

Interactive comment on “” by

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Introduction

Following the suggestions of Howard Roscoe, we have made revised figures and also introduced a new figure 5. The old figure 8 has been taken out because with the new calculations it is so similar to figure 4 that there is no point in showing it. We assume that we did an error in the original calculations behind figure 8 in the original paper that made us believe that using the same temperature data among the groups for the ozone retrieval made a visible difference in the ozone profile below 20 km.

Reply to Major comment of H. Roscoe

The authors agree with H. Roscoe that by calculating the standard error of the mean of the differences one reduces the influence of atmospheric variability. The calculations have been redone according to Roscoe's suggestion and Figures 4, 6 and 7 (4, 5 and 6 in the original manuscript) have been revised. In Figure 4 the standard error is now smaller, but the region where the differences are significant have not changed much

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by using the new calculation. It is only between 18.5 and 20 km that the differences have gone from being insignificant in the original manuscript to significant in the revised manuscript.

Reply to Minor comments of H. Roscoe

Minor comment no. 1: The authors have changed this sentence, now stating that ozone is “one of the most important components to be measured.

Minor comment no. 2: The original text has been replaced by an improved description of the GSFC system, for both section 2.1.1 and 2.1.2. A sentence to explain the purpose of a mechanical chopper has been added.

Minor comment no. 3: The text has been revised and the explanation is now better.

Minor comment no. 4: A sentence to explain this has been inserted

Minor comment no. 5: The CNRS ozone lidar data has been smoothed to the resolution of the GSFC data. The analysis leading to Fig. 4 has been redone with the smoothed CNRS data. The result of this analysis is shown in the new Fig. 5. This leads to a somewhat smaller relative mean of the differences up to 41 km, but a greater relative mean of the differences, although not significant at the 2 sigma standard error level, above this altitude. The vertical range where the relative mean of the differences is statistically significant to the 2 sigma level is very similar to the result obtained with unsmoothed CNRS data (Fig. 4).

Minor comment no. 6: The time lag of the ozonesonde will vary with pressure and will hence not be constant over the course of the sounding. Results from the JOSIE experiments indicate that the response time of the ECC sensor is approx. 20-30 seconds. Response time here means the time it takes for the sensor signal to decay to S_0/e when ozone is removed from the sampled air. This would correspond to a vertical shift of approx. 100-150 m. Such a shift is usually not applied to operational ozonesonde data. However, the authors have carried out an exercise where the sonde data was

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smoothed and shifted by 300 m. These modified sonde data have been compared to the GSFC lidar data since this is the data set with most coincident sondes (5). The shift leads to a clearly visible slope in the difference profile, which indicates a height shift problem which was not there using the original unshifted data. The authors therefore prefer not to subject the sonde data to any vertical shift, at least not of the magnitude suggested by the referee. In addition, the smoothing did not change the difference profile significantly, and as seen from Figure 6 (revised paper), the mean of the differences is statistically insignificant over most of the altitude range.

Minor comment no. 7: The authors are aware of the difference between “standard deviation” and the “standard error of the mean”. The confusion here is related to the fact that the authors believed one could use the term “standard deviation of the mean” (which is not the same as the “standard deviation of the data set”) to denote the “standard error of the mean”. The manuscript has been corrected so that the term “standard deviation of the mean” is no longer used.

Reply to technical comments

1. Agreed. This has been corrected.
2. Agreed. This has been corrected.
3. Agreed. A new abstract, with results, has been written.
4. OK. This has been corrected.
5. OK. This has been corrected. Note: it is in sec 2.2.1. There was wrong numbering in the original manuscript.
6. OK. Done
7. OK. Done
8. A better formulation has now been written at the end of paragraph 1 of 2.3.2. It ought to be clear now.

9. Yes, the authors mean “when to reject data”. The text has been changed to clarify this.

10. OK. These abbreviations have now been spelled out. KFA is now called FZJ, by the way, and this has been updated.

11. OK. This has been corrected. Both the date and the style.

12. OK. This has been fixed. The red now shows through the green in Figure 5.

13. Since ACP is an on-line journal one does not have to take into consideration whether the figures come out nice on paper. If one makes the green line considerably thicker it will be more difficult to appreciate the details of the plots. Since the figures are in vector format (encapsulated postscript) they can be magnified up to 6400% in the Adobe Reader. The authors therefore prefer to keep the thickness of the lines.

14. This has been fixed. The number of the figure has been updated to Figure 8 as a new Figure 5 has been introduced.

Answer regarding references given by H. Roscoe: The authors assume that these references are meant as background material for the comments and not meant to be included as references in the paper.

Caption to New Figure 5: Fig. 5. Same as Fig. 4, but the CNRS ozone lidar data has been smoothed so the resolution is similar to the GSFC lidar.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 5303, 2004.

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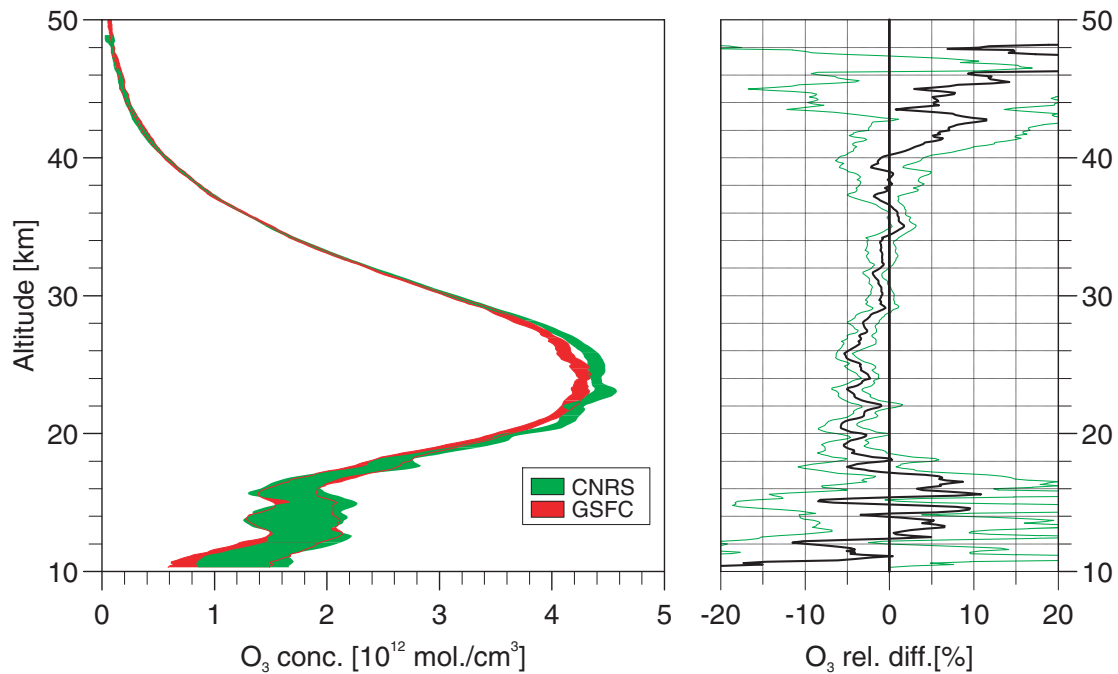


Fig. 1. Revised Fig 4.

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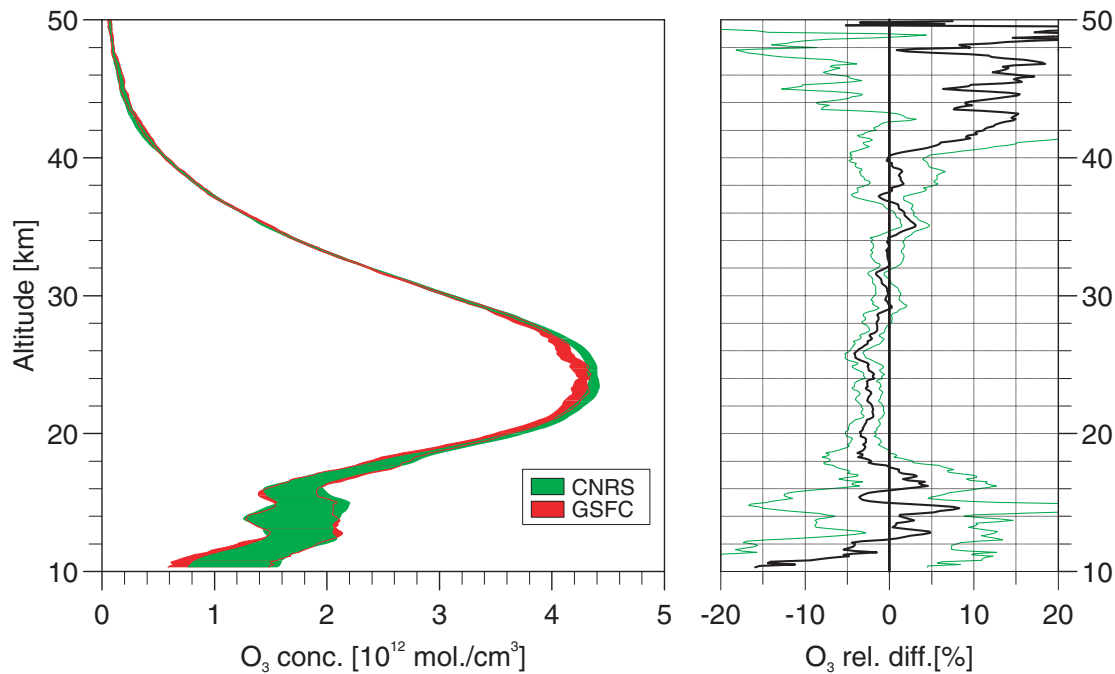


Fig. 2. New Figure 5.

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