

# The Albuquerque International Balloon Fiesta

October 7-15, 2023

Weather Forecast Office  
Albuquerque, NM

Issued September 27, 2023 5:01 PM MDT



October 2010 Photo courtesy bobvn via flickr



October 11, 2014 Photo courtesy Enrique A Sanabria via flickr



Photo courtesy Alyssa Clements



October 3, 2009 Photo courtesy Holly Ladd via flickr



Photo courtesy KrisNM via flickr



Photo courtesy Brian Guyer



October 2017 Photo courtesy Randall Hergert





# The Albuquerque International Balloon Fiesta



October 2018 Photo courtesy Enrique A Sanabria via flickr



Photo courtesy Sharon Sullivan



Photo courtesy Brian Guyer



Photo courtesy Randall Hergert

October can be an ideal month for outdoor events. The summer thunderstorm season has waned and the jet stream is usually still situated to our north. Spectacular weather is common for prolonged stretches with dry air, crisp blue skies, and light winds. However, on rare occasions, remnants of land-falling tropical systems from the eastern Pacific or western Gulf of Mexico can bring surges of moisture into the state, particularly early in the month. Weather systems moving far enough south through the Rocky Mountains can bring strong winds, cooler than normal temperatures and widespread precipitation, including snow! Severe weather, while not common, can occur as it did in 2004.

A unique weather phenomenon known as the "Albuquerque Box" produces an atmospheric wind pattern that results in balloons remaining over the park during the morning hours. More information about the Albuquerque Box is provided in the following slides. The 9-day [International Balloon Fiesta](#) surrounds the first full week of October and has occurred in early October since 1975. Let's take a look at early October weather since 1975 across the Albuquerque metro area to see what one may expect while dazzling at balloons launching from Balloon Fiesta Park.

Always check the latest [NWS forecast](#) for the Balloon Fiesta Park area prior to attending the fiesta.



# Temperature Summary



The data listed on the following slides summarize temperature, wind, and precipitation for the first fifteen days of October for the Albuquerque International Balloon Fiesta. Several notable weather events have also been highlighted that impacted the Albuquerque metro. Data was compiled using the Albuquerque International Sunport, Albuquerque South Valley, and Albuquerque Foothills stations. Data from the Sunport, South Valley, and Foothills should be considered as proxies to conditions observed at Balloon Fiesta Park since weather conditions vary greatly across the metro. Due to its north valley location, morning low temperatures at Balloon Fiesta Park can often be 5 to 10° cooler than at the airport and foothills, while daytime highs are generally 1 to 4° warmer. Winds also vary considerably across the metro since complex terrain features to the east of Albuquerque often result in microscale circulation patterns.

	Sunport		Valley		Foothills	
Average Temperature (1991-2020)	62.1°		59.8°		59.0°	
Average High Temperature (1991-2020)	74.8°		75.7°		71.9°	
Average Low Temperature (1991-2020)	49.4°		43.9°		46.2°	
Coollest Low Temperature	30°	10/08/1976	27°	10/08/1992	28°	10/14/2004
Warmest Low Temperature	66°	10/01/2019	63°	10/01/2019	66°	10/01/2018
Coollest High Temperature	38°	10/12/1986	47°	10/15/2018	39°	10/08/2000
Warmest High Temperature	91°	10/05/1979	89°	10/14/2020 10/01/2015 10/01/2000	86°	10/08/2020 10/07/2020

Warmest Years (Sunport)		Coolest Years (Sunport)	
66.5°	2015, 1979	54.2°	1986
66.3°	2020	55.2°	1982
65.6°	1987	57.6°	1984
65.5°	1991	57.7°	2000
65.3°	2010	58.3°	1985



# Precipitation Summary



	Sunport		Valley		Foothills	
Average Precipitation (1991-2020)	0.50"		0.59"		0.69"	
Max Daily Rainfall	1.47"	10/09/2016	1.71"	10/09/2016	1.85"	10/05/2008
Greatest Number of Days w/ Rain (≥ Trace)	10	2022	8	2005	8	2022
Greatest Number of Days w/ Measurable Rain (≥ 0.01")	7	2022, 2018, 2000	7	2000	8	2022
Average Number of Days w/ Rain (≥ Trace)	3.7	(1975-2022)				
Average Number of Days w/ Measurable Rain (≥ 0.01")	2.3	(1975-2022)				
Percentage of Days w/ No Rain (October 1-15)	84%	(1975-2022)				
Percentage of Days w/ No Rain (Entire Year)	84%	(1975-2022)				

Wettest Years (Sunport)	
2.34"	1984
1.70"	2006
1.58"	2003
1.49"	1986
1.44"	2011

Driest Years (Sunport)	
0.00"	1975, 1991, 1992, 1995, 2020
Trace	1976, 1978, 1979, 1999, 2002, 2012
0.01"	2021
0.04"	2013, 2017

Snowiest Years (Sunport)	
3.2"	1986
0.2"	2004
Trace	2018, 2016, 1999, 1997, 1984





# Albuquerque Metro Area Historical Events



- **October 9, 2016:** A strong thunderstorm moved through Albuquerque during the late morning with heavy rain, lightning, and pea to nickel size hail.
- **October 15, 2015:** A powerful canyon wind blasted into Albuquerque with peak wind gusts up to 68 mph below Tijeras Canyon. Tree limbs, power lines, road signs, and fences were blown down across the east side of Albuquerque.
- **October 12, 2014:** A virga shower passing through the Albuquerque metro area produced wind gusts up to 70 mph. A large road sign was blown down along I-25 and a large tree was damaged in the foothills.
- **October 10, 2013:** A weather system moving thru the southern Rockies produced wind gusts up to 60 mph at the ABQ Sunport.
- **October 2, 2010:** An isolated severe thunderstorm moved southeast across the Sandia Mountains and produced 1 to 2" diameter hail. Significant damage was reported to trees, gardens, vehicles, roofs, and skylights in the east mountains.
- **October 11, 2008:** A severe thunderstorm moved through the Albuquerque metro area with hail up to the size of quarters and wind gusts near 65 mph. Damage was reported from wind and hail. Very heavy rain resulted in flash flooding in Rio Rancho. Several dirt roads were washed out.
- **October 4-5, 2004:** Numerous severe thunderstorms moved across the Rio Grande Valley, including the Albuquerque metro area in the late evening of [October 4<sup>th</sup>](#) and again on [October 5<sup>th</sup>](#). Heavy rain and severe hail up to the size of golf balls produced significant damage across northwest Albuquerque and Rio Rancho. (Click each date to view radar loops)
- **October 12, 2000:** A severe thunderstorm moved through the west side of Albuquerque and Rio Rancho with hail up to the size of quarters.
- **October 1, 1998:** A strong thunderstorm produced dime to penny size hail over downtown Albuquerque.
- **October 10, 1998:** A strong thunderstorm moved through Rio Rancho with hail up to the size of pennies.
- **October 4, 1996:** A thunderstorm with heavy rain produced minor flooding along Central Ave on the west side of Albuquerque. An Air Force sergeant was sent to the hospital after being struck by lightning at Kirtland AFB.
- **October 7, 1978:** A severe thunderstorm moved through Albuquerque with peak wind gusts up to 62 mph.
- **October 6, 1977:** A severe thunderstorm moved through Albuquerque with peak wind gusts up to 58 mph.

Various gaps since 1975 may not represent the complete weather history in the metro during the first two weeks of October.



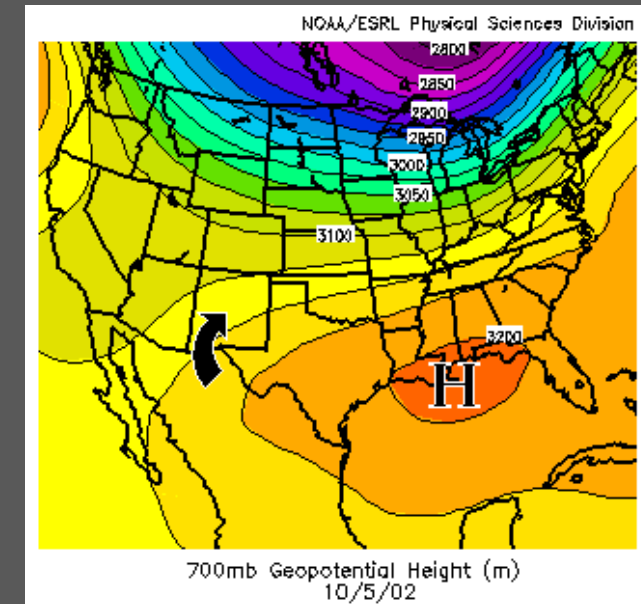
# The Albuquerque Box



The Albuquerque box is essentially a valley wind pattern which develops under certain "stable" conditions. During the nighttime hours, the air near the ground is cooled by the process of radiational cooling. This process is most efficient with clear skies, low humidity, and light winds. Cooler, and therefore more dense air, flows downslope and pools at lower elevations, such as along arroyos and river valleys – as noted by the white arrows in the image on the top right. The cool air that pools in the Rio Grande Valley is shallow (generally no more than a few hundred feet in depth). During the early morning hours this "drainage wind" flows from north to south down the valley from higher to lower elevations (blue arrows). In much of the Albuquerque metro area, including the balloon park, a north wind of generally less than 10 mph can result.



Above the surface, the flow of the air is controlled by synoptic patterns in the atmosphere. The figure in the bottom right depicts the 700 millibar heights, or pressure pattern around 5,000 feet above the surface, on October 5th, 2002. High pressure over the southeast U.S. resulted in a weak southerly flow over central NM. The stable "river of air", or drainage wind described above, occurs below a temperature inversion which separates it from warmer, less dense air above the inversion, just as vinegar is separated from oil by differences in density. The wind direction in the airmass above the shallow inversion can be different than that below the inversion. In an "ideal" box pattern, the wind blows in exactly the opposite direction, with a north wind at the surface and a south wind above the surface (orange arrows). A skillful pilot can bring a balloon back to near the point of takeoff by changing altitudes to ride wind currents in different directions. Upon takeoff the pilot first heads south toward downtown, then ascends higher where the winds will take the balloon back north toward the balloon fiesta grounds.





# The Albuquerque Box



The photo to the bottom right, taken during the 2007 Balloon Fiesta, nicely depicts the low level drainage winds. The photo was taken facing west, and the flags at the north end of Balloon Fiesta Park indicate a north to south wind. On this day, winds aloft were out of the south and southwest (as noted by the white flags on the red balloon). The [time lapse video](#) on the bottom left shows an excellent example of the box effect courtesy of Stu Ostro (*click image to loop*). This wind pattern for which the Albuquerque area is well known occurs under stable conditions during the fall season when generally no strong weather systems are affecting the area. A local study found that on average the "box" circulation occurs about 3 days out of the first 15 days of October. Even on days when the "box" occurs, it dissipates by mid morning as the sun heats the ground, resulting in thermal turbulence which mixes the lower layers of air and eliminates the low level inversion. An example video of the "Albuquerque Box" is available by clicking the bottom left image.



A time lapse of the "Albuquerque Box" is available by clicking the image above  
Video courtesy of Stu Ostro (October 2017)



Photo courtesy J. Wachter

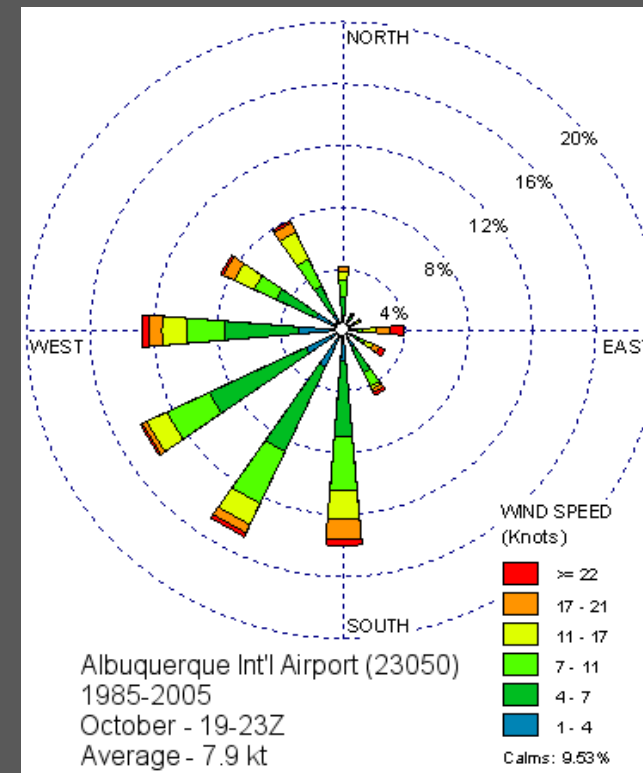
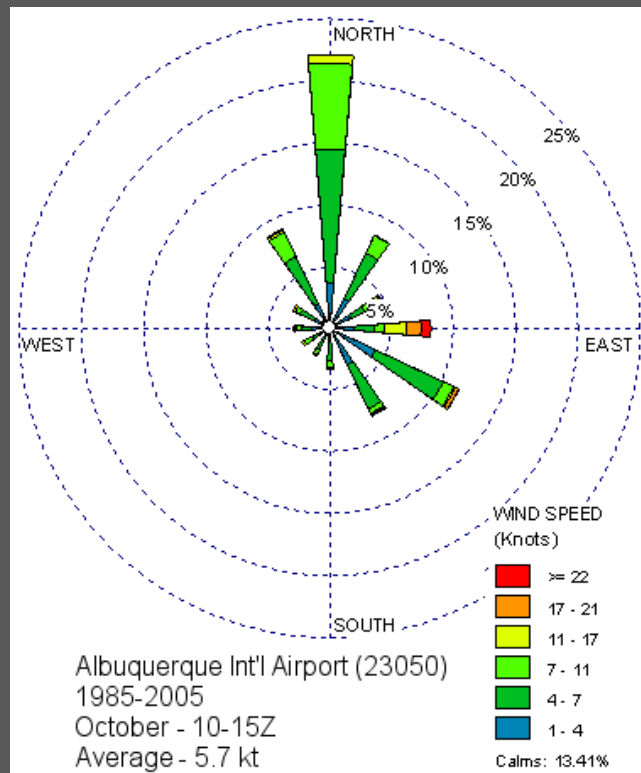




# Wind Roses



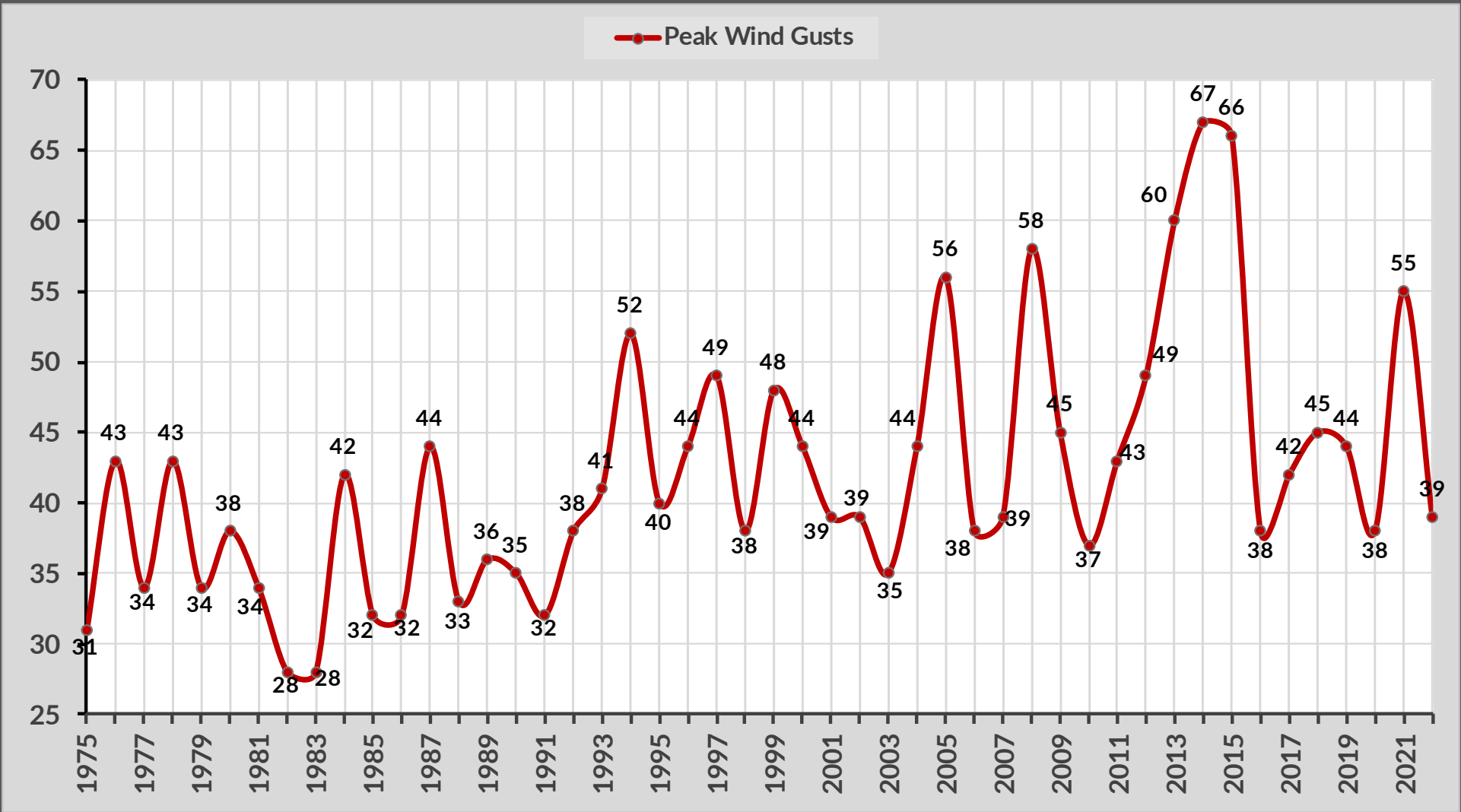
Wind roses can help illustrate the difference in wind patterns from morning to afternoon. The wind roses below depict the frequency and speed of the wind from 12 compass directions measured at the Albuquerque Sunport for the month of October from 1985 through 2005. The wind rose on the left depicts the distribution of the wind from 4 am to 9 am MDT. The persistence of the nocturnal drainage wind in the Rio Grande Valley is evident by the greater frequency of northerly surface winds. Cooler surface air becomes more dense and leads to a downvalley wind. While this graphic represents data from the Sunport, the wind at the Balloon Fiesta park is similar, though the drainage wind is likely stronger due to the lower elevation and proximity to the Rio Grande. The wind rose on the right depicts the distribution of wind from 1 pm to 5 pm MDT. By afternoon, the drainage wind is gone, having been mixed out. The winds tend to become more southwesterly, and usually have higher speeds than the north drainage wind. Both wind roses illustrate that while winds from the east do not occur frequently, when they do occur the wind speeds are generally strong, often reaching speeds greater than 20 knots.





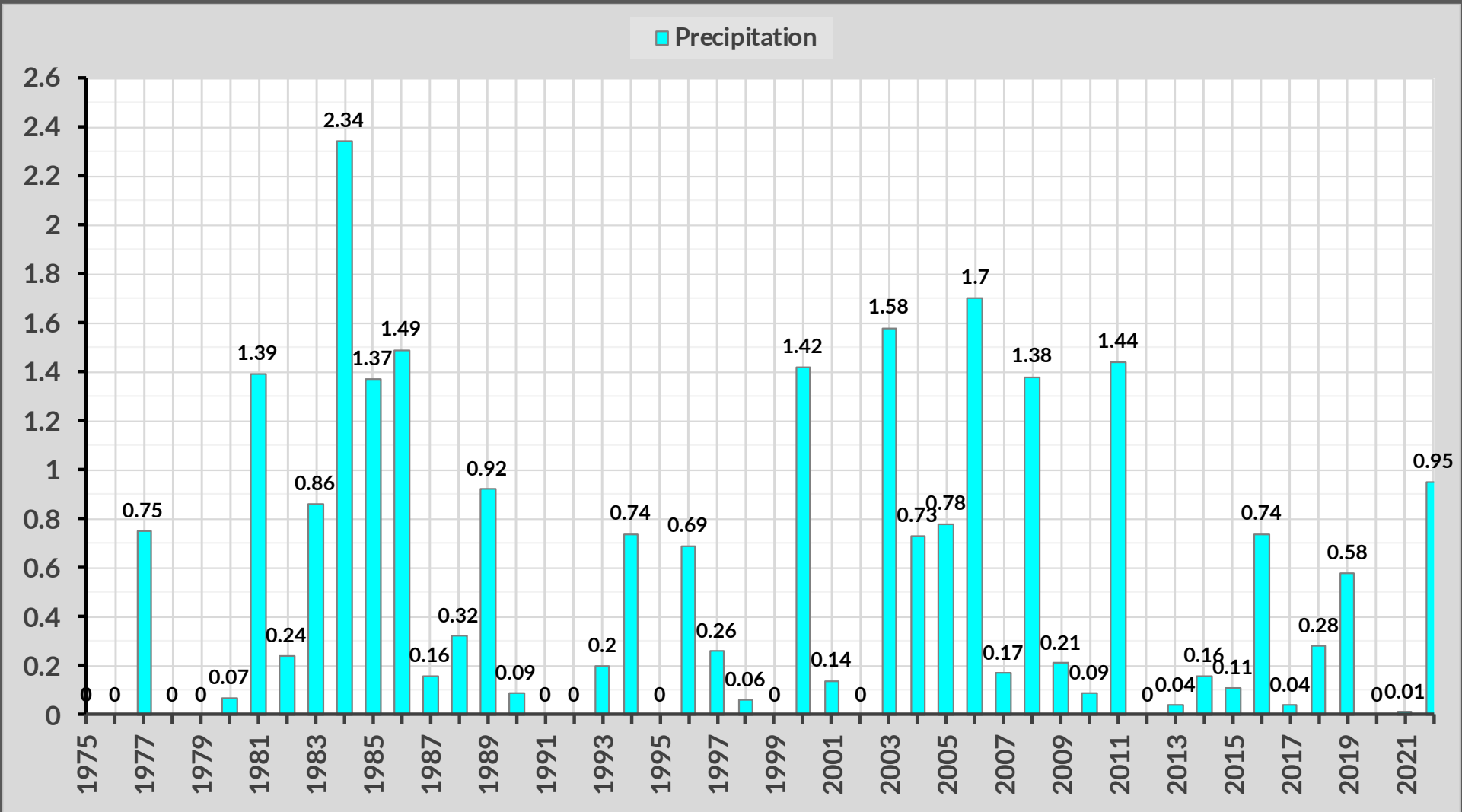


# Peak Wind Gusts





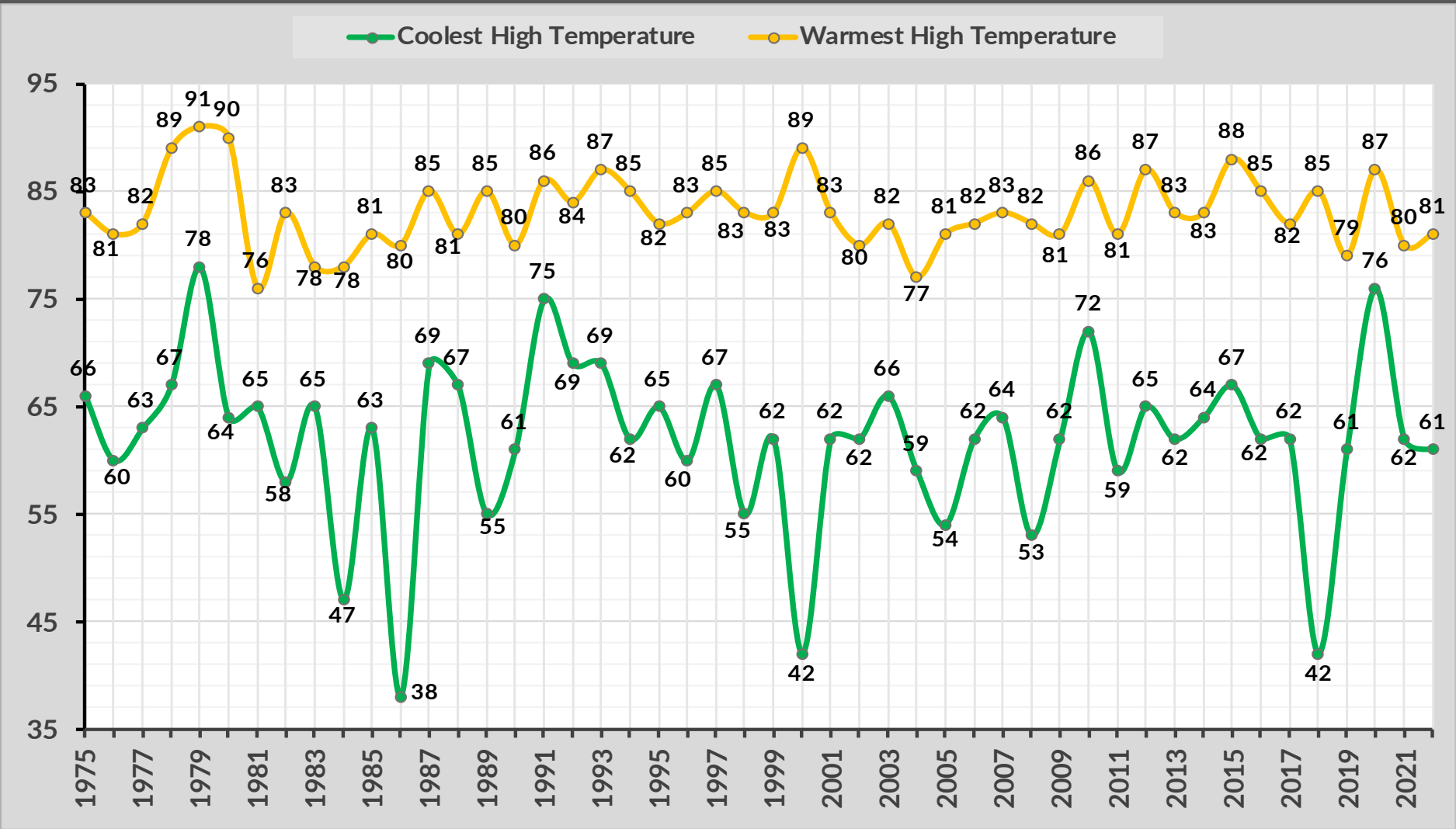
# Total Precipitation







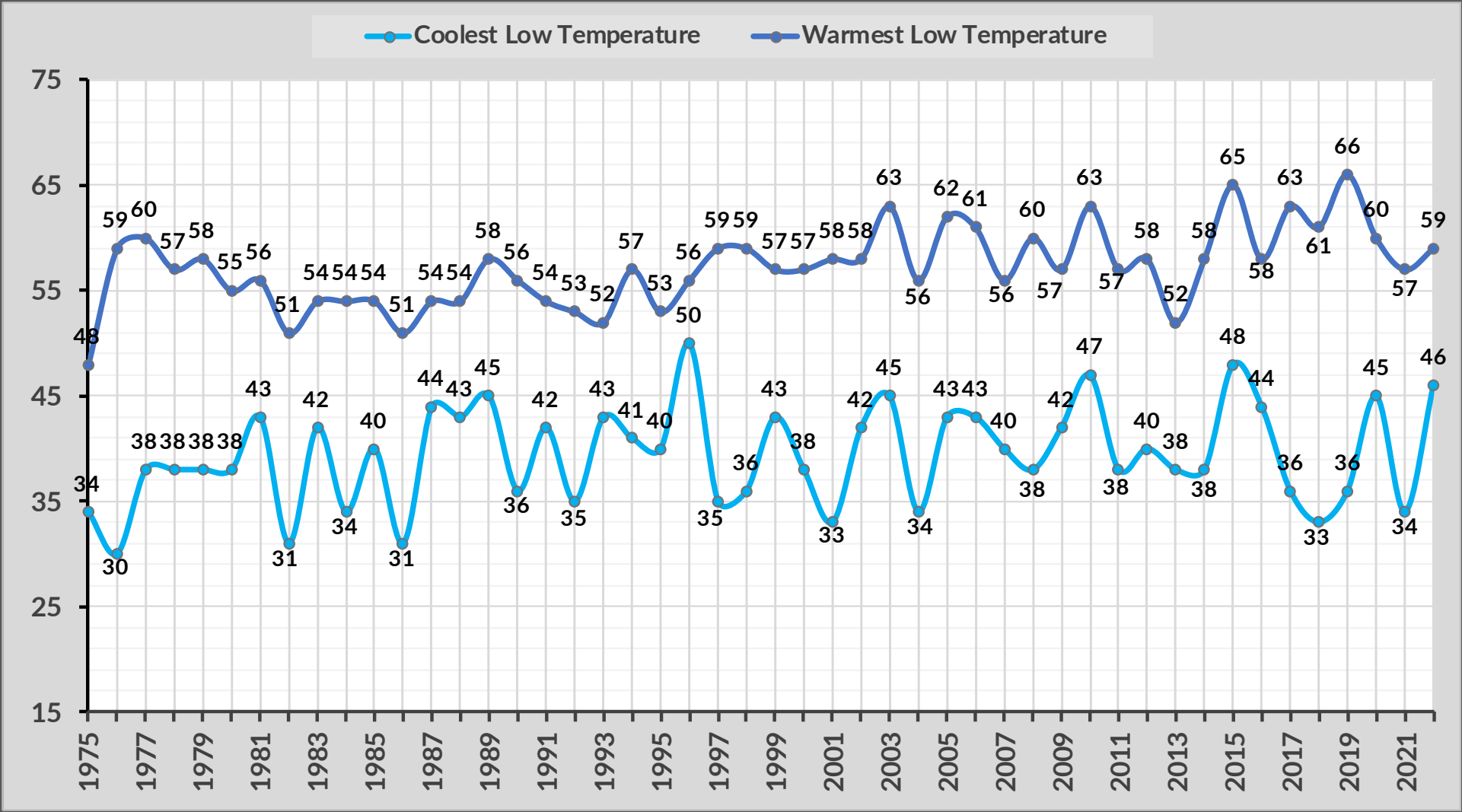
# Cooler & Warmest High Temperatures



Albuquerque International Sunport October 1-15 1975-2021



# Cooler & Warmest Low Temperatures



Albuquerque International Sunport October 1-15 1975-2021



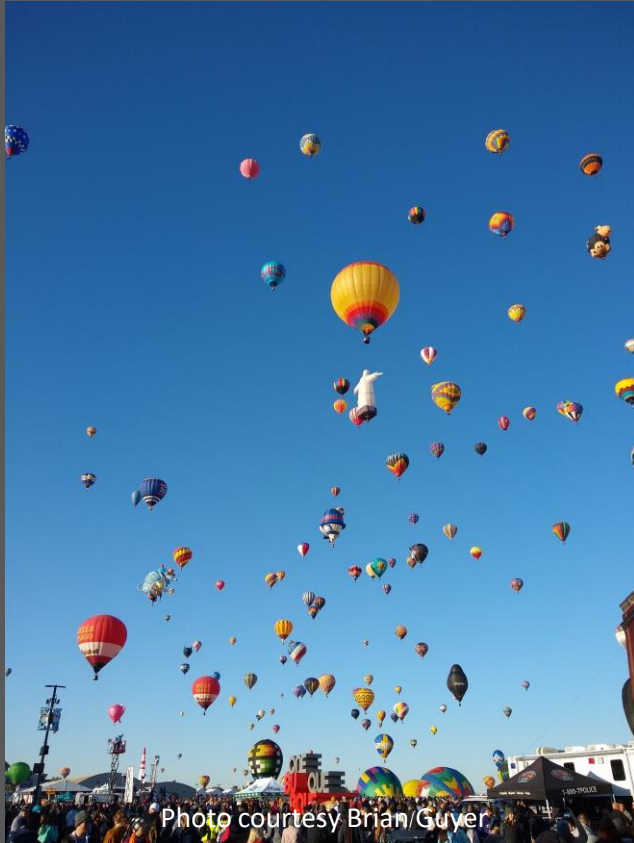


Photo courtesy Brian Guyer

- NWS Digital Forecast Database [Point-n-Click Forecast](#) around Balloon Fiesta Park
- National Centers for Environmental Information - Image and Publications System (NCEI IPS)
- Applied Climate Information System by the NOAA Regional Climate Centers
- NCEI Storm Events Database
- NOAA NWS Performance Management Portal
- [Albuquerque International Balloon Fiesta](#)
- Questions? Contact [SR-ABQ.Webmaster@noaa.gov](mailto:SR-ABQ.Webmaster@noaa.gov)