June 29, 2009 — Review of Thouret et al: Two years of ozone radio soundings over Cotonou as part of AMMA: Overview

Summary Comment & Recommendation:

The paper is of great general interest to atmospheric scientists and it documents a set of data that are being widely used. Improvements need to be made to the paper in two ways: (1) some graphics are of very poor quality and nearly illegible; (2) quite a bit of prior research on the tropical convection-ozone topic has been carried out that should be acknowledged with more complete references. With those changes made, the paper can be published.

Specific Comments:

page 11223 - Although SAFARI and TRACE-A are mentioned in a number of places relevant references are not cited. These include:
D Jacob et al (1996), JGR on TRACE-A
K Pickering et al (1992) JGR on biomass burning mixed with convection; also a TRACE-A paper by Pickering et al, JGR (1996)
A Thompson et al (1996; TRACE-A) - and GRL (2000) on complexities of the tropical Atlantic that pre-date the Sauvage et al (2006) work — this applies to line 21. The RHBrown cruise showed the NH-SH ozone complexity highlighted in the present study. Note that satellite data also bring this to light as in -
Edwards et al (JGR, 2003); R V Martin et al (JGR, 2002? And 2004 or 2005)
Other relevant papers -
G Jenkins - several of these in JGR, ACP

page 11225 - line 7. Reference to SHADOZ website *and* to WOUDC woudc.org (World Ozone Data Centre, WMO sponsored) for archive should be provided in addition to AMMA archive

page 11225 - line 24. *and* top of page 11226 -the following are more relevant than Newchurch et al bec they are based on dedicated experiments for looking at data quality critically. Likewise, WMO sponsored work with sonde intercomparisons that has updated the deBacker work, eg:

Deshler, T., et al., Balloon Experiment to Test ECC-ozonesondes from different manufacturers, and with different cathode solution strengths: Results of the BESOS flight, J. Geophys. Res., **113,** D04307, doi:10.1029/2007JD008975, 2008.

Smit , H. G. J., et al: Assessment of the performance of ECC-ozonesondes under quasi-flight conditions in the environmental simulation chamber: Insights from the Jülich Ozone Sonde Intercomparison Experiment (JOSIE), J. Geophys. Res., 112, D19306, doi: 10.1029/2006JD007308, 2007.

Thompson, A M, J C Witte, H G J Smit, S J Oltmans, B J Johnson, V W J H Kirchhoff, F J Schmidlin, Southern Hemisphere Additional Ozonesondes (SHADOZ) 1998-2004 tropical ozone climatology. 3. Instrumentation, station variability, evaluation with

simulated flight profiles, J. Geophys. Res., **112,** D03304, doi: 10.1029/ 2005JD007042, 2007b

Page 11229 - Figures 4 and 6 appear to be mentioned out of order

Page 11226 - on Figure 6, you could compare transport (or at least, winds) to climatology to see if Dec 06 is indeed unusual. Show the reader.

Page 11230 - Line 16 - Pickering reference above in SAFARI.TRACE-A issues would be highly relevant.

Page 11235. Line 8 "variability in the Brewer-Dobson circulation" would be better.

Page 11236. Line 3 - NOT SO! Nairobi data (1997-2008 at 1S) are the first equatorial African ozone sounding data with high-density (approx weekly) coverage! In discussing tropospheric columns of ozone, it is surprising that comparisons are not made to the Nairobi SHADOZ record (see Thompson et al., 2003; 2007). This tells quite a bit about meteorological influences and those columns are more accurate than satellite data. The impact of the paper would be greater if the east African data were included.

Page 11237. Line 26. September month; (needs semi-colon)

Page 11239. On this page there is much discussion of values like 4.99 DU, 1.66 DU - these seem as if over-stating statistical significance of figures. What is the precision one really expects? Also applies to page 11240 esp line 26.

Line 15. More omission of prior work. In addition to Pickering et al., JGR (TRACE-A, 1996), Smyth et al, 1996 reported lightning influences on elevated NO in tropical southern hemisphere. Levy and Moxim (2000) is an important modeling reference, albeit for early lightning season.

Page 11240. Even in the tropics, where the tropopause is relatively "firm" upper tropospheric air shows signs of stratospheric influence. The various products referred to attempt to find a more accurate tropopause but layers of stratospheric and tropospheric air intermingle and cannot really be discriminated often within the TTL, "tropical tropopause layer."

Figures 2&4 - the read vs magenta is not distinguishable to many readers

Figure 8 - impossible to read

Figure 14. It seems significant that the poorest agreement of the OMI/MLS product occurs during the highest soundings. What is the effect of averaging?