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## Examining the spatial and temporal characteristics of hydrological drought in the largest basin of the Indian Peninsula

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The intensified warming conditions have substantially impacted the occurrence, duration, and magnitude of severe hydroclimatic events worldwide. Consequently, economic conditions have experienced considerable influence in the past decades. Droughts, in particular, are complex catastrophic events, rendering them extremely unpredictable and hard to comprehend. It is a gradual and prolonged catastrophe marked by insufficient rainfall, leading to a scarcity of water. In addition, drought is often defined as a period of reduced rainfall resulting in water shortage. It is frequently assessed by examining combinations of many factors, such as precipitation, temperature, and soil moisture. Specifically, hydrological droughts are precisely characterized as prolonged periods when water levels in rivers and streams fall below a preset threshold value. Furthermore, frequent occurrences of hydrological drought pose a significant threat to freshwater resources. Thus, identifying the spatiotemporal characteristics of preceding droughts is crucial for the effective management of future water resources. Hence, this work focuses on analyzing the spatial and temporal patterns of hydrological drought events that occurred between 1964 and 2020 in the Godavari River Basin (GRB) located in the peninsular area of India. The GRB has an area of roughly 0.3 million square kilometers, making it the biggest river basin in peninsular India. Over the last several decades, the GRB has been confronted with severe drought conditions. Therefore, the present analysis utilized the dataset of daily observed water discharge data collected at 21 gauging stations by the Central Water Commission (CWC). In addition to eliminating minor droughts and aggregating droughts, the 'Variable Threshold' concept is utilized to derive hydrological drought characteristics at various stations, including intensity, deficit, and duration. According to our findings, significant spatial and temporal variation is evident in the regional hydrological drought characteristics of the GRB. Additionally, flash drought conditions have been reported at multiple stations. The results derived from this research contribute to the advancement of knowledge regarding the spatiotemporal patterns of droughts in the GRB.