**Responses to Anonymous Referee #3**

**Referee #3:** This data paper introduces SHEDIS-Temperature, a curated dataset linking EM-DAT national disaster records for heat and cold waves to subnational geometries, meteorological data, and population exposure. The dataset is useful, well-structured, and has clear potential for cross-national hazard–exposure analysis, model benchmarking, and policy applications. Overall, the manuscript is strong, but several clarifications and additional details would improve transparency, reproducibility, and usability.

**Authors**: We sincerely thank Referee #3 for the constructive and encouraging feedback and are pleased to read that the dataset is considered useful for a wide range of applications. We also agree with the provided suggestions and believe they will help further improve the clarity and transparency of the manuscript. Please find our detailed responses to the specific comments below.

**Major comments**

1. **Referee #3:** Abstract: The abstract should include some key evaluation results (e.g., mean absolute error between EM-DAT and MSWX extremes) to convey dataset reliability at first glance.
   **Authors:** Thank you for this suggestion. We agree, and will include key evaluation results in the Abstract in the revised manuscript. However, we are cautious about presenting the comparison statistics between EM-DAT and MSWX as direct indicators of dataset reliability, since the temperatures reported in EM-DAT cannot strictly be considered ground truth.

2. **Referee #3:** Detrending procedure: The manuscript should explicitly clarify what "detrending" means—whether it refers to removing the long-term climatological trend or the seasonal cycle. Equations or a concise methodological description would help. Please also discuss the sensitivity of detrending results to the choice of reference period.
   **Authors**: Thank you for highlighting the need to clarify this. In our study, detrending refers to the removal of the long-term trend from the daily maximum and minimum temperature time series at the grid-point level. The seasonal cycle is preserved. To do this, we applied the *detrend*-function of CDO (Schulzweida, 2023) which removes the long-term trend estimated via least-squares regression. After detrending, the temporal mean of the original series was added back to preserve the baseline level, since the output from the detrending-function is centred around zero. We will include the relevant equations in the revised manuscript. We also note that we need to clarify in the revised version that the detrending was applied to the full time series (1979–2018), whereas the 30-year reference period (1981–2010) was used specifically for percentile calculation.

3. **Referee #3:** Advances over EM-DAT: Although Figure 1 touches on this, the global advances in spatial coverage and finer geometries relative to EM-DAT are not clearly visualized. A global map showing EM-DAT vs. SHEDIS coverage would highlight the added value.
   **Authors**: Thank you, we agree that the advances in spatial detail could be illustrated more clearly. Our initial reason for not including such a visualization was that the GDIS article (Rosvold and Buhaug, 2021) already presents this in an effective way. However, we agree that it would still be valuable to provide a visualization tailored to our subsample of EM-DAT records included in SHEDIS. We will therefore revise Figure 1 accordingly in the updated manuscript.

4. **Referee #3**: Choice of MSWX: The manuscript should justify why MSWX was selected as the meteorological input, rather than ERA5-Land, which has the same spatial resolution. A short rationale (e.g., bias corrections, variable availability) is needed.
**Authors**: Thank you for pointing this out, which was also noted by Referee #1. We agree and will add a concise explanation in the revised manuscript to clarify our choice of MSWX over ERA5-Land.

5. **Referee #3:** Cross-comparison with independent datasets: The study compares EM-DAT records with MSWX-derived extremes, but this is not fully independent from SHEDIS. A cross-check with another dataset (e.g., E-OBS, GHCN, Berkeley Earth, or reanalyses) would provide an independent validation.
**Authors:** Thank you for highlighting this important point. We agree that cross-checking with an independent dataset further strengthens the quality assessment. The article introducing MSWX (Beck et al., 2022) provides a global validation against station observations, and we will refer to those results in the manuscript (together for the rationale for choosing MSWX). In addition, we will complement this by conducting our own comparison with E-OBS daily maximum (for heat waves) and minimum (for cold waves) temperatures for the European records in our sample, to quantify the ability of MSWX to capture extremes.

6. **Referee #3:** Apparent temperature: Provide more detail on how apparent temperature was calculated (equations, inputs). This is important for reproducibility and comparability with alternative indices such as UTCI or WBGT.
**Authors:** We agree. We used the apparentTemp-function by the R package HeatStress (https://github.com/anacv/HeatStress). We will provide more details on this, including inputs and equations, in the revised manuscript.

7. **Referee #3:** Area vs. geo-projection: Tables define variables in km², but the gridded input is in WGS84. Clarify whether the data were reprojected or area-corrected to ensure comparable cell areas across latitudes.
**Authors:** We agree that this needs to be reported as well, will clarify it in the revised manuscript. For calculating area of grid cells, we used the cellsize-function by the R package terra (https://rspatial.github.io/terra/) and for calculating polygons we used the st_area-function by the R package sf (https://r-spatial.github.io/sf/index.html). Both of these function perform area-corrected calculations if the input is in a geographic CRS like WGS84.

8. **Referee #3:** Percentile thresholds: Provide references for the use of a 31-day window for percentile determination.
**Authors:** Thanks for highlighting this. We will provide references, including Russo et al. (2015) and Vogel et al. (2019).

9. **Referee #3:** Minimum duration: Provide references or justification for the choice of a three-day minimum duration for events.
**Authors:** Thank you for noting this. We will clarify the rationale and references behind this choice in the revised manuscript. We chose this minimum duration since it is widely used in the climate literature (e.g. Meehl and Tebaldi, 2004; Perkins and Alexander, 2013; Perkins-Kirkpatrick and Lewis, 2020). While these kinds of thresholds will always be, to some extent, arbitrary we think that the main benefit here is the application of consistent methodological choices across all records to ensure comparability. We will also further highlight that users who prefer different event detection settings can use our publicly available R-scripts to do so.

10. **Referee #3:** Uncertainty guidance: There is no quantified uncertainty guidance, required by ESSD.
    **Authors:** Thank you for highlighting this limitation. We will include a clear and condense section on uncertainty guidance to support users. This will cover limitations of the parent database EM-DAT (such as inclusion criteria and known biases), key findings from our validation and comparison analyses (with E-OBS and EM-DAT's temperature data), and the potential omission of local effects (e.g., urban heat islands). In doing so, we will emphasize that the dataset is best suited for analyses at regional to international scales, while more detailed data may be preferable for local applications.

**Minor comments**

**Referee #3:**

- Correct minor typos:
    - "logaritmic" → "logarithmic"
    - "recrods" → "records"
    - "percieved" → "perceived"
    - "Jammu and Kasmir" → "Jammu and Kashmir"
    - "the the" duplication
    - "Files within in these subfolders" → "Files within these subfolders"
- Spelling: Ensure consistent spelling of "GADM" (some occurrences appear inconsistent).
- Figure 9: Clean up the duplicated words and phrasing in the caption/description.

**Authors:** We thank Referee #3 for also capturing these details, we will amend them in the revised version of the manuscript.

**References provided by Authors:**

Beck, H. E., van Dijk, A. I. J. M., Larraondo, P. R., McVicar, T. R., Pan, M., Dutra, E., and Miralles, D. G.: MSWX: Global 3-Hourly 0.1° Bias-Corrected Meteorological Data Including Near-Real-Time Updates and Forecast Ensembles, Bull. Am. Meteorol. Soc., 103, E710–E732, https://doi.org/10.1175/BAMS-D-21-0145.1, 2022.

Meehl, G. A. and Tebaldi, C.: More Intense, More Frequent, and Longer Lasting Heat Waves in the 21st Century, Science, 305, 994–997, https://doi.org/10.1126/science.1098704, 2004.

Perkins, S. E. and Alexander, L. V.: On the Measurement of Heat Waves, J. Clim., 26, 4500–4517, https://doi.org/10.1175/JCLI-D-12-00383.1, 2013.

Perkins-Kirkpatrick, S. E. and Lewis, S. C.: Increasing trends in regional heatwaves, Nat. Commun., 11, 3357, https://doi.org/10.1038/s41467-020-16970-7, 2020.

Rosvold, E. L. and Buhaug, H.: GDIS, a global dataset of geocoded disaster locations, Sci. Data, 8, 61, https://doi.org/10.1038/s41597-021-00846-6, 2021.

Russo, S., Sillmann, J., and Fischer, E. M.: Top ten European heatwaves since 1950 and their occurrence in the coming decades, Environ. Res. Lett., 10, 124003, https://doi.org/10.1088/1748-9326/10/12/124003, 2015.

Schulzweida, U.: CDO User Guide, 2023.

Vogel, M. M., Zscheischler, J., Wartenburger, R., Dee, D., and Seneviratne, S. I.: Concurrent 2018 Hot Extremes Across Northern Hemisphere Due to Human-Induced Climate Change, Earths Future, 7, 692–703, https://doi.org/10.1029/2019EF001189, 2019.