Borsdorff et al. Mapping carbon monoxide pollution from space down to city scale with global coverage

This short paper introduces the early validation of TROPOMI/Sentinel 5 Precursor XCO product with ground-based spectrometers using data during two months. The validation results indicate good accuracy and possibility for monitoring atmospheric CO globally on daily bases with relatively small spatial resolution, allowing thus further research on local sources of CO and the transport of the pollution in a novel way.

Overall the manuscript is well written and clear and the results are scientifically important. The manuscript is based on early TROPOMI observations and it is obvious that the aim is to report the validation results also in a timely manner. However, I have few general comments to encourage the authors to clarify what was actually done and to expand the discussion of the results. In addition, I have few minor comments.

Major comments:

1. In the abstract the game-changing nature of TROPOMI is emphasized. I would like to see further discussion on this topic perhaps in the Introduction chapter and later in the manuscript to more specifically address this point. E.g. it would be good to include some reference what the heritage instruments measured and why TROPOMI is a game-changer. Need for averaging data is briefly mentioned in Sec 3.2, but I would welcome a bit more discussion on this.
2. In the text both terms XCO and CO are used. Just by looking at the notation one might get the impression that XCO denotes daily values, which is perhaps not meant (Section 3.1). Please, clarify what is the TROPOMI data product and whether the validation was based on XCO or CO products.
3. In the validation both cloudy (low clouds) and cloud-free conditions are compared. Please, add discussion how valid FTS cloudy observations are, or clarify if only cloud free FTS observations are considered. Are TCCON and FTS in cloudy cases measuring the same air mass? Cloud optical thickness is used to select clear sky observations – where is this information coming from?
4. Please add a paragraph on FTS measurements since they are used as reference data here, their accuracy etc. The geographical distribution of the validation sites is limited to 50S-50N. Please, this is also good to be included in the text.
5. Soft calibration is done during the validation – please, discuss if this is also recommended when operational data is available.
6. Related to figures 4 and 6: Is here both cloudy data and cloud free data? Is there difference in the interpretation of the pixels depending on whether they are cloud free or cloudy? Please, add some discussion on this.
7. Conclusions: I would appreciate discussion on what exactly has been validated and to elaborate more what type of validation is needed in the future (in terms of spatial and temporal coverage, atmospheric and observational conditions).

Minor comments:

- Fig 1 & Fig 2. Please, indicate if this refers to cloud free data / cloudy data or both. If both, would it be possible to indicate this somehow.
- P 1, L 6: Sentence starting Due to …. – you could re-formulate this to make the message more clear.
- P 1, L 13: Please, clarify station-to-station bias?
- P 2, L 13. led -> lead ?
- Figure 5, lower panel, indications on how many observations correspond to varying radius values would be very nice to have.
- Fig 7 I think this is a zoom of figure 2. Is this needed?