

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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Reply to Anonymous Referee #2

General comments from Anonymous Referee #2

This is an interesting paper that fits well into the scope of Atmospheric Measurement Techniques. The most interesting part of the presented material is the vertical range over which HCl profiles can be retrieved due to the high spectral resolution and signal-to-noise ratio achieved by the measurement technique. The coverage in the

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mesosphere and in the transition zone to the lower thermosphere makes this dataset unique and I can envision significant interest in it for example for studies of the dynamics in this atmospheric region, which is otherwise difficult to access. My main point of criticism of this paper is the lack of a description of the temperature retrieval that underlies the trace gas retrieval. This is particularly important as the authors identify differences in the underlying temperature profile as the main reason for differences in HCl in the upper stratosphere/lower mesosphere region. A description of the temperature data, including the method of the temperature retrieval, its vertical range and its accuracy in the various altitude regions is essential for understanding possible caveats of the HCl data, especially for use in studies of the mesosphere and lower thermosphere, where other data is sparsely available. With the addition of this information, as well as responses to my more detailed comments below, I would recommend this paper for publication.

Author's response

Dear Anonymous Referee #2

Thank you very much for your cooperation to improve our manuscript.

We revised our manuscript following your valuable comments as follows. In particular, we added a detailed description of the retrieval and temperature profiles (Author's responses 2 and 18). 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,

Seidai Nara^{1,2}, Yasuko Kasai^{1,2}

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Please also note the supplement to this comment:

<https://amt.copernicus.org/preprints/amt-2020-105/amt-2020-105-AC1-supplement.pdf>

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2020-105, 2020.

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