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Atmospheric Measurement Techniques Discussions

Interactive comment on "Application of mobile aerosol and trace gas measurements for the investigation of megacity air pollution emissions: the Paris metropolitan area" *by* S.-L. von der Weiden-Reinmüller et al.

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This paper reports studies on mobile measurements undertaken in the Paris region as part of the MEGAPOLI project, with a focus on the experimental methods, but including some initial results. The material is appropriate for AMT. Further, more detailed studies on the experimental results will be presented in the future. I found this an interesting paper and am happy to recommend publication, but would request that the authors consider the following points.

1. Introduction - I confess to some self interest here, but there are other publications on mobile measurements that have not been cited. Some are possibly too specialized, but we do have a publication on aspects of the PUMA campaign (looking the Birmingham region, ref 3 below) which would be very relevant to this work. References to consider are:

(1) Estimations of Primary Nitrogen Dioxide Exhaust Emissions from Chemiluminescence NOx Measurements in a UK Road Tunnel, W.A. Simmons and P.W. Seakins*, Science of the Total Environment, 2012 438, 248-59. (2) NO and NO2 interconversion downwind of two different line sources in suburban environments, Alison Chaney, David C. Cryer, Emily Nicholl and Paul W. Seakins, Atmospheric Environment, 2011, 45, 5863-5871, Doi 10.1016/j.atmosenv.2011.06.070 (3) 'Measurement and modelling of air pollution and atmospheric chemistry in the U.K. West Midlands conurbation: Overview of the PUMA consortium project.' R.M. Harrison, J. Yin, R.M. Tilling, X. Cai, P.W. Seakins, J.R. Hopkins, D.L. Lansley, A.C. Lewis, M.C. Hunter, D.E. Heard, L. J. Carpenter, D.J. Creasey, J.D. Lee, M.J. Pilling, N. Carslaw, K.M. Emmerson, A. Redington, R.G. Derwent, D. Ryall, G. Mills and S.A. Penkett. Science of the Total Environment 2006, 360, 5-25 doi 10.1016. (4) 'Mobile Laboratory reveals new issues in urban air quality' P.W. Seakins*, D.L. Lansley, N. Huntley and A. Hodgson. Atmospheric Environment 2002, 36, 1247-8.

2. Intercomparisons - Given the nature of the publication (AMT vs ACP), I was surprised that more detail wasn't provided on the intercomparison between the two mobile laboratories. Some of the text could more usefully by replaced and certainly would be enhanced by figures showing timeseries comparions and/or regression plots (I appreciate statistics are given in the table, but are hard to visualize and may be distorted by spikes). Some issues need following up on - e.g. CO2 measurements ' During the time.....and reliably calibrated....' Does this mean that there were other times when the agreement was not good? How do we know when the measurements were reliable? Does this cast doubt on the measurements reported on CO2? Another area to address

would be the NOx data. A difference of 30% would be outside most random calibration errors suggesting a systematic source. NO:NO2 is also an important parameter (like O:C ratio, giving some evidence on air mass processing, but also as a useful indicator of fresh/local emissions) and I would suggest that both NO and NO2 as well as total NOx is reported. It is quite likely that this paper will be referenced in several upcoming studies, so it is important to get this details fixed.

3. Data interpretation and video analysis (2.3, 2.3.1). Ref 3 above includes discussion of local influences including from opposite carriageway (criteria 2) and Ref 1 on tunnel measurements. Presumably there is potential for future automation where proximity devices could be used to screen data (criteria 2 vehicles < 150 m).

4. Fig 1 - I found this figure difficult to interpret (and impossible in b/w printed output). It is not clear where Paris is, what the scale is etc. It might be helpful to have two figures side-by-side, one with a map and the other with the predictions.

5. Section 3.1 (Fig 2) How does this description of the data with obvious influences of local pollution link to the earlier section (2.3.1) on video analysis. Have the data been screened? Possibly might be worth showing a 'before and after' figure.

6. Section 3.2 (Fig 3) What was the role of the MOSQUITA system which appears to be making virtually all of its measurements outside the plume? Fig 3 works well, but might consider removing most of the MOSQUITA data which do not appear to transect the plume shown in Fig 3. This would allow you to expand the spatial scale of the MoLa transects.

7. Section 3.3 (p7685, line 14) What defines the boundary of the plume (shaded area in Fig 4)? On the outward journey the boundary is drawn at 60 km, but O3, HOA and BC all seemed to have reached a plateau closer to the centre.

8. Section 3.4 (Fig 5) The influence of the moving plume across the stationary measurement site is nicely shown. I think it would be useful to significantly expand the time

scale to focus on crossing of the plume - a lot of the data after 13.30 don't change significantly. It would be interesting to see if there is any temporal variation (allowing for different sampling) between the different plume markers. Plotting NO and NO2 as well as NOx (and possibly NO:NO2) might be interesting too.

Minor editorial comments p7674 line 6 times whilst driving... p7677 line 8 should 'Apes' be fully capitalized? p7680 line 7 therefore rather than therewith p7682 line 14 In this section...

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 7659, 2013.