

Reply to the reviewer for the manuscript:

“First forcing estimates from the future CMIP6 scenarios of anthropogenic aerosol optical properties and an associated Twomey effect” by Fiedler et al.

We would like to thank the editor Andrea Stenke and an anonymous reviewer for their comment. Please find (blue) our reply below (black) the comment.

Reviewer #1

The authors mostly responded well to my concerns.
Thank you again for your comments.

There are two items that need to be clarified before publication:

1. the new ECHAM-HAM study. I wonder whether this model includes nitrate (to my knowledge it doesn't). How can it be used to study the relative effects of sulfate and nitrate?

The model simulation with ECHAM-HAM did not have nitrate. The intention of showing this analysis is an assessment of the reproducibility of the development of the aerosol optical depth by scaling with anthropogenic aerosol emissions (Section 2.2). The relative contribution of nitrate and sulphate is based on Stevens et al. (2017). We add in the caption of Figure A1: „(...) using a pre-existing aerosol emission database (...)“.

2. I still cannot read the supplementary netcdf file.

I have been in contact with the journal for asking for a more intuitive solution for providing the data in the supplementary material. The journal personnel would intend to revise the file format in the course of the revision of the manuscript. For the time being, please add „.tar“ to the file in the folder after downloading the supplementary material and open the archive accordingly. You will then see the folder containing the forcing files in netCDF format and a Readme file.

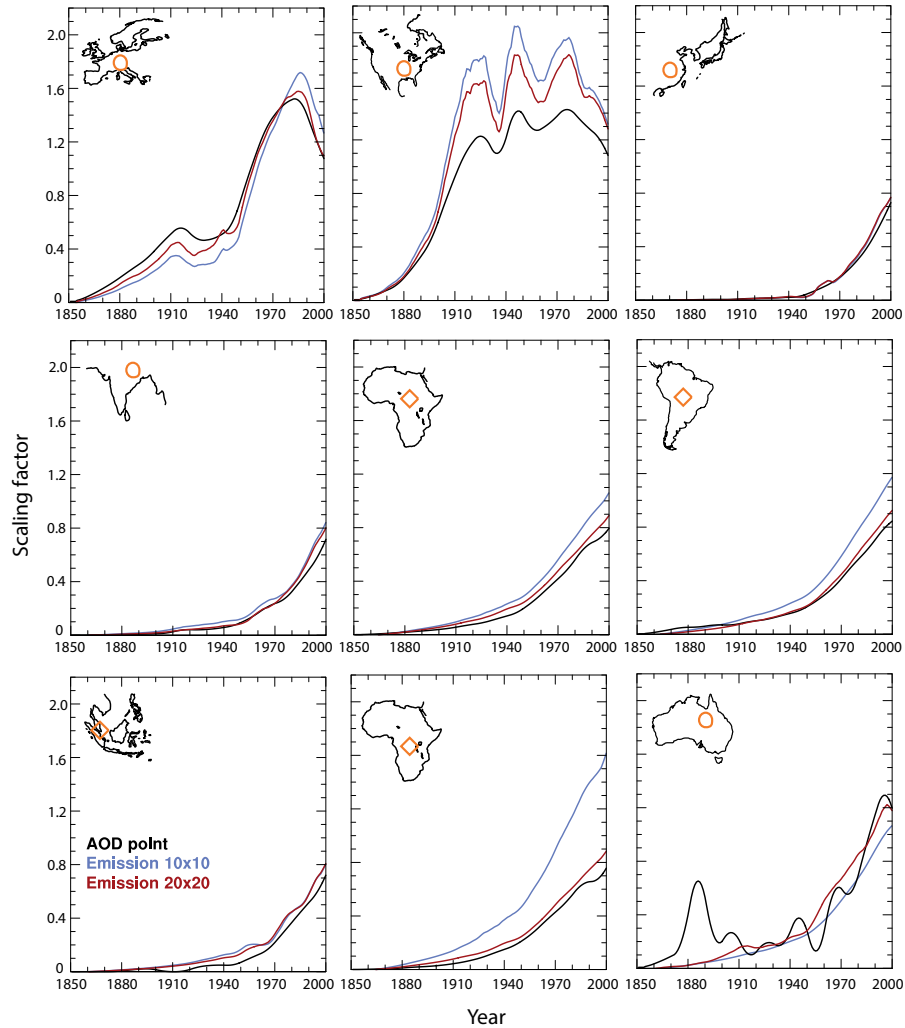


Figure A1. Scaling factor comparison. Shown are annual scaling factors $E_i(t)$ derived from (black) the aerosol optical depth in the plume centres of a transient ECHAM-HAM simulation [using a pre-existing aerosol emission database](#), and (colours) the anthropogenic aerosol emissions of that simulation, averaged over grid boxes around the plume centres. The geographical positions of the plumes with (circles) industrial pollution and (rectangles) biomass burning are indicated.