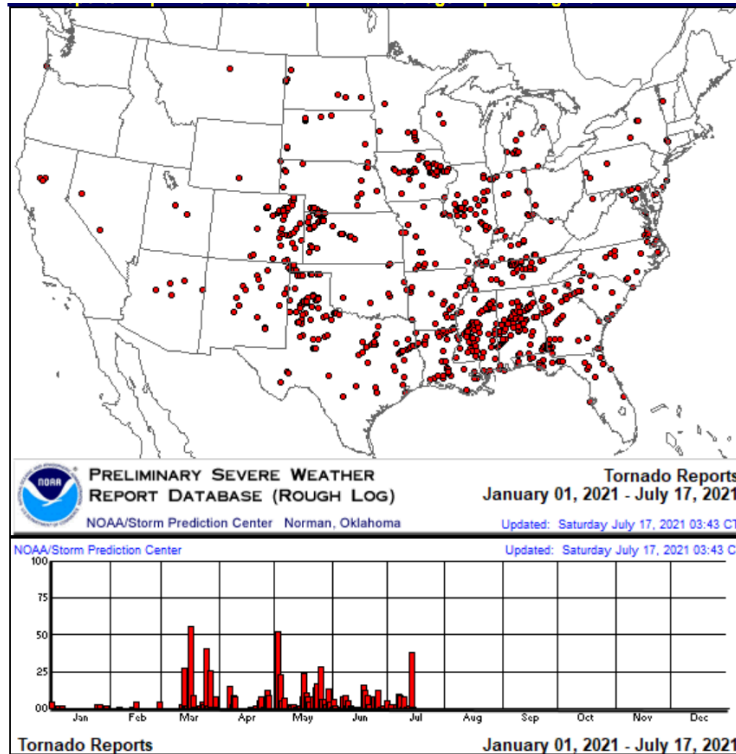


Update on the Ongoing Tornado Season

It has been a below normal year for tornadoes in the U.S. March saw the most action in the last 4 years mainly in the south. April was unusually quiet. May was the biggest month with 289 tornado reports but that was far short of the 510 in 2019. After a quiet Jun mid-July featured a modest burst.

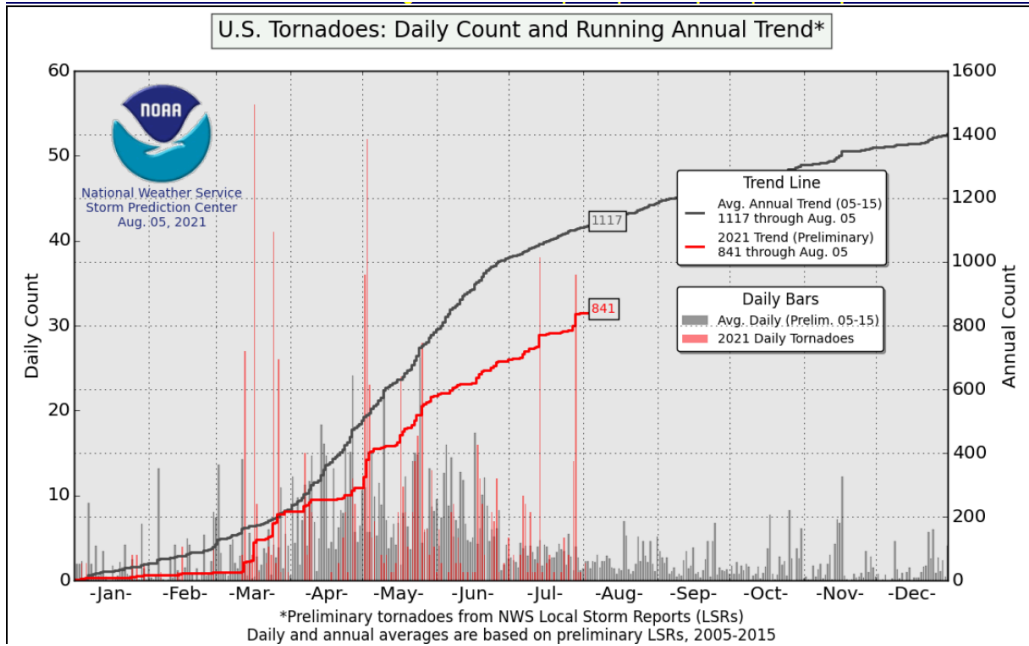


TORNADO TOTALS AND RELATED DEATHS...THROUGH 24 JUL 2021
 NWS STORM PREDICTION CENTER NORMAN OK
 0340 PM CDT SUN JUL 25 2021

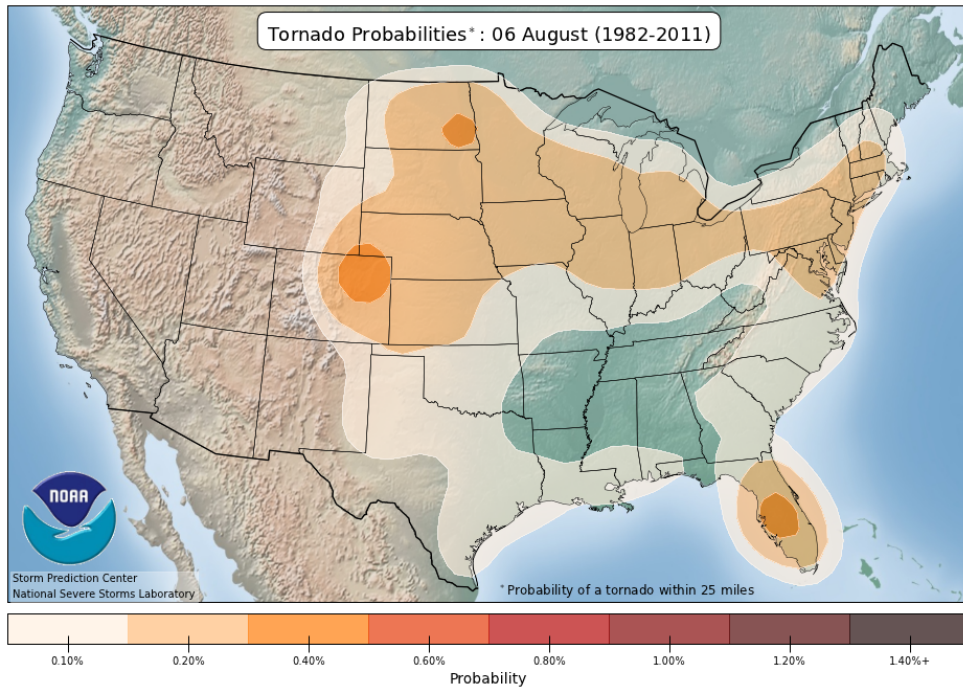
...NUMBER OF TORNADES...						NUMBER OF TORNADE DEATHS				KILLER TORNADES						
..2021..		2020	2019	2018	3YR	3YR				3YR						
PREL	ACT	ACT	ACT	ACT	AV	21	20	19	18	AV	21	20	19	18	AV	
JAN	16	-	86 [^]	22	15	41 [^]	1	7	0	0	2	1	3	0	0	1
FEB	11	-	42 [^]	27	48	39 [^]	3	1	1	2	1	1	1	1	2	1
MAR	191	-	83 [^]	107	55	82 [^]	7	25	23	0	16	2	3	1	0	1
APR	73	-	271 [^]	272	130	224 [^]	1	38	7	1	15	1	13	4	1	6
MAY	289	-	126 [^]	510	170	269 [^]	0	1	7	1	3	0	1	4	1	2
JUN	110	-	90 [^]	177	155	141 [^]	0	0	0	0	0	0	0	0	0	0
JUL	94	-	99 [^]	101	92	97 [^]	-	1	0	1	1	-	1	0	1	1
AUG	-	-	182 [^]	78	81	114 [^]	-	3	0	0	1	-	2	0	0	1
SEP	-	-	38 [^]	85	108	77 [^]	-	0	0	1	0	-	0	0	1	0
OCT	-	-	19 [^]	65	123	69 [^]	-	0	0	0	0	-	0	0	0	0
NOV	-	-	21 [^]	16	83	40 [^]	-	0	1	3	1	-	0	1	2	1
DEC	-	-	18 [^]	57	66	47 [^]	-	0	3	1	1	-	0	2	1	1
SUM	784	---	1075 [^]	1517	1126	1240 [^]	12	76	42	10	41	5	24	12	9	15

*PRELIMINARY REPORTS.
[^]PRELIMINARY/INCOMPLETE VERSION OF FINAL COUNTS.

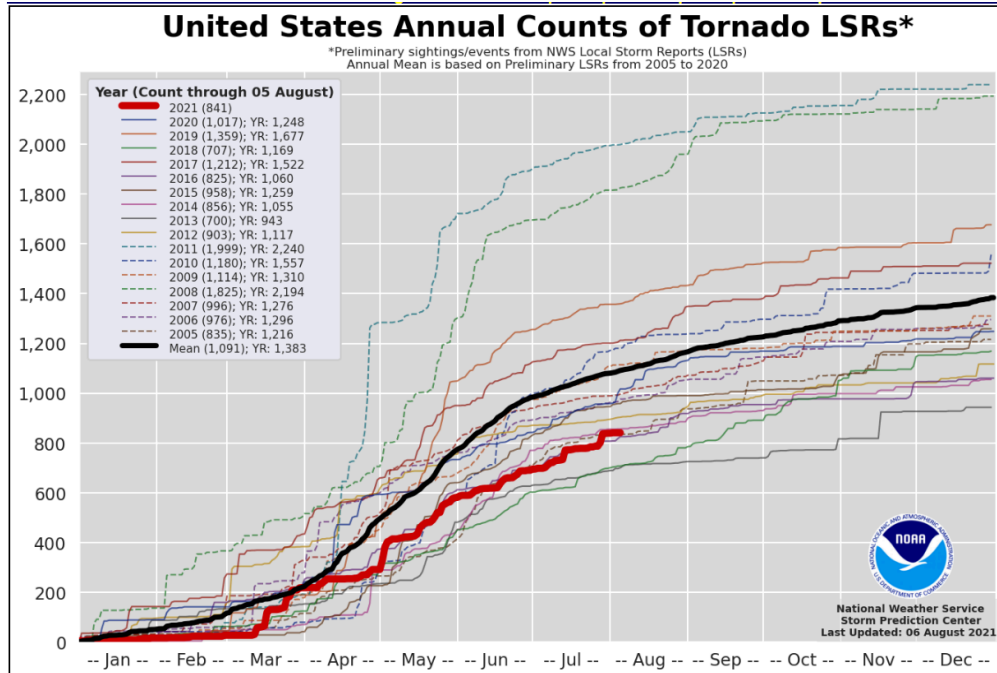
We are running well below the average for the year.



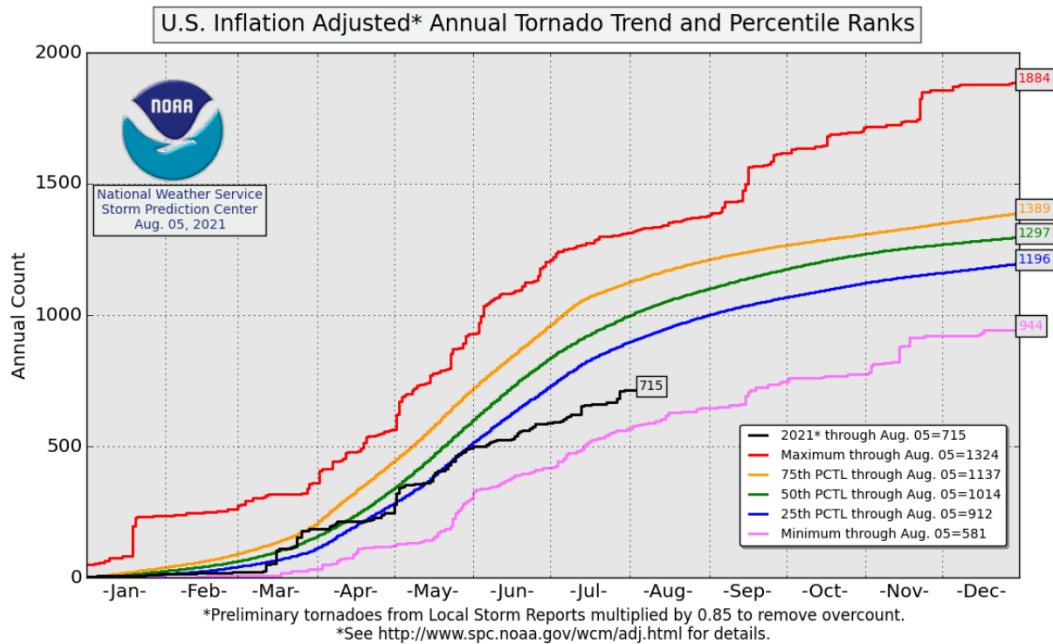
As we get to late summer, tornado action shifts to the northern plains, Great Lakes, Ohio Valley and the east including Florida (often associated with tropical activity).



The season tracks behind only 2006, 2016, 2018



We are tracking below the 25th percentile.



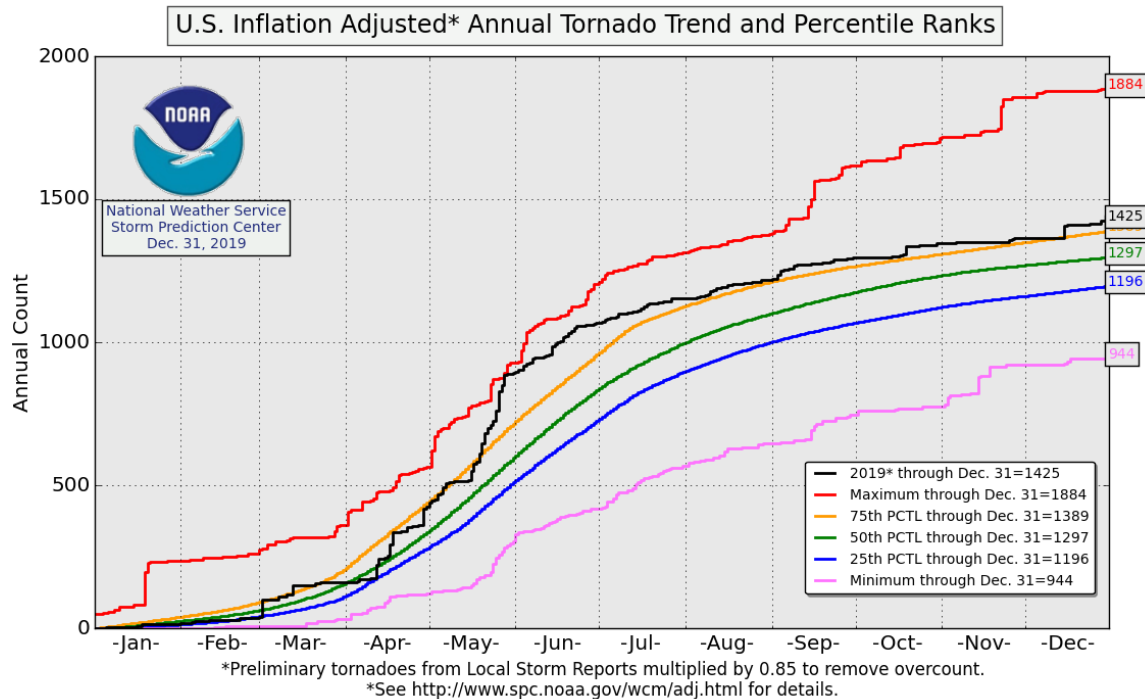
Strong tornadoes have seen a drop in frequency since the 1950s. The years 2012, 2013, 2014, 2015, and 2016 all saw below average to near record low tornado counts in the U.S. since records began in 1954. 2017 rebounded only to the long-term mean while 2018 activity returned to well below the 25th percentile.

This lull followed a very active and deadly strong La Nina of 2010/11, which like the strong La Nina of 1973/74 produced record setting and very deadly outbreaks of tornadoes.

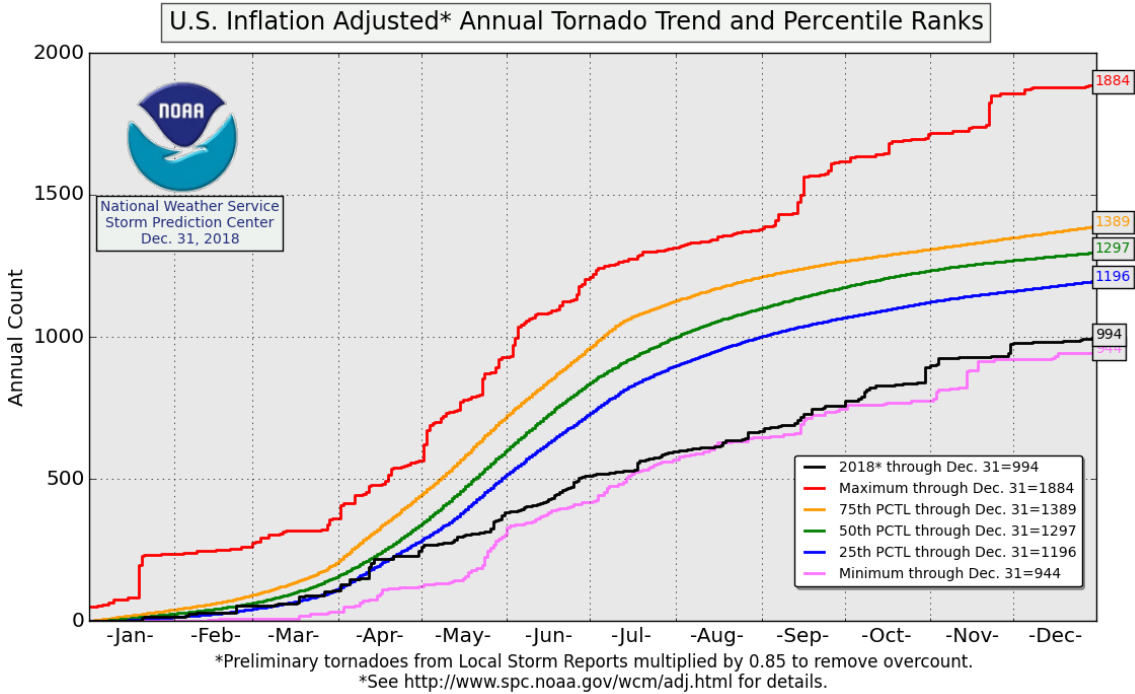
When an amplified La Nina like jet stream pattern developed in the spring of 2019, a very active period raised the seasonal total to above the 50th percentile for the first time in years. A similar transient pattern in April 2019 produced a major outbreak centered on Easter Sunday.

Population growth and expansion outside urban areas have exposed more people to the tornadoes that once roared through open fields. Tornado detection improved with the addition of Doppler radar (NEXRAD), the growth of the trained spotter networks, storm chasers armed with cellular data and imagery as well as the proliferation of cell phone cameras and social media. This shows up most in the weak EF0 tornado count but for storms from moderate EF1 to strong EF 3+ intensity, the trend has been down despite improved detection.

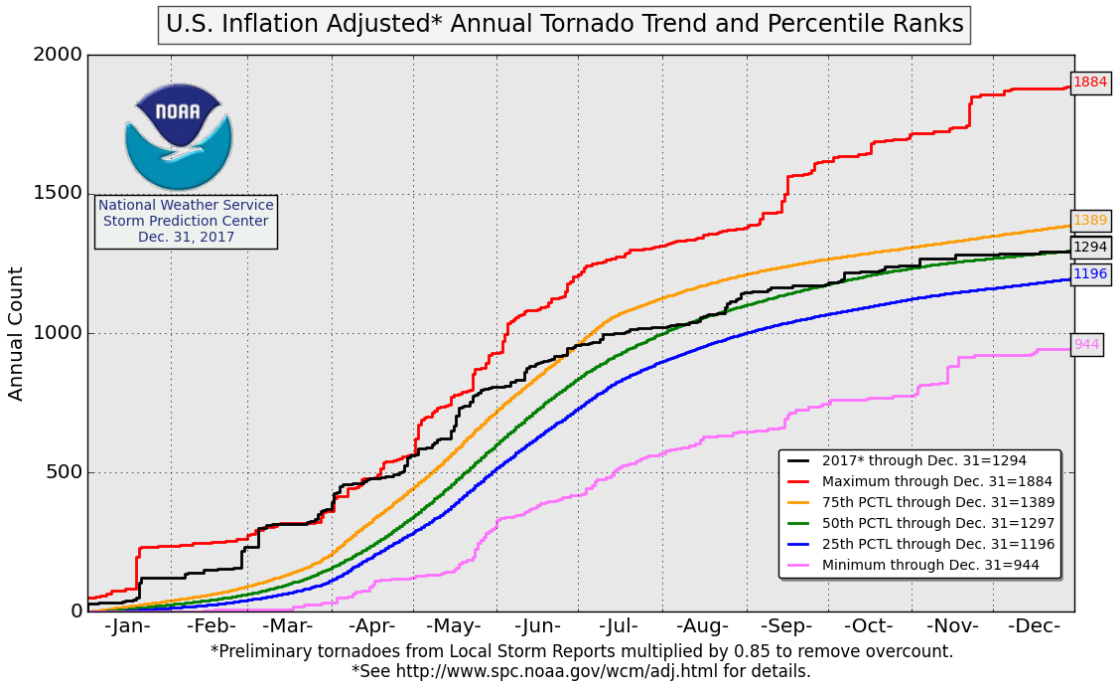
See the 2019 plot exceed the 75th percentile.



See the very quiet 2018 season.

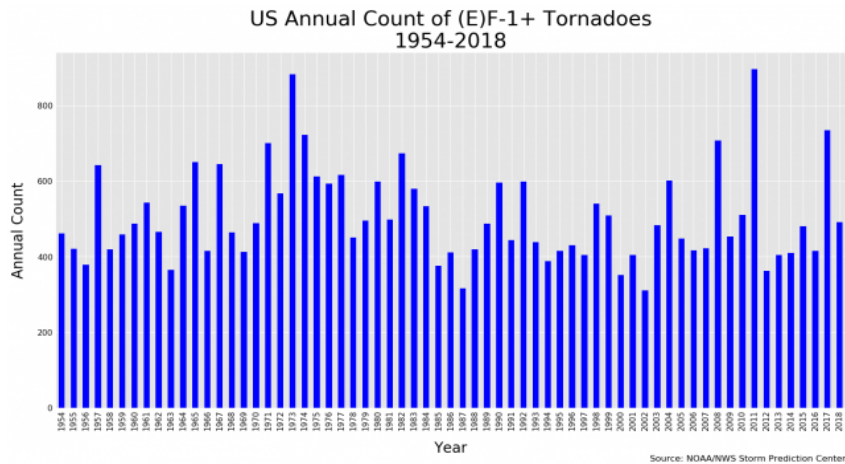


Following a very normal 2017.



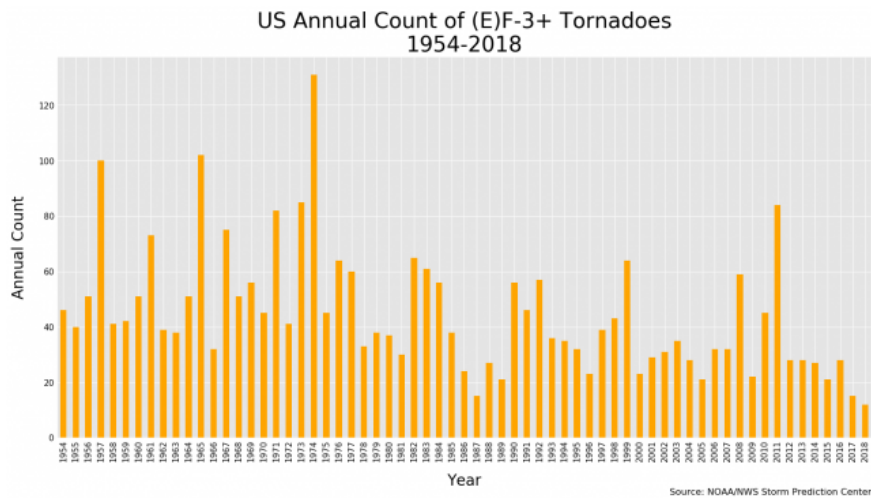
Tornado trends longer term show activity mostly in the weak EF0 tornado count due to many spotters, chasers, dopplar radar and trained observers but for storms from moderate EF1 to strong EF 3+ intensity, the trend has been down despite improved detection.

The US Annual count of EF1+ tornadoes shown below, more active years are clear but there is no discernible upward slope trend.



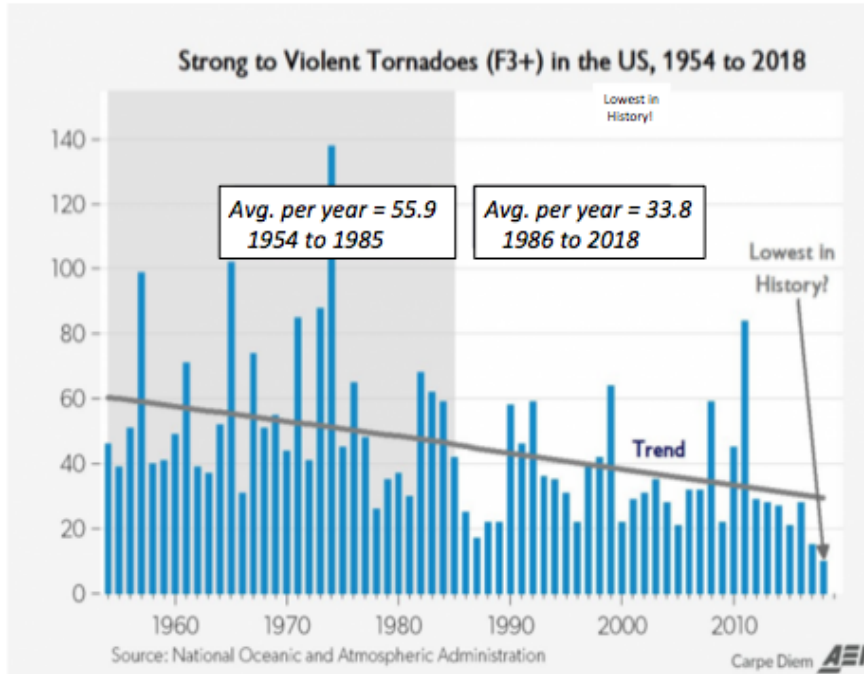
Source: Storm Prediction Center

For strong EF3+ tornadoes, there are again active years and periods. But the trend, despite better detection, has been clearly down, not up.



Source: Storm Prediction Center

The average number of strong to violent tornadoes fell from 55.9 per year in the period from 1954 to 1985 to 33.8 per year in the period 1986 to 2018. 2018 had the fewest in the entire record.



Source: Storm Prediction Center NOAA