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Interactive comment on “Arctic smoke – record high air pollution levels in the European Arctic due to agricultural fires in Eastern Europe” by A. Stohl et al.

Anonymous Referee #2

Received and published: 21 November 2006

General comments:

This is generally an excellent manuscript, and publication in this journal is recommended. I only have a few very minor comments (see below). The manuscript presents a thorough analysis of a few air pollution events during spring 2006, which are the most severe air pollution events ever recorded in the European Arctic. This is done through a combination of forward and backward modeling and measurements of e.g. CO, CO₂, halocarbons, O₃, levoglucosan, potassium and GEM as well as optical depth and aerosol size distribution obtained at the Zeppelin mountain at Spitsbergen. Fire detections from MODIS have been used to construct maps of emissions from biomass

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burning and the paper concludes that smoke from agricultural fires in Eastern Europe was the main source during these episodes. Photographs taken during the episodes combined with the other measurements documents the possible implications for the radiative processes in this region due to such transport events. The meteorological conditions leading to the low-level transport of pollution into the Arctic is also discussed and the results of this study are thereby put into a broader perspective of potential future climate changes. The paper is very comprehensive and therefore also long (with 25 figures), it is however very well written and I can therefore not see any reason to make it shorter.

Specific comments:

The title should be changed so that the year of the episodes is mentioned. Since the analysis only covers 2006 this could be reflected in the title.

In section 4 where the BB emissions are discussed it is not clear if the crude attempt to account for clouds is actually applied in the final estimation of the emissions (line 5-9, p. 9664). This should be stated more clearly and if it is not used please give an argument why. When looking at Fig. 3 it seems like the agreement with the measurements of CO would be higher if the correction for clouds was used.

Technical corrections:

p. 9664, line 28, insert “the” before equation

p. 9676, line 14, delete “large” after large

It would be easier to read the conclusion (also for people who have not read the whole paper) if terms like BB, FFC, EBC etc. were explained here also.

Fig. 6: It is very hard to read the numbers in these figures.

Fig 10: It should be mentioned in the text (page 9671) that the scale on the time series plot differs between the modeled and measured CO.

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Reference list:

As far as I can see there are two Friedli et al., 2003 references. Maybe it should be 2003a and 2003b?

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 9655, 2006.

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6, S4757–S4759, 2006

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