

Interactive comment on “Technical Note: Formal blind intercomparison of HO₂ measurements in the atmosphere simulation chamber SAPHIR during the HOxComp campaign” by H. Fuchs et al.

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We thank referee #3 for her/his positive comment. In the following we give a step by step answer to the comments.

COMMENT: Although the general technique for measuring HO₂ using LIF by these instruments is similar, there are significant differences between the instruments. Table 1 lists some of these differences, and other differences are summarized in the text in Section 2.2. It would be useful if Table 1 included all important aspects of each instrument's operation and performance, including nozzle size, flow rate, sampling cell pressure, laser power as well as repetition rate, the OH transition used, water quench-

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ing correction and each instrument's limit of detection and instrument precision.

RESPONSE: We extended Table 1 as suggested by the reviewer.

COMMENT: In addition, it would be useful to provide more information on the instrument calibrations. How often were calibrations performed? How much did the calibration factors change for each instrument during the course of the campaign, and what was responsible for any changes? Did the groups exchange calibration sources to see if there were any systematic differences, or did the design of the individual calibrators prevent this?

RESPONSE: Similar questions were raised by the second reviewer. Most of them were answered in our response to his/her comment. There was no exchange of calibration sources during the campaign, because adaption to the individual instrument design and operational parameters would have been required.

COMMENT: The measurements from the MPI instrument appear to be systematically higher during the ambient measurements as well as during the high ozone experiments in the chamber. In addition to being the only multipass instrument, the MPI instrument is the only one where HO₂ is measured downstream after OH detection. As a result, the airstream is exposed to the OH laser beam prior to reaching the HO₂ detection axis. Did the MPI group measure HO₂ without exposing the airstream to the OH laser to see if the OH laser is causing an interference in the HO₂ measurements?

RESPONSE: The test mentioned by the reviewer was not done during the campaign. However, there is no clear similarity of the relationship between ambient air measurements and high ozone experiments in SAPHIR. Larger values by MPI-LIF occur only during dark periods, when the chamber was exposed to sunlight before and ozone concentrations are high, whereas HO₂ by MPI-LIF is higher than HO₂ by the other two LIF instruments for the entire ambient air sampling period, indicating a calibration issue rather than an interference for the ambient air measurements. Furthermore, there is no interference observed during the ozonolysis of alkenes which was carried out in the

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dark on 22 July, when ozone was up to 100ppbv. As said on p. 21210 l. 6, it is unlikely that ozone photolysis caused the observed interference, so that the test, if the exposure of sampled air to the laser beam in the OH cell causes an interference cannot be carried out in simple laboratory experiments. In principle, this test would indeed give information about the nature of the interference.

COMMENT: Page 21196, line 19: To reduce solar scatter in the FRCGC-LIF instrument, a black aluminum disk coated with hydrocarbon wax was placed above the inlet. How far from the inlet nozzle was this disk placed? Were measurements done with and without the disk to insure that it did not interfere with the HO₂ measurements?

RESPONSE: The disk was placed approximately 8 cm above the inlet. Only daytime measurements during the ambient air period were performed with the disk. It was dismounted for nighttime measurements and SAPHIR experiments. Also during daytime the disk was displaced during certain periods. No change in HO₂ measurements related to the presence or absence of the disk was observed. We added this information on p. 21196 l. 21.

COMMENT: Page 21204, line 18: During the ambient measurements, the nighttime data during the second night showed a significant discrepancy than during the first night, and the manuscript states that "the nighttime data are discussed separately." However, there is no further discussion of the ambient nighttime data in the paper.

RESPONSE: This point was also mentioned by the second reviewer. We modified the manuscript as written in our response to reviewer 2.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 21189, 2010.