Atmos. Chem. Phys. Discuss., 10, C11010–C11012, 2010
www.atmos-chem-phys-discuss.net/10/C11010/2010/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Detecting the influence of fossil fuel and bio-fuel black carbon aerosols on near surface temperature changes" *by* G. S. Jones et al.

G. S. Jones et al.

gareth.s.jones@metoffice.gov.uk

Received and published: 13 December 2010

Reply to J. Schwarz comment

It is beyond the scope of this study to fully explore all the possible uncertainties in BC aerosol datasets and modelling but uncertainties in the vertical distribution is a particular important issue which should be mentioned. We have added text to section 2 to point out that uncertainties in emission datasets and within modelling processes can lead to uncertainties in the distribution of aerosols including in the vertical, which can have a specifc impact on radiative and hydrological processes (ref Koch ACP 2010). We also mention that how fBC is distributed in the vertical is presented in Martin et al.

2006.

The section of the paper (pages 20926-20927) is attempting to demonstrate that we view HadGEM1 as an appropriate model for detection and attribution studies investigating aerosol impacts on climate. We point out that there have previously been studies including varying degrees of sophistication of aerosol modelling and depending on what the study is looking at it may not be vital to include all known aerosol processes. For example for the analysis of climate changes over the 20th century, it may be more useful to include the main anthropogenic forcings of greenhouse gases and sulfate aerosols and natural forcings in an atmosphere/ocean coupled model than just including all the known aerosol species in an atmosphere only model. The latter model experiment is much more useful in other types of investigation. We have added text to make clear that we view HadGEM1 as an appropriate model to use for analysis of climate change over long periods (50-100 years).

Whilst there have been no direct comparisons of simulated aerosols within HadGEM1 and the limited available direct observations of individual aerosol species, the overall response of the model to aerosols appears to be credible when compared with indirect measures of the impact of aerosols, such as TOA fluxes (P20927 L6-21).

References Martin, G. M. et al., The Physical Properties of the Atmosphere in the New Hadley Centre Global Environmental Model (HadGEM1) - Part I: Model Description and Global Climatology, J. Climate, 2006.

Technical Corrections ————————

We would like to take the opportunity to make two corrections to the manuscript.

P20931 L7: we quote the value of '+2.30 (2.07 to 2.53)Wm-2' for the radiative forcing for greenhouse gases taken from the IPCC 2007 report. This value is actually for total CO2, CH4 and NO2 radiative forcing, when we should have used the value for all well mixed greenhouse gases, '+2.63(+/-0.26)Wm-2' (Table 2.12 in working group 1 IPCC

2007 report) . We have corrected this in the manuscript.

P20931 L2: due to a typographic mistake in an early draft of the paper we have included an incorrect value for the radiative forcing deduced from the greenhouse gas simulation. We have corrected the value to '+2.52+/-0.10 Wm-2' (which can be seen to be consistent with Figure 3). The abstract is amended also to reflect this.

Neither of the two corrections above have any signicant impact on the paper or its conclusions.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 20921, 2010.