

# Modeled black carbon radiative forcing and atmospheric lifetime in AeroCom Phase II constrained by aircraft observations

## Responses to reviewers

We thank both reviewers for their positive assessment of our paper, and for their helpful comments. Point-by-point responses and details of the changes made to the paper can be found inline below.

### Reviewer #2:

#### SPECIFIC COMMENTS

1/ The authors should check the numbering of tables and figures, e.g., Fig. 4 is mentioned right after Fig. 1 and there is no reference to Table 2 in the text.

We thank the reviewer for spotting this. The numbering has been updated, and a reference to table 2 that had been lost in editing is reinserted.

2/ Fig. 2 presents average vertical profiles of BC mass concentrations from observations together with results from models. Observations are presented as average plus 1 standard deviation. In the current form there is only an upper bound for observation data given, while for most of the cases, the model BC values are significantly smaller than average observation values. The authors may consider plotting the observational data as 25-percentile, median, and 75-percentile values. Then also a lower bound of observational data is given in the figures for comparison with model data.

*Median and +1sigma was used for consistency with other studies, however we agree that adding median and percentiles is relevant. In several regions, the measurements vary quite extensively, to the point where the mean is at times above the 75<sup>th</sup> percentile. We added the median and 25<sup>th</sup>/75<sup>th</sup> percentiles to the plots, to ensure this information comes across.*

#### TYPOS

1/ Page 20088, line 20: I suggest deleting “and”; then the sentence would read “: : the atmospheric segment from the surface up to 250 hPa.

Fixed.

2/ Page 20088, line 22: There is a confusion of past tense and present tense; I suggest rephrasing the sentence: “The Polar Airborne : : : campaign consisted of : : :”. This would be in accordance with the sentences describing the other field campaigns.

Fixed.

3/ Page 20089, line 16: I suggest deleting “also”; then the sentence would read “To calculate BC : : : mean pressure and temperature fields were used.”

Fixed.