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Characterization of Large Scale Climate Pattern Associated with Extreme Rainfall Events Using Geometric Moments Based Ellipsoid Model

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It has been widely acknowledged that climate system associated with extreme rainfall events was difficult to understand. This study developed a new model for characterizing large scale climate system associated with extreme events. Main interests are to derive location, size and direction of the rainfall field and this study developed an algorithm to extract the above characteristics from global climate data set. This study mainly utilized specific humidity and wind vectors provided by NCEP reanalysis data to define the moisture track. First and second geometric moments have been extensively employed in defining the rainfall field in the selected zone. The proposed geometric moments based ellipsoid model works equally well with regularly and irregularly distributed synthetic grid data. As a pilot study, we extracted daily wind patterns and specific humidity on top 20 extreme rainfall events and apply a 90% threshold to isolate high magnitude of moisture transport associated with extreme rainfall in South Korea. It was found that location, size and direction of the rainfall field was successfully extracted. Our analyses of daily synoptic moisture transport patterns defined by geometric moments suggest can be possibly clustered given their intensity, direction and position properties.