
Weather with the Weathersmith

by: Patsy Miller, Ph.D.

TIPS TO COPE WITH OUR UNIQUE ARIZONA WEATHER

Kip Smith the “Weathersmith” was a speaker at a Desert Awareness Committee evening lecture.¹ The following article is based on his remarks.

The Desert Foothills is not home to many of the weather hazards that frequent the rest of the country. We do not have to concern ourselves with avalanches or other traditional winter hazards such as whiteouts or icy roads. Tornadoes and hurricanes are not a part of our weather patterns. But we do have other weather conditions that are potentially dangerous to property and individuals. Our summer monsoon thunderstorms often produce significant amounts of lightning. Lightning has the potential to kill or cause permanent physical disabilities to one unfortunate enough to be struck. The chance of being struck by lightning may seem very remote, but on a per capita basis New Mexico and Arizona are states with the highest fatalities caused by lightning.

Another phenomenon associated with our summer monsoons is the [microburst](#), a sudden localized area of high winds. Microbursts occur when a column of air “falls out” of the bottom of a

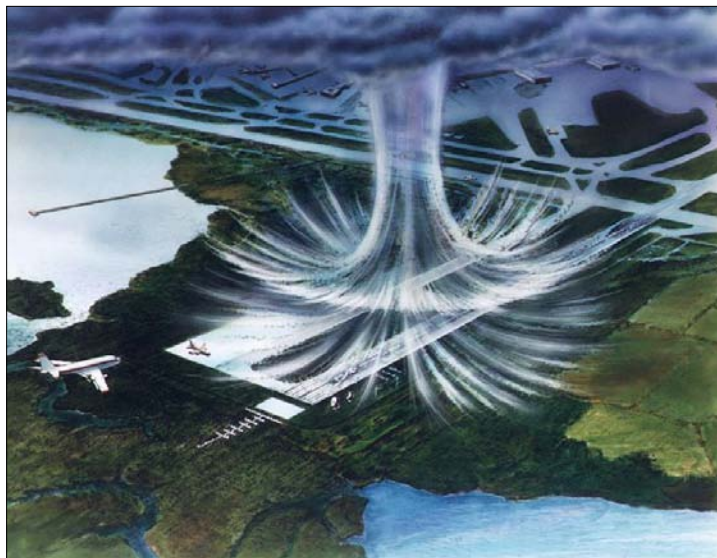


Illustration of a microburst. Note the downward motion of the air until it hits ground level. It then spreads outward in all directions. The wind regime in a microburst is opposite to that of a tornado.

[NASA @Wikipedia]

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cloud. On August 14, 1996, a microburst at the Deer Valley airport produced winds of 115 mph. These downdrafts can be very destructive. A storm during summer 2002 produced microbursts that toppled many large trees and power poles along Lincoln Drive and in other parts of Scottsdale. Fortunately, our higher elevation here in the Desert Foothills offers some protection from destructive microbursts. Where we are, these downdrafts have less distance to travel before they reach the ground and therefore are not as powerful as they are in lower parts of the Valley.

Arizonans appreciate rain, but upon occasion we can get too much, too fast. Summer monsoons can produce flash floods that sweep people and cars into washes that are usually dusty tracks through the desert.

A rarer but potentially widespread and therefore more dangerous precipitation pattern results from dissipating tropical storms moving north from off the coast of Baja California during the late summer or early fall that can stall over Arizona or collide with a cold front

moving south. These weather patterns can create widespread flooding, as can a series of storms that move in from the Pacific Northwest and produce days, and days, and days of rain. Yes, this can happen here in the Arizona desert.



Summer storm



Cave Creek gives the Arizona Stupid Motorist Law a workout.

Winter and spring storms that bring Arizona increased precipitation are often associated with El Niño events, when the ocean temperature off the coast of South America is warmer than normal. Surprisingly, it seems that the Pacific Ocean is not flat. Because of global circulation patterns (the trade winds), warm water near the equator piles up in the



western Pacific off Indonesia. When these usual wind patterns change, that pile of warm water flows downhill towards the coast of Peru. The presence of the warm water alters the direction of the jet stream that rearranges weather patterns including the amount of rain that Arizona receives in February and March. Widespread flooding can and has destroyed roads, washed away structures and killed Arizonans.

However, the most pervasive and dangerous weather hazard in Arizona is associated with our high summer temperatures. Heat kills directly via a heat stroke or in concert with dehydration. The toll of job seekers who die each summer trying to cross our southern deserts is in the hundreds. Anyone who travels on our remote roads, hikes, or rides a bike during the summer should go prepared with water, a personal shading device such as an umbrella or space blanket, and a signaling device such as a mirror or whistle. Cell phones are a good idea, but without a nearby relay tower they are useless.

Some of the weather hazards in Arizona are subtler. During summer, ozone creeps in on silent cat feet, or what really happens is that it blows in from the metropolitan areas to our Southwest and then is trapped by Continental Mountain and the hills to the northeast of us. Our topography is a mixed bag. The mountains and hills trap ozone but they also deflect summer dust storms that can and do cause traffic accidents in the southern part of the Valley.

Summer ozone concentrations are a diurnal phenomenon; they are the product of auto exhaust emissions in the presence of long days with bright sunlight. Concentrations are low in the morning but by late afternoon some of the highest ozone concentrations measured in the Phoenix metropolitan area are right here in the Desert Foothills. Ozone, down here where we breathe it, is linked to various lung diseases including asthma. During summer when high ozone levels are forecast, it is best to restrict vigorous outside activities to morning hours. Stay indoors where air quality is better during the late afternoons.

However, up in the stratosphere ozone is a good gas and protects the earth from damage caused by ultraviolet irradiance. Up there the worry is ozone depletion by CFCs and other manmade products which result in ozone holes over northern and southern polar regions.



The Desert Foothills may have the highest ozone levels in the Valley, but at least we are spared the brown cloud problem that southern Valley cities face during the winter months. The most dangerous components of the brown cloud are not the relatively large particles of dust and dirt but the much smaller particles of combustion products. Diesel fuel and even smoke from fireplaces and cigarettes contain very small particles that lodge deep in human lungs and there they stay, accumulate, and all too often are associated with lung cancer and emphysema. The brown cloud stays “down there” because cold air drainage from “up here” traps it under an inversion layer. The higher elevation of the Desert Foothills keeps our winter air quality acceptable for all but a few days during an average winter.

Now that the heat of the 2003 summer has passed into the record books, we are ready to enjoy our Arizona winter. While much of the United States is battling ice and snow, we will be enjoying our mild winter sunshine, but remember that summer 2004 is only a few months away. Check the UV index in the newspaper and when it is at the top of the scale, wear your sunscreen, add a hat to your summer wardrobe, and drink lots of water.

