

APPENDIX E HISTORICAL WEATHER ANALYSIS DETAILS

The NOAA Storm Event Database was used to illustrate the frequency of a number of significant weather events. Table E-1 further details the methodology used by NOAA to record each event, as defined by the National Weather Service (NWS) Directive 10-1605. These events were either developed for the county or forecast zone region. Forecast zone is generally used for very large phenomena that cover large swaths of land. For purposes of this work, all events were translated to a common county-scale resolution. Most of the events rely on records from 1996 through 2013 unless otherwise noted. Generally the event needs to reach a county-specific threshold in order to be reported (e.g., the magnitude of the event reaches a weather service “warning” or “watch”) or, in some instances such as dense fog, the event needs to cause serious harm or damage within the county such as reported death. This form of record-keeping suggests that those events reported are ones that may be beyond “the norm” of what an airport may generally experience. This provides a “relative” ranking of the frequency of the events.

Table E-1. Weather Event Type Definitions from NOAA Storm Event Database

Map	NOAA Storm Event Database Variable	Description as Provided by the NOAA Storm Event Database
Heavy Precipitation	Heavy Precipitation	Unusually large amount of rain which does not cause a flash flood or flood, but causes damage, e.g., roof collapse or other human/economic impact. Heavy rain situations, resulting in urban and/or small stream flooding, should be classified as a Heavy Rain event, or another suitable event that occurred at the same time.
Snow	Snow	Snow accumulation meeting or exceeding locally/regionally defined 12 and/or 24 hour warning criteria, on a widespread or localized basis. This could mean such values as 4, 6, or 8 inches or more in 12 hours or less; or 6, 8, or 10 inches in 24 hours or less.
Ice	Ice	Ice accretion meeting or exceeding locally/regionally defined warning criteria (typical value is 1/4 or 1/2 inch or more), on a widespread or localized basis.
	Freezing	Sleet accumulations meeting or exceeding locally/regionally defined warning criteria (typical value is 1/2 inch or more).
Hail	Hail*	Frozen precipitation in the form of balls or irregular lumps of ice. Hail 3/4 of an inch or larger in diameter will be entered. (looks like smaller size too)
Heavy Winds	Heavy Winds	Sustained non-convective winds of 35 knots (40 mph) or greater lasting for 1 hour or longer or winds (sustained or gusts) of 50 knots (58 mph) for any duration (or otherwise locally/regionally defined), on a widespread or localized basis. In some mountainous areas, the above numerical values are 43 knots (50 mph) and 65 knots (75 mph), respectively.
Hurricanes	Hurricane/Typhoon	A tropical cyclone in which the maximum 1-minute sustained surface wind is 64 knots (74 mph) or greater.
Tornado	Tornado†	A violently rotating column of air, extending to or from a cumuliform cloud or underneath a cumuliform cloud, to the ground, and often (but not always) visible as a condensation funnel.
Visibility	Dense Fog	Water droplets suspended in the air at the Earth’s surface, over a widespread or localized area, reducing visibility to values equal to or below locally/regionally established values for dense fog (usually 1/4 mile or less) and impacting transportation or commerce. Must cause death and damage in order to be reported.
	Dense Smoke	Widespread or localized dense smoke, reducing visibilities to values equal to or below locally/regionally established values (usually 1/4 mile or less), that adversely affects people and/or impacts transportation or commerce.
	Dust	Strong winds over dry ground, with little or no vegetation, that lift particles of dust or sand, reducing visibility over a localized or widespread area below locally/ regionally established values (usually 1/4 mile or less), and results in a fatality, injury, damage, or major disruption of transportation.

Map	NOAA Storm Event Database Variable	Description as Provided by the NOAA Storm Event Database
Extreme Cold	Cold	A period of extremely low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined warning criteria (typical value around -35oF or colder), on a widespread or localized basis. Normally these conditions should cause significant human and/or economic impact.
Extreme heat	Heat	Excessive Heat results from a combination of high temperatures (well above normal) and high humidity. An Excessive Heat event occurs and is reported in Storm Data whenever heat index values meet or exceed locally/regionally established excessive heat warning thresholds, on a widespread or localized basis.
Blizzard	Blizzard	A winter storm which produces the following conditions for 3 hours or longer: (1) sustained winds or frequent gusts 30 knots (35 mph) or greater, and (2) falling and/or blowing snow reducing visibility frequently to less than 1/4 mile, on a widespread or localized basis.
Flood	Flood	A rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined flood level, beginning within six hours of the causative event (e.g., intense rainfall, dam failure, ice jam-related), on a widespread or localized basis. Ongoing flooding can intensify to flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters.
	Flash Flood	Any high flow, overflow, or inundation by water which causes or threatens damage. In general, this would mean the inundation of a normally dry area caused by an increased water level in an established watercourse, or ponding of water, generally occurring more than 6 hours after the causative event, and posing a threat to life or property. This can be on a widespread or localized basis.
Lightening	Lightening	A sudden electrical discharge from a thunderstorm, resulting in a fatality, injury, and/or damage.

* Record keeping of hail began in 1955

† Record keeping of tornadoes began in 1950.

A series of maps were developed tailored to inform airport stakeholders. Each map shows the frequency of the events as reported by the county.

The national statistics shown on each map are defined as follows:

- Max: The maximum number of events reported by one county in the United States.
- Median: The median value of the number of events reported by each county in the United States (only counties with at least 1 event reported are included).
- Mean: The average value of the number of events reported by each county in the United States (only counties with at least 1 event reported are included).
- Standard deviation: The standard deviation of the reported events by each county in the United States, providing a gage of the range of frequency across counties (this may represent about 68% of all frequencies reported).
- % of counties: The percent of counties that have experienced at least one event in the time frame noted.
- Total: The total number of events experienced in the United States (there may be some double-counting of events that cross county lines).