

Interactive comment on “Ground-based FTIR O₃ retrievals from the 3040 cm⁻¹ spectral range at Xianghe, China” by Minqiang Zhou et al.

Anonymous Referee #2

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General comments:

The authors present a study on ozone retrievals from infrared spectra recorded in Xinghe, China and on Reunion Island. Data from these sites are highly needed since these areas are poorly represented in the networks. This study uses the 3040 cm⁻¹ spectral region and presents results of a one year time series and a characterisation of the 3040 cm⁻¹ ozone product. Moreover, using spectra from Reunion Island data obtained from the 3040 cm⁻¹ region are compared with those with the standard NDACC retrieval at 1000 cm⁻¹. The comparison shows a good correlation, but a bias of 5.5 to 9.0 % and reduced degrees of freedom compared to the standard microwindow. Ozone retrievals in the 3040 cm⁻¹ cm⁻¹ region are very useful since there are several FTIR spectrometers without an MCT detector around the globe.

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For the 3040 cm⁻¹ retrieval a modified version of the recipe of Garcia et al., 2014, was used. As a result, the key findings are very similar to those obtained by Garcia et al., 2014. However, since the recent study doesn't use exactly the same recipe, strictly speaking, it cannot be used as confirmation of the Garcia recipe and as an extension including more sites covering different conditions. To my impression, it is not clear whether it is a confirmation of the Garcia paper showing similar retrieval results or whether there is an improvement as compared to the Garcia paper. If the authors claim the latter this should be demonstrated or at least discussed in detail. To do so the authors might think in adding a Garcia type retrieval for comparison.

Therefore, I would recommend publishing this paper after major revisions although the paper is well written and fits well to the scope of AMT. Please also see specific comments below.

Specific comments:

- The statement in the abstract 'as the harmonized ... uses the 1000 cm⁻¹ spectral range, we designed an alternative O₃ retrieval strategy ...' is not correct since there is a published 'alternative' retrieval recipe for FTIR sites without MCT detector as published by Garcia et al., 2014.
- The recipe from Garcia et al. 2014, has been modified. The modifications made and the rationale behind these modifications should be described in more detail. Moreover, a comparison with retrieval results using the full recipe from Garcia et al. would be very useful to see the effect of these modifications.
- p. 4: 'a few badly fitted absorptions': Fig. 1 shows strong residuals at ozone line positions in particular in microwindow 1, not included in the Garcia paper. Does this additional window really improves the fit results although the line list needs improvement for this window?
- p. 3: 'One specific optical bandpass filter (2000 – 4000 cm⁻¹): This is not the standard

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NDACC type optical filter. The NDACC type filters provide a smaller bandwidth and increase the signal to noise ratio.

- p. 4: 'the ILS ... retrieved simultaneously ...': Since differences to the ideal ILS are hardly to distinguish with differences of the profile shape it is strongly recommended to retrieve the ILS from cell spectra. How does the resulting ILS looks like? Does it differ with respect to the ideal ILS and how much does it vary with time?

Technical corrections:

- p. 3, line 1: in June at Xianghe => at Xianghe in June
- p. 4, line 15: O3 retrieved profiles => retrieved O3 profiles
- p. 6, line 23: mainly the => mainly from the
- p. 7, line 4: larger the => larger as compared to the
- p. 16, line 2: a MCT => an MCT?

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