Atmospheric
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Techniques

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Discussions

Interactive comment on "Assessment of the quality of TROPOMI high-spatial-resolution NO$_2$ data products" *by* Xiaoyi Zhao et al.

Anonymous Referee #1

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The manuscript present the comparison between TROPOMI and Pandora NO2 retrievals over 3 Canadian sites. The validation is really accurate especially concerning the uncertainty analysis and presents new wind-based approach that provides insight of the relative effect of local emission and transport. The manuscript can be published after addressing the following minor comments.

Specific comments

I have an issue with the title. I think it should include that the assessment of TROPOMI NO2 data in the GTA. Now it gives the impression that the assessment is exhaustive. Maybe you could add "in the Greater Toronto Area" at the end or something similar

Section 2.1.2. Does ECCC NO2 Modis-based albedo include geometry-dependent

information?

Section 3.1 Did you analyse how the agreement change in the standard approach if you change the radius (spatial averaging) or the time range? And did you find any dependence on the pixel size (it should be less important than for OMI, since the increase from the center to the side of the swath is much smaller).

Abstract: You might want to add some number e.g. absolute or relative difference or correlation between Pandora and Tropomi NO2 in the abstract. Also for the improvement in the agreement using high resolution model AMFs it could be useful to quantify this improvement here in the abstract.

P2 L21 You write that Pandora NO2 VCDs have been validated through [...] satellite validations That sounds inaccurate. Maybe you mean "have been used in..."?

P2 L23 You can add these TROPOMI validation paper using Pandora data also here: Herman et al 2019 Ialongo, I. et al, 2019.

P3 L32 Maybe you can mention that the resolution decreased to 3.5 × 5.5 km since 6 August 2019.

P4 L20 TROPOMI file includes a QA quality flag that is recommended to be used for flagging with QA>0.75 for clear sky. You say here that you use cf<0.3 but later on you say that you use the quality flag which already include the cloud screening: can you clarify?

P8 L18 In previous -> Previously

P10 L20 You find positive bias at Egbert: can you speculate on the reasons? Stratospheric overestimation perhaps (see e.g. Wang et al 2019 AMTD)?

P14 L9 TROMPOMI -> TROPOMI

Figure 1. It could be useful to add (perhaps in the appendix or supplement as well) a map like Fig. 1 including OMI data in order to visualise the differences in the mapping

capability of the two instruments.

Figure 8. Could be this go to appendix or supplement? (the paper is quite figure heavy anyway)