

Interactive comment on “On the distribution of formaldehyde in the western Po-Valley, Italy, during FORMAT 2002/2003” by W. Junkermann

Anonymous Referee #1

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This paper presents formaldehyde measurements from the FORMAT campaigns in the Po Valley, Italy from 2002 and 2003. Formaldehyde is central to tropospheric photochemistry and the Po Valley is the most industrialized and populated area in Italy and thus the topic of the paper is of significance to tropospheric chemistry. The formaldehyde observations are of high quality and they present a valuable data set.

There exist a number of previous papers discussing formaldehyde from the Po Valley, including from the FORMAT campaigns, in particular Liu et al. (2007a, b referenced by the author). The work by Liu et al. already contains some description of some of the measurements presented here as well as a model measurement comparison. Thus, it is this reviewer's opinion that it would be helpful and necessary to present a clear delineation of what the new findings in this work are. I would suggest this should be

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done with some detail in the introduction, e.g. what are the findings of Liu et al. and others and what are the goals of this paper that go beyond this (e.g., discussion of the areas north and south of Milan, some aspects of the airborne observations, etc.) and to also make it clear in the abstract what the new aspects are. This is particularly important with respect to section 4.

It is unfortunate that the other (non-Hantzschi) formaldehyde measurements from FORMAT are not included as this would provide a very comprehensive review of the distribution of formaldehyde in this important region and thus strengthen the paper. However, this likely is beyond the scope of this work.

I recommend this paper for publication if the author revises the manuscript to highlight the new aspects being presented and their relevance.

I have a few minor comments for the author to consider:

P. 14003 lines. 9, 14 and 16. Although it is fairly clear within the context the m.s.l. and a.s.l. and their relationship could be made clearer.

P. 14005 line 7. What is meant with a visible source of formaldehyde?

P. 14005 line. 14. The text refers to Fig. 3a and 3b. The figure does not state a and b although it contains the year and thus is clear.

P.14005 line 17 states that the “trends can be attributed to changes in local emissions” It could be helpful to explain how this can be done. Is there evidence for changes in local emissions that supports this, or is the rationale that based on the formaldehyde there have to be changes.

Figure 2: Is it possible to indicate the measurement sites in the figures?

Figure 3: It would be helpful to have the x-axis on the 3-plots from the same year match, as this will make it easier to compare them.

Figure 5: It would be helpful to indicate, which color is ascent and which one is descent

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and provide some means of assessing time of day for these (e.g. as in figure 6).

Figure 6: It would be helpful to indicate, which color is ascent and which one is descent.

I would further recommend going over the manuscript to consider some of the phrasing of the paper for clarity.

References:

Liu, L., Andreani-Aksoyoglu, S., Keller, J., Ordonez, C., Junkermann, W., Hak, C., Braathen, G. O., Reimann, S., Astorga-Llorens, C., Schultz, M., Prevot, A. S. H., and Isaksen, I. S. A.: A photochemical modeling study of ozone and formaldehyde generation and budget in the Po basin, *J. Geophys. Res.*, 112, D22303, doi:10.1029/2006JD008172, 2007a.

Liu, L., Flatøy, F., Ordonez, C., Braathen, G. O., Hak, C., Junkermann, W., Andreani-Aksoyoglu, S., Mellqvist, J., Galle, B., Prevot, A. S. H., and Isaksen, I. S. A.: Photochemical modeling in the Po basin with focus on formaldehyde and ozone, *Atmos. Chem. Phys.*, 7, 121–137, 2007b.

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