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Drought Quantifications in Semi-Arid Regions Using Precipitation Effectiveness Variables

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This study proposes a new drought index based on several precipitation -based parameters to quantify drought hazard in semi arid region. In addition to the practice of using only rainfall volume for indexing drought, the proposed index verifies the potentials of nine (9) other precipitation effectiveness variables PEVs, (onset of rain, cessation of rain, length of rainy and dry season, wet days and dry days within a wet season, dry days within the year, maximum dry spell length within a wet season and mean seasonal rainfall depth (MAR) in quantifying the drought conditions over a place. In formulating the index, each standardized deficit for each PEV is magnified using the Kridging principle and summed up together. A statistical comparison test using historical drought data is used to determine the most appropriate PEVs set that can be conjunctively included in indexing the drought hazard at each location. The daily rainfall data from seven stations in the semi-arid region of Nigeria (namely Gusau, Kano, Katsina, Maiduguri, Nguru, Potiskum, and Sokoto) were used to verify the effectiveness of this new method.