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Atmospheric Measurement Techniques Discussions

Interactive comment on "Intercomparison of NO_3 radical detection instruments in the atmosphere simulation chamber SAPHIR" *by* H.-P. Dorn et al.

Anonymous Referee #1

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Intercomparison of NO3 radical detection instruments in the atmosphere simulation chamber SAPHIR by Dorn et al.

The manuscript presents a detailed intercomparison of seven instruments based on spectroscopy for measuring the NO3 radical, which plays a very important role in the night time chemistry. There are three techniques used for making measurements in a controlled environment and the sensitivity and precision of each instrument is explored under different conditions. The paper is well written and I suggest it be published in AMT subject to a few changes detailed below.

Comments

Page 309, Line 21: Was the number of instruments seven or nine?

Reactions R2-R6: remove commas and stops at the end

Were the other CRDS instruments corrected for NO2 offset during calculation of the ring down times similar to the UAF instrument?

Page 341 line 27: Was the baseline drift quantified?

Page 315 line 7: what was the flow rate?

Page 318 line 10 – please give more details on the box modelling

Page 319 line 12: Is it really 61 s?

Page 320 line 9: Mention the cutoff wavelength

Please give details as to how the L_eff was calculated for all the CRDS instruments.

Page 323 line 6: Should the mirror reflectivity not be measured more regularly to account for any deposition effects? Could this be why the CE-DOAS is less accurate on some days with more aerosols?

Page 329 – the pressure was slightly over the ambient pressure.

Page 330 line 11 – should be 4 and 2 pptv, respectively.

Page 334 line 6 – why did the sensitivity change?

Page 335 line 4 – why was the arc so unstable – this is an easily solvable problem with DOAS instruments?

Page 335 line 24 – why did the differences increase? I couldn't find it in the paper.

Please give similar information for all instruments – e.g. which detectors, spectrometers and light sources were used. It would be useful to have a table with the similarities and differences between the same techniques, especially for the CRDS instruments. Also, maybe you can describe the common features of the CRDS instruments in one place and then detail the difference, more importantly why the groups chose different

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configurations. Essentially the pros and cons.

The use of the goodness-of-fit parameter (q) indicates that the measurement errors are underestimated for most of the instruments on most of the days. The authors should specify whether its because of the assumption of a linear model or whether its a non-normal distribution. If indeed the linear relationship is in question for most of the experiments, a different statistical method should be used to calculate the correlations.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 303, 2013.