

## ***Interactive comment on “Aircraft measurements over Europe of an air pollution plume from Southeast Asia – aerosol and chemical characterization” by A. Stohl et al.***

**A. Stohl et al.**

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We thank the reviewer for his positive evaluation of our paper and also for the clear message that the paper is too long. In the following, we repeat the specific reviewer comments in italics and write our responses in normal letters.

*Given that the authors basically discuss 1 transport plume sampled on 2 successive days, I find the paper to be too long and sometimes going into unnecessary details. Some of the material could be available in supplementary material instead of the main paper. It takes 19 pages of text and 13 figures before reaching the interesting part of the paper on the chemical characterization of the plumes. Some of the information included before could be substantially shortened. For example, the campaign execu-*

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*tion part contains too much information. The reader doesn't need to know about the logistical details (no suitcase flights, availability of aircraft, number of flight hours, air traffic control limitationsE? ) that lead the flight tracks into being what they are.*

Given that the other reviewer also suggested to shorten the manuscript, we re-considered also his/her suggestions, and we have made considerable changes to the paper. We have removed Figure 1, and we have considerably shortened the text in sections 1-3. We have removed most of the logistical details (but kept the remark on air traffic control limitations, as one otherwise would wonder why the aircraft didn't ascend higher); we have somewhat shortened the instrument description; and we have eliminated all unnecessary details in the sections describing the plume transport and the identification of segments influenced by Asian pollution.

*The GFS model results are shown on Figures 8 and 10, but are not discussed in the text. I suggest eliminating them.*

We do not agree on that. These panels occupy only one fourth of the figure, so eliminating them would not save much space. The GFS results are discussed (though only briefly) in the text. The main purpose of showing them is to show the reader the differences between model results using the alternative GFS and ECMWF model input data. This is an important information on the uncertainty of the results and we think it is only fair to share this information with the reader.

*Figure 8 and 10 are difficult to read. I had a very difficult time understanding the way the age of the plumes is presented in figures 8ab and 10ab. I understand that the color corresponds to the age, but why are there multiple colors? Do they correspond to individual ages of the ensemble of particles? The figure legend was not very helpful. What does the y-axis represent? What not use a single 'mean age' representing the mean of the ensemble of particles? The y-axis of these figures are not labeled, and it is thus difficult to see what axis corresponds to what variable. What is the different between CO<sub>t</sub> and CO? Which one is plotted?*

Figures 8 and 10 contain much information and are indeed complex. As the air mass travelled over Asia, it picked up emissions at different times and from different parts of the continent (e.g., first from India, later from China). Thus, also the sampled air mass contains emissions that were released at various times, not only at a single time. While one could derive a mean age, this would correspond to a significant loss of information (e.g., the minimum age of the Asian plume marks the time when it left the Asian continent). In cases where the age distribution is not centered at a particular age but has a U-like distribution, the mean could even be misleading.

The y-axes of the figures are labelled but inside the figure, not outside. This was done to allow more horizontal space to stretch the figure as much as possible. We are sorry that this was not explained in the figure caption – this has been changed now. CO<sub>t</sub> corresponds to the model results, whereas CO corresponds to the measured CO – this is also explained now in the caption of the revised version of the paper.

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Interactive comment on Atmos. Chem. Phys. Discuss., 6, 12611, 2006.

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