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Atmospheric Measurement Techniques Discussions

Interactive comment on "Reducing representativeness and sampling errors in radio occultation–radiosonde comparisons" *by* Shay Gilpin et al.

Anonymous Referee #3

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1. Abstract: Pls. provide the time period of the data used. 2. P2, L26-30: Those are assumptions. Are there any prior studies on this or can the authors conduct some sensitivity studies on this? 3. Some reviews on prior studies considering different approaches to match pairs spatially, such as Mears et al. (2015) 4. Section 2.1: Pls. provide references for COSMIC and GRUAN projects. This applies to other places too. For GRUAN, pls. use Bodeker et al (2016) on https://www.gruan.org/documentation/articles/ 5. P6, L25-30, add this reference for spatial correction applied to RS and space-borne MWR comparisons: Mears, C. A., J. Wang, D. Smith, and F. J. Wentz (2015), Intercomparison of total precipitable water measurements made by satellite-borne microwave radiometers and ground-based

GPS instruments, J. Geophys. Res. Atmos., 120, doi:10.1002/2014JD022694. 6. Fig. 2: How many co-located RO profiles do you get within big circle, small circle and ellipse given your time matching window? If you get more than one, do you average them and then compare with RS? 7. Section 3.1: Table 1 shows that the reduction in RMS due to filtering is the largest for Eclipse. Is it due to smaller spatial coverage of Eclipse or the fact that the RS & RO profiles matched in Eclipse are more representative of the same air mass? 8. Main goal of applying filtering and different spatial matching is to reduce spatial and temporal sampling errors and increase the signals of instrument errors for both instruments. It would be very useful if the authors can provide one example showing this. For example, how the comparisons show one instrument's know errors more clearly after applying the new matching approaches proposed here. 9. One of unique things about GRUAN radiosonde data is its uncertainty estimate. How does your algorithm reduce ïĄş, then give you a better estimate of RO uncertainty if you already know the uncertainty of RS data in (see Immler et al. 2010 and other GRUAN references on www.gruan.org) for this. 10. Read this: Fassò, A., Ignaccolo, R., Madonna, F., Demoz, B. B., and Franco-Villoria, M.: Statistical modelling of collocation uncertainty in atmospheric thermodynamic profiles, Atmos. Meas. Tech., 7, 1803-1816, doi:10.5194/amt-7-1803-2014, 2014.

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