Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2020-322-RC1, 2020


Atmospheric Measurement Techniques Discussions



# *Interactive comment on* "Residual Temperature Bias Effects in LIMS Stratospheric Ozone and Water Vapor" *by* Ellis Remsberg et al.

**Anonymous Referee #1**

Received and published: 24 November 2020

This study revisits the quality of Limb Infrared Monitor of the Stratosphere (LIMS) V6 temperature ozone, and water vapour products by means of several diagnostics examples based on their L3 zonal Fourier coefficient products. A main result is the detection of systematic ascending (A) -descending (D) biases that can be related to A-D biases in T(p) due to unresolved temperature gradients along the LIMS viewing path. It is shown that such T(p) biases can affect the retrievals of ozone and water vapour either through non-linear effects via the Planck function or through the registration of radiance profiles in pressure altitude. Upper stratospheric V6 ozone profile biases are further evaluated against a climatology from rocketsondes. In addition, time series of ozone, water vapor and PV (computed from LIMS T(p) and GPH) are compared to demonstrate their consistency regarding tracer evolution during NH winter. Finally, recommendations



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regarding the scientific use of LIMS V6 L3 data are provided.

The paper is written very concisely and the results are of high relevance in particular for the data user community. I recommend publication in AMT after addressing a few very minor comments listed below:

l120: Isn't it A+D ozone shown in Fig.1 (and not only daytime O3)? Probably you mean "daytime ozone CONTRIBUTING to the A+D ozone in Figure 1" .

l156: It seems to me that V6-BC is larger than the bias estimates for T(p) at 3 out of 5 altitudes in Table 1. Maybe the the statement "...have values no greater than the bias estimates for T(p) (in row 2) at most altitudes" could be revised accordingly.

l189: "Fig. 4 also shows the expected 180° change of phase for A-D T(p) from the tropics to subtropics." I guess this refers to tidal phase. Maybe "....change of tidal phase as inferred from A-D..." would be clearer.

l516: "...or in nearly a zonal direction for the low and middle latitudes, where temperature gradients are weak." It is not clear whether you refer to temperature gradients at low and middle latitudes or gradients along the zonal direction.

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Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2020-322, 2020.



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