

## ***Interactive comment on “Interpolation uncertainty of atmospheric temperature radiosoundings” by Alessandro Fassò et al.***

**Anonymous Referee #2**

Received and published: 30 July 2020

### GENERAL COMMENTS

This manuscript contributes to highlight the importance of properly assessing uncertainty when imputation of missing data in atmospheric profiles is realized by interpolation, with novel ideas and tools within the scope of AMT. The statistical approach adopted is innovative, very valid and multifaceted, and it leads to reach substantial conclusions, even illustrated in its practical aspects. The overall presentation is well structured and clear, although some points need further clarifications and improvements, as specified in the following. Thus I would recommend the publication of this manuscript after a minor revision, believing it will be very interesting and useful for AMT readers.

### SPECIFIC COMMENTS

C1

Figures: titles are redundant since information is already written in the caption, if necessary please add information in the caption but remove titles; moreover check axis names (e.g. missing in Figures 2-4) and limits

Line 65: please clarify the sentence "thanks to the availability of appropriate data"

Lines 118-120: the error term  $\epsilon(t)$  should be introduced after its appearance in Equation (1)

Lines 118- 124: although the assumption of GP is relaxed in a second phase, it would be suitable to justify or at least comment upon the choice of the two considered autocovariance functions

Line 127: here the assumption of zero expected value for the error term in Equation (1) is implied, while it could be written before

Line 174: the assumption of a GP as a good description of the problem comes with a specified autocovariance function, it would be useful to clarify this

Line 200: to facilitate reading, it would be useful to specify that  $m_1$  refers to Equation (5) and  $m_2$  to Eq. (9), and only for  $m_2$  we need an estimation method (and so a hat)

Section 8: this section needs to be revised because a 3x3 simulation design is described but after there are comments about the 60 seconds case (e.g. line 237) and even results (e.g. in Table 2). Please correct consistently to have a 4x3 or 3x3 simulation design in all section

Line 228: I would suggest to avoid the technical term "2-fold" since it is not introduced before and not necessary

Line 270: it could be useful to clarify this sentence, consistently with the abstract where you state that both interpolation methods provide an underestimation

Lines 299-300: it could be useful a line summarizing reasons to integrate the two approaches and then use the proposed bootstrap-corrected formula

C2

## TECHNICAL CORRECTIONS

Line 44: a reference for RAOB would be useful

Line 61: “note” should be “noted”

Line 76: “soruces” should be “sources”

Line 89: a reference for the statistical analysis conducted by GRUAN would be useful

Table 1: please specify what “Imported” and “Selected” mean

Line 186: add parenthesis for the two references

Line 225: maybe campaign?

Line 237: “vey” should be “very”

Figure 7: in addition to the general comments about figures, this one appears with a different look, I would suggest to use the same software for all plots

Line 261: in the same line seconds are written differently, please check throughout all manuscript

Figures 10 and 11: captions should be revised since altitude is not represented as axis, and the box with altitude intervals needs a title

Line 282 and Figure 13: please write in both points 22 or 23 km

Figure 11: “Lint” needs to be defined

Figure 12: axis names are missing

Figure 13: please change one blue color

Line 312: please delete “TEXT”

Line 325: please explain QTF

C3

Line 335: Finazzi et al. should have year 2019 (that is correct at page 2)

---

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2020-161, 2020.

C4