

A study of consecutive days of measurements with no rain in Louisiana

Problem Statements:

Are dry runs becoming more frequent over time? How often do they occur at different magnitudes? Are there ways to predict dry runs in Louisiana? Do dry runs in LA have a significant relationship to ENSO or other Teleconnections?

Objectives:

(1) Identify any trends occurring over the last 78 years. (2) Identify any possible changes in the frequencies of dry runs from year to year as well as to (3) Identify any trends in the lengths of the dry runs throughout the last 78 years. (4) Return periods may also be calculated for extended dry periods. An extended dry period would be defined in the project. (5) This study may also explore trends of dry runs through the years, but specifically with the seasons.

October is typically the driest month in Louisiana. This study would show if in the last 78 years, the fall has always been the driest season and how this might fluctuate through the years. ENSO will also be researched to show any relations to the dry years in Louisiana.

Data & Methods:

The study area is 30 weather stations across Louisiana, including 15 stations in the NOAA Historical Climate Network. The other stations were chosen by their length of record for precipitation data and their location in the state. Stations with less than 90% complete records were removed from the data set. There are nine climate divisions in Louisiana, with an average of 3.3 stations per division. Statistical methods will be used to test for trends. The Spearman Rank Test can be used to test for trend in frequency at each station. Compositing of 500mb geopotential height maps for the dates of the dry runs can also be used to classify the atmosphere circulations during the dry runs. Comparisons of ENSO patterns will be made to identify any trends that match the length of dry runs for each year at each station. Quantile estimates may also be run to find probabilities of dry runs at each station for the magnitudes of 15, 20, and 30 consecutive days.

Expected Results:

I hope to find consistent trends and predictors of dry runs across the Louisiana. These results of frequencies and return periods may help city, parish, and state planners to ready their resources for future periods of no rain, which can also be called a meteorological drought. Along with the results, this study will also produce a database for daily rainfall data in Louisiana focusing on dry runs which could be used for future projects.