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Geoscientific Model Development Discussions

Interactive comment on "Simple Plumes: A parameterization of anthropogenic aerosol optical properties and an associated Twomey effect for climate studies" *by* Bjorn Stevens et al.

Anonymous Referee #1

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Simple Plumes: A parameterization of anthropogenic aerosol optical properties and an associated Twomey effect for climate studies

by Stevens et al.

The "Simple Plumes" approach is described in detail. This is an approach where the properties of anthropogenic aerosols for use in Earth system models (ESMs) are described using plumes that originate from several large sources. A simple, empirical method to include the effect of the aerosols on clouds, the Twomey effect, is also described. These are then used in an ESM to estimate the aerosol radiative forcing.

Overall the paper is well written and describes well the approach, its main intended use

within CMIP6 and its limitations. The supplemental seems to provide sufficient code and datasets to implement the "Simple Plumes" approach. I do not have any substantial revisions and suggest that the manuscript be accepted subject to one technical correction. The last sentence of Section 2.3 (bottom of page 8),

"For the wavelength dependence of the single-scattering albedo ωi (λ) of the plume i, we assume"

seems like it should be removed.

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