

Interactive comment on “Trends, interannual and seasonal variations of tropospheric CO, C₂H₆ and HCN columns measured from ground-based FTIR at Lauder and Arrival Heights” by G. Zeng et al.

Anonymous Referee #1

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General Comments

Zeng et al. describe and analyse a valuable, long-term Southern Hemisphere dataset consisting of ~13 years of atmospheric measurements of CO, C₂H₆ and HCN from Lauder, New Zealand and CO and C₂H₆ from Arrival Heights, Antarctica. They compare their measured partial columns to modeled partial columns and note that the modeled results do not capture the statistically significant negative trends of these gases over the period of the measurements. The authors provide some speculation on the possible causes of the disagreement between the model and measurement, and test

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a subset of them, but it is not clear whether the possible causes can eliminate the difference in the trend between the model and measurements.

Specific comments

P6193L14-20. I don't accept the argument that you do not need to take averaging kernels into account because you are interested in “characterizing the seasonal and interannual variations rather than improving the comparison between the modelled data and the observed data.” Without properly accounting for the averaging kernels and a priori profiles of the measurements, you can draw the wrong conclusions about where your model is (or is not) wrong. For example, if there is a significant difference in your averaging kernels at different times of the year, this may affect the measured seasonal cycle amplitude. Only if you apply the same kernels and a priori to the model can you properly assess whether the model is able to capture the measured seasonal cycle amplitude. At the very least, a sensitivity study should be undertaken to assess the magnitude of the effect of the averaging kernel and a priori profile on the model.

P6194 Items (1) and (2) are not discussed further, so a quantification of their maximum effects is important.

Technical comments

There are two acronyms defined to describe the instrumentation: FTS, FTIR. For simplicity, please pick just one.

P6189L4: “is largely similar to” → “is similar to”

P6189L28: “appropriate to year 2000” → “appropriate for the year 2000”

P6192L1: “OH could play an critical” → “OH could play a critical”

P6192L25: replace “supposedly” with “a”

P6192L26: insert “the” between “exhibit” and “largest”

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P6193L8: replace “largest” with “strongest”

P6193L10: replace “considerably large”

P6194L7: Please quote the errors on your trends.

Figure 5. I believe the Southern Africa curve is in black, not blue.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 6185, 2012.