

Atmos. Meas. Tech. Discuss., referee comment RC1
<https://doi.org/10.5194/amt-2022-54-RC1>, 2022
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Comment on amt-2022-54

Anonymous Referee #1

Referee comment on "Evaluation of MOPITT and TROPOMI carbon monoxide retrievals using AirCore *in situ* vertical profiles" by Sara Martinez-Alonso et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2022-54-RC1>, 2022

Reviewer -AMT

Evaluation of MOPITT and TROPOMI carbon monoxide retrievals using AirCore *in situ* vertical profiles. Martiñez-Alonso et al., 2022

General:

The authors use the advanced AirCore profiles operated by NOAA during the last years to validate the MOPITT and TROPOMI CO products. With the high measurement altitude of the AirCore measurements, the authors quantify the error introduced in MOPITT CO validation by the use of shorter aircraft vertical CO profiles extended upwards. The results are promising, and the error is estimated to be small. The AirCore profiles are also applied to validate the TROPOMI CO under both clear and cloudy conditions. The results are also consistent with previous studies. In general, the paper is well-written and easy to understand. I would like to recommend it to publish on AMT after addressing some minor comments/suggestions below:

lines 5-6 the unit is in mole cm⁻² for MOPITT-AirCore, while in line 19 the unit is in % for TROPOMI-AirCore. Please be consistent, better to use %.

Line 88 – 91: it is not so clear for me to understand the uncertainty of the CO. The authors said that "the total uncertainty is typically <5 ppb (Karion et al., 2013)", but they also pointed out that "stratospheric CO profiles have shown differences up to ~15 ppb". Besides the uncertainty of the CO at each altitude, it is more important to highlight the uncertainty of the CO total column (or within the AirCore measurement vertical range)

Figure 6, shows that the relative bias at one latitude (or at the same location) can vary from -18% to 28%. Have you ever investigated the cause for this, e.g. AirCore-satellite distance? cloud? surface? meteorology?