

Interactive comment on “Field inter-comparison of eleven atmospheric ammonia measurement techniques” by K. von Bobruzki et al.

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We appreciate the overall positive response of the reviewer and thank for the constructive comments that have helped to improve the manuscript further.

Anonymus Referee #1: An important message is that time resolutions are generally worse than indicated by the manufacturer. To me this points to the stickiness of NH₃ molecules on surfaces. The dataset certainly would allow a more profound investigation. Exemplarily: how are reacting the different systems to rapid changes in the atmospheric concentration; is there any dependence on the relative humidity?

Reply: Yes, we agree that in many instruments the wall interactions are the reason for the limited time-response, and that this, on closer inspection, may vary with humidity. In

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the wet chemistry instruments, with very short inlets, however, the limiting factor tends to be the turn-over time of the liquid pool in the denuders. Thus, the wall interactions primarily affect the fast-response instruments. A closer investigation of the RH effects on the response time of the c-QCLAS will be the subject of a separate paper, which will be submitted by co-author R. Ellis to AMT in the near future.

Anonymus Referee #1: Describing the quality of the systems with correlation coefficient to a synthetic NH₃-ref that itself is derived from the measurements is likely to give a rather good looking result and small, but systematic differences are easily overlooked. Such differences might play an important role in case such systems are used for flux measurements in a gradient configuration.

Reply: In this paper we use a dual approach. We describe the performance against the ensemble average (Table 2 & Fig. 2), but we also compare the individual instruments against each other (Tables 4-8), which provides information on the 'systematic differences' to which the reviewer refers. It is true that the comparison against the ensemble average contains some circularity, but since this is the average over typically at least five instruments, the impact of each instrument is limited. To be able to use any two NH₃ instruments for flux gradient measurements, they usually have to be carefully cross-calibrated on a regular basis and correction procedures need to be derived (see comment of Reviewer-2 regarding the TAbMEP measurements).

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 1783, 2009.

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