

Interactive comment on “Offsetting effects of aerosols on Arctic and global climate in the late 20th century” by Q. Yang et al.

Anonymous Referee #1

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The manuscript concerns the Arctic and global climate response to concentrations of BC, OC and sulfate from 1975 to 2005. The authors have carried out several ensemble runs to calculate the climate effect of the different aerosols. The topic is very interesting and highly relevant for publication in ACP. The manuscript is well-written and the results are presented clearly. I recommend this paper for publication with only a few, minor comments.

It is a great advantage that this study includes several ensemble-runs of each aerosol. Would it be an idea to make a table with the different runs? It is a bit confusing to me what the ‘all-aerosol-forcing’ includes; is that OC in addition to BC and sulfate? Could this be specified? Then the sentence in line 129-131 would make more sense (.. ‘but this is almost completely offset by the cooling influence from organic carbon, which is

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co-emitted with BC').

The model set-up section is a bit short. How are aerosols treated in the model? It is a reference to Shindell et al. 2013 for comparison with observed AOD trends 1980-2000. What about other comparisons with observations? Climate models (and I think CAM4 is no exception) tend to underestimate surface concentrations of BC, especially in the Arctic. I would like to see a discussion about how good the model captures aerosol concentrations and how CAM4 is in comparison with other climate models.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 30929, 2013.

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