Climate vs. Weather

This text is from the U.S. National Oceanic and Atmospheric Administration: National Weather Service.

Time is the basic difference between climate and weather. When one averages the weather (maximum temperature, minimum temperature, wind speed and direction, rainfall, etc.) for any place, for any day, over a fixed number of years, that determines the average weather experienced, for that day, at that location.

Those averaged weather values then become to represent the *climatic normal* weather for that day. From the National Centers for Environmental Information (NCEI, formally NCDC), "the *climatic normal* is simply the arithmetic average of the values over a 30-year period (generally, three consecutive decades)."

The current set of climate normals is based upon observed weather in the years of 1981 to 2010. [I]n 2021, a new set of climate normals will be generated based upon the observed weather between 1991 and 2020.

Climatic normals (or averages) are most commonly seen on local weather broadcasts. The daily observed maximum and minimum temperatures is often compared to the "normal" temperatures based upon the 30-year average.

2015 was an extraordinary year for rainfall in North Texas. This view is looking north into Oklahoma, from Texas, across the Red River in a "normal" year (bottom) and after very heavy rains that was part of the phenomenally wet year weather-wise.

Also, these climatic normals help provide context if you hear something like "this winter will be wetter (or drier, or colder, or warmer, etc.) than normal." Other phrases such as "unseasonably warm (or cool)" weather is a comparison of the current weather conditions as related to the "climatic normal" for that time.

It has been said, "Climate is what you expect. Weather is what you get." In part, that is true, but for the vast majority of time, the observed weather [is] rarely "normal."

A good example is the all-time record rainfall for the Dallas/Fort Worth Airport in 2015. Climate normal for rainfall is 36.14" (918 mm). The actual rainfall for the year was 62.61" (1,590 mm). In only three months (May, October, and November) nearly a "normal" year's worth of rain fell.

The annual rainfall for 2015 broke the old all-time record by over 9" (229 mm). This was truly an extraordinary rain record that will stand for tens of decades, if not centuries.

2015 was a "roller coaster" year for the *occurrence* of rainfall in the DFW area as well. That same year, there was a stretch of 41 consecutive days with **NO** precipitation, which was the third-longest number of rain-free days on record.

Even individual days can have a wide variety of weather yet appear to be near climatologically normal. Again at the Dallas/Fort Worth Airport on November 27, 2015, the average of the maximum and minimum temperature was 55°F (13°C). The normal for that day is 52°F (11°C). So at first glance it would have appeared to be a "near normal" day temperature-wise.

The maximum temperature was 70°F (21°C), but [it] occurred around 3 AM in the morning. . . . [A] strong cold front moved past Fort Worth and Dallas early that morning, and the temperature began to fall.

The minimum temperature . . . was 39°F (4°C), and [it] occurred just prior to midnight. So the average temperature was near normal *climate*-wise, when that day was quite different weather-wise.

So large swings in day-to-day, month-to month, and even year-to year weather does not necessarily imply large, rapid changes in climate. Weather, over time, will become part of the 30-year normal.