Atmos. Meas. Tech. Discuss., 7, C1626–C1630, 2014
www.atmos-meas-tech-discuss.net/7/C1626/2014/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Validation of nine-years of MOPITT V5 NIR using MOZAIC/IAGOS measurements: biases and long term stability" *by* A. T. J. de Laat et al.

Anonymous Referee #2

Received and published: 9 July 2014

The paper presents a validation of MOPITT V5 NIR CO product for the period 2002-2010, using aircraft measurements from the MOZAIC/IAGOS program, at global and local scales. A good agreement was found between these two products. It was shown that MOPITT was not biased, has not been affected by significant drifts, and that it does add value to the a priori. In particular, using MOCAGE simulations, this study shows that the large MOPITT variability seen along the MOZAIC/IAGOS flight path is due to CO variability. The paper is well structured, the methodology is explained in detail and the results are useful to the community. It is worth publishing in AMT with the following minor corrections:

In general, it is often made reference to the 'range' data as the way to take into account the large MOPITT variability along the flight path in the comparison process. I find the formulation quite vague and maybe a little misleading - the 'mean' is also a way to take it into account. Although the definition of the 'range' data given in Section 3 is clear, I would suggest finding a better formulation (e.g. talking about 'mean MOPITT value' and 'best MOPITT value'?). Also, for the sake of clarity, it should be stated explicitly in the legends of tables and figures that you're using the 'range' data (with a reference to Section 3).

p5253 l1 : "for monitoring" > to monitor

l25: "Many scientific papers have been published using MOPITT data": the sentence looks awkward to me. I suggest: MOPITT data have been widely used for several applications. . .

p5254 l11: "for monitoring" > to monitor

p5255 l1: "how results" > how our results

l2: "for spatial biases" > of spatial biases

l6: "integrated CO profile MOZAIC/IAGOS measurements" > integrated MOZAIC/IAGOS CO profile measurements

l22: "will serve as a baseline" > aims to serve as a baseline

p5256 l3: "discussion" > a discussion

l9: "we suffice here with a few remarks. . ." > We simply make here a few remarks. . .

Section 2.1: Please mention the general characteristics of MOPITT (type of instrument, spatial and spectral resolution. . .) as well as the time period covered by the product.

p5257 l17: "activity with" > activity. With

l18: "aircraft" > aircrafts

“and extension” > and an extension

p5258 l15: “For comparing” > to compare

l26: “most relevant” > the most relevant

“where” > for which

p5259 l8-11: the same information is stated twice

In general, I find Section 2.3.2 not very clear. I would find it useful if you said (i) how the comparisons between MOPITT a priori and MOZAIC/IAGOS (M/I) profiles were made (collocation, etc.), (ii) how the M/I profiles were extended (linear extrapolation?), (iii) if the comparisons concern, in the case of M/I, total or partial columns.

p5260 l7: “distance” > distances

l21: “kernel” > kernels

p5262 l14-15 : “Thus, variations in CO total columns corrected for the MOPITT averaging kernel due to different MOPITT averaging kernels are relatively small.” > Thus, variations in MOZAIC/IAGOS CO total columns due to differences in the MOPITT averaging kernels are relatively small.”

p5261 l25: “with the MOPITT a priori” > with the nearest MOPITT a priori profile

p5262 l7: “averaging kernel and a priori” > averaging kernels and a priori profiles

l8: “profile” > profiles

p5263 l24: “than seen” > than the one seen

“NOAA data” > NOAA aircraft data

In Section 3, I suggest that you tell more the figures and that you precise how Deeter et al. (2013) deal with MOPITT variability along the flight path.

p5264 l12-16: this part should come earlier in the section, I think it is the first thing to

say about Fig. 1.

p5266 l4: “particular” > particularly

“emission” > emissions

“regions” > region

l7: “shows” > show

l10: “better for all statistical measures”: you should tell some figures.

l11: “biomass burning season not present” > biomass burning season (ref) that are not present

p5267 l11: “the the” > the

l12: ““range” data, statistics are better than the MOPITT a priori data” > “range” data statistics are better than the ones of the MOPITT a priori data

l15-19: this paragraph is not clear. You should rephrase and mention that you’re talking of Fig. 4b.

p5268 l12: “corresponding fraction of measurements qualifying for this filter are” > the corresponding fractions of measurements qualified for these filters are

l24: “differences in correlation coefficients” > the correlation coefficients

l25: “columns 6/7” > columns 6/8

l26: “not corrected” > that are not corrected

l28: “columns 6/8” > columns 6/7

p5269 l10: “comparison” > the comparisons

l19: “model grid”: you should remind us of the MOCAGE resolution here.

l26: “is” > is a

“MOCAGE” > MOCAGE for both cases

p5270 l5: “is likely is related” > is likely to be related

l13: “We suffice here to note that” > We simply note here that

p5271 l3-5: this part should come earlier in the section.

l9: “Deeter et al. (2013)” > Deeter et al. (2013) with NOAA aircraft data

l20: “when taking the MOPITT a priori into account”: this is not clear, you should be more specific.

p5272 l13: “representative for” > representative of

l16: “method how to” > method to

legend Table 1 l11: “Biases root mean-square “ > Biases and root mean-square

legend table 3 l11: “below” > along

table 3 is hard to understand. You should at least write explicitly what you’re comparing in the table.

p5285-5286, legend Fig. 2: “as” > Same as

legend fig.6 l2:”MOZAIC/IAGOS flight path profile” > M/I profile path

l3: “measurements” > simulations

By the way, reference is often made to MOPITT CO data as “measurements”; it would be better to say “retrievals” instead.

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 5251, 2014.