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Comment

***Interactive comment on* “Standard climate models radiation codes underestimate black carbon radiative forcing” by G. Myhre and B. H. Samset**

Anonymous Referee #1

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This paper explores the sensitivity of black carbon (BC) aerosol radiative forcing (RF) to the complexity of the radiation code (2-stream versus 4- to 16-stream). As such, it nicely extends and illustrates the conclusions of recent multi-model radiation code inter-comparisons. It is well written and should be accepted to ACP with very minor revisions, which I describe below:

1. I am somewhat confused by exactly how BC RF is calculated. It seems you use aerosol present-day (PD) and pre-industrial (PI) aerosol distributions from AeroCom Phase II? However, optical properties and meteorological data (i.e. clouds) come from OsloCTM2 and ECMWF, respectively? Perhaps some rewording could be done to make this a bit more clear in Section 2. Further, when calculating BC RF, you seem to imply in Section 3.2 that BC RF is calculated when other scattering aerosol types are

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included, and I'm not sure how this is done; some elaboration would be appreciated.

2. This point in Section 3.2 about how the BC RF changes much more in the presence of scattering aerosols (more so than when alone) is very interesting and could be highlighted a bit more in the abstract and conclusions.

3. Did you look at other aerosol types in terms of RF at all? It would be interesting to mention the effect of the radiative transfer code complexity on other aerosol types as well.

4. Figure 1; it would be useful to print the global mean on the plot.

5. Figure 2: The legend is confusing. What is meant by "All eff"? and "BC only"? The thinnest lines are difficult to see. There are also 8 things in the legend but only 6 lines on the plot (a). Perhaps make the lines in (b) a different color to distinguish them from lines in (a).

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 26173, 2014.

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