

Editor

The manuscript is acceptable pending minor corrections. The authors should make small revisions to strengthen the conclusion by clearly synthesizing the main limitations and uncertainties and by refining the future outlook where appropriate. The author (s) shall include the suggested citations only if they are directly relevant to the study, assessing the need in light of COPE guidance.

We thank the Editor for this positive assessment. The Conclusion section has been revised to more explicitly synthesize the key limitations and uncertainties of the study, including those related to climate variability, atmospheric river (AR) detection methodology, and the absence of detailed process-level diagnostics. In addition, the future outlook has been refined to more clearly articulate pathways for extending the present framework. The suggested references were carefully evaluated and incorporated where they directly support the discussion of future moisture budget–based analyses, consistent with COPE guidance.

Reviewer

The authors have satisfactorily addressed the previous comments, and the manuscript has improved significantly in clarity, structure, and scientific quality. However, the Conclusion section would benefit from further strengthening by more explicitly synthesizing the key limitations of the study, including uncertainties related to climate variability, AR detection methodology, and the exclusion of detailed process-level diagnostics. In addition, the future outlook should more clearly emphasize the potential role of moisture budget–based analyses in advancing understanding of the mechanisms linking atmospheric rivers to extreme precipitation and runoff. Recent developments of long-term, high-resolution regional moisture budget datasets enable direct quantification of moisture convergence, storage, and transport associated with precipitation extremes and their propagation, offering a valuable pathway for extending the present framework (Raghuvanshi & Agarwal, 2025a; Raghuvanshi & Agarwal, 2025b).

References

*Raghuvanshi, A. S., & Agarwal, A. (2025a). An hourly dataset of moisture budget components over the Indian subcontinent (1940–2024). *Scientific Data*, 12, 1770.
<https://doi.org/10.1038/s41597-025-06044-y>*

*Raghuvanshi, A. S., & Agarwal, A. (2025b). Complex network reveals propagation and moisture dynamics of Indian monsoon precipitation extremes. *Climate Dynamics*, 63, 443.
<https://doi.org/10.1007/s00382-025-07924-0>.*

We thank the Reviewer for the positive evaluation and the constructive suggestion. In response, we have revised the Conclusion to (i) explicitly synthesize the principal sources of uncertainty, including climate variability, methodological choices in AR detection, and the exclusion of detailed process-level diagnostics, and (ii) strengthen the future outlook by emphasizing the

potential role of moisture budget-based approaches in advancing mechanistic understanding of AR-driven extreme precipitation and runoff. Recent developments in long-term, high-resolution regional moisture budget datasets are now cited and discussed as a promising avenue for extending the present framework.

Technical and Formatting Comments

Supplementary Figures

Comment: Please number the figures of the supplement according to the guidelines (e.g., Figure S1, Figure S2, Figure S3).

Response: All supplementary figures have been renumbered following the journal guidelines and are now labeled as Figure S1, Figure S2, etc.

Comment: Please ensure that the colour schemes used in figures allow interpretation by readers with colour vision deficiencies.

Response: Figure 9 has been revised using color-blindness–friendly color schemes. The updated figure was checked using the Coblis Color Blindness Simulator to ensure accessibility.