

### Supplement 3

Additional evaluation results

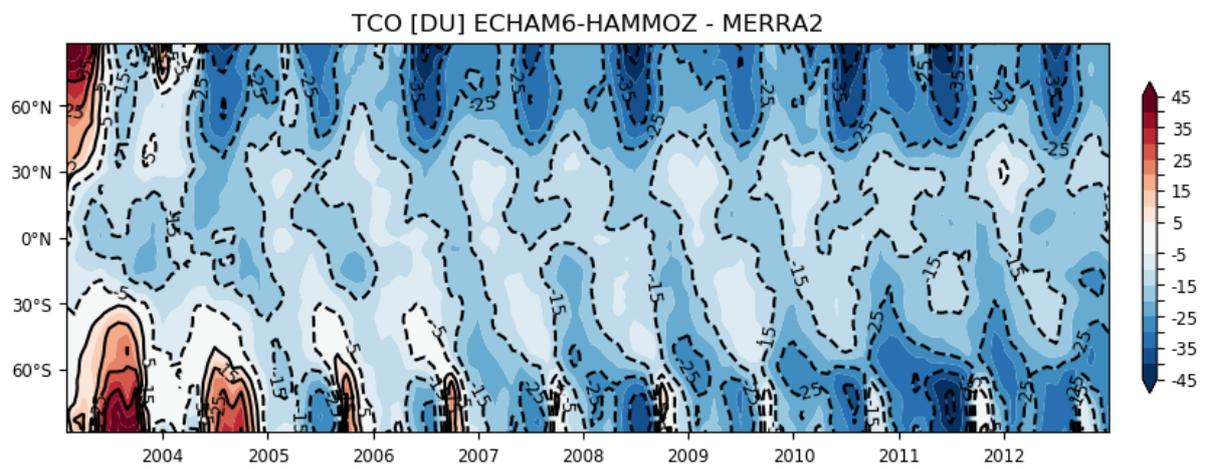


Figure S3.1: Latitude-time plot of TCO bias (in DU) of ECHAM-HAMMOZ versus the Modern-Era Retrospective analysis for Research and Applications, Version 2 (MERRA2) reanalysis. See Figure 4 in the main text for absolute values.

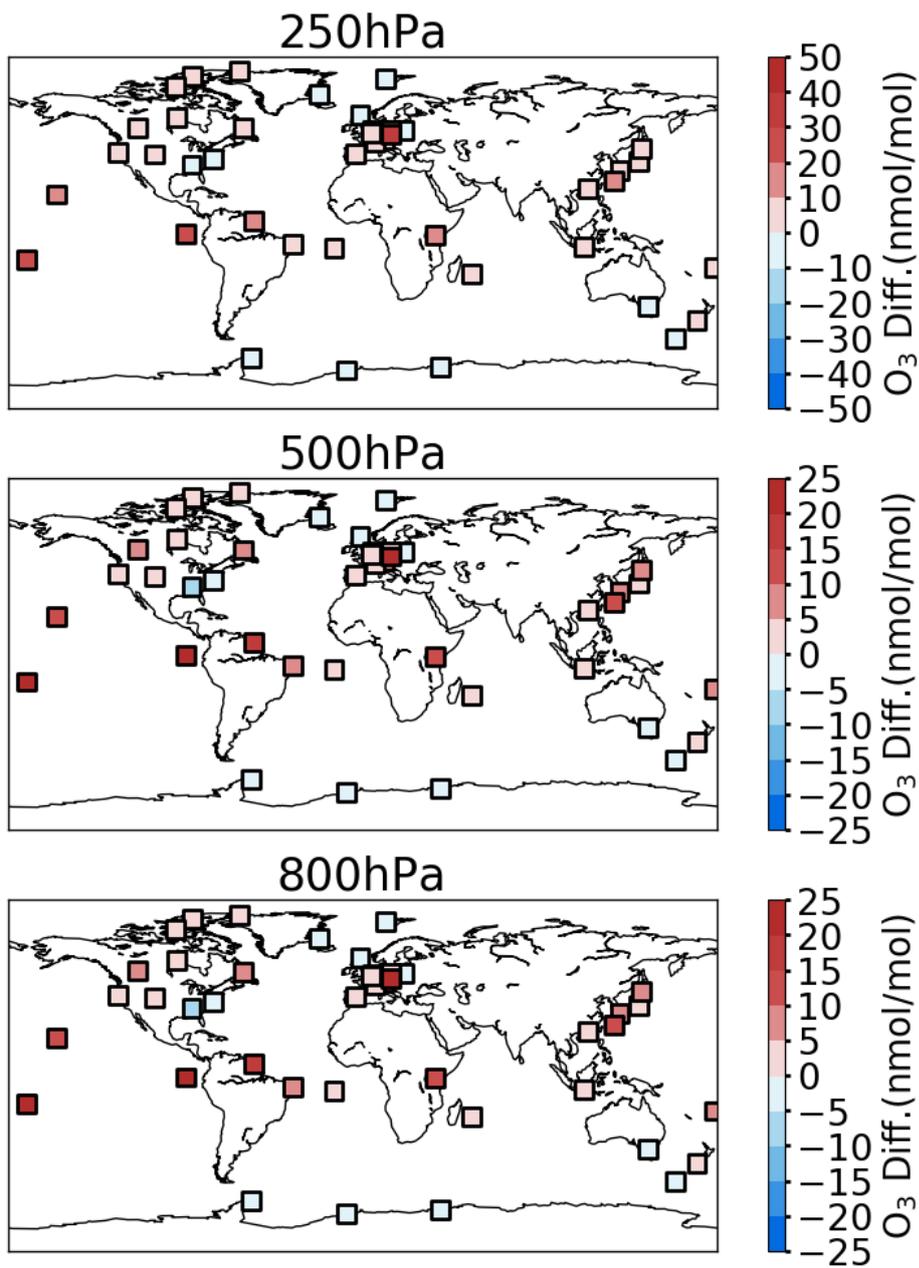


Figure S3.2: Annual mean bias of the ECHAM-HAMMOZ simulation *lght\*4* versus ozone sondes from the climatology of Tilmes et al., 2011. See Figure 4 in the main text for comparison.

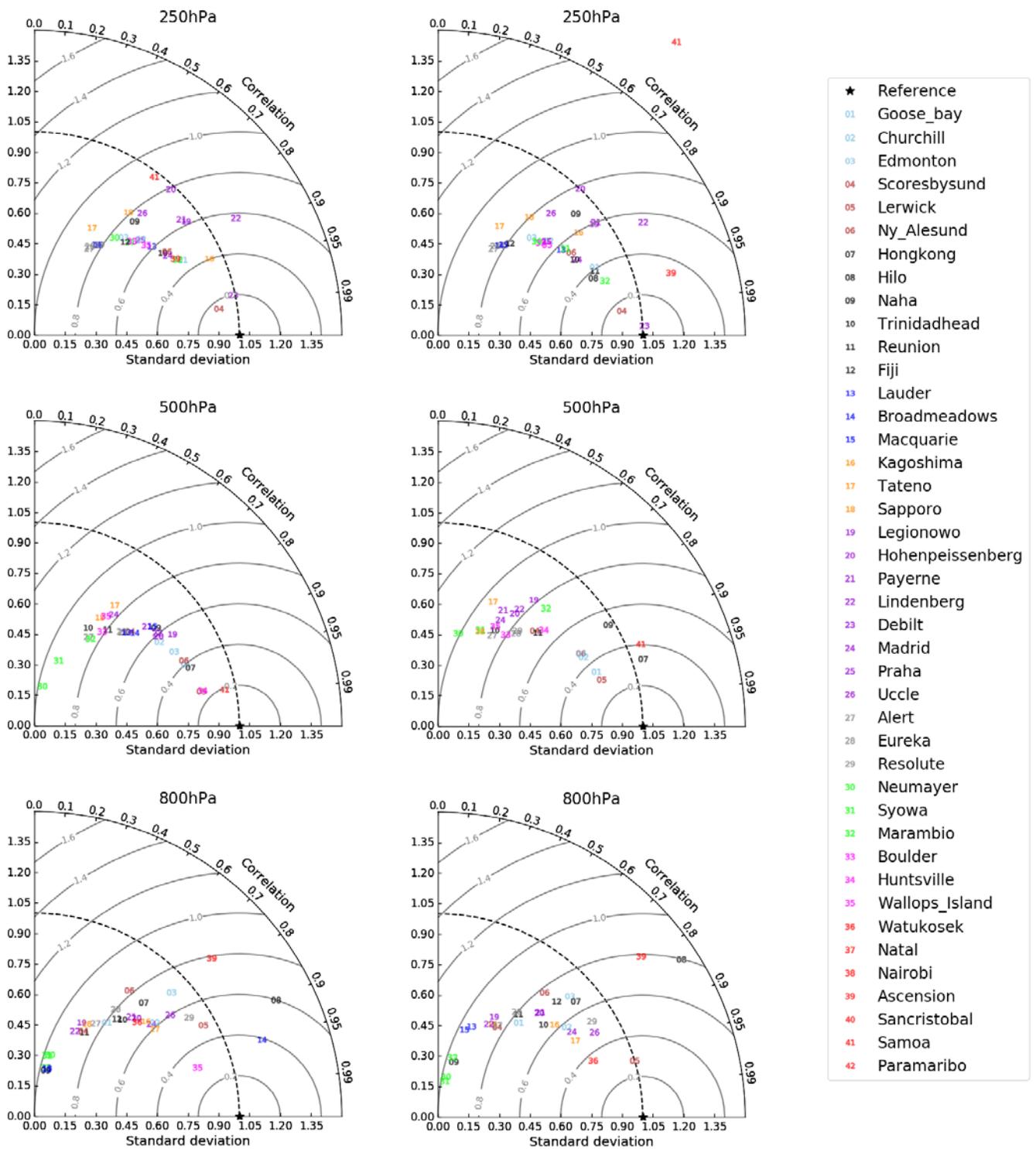


Figure S3.3: Taylor plot (ratio of standard deviations and correlation coefficient) of the ECHAM-HAMMOZ base run (left) and the lght\*4 simulation (right) versus the ozone sonde climatology of Tilmes et al. (2011). Compare with Figure 5 from the main text, where regional averages are shown for the base run.

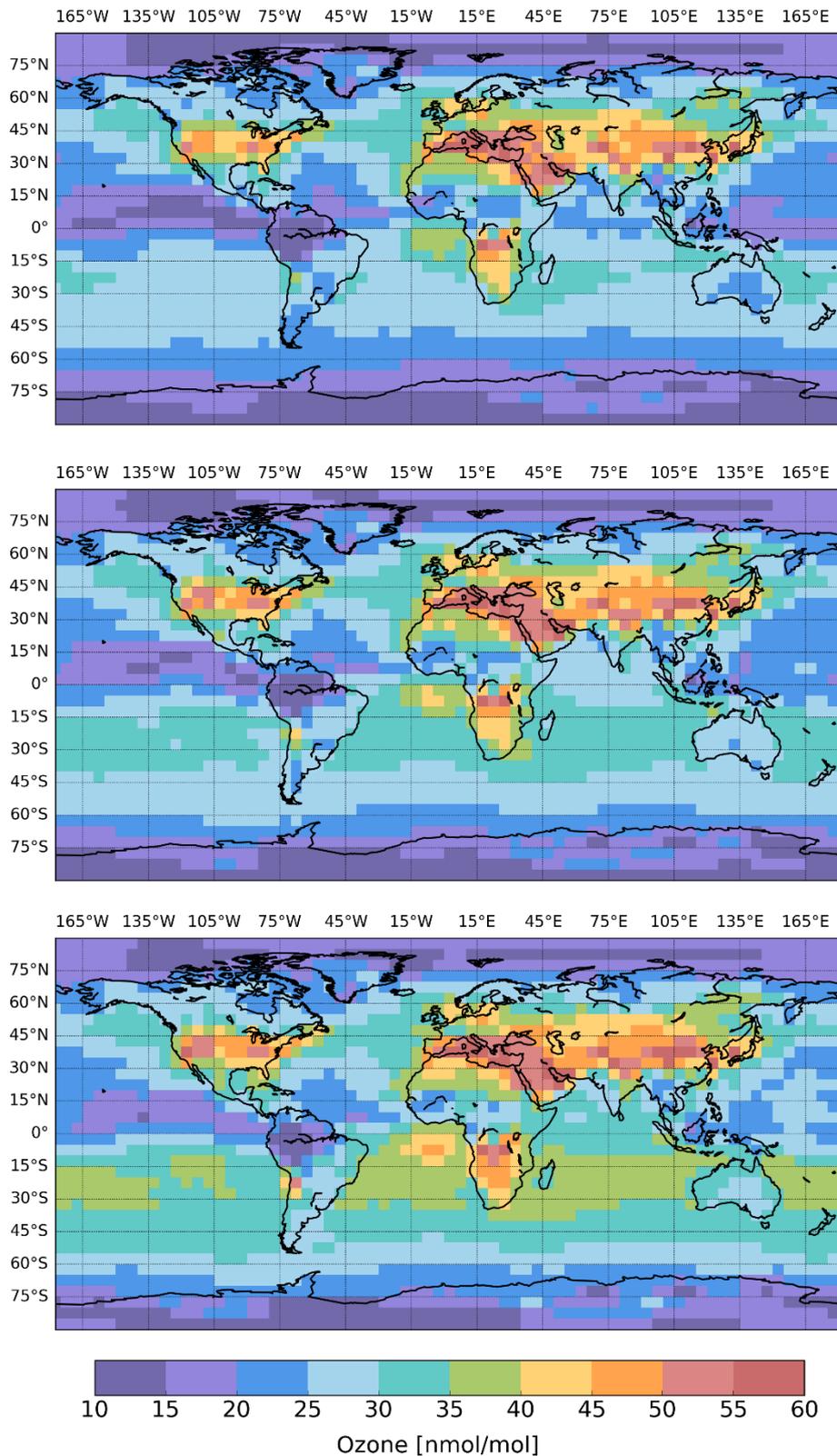


Figure S3.4: Monthly mean maps of surface ozone mixing ratios from three ECHAM-HAMMOZ simulations for July 2008. Top: base run (same plot as lower right panel in Figure 7 of the main text); middle: run lght\*2; bottom: run lght\*4.

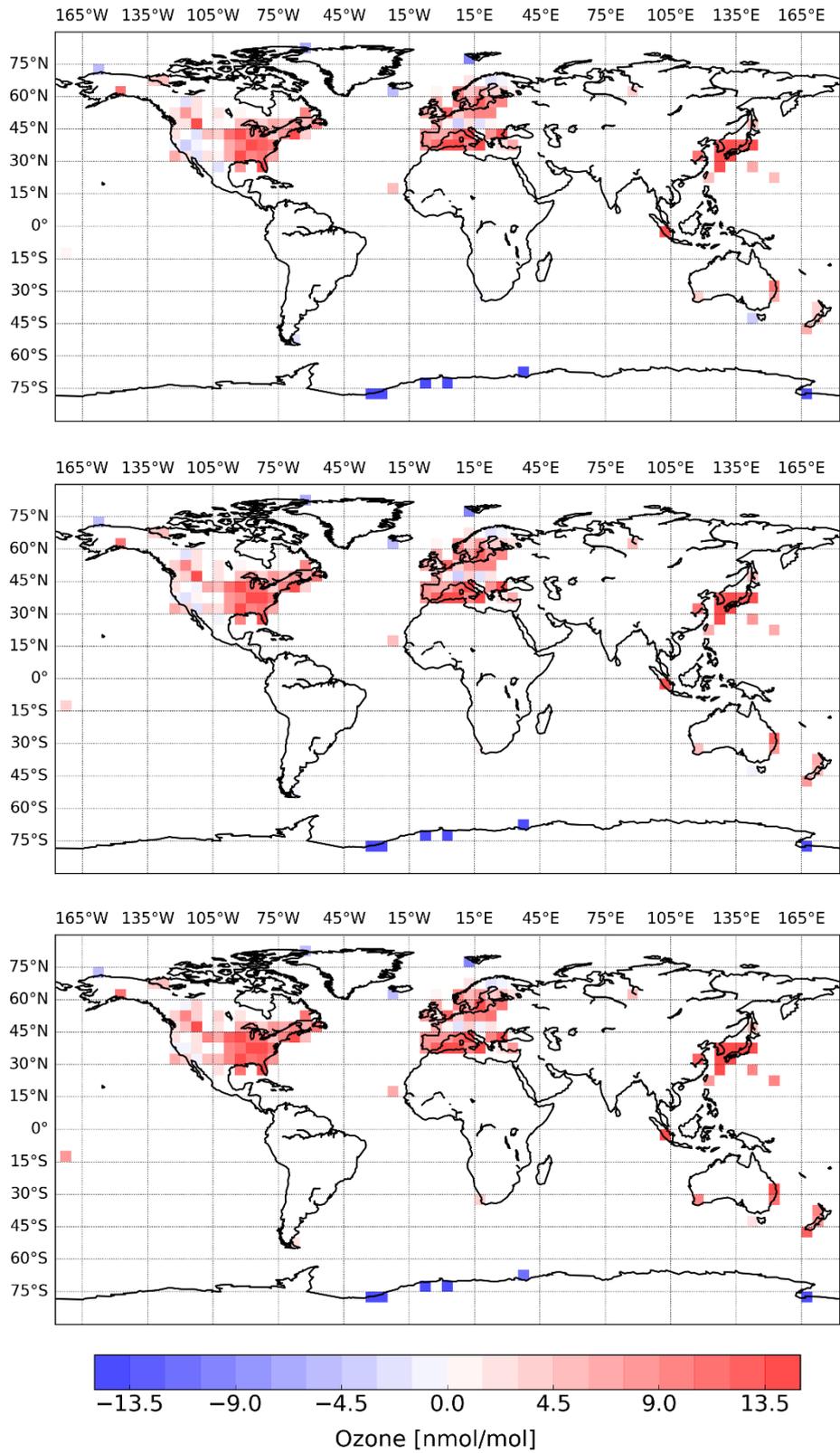


Figure S3.5: Monthly mean bias maps of surface ozone mixing ratios from three ECHAM-HAMMOZ simulations for July 2008 in comparison with rural stations from the TOAR database. Top: base run; middle: run lght\*2; bottom: run lght\*4.

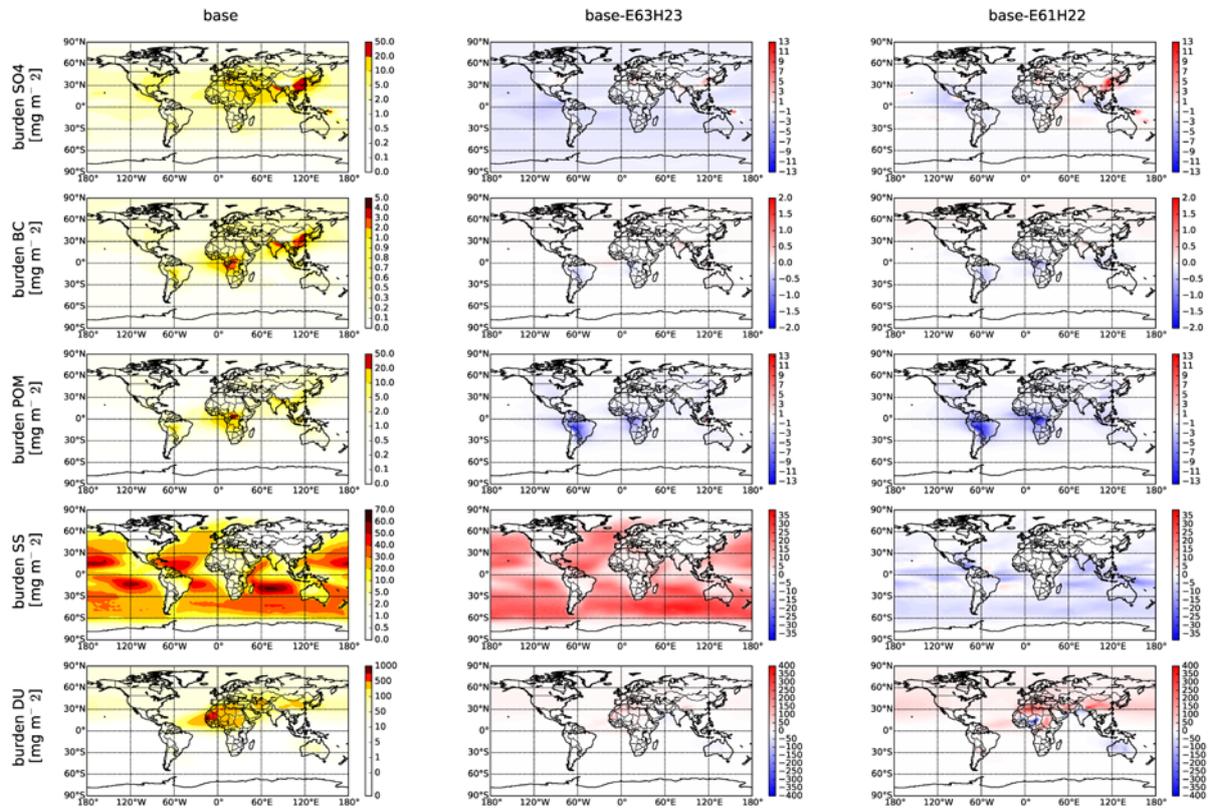


Figure S3.6: Decadal mean burdens of the different aerosol components in the ECHAM-HAMMOZ base run (left) and percent differences to the ECHAM6.3-HAM2.3 (center) and ECHAM6.1-HAM2.2 (right) simulations described in the text.

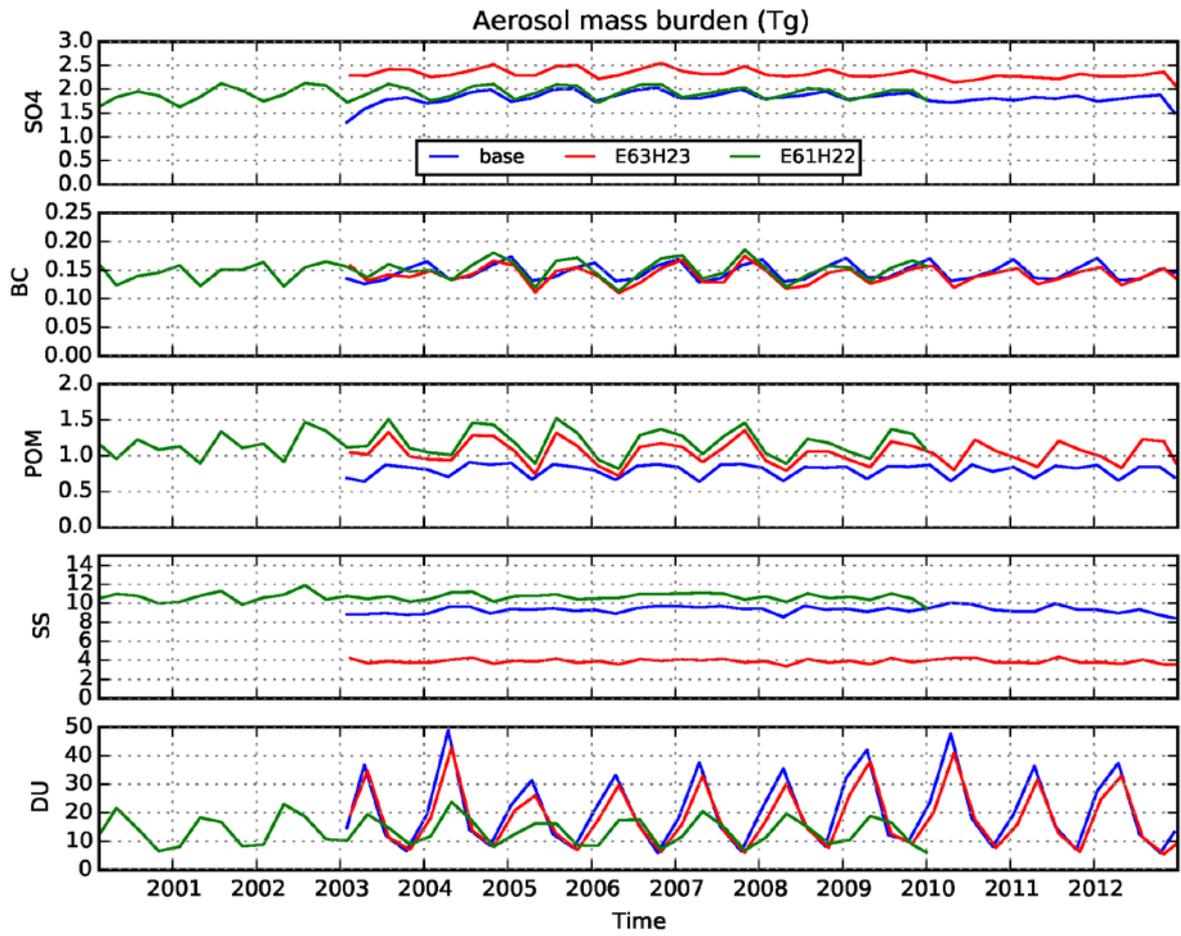


Figure S3.7: Time series of monthly mean burdens of the different aerosol components in ECHAM-HAMMOZ, ECHAM6.3-HAM2.3, and ECHAM6.1-HAM2.2.