Southeast Climate
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Climate Trends in the Southeast

Average Precipitation

Key Points

- The annual precipitation for the Southeast as a whole from 1895 to 2013 is about 50 inches per year with a slight positive trend to wetter conditions.
- Most seasons and regions within the Southeast have nonzero trends.
- Although annual precipitation is nearly constant, the percent of rainfall from high-intensity events like thunderstorms is increasing.
- Future precipitation trends are difficult to predict because climate models do not do a good job of simulating precipitation processes like thunderstorms and hurricanes.

Precipitation trends in the Southeast

Precipitation in the Southeast has been measured by official observers as far back as the 1840s, when surgeons kept careful records of weather observations at U. S. Army forts. Since then, hundreds of observers from the National Weather Service have added their records to the storehouse of weather data collected at the National Climatic Data Center in Asheville, NC. These records have been combined into regional averages of precipitation which can be used to determine changes in rain and snow over time.

Figure 1 shows the annual average precipitation for the Southeast (AL, FL, GA, NC, SC, and VA) from 1895-2013. This record shows that the trend in annual average temperature for the region over the entire period is slightly positive (0.07 inches per decade). However, there are differences between seasons and regions in the Southeast.

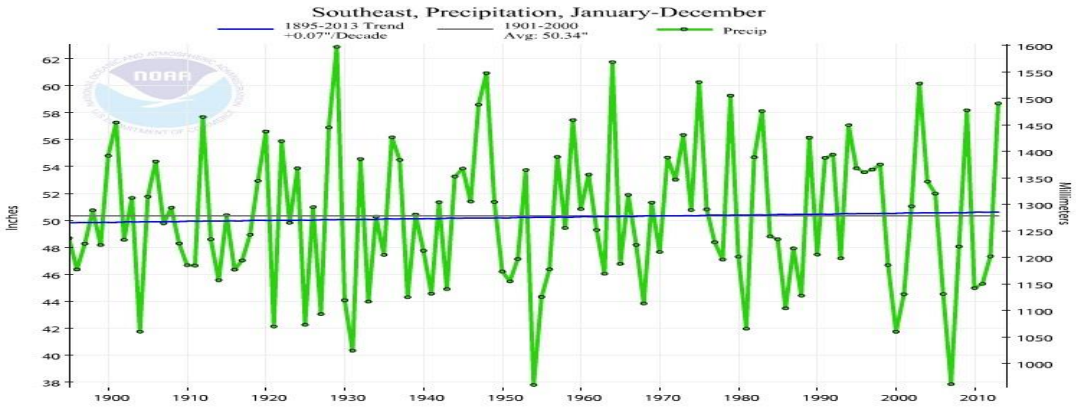


Figure 1. Annual average precipitation deviation from the 1901-2000 base period for the Southeast with trend line. (Source: NOAA: http://www.ncdc.noaa.gov/cag/time-series/us).

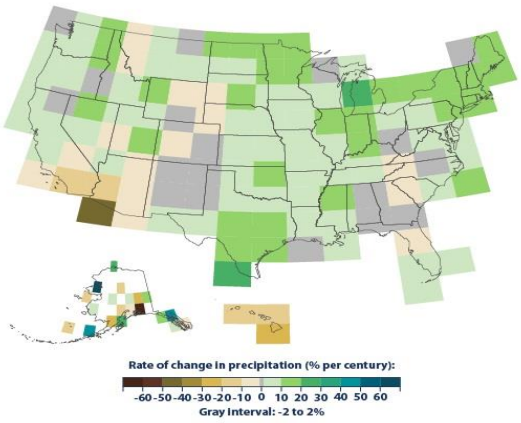
USDA United States Department of Agriculture National Institute of Food and Agriculture

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Photo source: http://commons.wikimedia.org/wiki/File:FoggDam-NT.jpg

Looking at seasonal trends across the Southeast, spring and winter have no trends, but summer is getting drier and fall wetter (you can use the web site listed in the box at the bottom of this column to check this). These seasonal changes have impacts on agricultural producers because the drier summer conditions put more stress on crops and livestock, while wetter fall conditions make harvest more difficult. Individually, the only Southeastern state that shows a trend in annual precipitation is Alabama, although seasonal differences are seen in most states.

Figure 2. Rate of annual precipitation change, 1901-2012 (Source: EPA).



Causes of changes in precipitation

Average precipitation amounts across regions vary due to a variety of causes. Some are related to changes within the region itself, and others are due to large-scale changes in the climate of the earth as a whole. Within an area, rainfall can vary naturally from year to year depending on the soil conditions and storms that have occurred over the area. Years that are dry tend to perpetuate dry conditions since there is no moisture present to serve as a source for new clouds and showers. Over time, average precipitation can also change in areas due to changes in land use, which can affect the local water cycle. Forests are cooler and more humid, which can affect the development of local storms. Trends in higher intensity rainfall (more than 2 inches per day) do show an increase, with longer dry spells in between the heavy rain events.

You can graph trends for your own state at this National Climatic Data Center site:

http://www.ncdc.noaa.gov/cag/time-series/us

Precipitation also changes from one year to the next due to longer-term cycles in the global atmosphere, such as El Niño (Figure 3). El Niño winters tend to be cooler and wetter than normal due to the presence of a strong stream of air from the tropics over Florida and southern Alabama and Georgia.

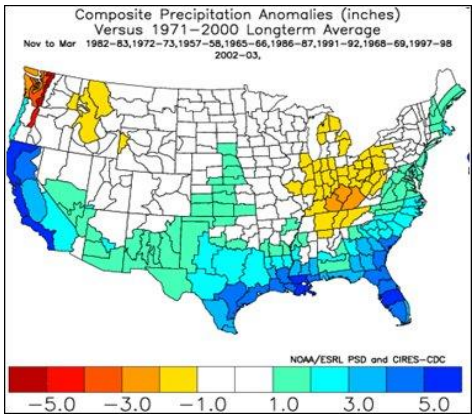


Figure 3. Precipitation departures from normal in El Niño winters (Source: NOAA).

Computer simulations of future precipitation amounts do not provide a consistent picture of what future precipitation patterns may look like. This is due to the difficulty they have in simulating small-scale weather systems like thunderstorms and tropical storms which provide much of the precipitation in any area, particularly in the Southeast. However, with rising temperatures expected to continue, evaporation is likely to increase, and this may lead to stress on crops and livestock in the future, especially in warmer seasons.

Resource: http://ncadac.globalchange.gov/

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