

## ***Interactive comment on “Assessment of recent advances in measurement techniques for atmospheric carbon dioxide and methane observations” by Christoph Zellweger et al.***

**D.W.T. Griffith (Editor)**

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Both reviewers recommend publication with only minor technical corrections. I encourage the authors to address these corrections in a revised manuscript. In addition I have a couple of editor comments, general and technical:

Editor general comment:

I am confused by the references to the "audit" in this paper. It seems that there are two distinct studies here, and they are intermixed in a way that is (to me) unclear. Firstly there is the travelling instrument side-by-side measurements of ambient air at 4 stations, which is the main thrust of the paper, occupies most of the experimental

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description and results up to section 3.5. Secondly section 3.5 then describes a quite different study for which there is no corresponding description in section 2 - Experimental. This is the "audit", which appears to be a separate study in which travelling standards were circulated around a much larger suite of stations and measurement methods over a longer time period. This is quite a separate study and requires some introduction to the sites and instruments and methods in section 2. (I am aware independently that this study happened, but not the details.) At present there seems to be only the last sentence of section 1, and the first two of 3.5, to introduce the "audit". Without further explanation, Figure 15 is very difficult to interpret. Firstly, there is no description of the sites and instruments included in this comparison. Secondly, in a 2-parameter linear regression the slope and intercept can trade off against each other, so the value of plotting the only the slope against the "bias" is not at all clear. Some further explanation is required.

My suggestion is therefore to modify the paper to separate the descriptions and results of the two comparisons . Unfortunately this will make the paper longer, and the authors might reconsider if the audit study could be removed from this paper and published separately; in its current form it is incomplete. If expanding the current paper to address these concerns , I suggest: 1. Provide a separate subsection of 2. Experimental to describe the audit and distinguish the two studies. All details of the audit required to interpret the results to be presented should be included. 2. Arrange the results sections in part 3 to relate to section 2 so that the results of the travelling instrument and the audit are separated. Figures 8, 12 and 15 relate to the audit, not the travelling instrument, and should be grouped together with the relevant description of results. Parallel and contrasting conclusions from both studies can then be made.

#### Editor technical corrections

The manuscript is well produced and I have only two technical comments:

- Page 5 line 6 replace "monotonous" with "monotonic".

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- P5 line 7 and many subsequent examples. I think the correct term should "Allan deviation", not "Allan standard deviation" This is not a "standard deviation" in the statistical sense, and should not be confused with the usual standard deviation. It is the square root of the the Allan Variance, which is something quite different from the usual statistically-defined variance. Perhaps there is a formal definition of this nomenclature somewhere, but I am not aware of it.

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