We kindly thank the reviewer for his comments and questions.

Below you will find our response to these comments and questions together with questions and comments themselves.

Kind regards,

Siebren de Haan , et al.

Line 120 and bellow. The authors describe the method for determining the time delay of the air temperature recording in the AMDAR system. The very value of the correction to the temperature cannot be large. With a typical time constant for Rosemount 102 sensors of 1 s and an airplane ascent or descent rate of 10 ms-1 (this value even exceeds the standard rate of climb of civil aircraft of 5 ms-1), as well as with standard temperature stratification in the atmosphere in 0.0065 K/m, the correction will be no more than 0.065 K. It is the values of the correction that were obtained by the authors (see Figures 2 and 3).

» This is indeed the magnitude of the first correction.

However, the question arises, what will be the magnitude of the correction and its sign for unstable temperature stratification in the atmosphere? Super-adiabatic temperature gradients are often observed in the lower part atmosphere, in the surface and boundary layers.

» We do not correct the temperature measurement, but the reference height, assuming the delay is independent of the weather

From the description provided by the authors, it is also unclear what altitude is used to correct the air temperature, barometric or geometric, based on the global positioning system. This is important in this case, since the registration of the barometric altitude also occurs with a time delay relative to the true altitude due to the pressure inertia of the aircraft air pipe.

» We added the following :Finally, we correct the reference height of the temperature measurement using the vertical velocity of the aircraft."

Line 150 and bellow. The procedure presented by the authors for the AMDAR pressure processing has the goal for correcting its value, taking into account the distortion of the air flow depending on the speed and altitude of flight, which is quite fair. However, the proposed method does not allow estimating the value of the pressure readings lag in the AMDAR system, which was declared by the authors. Authors need to clarify these aspects of the study.

» The pressure lag, when present, is included in the correction.

Line 200 and bellow. Figures 2 and 3 show the vertical profiles of the discrepancy between the AMDAR air temperature readings and the radio-sounding data. Obviously, the authors succeeded in significantly diminishing of the discrepancies between different observation methods. At the same time, the manuscript implicitly declares that the proposed correction methods make it possible to exclude systematic errors of determining the air temperature in the AMDAR system. However, as it follows from the figures that the observed peaks on the profiles represent a systematic error. If the residual error were random, then the profiles of the discrepancies would have chaotic peaks. The systematic character of the discrepancies is also confirmed by the profile of standard deviations in Figure 2. The maxima on these profiles correspond to the heights where peaks are observed on the profiles of discrepancies. It would be desirable to clarify the nature of the residual systematic discrepancies.

» the increase of standard deviation near the surface is related to natural variability of temperature and the fact that both measurements are not completely Colocated. The larger standard deviation near the top could be related to general measurement inaccuracies of the aircraft temperature measurement

line 165 and bellow. Figure 1 provides a diagram for evaluating corrections to pressure measured by the AMDAR system. The aircraft number is given, but its type is not indicated. The question arises as to how applicable this diagram is to other types of aircraft.

» This diagram is just an example; diagrams of other aircraft showed a similar picture.

line 165 and bellow. Approximation formula (19) is presented without justification; it is necessary to clarify at what values of the parameters it is valid and what is the possible error.

» the justification is stated in the lines preceeding this equation.

line 185 and bellow. The authors do not indicate the region (or rgions) where the comparisons of the aircraft and radio-sounding data were fulfilled, as well as the weather conditions during comparisons. Has the temperature stratification always been close up to the standard?

» we added information on the geographical coverage to the text

line 200 and bellow. There is confusion in Figures 2 and 3 and the profiles of temperature lag correction and the vertical zero axes in the figures are indicated by almost the same lines.

» changed the linestyle of the axes

line 55 (and hereinafter): it is need to use the conventional aerodynamic term "dynamic pressure" instead of "impact pressure".

» wording is changed

line 65: There is no need for formula (2) to determine the speed of sound, the Mach number is well-known parameter.

» We added some words on the measurement of temperature using Bernoulli's equation. In this derivation the speed of sound is needed

line 65: Formula (3) for the indicated air speed does not make sense for this manuscript, since it is necessary to use the true aircraft airspeed taking into account the current air temperature.

» adjusted accordingly

line 70 (and hereinafter): it is need to use the conventional aerodynamic term "total air temperature" instead of "stagnation temperature".

» adjusted accordingly

line 80, Table 1: not "Parameter resolution of time and position", but "Time and position resolution". What is time resolution "1 s - 1 ms"?

» adjusted accordingly

line 115: (and hereinafter): it is need to use the conventional meteorological term "vertical temperature gradient" or "temperature stratification" instead of "lapse rate".

» adjusted accordingly

line 155, table 2: It is need to indicate dimensions of mean and standard deviation values in the title of the table.

» adjusted accordingly

line 155, figure 1: What is the type of aircraft EU0884? This is important because the correction diagram depends on type of aircraft. Titles of axes in figure should be larger.

» adjusted accordingly

line 200, figure 2: Labels of the axis of height is not indicated. Title of temperature axis is not shown. What is the "number in bin"? Titles of axes in figure should be larger. It also seems that lines of "tay" and vertical zero axis are confused.

» adjusted accordingly

line 210, figure 3: Labels of the axis of height is not indicated. Title of temperature axis is not shown. What is the "number in bin"? It is needed to indicate "synoptic hours" in top of the axis. Titles of axes in figure should be larger. It also seems that lines of "tay" and vertical zero axis are confused.

» adjusted accordingly