

7.4: Tornadoes and Dust Devils

Tornadoes and Dust Devils

Another type of ferocious storm here on Earth are tornadoes. A tornado is a rapidly rotating column of air that is in contact with both the surface of the Earth and cloud. Tornadoes form when warm, moist air from the Gulf of Mexico and cool, dry air from Canada collide. When these two air masses meet, they create instability in the atmosphere. Sizes of tornadoes average about 500 feet, whereas the largest measured to date was 2.6 miles in diameter. Tornadoes usually travel just a few miles before they dissipate; however, the 1925 Tri-State Tornado traveled some 219 miles.



A classic tornado, near Anadarko, Oklahoma, May 1999. Note the funnel, extending from the cloud to the ground, and the debris or dust cloud, where the funnel meets the ground. [” [Dszpics1](#) ” by Daphne Zaras, NOAA, in the Public Domain]



A wedge tornado, near Marquette, Kansas, April 2012. Wedge tornados can grow to over a mile in diameter, and exhibit very strong winds. [” April 14, 2012 Marquette, Kansas EF4 tornado ” by Will Campbell, NWS, in the [Public Domain](#)]

A “close cousin” of the tornado is the waterspout. These storms form over water, the ocean, river, or lake, and are primarily made up of water. Waterspouts can move on land; often they degrade but can develop into a tornado.

The Midwestern United States is known as Tornado Alley. More tornadoes occur in this area, by far, than any other place in the world. And, the waterspout capital of the United States? Florida!

Why are tornadoes so devastating, since they are much smaller than a hurricane?

One of the characteristics of many tropical cyclones is that they can spin up tornadoes and waterspouts in the intense bands of wind. This is especially true on the eastern side of Atlantic basin hurricanes. Hurricane-spawned tornadoes are on the weaker side, yet can and do cause significant damage.

Dust devils are related to tornadoes, but do not form the same way. Dust devils form when hot air near the surface rises quickly through a small pocket of cooler, low-pressure air above it. If conditions are just right, the air will begin to rotate.

They can be powerful, but not as powerful as tornadoes. In fact, a number of dust devils have been imaged in the planet Mars. Perhaps you saw the movie *The Martian*? It did an excellent job portraying Martian dust devils. Let’s examine the differences and similarities between Earth’s tornadoes and dust devils, and dust devils on the planet Mars.



A waterspout, photographed off of the Florida Keys by NOAA meteorologists, 1969. [” Trombe ” by Dr. Joseph Golden, NOAA, in the [Public Domain](#)]



A dust devil, Ramadi, Iraq, July 2007. [” Dust devil ” by NASA, in the [Public Domain](#)]



A Martian Dust Devil and its shadow. This dust devil has been nicknamed “The Serpent Dust Devil.” Image captured by the NASA Mars Reconnaissance Orbiter (MRO) spacecraft. [“The_Serpent_Dust_Devil_on_Mars_PIA15116 ” by NASA/JPL-Caltech/Univ. of Arizona, in the [Public Domain](#)]

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