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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Technical Note: Estimating aerosol effects on cloud radiative forcing" *by* S. J. Ghan

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This paper discusses the problem of estimating aerosol radiative forcing from differences in cloud radiative forcing between pre-industrial and present-day aerosol concentrations. It explains why doing so leads to positive biases in aerosol radiative forcing. The paper suggests an alternative way in which the difference in cloud radiative forcing is modified such that aerosol scattering and absorption are neglected. As a side effect, also changes in surface albedo are estimated.

While I fully agree that estimating aerosol radiative forcing using cloud radiative forcing leads to biased estimates and I like the discussion of this, I disagree with the conclusion that a new metric is needed because the best estimate of the overall anthropogenic

aerosol effect is the difference in the net top-of-the-atmosphere radiation between pre-industrial and present-day aerosol concentrations. Therefore I don't see the value of this technical note in its present from.

Specific comments:

p.18773, line 1: I suggest using the net radiative flux and not limiting this analysis to the shortwave radiative flux

p.18775, recommendations: I don't see the need to decompose the overall aerosol radiative forcing in its components. Any decomposition of this is artificial because most of the anthropogenic aerosols will simultaneously affect the clear-sky and cloud properties and cause fast adjustments.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 18771, 2013.