

## ***Interactive comment on “Retrieval and validation of O<sub>3</sub> measurements from ground-based FTIR spectrometer at equatorial station: Addis Ababa, Ethiopia” by S. Takele Kenea et al.***

**Anonymous Referee #1**

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This paper describes a new measurement station at Addis Ababa that has been equipped with a high resolution solar remote sensing Fourier transform spectrometer. Spectra recorded by this instrument on an InSb detector have been used to derive total column amounts and vertical mixing ratio profiles of O<sub>3</sub>. These results have then been compared to O<sub>3</sub> data products from a number of different satellites taken nearby in time and space. It is planned that this new site will join the network for detection of atmospheric composition and change (NDACC). As such it will be the first African site and it is located in a region of the earth that is poorly characterised. As such the station is an important addition to the global network of solar remote sensing FTIRs

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and this paper (the first paper describing the site and its capabilities) is appropriate for this journal and in essence is worthy of publication. There are however a very large number of minor corrections needed - the paper as presented looks like it has had no editorial work done before submission. In particular the authors should address the following: 1. It is not clear exactly what is meant by "validation" as used by the authors, and the term seems to be used interchangeably with the term "intercomparison". The techniques described have been validated against other measurements of O<sub>3</sub> at different locations (as referenced by the authors). It is usual to use such measurements as these to validate satellite data products (which are subject to a much larger number of uncertainties), not visa versa. I believe that the authors should make a clear statement that the intercomparisons described here will act both to validate the satellite products over the tropics and to add confidence to the new instrument's performance (since the differences found are similar to other such comparison exercises performed elsewhere.). 2. The references are not formatted in a consistent way throughout the paper 3. The figures are not given in the order that they are referenced in the text. 4. Figure 5 and 8 seem to be muddled - the captions and title are contradictory which shows MLS and which shows MIPAS? 5. The x-axis of Figure 6 rather unusually has negative values to the right hand side. This is confusing especially as all other Figures follow the usual convention of negative values to the left. 6. It would be better to chose either "Fig" or "Figure " and stick to it. 7. The descriptions of the satellite instruments are quite long and contain some redundant information. 8. In the description of intercomparisons there seems to be an assumption that any bias is due to the FTIR spectrometer but no explanation is given for this. In previous studies the ground-based FTS has been shown to have lower uncertainties than satellite-based measurements - so these assumptions must be explained - or the text rephrased to say simply that a difference was found. 9. In section 5.7 the authors find a very good level of agreement that looks like it may not even be statistically significant. It is then stated that the most likely explanation is spectroscopic differences between the UV and IR - but no justification is given for why other uncertainties will not contribute. Perhaps what is meant is

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that this level of differences could be fully explained by the known biases between the UV and IR? If so this should be re-phrased. The authors should state whether or not the differences are statistically significant. 10. The conclusion section is rather too long I think and might better be described as a summary. Perhaps the main points could be summarised by showing that in the main the comparisons showed similar findings to other such comparisons elsewhere and describing any deviations from this along with the results as shown in Table 2.

In addition there are a number of grammatical suggestions that I have and minor corrections suggested for the text. These are quite numerous and I have included a marked up version so that the authors can consider if they would like to make any of the suggested changes.

Please also note the supplement to this comment:

<http://www.atmos-meas-tech-discuss.net/5/C2746/2012/amtd-5-C2746-2012-supplement.pdf>

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