

Overall Assessment: Moderate to Major Revision

The research addresses the crucial topic of Compound Drought-Heatwave (CDHW) events in the Indian context, which is of high relevance. However, the current manuscript suffers from significant technical inconsistencies, particularly regarding the methodological definition of drought timescales and the justification of core analysis thresholds. I strongly recommend the authors undertake a ****Moderate to Major Revision**** to address these technical issues. The clarity of scientific terminology and consistency in defining timescales must be significantly improved.

Major Technical and Conceptual Recommendations (Revisions Required)

1. Methodological Inconsistency: Timescales and SNEPI Framework

The most critical issue is the fundamental contradiction between the manuscript's claims and its methodology.

- **Claim vs. Method:** The authors claim that the proposed SNEPI framework addresses and captures ****intra-monthly precipitation spells**** (e.g., Lines 140-148). However, the methodology defines drought based on $SNEPI < -1$ for a **single month**. A monthly index inherently fails to resolve intra-monthly variability, rendering the core claim technically incorrect. **The authors must revise the framework to either genuinely operate at an intra-monthly scale or remove the unsubstantiated claim from the Introduction and Conclusions, thereby adjusting the paper's main novelty focus.**

The authors must strictly maintain consistency in the ****time scales**** throughout the analysis. The current discussion (L401-429) confusingly blends intra-monthly and seasonal scales, resulting in an ambiguous “mechanistic analysis” that needs complete restructuring to provide clear, scientifically sound justifications.

2. Threshold Justification and Definition of Metrics

- **Heatwave Threshold:** The use of an absolute threshold of $T_{max_daily} > 40^{\circ}\text{C}$ for a heatwave is non-standard. The general practice involves percentile-based thresholds (e.g., 95th or 99th percentile). The authors must provide explicit **justification or citations** supporting the use of 40°C in this specific context.
- **Intensity Definition:** When discussing the ****Intensity of Drought/Heatwave**** (e.g., Figure 2), you should define what is intensity in the paper.

3. Figure Quality and Presentation

The overall quality of figures needs significant enhancement for publication clarity:

- **Figure 2 Quality:** The visual resolution and consistency across sub-figures (2a) and (2b) are poor. The figures need a professional standard of visualization. Try plotting using Python. These days chatGPT is of great help. When you use MATLAB, the vibrant colormaps are not coming really well. Its better if you can consider revising in python. With chatgpt it won't take much longer to translate your codes to python's matplotlib.
- **Figure 3 Enhancement:** The six spatial maps can be presented more succinctly, for instance, by aggregating into a **latitudinal average plot** for better trend visualization. The authors should also consider adding trend lines and presenting the time series as the ****fraction or percentage of grids**** affected.
- **Clarity in Figure 1:** State boundaries and all non-standard elements (like the yellow boundaries) must be clearly explained via a proper legend.

Minor to Moderate Recommendations (Clarity and Style)

- **Terminology:** Please ensure all scientific terms are used precisely. For example, revise “recurrent compound extremes” to the more appropriate **“concurrent compound extremes”** (L38). Also, clarify whether the approaches used are “numerical” or **“statistical approaches”** (Line 96).
- **Novel Terms:** If introducing new terms (e.g., “scorch”), ensure they are clearly defined, justified, and cited to avoid confusion within the hydroclimatic community.

- **Introduction and Citations:** The Introduction should clearly articulate the **specific knowledge gap** addressed by this study. Review the high volume of citations (L78-95) and remove those not directly relevant to CDHW studies to maintain focus.
- **Stylistic Edits:** Revise minor language issues such as the opening of sentences with “Whereas” (L43), awkward phrasing (L25), and excessive capitalization (L47). Check for typographical errors like the double full stop (L122).
- **Title Suggestion:** Consider adopting a more ****result-oriented title**** to enhance the manuscript’s broader visibility.

The authors must ensure that all terms are defined and the overall scientific clarity of the manuscript is high.