Authors' request for updates in accepted manuscript

Christoph Gerbig
Editor, *Atmospheric Chemistry and Physics*

Dear Dr. Gerbig,

We would like to submit a request to update the current Table 4 in our accepted manuscript (acp-2018-71) entitled "Evaluating High-Resolution Forecasts of Atmospheric CO and CO2 from a Global Prediction System during KORUS-AQ Field Campaign".

The reason is that we have updated the calculation of CAMS total column CO for the comparisons with MOPITT and IASI. All the changed values in Table 4 are marked as red in the following updated Table 4. These changes in Table 4 have no impact on our main analyses, results, arguments, and conclusions. Please see the following for the detail.

Update 1 (for comparison with MOPITT):
When applying the MOPITT CO retrieval averaging kernel to CAMS, the values in the current Table 4 are based on an old definition of MOPITT layer thickness in pressure (i.e., ΔP; please see https://www.acom.ucar.edu/mopitt/v4_users_guide_val.pdf, Page 20). However, the definition of ΔP has been changed since the MOPITT version 5 product (please see https://www.acom.ucar.edu/mopitt/v5_users_guide_beta.pdf, Page 11). Since we used the MOPITT version 6 product in this study, we realized that the new definition of ΔP should be applied, so we have corrected the calculations and results accordingly (see 3rd column marked as red in the following updated Table 4).

Update 2 (for comparison with IASI):
The IASI CO retrieval averaging kernel is given at different vertical layers corresponding to height ranges (e.g., [0-1km], [1-2km], ...). Please see https://cds-espri.ipsl.upmc.fr/etherTypo/fileadmin/files/IASI/readme_IASI_FORLI_CO_data_ETHER_en_20160908.pdf (Page 2). For the current Table 4 (i.e., 4th table column), the modeled column CO in each IASI vertical layer before applying averaging kernel is calculated by first interpolating modeled CO concentrations to values in the middle of each IASI vertical layer (e.g., 0.5 km, 1.5km ...) and then multiplying the interpolated CO with the IASI layer thickness. However, we realized that this may introduce some uncertainty, since it does not account for the vertical variation of modeled CO within each IASI vertical layer (note that each IASI vertical layer usually covers multiple model vertical layers). To reduce the uncertainty, for the new Table 4, we have used an updated method. We directly sum up the modeled CO across the model vertical layers (or part of layers) that are overlapped with each IASI vertical layer to obtain the modeled column CO in each IASI vertical layer before applying averaging kernel. Accordingly, we corrected the corresponding results in Table 4 (i.e., 4th column marked as red in the following updated Table 4).

We note that the changes from the current Table 4 to the updated Table 4 have no impact on our main analyses, results, arguments, and conclusions. The only minor change is a statement in Sect. 4, where we have changed the sentence from "When compared to IASI, ANs are better in terms of RMSE and correlation but not bias" to "When compared to IASI, ANs are better in terms of

correlation but not bias".

We apologize that we forgot to include these updates during the revision process and just realized this issue during proofreading. Since the changes in Table 4 have negligible impact on our accepted manuscript, we sincerely hope that you approve our request to update Table 4.

Thank you!
Wenfu Tang

Current Table 4:

		CO		CO$_2$	
		MOPITT	IASI	OCO-2	GOSAT
Total observations during campaign		13 612	25 509	4591	42
Bias (molecules cm^{-2})	FC16s	-1.13×10^{17}	8.28×10^{16}	9.30×10^{18}	-2.64×10^{19}
	ANs	-6.42×10^{16}	1.3×10^{17}	4.48×10^{19}	1.05×10^{19}
	FC9s	-1.01×10^{17}	7.52×10^{16}	-1.31×10^{19}	-1.28×10^{19}
RMSE (molecules cm^{-2})	FC16s	2.47×10^{17}	4.19×10^{17}	7.11×10^{19}	5.67×10^{19}
	ANs	2.31×10^{17}	4.12×10^{17}	8.48×10^{19}	6.42×10^{19}
	FC9s	2.56×10^{17}	4.19×10^{17}	8.29×10^{19}	5.49×10^{19}
Correlation	FC16s	0.65	0.44	0.88	0.78
	ANs	0.66	0.52	0.85	0.63
	FC9s	0.61	0.45	0.85	0.75

Updated Table 4:

		CO		CO2	
		MOPITT	IASI	OCO-2	GOSAT
Total observations during campaign		13612	25509	4591	42
Bias (molecules cm^{-2})	FC16s	-9.53×10^{16}	2.53×10^{17}	9.30×10^{18}	-2.64×10^{19}
	ANs	-5.29×10^{16}	3.00×10^{17}	4.48×10^{19}	1.05×10^{19}
	FC9s	-8.67×10^{16}	2.83×10^{17}	-1.31×10^{19}	-1.28×10^{19}
RMSE (molecules cm^{-2})	FC16s	2.84×10^{17}	4.53×10^{17}	7.11×10^{19}	5.67×10^{19}
	ANs	2.74×10^{17}	4.64×10^{17}	8.48×10^{19}	6.42×10^{19}
	FC9s	2.97×10^{17}	4.76×10^{17}	8.29×10^{19}	5.49×10^{19}
Correlation	FC16s	0.72	0.57	0.88	0.78
	ANs	0.72	0.63	0.85	0.63
	FC9s	0.69	0.56	0.85	0.75