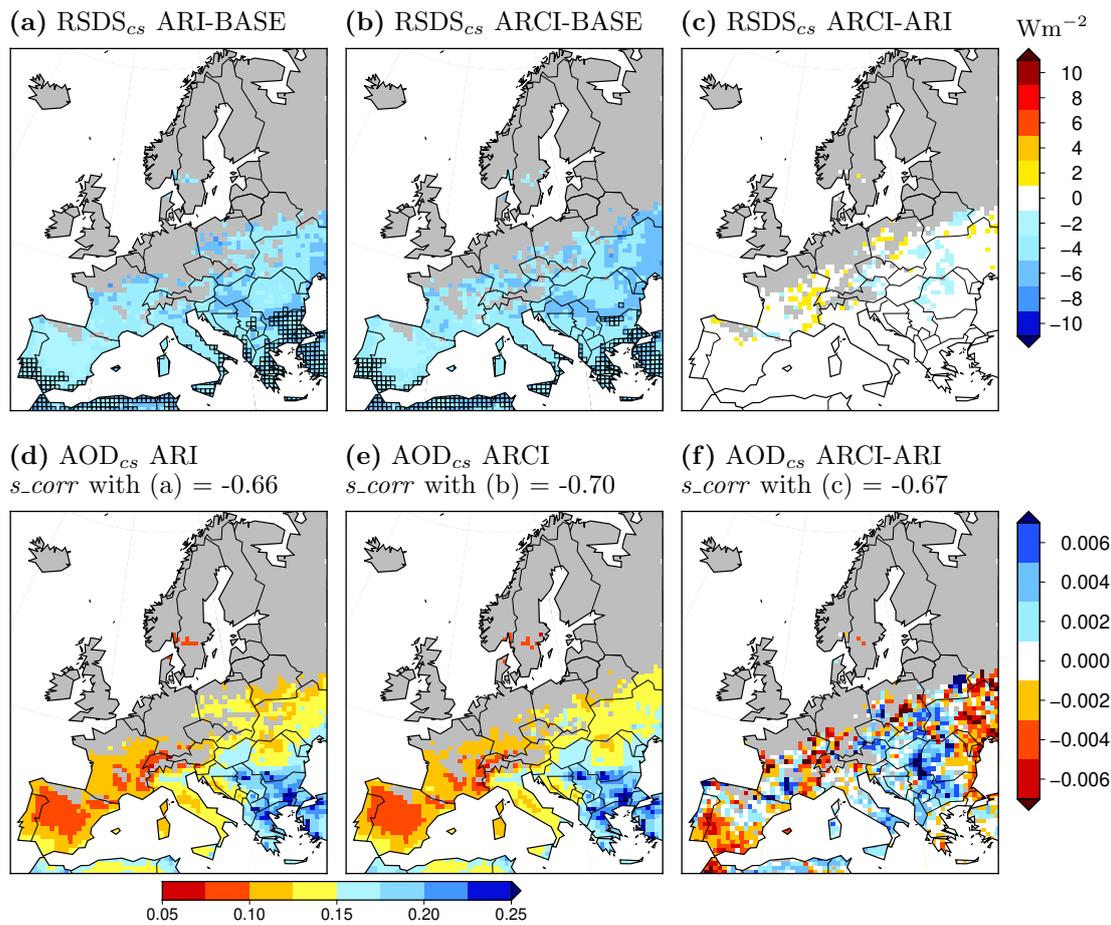
Supplementary Figure S3. As Figure 1 of the main manuscript but with plain differences depicted (non-relative values). Units: RSDS in Wm^{-2} , CCT in % of the grid cell area, AOD dimensionless.

**Temporal correlations between RSDS, CCT & AOD differences
JJA-mean series in 1991-2010**



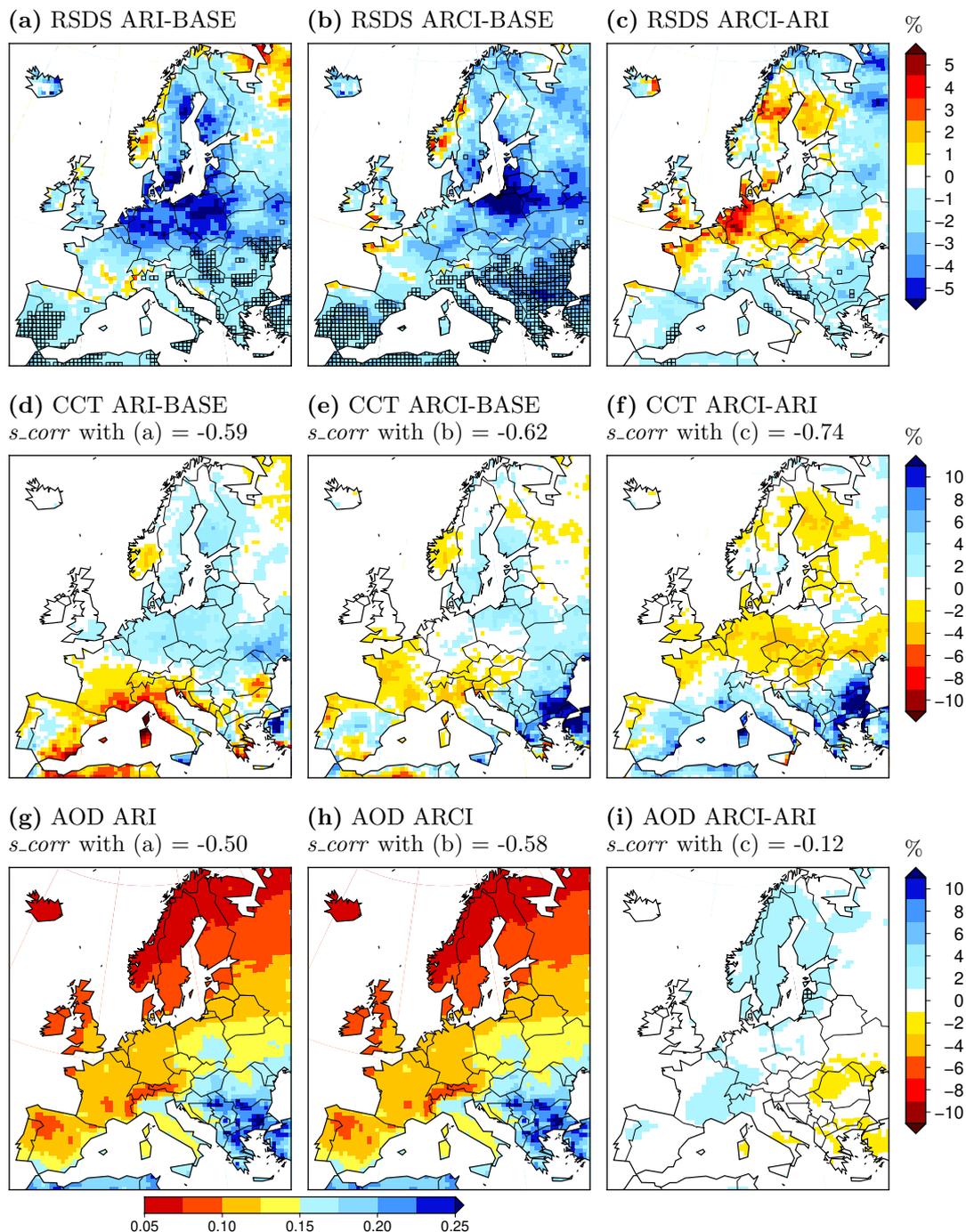
Supplementary Figure S4. Temporal correlations between JJA-mean temporal series of differences in RSDS and CCT (a to c), RSDS and AOD (d to f), and RSDS_{cs} and AOD_{cs} (g to i; gray-shaded areas where the number of time steps in the clear-sky series is below 75% of total time steps) between ARI and BASE (first column), ARCI and BASE (second column), and ARCI and ARI experiments (third column) in the historical period (1991-2010). Little stars indicate statistical significance ($p < 0.05$).

**RSDS_{CS} & AOD_{CS} JJA climatologies for 1991-2010:
differences between experiments**



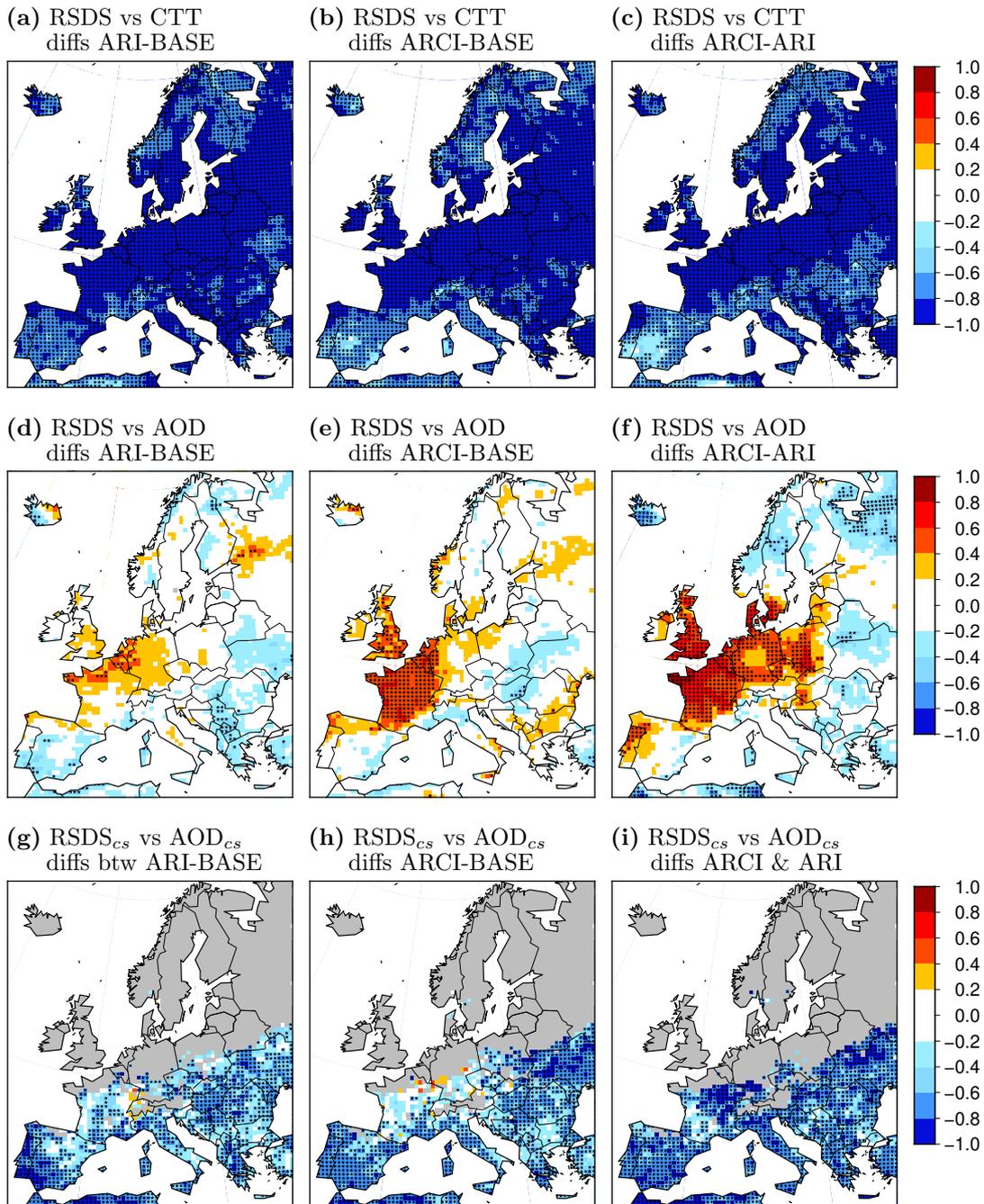
Supplementary Figure S5. As Figure 6 of the main manuscript but with plain differences depicted (non-relative values). Units: RSDS_{CS} in Wm⁻², AOD_{CS} dimensionless.

**RSDS, CCT & AOD JJA climatologies for 2031-2050:
differences between experiments**



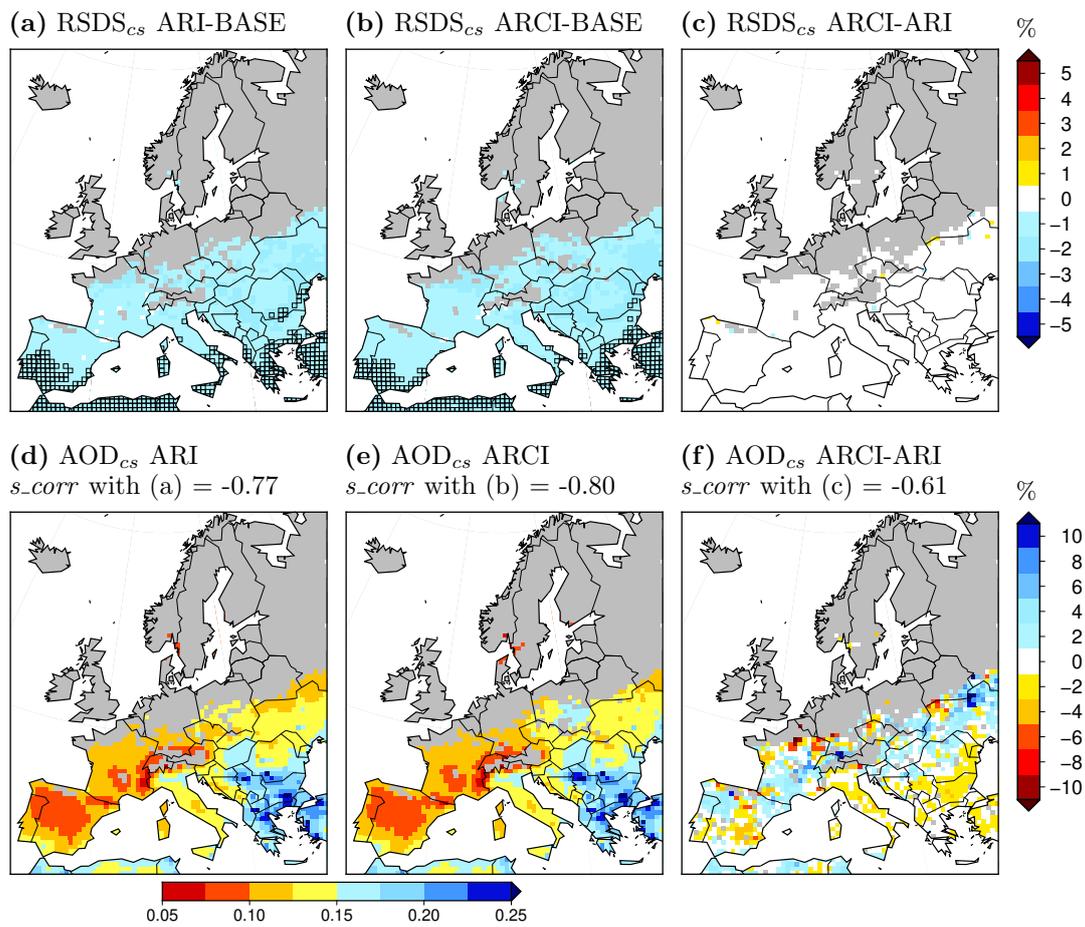
Supplementary Figure S6. As Figure 1 of the main manuscript but for the future period (2031-2050).

Temporal correlations between RSDS, CCT & AOD differences
JJA-mean series in 2031-2050



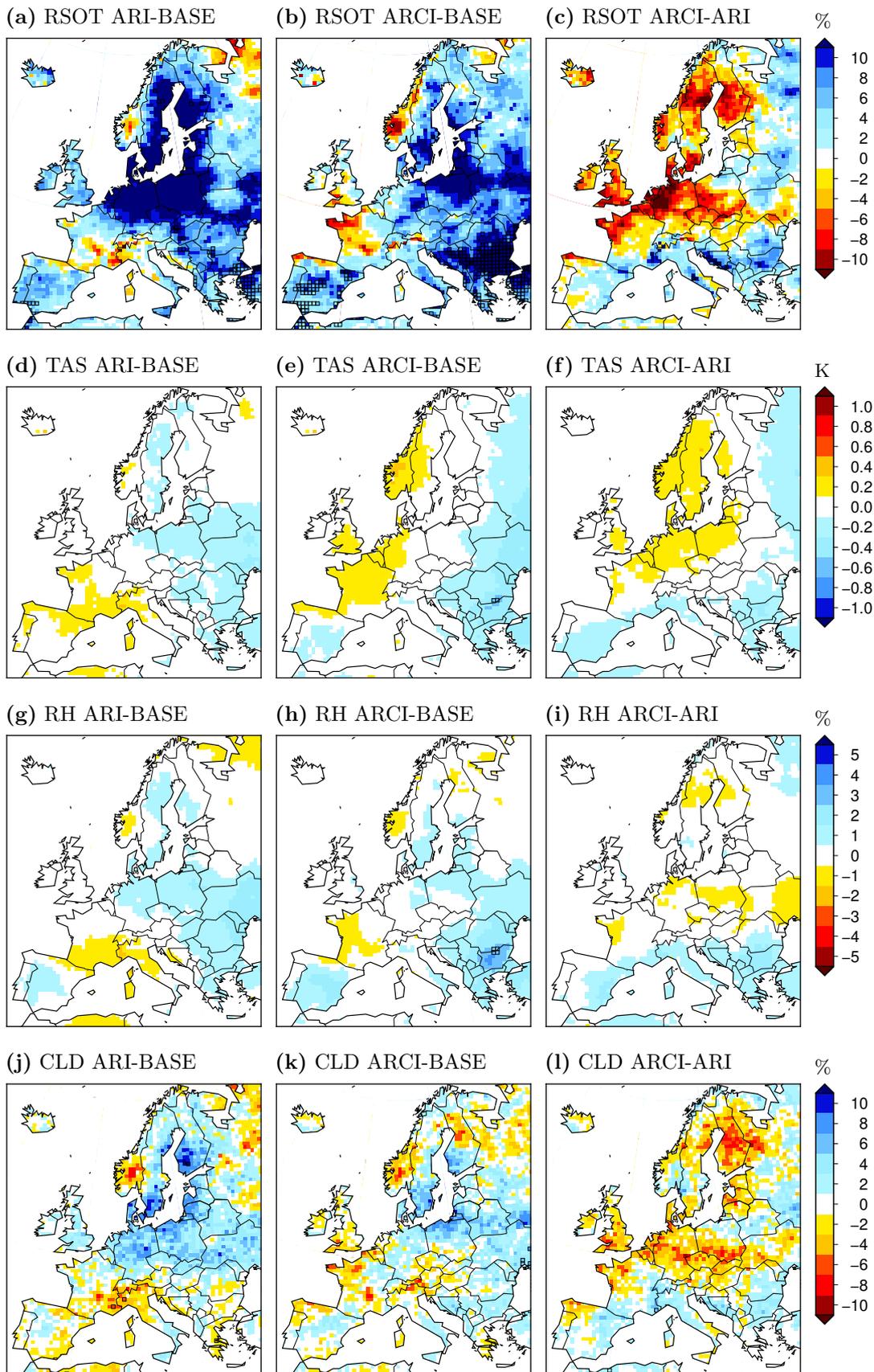
Supplementary Figure S7. As Supplementary Figure 4 but for the future period (2031-2050).

**RSDS_{cs} & AOD_{cs} JJA climatologies for 2031-2050:
differences between experiments**



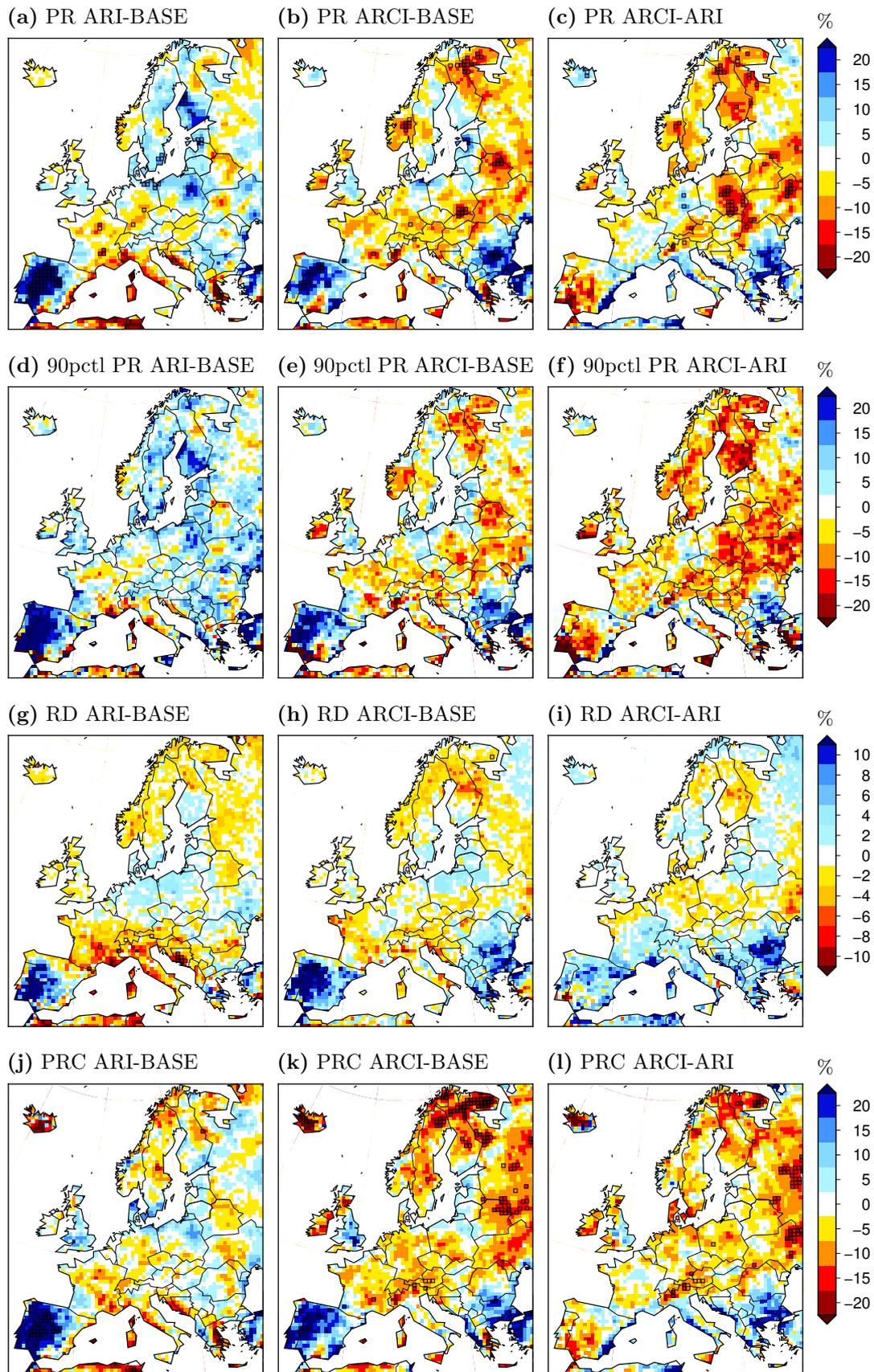
Supplementary Figure S8. As Figure 6 of the main manuscript but for the future period (2031-2050).

**RSOT, TAS, RH & CLD JJA climatologies for 2031-2050:
differences between experiments**



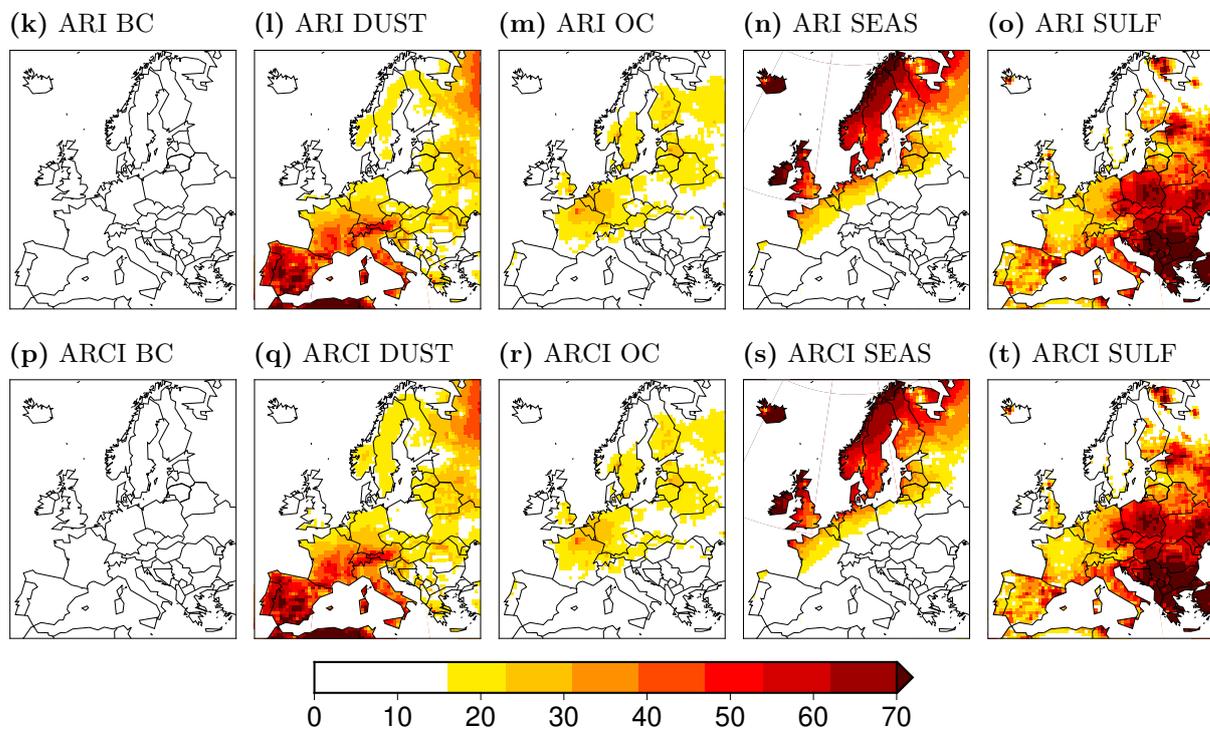
Supplementary Figure S9. As Figure 3 of the main manuscript but for the future period (2031-2050).

**Precipitation-related JJA climatologies for 2031-2050:
differences between experiments**



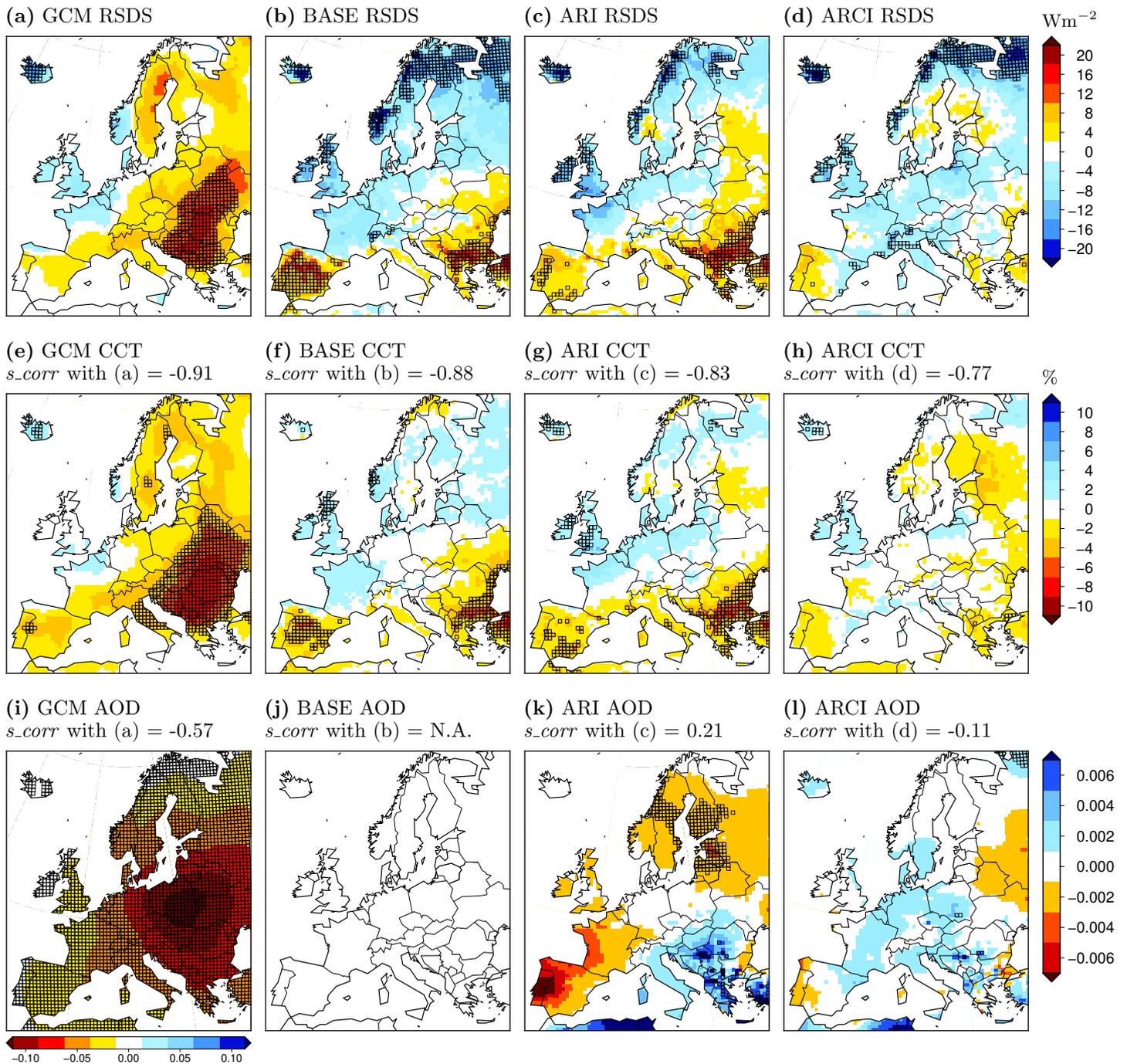
Supplementary Figure S10. As Figure 4 of the main manuscript but for the future period (2031-2050).

Contribution of each aerosol species to the JJA-mean total surface aerosol concentration (period 2031-2050)



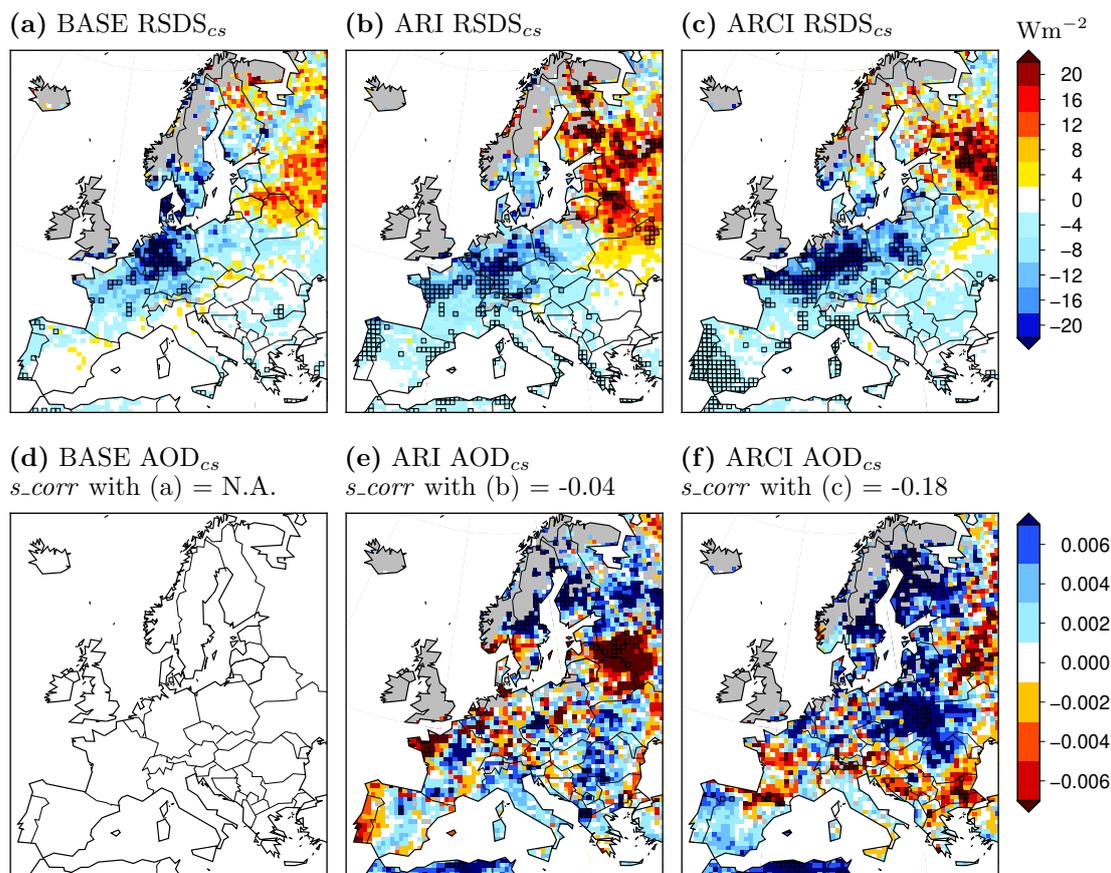
Supplementary Figure S11. As Figure 2 of the main manuscript but for the future period (2031-2050).

RSDS, CCT & AOD JJA changes (2031-2050 vs. 1991-2010)



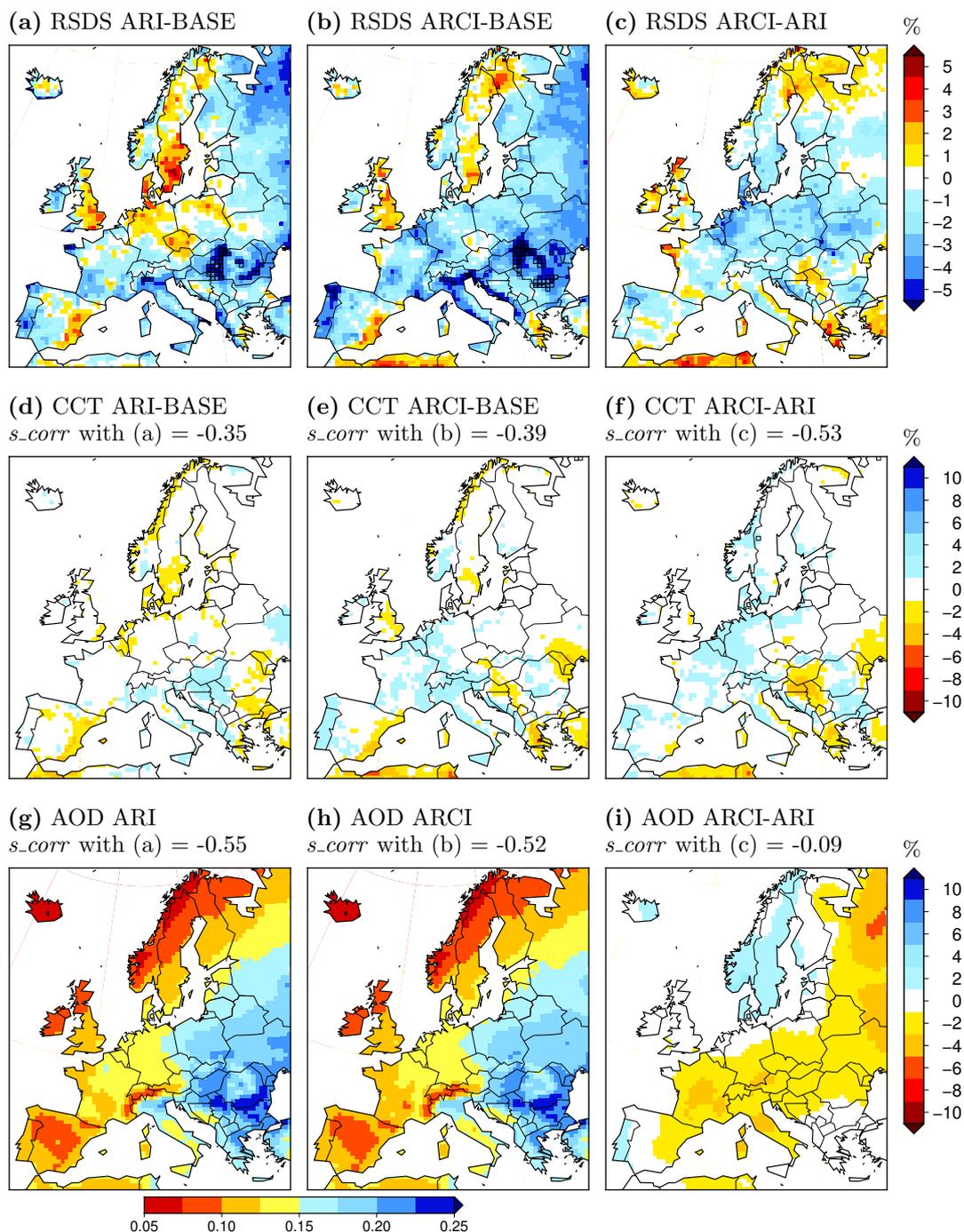
Supplementary Figure S12. As Figure 7 of the main manuscript but with plain differences depicted (non-relative values). Units: RSDS in Wm^{-2} , CCT in % of the grid cell area, AOD dimensionless.

RSDS_{cs} & AOD_{cs} JJA changes (2031-2050 vs. 1991-2010)



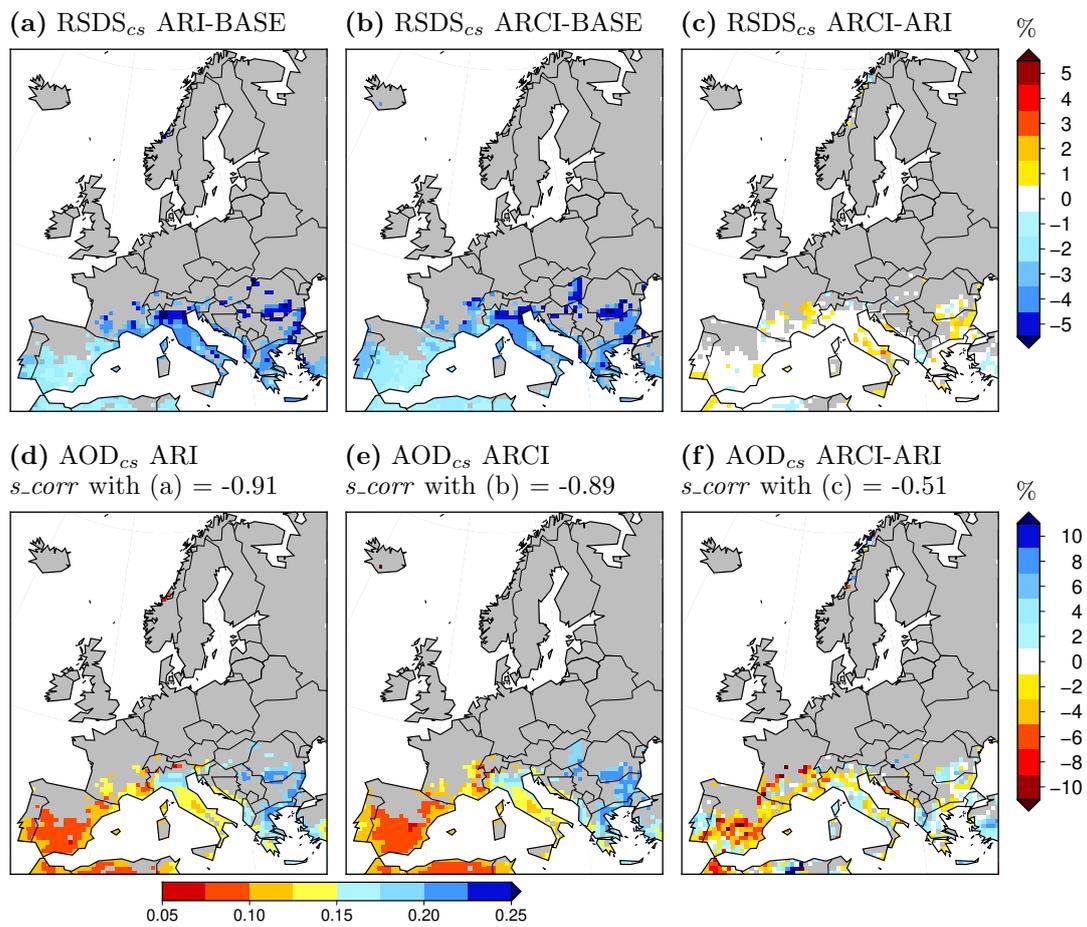
Supplementary Figure S13. As Figure 8 of the main manuscript but with plain differences depicted (non-relative values). Units: RSDS_{cs} in Wm⁻², AOD_{cs} dimensionless.

**RSDS, CCT & AOD DJF climatologies for 1991-2010:
differences between experiments**



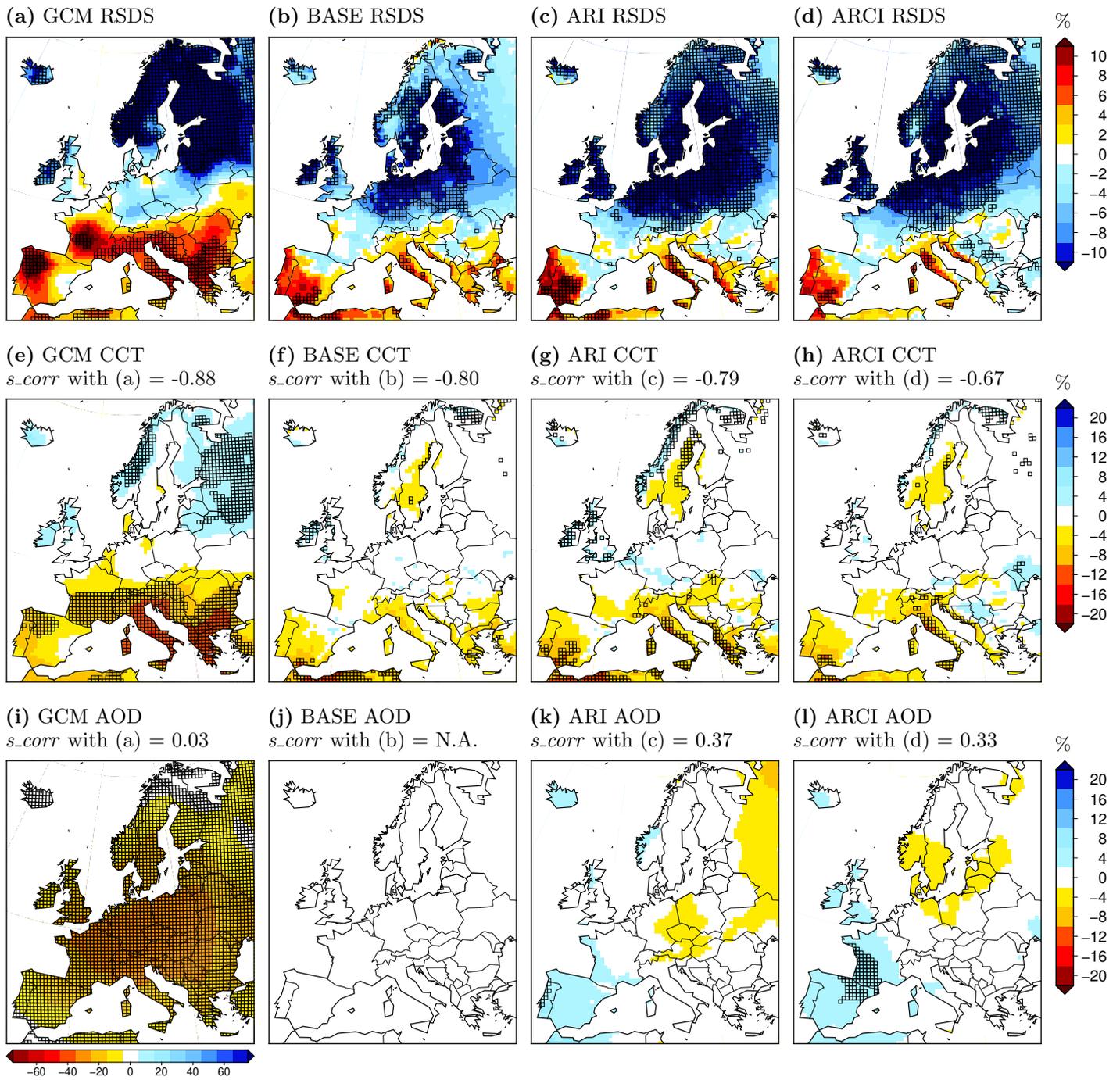
Supplementary Figure S14. As Figure 1 of the main manuscript but for the winter (DJF) season.

**RSDS_{cs} & AOD_{cs} DJF climatologies for 1991-2010:
differences between experiments**



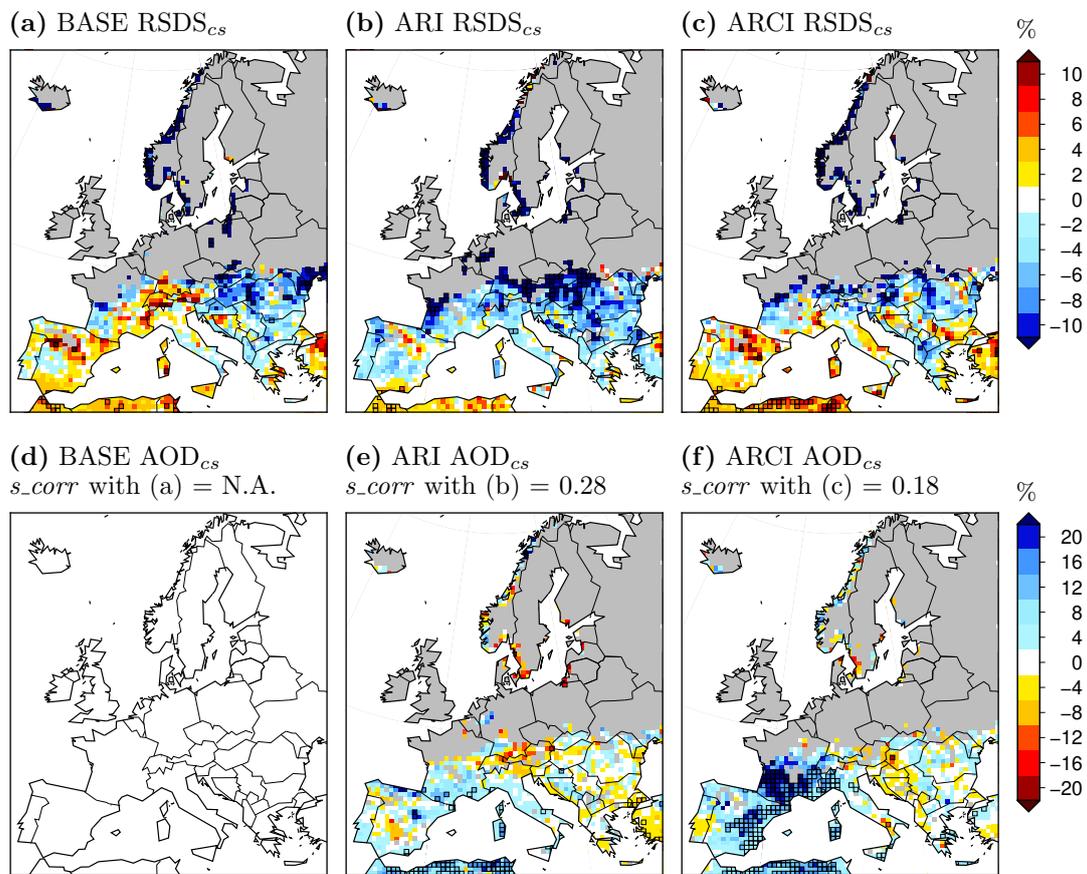
Supplementary Figure S15. As Figure 6 of the main manuscript but for the winter (DJF) season.

RSDS, CCT & AOD DJF changes (2031-2050 vs. 1991-2010)



Supplementary Figure S16. As Figure 7 of the main manuscript but for the winter (DJF) season.

RSDS_{cs} & AOD_{cs} DJF changes (2031-2050 vs. 1991-2010)



Supplementary Figure S17. As Figure 8 of the main manuscript but for the winter (DJF) season.