

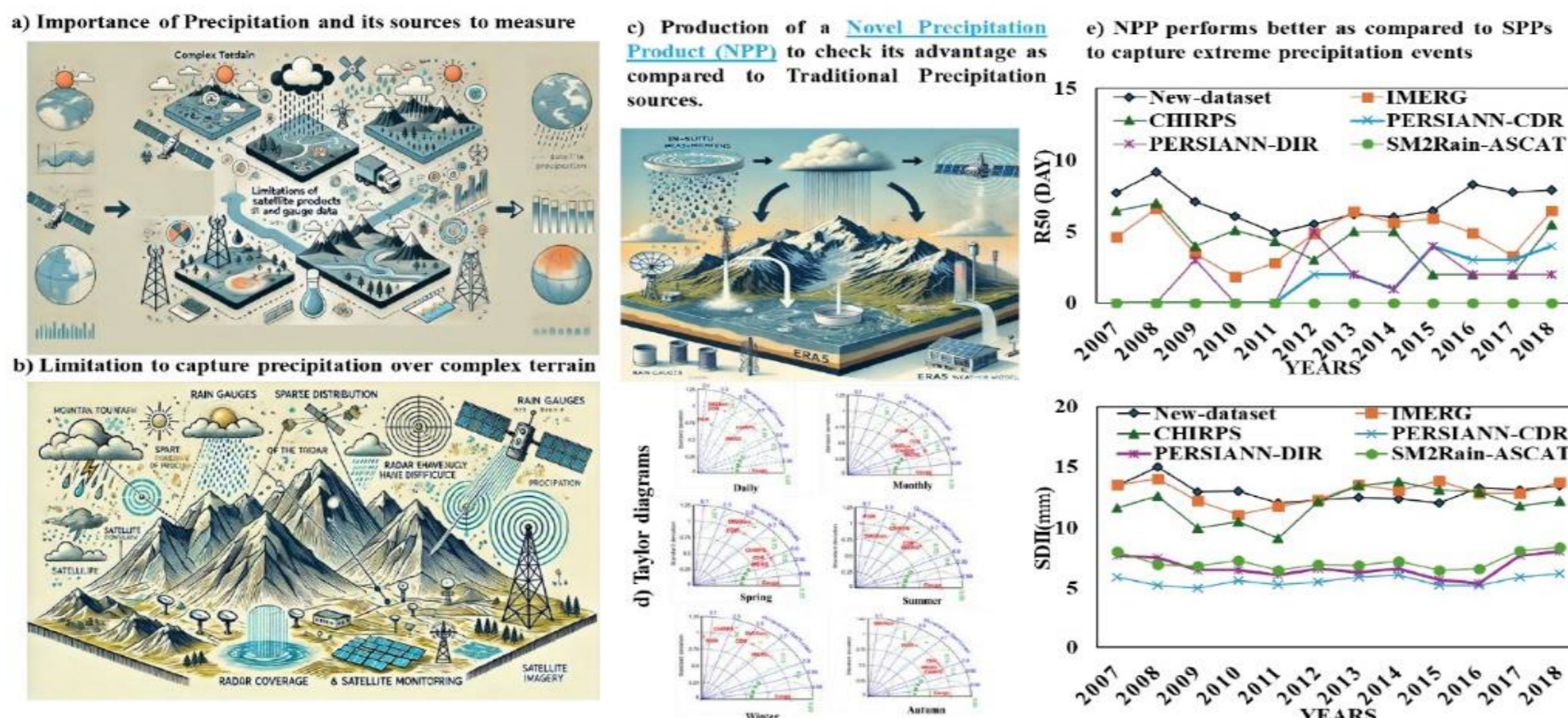
Development and Evaluation of a Novel Precipitation Product for Extreme Events: A Principal Component Analysis Approach

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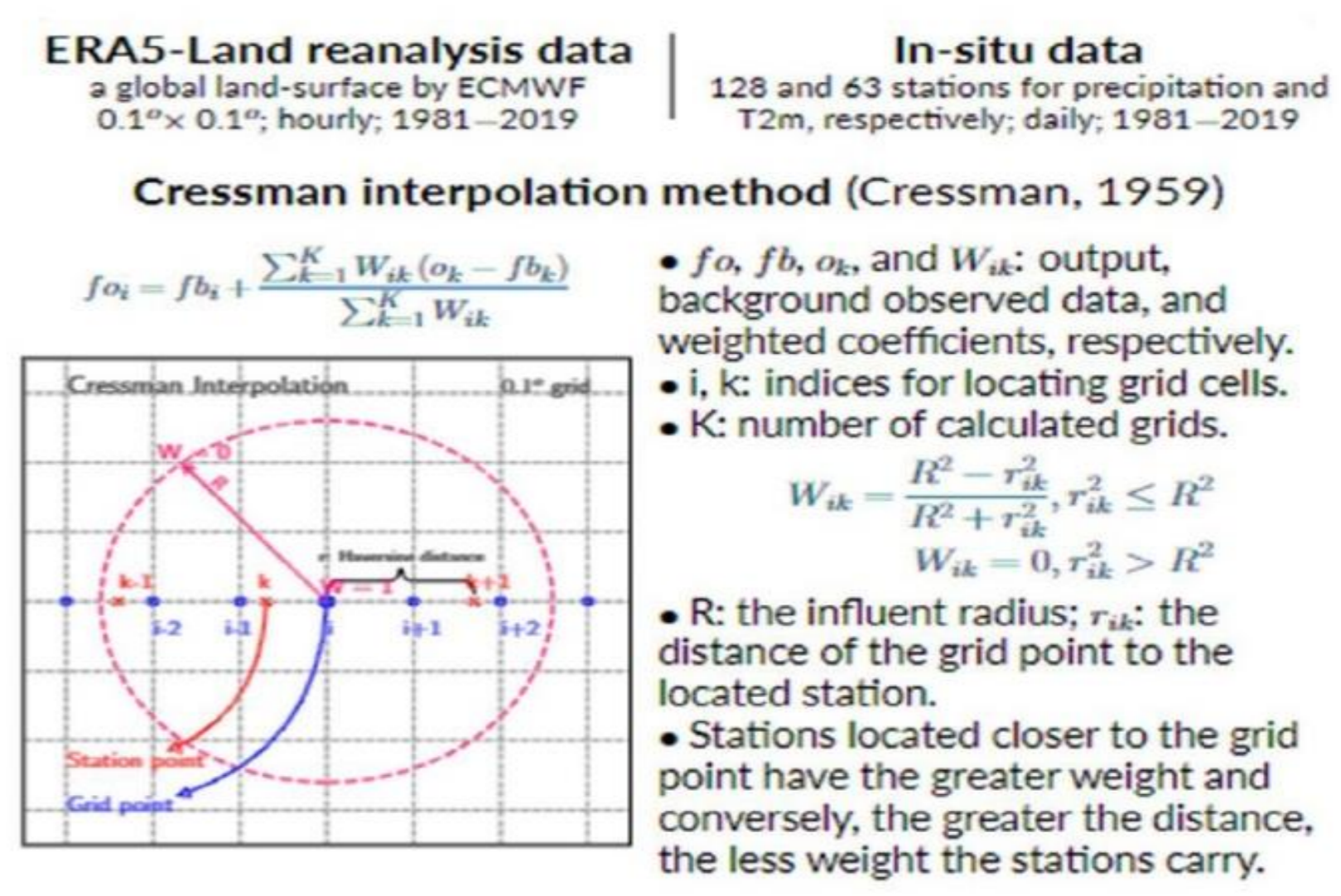
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❖ The research develops and tests a novel precipitation product to accurately measure extreme precipitation in Vietnam's mountainous regions, addressing challenges where current methods are less effective due to the complex terrain.

1 Graphical Abstract



2 Novel Precipitation Product (NPP)



3 Materials and Methods

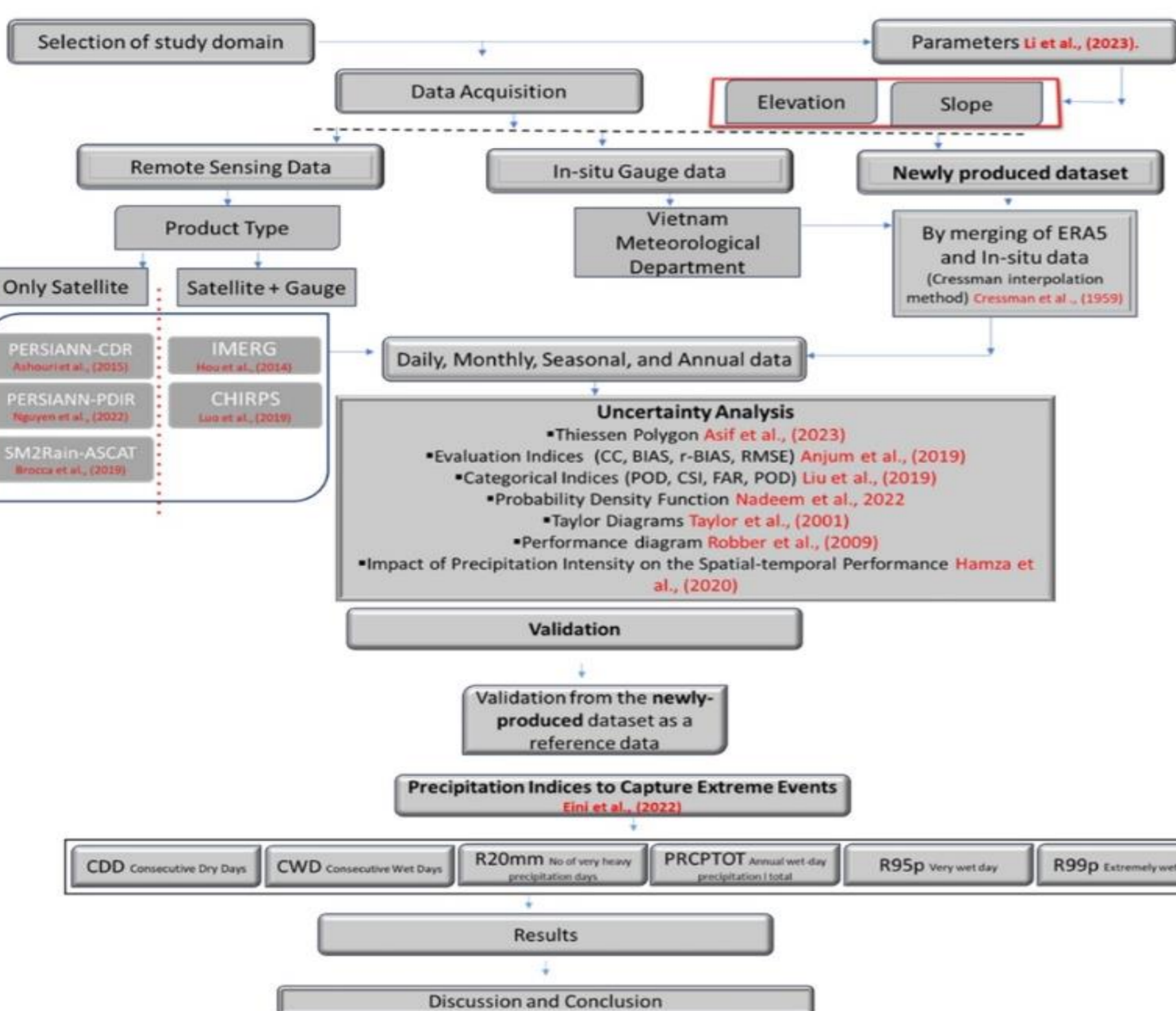


Figure 1. Layout of methodology

4 Results

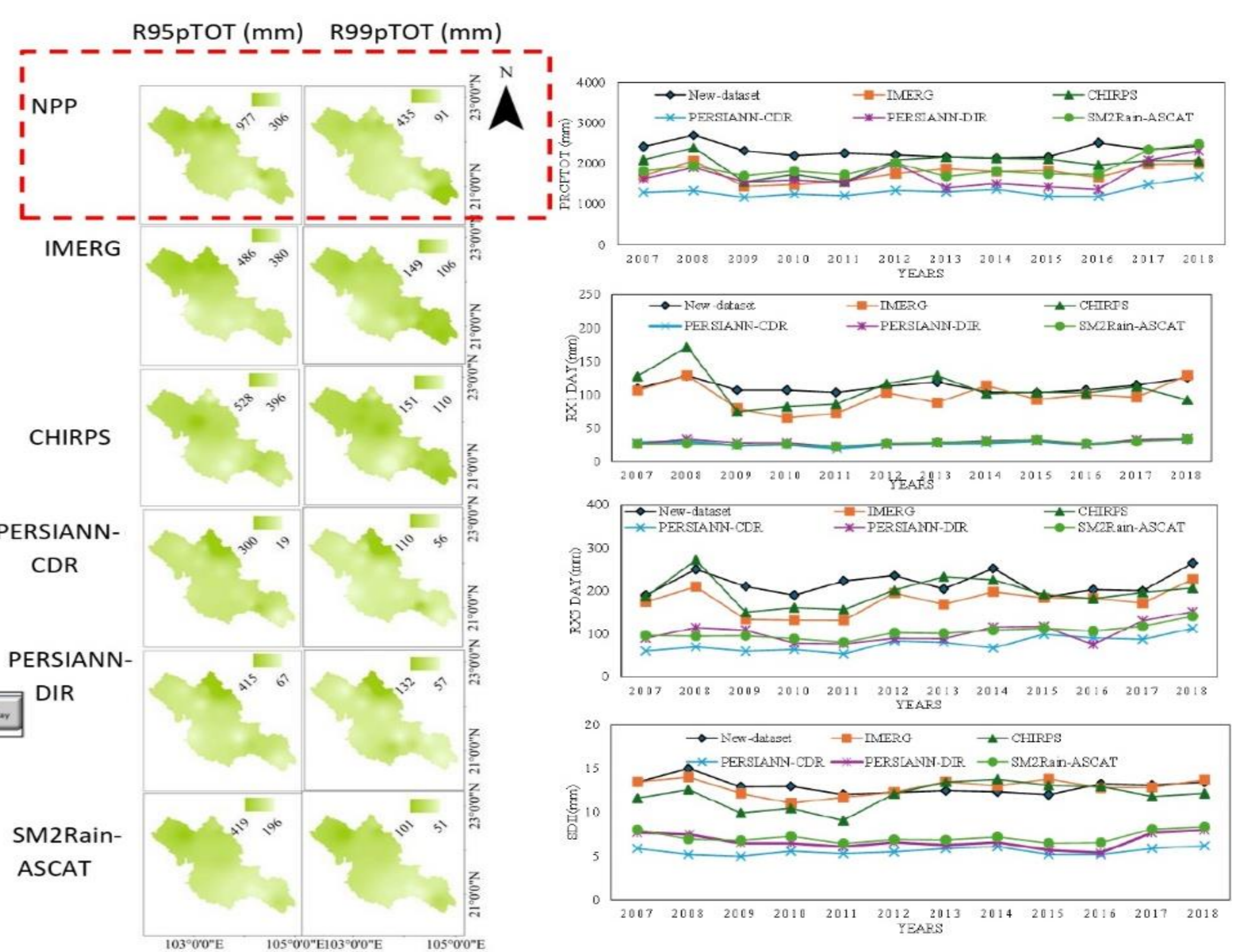


Figure 2: Where used as R95pTOT (mm) and R99pTOT (mm), Grid Threshold indices. Figure 3: RX1day (mm), RX5 day (mm), SDII (mm), and PRCPTOT (mm) used as Non-threshold indices.

5 Key Findings

- The novel precipitation product (NPP) was created by merging in-situ estimations with ERA5 data to accurately capture extreme precipitation events over complex terrain.
- The NPP's performance was evaluated against five satellite precipitation products (SPPs), revealing novel insights and offering advantages over SPPs.
- IMERG and CHIRPS were able to marginally track the NPP's performance in capturing moderate to heavy precipitation events.
- NPP's superior performance in capturing high-intensity precipitation indicates that all SPPs require further improvement for use in mountainous regions, while NPP shows significant advantages for future hydroclimatic applications.

6 Future Work

- To advance, region-specific cloud classification and quantitative precipitation estimation model that incorporates cloud property and model uncertainty for enhanced rainfall-runoff modeling in the Flood region, thereby providing reliable data to support sustainable water resource management.

Acknowledgment

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