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Discussions

Interactive comment on "Validation of the vertical profiles of HCl over the wide range of the stratosphere to the lower thermosphere measured by SMILES" *by* Seidai Nara et al.

Seidai Nara et al.

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Received and published: 14 August 2020

Reply to Anonymous Referee #1

General comments from Anonymous Referee #1
The paper presents an important new data set for middle atmospheric studies. The retrieval process is presented clearly, and the validation method is valid. The overall presentation is well structured. However, some important explanation is missing. For example, you say that the water vapor effect is a possible cause for the

observed latitudinal differences, but you do not explain anything about this effect, or you describe the HCl vertical and geographical distribution, without discussing the chemical and dynamical mechanisms controlling it. Last but not least, you conclude that the temperature data used to retrieve HCl is responsible for up to 30 to 40% of the observed differences between SMILES and the other instruments, but you do not give any information about the source and quality of these data sets. Please see my specific comments below for more detailed questions and suggestions. Moreover, the language should be improved. See my suggestions for the technical corrections below.

Author's response
Dear Anonymous Referee #1

Thank you very much for your cooperation to improve our manuscript.
We answered all your comments improved our manuscript as follows.

Major improvements are:
· the description of water vapor effect: We removed the description of the water vapor effect because it was not verified enough. Please see the Author's response (1-12).
· the details of HCl distribution: We added a note on the chemical and physical mechanism that produces the HCl vertical and geographical distribution. Please see the Author's response (1-7).
· the details of the a priori temperature profiles: We added a note that the details of the a priori temperature profile used in SMILES, MLS, and ACE-FTS retrieval. Please see the Author's response (1-18).

Also, the English language corrections you pointed out were revised throughout the text. Please find the supplement pdf file of our answer to your comments and the revisions according to your suggestions.
We hope that our manuscript is suitable for the publication in AMT.

Sincerely.

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Please also note the supplement to this comment:
https://amt.copernicus.org/preprints/amt-2020-105/amt-2020-105-AC2-supplement.pdf