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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The CO_2 tracer clock for the Tropical Tropopause Layer" *by* S. Park et al.

S. Park et al.

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Reply to review 2

We have made changes to the manuscript to answer the suggestions of the reviewers and clarified a few points raised in review. We respond to the reviewer's comments below and a revised version of the manuscript including most of the changes suggested by the reviewers will be submitted to the editor. We thank the reviewers and the editor for their time and effort and appreciate the recommendation for publication.

1. Yes, the reviewer is correct; the phrase reading "indicating..." has been removed to avoid confusion. After learning throughout this paper, one can see that the LZH level (about 360K) is more acceptable as the base of the TTL, just as the reviewer commented on. However, we prefer to keep here a summary of the ideas for the lapse rate minimum level as the lower boundary of the TTL, based on the thermal structure, for the purpose of introducing the most common description of the region and setting

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the stage for our data analysis.

2. We agree. We suggested the level of 360K as an important boundary within the TTL from the speculation on individual profiles, since the single profile more clearly contains natural variability of CO2 mixing ratio that presents significant pieces of information about source location and transport/mixing. We realized that more analysis for comparison between TWP-ICE and CR-AVE beyond the emergence of CO2 mixing ratio at 360 K could be limited due to the lack of TWP-ICE datasets above the level of 360K. We thus hope the current discussions will initiate deeper investigation of the TTL from the southern hemispheric side.

3. page 12. This has been clarified in the section of 3.3.2 of the revised text.

4. Altitude and potential temperature climatology obtained by the Meteorological Measurement System (MMS) on the WB-57F aircraft during CR-AVE showed in average that 12, 12.5, 14, 14.5, 17.8, and 18 km corresponded to 348, 350, 358, 360, 390 and 395K, respectively, but the climatology varied within +/-0.4 km fight by flight.

5. The WB-57F does not fly into convection, and the samples were obtained outside the convective core, which we have clarified in the text. The humidity was close to saturation.

6. The citation has been added to the introduction and the section 3.3.2.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 6655, 2007.