

Earth Syst. Sci. Data Discuss., referee comment RC1  
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## **Comment on essd-2022-290**

Anonymous Referee #1

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Referee comment on "Two new early instrumental records of air pressure and temperature for the southern European Alps" by Yuri Brugnara et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-290-RC1>, 2022

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Review of the paper "Two new early instrumental records of air pressure and temperature for the southern European Alps" by Brugnara et al.

General comment

The recovery of past observations is always an important task, and so is this work. A significant part of the paper also deals with the data digitisation.

According to the title, the paper focusses on the time series, but a significant part of the article describes and discusses data digitisation (Sect. 3.1.1, 3.1.2 and 5). If digitisation is a relevant part of the work, I think that the title should mention it in some way, otherwise, the technical aspects could be moved to an appendix.

In any case, the paper appears unbalanced and its purpose is partly unclear. The Rovereto time series covers 40 years and was digitised by hand, while the Bolzano/Bozen time series only covers 8 years and was digitised with three different methods. The discussion about digitisation is only relevant for Bolzano/Bozen, which has a very short time series, despite the fact that data up to 1873 (24 more years) are available but they were not digitised (see line 170).

I have two questions: 1) Why the Bolzano/Bozen time series was not extended to 1873?  
2) Do the authors want to illustrate the recovered historical data or the digitisation

methods?

Perhaps the authors could consider either to complete the time series of Bolzano/Bozen or to drop it, and only discuss Rovereto.

A major issue is related to the amount and quality of metadata (e.g. instrument position and performance, observation times). They appear insufficient for the time series to be considered of high quality, therefore it seems that the observations described in the paper, particularly those of Bolzano/Bozen, have essentially a historical value. This point should be discussed in more details.

Therefore, the paper cannot be published.

Major points

These are examples of insufficient metadata:

- Lines 38, 43: Little metadata not provided by the diarist.
- Lines 46, 49-50: Position of thermometer changed. Location of thermometer and observation times unknown.
- Line 51: Barometer readings at unknown times.
- Lines 114-117: Barometer elevation unknown.
- Lines 246-249: 10 hPa roughly correspond to 100 m and there are many unresolved issues.

Specific points

Line 82: Is the EKF400 time series suitable for homogenisation? Its horizontal resolution is  $2^{\circ} \times 2^{\circ}$  and both Rovereto and Bolzano/Bozen lie in rather deep valleys surrounded by high mountains.

Line 88: Does "self-keyed" correspond to "manual keying" (line 86)?

Lines 114-117: As the barometer elevation is unknown (see also lines 241-245), how was the reduction to MSL done? If elevation can be constrained within certain limits, the author could, in principle, estimate upper and lower limits of reduced pressure.

Line 122: Please say explicitly that WMO (2018) is the source of the equations used for the data reduction.

Lines 126-127: Is that a reliable check? Moreover, in sect. 2.1 the authors say that the main weather events were also recorded in Rovereto. If possible one should use data of the same location. Please discuss the data availability in more details.

Lines 139-140: I understand that eq. 2 holds for T1 and T2 separately and that T1/2 (line 140) means T1 or T2. If my interpretation is correct, I suggest to use " $T_k$ ,  $k=1,2$ " or something similar. If I am wrong, please explain it better.

Lines 142-152: This piece of text should appear at the end of sect. 3.4 because it logically follows the data quality control.

Line 173: What is the "reporting resolution"? Is it related to the instrumental uncertainty? How much is it?

Line 184: "valid" instead of "non-missing".

Line 189: The authors should discuss if the modern climatological daily cycle is really representative of that of the early 19<sup>th</sup> century. For instance, the soil characteristics at the station might be different, as well as the instrument exposure and elevation.

Lines 194-195: The sentence is unclear.

Line 207: "lower" than what?

Lines 209-214: Could sunrise and sunset times be determined from direct observations in

the towns of Rovereto and Bolzano/Bozen? The assessment based on temperature variations probably only holds on calm and clear-sky days. Please discuss the point.

Line 213: "4:15 PM and 6:45 PM" (reverse, in chronological order). Why has 1 hour to be subtracted?

Sect. 4.2: In the end, how accurate are the Bolzano/Bozen data? The uncertainties related to the method are not very encouraging ...

Lines 234-235: "average annual correction". Is the correction related to the uncertain instrument elevation?

Fig. 9: The line of 7:00 AM is faint.

Fig. 10: Panel a): The grey dots are rather faint. Panel b): Probably a dashed line is better visible than the dotted line (at least in the pdf).

Fig. 11: Panels a, b) The grey dots are rather faint.

Line 284: Despite the last sentence, the paper misses the account of systematic errors.