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Atmospheric Measurement Techniques Discussions

Interactive comment on "Comparison of OMI NO_2 observations and their seasonal and weekly cycles with ground-based measurements in Helsinki" *by* I. Ialongo et al.

Anonymous Referee #1

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The paper presents the comparison of NO2 column measured by Pandora sun-photometer with two OMI satellite products. It is a well presented paper that demonstrates the capabilities of Pandora for satellite NO2 validation. The subject is relevant for AMT and the quality of the paper is good to be accepted for publication in AMT.

However, before publication I recommend to the authors to address the following issues:

General comments:

1. Pandora was installed in 2012, but only one year of data was discussed. If more data are available, I suggest the authors use all of them.

2. Pandora is a relatively new instrument. It would be useful to include some technical details in the paper. For example, what spectral window was used for the spectral fitting? Were any attenuation filters used? If so, are the results for different filters consistent? A temperature correction is mentioned on p. 4. How it was done? Is it a part of Pandora's operational software of something developed by the authors.

3. The authors do not mention any diurnal NO2 total column variations. It would be useful to have some information about them for satellite data interpretation.

Specific comments:

1, 2: Change to "NASA standard product (SP) and KNMI DOMINO product"

3, 18: What OMI data product is discussed here? SP?

4, 6: "Temperature correction" What temperature data are used for this correction? Climatological? How large is the correction?

5, 3: Figure 2. There are too many dots and symbols on this plot. Perhaps it is better not to show bad data.

6, 1: Figure 3. You could add one more panel that shows the difference vs. time using the colorscale that represent NO2 values themselves

6, 6: The supplementary material contains only one figure. Add S1 to Figure 3 and drop the supplement.

7, : Figure 4. It is very difficult to see overlapping error bars. Shift them slightly or use different thickness for the error bars.

7, 1: This sentence is confusing. The difference between individual OMI and Pandora measurements cannot be smaller than the uncertainties of individual OMI measurements. Or, you are talking about systematic differences here?

7, 9: Figure 3 is not enough for such statement. Could you calculate the standard

deviation of the OMI-Pandora difference for small and large OMI pixels?

8, Figure 5. Do you really need SP total and DOMINO total in this figure? Also, you could drop surf.con. (DOM) and Pandora (DOM) since they are very similar to the surf.con (SP) and Pandora (SP)

10, 12: Be more specific here: "OMI CFs below 0.5 valued give the same cloud-screening results as the ground-based cloud cover below 5/8 condition in more than 80% of the cases."

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