**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Aircraft measurements of gases pollutants and particles during CAREBeijing-2008: distributions, characteristics and influencing factors" *by* W. Zhang et al.

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This manuscript presents an interesting data set, probably one of very few that have been published from aircraft measurements made over mainland China. There is a wealth of information in this data, probably enough for several papers; however, this manuscript, in its current state, is not close to ready for publication in ACP.

The first problem, of course, is that it was not thoroughly edited by someone with a better grasp of English. Normally this would not cause me problems, but there are too many errors in general to allow easy reading and this is an obstacle that should not be placed immediately in front of the reviewers.

The second problem is one of how the results are presented. A lot of numbers are presented in the text and in tables but the reader is forced to try to understand these numbers with no easy way to put them into context. I will make a few suggestions below, but in general only the most important numbers should be discussed in the text with everything else in readable Tables (Table 2 is not. Either it needs to be rotated and enlarged or split into several tables with notable values highlighted). All the flights should be given designations that are in Table 1 but that are easier to refer to than dates. For example all flights in a line could be referred to as flights I-1, I-2. . .I-9; II-1..II-3, for example. The dates are only relevant when talking about the back trajectories and meteorology.

The third problem is that there is no analysis in this paper. Results are presented with no discussion at all that justify the conjectures. For example, at the end of presenting results for each of the four cases of air coming from various directions, statements are made like "The gases pollutants showed some remarkable features, particularly in the air with high concentration of SO_2 and O_3, as shown in Table 2. This may be due to the stagnation with low wind speeds and highly active photochemistry, the urban emissions of both primary compounds and precursors for secondary ions lead to an additional pollutant on top of the already elevated regional level". This is completely hypothetical and no attempt is made to support this conjecture. Every section has statements like this that are completely irrelevant with no solid analysis that backs them up.

The fourth problem is that virtually none of the aircraft data is shown graphically in a way that highlights the important features. A lot is said about the gases but only CO is shown graphically and that is not very informative. Time series along the flight track provide a useful start for the analysis.

General suggestions: Summarize all the statistics in bar charts that compare average, standard deviations and maximums. Maybe put these on the map of Figure 1, or stratify by cases.

Select the most interesting features and analyze with respect to the physics of what is actually happening, backed by solid evidence, not just conjecture.

I started to do a detailed, point by point review, but realized that I was going to have a review longer than the current manuscript.

In the end, all I can do if summarize as I have the deficiencies of this paper and offer the authors my assistance, if they wish to make use of it, to tidy up and improve uponthis potentially useful paper.

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