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Atmospheric Measurement Techniques Discussions

Interactive comment on "Validation of IASI FORLI carbon monoxide retrievals using FTIR data from NDACC" *by* T. Kerzenmacher et al.

Anonymous Referee #3

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The authors apply a retrieval algorithm to IASI radiances for the retrieval of CO and compare the results (CO abundance integrated over the atmospheric column) to equivalent observation from the ground. Six NDACC stations have been considered, and the comparison covers one year of IASI observations, which yields a number of retrieved pairs (IASI CO, ground-based CO) at each station, which is statistically significant. The paper is methodologically correct, interesting and, fairly enough, does not hide open problems, which need more research effort and maybe retrieval improvement. I found the paper interesting for the large community involved in atmospheric chemistry from satellite and therefore, I recommend publication with stated revision.

1. The authors say that the comparison of IASI CO to that provided by ground based

FTIR is not biased, although the variability of the IASI estimation is larger than expected. The present study does not hint to possible sources of this high variability, which is a weak point for the paper itself. It is not clear what the authors did to prepare the atmospheric state (of which mostly important is the temperature profile) needed for the final retrieval of IASI CO. This is only briefly summarized for ground based instrumentation, page 3979, after line 20), but no information is given for IASI. Well, they have to check that the atmospheric state is not adding spurious variability.

2. To this end, as suggested by Antonelli et al, DOI:10.1002/qj.909 a good test is to compute the standard deviation of the IASI spectral residual for the spectral region used for the retrieval analysis. In case all the important variability has been extracted from radiances, the spectral residual has to closely follow the IASI radiometric noise.

3. In this respect I think that its mandatory that authors show examples of IASI spectral residuals, in order to understand whether or not the method is at least internally consistent. In addition, the analysis of spectral residuals can give insight into understanding additional sources of their unexpected variability. Is it atmosphere? Or not.

Minor points.

1. On page 3976 line 10, I think that here a proper reference to Hilton et al, 2009 (doi:10.1175/BAMS-D-11-00027.1) should be much more appropriate, the same on page 3977, line 25.

2. On page 3977 section 2. Please in this section add information about the atmospheric state used for IASI, has surface emissivity been taken in any account? In this section, please also exactly show the IASI spectral range used for the retrieval.

3. On page 3978, line 20, «cloud cover less than 12%». In which way cloud cover has been determined within each IASI field of view. AVHRR? Please, expand a bit. Clouds could also be another source of unknown variability.

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 3973, 2012.