

Interactive comment on “Modeled black carbon radiative forcing and atmospheric lifetime in AeroCom Phase II constrained by aircraft observations” by B. H. Samset et al.

Anonymous Referee #2

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GENERAL REMARKS

The manuscript presents results from the AeroCom Phase II intercomparison, focusing on the representation of Black Carbon (BC) in global climate models. In particular the intercomparison study investigates how well models can reproduce vertical profiles of BC mass concentrations from a set of recent aircraft field studies. Involved field studies cover longitudinal trans-sects from HIPPO as well as flight campaigns in the polar and arctic regions and in East-Asia. All airborne observations used for this study originate from Single Particle Soot Photometer instruments which report refractory black carbon. The findings of the model-observations intercomparison were used to constrain the

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atmospheric lifetime of BC and the resulting radiative forcing.

The manuscript makes a significant contribution to the topic of radiative forcing of BC. The study is well designed and carefully conducted; the presentation of the material is very well organized, clear and convincing. In summary, the manuscript is very well suited for publication in ACP and requires only minor and mainly technical revisions before publication.

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.

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.

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.

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.

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