

Interactive comment on “Is it feasible to estimate radiosonde biases from interlaced measurements?” by Stefanie Kremser et al.

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We appreciate the suggestions and constructive comments provided by both reviewers. Below, the reviewer's comment is repeated in blue with our response in black.

Response to Reviewer 1

What I am missing as a reader are one or two vertical profiles of autocorrelation coefficients calculated from radiosonde temperature time series in the Tropics and in the Extratropics. This would be helpful for estimating which curve in Fig. 4 is the most relevant one. So far the paper only states that the autocorrelation at Lindenberg is around 0.5. The autocorrelation at other levels and regions may be quite different.

C1

We thank the reviewer for this suggestion and we have now added a new figure to the manuscript (Figure 5). This figure shows vertical profiles of autocorrelation coefficients determined from ERA5 reanalyses interpolated to the locations of 6 GRUAN sites, including sites in the tropics, middle and high latitudes. We chose to calculate the autocorrelation coefficients from ERA5 data rather than from radiosondes as long-term continuous measurements are required to obtain a robust estimate of the seasonal cycle of the temperature time series before calculating the autocorrelation coefficients. Such continuous observations, covering at least 2 years of daily radiosonde flights, are currently only available at a small subset of GRUAN sites, which does not cover all latitude bands. ERA5 is the latest reanalysis data set provided by ECMWF and it is expected that the calculated autocorrelation coefficients provide a good estimate of the autocorrelation coefficient at each of the selected sites. The estimated autocorrelation coefficient at 300 hPa for the radiosonde measurements made at Lindenberg (0.5 as described in the manuscript), agrees very well with the coefficient determined from the ERA5 reanalyses.

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C2