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Atmospheric Measurement Techniques Discussions

Interactive comment on "The Cabauw Intercomparison campaign for Nitrogen Dioxide measuring Instruments (CINDI): design, execution, and early results" *by* A. J. M. Piters et al.

Anonymous Referee #2

Received and published: 2 November 2011

Scope/Overview of Paper:

CINDI was an intercomparison campaign conducted in June and July 2009 at the Cabauw experimental site not far from Utrecht in the Netherlands. Nitrogen dioxide, NO2, was the principal constituent measured by 24 spectrometers, all but 3 capable of viewing by multi-axis approaches. Several reference instruments operated on the ground (in-situ, lidar) and on a tower. Relevant meteorological data were collected over 31 days of experiment that featured fairly extensive sunlight viewing conditions. Measurements of O4, HCHO, ozone, H2O, and glyoxal were made by some of the

sensors. Selected NO2 comparisons are shown for the spectrometers and reference instruments. The results on intercomparison for NO2 are very good, resulting in a 15% agreement among the 20-odd instruments. Aerosol comparisons are sparser and less promising. Differences among the instruments for one of the aerosol parameters ranges from 1.5 (50% agreement) up to a factor of 4.

STRENGTHS & SUMMARY RECOMMENDATION:

1) The paper is intended as a reference for the various NO2 instruments for participant in various monitoring and validation programs. The goals and compilation of participant instruments are well-defined.

2) Photos. Tables about the instruments are a good digest of overall differences in aiming geometry, etc.

3) The preliminary statistics are very useful and good to have summarized in one place. Overall the paper should be published after the issues listed below are addressed.

ROOM FOR IMPROVEMENT

1) Although the photos are helpful, a diagram that summarizes the viewing geometry for most of the spectrometers would be helpful. In Section 2.3, having a simple figure or two to allow a novice to understand the terminology will make this section and the other descriptions of instruments (in Appendix) less jargony. Photos don't tell the reader a lot without a basic frame of reference. The paper is written as if specialists only will read it. This is not a good assumption because this will be a long-lasting and highly cited paper and should provide the basic information to ensure that this is so. The paper can serve as a reference for people who are starting to work in this area of technology. For an AMT article, having the technology clearly spelled out is important.

2) Some of the graphics are very poor. Figures unreadable because legends are too small. Some colors almost overlap in value/tone and cannot be distinguished from one another. These are: Figure 7 (color scale labels reproduce poorly); Figure 9 (blue and

black hard to distinguish); Figure 16 (unreadable labels on axes).

3) This Reviewer found the information about aerosols discouraging - poor agreement, but the data were not well-digested or described (Section 4.6). Maybe some other papers will do this important topic more justice but the current one is inadequate. Consider removing this discussion altogether.

4) The references are full of 'in preparation' and multiple page numbers that are very confusing. Examples: Roscoe et al (page 5979; Spinei et al.

5) The paper has some grammatical fine points that can be improved as follows.:

Page 5938. Line 24... agree within 25% of one another. (Add words)

Page 5941 Line 4. Better wording... Simultaneous (spelling check) observations at 3 m altitude drovided the opportunity to demonstrate that there is a bias between the ....

Page 5982. Line 26 Cabauw is *a* rural site...

Page 5945 line 2. First time, (add comma) Line 13. Relative humidity; thus, drying frustrates...

Page 5946, line 13. All seasons. It also supports aviation at...

Page 5952. ...all day. Only the presence of...

Page 5953. Line 17. Duration in time (what times? Periods).

Page 5958, Line 26-27. Factor of 6; this variability....

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 5935, 2011.