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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Mixing between a stratospheric intrusion and a biomass burning plume" *by* J. Brioude et al.

Anonymous Referee #2

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General

This paper describes a mixing event of a biomass burning plume with a stratospheric intrusion over Texas during the TexAQS/GoMACCS campaign in 2006. The biomass burning is identified by enhanced concentration of CO, acetonitrile and aerosol extinction, while increased concentrations of O3 and HNO3 are used to identify stratospheric airmasses. In depth analysis of the event is done by using the FLEXPART model.

Overall the paper is pretty well written, but it needs improvement as indicated in the specific comments below.

Specific Comments:

p 8019 Instrument and model description is concise and to the point.

p 8021, l22. The authors state that the HNO3: O3 relationship is 0.0022*O3- 0.055 and then say that typical UT/LS HNO3 is 300 ppt. It is not quite clear how this equation relates to the concentration in the UTLS, it would be more useful to quote the relationship found in the UT/LS. Please add units to be used. E.g." HNO3 [ppb] = 0.0022*O3 [ppb]..."

P 8022, L 4-5: I can't really see horizontal or vertical branches, though I think I know what the authors are talking about. I suggest also in the context of the discussion of the P3 data, to overlay the different branches with labeled lines that can then easily be referenced in the text.

L25 the modeled trace is also not correlated after 16:20, where measured CO stays flat at an elevated approximately 100 ppb, whereas modeled CO goes to 0, which seems to say that the model does not capture the source for the spikes after 16:20.

P 8025 The discussion of the statistical analysis is very sparse and could be improved in clarity. I have trouble understanding the motivation and what the relevance is. Is this a surprising or expected result?

The conclusion that this kind of mixing can influence tropospheric chemistry is not really substantiated and the claim about possible impact on surface air quality seems pretty far fetched. Do the measurements demonstrate anything like that? If anything, O3 seems to decrease in the mixed part of the stratospheric intrusion. With all the concurrent measurement from the P3, I would think the authors have some evidence for this statement.

Figure 2 As mentioned above, add labeled lines for clarity and easy reference in text. Adding a colorbar for the grayscale may be useful and make these measurements more quantitative.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 8017, 2007.

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Interactive Comment