

## ***Interactive comment on “Comparison of TROPOMI/Sentinel 5 Precursor NO<sub>2</sub> observations with ground-based measurements in Helsinki” by Iolanda Ialongo et al.***

### **Anonymous Referee #2**

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This paper presents a comparison between satellite-based TROPOMI NO<sub>2</sub> products and ground-based Pandora observations in Helsinki. The validation results show TROPOMI's applicability for monitoring pollution levels in urban sites, even in a relatively small and high-latitude city. I recommend publishing the paper after minor revision.

General comments:

1. The validation is based on total columns. The reason for doing so is reasonable for me. However, we usually rely on tropospheric columns to investigate air pollution. I would recommend adding the analysis focus on tropospheric columns, even though

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systematic retrieval errors may exist. Such validation results will be very useful for data users to have a better sense about the current quality of the data.

2. The comparison with OMI. The authors have performed a similar validation of OMI NO<sub>2</sub> columns against Pandora observation. Do the validation results differ significantly from this study? I would recommend a short discussion to compare the OMI and TROPOMI validations.

3. The use of high-resolution profile. I expect a better performance of the NO<sub>2</sub> products using CAMS profiles compared to those using TM5 profiles based on the experience on OMI validations. However, as shown on Page 13, the use of CAMS a-priori profiles does not improve the agreement with Pandora significantly. What is the most likely reason for this? Does it indicate that TM5 profiles are good enough for the retrieval?

Specific comments:

1. Page 3, line 1. “The improved resolution of TROPOMI retrievals is expected to reduce the effect of dilution, due to the relatively coarse pixel size as compared to the field-of-view of the ground-based observations.” I guess the authors want to say the pixel size of TROPOMI is finer than that of OMI and thus the effect of dilution is reduced. If so, what the reason for pointing out the relatively coarse pixel size as compared to the field-of-view of the ground-based observations here?

2. Page 3, line 29. The time format of “15.4.–30.9.2018” is a little bit confusing for readers. I recommend using the April 15- Sep 30. Same comments for Page 4, line 30.

3. Page 12, line 4. The authors use summed columns for TROPOMI and total columns for Pandora. Is this intended? If so, please clarify the reason in the text.

4. Page 15. Line 4. “The correlation between Pandora and TROPOMI NO<sub>2</sub> retrievals is also in line with the results obtained by Griffin et al. (2019) over the Canadian oil sands.” How those two studies are in line with each other? I recommend presenting

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the quantitative analysis for the consistency.

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