

Public Abstract

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Title:Analysis of twenty-five years of heavy rainfall events in the Texas Hill country

Forecasting heavy rain events and the area of greatest threat has been a long standing challenge in operational meteorology. Quantifying rainfall as a distribution provides forecasters with supplementary information on precipitation thresholds that can lead to significant flash flooding or major flooding.

Twenty-five years of daily (24-hour) rainfall data were examined for the Texas Hill Country using observations from 86 cooperative climate stations in the region; the period examined for this study was 1982-2006. Days with measurable precipitation were treated as a gamma distribution in order to determine the top 2%, 1%, and 0.5% to define events as unusual, rare, and extreme, respectively. This approach was applied to each station as well as to the aggregate data for all 86 stations, resulting in an analysis of 130,986 observations of 24-hour precipitation.

Soundings were reconstructed, from which convective instability parameters were used to determine mean values. Using these mean values, a composite sounding was made for each rainfall threshold for the Mesohigh, Frontal and Synoptic classifications. Seasonal composites provide a representative sounding for a specified time of year and help eliminate smoothing of the data.