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Atmospheric Measurement Techniques Discussions



# *Interactive comment on* "Retrieval of tropospheric CO column from hyperspectral infrared sounders – application to four years of Aqua/AIRS and MetOp-A/IASI" *by* T. Thonat et al.

**Anonymous Referee #1**

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This paper describes two tropospheric CO column data products retrieved from Aqua/AIRS and MetOp-A/IASI, respectively, using a double differential approach. It includes a comprehesive description of the retrieval method, a characterization of the retrieval products, and validation with CARIBIC aircraft measurements. An analysis of the temporal evolution of tropical CO in the context of biomass burning activity is also conducted by means of comparisons to fire products and dynamical indices. The paper is generally well written and should be suitable for publication in AMT with the following minor corrections:

p3862 l6: spell out acronym "4A"

p3862 l9: "half a maximum between 200 and 750 hPa": if this refers to the vertical resolution (FWHM of AK columns), please state this explicitely.

p3862 l17: "relative difference". Is it the average difference?

p3863 l1: In the middle atmosphere, CO is mainly produced by CO2 photolysis. Therefore, this statement should be restricted to "tropospheric CO".

p3864 l 20: "estimations". Wouldn't "retrievals" be a better word choice?

p3864 l 21: "Here, we use an alternative approach for the retrieval of a tropospheric integrated content of CO, that relies on differences between simulated and observed radiances...". Also optimal estimation relies on differences between simulated and observed radiances....

p3868 l 17: It might be better to refer to the 4.6 um region since 4.7 um (i.e. < 2160 cm-1 ) is NOT used in the study and it is also strongly affected by O3 inteferences.

p 3869 l20: Interfering spectral signatures have the potential to bias the retrievals while radiometric noise errros would cancel out on average. Is it really a good way to merge these quantities when defining a parameter that reflects the suitability to measure CO?

p3872 l10-19: It is not really clear what has been done to remove potential(?) biases. Have independent satellite observations been used to determine the bias (in this case not being "potential" but real)? Please explain in a clearer way.

p3878 l 17: typo: ..due to a too strong cloud detection...

p3879 l24: "...a shift of about two months". This is true only for the SH, the time shift in the NH appears to be considerably longer.

p3882, l28: "twice better noise". Twice smaller noise?

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 3861, 2012.



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