EGUsphere, referee comment RC1
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Comment on egusphere-2022-1071

Anonymous Referee #1

Referee comment on "Understanding the variations and sources of CO, C_2H_2, C_2H_6, H_2CO, and HCN columns based on 3 years of new ground-based Fourier transform infrared measurements at Xianghe, China" by Minqiang Zhou et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-1071-RC1, 2022

This paper by Zhou et al. shows the Carbon monoxide (CO), acetylene (C2H2), ethane (C2H6), formaldehyde (H2CO), and hydrogen cyanide (HCN) column retrievals derived from the ground-based FTIR measurements at Xianghe, China. Such new ground-based FTIR datasets, following NDACC protocol with high precision and accuracy, are very important to understand these atmospheric components in this region. Until now, the variations and correlations among these species are not well known in North China, since limited or even no column measurements are available. The measurement and retrieval techniques of the ground-based FTIR dataset are nicely presented and well discussed. The seasonal variations of C2H2, C2H6, H2CO, and HCN are similar to other places (previous studies), while there is almost no seasonal variation of CO at Xianghe, which is different from other places. The paper shows that this weak seasonal variation of the CO column is also observed by co-located TROPOMI satellite and ground-based TCCON measurements. The HCN columns observed at Xianghe are also applied to identify the fire emission in Russia and Kazakhstan. In general, the paper is well-written, and the results are summarized well with novel scientific founds. Therefore, I would like to recommend it to AMT after addressing the following minor comments.

Minor comments:

- P5,Eq1, change the '.' to ',' 'Where' to 'where'

- P10 line 13-14 "The daily mean std of each species within ±1 hour around local noon with at least 2 measurements is calculated to represent the variability of the retrieval. " I guess I understand what the authors did, but it is confusing from this sentence.

Please rewrite it.

- Eq 7, please add an uncertainty component in the formula.

- line 27 – 34. As the uncertainty of the trend is very large due to limited time coverage, and the trend of these species is not the key point of this paper. I would suggest removing this paragraph.

- Please check the reference carefully, as some references are not correctly formatted. For example, P30 line 20. This reference has two times of doi.