

Interactive comment on “Shipborne MAX-DOAS measurements for validation of TROPOMI NO₂ products” by Ping Wang et al.

Anonymous Referee #1

Received and published: 9 January 2020

The manuscript describes the comparison between TROPOMI, TM5 model and MAX-DOAS NO₂ observations during 5 ship cruises over the Pacific Ocean. The paper is well written and can be published after addressing the following minor comments.

Specific comments

P2 L41 There are a few recent paper on the validation of TROPOMI NO₂ over land (some under discussion). Here some examples:

Griffin, D., Zhao, X., McLinden, C. A., Boersma, F., Bourassa, A., Dammers, E., Degenstein, D., Eskes, H., Fehr, L., Fioletov, V., Hayden, K., Kharol, S. K., Li, S.-M., Makar, P., Martin, R. V., Mihele, C., Mittermeier, R. L., Krotkov, N., Sneep, M., Lamsal, L. N., ter Linden, M., van Geffen, J., Veefkind, P., and Wolde, M.: High-

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Resolution Mapping of Nitrogen Dioxide With TROPOMI: First Results and Validation Over the Canadian Oil Sands, *Geophysical Research Letters*, 46, 1049–1060, <https://doi.org/10.1029/2018GL081095>, 2019.

Ialongo, I., Virta, H., Eskes, H., Hovila, J., and Douros, J.: Comparison of TROPOMI/Sentinel 5 Precursor NO₂ observations with ground-based measurements in Helsinki, *Atmos. Meas. Tech. Discuss.*, <https://doi.org/10.5194/amt-2019-329>, accepted, 2019.

Zhao, X., Griffin, D., Fioletov, V., McLinden, C., Cede, A., Tiefengraber, M., Müller, M., Bognar, K., Strong, K., Boersma, F., Eskes, H., Davies, J., Ogyu, A., and Lee, S. C.: Assessment of the quality of TROPOMI high-spatial-resolution NO₂ data products, *Atmos. Meas. Tech. Discuss.*, <https://doi.org/10.5194/amt-2019-416>, in review, 2019.

P3 L74-76 So I understand you did not use the measurements of ship emissions? I was wondering why; could not be useful to get some of these data for the validation? If you are afraid the resolution of TROPOMI will not be able to detect that I think it's still worth showing. . .

Figure 2 (and all the others) Day fraction: could you use normal time of the day (not decimals)? It's a bit confusing. . .

P9 L267 Could you give these differences also as percentage? (In the abstracts as well)

L282 Could give a brief description of this interpolation method together with the reference? (it remains a bit unclear)

Figures 6,10, 11: What quantity are the error bars? It should be mentioned in the caption

Interactive comment on *Atmos. Meas. Tech. Discuss.*, doi:10.5194/amt-2019-461, 2019.