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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Quality assessment of O_3 profiles measured by a state-of-the-art ground-based FTIR observing system" *by* M. Schneider et al.

Anonymous Referee #2

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Comments on ACPD 8, 4977-5006, 2008

Quality assessment of O3 profiles measured by a state-of-the-art ground-based FTIR observing system

By M. Schneider etal.

Reviewer #2

This is a very well organized and presented paper. It is careful and clear in its analysis and reports on a topic that will find wider application. I believe it to be a valuable contribution to the field of infrared remote sensing.

Below are some general and specific comments. The authors exhibit an excellent command of English but I have made a few suggestion that might make the text flow easier.

Page 4978 Line 2 expand FTIR since this is the first use of the contraction also in line 6 expand ECC Line 5 This is done in the form of…. Line 7 delete “currently” Line 8 …retrieval strategies that represent the current…. Line 22 … constituent and has been monitored for many years by a variety of……

Page 4979 Line 15 … we briefly describe the FTIR instrumentation… Line 19 … measurement were performed at… Line 22 …was operated at the site … … 2005 we operated a … Line 24 …which offers better…

Page 4980 Line 5 …consists of a simultaneous… “a priori” should be used throughout without a dash Line 13 …superior to an inversion… Line 15 …allows us to constrain against…

[What does this mean? “constrain against” is the isotope ratio profile retrieved, is it known from some other source and used as an a priori constraint?] Line 18 define ptu-sondes Line 21 …H2O line parameters we… [Is a water vapor profile applied separately?]

Page 4981 Line 6 …as an independent… Line 16 … estimation is based on… Line 28 … and xa are the…

Page 4982 Line 1 … a priori states p and p are the … … and y are the … Line 2 …and I is the… Line 3 [Is there some reference why this procedure produces an accurate error analysis and not just an analytic and consistent error analysis, what makes it the true (ie accurate) error?] [Table 1 is not just a list of error sources it contains values critical to the later analysis. Where do

ACPD

8, S2790–S2794, 2008

these values come from?] Line 7 …about coarse vertical… [In general I would replace the usage of “rough” with “coarse” when describing vertical resolution.] Line 8 ..profile may be highly… Line 9 define ILS Line 16 … with thickness of… Line 18 …a reasonable estimate of the extent of these… Line 25 … in great detail. For VMR profile errors….we restrict the.. Line 26 …, but we separate the partial column amount errors into … Line 28 …error components.

Page 4983 Line 3 …value gives the … Line 5 …line indicates the … Line 12 …would only confuse the… Line 17 ..program at Tenerife started in…..1992 using ECC… Line 21 …activities were accepted.. Line 24 …2000)) as a complementary observing site. Line 27 … 53 coincident ECC…

Page 4984 Line 5 …between coincident measurements… Line 6 … 2007 allowed Schneider to conclude… Line 8 …is consistent with laboratory… Line 9 …attribute systematic differences to … Line 11 … study of the… … As mentioned we only use ECC… Line 13 …the total O3 column. Line 19 ..for 80 Brewer… Line 20 …6.8 DU between the Brewer total column and the ECC partial column.

Page 4985 Line 5 …altitude to the top… [I personally do not like reference to something so narrowly distributed as minutes. Perhaps the authors could say “ as is common practice among NDACC sonde users”.]

Line 12 [What does real information mean here: the inclusion of the residual above 30.5 km must improve the total column.] Line 20 … that are predicted to …

Page 4986 Line 9 [Why was the profile not extended with the results from section 4.1 and Figure 6, why was that analysis performed if you do not use the result.] Line 17 [sum of the FTIR and ECC in the figure it has (FTIR- ECC)/ECC] Line 18 ..For the ECC random …assumed 6% as suggested… Line 19 [up to 26 km It looks like

ACPD

8, S2790–S2794, 2008

the systematic difference is between -9 and +9 up to 30km] Line 28 …ECC is a mean…

Page 4987 Line 2 …is in satisfactory agreement with the… Line 8 [What does an inverted profile mean here?] Line 11 …are much coarser. Line 15 [What does the original ECC sonde data refer to, is this data different than what has been discussed?]

Page 4988 Line 2 [Can the authors offer any reason why line parameters should be more important for the MS layer than for the TR and TP layers?] Line 7 …low value recalling that… Line 16 …and FTIR measurements observe the same….. Line 19 …which shows the differences…

Page 4989 Line 1 …good insight into the… Line 6 …or tropopause region the…. Line 9 …quality as compared with Brewer…. Line 13 …if the balloon bursts below…. Line 16 … enables us to … Line 21 … We have made an… Line 25 [Does this imply that there is only one a priori that would produce good retrievals? I think not. Perhaps the authors mean a single a priori for all seasons but this may not be unique.]

Page 4990 Line 2 …This offers unique conditions… Line 3 …and an opportunity to document… Line 4 … quality checks are…. Line 6 … estimations concerning the FTIR… Line 12 … We chose O3 as the object of our assessment of ground-based FTIR profile measurements because O3 offers….

Table 1 Expand eff. z. bl. pres. and coef. Why are the systematic uncertainties in line intensity and pressure broadening only negative? Why is there no systematic uncertainty for the solar angle determination?

Figure 1 “typical variability” What variability, 1 sigma? Caption says 1997 to 2006, text says 1996 to 2006.

ACPD

8, S2790–S2794, 2008

Figure 2 This figure is introduced before TR, TP and MS are defined in the text.

Figure 3 “relative to actual VMRs” Section 3 deals only with theoretical error, no real measurements. Figures 3 and 4 imply comparisons with real (actual) observations.

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Interactive Comment