

Interactive comment on “Investigating the long-term evolution of subtropical ozone profiles applying ground-based FTIR spectrometry” by O. E. García et al.

Anonymous Referee #2

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This study focuses on improvements in the application of FTIR remote sensing techniques to assess ozone trends as a function of altitude using measurements performed at the subtropical site of Izaña from 1999 to 2010. This paper first presents a full description of the implementation of different ozone profile retrievals as well as their influence on ozone data quality. An in-depth discussion about retrievals sensitivity and capability, based on averaging kernel analysis and error estimation, is provided. Then, retrieved FTIR ozone profiles are validated by comparing them with ECC-sonde data corrected with simultaneous Brewer measurements, in order to analyze and discuss ozone trends and seasonality above subtropical stations.

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In my opinion, the subject of the paper is within the scope of this journal, and the scientific discussions of the instrumental setup and retrieval analysis are well detailed. These retrievals and the resulting data analysis improvements are crucial to achieve sufficient accuracy for ozone monitoring in order to obtain long-term time series for trend analysis. The discussion about ozone trends and seasonality is particularly interesting. Hence, I recommend that this paper be published in AMT after the comments below are addressed.

Specific comments:

Section 1: What do you mean exactly by ozone "Programme"?

Section 2.1 (p 3435 line 3): Are there any references about the comparison between the two FTIR measurements?

Section 2.1 (p 3435 line 9): Since this paper is for technical journal, you may want to add some more instrumental details about the instrument (FOV, ILS, filters, numbers of scans, detectors, etc...) or add a reference about those details.

Section 3.1 (p 3436 line 12): Why do you perform retrievals on a logarithmic scale? What are the advantages compared to a linear one?

Section 3.1 (p 3437 line 7): Why do you make the assumption of heavy ozone enrichment of 100%? Can you explain?

Section 3.2 (p 3438 line 2): In figure 2, Av_k (8–18 km) in setup C seems negative compared to setup A and B. What is the effect of this on retrieved ozone concentrations?

Section 3.2 (p 3438 line 10): You observe some annual cycle in the dof time series, why does dof vary throughout the year?

Section 3.3, Table 2: You say that Av_k (A) is almost equal to Av_k (B), which is the reason to exclude Av_k (A) from Figure 1. But considering the difference in the value of the dof in Table 2, you should probably add a comment about these differences in this

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section.

Section 3.3 Figure 4: Baseline error profiles do not have the same pattern for A, B and C. Can you explain why?

Section 3.3 (p 3440 line 2): Temperature retrievals are important for accuracy of ozone data. This has already been demonstrated in Schneider, M and Hase, F (2008), you could add this reference here.

Section 3.4: What affects modulation efficiency and phase error over time?

Section 4: The introduction of this section is almost a repetition of the general introduction. You may make it more concise.

Conclusion: You might add some perspectives and future works of this study.

technical comments:

- p 3433 line 11: add a coma after "2100".
- p 3433 line 26: "since 1999" may be placed at the end of the sentence.
- p 3434 line 1: Izaña Observatory and Its Ozone Programme is capitalized so it should also be in the title of section 2 and the same at line 11 and 22 for the word Programme (as well as p 3441 line 22).
- p 3434 line 20: the "p" of programme should be capitalized.
- p 3434 line 25: add a coma after "January 2005".
- p 3435 line 4: delete the word "network" after NDACC as it is repetitive.
- p 3435 line 9: "maximum Optical Path Difference".
- p 3438 line 28: "Line Of Sight".
- p 3445 line 22: repetition of the word "small".

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- p 3449 line 15: "19990-2010" should be 1999-2010.
- Table 1: define the word "Tfe".
- Figure 6: add in the caption that it is about setup C.
- Figure 12: define "/10a" in the caption.

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