Atmos. Chem. Phys. Discuss., 10, C3275–C3277, 2010
www.atmos-chem-phys-discuss.net/10/C3275/2010/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Peroxy radical partitioning during the AMMA radical intercomparison exercise" *by* M. D. Andrés-Hernández et al.

Anonymous Referee #2

Received and published: 28 May 2010

General Comments

The present study provides an intercomparison exercise on the measurement of peroxy radical during the AMMA campaign. In this intercomparison exercise, a LIF-FAGE instrument and two similar instruments based on the peroxy radical chemical amplification were subject to a blind intercomparison. Because the intercomparison was performed under real airborne conditions, it is very useful in order to identity biases and artefacts of these instruments. In this sense, this paper is very interesting and is in the scope of ACP. However, some discussions should be developed to explain the discrepancies observed between the measurements or between the measurements

and the model. Moreover it appears that this paper may have been submitted "too early" since some information which are necessary to evaluate the accuracy of the instruments and the model are not available actually and are presented in papers "in preparation". Moreover, some instruments such as the radiometers have to be recalibrated to provide more accurate photolysis rates. In consequence, the authors are encouraged to develop some technical details in this paper.

2. Experimental description

- Both detection limits and estimated accuracies have to be given for all 3 techniques which is not the case actually. Moreover, errors bars should be added on Figure 2 for all data to allow relevant comparisons of the concentrations measured by the different instruments. So errors bars for HO2 and RO2-BAe should be added.

- In the FAGE instrument description, it is explained that the instrument and associated calibrations are described in detail in an another paper but this last one is in preparation actually. In consequence, technical details on this instrument are not available now. This is a real limitation to evaluate the accuracy of the measurements and to compare the results with those obtained by other instruments and by the model. Therefore, more information on the calibrations, the rescanning process of the laser and the estimated accuracy has to be given here.

3. Supporting calculation or modelling

- As in the experimental section, full details on the modelling exercise are given in another paper which is in preparation. So the authors are encouraged to find a solution to provide more information on the model.

- Moreover, several VOCs have been measured during the intercomparison exercise and are used to estimate RO2 and HO2 concentrations. They are mainly alkanes, alkenes and oxygenates (in particular secondary oxygenated products arising from the degradation of isoprene). However, on can wonder about the presence of other VOCs

in the air mass, in particular of other biogenic and/or anthropogenic species (benzene, toluene, ...). Are these missing VOCs supposed to be significant in the probed air masses ? Since other measurements of VOCs were performed during AMMA campaign aboard other planes or at the ground, could the authors use these information to estimate if some missing organic compounds induce a significant error on the simulated concentrations of RO2 and HO2 ?

- p.9 first paragraph, replace NOx by NOy.

- TUV : give a reference.

4. Discussion of results

- p9 and 10 : At the second pressure level, abrupt changes in the concentration of HO2 have been observed at 15:35 and 15:42. Both of these steps follow periods where the laser wavelength was rescanned. The authors indicate that there not evidence to suggest that the sensitivity of the instrument has changed and conclude that these changes are real variations of [HO2]. However, this explanation is not very clear and should be developed. Indeed, this is quite surprising that these abrupt changes occur exactly at the time where the laser was rescanned ! Moreover, this decrease in the HO2 concentration is not correlated to a decrease of RO2* concentration (a slight increase of [RO2*] was observed between 15:30 and 15:35) and is not simulated by the model. In conclusion, the authors should provide a more clear and justified explanation of these changes.

- Photolysis rate are of prime importance to model the concentrations of HO2 and RO2. However, systematic differences of about 25% have been observed between the radiometers aboard the two aircrafts. Calibrations are in preparation to clarify the origin of these discrepancies but results of these calibration would be really useful for this paper. So, the authors should add the results of these calibration, if possible.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 8447, 2010.