

This article describes the production of a high-resolution observational gridded dataset over Trentino - South Tyrol. The daily aggregated variables considered are temperature and precipitation.

The article is well structured and the presentation is clear and concise. The Introduction highlights the benefit of the study and includes a good review of the relevant literature on the topic. "Data and Methods" describes the study area and the observational database in a satisfactory manner. The interpolation scheme presented builds on a classical two-step approach. First, the climatologies are generated, then the authors use daily anomalies in their spatial analysis scheme, based on the underlying assumption of working with more Gaussian random fields. The "results and discussion" section includes the evaluation and presents a number of significant examples. As far as I can judge, there are no major flaws in the statistical analysis and the conclusions are well supported by the results. The accuracy and precision of the results are reasonable and comparable to state-of-the-art products in the Alps.

The presented method is not particularly original, because it has been applied before in the Alps, as the authors points out. The merit of this work is in the careful application of the method at such a high spatial resolution (250 m!) over complex terrain and with a pretty dense observational network. Furthermore, the final dataset is publicly available and this is a great merit of the authors. If the authors will regularly update this dataset, as they mention in their future plans (line 420), I can foresee a bright future for this dataset, which could be the basis for environmental applications and research in that part of the Alps. In conclusion, the study is valuable. My advice to the editor is to publish it (almost) as it is. I just have a few comments.

We thank the reviewer for the positive overview of our manuscript and for appreciating the method and result description. As marked by the reviewer, the aim of the work was not to test a new interpolation method but to employ an approach already proved in the Alpine context to derive a dataset which can be easily adopted for applicative purposes requiring local-scale information. For this reason, as stated in the manuscript, the dataset will be updated with a certain frequency in order to assure its availability for local studies.

We thank for the useful points raised by the reviewer. We address the comments here below and can integrate them in a revised version.

Comments:

Figure 8, total precipitation climatology. The figure shows that the elevation has an effect on the spatial distribution of precipitation. However, it looks like the distance from the sea (or from the Po plain) also has an effect on this variable. Have the authors considered to include this variate (i.e. distance from the sea) in their study?

In the method we applied in the study, the precipitation climatologies are interpolated by performing a local linear regression with elevation, which is then considered as unique predictor for precipitation distribution. The other geographical influences are included in the local selection of the stations entering the fit and in their corresponding weight. The station selection for the linear fit is in fact performed month-by-month for each grid point separately and

identifies the sites with the most similar geographical conditions to the point under reconstruction. Each station is assigned a weight which is proportional to such similarity and defines its contribution in the local linear fit. In the scheme here presented, we used distance, elevation difference and slope difference (orientation and steepness) as weighting factors. As correctly underlined by the reviewer, the sea proximity is another geographical factor which could have an influence on climate distribution.

The sea distance of the stations in the database ranges from 80 to 230 km. If we add the difference in sea proximity as further weighting factor, no improvement is observed in the reconstruction accuracy. It is worth noting that in the study area, sea distance is closely related to latitude and the similarity in geographical position is already taken into account in local station selection and contribution to the linear fit by the weight depending on the radial distance from the point under evaluation.

For these reasons we considered the sea distance factor negligible in the interpolation scheme. However, we can explicitly mention and discuss the choice in the Section 2.3.1 in a possible reviewed version of the manuscript.

It is not clear if this dataset can be used to extract climatological trends of temperature and/or precipitation. Considering the construction of the observational dataset used, I think the answer may be positive. However, given the importance of such an application, I would recommend discussing this point explicitly in the text. Perhaps, the right place where to discuss this issue would be at the end of Sec 3.1 (right after the related discussion on Fig. 7), with a further reference in the conclusions.

We thank the reviewer for highlighting the point. The reconstruction methodology and the quality check applied to the series, including the homogeneity evaluation for the longest records, make the dataset useable to analyze temperature and precipitation trends over the recent decades. Keeping the product updated is also thought to build a historical archive of climate information supporting assessment of changes and trends over the study region. However, the regional trend evaluation is beyond the scope of the submitted manuscript and the topic will be addressed in forthcoming studies employing the dataset here presented.

As suggested by the reviewer, the potential use of the dataset for trend analysis can be mentioned at the end of Section 3.1 as integration to the discussion on Figure 7. The similar magnitude of the leave-one-out errors over the whole spanned period, especially for temperature fields, demonstrates the general accuracy of the reconstructed temporal signal over the domain. We can also remark such further potential use of the dataset in the conclusions by integrating the lines 399-404 in the current version.