I thank R1 for the thorough review and the time taken to review this manuscript; the comments and suggestions provided will improve the manuscript.

My answers to R1's suggestions/observations are written in blue.

General comments: The author presents a newly developed gridded, high-resolution climate dataset comprised of daily, monthly and yearly precipitation and temperature for Mexico that they have developed using stations data and Kriging with External Drift on a local neighborhood (KEDl) interpolation. The study presents a new dataset that can be very useful in understanding different aspects of climate change and its impacts at relatively high spatial and temporal resolution across Mexico.

This dataset appears to be a major improvement over existing datasets for Mexico. The station counts for the 1999-2020 period are much higher than in CRU and GPCC datasets; it would be helpful to demonstrate that they are higher than the Daymet dataset. We conducted a visual comparison of the MexiHiRes January and July 1981-2020 normals to the WorldClim, CHELSA, Daymet, and US PRISM products, and found that the MexiHiRes surfaces were relatively free of artefacts and appeared to be more credible than WorldClim, CHELSA, and Daymet, and generally more compatible with the adjacent US PRISM normals.

I will include this analysis in the new version of the manuscript; thank you for suggesting it.

Our main concerns relate to the filtering of the original datasets—specifically, the criteria used, the quality of the input data, and the details of the interpolation method. The data and methods section needs substantial revision. Clear explanations, potentially a flowchart, and a discussion of how each step in the process might influence the results would be highly beneficial. The validation and comparison presented are limited and only applied to specific extreme cases. The manuscript lacks discussion of potential limitations of the datasets. It is not sufficiently demonstrated that the newly generated datasets are better than existing alternatives, despite multiple claims by the author, though we are confident this can be done with more convincing analyses.

Although this paper requires major revisions, it appears that this is an exciting and necessary improvement to climate data available for Mexico, and we commend the author for the effort.

Thank you for your positive comments; I will address your suggestions and observations in the revised manuscript according to my answers that follow your following comments:

Major comments:

- Description of method: The author mentions in multiple instances that this is better data. However, the methods is not clear on the process of interpolation of stations data. How the observation data, how the interpolation works, what are benefits or

limitations of the method they choose and why they chose the method need to be clearly explained.

- Validation and comparison: The intercomparison with other datasets wasn't convincing. The author needs to make a more comprehensive comparison of their new dataset to other datasets, not only for selected extreme events. Further, they have to present how their data represents climate differently than other datasets and why it is so. I also suggest that the author discusses their methodological and data limitations.

I agree; I will include a section on the limitations of this new database.

- Climate normals: The focus of this paper is on the daily time series. However, the climate normals are also an important contribution and deserve some description, validation, and intercomparison.

Thanks for this suggestion; I think than this will improve the comparison section and will include it in the revised version of the manuscript.

- Content Refinement: The Introduction is ambiguous and there are several instances when concise refinement of the writing is required. They have to present the need for this work, and how this dataset will be better than existing datasets. Overall writing can be more concise.

Other comments:

In the comments below. L indicate line number, * indicate major comments.

- L3: remove terms like largest , highest etc and provide specific values like what temporal coverage, especially in abstract.

I agree and will remove these adjectives where possible.

- *L10-17: not clear if the author is just presenting these values or saying that these values are more realistic than values from other datasets. I am not clear what the author is trying to say by saying 'a summary that was not available before'. It is available from other datasets like ERA5land. Reliability of the values can be different, but it is available.

I am presenting these values because to date there is no information anywhere regarding country-wide information on climate extremes for Mexico's. The information could be extracted from ERA5land, but to my knowledge no one has summarized this info before.

L12-17: for which period are these values true, 1951-2020? specify.

Yes, those values are for the 1951-2020 period; I did not want to mention again "for the 1951-2020 period…", because I thought it would be too repetitive. I can rewrite those lines as follows:

With this new database it was possible to summarize extreme events of precipitation and temperature in Mexico for the 1951‑2020 period ‑ a summary that was not available before: the wettest year was 1958, the wettest day 1970-09-26, and September of 2013 the wettest month. Regarding temperature, it was also found that for the 1951-2020 period, eight out of the ten days with the highest $T_{min}$ occurred in 2020, the two months with the highest $T_{min}$ were July and August of 2020 and that the six years with the highest $T_{min}$ were 2015‑2020. When $T_{max}$ was analyzed, it was found that the hottest day was 1998-06-15, while June of 1998 was the hottest 15 month and 2020 the hottest year, and that the four hottest years occurred between 2011‑2020. Nationwide (and considering 1961‑1990 as the baseline period), $T_{min}$, $T_{avg}$ and $T_{max}$ have increased, with their anomalies drastically increasing in recent years and reaching values above 1.0 ºC in 2020.

- L18-19: generic

I wanted to emphasize that the spatial resolution of this new database allows the development of hydrological studies for small watersheds.

- L39: define for the first use

I guess that R1 refers to MODIS; I will describe it in the new version.

- L46-48: redundant
- L46 -48: superfluous. This whole paragraph can be summarized to few sentences, much of the details may not be relevant to the paper

I agree; I can cite the recent review of Mankin et al.: Review of gridded climate products and their use in hydrological analyses reveals overlaps, gaps, and the need for a more objective approach to selecting model forcing datasets (2025), Hydrol. Earth Syst. Sci., 29,85-108, https://doi.org/10.5194/hess-29-85-2025

- *L63 (whole paragraph): I suggest that the author create a table with name of dataset, resolution ( spatial , temporal), data period, region and citation . such table will give this exact information from this and previous paragraphs and will be more succinct

Thank you for this suggestion; I will create a table with this information.

- L75: “monthly surfaces of precipitation, Tmin and Tmax for the 1910–2009 period (i.e. 12 surfaces in total)”. If these were normals, wouldn’t this be 36 surfaces? But also, the term “monthly surfaces” is ambiguous about whether it is a monthly gridded time series or climatological average/normal. As suggested, and table would be more succinct and explicit.

I agree; these surfaces are not normals; they are monthly averages for the 1910-2009 period. I also agree that this information is better shown on a table.

- *L80: what about Daymet / ERA5 or other regional and global datasets that covers Mexico and available at daily resolution but may not be as same spatial resolution as

this dataset ? However, What problem their spatial resolution creates that this MexHiresClimDB will better address ? Need to explain why this work is important and what value it adds in more detail.

I will create a table and move lines 200-239 to this section (as suggested by R1 in another comment).

- L93: use numeric for XXth

Thank you for noticing this; I have already modified it.

- L95: what is the link between the description of study area and the datasets the author developed ?

Thank you for pointing this out; I have already modified the manuscript and it now reads as follows:

Due to Mexico's geographic context, its precipitation is extremely variable, as on a given day during the rainy season, precipitation can vary from 0 to more than 300 millimetres and the adequate representation of these extreme events is important in Mexico, in particular for those cities that depend on reservoirs that are only filled during hurricanes or where flash-floods are a recurrent event.

- L97-99: move this paragraph after the data description
- L100: what aforementioned refer to ? Provide the name of dataset. Throughout the paper try to use 'aforementioned' less often as it creates confusion

Thanks for the suggestion; this "aforementioned" refers to the database that I developed in PostgreSQL. These lines will be improved with the flow chart that I will include in the new version of the manuscript.

- L100-101 : rewrite: how many stations originally were there , how many were used ? what are the criteria to select the stations

The total number of stations with data is 5467; I will add this to the manuscript. The current version of the manuscript reads (L101-103) "… and once the climate records were in PostgreSQL only those stations with more than 10 years of registered data were selected; accordingly, not all available stations were used, and the number of stations varied across the 1951–2021 period, as shown in Fig. 2."

Also, the caption of Fig. 2 reads "Number of weather stations used for daily interpolations of (a) temperature, (b) precipitation".

- L108: what might have caused less number of stations after 2021 ?

I think that this was caused by a reduction in budget and the believe that in situ measurements are not needed.

- *Figure 2. The station coverage in this dataset is much better than in the CRUts and GPCC datasets, which report a dramatic (>90%) decline in station coverage after 1998. This is a compelling advantage of the MexiHiRes product and it would be useful to highlight it.

Thank you for your suggestion; I will highlight it.

- *L110 onwards to paragraph: need more description of the process and how this method works. For example, what happens to temperature lapse rate and what value is used ? A flowchart with all the steps involved from data collection to final output will be useful.

Kriging with External Drift considers the relationship between temperature and elevation, because elevation is used as an auxiliary variable. I think that the suggestion of including a flowchart describing the procedure will improve the manuscript, and I will include it in the revision.

- *L125-128: can the author show how sensitive their used values are ?

I will describe this in more detail and will rewrite these lines. The revised manuscript will include the following:

"These values were recommended by Carrera-Hernandez et al., (2024) after a detailed comparison of different Kriging variants at both national and stratified domains showed that $KED_l$ using elevation as a secondary variable provided the best representation of yearly precipitation in Mexico. The manuscript that details these analyses is currently under review (Hydrological Sciences Journal).

- L129-133: can be more succinct

I think that it is important to show the amount of time and resources required to develop this database, but will try to rephrase it.

- L134: recommend re-expressing $1.227 \times 10^6$ as 28 months so readers don't have to do the math. It's a lot of computation!

Thanks for the suggestion; I agree with it.

- L129: Is 26GB minimum requirement? not clear

Each interpolation takes 26GB of RAM, but I will rephrase it.

- L146: "if R2=0.80, then the model explains 80% of the variability". Reword: it explains 80% of variance, not variability. since variance is calculated from squared deviations, this interpretation will overestimate the amount of variability/dispersion that is explained

Thanks for your suggestion; I will reword this line.

- L170: is it value or variable, be specific.

Thanks for this observation; it is variables and I have already corrected it.

- L172: it's true that MAE for raw precipitation (in mm) is meaningless, since an error of 50mm has a different significance in a wet vs dry climate. however, MAE is meaningful if precipitation is log-transformed prior to analysis of error. By the same token, I would expect that the other metrics (R-square, COE, and IOA) are confounded by raw precipitation values in mm; wouldn't they primarily represent wetter regions—and wet anomalies—where absolute errors (in mm) are larger.

Thanks for the comment; I will look into this and use a log-transformation for precipitation.

- *L200-239: I suggest the author move the description of these datasets to introduction and summarize there. Here they directly present the results of comparison.

Thanks for your suggestion; I will move these lines to the introduction.

- *L290-291: This is not well justified statement but based on selected extreme event and a single coefficient. How this statement compares with what they presented in figure 5. I recommend performing relative Root mean Square Error to explore relative goodness of each dataset for both temperature and precipitation

On lines 281-291 I compare both the COE and the IOA. I use the extreme events of Figure 6 because I believe that these extremes need to be well represented in gridded databases. I do not agree with R1's suggestion of using the RMSE in addition to the metrics shown in the manuscript (R2, COE and IOA), due to the reasons given on lines 160-165:

> L160- 163: The Mean Absolute Error (MAE) is also used in this work because it is an unambiguous and more natural measure of average error than the Root Mean Square Error (RMSE, Willmott and Matsuura (2005)) due to the bias of RMSE when large outliers are present (Legates and McCabe, 1999).
>
> L164: The modified Index of Agreement (IOA, Legates and McCabe (1999)) has the advantage that errors and differences are not inflated by their squared values…
>
> L167-168: Another advantage of the IOA is that it is related to the Mean Average Error (MAE) and the Mean Absolute Deviation (MAD)

- Fig 7. The panels are labelled a,b,c,b,c.

Thank you for pointing this error; I have corrected it.

- Fig 7. It is very hard to see the distributions at typical printing size. Recommend altering the color scheme to better stand out against the background.

Thanks for your suggestion; I will modify the background.

- L311: not clear what the author is trying to say here.

Thank you for pointing this out. I have corrected the manuscript. It now reads:

The MexHiResClimDB also includes temperature data, and the analysis of extreme values of temperature is useful in climate change analysis; however, there is currently no information available on the coldest or hottest days in Mexico for the 1951--2020 period.

- *L325-326: similar comments for precipitation and temperature. I suggest the author adds average comparison as well as relative comparison among the datasets to provide better perception on how their new dataset is better than existing datasets, if it is.

Thanks for this suggestion; I plan to compare the normals from L15, daymet and MexHiResClimDB to improve these comparisons. Furthermore, I will use data from some of the automatic stations managed by Mexico's Meteorological Agency.

- L328: no need to write the full form again, be consistent

I decided to write the full form again to avoid monotony to the reader; I changed it to IOA in the new version of the manuscript.

- L330: "it is not possible to obtain cross-validation values for L15 or Daymet". This is a reason to use some other metric for intercomparison.

I will use data from automatic stations to improve the validation of the MexHiResClimDB

- L335: "neither L15 nor Daymet were capable of howing the temperature extremes that were obtained through the MexHiResClimDB". This is not apparent from figure 9. The maximum values seem similar to L15

I modified this line and it now reads as follows:

… a visual comparison of the spatial distribution of both $T_{min}$ and $T_{max}$ for the dates with minimum and maximum values of the aforementioned temperature values is done in Fig. 9, where it can be seen that the MexHiResClimDB is the database with the longest temporal coverage and that neither L15 nor Daymet were capable of showing the temperature extremes that were obtained through the MexHiResClimDB for the period covered by this new database.

- Figure 9: it is not clear what the author is trying to illustrate from these plots. It is already clear that their data has longer temporal coverage across Mexico than other mentioned datasets. It does not provide information on how better their dataset is compared to others.

One point on which this dataset is better than others is the temporal coverage and I decided to create this figure in order to highlight this point. This comment is linked to the previous point, and I think that it is important to highlight that neither L15 nor Daymet can be used to obtain the temperature extremes shown on Table 3 due to their temporal coverage.

- Figure 11: describe what climate stripes bars represent and what additional information they provide other than the anomaly plots. Otherwise remove

I think that showing the anomaly plots is a useful application of this new database; in addition, these plots also show the five year moving average of all variables and show the nation-wide warm up that is occurring in Mexico.

- L393-L395: this has only been demonstrated for a few specific events, so the statement should likely be qualified as such.

I agree and modified the lines accordingly to the following:

… the daily precipitation data provided by this database is the only one that adequately represents the spatial variation of the extreme precipitation events that occurred during September 15--16 of 2013, caused by the presence of Tropical storm Manuel in the Pacific Ocean and Hurricane Ingrid (Cat 1) in the Gulf of Mexico.