

Interactive comment on “Radiative forcing of the direct aerosol effect from AeroCom Phase II simulations” by G. Myhre et al.

Anonymous Referee #2

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This paper is an an important timely presentation of AEROCOM radiative forcings. It updates radiative forcing estimates from Schulz et al. (2006). It presents forcing estimates for different anthropogenic aerosol changes over the industrial era. It then scales RFs to get numbers from pre-industrial to present day. The paper is very concise and because of this it is often hard to follow the discussion.

It is a very good paper generally, apart from the scaling discussion which is not presented clearly enough to understand in the current draft

Scaling issue: Fig 17 and the scaling discussion: I just can't work out from this what is being scaled. Is it forcing or emissions and how? I don't know what the bars are on figure 17 - the figure caption says "read the text" but the doesn't tell me either. If these scaled numbers are going into ipcc, I think a lot more explanation should be added. I

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cannot judge if it is done well in the current draft. it is also not clear what time period or emissions the forcings are being scaled to. The date ranges are complicated to understand. I think the text should be clarified.

I have a few other suggestions which I hope would improve it.

1. The albedo figure (Fig 1) is useful to aid understanding. The main other source of error discussed is the vertical profile. Can you show something similar related to this to aid the discussion? The key factor would be aerosol height related to cloud height - do you have a neat way of showing this? You may not have cloud height diagnostics from the model so it may not be possible. But your discussion left me wanting more here. And the vertical profile uncertainty seemed rather spread out in the current draft
2. It would be useful to know the pre-industrial and natural emissions - can these contribute to inter model differences and how were they handled?
3. Emission error is not accounted for in the RF spread. I think this needs to be discussed. In a similar vein, observations are never really discussed. I know this is a modelling paper but, for example, if AERONET is showing models underestimate BC burden, this points to errors in emissions....
4. Fig 14. seems really important for uncertainties in the paper but it wasn't clear. The discussion is quite good if a little concise but but I found it very hard to interpret fig 14 to check that it matched the discussion points. So I think this discussion and/or figure should be improved.

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