

Interactive comment on “Laboratory evaluation of the effect of nitric acid uptake on frost point hygrometer performance” by T. Thornberry et al.

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Received and published: 21 December 2010

We thank the reviewer for the review of our manuscript and the constructive comments provided. We have revised the manuscript to address the specific comments and include a response to each point below.

(page 3727, line 11) is the disagreement rather an offset than a relative disagreement (25–100%)

The source of the observed measurement disagreements at low ppm levels of water

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vapour in the UT/LS has not been identified, whether due to sensitivity changes, instrumental artifacts, calibration difficulties, or some combination thereof. The text has been changed to include this description.

(3732, 4–9 and 3734, 1–2) To what extent do the authors use the permeation source as a reference standard? Is it more reliable than the frost point method itself? What is the potential uncertainty due to the MFC used in the experimental setup? – It's not affecting the analysis concerning the HNO_3 sensitivity, but might be of interest in general.

The frost point measurement, particularly from the instrument not exposed to HNO_3 , was used as the true estimate of H_2O in the flow system. Under the experimental conditions, the precision of the frost point measurements and the agreement between the two instruments was significantly better than the 9% uncertainty claimed for the CFH in the UT/LS. The H_2O permeation source was not used as a standard, other than to initially compare the mixing ratio calculated from the manufacturer-stated output at 60 °C to the frost point derived mixing ratio as a consistency check. The agreement was within 10%. The use of frost point temperature to determine water vapour has been clarified in the text in section 2.3.

(section 3.1) The authors should consider to include a table with the individual experiments carried out (at which H_2O , HNO_3 , what are maximum deviations, etc.).

Given that no temperature deviations were observed in any of the experiments, including the highest exposures achieved, we felt that enumerating all of the conditions tested in a table would not provide significantly more information than describing the upper exposure limits achieved in these experiments.

Editorials: (3728, 29 and in reference list) Schäuble

Text corrected in both instances.

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(3729, 2) AIDA is not explained

Explanatory text “a large volume aerosol and cloud simulation chamber in Karlsruhe, Germany” was added.

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 3725, 2010.