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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Fine aerosol bulk composition measured on WP-3D research aircraft in vicinity of the Northeastern United States – results from NEAQS" *by* R. E. Peltier et al.

Anonymous Referee #2

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The paper by Peltier et al describes the bulk composition of pollution aerosol in the north eastern USA during the NEAQS study in 2004. The study presents a synthesis of submicron bulk composition measurements from the WP-3D aircraft, which conducted a wide range of predominately low level flight patterns across the main pollution regions in the NE USA. This included the Ohio valley and the highly populated coastal region. As such, the study presents important and very valuable data set that has been carefully analysed in this paper. It is an important source of information and should be published in ACP. The paper is well written, clearly presented and has clear, well annotated figures.

I do have some comments that the authors should address.

Page 3075 line 4: Given the timing it might be useful to cite newer references as this summary will very shortly be superseded and represents a review of the state of knowledge at around the turn of the millennium.

Page 3076 line 24: Given that the cut size is one micron at 1 atmosphere and the sample line is downstream of an LTI, what is the upstream pressure and how does this affect the cut? How much does it vary with altitude?

Page 3076 line 26: The RH is said to close to ambient in the inlet line inside the cabin. How was this maintained? Even if flying unpressurised, the thermal lag inside the aircraft will lead to substantial changes in temperature between outside and in.

Page 3077 line 10: If these detection limits are independent of pressure then this should be stated. It should also be stated whether the concentrations presented throughout the paper are at ambient pressure or standard pressure.

Page 3078 line 10-11: It is perhaps worth pointing out that water solubility of the organic carbon is instrumentally defined and may not represent the water soluble organic carbon in the ambient aerosol.

Page 3080 footnote: author name incorrect

Page 3083 One might expect that the WSOC/CO changes with photochemical age as SO partitions to the aerosol, is there any evidence for this?

Page 3084: line 7 Is figure 3 really necessary?, the statistics provided in the text convey the main point.

Page 3086: The terms PMvol and PMpils need to be related to the terms in equation 1.

Page 3088 When the profiles are discussed, it would be preferable to present the concentrations at a constant pressure, has this been done? It isn't clear.

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Page 3089 Whilst figure 6 presents all the data and is therefore an important plot, it is very difficult to obtain statistics from it. Other users of the data may find median and interquartile values binned as a function of height an important statistic.

Page 3090 line 5: It is again important to be clear how the concentrations are defined when omparing the concentration profiles with others again

Page 3090 line 23 This estimate should be compared with those of other published values.

Page 3091 line 10 The authors mean precipitation scavenging, without precipitation, cloud scavenging will simply act to enhance the rate of SO2 conversion to sulfate.

Page 3095 The flight described in this section in the same one discussed by Brown et al (Science, 2006) who discuss the changing uptake of N2O5 as a result of changing aerosol type. The emphasis in this paper appears to be the relationship to the sources in a general sense. However, despite the considerable similarity compared to the previous work of Brown there is simply a reference to state that the same data have been used. I suggest that the Brown et al paper is discussed alongside the data presented here.

The authors state the reason for looking at this flight is that a wide range of sources can be targeted. I would also like to see a more thorough discussion of what the data tell us about the sources than the rather general comments made at the bottom of page 3095.

Page 3107 One of the regression lines in the top left panel of figure 4 does not appear to match any of the data. Is the line correct? What does it represent?

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 3073, 2007.

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