Atmos. Meas. Tech. Discuss., 5, C1646–C1648, 2012
www.atmos-meas-tech-discuss.net/5/C1646/2012/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Strato-mesospheric ClO observations by SMILES: error analysis and diurnal variation" *by* T. O. Sato et al.

L. Froidevaux

lucienf@jpl.nasa.gov

Received and published: 23 July 2012

This manuscript describes ClO measurements from ISS SMILES (in 2009-2010) and related error characterization, along with first-order results regarding the ClO diurnal variation in the stratosphere and mesosphere . It certainly represents suitable material, as it underscores the usefulness of the microwave limb sounding technique, and demonstrates the higher signal-to-noise advantage for SMILES, versus other similar ClO measurements. The error characterization and assumptions used seem reasonable, overall. However, I do have a few issues and clarification requests, and a large number of English-related comments; this should be addressed before a revised manuscript can be considered suitable for publication.

» General Comments - The descriptions of the instrument and technique, as well as the error characterization, are overall well done and informative, although there are also references to other technical papers (with some still not published). - The first-order comparisons versus the UARS/MLS dataset regarding diurnal variations are also informative and provide first-order validation. - However, a few issues need some clarification so that readers can better understand the nature of the SMILES ClO observations and their quality at this stage, all the way down to 100 hPa (or to the tropopause) – and also for polar winter enhanced conditions (e.g., by a sample comparison to other observations, at least), even if this is not meant to be a more detailed validation and intercomparison paper. > In particular, some more information should be provided for the lower stratosphere, or, at a minimum, the paper should state why such information is not being provided for pressures between 10 and 100 hPa, or for the lower stratospheric polar regions during winter (for example). See my related comments regarding Table 3, for example. The focus seems to be more on the diurnal change for the upper portions of the stratosphere (and for the mesosphere). Will the other regions (and more validation) be part of another planned paper in the future? This might be good to point out. > Also, and probably in relation to the above comment, is there not a pointing-related uncertainty that still remains to be better characterized for SMILES measurements in general and if so, should this not at least be mentioned, even if it is still part of the "unknown" error estimates? - There are many editorial or English-related comments that need to be addressed or corrected; it would be (or have been) much nicer if some of the co-authors who are more fluent in English than other co-authors had helped through this part of the internal manuscript review process (and read it more carefully) before submission of the manuscript, as this can be a lot of work for reviewers, and should not have to be that way. See the long list of minor comments below. I think that official reviewers should seriously consider sending manuscripts back if this sort of issue happens, but unfortunately, this was not looked into enough during the first "technical review"; I plan to be more vigilant in the future... While this issue is quite understandable for non-native English writers, a solution that somehow

AMTD

5, C1646–C1648, 2012

distributes this work better should be sought. I will ask that the authors cover/review the reference list more carefully, as I have not spent (or had) the time to do that review carefully myself.

» A few questions and clarification requests - p7, line 17. It is not clear why the FOV can change by so much (3.2 to 4.4 km) for the 10-60 km range of tangent heights - please explain or correct this statement. This should not follow from simple geometry, but maybe there is a significant frequency dependence (also unlikely) or maybe an aperture illumination issue as a function of scan angle? If this refers to vertical versus horizontal FOV's, that does not seem to have the right ratio. - In relation to this, please specify the angular step angle (line 26) in km as well (e.g., 0.3 km), to have the same units for convenience (in addition to the angular value). - A mention of how often the calibrations are performed (cold space in particular) should be provided, for completeness, given the amount of detail that is already provided in this manuscript (and in other related past or concurrent papers that are referenced). - p10 (bottom) and p11 (top). Is there not a potential error source from signals outside the spectrometer passbands (but within the mixer and IF amplifier passbands)? How could this be (or is this) accounted for?

» A long list of more minor rewriting/clarifying/editorial corrections is attached in the full PDF review.

Please also note the supplement to this comment:
http://www.atmos-meas-tech-discuss.net/5/C1646/2012/amtd-5-C1646-2012-supplement.pdf

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 4667, 2012.