

## **RC1: 'Comment on essd-2024-433', Anonymous Referee #1, 01 Dec 2024**

Dear referee, thank you for your insightful comments and suggestions, which have significantly improved the clarity and rigour of our manuscript according to your review.

We have thoroughly revised our manuscript and addressed all the questions and concerns raised by the reviewer. Detailed responses are provided in blue following the reviewer's comments (in black).

This manuscript documents and validates a daily gridded temperature dataset for Poland, designed for climatological applications. While the methodology is not innovative, it is appropriate for the authors' goals. The validation process uses recommended best practices and metrics, with the manuscript's primary strength being the detailed description of this validation. However, the communication of the research could be improved. With revisions addressing the following comments, the manuscript could be suitable for publication.

Based on the reviewers' comments, we have extended the Summary section with an outlook part on planned improvements in subsequent versions of the dataset within the presented methodology.

Main comments:

### 1. Station Data Description:

The section on station data requires significant expansion. Specifically:

#### a) Are the data homogenized?

The homogenisation was not included in our methodology. Our approach focuses on preserving the same consistent way of calculating the daily average temperature. We have extended the station data section to comment on this issue and describe the part on data QC in more detail.

#### b) Do you use a fixed number of stations over time, or do you include all available stations, potentially varying with time (as suggested in line 73)?

Thank you for your comment. We have conveyed it at the end of section 2.1. A figure showing daily data availability (Figure 2a) has also been added and commented on.

#### c) If station number varies over time, how does this impact the dataset's time consistency?

To consider this issue, we showed the distribution of available data percentage in the period in Figure 2b. It is commented on at the end of section 2.1.

Points a) and b) should be stated in the Abstract too.

We have included additional information on b) in the abstract. We decided not to extend the description of the source data according to a) remark. The reader is supposed to get familiar with the data description in a dedicated section.

### 2. Temperature Definitions:

#### a) Clearly define TG, TX, and TN.

The definitions are added to the description of Eq. (1)

#### b) Specify the day definition used (e.g., 00 UTC to 24 UTC).

The definition is added to the description of Eq. (1).

- c) Does TG share the same day definition of TX and TN?

TX and TN are defined the same way throughout the period, and TG is calculated consistently. The description is improved to describe the methodology (Section 2.1) clearly.

### 3. Methods and Equations:

- a) Define all symbols in equations (e.g., “ $r$ ” in Eq. (2)).

We have corrected this part by improving the description of equations. (2), (9), (10).

- b) State fixed values, such as the number of sample points (“ $m$ ”).

We have corrected it by describing how  $m$  is taken into the interpolation procedure.

- c) Provide parameter values for the methods used.

We have corrected it by providing the value of the shape parameter.

- d) Clarify the statement in lines 123–124: Are you not using elevation as a predictor? This needs to be explicit.

Yes, elevation is a predictor. We have clarified it in the last paragraph of section 2.2.

### 4. Manuscript Organization. The structure of the manuscript should be revised, some sections need to be moved and you should check for repetitions in the text. Some suggestions follows:

- a) Abstract: Avoid unclear phrases like ““The linear RBF was employed by hold-out cross-validation (HO-CV) as the most suitable for the gridding procedure among other RBFs.” If HO-CV was used for parameter optimization, clarify this. Listing specific scores may not be necessary in the abstract.

Dear reviewer, we partly agree with your remarks and have rewritten this part slightly. However, including the scores’ values in ESSD’s paper abstracts seems quite common (e.g., <https://doi.org/10.5194/essd-13-1273-2021>, <https://doi.org/10.5194/essd-16-3795-2024>, <https://doi.org/10.5194/essd-2024-586>), so we decided not to remove them. We assume that this information could be valuable for the readers.

- b) Introduction: Clearly state motivations, research questions, and approach. Avoid mixing conclusions into this section (e.g., lines 36–42). Eliminate redundancies (e.g., lines 43–45). Clarify if line 60 refers exclusively to observational datasets.

We have taken into account your suggestions and modified this section accordingly.

- c) Reorganization: Consider moving Section 2.4 to the beginning of Section 3, avoiding redundancies (e.g., lines 156–157).

We have considered the suggestion and moved this section accordingly.

- d) Section 4: Reassess why trend analysis is treated as an application while extremes analysis in Section 3 is treated as validation. Both seem to be dataset applications. Provide a clear strategy for distinguishing these analyses.

Thank you for this remark. We agree that extreme analysis in Section 3 should be treated as an application, as both are based on gridded datasets. We made this part the second subsection of Section 4, after the subsection on trend analysis.

5. Dataset Purpose: State whether this dataset is intended for near-real-time climate monitoring (e.g., with regular updates) or as a one-time release

The dataset is mainly devoted to climate analysis and other climate-related applications. It is stressed in the introductory part and in the abstract.

6. Title. A more concise title, such as “PL1GD-T: High-Resolution Gridded Daily Air Temperature Dataset for Poland,” is recommended.

We have taken into account your suggestion and changed the title accordingly.

Minor comments:

Ensure consistent use of terms for TG, TN, and TX (e.g., TG is inconsistently referred to as TMEAN in Fig. 4 and TAVE in Section 4). Standardize abbreviations throughout the manuscript: e.g. replace 90% quantile and 10% quantile with 90th percentile and 10th percentile.

We have carefully checked the manuscript to avoid inconsistencies.

Line 260: This sentence seems abrupt and lacks context, making it feel disconnected from the surrounding text. Consider revising it to provide a smoother transition and explain its relevance to the discussion.

This line has been removed.