Atmospheric
Measurement
Techniques

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Discussions

Interactive comment on "Evaluating Sentinel-5P
TROPOMI tropospheric NO$_2$ column densities with
airborne and Pandora spectrometers near New
York City and Long Island Sound" *by*
Laura M. Judd et al.

Anonymous Referee #1

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The present manuscript presents the evaluation of S5P TROPOMI tropospheric NO2
column densities with the aid of airborne and ground-based spectrometers in New York
City and Long Island Sound. The advantage/ challenge of this region is that the NO2
concentrations are highly heterogeneous in time and space. The validation of S5P
TROPOMI tropospheric NO2 column densities is separated in two major categories:
(1) comparison between airborne NO2 TrVC and TROPOMI NO2 TrVC and (2) com-
parison between ground-based NO2 TrVC and TROPOMI NO2 TrVC. From the above-
mentioned comparisons, the authors observe a bias in TROPOMI NO2 TrVC and the

effect of clouds and a-priori profile in the TROPOMI retrieval are examined into details. I strongly recommend the publication of the manuscript after consideration of a minor number of specific considerations: Specific comments:

– Page 2, Line 60: It would be interesting to add the exact spatial resolution of OMI and OMPS

– Page 4, Line 110: I suggest that for the reader it would be more practical if you include a small separate section or subsection called "LISTOS campaign" and write there the information about the campaign, as you already did in Section 2.

– Page 7, Line 218: Please explain the PRATMO acronym

– Page 8, Line 234: If I understand well, did you assume that the aerosol a-priori profile in the AMF calculation is zero? So, you assumed that no aerosols are present in the atmosphere, or not? If this the case, is this assumption leading to realistic results?

– Page 18, Line 580: Can you provide an approximate value for the Pandora horizontal sensitivity?

– Page 19, Line 581: This means that the Pandora data are not filtered for clouds?

– Page 21, Line 650: Is there a reason why you did not compare Pandora TrVC (vs) TROPOMI-NAMCMAQ for the extended time period? I would be interesting to add a figure with this comparison.

– Page 21, Line 678: You could cite studies that use MAX-DOAS measurements to evaluate the TROPOMI NO2 product.

– Page 22, Line 699: Please add some reference studies.

– Page 39, Table 5: Is there a reason why you did not present the median percentage difference for the Standard Slant Column?

– Page 46, Figure 6: I would suggest that in Fig. 6a, you include the reported

TROPOMI SCD error.

– Page 47, Figure 7: The figure does not contain error bars in the vertical axis. Is there any way to estimate the TROPOMI-NAMCMAQ error and add it to the figure?