



Paper: “Assessing Climatic Variability in Data Scarce Region of Morocco (Upper Larbaâ Basin): Drought Periods and Exceptional Precipitation Events from 1958 to 2023”

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Please respond within the appointed time so that we can give the authors timely responses and feedback.

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Evaluation Criteria:

Please give each evaluation item a numeric rating on a 5-point scale, along with a thorough explanation for each point rating.

Questions	Rating Result [Poor] 1-5 [Excellent]
1. The title is clear and it is adequate to the content of the article.	5
No comments.	
2. The abstract presents objects, methods, and results.	5
No comments.	
3. There are a few grammatical errors and spelling mistakes in this article.	5
No comments.	
4. The study methods are explained clearly.	4
They need to be described in more detail all the data used and their source availability.	
5. The results are clear and do not contain errors.	3
They need to expand some results.	
6. The conclusions or summary are accurate and supported by the content.	3

<i>It need to be expanded as I mentioned in the bottom of the text.</i>	
7. The references are comprehensive and appropriate.	3
<i>They are updated and relevant, check the references that I recommended.</i>	

Overall Recommendation (mark an X with your recommendation) :

Accepted, no revision needed	
Accepted, minor revision needed	x
Return for major revision and resubmission	
Reject	

Comments and Suggestions to the Author(s):

Dear Authors,

Please address the following comments, which are necessary to improve the quality of the manuscript:

1. The images included in the manuscript are of low resolution. All figures must be provided at a minimum resolution of 300 dpi.
2. Equations should be written using the equation editor of the word processor and not inserted as images.
3. The conclusions section should be expanded, further elaborating on the main findings and their significance.
4. It is recommended to include and discuss the following references as part of the literature review and contextual analysis:
 - <https://link.springer.com/article/10.1007/s00477-023-02505-1>
 - <https://www.degruyterbrill.com/document/doi/10.1515/geo-2022-0557/html>
5. The section on homogeneity tests should be expanded, particularly the part concerning the following results:

“The results indicated the presence of interruptions in the sampling series for all stations. Specifically, the Kifan, Bab Mrouj, and Bni Ftah centers recorded a breakup in 1978, the Taza center in 1979, and both Sebt Bouklal and Ain Aghbal in 1980 (Table 3). These interruptions suggested a lack of consistency in the observed series, with varying averages recorded at each station.”

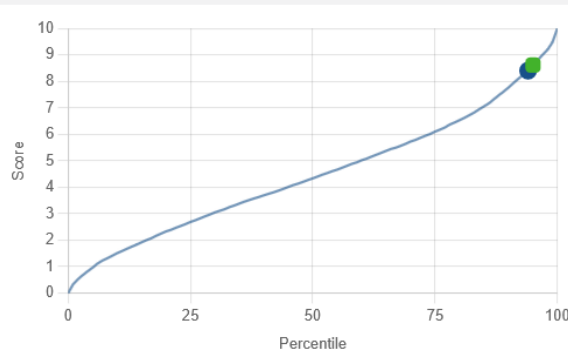
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Comments and Suggestions to the Editors Only:

Reviewer A:

Recommendation: Revisions Required

The TITLE is clear and it is adequate to the content of the article.

The title of the article is generally descriptive of the study's focus on climatic variability, drought, and extreme precipitation in Moroccan regions. However, it contains an apparent typographical error: "Data scare" should likely read "data-scarce," as the phrase "data scare regions" is unclear. Moreover, the title refers to "regions of Morocco" in the plural, whereas the study specifically examines the Upper Larbaâ Basin. To improve clarity and accuracy, the authors should correct the typo and consider specifying the region under study (e.g., "the Upper Larbaâ Basin") or clarify whether multiple regions are intended. In its current form, the title is moderately clear but suffers from wording issues that could mislead readers.

The ABSTRACT clearly presents objects, methods, and results.

The abstract provides a thorough summary of the study's context, objectives, methodology, and key results. It clearly states the study's aim (analyzing climatic variability in the Upper Larbaâ basin with 65 years of precipitation data) and outlines the methods (homogeneity tests, moving averages, IDW spatial interpolation, correlation with the NAO, and drought indices like EM and SPI). The results are also presented, including observed spatial trends, correlations, drought durations, and the choice of probability distributions for extreme events. However, the abstract is quite dense and includes many specific numerical details (e.g., precipitation values for return periods) that might be excessive for an abstract. Some sentences are long and could be split for readability. For example, phrases like "We record precipitation levels of 45 mm... and rise to 88 mm..." mix tenses and could be clearer.

There are a few grammatical errors and spelling mistakes in this article.

The manuscript exhibits a number of grammatical and typographical issues throughout. The most glaring error is in the title ("Data scare"), which should be corrected to "data-scarce." There are also instances of inconsistent tense or pluralization (e.g., "We record precipitation levels..." should be "We recorded..."; "rise to 88 mm" should be "rose to 88 mm"). Some sentences are awkwardly constructed: for example, in the conclusion, "The study area is now clearly exhibits the threat of drought as a structural characteristic" should be rephrased (perhaps "now clearly exhibits drought as a structural characteristic" or similar). The spacing and hyphenation of terms could be reviewed (e.g., "Upper Larbaâ basin" vs. "UpperLarbaâ basin"). Acronyms should be defined when first used (the EM index is introduced without expansion). Overall, while the text is understandable, it would benefit from careful copy-editing to fix these errors. There are also consistency issues with place names (e.g., Sebt Boukellal vs. Bouklal in tables) and some punctuation choices. Improving these would enhance readability and professionalism.

The study METHODS are explained clearly.

The methods section is described clearly and appears to be appropriately detailed. One area for improvement is clarity on some indices and models: for instance, the manuscript should spell out what "EM index" stands for, and more detail could be given on how SPI thresholds were chosen or calculated. The description of the extreme value analysis is adequate, listing the distributions compared (GEV, Gumbel, etc.) and the return periods examined.

The body of the paper is clear and does not contain errors.

The main body of the paper is logically structured into subsections addressing homogeneity tests, spatial variability, temporal variability, correlation with large-scale indices, and extreme events. However, there are a few issues to address. In a couple of places, the text repeats background information or references more than once in a short span (e.g., the same citation is used in successive sentences), which could be streamlined. It would also be helpful if the authors explicitly tied each result back to the study's objectives to reinforce coherence (for example, linking the spatial trend analysis directly to the goal of understanding regional variability). The subsection on daily precipitation and extreme event modeling is pertinent and well-focused, although it might benefit from a sentence or two explaining why only two stations were used for daily data.

The CONCLUSION or summary is accurate and supported by the content.

The authors note that these results are consistent with other Mediterranean studies, which strengthens their argument. The recommendation to improve water management and consider desalination is a reasonable extrapolation of the findings. The main issue is one awkward phrasing, as noted above ("now clearly exhibits the threat of drought as a structural characteristic"), which should be corrected for clarity. Otherwise, the conclusion accurately reflects the manuscript's content without introducing new information.

The list of REFERENCES is comprehensive and appropriate.

The reference list is extensive and includes many relevant works on climate variability, drought indices, and Moroccan climatology. However, there are significant mismatches between in-text citations and the reference list. Notably, several works cited in the text (e.g., Barriendos et al. 1998 and 1999; Xoplaki 2002; Hertig 2013; Hoerling et al. 2012; Raymond et al. 2016) are missing from the reference list. This discrepancy is a critical issue, as readers cannot locate these sources. All in-text citations should be checked against the reference list for completeness and consistency. The references themselves seem to follow a consistent format, but attention should be paid to author name capitalization and journal title formatting to meet ESJ style.

Please rate the TITLE of this paper.

[Poor] 1-5 [Excellent]

3

Please rate the ABSTRACT of this paper.

[Poor] 1-5 [Excellent]

4

Please rate the LANGUAGE of this paper.

[Poor] 1-5 [Excellent]

3

Please rate the METHODS of this paper.

[Poor] 1-5 [Excellent]

4

Please rate the BODY of this paper.

[Poor] 1-5 [Excellent]

4

Please rate the CONCLUSION of this paper.

[Poor] **1-5** [Excellent]

4

Please rate the REFERENCES of this paper.

[Poor] **1-5** [Excellent]

2

Overall Recommendation!!!

Return for major revision and resubmission

Comments and Suggestions to the Author(s):

The authors have tackled an important problem of climatic variability and drought in a region with sparse data. Your methodology is sound and the analysis is thorough, yielding interesting findings about rainfall trends and drought frequency in the Upper Larbaâ basin. To strengthen the manuscript, I suggest the following revisions:

- Title and Abstract: Correct the phrase “Data scare” to “data-scarce” in the title and throughout the text. Consider specifying the study region (e.g., “Upper Larbaâ Basin”) in the title for precision. In the abstract, check tense consistency (e.g., “we recorded” instead of “we record”) and simplify long sentences. You may remove some overly detailed numeric results from the abstract to maintain focus on the main outcomes.

- Language and Style: Carefully proofread the manuscript for grammatical issues. For instance, revise sentences like “The study area now clearly exhibits drought as a structural characteristic.” Ensure acronyms (EM, SPI, NAO, MO) are defined at first use. Standardize the spelling of place names (e.g., Sebt Boukellal) and check for consistent spacing around terms (e.g., “Upper Larbaâ basin”).

- Methods: The methodology is well described, but you could add brief definitions for the EM index and explain how SPI drought classes were determined. Clarify why only two stations were used for daily data analysis. Otherwise, the descriptions of homogeneity tests, interpolation, and statistical models are clear.

- Results and Discussion: The body of the paper is generally coherent. To improve flow, ensure each subsection clearly ties back to the research objectives. For example, explicitly state how the homogeneity findings or spatial trends inform the overall goal. Avoid redundant phrases and repeated citations in close succession.

- References: This needs urgent attention. Add all missing references cited in the text (e.g., Barriendos et al. 1998/1999, Xoplaki 2002, Hertig 2013, Hoerling et al. 2012, Raymond et al. 2016). Verify that every in-text citation has a corresponding entry in the reference list, and vice versa. Follow the journal’s reference format consistently.

Reviewer C:

Recommendation: Revisions Required

The TITLE is clear and it is adequate to the content of the article.

Please, insert location + analysis period in the title like this: Assessing Climatic Variability in Data scarce regions of Morocco (Upper Larbaâ basin): Drought Periods and Exceptional Precipitation Events from 1958 to 2023

In addition, for me, your study should be focused for 1 extreme event: "Drought" or "Exceptional precipitation (flood)"

Which extreme event is more frequently observed in your study region ? This can guide you to choose only drought or Exceptional precipitation for investigation.

The ABSTRACT clearly presents objects, methods, and results.

The aim of the study is not clear (in the Abstract and in the Introduction)

There are a few grammatical errors and spelling mistakes in this article.

the English language must be significantly improved.

The study METHODS are explained clearly.

Yes.

But, you need to structure very well the methods.

The body of the paper is clear and does not contain errors.

There are some minor errors to be corrected (see the observations in the manuscript).

The CONCLUSION or summary is accurate and supported by the content.

The conclusion must be improved.

The list of REFERENCES is comprehensive and appropriate.

Ok for references.

But, you need to explore more references after 2020.

Please rate the TITLE of this paper.

[Poor] 1-5 [Excellent]

5

Please rate the ABSTRACT of this paper.

[Poor] 1-5 [Excellent]

4

Please rate the LANGUAGE of this paper.

[Poor] 1-5 [Excellent]

4

Please rate the METHODS of this paper.

[Poor] 1-5 [Excellent]

4

Please rate the BODY of this paper.

[Poor] **1-5** [Excellent]
3

*Please rate the **CONCLUSION** of this paper.*

[Poor] **1-5** [Excellent]
3

*Please rate the **REFERENCES** of this paper.*

[Poor] **1-5** [Excellent]
5

Overall Recommendation!!!

Accepted, minor revision needed

Comments and Suggestions to the Author(s):

Some comments and suggestions are in the paper.
