Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC2
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Comment on amt-2022-13

Anonymous Referee #2

Referee comment on "Intercomparison of upper tropospheric and lower stratospheric water vapor measurements over the Asian Summer Monsoon during the StratoClim campaign" by Clare E. Singer et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2022-13-RC2, 2022

Review of: Intercomparison of upper tropospheric and lower stratospheric water vapor measurements over the Asian Summer Monsoon during the StratoClim Campaign by Clare E. Singer and colleagues; https://doi.org/10.5194/amt-2022-13

Overview: This paper presents an intercomparison between the 3 in situ water vapour instruments that flew on the Geophysica aircraft for the 2017 StratoClim experiment based in Kathmandu. Included in the discussion is a comparison with an average profile from a balloon borne hygrometer launched near the Kathmandu airport and from the Microwave Limb Sounder satellite instrument. The paper is well written and found good agreement between the aircraft instruments, and also with the average satellite and frost point balloon profiles. I recommend publication, but offer just a few comments below.

1) The abstract states " In clear-sky UTLS conditions (H2O < 10 ppmv), mean differences between ChiWIS and FLASH were only -1.42% and those between FISH and FLASH only -1.47%. Agreement between ChiWIS and FLASH for in-cloud conditions is even tighter, at +0.74%. In general, ChiWIS and FLASH agreed to better than 10% for 92% (87%) of clear-sky (in-cloud) datapoints." I'm a bit confused between the order 1% values noted in the first sentence, and the 10% value noted in the second. Is the second sentence valid for cases where H2O is larger than 10ppmv? Perhaps instead, the uncertainty needs to be included in the first sentence (ie, what's the Standard deviation on the -1.42% for ChiWIS and FLASH?) Please made this clear. Also, include the range in the statement on line 253 on page 10.

2) Figures in supplement: It would be easier to look at on a laptop screen if you include the values on the horizontal axis for figure s2 and s4

3) Re: MLS, the most recent retrieval is version 5, which at least partially corrected for an instrumental drift. It would be worthwhile redoing the comparisons with the new retrieval.