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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Total OH reactivity measurements in Paris during the 2010 MEGAPOLI winter campaign" *by* C. Dolgorouky et al.

Anonymous Referee #1

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[General comments] This paper reported the measurements result of total OH reactivity using comparative reactivity method (CRM) in urban area, where NO concentration is high. Influence of NO and humidity on CRM are checked for high NO urban measurement. Urban air was observed about three weeks in Paris during winter. The difference between observed OH reactivity and calculated OH reactivity (missing OH reactivity) was small during maritime air and large during continental air. The observed results were compared with previous reports observed other cities. The observation of OH reactivity in urban area in Europe is interesting for comparison with other cities. Also the finding of clear relationship between missing OH reactivity and sum of SO4, NO3, NH4 is very interesting. But the observed OH reactivity (missing OH reactivity)

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was surprisingly high in some case (period 3). It would give more confident for this result if the corrections by NO and water vapor are checked also in real atmosphere.

[Specific comments]

Since the correction factors by NO and water vapor are very large (Fig.3, 4), even the author checked the influence of NO and water contents in laboratory, readers would wonder if the correction can be applied for the urban ambient air measurement properly. Is it possible to show the correction by NO and water vapor in real polluted ambient air? Large OH reactivity around 120 s-1 is possible in polluted urban air. But the period 3, NO (and other typical pollutants) was not high and the air seems to be not very polluted.

Possible error is discussed in the text. But the error is not liner for the OH reactivity deduced by CRM from equation (1). Is it possible to show error bar (not data deviation, but theoretically deduced error) in some figures?

Page10944 line 25 : Did you check the influence of filter with your system? The referred paper was using different technique. In 3.4 and Fig. 12, you mentioned relationship between missing OH reactivity and SO4, NO3, NH4 (and organic aerosol).

Page 10947 line 16- : Was the relative humidity (RH) of the ambient air you mentioned here at chamber (24 C), or reaction chamber of PTRMS, or ambient temperature? If RH was at ambient air temperature, RH will change at reaction chamber of PTRMS or in the laboratory (24 C). In my understanding, the influence of water vapor on PTRMS signal will be depending on absolute water concentration in the reaction chamber of PTRMS. In your system, the chamber (room air) was kept 24 C, and T (should be 24 C) and RH were monitored at the end of the chamber, and also water vapor in the PTRMS chamber was monitored by water cluster signals. Therefore RH and water concentration will be proportional. I believe authors consider these differences properly. But it is not clear in the text when you say RH (where the RH is measured).

Page 10963 line 1-4 : HCHO is one of important OVOC, and its contribution to total OH

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reactivity would be 5-10%, and be more important in clean atmosphere. Is it possible to estimate HCHO concentration? For assume HCHO and CH3CHO is proportional etc.. This have also problem, but better than without consideration in fig. 10, 11 etc.

Page10963 line 8-9 : During February 5-8, what kind of interferences were expected?

Figure 9 : During period 3 (February 9 - 13), observed OH reactivity had clear diurnal variation (OH reactivity were high during nighttime?). Do you have any explanation about this? From the calculated OH reactivity (red line in Fig. 9), there were not such diurnal cycle.

Figure 10 and 11 : It will be useful information to show the average total OH reactivity values in these figures (and text).

Figure 12 : For the explanation to show the aged polluted air, backward trajectories and AMS results (SO4, NO3, NH4) are shown. Is it possible to check the age of air by ratio of VOCs?

[Technical corrections]

Page 10940 line 10 : The most important difference between the measurement methods are not “produce OH”, but “detect the decrease of OH”.

Page 10945 line 25 - : Unit of reaction rate constants will be “cm3 molecule-1 s-1”. (without “s” in molecule). (page 10948 line 13,)

Page 10946 line7 : It should be clearly indicated “facsimile” is the name of the model calculation.

Page 10952 line 12 : “HR” -> “RH”

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 10937, 2012.