SOUTH CAROLINA'S CLIMATE CONTROLS

Several factors normally control South Carolina's climate. Most important are the state's location in the northern mid-latitudes, its proximity to both the Atlantic Ocean and the Appalachian Mountains, and elevation. Although South Carolina's normal annual precipitation is plentiful, 47.9 inches (1895-2004), the distribution varies geographically, seasonally, and annually (Figure 1). South Carolina temperatures are generally mild with the annual average fluctuating from the mid-50s in the mountains to low 60s along the coast (Figure 2).

South Carolina's weather from October through April is controlled largely by the characteristics of the airmasses and frontal systems that move eastward or southeastward across the United States. During the summer, the strengthening of high-pressure systems offshore keeps the state under the effects of tropical maritime air for extended periods. The high-pressure system offshore is known as the Azores or Bermuda high. The clockwise circulation around this high pressure strongly influences rainfall patterns in South Carolina by transporting warm, moist air inland from the ocean. As the air comes inland, it rises and forms localized thunderstorms, resulting in a summer precipitation maximum.

The state's position on the eastern coast of the continent is important because any sustained air-flow from the east or southwest increases the moisture content of the atmosphere. Moisture is transported to South Carolina principally by storms that move inland from the Gulf of Mexico, the Caribbean Sea, and the Atlantic Ocean. Moisture is also added to the atmosphere by evaporation from lakes, reservoirs, and land surfaces. Typically, as a moisture-laden ocean airmass moves inland it picks up moisture that has been recycled one or more times through the land-vegetation-air interface.

Michael Foster

South Carolina summers are hot and humid. Summer average mean temperatures range from the upper 60s in the mountains to the mid-70s in the Lowcountry. Maximum temperatures soar above 90° F an average of 55 days each year between the months of April and October. From late spring to early fall, tropical maritime air persists for extended periods with penetrations of continental air becoming infrequent. Rainfall is mostly convective in origin and falls during thunderstorms.

The statewide average summer (June-August) rainfall is 15.66 inches. During the summer and early fall of most years, the state receives the effects of one or more tropical storms or hurricanes. Tropical-event induced rainfall is prominent in South Carolina because of the coastal orientation, accounting for an average of 13% of all heavy rainfall events in the Southeast U.S.

Statewide minimum precipitation is normally received during October and November. This is traditionally a transition period between the convective summer precipitation and frontal winter precipitation; without tropical-event induced precipitation there are generally minimal mechanisms to trigger rainfall. Winter precipitation is generally caused almost entirely by the passage of low-pressure and associated frontal systems. Low-pressure systems moving northeastward from the eastern Gulf of Mexico during late winter and early spring commonly cause intense rainfall over the state with monthly precipitation reaching a second maximum in March.

References:

National Water Summary 1988-1989 - Hydrologic Events and Floods and Droughts, United States Geological Survey, Water-Supply Paper 2375, Denver, Colorado, 1991.

Spatial, Synoptic, and Seasonal Patterns of Heavy Rainfall in the Southeastern United States, B.D. Keim, *Physical Geography,* 17 (4), 313-328, Jul-Aug 1996.

General Characteristics of South Carolina's Climate, Climate Report G-5, South Carolina Department of Natural Resources, Water Resources Division (formerly South Carolina Water Resources Commission), 1990.

Figure 1

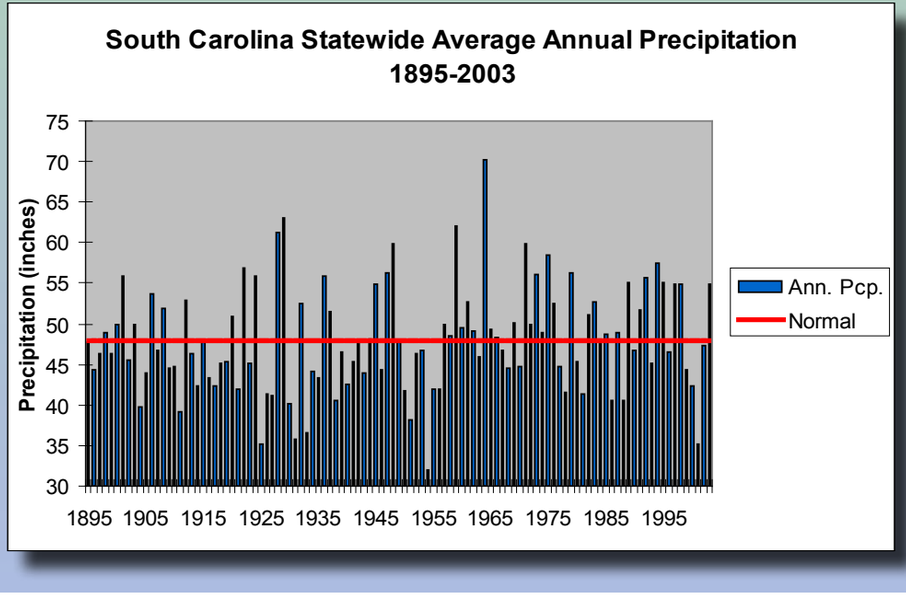

Figure 2