

# Heat burst

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In meteorology, a **heat burst** is a rare atmospheric phenomenon characterised by gusty winds and a rapid increase in temperature and decrease in dew point (moisture). Heat bursts typically occur during night-time and are associated with decaying thunderstorms.<sup>[1]</sup>

Although this phenomenon is not fully understood, it is theorized that the event is caused when rain evaporates (virga) into a parcel of cold dry air high in the atmosphere making the air denser than its surroundings.<sup>[2]</sup> The parcel descends rapidly, warming due to compression, overshoots its equilibrium level and reaches the surface, similar to a downburst.<sup>[3]</sup>

Recorded temperatures during heat bursts have reached well above 90 °F (32 °C), sometimes rising by 20 °F (11 °C) or more within only a few minutes. More extreme events have also been documented, where temperatures have been reported to exceed 188 °F (87 °C), although such extreme events have never been officially verified. Heat bursts are also characterised by extremely dry air and are sometimes associated with very strong, even damaging, winds.

## Some documented cases

- Wichita, Kansas, June 9, 2011: Temperatures rose from the lower 85°F to 102°F at about 1:00am. The heat burst caused some wind damage (40-50 mph) and local residents reported the phenomenon to area weather stations.<sup>[4]</sup>
- Sioux Falls, South Dakota, August 3, 2008: Temperatures rose rapidly from the lower 70s (20s) to 101 °F (38.3 °C) in a matter of minutes. Wind speeds also rose with gusts up to 50-60 mph (80–100 km/h).<sup>[5]</sup>
- Cozad, Nebraska, June 26, 2008: Wind gusts reached 75 miles per hour (121 km/h), as the temperature rose 20°F (7°C)<sup>[6]</sup> in a matter of minutes.<sup>[7]</sup>
- Midland, Texas, June 16, 2008: At 11:25 pm a wind gust of 62 mph (100 km/h) occurred, and the temperature rose from 71 °F (21.7 °C) to 97 °F (36.1 °C) in minutes.<sup>[8]</sup> (These measurements were taken from miles away, and theories point to 80–100 mph (128–160 km/h) winds in a 2–3 block perimeter.)<sup>[9]</sup>
- Emporia, Kansas, 25 May 2008: Reported temperature jumped from 71 °F (21.7 °C) to 91 °F (32.8 °C) between 4:44 am and 5:11 am (CDT)<sup>[10]</sup> as the result of wind activity from a slow moving thunderstorm some 40 miles (64 km) to the southwest.
- Canby, Minnesota, 16 July 2006: A heat burst formed in Western Minnesota, pushing Canby's temperature to 100 °F (37.8 °C), and causing a wind gust of 63 mph (55 kn; 101 km/h). The dew point fell from 70 °F (21.1 °C) to 32 °F (0 °C) over the course of one hour.<sup>[11]</sup>
- Hastings, Nebraska, 20 June 2006: During the early morning the surface temperature abruptly increased from approximately 75 °F (23.9 °C) to 94 °F (34.4 °C).<sup>[12][13]</sup>
- Sheppard AFB/Wichita Falls, Texas, 12 June 2004: During late evening the surface temperature abruptly increased from approximately 83 °F (28.3 °C) to 94 °F (34.4 °C) and causing a wind gust of 72 mph (63 kn; 116 km/h). The dew point fell from 70 °F (21.1 °C) to 39 °F (3.9 °C).<sup>[14][15]</sup>
- Minnesota and South Dakota, March 26, 1998: A temperature increase of 10–20 °F (6-11 °C) was reported in the towns of Marshall, Minnesota, Sioux Falls, South Dakota, Brookings, South Dakota, and Montrose, South Dakota during a two-hour period.<sup>[16]</sup>
- Oklahoma, May 22–May 23, 1996: The temperature in the towns of Chickasha rose from 87.6 °F (30.9 °C) to 101.9 °F (38.8 °C) in just 25 minutes, while the temperature at Ninnekah rose from

87.9 °F (31.1 °C) to 101.4 °F (39 °C) in 40 minutes. In addition, wind damage was reported as winds gusted to 95 mph (153 km/h) in Lawton, 67 mph (108 km/h) in Ninnekah, and 63 mph (101 km/h) in Chickasha.<sup>[17]</sup>

- Kopperl, Texas, 1960: A heat burst sent the air temperature to near 140 °F (60 °C), supposedly causing cotton crops to become desiccated and drying out vegetation.<sup>[18]</sup>
- Portugal, July 6, 1949: A heat burst reportedly drove the air temperature from 38 °C (100.4 °F) to 70 °C (158.0 °F) two minutes later (note that the highest temperature formally recognized on the Earth is 57.8 °C (136.0 °F) in Libya in 1922, and the former record has not been verified).<sup>[19]</sup>
- Cherokee, Oklahoma, 11 July 1909: at 3:00 in the morning, a heat burst south of Cherokee, Oklahoma reportedly caused the temperature to rise briefly to 136 °F (57.8 °C) , desiccating crops in the area.<sup>[20]</sup>

## See also

- Atmospheric thermodynamics
- Chinook wind
- Wake low

## References

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## External links

- P11.13 THE 22-23 MAY 1996 HEATBURST: A SEVERE WIND EVENT (<http://www.cimms.ou.edu/~heinsel/heatburst/heatburst.html>)
- What is a Heat Burst? (<http://www.theweatherprediction.com/habyhints/341/>)
- The Texas Heat Burst, Others (<http://www.accuweather.com/mt-news-blogs.asp?blog=weathermatrix&partner=accuweather&pgUrl=/mtweb/content/weathermatrix/archives/2006/0>)

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