Atmospheric
Measurement
Techniques

Discussions

Open Access

EGU

Interactive comment on "Channel selection method for hyperspectral atmospheric infrared sounder using AIRS data based on layering" *by* Shujie Chang et al.

Shujie Chang et al.

changshujiebeauty@163.com

Dear Referee #2, We thank you for your review of our manuscript and your detailed remarks. We would like to improve the article here in an immediate reply. Please, find our answers/comments on your notes below:

(1) Explain the abbreviations ICS, NCS and PCS in the abstract. Sorry for my carelessness. In abstract: "In general, the accuracy of the retrieval temperature of ICS is improved. Especially, from 100 hPa to 0.01 hPa, the accuracy of ICS can be improved by more than 11 %; (3) Statistical inversion comparison experiments in four typical regions indicate that ICS in this paper is significantly better than NCS and PCS

C1

in different regions and shows latitudinal variations." (L 31-L 37) This has been modified to "In general, the accuracy of the retrieval temperature of ICS (Improved Channel Selection) is improved. Especially, from 100 hPa to 0.01 hPa, the accuracy of ICS can be improved by more than 11 %; (3) Statistical inversion comparison experiments in four typical regions indicate that ICS in this paper is significantly better than NCS (NWP Channel Selection) and PCS (Primary Channel Selection) in different regions and shows latitudinal variations." (L 31-L 37)

(2) p. 21, L. 429: Include the following citation: Saunders, R., Hocking, J., Turner, E., Rayer, P., Rundle, D., Brunel, P., Vidot, J., Roquet, P., Matricardi, M., Geer, A., Bormann, N., and Lupu, C.: An update on the RTTOV fast radiative transfer model (currently at version 12), Geosci. Model Dev., 11, 2717–2737, https://doi.org/10.5194/gmd-11-2717-2018, 2018. Yes, you are right. This has been added. "For the radiative transfer model and its weight function matrix, K, the RTTOV v12 fast radiative transfer model is used (Saunders et al., 2018)." (L 429-L 430) "Saunders, R., Hocking, J., Turner, E., Rayer, P., Rundle, D., Brunel, P., Vidot, J., Roquet, P., Matricardi, M., Geer, A., Bormann, N., and Lupu, C.: An update on the RTTOV fast radiative transfer model (currently at version 12), Geosci. Model Dev., 11, 2717-2737, https://doi.org/10.5194/gmd-11-2717-2018, 2018." (L 1033-L 1037)

(3) p. 21, L. 429-430: The sentence "RTTOV is an evaluation of RTTOV v11, adding and upgrading many features" should be removed because explained is only the common procedure. Yes, you are right. The sentence "RTTOV is an evaluation of RTTOV v11, adding and upgrading many features" has been removed. (L 429-L 430)

(4) Table 1 and table 2 should be removed or shifted to the appendix. Yes, we agree with you. The two tables have been shifted to the Appendix A. (L 894-L 904)

(5) p. 44, L. 747-748: Description of figure is too universal. Please specify the behavior in more detail. Sorry about this. We explain this as follows. "In order to further compare the regional differences of inversion accuracy, the temperature standard deviations of

C2

ICS in four typical regions are compared in Sect. 5.2." (L 738-L 740)

(6) p. 3, L. 65: Atmospheric Infrared Sounder -> Atmospheric InfraRed Sounder. Yes, we agree with you. This has been modified. (L 66)

(7) p. 14, L. 302: bright-> brightness. Yes, you are right. This has been modified. (L 303)

(8) p. 16, L. 327: bright->brightness. Yes, you are right. This has been modified. (L 328)

(9) p 26, L. 495: add last access date. Yes, we agree with you. "The error covariance matrix of the background, Sa, is calculated using 5000 samples of the IFS-137 data provided by the ECMWF dataset. The last access date is April 26th, 2019 (download address: https://www.nwpsaf.eu/site/update-137-level-nwp-profile-dataset/, 2019)." has been added to "The error covariance matrix of the background, Sa, is calculated using 5000 samples of the IFS-137 data provided by the ECMWF dataset. The last access date is April 26th, 2019 (download address: https://www.nwpsaf.eu/site/update-137-level-nwp-profile-dataset/, 2019)." (L 487)

(10) p. 39, L. 656: Do not write and so on. Either specify the variables or stop the sentence after cloud information. Yes, you are right. "Moreover, the IFS-91 database also supports the mode with input parameters, such as detection angle, 2 m temperature, cloud information, and so on." has been modified to "Moreover, the IFS-91 database also supports the mode with input parameters, such as detection angle, 2 m temperature, cloud information." (L 646)

(11) p. 39, L. 664: add last access date. Yes, we agree with you. "Red parts represent precipitation. (from https://www.nwpsaf.eu/site/ update-137-level-nwp-profile-dataset/ , 2019)." has been added to "Red parts represent precipitation. The last access date is April 26th, 2019. (from https://www.nwpsaf.eu/site/update-137-level-nwp-profile-dataset/ , 2019)." (L 653)

(12) p. 40, L. 674: Do not write etc. Either specify the variables or stop the sentence after wind speed. Yes, you are right. "5000 profiles and their corresponding surface factors, including surface air pressure, surface temperature, 2 m temperature, 2 m specific humidity, 10 m wind speed, etc." has been modified to "5000 profiles and their corresponding surface factors, including surface air pressure, surface temperature, 2 m temperature, 2 m specific humidity, 10 m wind speed." (L 664)

(13) p. 51, l. 872: at 4.3 μm. Yes, you are right. "...and 4.3 μm for the CO2 absorption bands;" has been modified to "...and at 4.3 μm for the CO2 absorption bands;" (L 865)

Thanks again for your careful review. Hopefully our response can enable a further review of the manuscript. Many thanks for your work so far and best regards, Shujie Chang and Co-authors.

Please also note the supplement to this comment: https://www.atmos-meas-tech-discuss.net/amt-2019-183/amt-2019-183-AC1-supplement.zip