Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC1
https://doi.org/10.5194/amt-2021-190-RC1, 2021

Comment on amt-2021-190

Anonymous Referee #1

Referee comment on "Intercomparison of CO measurements from TROPOMI, ACE-FTS, and a high-Arctic ground-based Fourier transform spectrometer" by Tyler Wizenberg et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-190-RC1, 2021

In this paper the authors present a comparison of CO TROPOMI with ACE-FTS in the Arctic. To provide context to this comparison, TROPOMI and ACE-FTS CO products are compared against NDACC measurements from PEARL-FTS in Eureka. The study suggests that TROPOMI CO product exhibits a high bias in the high-Arctic region.

This study has been thoroughly conducted. The paper is well written and interesting. I found the paper clearly presented and well organized. This work is useful for the TROPOMI team to improve the CO product, as well as for the community.

The subject of the paper is appropriate to AMT. I recommend the paper to be published, after addressing the minor issues I raise below.

Comments:

L50: add TES +reference

L85: methodology used for comparing each instrument IS described

L221: add units of CO reference profiles

L265: null-space error e_n (also known as the smoothing error). Why not prefer the smoothing error ? You should add the Rodgers reference. If you want to use the null-space error, you have to explain why. You give references of different studies but we need explanations.

L285: In the following section describes.. Remove "In"

L300: A is the VMR averaging kernel > A is the VMR/VMR averaging kernel

(A is unit less)

Same thing in L343

L328-330: What reference should you give when talking about sensitivity ? Rodgers 2000 ? Rodgers and Connor 2003 ? As already said, you mention a work published in a paper "following xx et al.". You should be more specific and cite the proper reference for terminology.

L362: SEM. Define (to understand the difference with standard error and standard deviation) and justify your choice for using SEM. Make uniform notation.

Caption of Table 3: "standard deviations of the differences" in the first sentence. "standard error of the mean" in the last sentence. It is confusing. The caption should be reformulated.

L481: coming from the measurement IN this range ?

L487: “do not overlap within their bounds of uncertainty on the standard error” Not clear, please reformulate