May 2020 Central NC Climate Summary

By Phillip Badgett and James Danco

May 2020 was excessively wet and cool.

May 2020 began with the cool pattern that started in April. This pattern featured a persistent mid and upper level trough over the eastern United States. This pattern allowed much cooler air to frequently dive well to the south into the Carolinas. By mid-May a large upper level low developed over the lower Ohio Valley and expanded to the Tennessee Valley and Southern Appalachians. This trough became expansive and dominated our region's weather from mid-to-late May, resulting in rain and extensive cloud cover. Even the tropics got an early start with two named tropical storms in the Atlantic basin before the official start of hurricane season on June 1. Remarkably, both systems (Arthur and Bertha) brought significant rain to North Carolina. Rainfall totals for the month were generally well above normal by 2 to 7 inches, except in northeastern parts of the region where they were near normal.

With all the rain and clouds and the persistent upper trough came below-normal temperatures. The monthly average temperatures and their departures from normal at the three climate sites are depicted in Table 1. Temperatures averaged significantly below normal (by 2°F to 4°F) for the month. Several cool and wet records were set as well. The monthly and daily record information can be found in the records section at the end of the May 2020 Climate Report.

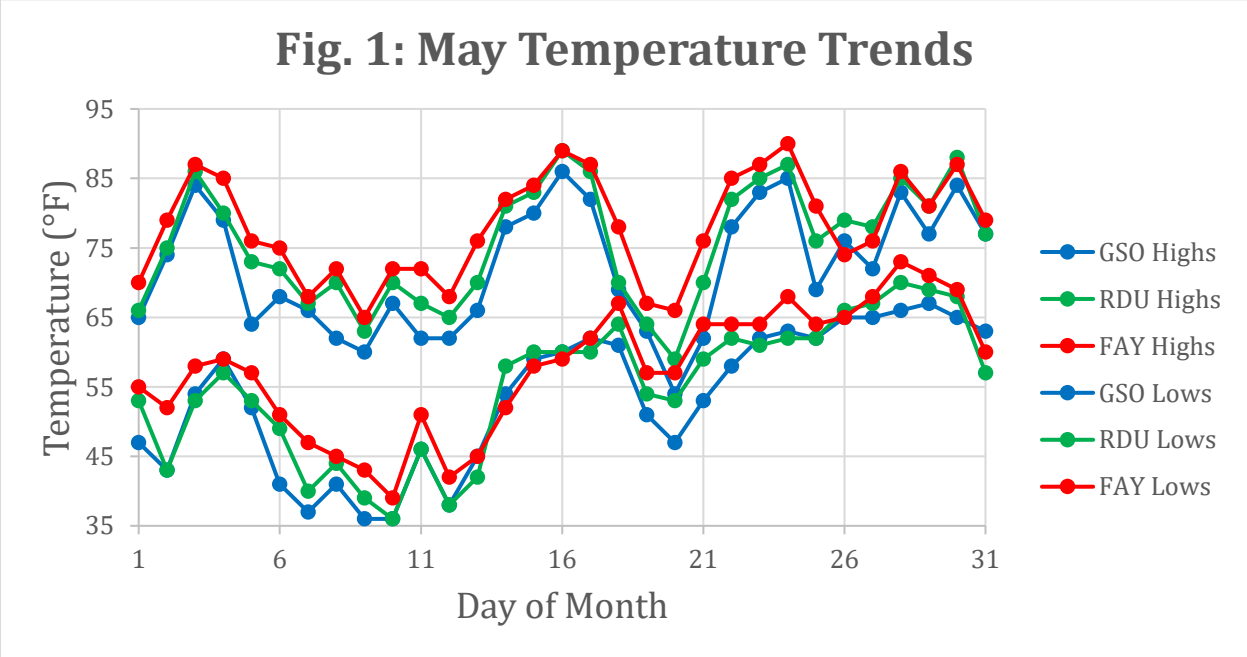
Table 1: Monthly Temperature Statistics

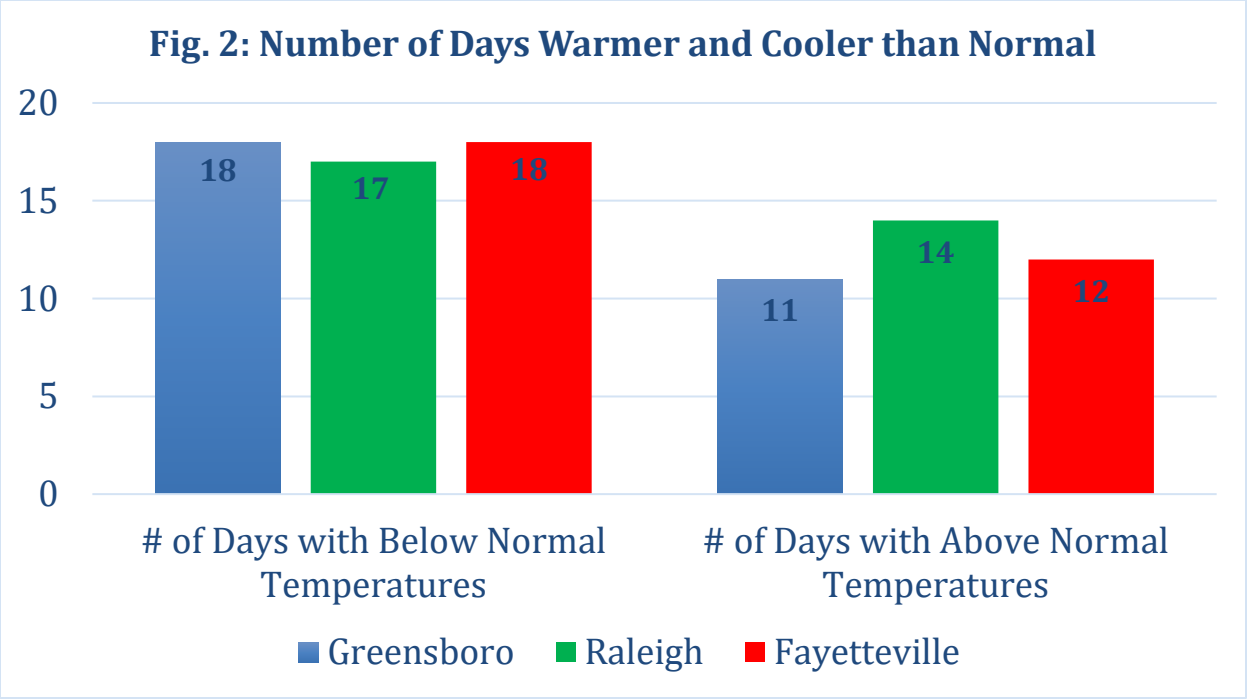
Site	Avg High Temp (°F)	Avg Low Temp (°F)	Avg Temp (°F)	Departure From Normal (°F)	Maximum Temperature (°F)	Minimum temperature (°F)
Greensboro (GSO)	72.2	53.5	62.8	-4.0	86 on 5/16	36 on 5/9 and 5/10
Raleigh-Durham (RDU)	75.6	55.0	65.3	-2.7	89 on 5/16	36 on 5/10
Fayetteville (FAY)	78.0	57.6	67.8	-2.8	90 on 5/24	39 on 5/10

The time series of daily temperature for the month at Greensboro, Raleigh, and Fayetteville can be found in Figure 1. The first two weeks of May 2020 were dominated by frequent cold frontal passages, colder-than-normal temperatures, and predominantly dry weather. There was little time for moisture to return with the quick-moving cold fronts. The temperatures did briefly

reach into the 80s on May 3 and 4, which were above normal by 5°F to 10°F. This warmth was short lived with chilly conditions following several strong cold frontal passages between May 5 and May 13. Many locations recorded several nights with lows in the 30s and 40s, with highs only in the 60s. These readings were 10°F to 15°F below the daily averages. Out of the first 13 days of the month, 11 of them had below normal temperatures at all three climate sites. There were even reports of some low 30s and light frost in some of the normally colder locations in the northern Piedmont, including Roxboro. Greensboro reported 36°F on both the 9th and 10th, and 38°F on the 12th. Raleigh recorded a low temperature of 36°F on May 10 and 38°F on May 12. Fayetteville fell to 39°F for their monthly low temperature on May 10. This also tied a new daily record minimum temperature for the date.

Later in the month, temperatures became more seasonable overall, with additional cool weather from clouds and rain interspersed with some warm days. Monthly high temperatures occurred on May 16 at Raleigh and Greensboro (89°F and 86°F respectively) and May 24 at Fayetteville (90°F). Overall, slightly more than half of the days of the month had below-normal temperatures at the three climate sites (Figure 2).

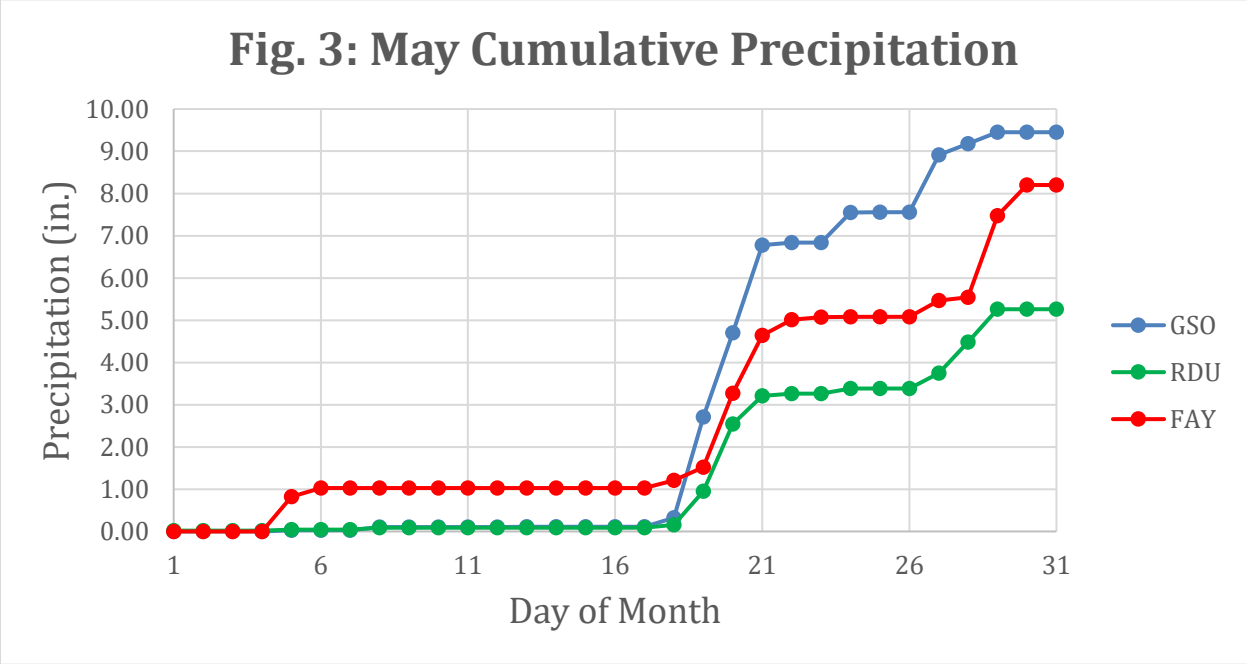




The cumulative precipitation at the three climate sites for the month of May is shown in Figure 3. It is clear from the graph that rainfall during the first half of the month was very limited, which was due to frequent moisture-starved frontal passages. The pattern changed during the middle of the month when two named tropical systems and a large upper low brought frequent bouts of heavy rainfall. Central North Carolina went from rather dry to excessively wet conditions quickly in the last half of the month. This led to impressive rainfall totals that made the record books. Greensboro recorded their second-wettest May on record with 9.45 inches, only trailing May 1905 when 10.88 inches was recorded. This is especially remarkable considering Greensboro only received 0.11 inches through the first 17 days of the month. Fayetteville also recorded their second-wettest May on record with 8.20 inches, only barely trailing the 8.24 inches recorded in May 1946.

The first tropical system to be named in the Atlantic basin for 2020 was Arthur. This system lifted north from Bermuda into the Gulf Stream off the southeast United States coastline then developed tropical characteristics on May 16-17. As the system tracked north then northeast paralleling the coast of North Carolina on May 17, it brought up to 5 inches of rain along the immediate coast from Jacksonville to Morehead City to Cape Hatteras. The system then turned eastward into the open Atlantic on May 18. However, a large upper-level low pressure system developed over the lower Ohio and Tennessee Valley regions, effectively pulling deep tropical moisture inland into central North Carolina from May 18 through May 21. Areas of very heavy rain overspread much of the region with Greensboro totaling 6.46 inches from May 19-21. Both Raleigh and Fayetteville tallied over 3 inches of rain during this same period. In addition to the heavy rainfall, there was a strong and gusty northeast wind. Greensboro's winds gusted to 38 and 34 mph respectively on May 19 and May 20. Raleigh reported easterly winds that gusted over 30 mph on three consecutive days between May 19 and May 21.

During the last week of the month, yet another system developed tropical characteristics in the same general region as Arthur, which became known as Tropical Storm Bertha. Bertha took a more northwest track and came ashore between Charleston and Georgetown, South Carolina on May 27. Due to the circulation around a large upper-level low over the Tennessee Valley and Southern Appalachians, Bertha tracked northward across central North Carolina, producing between 2 and locally 5 inches of rain over much of the Piedmont and Foothills of the state. This additional heavy rainfall produced minor to moderate river flooding across North Carolina.



As shown in Table 2, rainfall at the three climate sites was well above normal, by anywhere from 2 to 6 inches. Final monthly totals were generally in the 3 to 10 inch range across central NC, lowest in the northern Coastal Plain and highest in southern and western parts of the area (Figure 4). Outside of the northeast where they were near normal, these totals were a whopping 2 to 7 inches above normal (Figure 5).

Table 2: Monthly Precipitation Statistics

Site	Total precipitation (in.)	Departure from Normal (in.)	Max Daily Precipitation (in.)
Greensboro (GSO)	9.45	+6.07	2.39 on 5/19
Raleigh-Durham (RDU)	5.26	+1.99	1.59 on 5/20
Fayetteville (FAY)	8.20	+4.96	1.93 on 5/29

Fig. 4: Radar-Estimated Monthly Precipitation

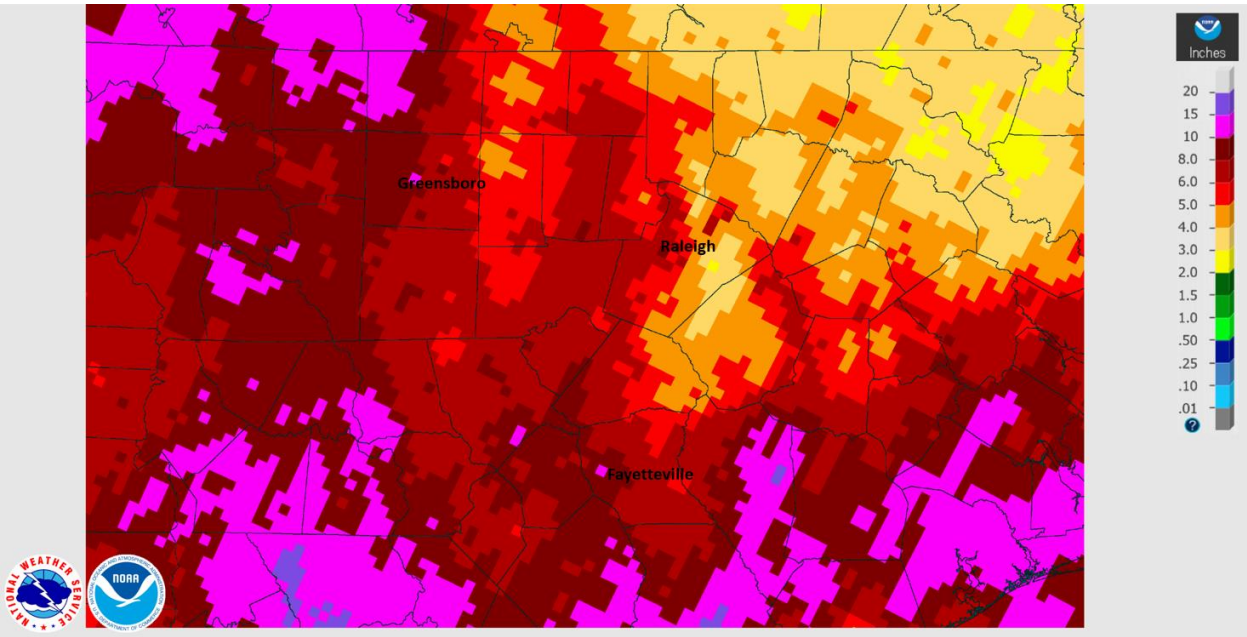
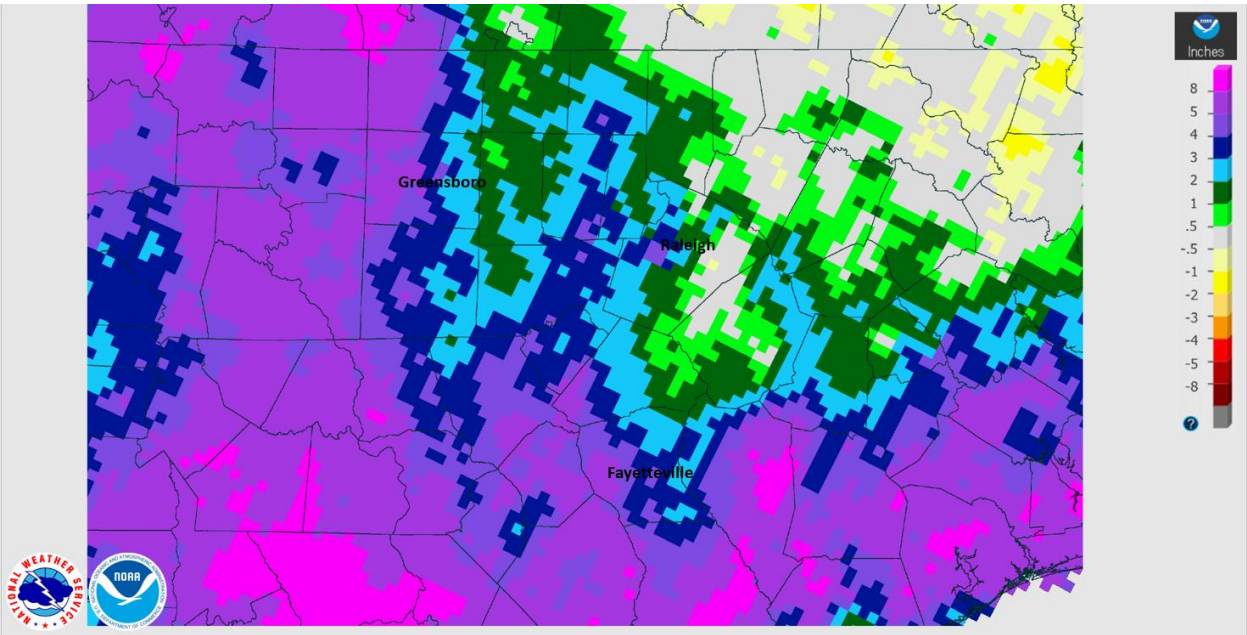


Fig. 5: Radar-Estimated Monthly Departure from Normal Precipitation



Other notes:

Number of days with high temperatures at or above 90 °F this month:

Greensboro: 0
Raleigh: 0
Fayetteville: 1

Strongest wind gusts and direction:

Greensboro: W at 44 mph on May 8
Raleigh: SW at 43 mph on May 8
Fayetteville: W at 55 mph on May 22

Monthly records:

Greensboro received 9.45 inches during May 2020, which was the second-wettest May on record.

Fayetteville received 8.20 inches during May 2020, which was the second-wettest May on record.

Daily records:

Greensboro recorded a new daily rainfall record of 2.39 inches on May 19th. This broke the old record of 1.64 inches set in 1930.

Greensboro recorded a new daily rainfall record of 1.99 inches on May 20th. This broke the old record of 1.69 inches set in 1940.

Fayetteville recorded a new daily rainfall record of 1.93 inches on May 29th. This broke the old record of 1.34 inches set in 1958.

Fayetteville tied a daily record minimum temperature of 39°F on May 10th. This record was first recorded on May 10, 1980.

There were no new records recorded at Raleigh in May 2020.