



Interactive
Comment

Interactive comment on “Greenhouse gas observations from Cabauw Tall Tower (1992–2010)” by A. T. Vermeulen et al.

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The paper provides a nice description of measurements at the Cabauw tower and the evolution of the instrumentation over the years. This is an important data record, and the manuscript is needed for documentation. It is a substantive and appropriate contribution to the special issue on Tall Tower measurements in Europe. It is, of course, challenging to sum up ~20 years of measurements in one paper.

Some general comments:

The measurements are not really concentration measurements, but rather dry air mole fraction or mixing ratio measurements. This should be clarified early on.

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There are lots of small grammatical errors and inconsistencies between figure captions and text. Also, the tables and figures are cited out of order.

The “trend” analysis seems overly complicated. I think it is perhaps better to just use afternoon averages for trend and seasonal cycle analysis. In any case, more clarification is needed about which trimming method was applied to which species.

Figure axis labels & legends are too small! I had to blow them up to >200% to read in some cases.

Specific comments:

Abstract:

Pg 4170 line 15: Is the region around Cabauw tower really one of the most intensive and complex source areas of greenhouse gases in the world? It is not obvious to me that it would be any more complicated than many other sites.

Pg 4170 line 21: suggest: “The influences of strong local sources and sinks are reflected in. . .”

Pg 4171 line 5: sentence with “that is and will be used” is confusing.

Pg 4172 line 20: Cabauw tower was erected in 1972

Pg 4172 line 26: suggest: a consortium of 9 institutes and universities has been in place to use the tower. . .

Pg 4173 and Figure 2: It would be useful to show daytime and nighttime footprints separately. Perhaps point out that many global and continental-scale inverse modeling studies to date do not use nighttime data.

Pg 4177 line 13: “aforementioned”

Pg 4178 line 5: a small fraction of the air stream was directed to a NDIR analyzer

Section 3.1.1: No mention of use of “targets” during this period. Were they used in
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period A? If not, how was the precision estimate in Table 2 determined. Also, no mention of whether there were differences in humidity between samples and standards during this period. Short-term precision of 0.5 ppm can be estimated from the span gas measurements, but what about drift on timescales of hours?

Pg 4182 line 20: suggest: “ a new set of equipment was installed at Cabauw”

Pg 4184: I read lines 5-12 to indicate that two targets are sampled every 30 minutes. Is that correct? If not, then clarification is needed.

Pg 4190 line 21: Replace “between” with “among” to indicate that more than 2 labs were involved. Also, when possible, I prefer the word “comparison” rather than “inter-comparison”.

Pg 4190 last paragraph: Are the numbers given after the correction for the problems identified with the cucumber cylinders? It would be interesting to elaborate more on the nature of the problems that were identified, since this could be instructive to others attempting to make high accuracy GHG measurements.

Pg 4191: Figure 4a,b is for period 2000-2010, not 1992-2010 as stated in the text. Reference to figure 5 on line 17 is confusing –not sure which figure I am meant to look at for some of the points being made. Also, according to the caption Figure 5 covers 2005-2008, not 2000-2009.

Pg 4192 line 1: cannot see winters of 1994-1999 in the figure since it starts with 2000.

Pg 4193 Figure 5b, Should make it clear in the caption that the standard deviation is the one minute standard deviation, not the standard deviation computed over all years.

Pg 4194: Why not use median statistics to minimize impact of extreme events described at end of section 4.2.

Pg 4195: I have no idea what is meant by the term Omega blockade.

Pg 4195: Figure 6 y axes say “CH4”, but CO2 is being plotted.

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Pg 4197: Figure 7c is CH₄ not 7b. . .also need to make clear which trimming method is used for each species. Why not show the same date range 2004-2009 for all species instead of a longer period for CO₂ and CH₄?

Figure 8: Caption does not seem to correspond to colors on plot.

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