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Atmospheric Measurement Techniques Discussions

Interactive comment on "Five years of CO, HCN, C_2H_6, C_2H_2, CH_3OH, HCOOH, and H_2CO total columns measured in the Canadian High Arctic" *by* C. Viatte et al.

Anonymous Referee #1

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General Comments:

This paper presents a 5 year time-series of a number of important trace gases measured in the High Arctic. The seasonality of the trace gases is explored and the data are used as a validation tool for measurements from the ACE satellite.

These measurements are important because:

1. They can help to characterise the chemical composition of the atmosphere in the remote Arctic where measurements are sparse 2. The seasonal variability provides additional evidence of the interplay between chemistry and transport which will help to

constrain global atmospheric chemical transport models 3. They provide an excellent means of ground validation for the ACE satellite over the high Arctic.

The paper is very well written and includes an excellent clear introduction to the previous literature. The explanations of the analysis and the uncertainty budgets presented demonstrate that a detailed and thorough analysis has been done. The subject matter is relevant to AMT and the data are certainly worthy of publication.

Specific Comments:

1. The section 3.2 Comparisons with ACE-FTS needs a little re-phrasing. Currently two separate measures of comparison are described together (correlation coefficients and slope). Despite most gases (except CO) having slopes that are significantly different to 1.0 the word "bias" is absent from the description. e.g. HCN is described as in good agreement despite having a slope of 0.69. Isn't this a bias of 31%? This may be an acceptable level of difference but it needs to be stated more clearly. Also it is not clear from the way this data is presented whether this means that ACE-FTS is 31% higher than the PEARL instrument or 31% lower.

2. In my opinion, there is an imbalance in the priority given to the figures in terms of the space allocated. Figure 1 is unreadable at its current size. Figure 9 is the most interesting figure (where all the scientifically significant data is presented) and yet very little space has been allocated and it is only just legible. Whilst in comparison lots of room is lavished on the technical details of the retrievals in Figures 2-8. I suggest that Figure 1 could be split into two and Figure 2 kept as it is to illustrate the point whilst Figure 3-8 could be combined into one larger figure. Finally the individual plots in Figure 9 could be enlarged and presented in a number of separate figures. Of course, this is a matter of style not content, and so the authors need to consider this point and make up their own minds as to the priority given to the figures.

3. The Conclusions section is somewhat long and repeats a number of technical details that are not exactly conclusions. Perhaps the section should be entitled "Summary and

Conclusions". I recommend a ruthless cutting of this section to re-emphasise the main scientific (not technical) points. In particular the entire section from page 11374 line 13 – line 27 could be cut.

Technical Corrections:

None.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 11345, 2013.