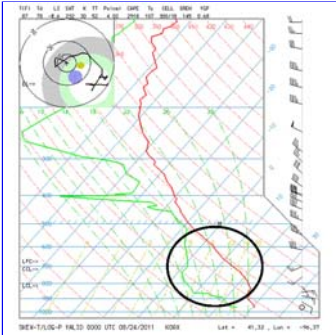


## Heat Burst Affects Southwest Iowa

During the evening of August 23, a rare phenomenon known as a heat burst affected portions of southwest Iowa. A heat burst is characterized by a sudden rise in temperature, a drop in humidity, and strong winds that can approach or exceed severe levels. They are associated with high based decaying thunderstorms with a substantial dry layer beneath the base of the storm. As rain from the thunderstorm falls into the underlying dry air, it cools the air immediately around it, which becomes denser than the surrounding air and begins to sink. As this air sinks, it dries and compresses adiabatically, which results in the hot and dry readings recorded with heat bursts.

The sounding from Omaha at 7:00pm on August 23 clearly depicts this low level dry layer, with cloud bases up around 18,000 feet. This dry layer is circled on the sounding below.



## Storm Reports from the Evening of August 23

The evening's heat burst produced scattered wind damage across southwest Iowa. The worst damage appears to have been just south of Brayton in southern Audubon County shortly after 7:00pm. Several reports of downed trees and power lines were received from this area. Additional trees and power lines were reported down in the town of Bridgewater in Adair County at 6:50pm.

0650 PM      NON-TSTM WND DMG BRIDGEWATER      41.25N 94.67W  
08/23/2011      ADAIR      IA      LAW ENFORCEMENT

TREE REPORTED DOWN ON A POWER LINE ON NORTH MAIN. DAMAGE POSSIBLY FROM A HEAT BURST.

0705 PM      NON-TSTM WND DMG 1 S BRAYTON      41.53N 94.93W  
08/23/2011      AUDUBON      IA      LAW ENFORCEMENT

TREE REPORTED DOWN ON A POWER LINE. TRAINED SPOTTER ALSO REPORTED LIMBS DOWN IN HIS YARD. SPOTTER ESTIMATED WINDS OF AROUND 40 MPH AND OBSERVED A TEMPERATURE INCREASE FROM 76 TO 96 DEGREES IN A FEW MINUTES ALONG WITH A SHARP DROP IN THE HUMIDITY. THIS EVENT WAS LIKELY A HEAT BURST.

0744 PM      NON-TSTM WND GST FONTANELLE      41.29N 94.56W  
08/23/2011      M60 MPH      ADAIR      IA      MESONET

## Observations

A number of weather stations recorded the heat burst as it passed through. The highest wind gust recorded was 60 mph at the Fontanelle schoolnet site, while both the Atlantic AWOS and Fontanelle schoolnet sites recorded a temperature of 102 degrees. To show just how quickly the weather conditions changed as a result of the heat burst, the tabular data from the Atlantic AWOS is shown below.

### Atlantic AWOS Data

Time (CDT)	Temp (F)	Dew Point (F)	Wind
5:55pm	84	75	Calm
6:05pm	86	61	16 G 28 mph
6:15pm	93	54	21 G 41 mph
6:25pm	88	61	10 G 39 mph
6:35pm	86	59	12 mph
6:45pm	86	61	14 mph
6:55pm	88	64	16 G 26 mph
7:05pm	90	54	20 G 30 mph
7:15pm	99	18*	8 G 38 mph
7:25pm	102	7*	3 mph
7:35pm	91	52	Calm
7:45pm	88	64	10 G 18 mph
7:55pm	84	72	13 G 21 mph
8:05pm	84	75	8 mph

\*AWOS sites typically have problems reporting dew points in low humidity environments, so these two dew point measurements are likely incorrect.

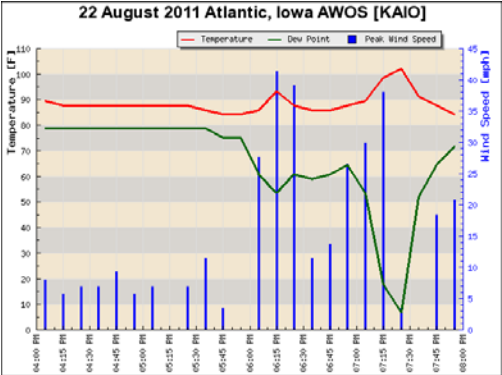
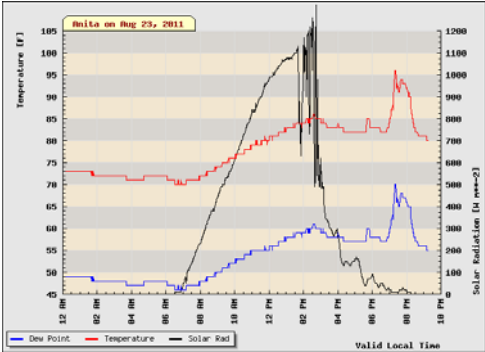


Chart of the Atlantic AWOS temperature, dew point, and wind speed.  
Courtesy of the [Iowa Environmental Mesonet](#)

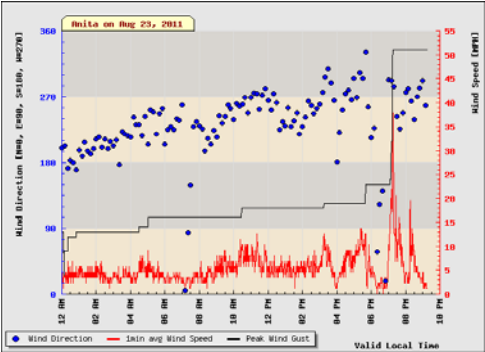
Below are some plots from local schoolnet stations, courtesy of the [Iowa Environmental Mesonet](#).

Anita Schoolnet Site



Temperature and Dew Point Plot

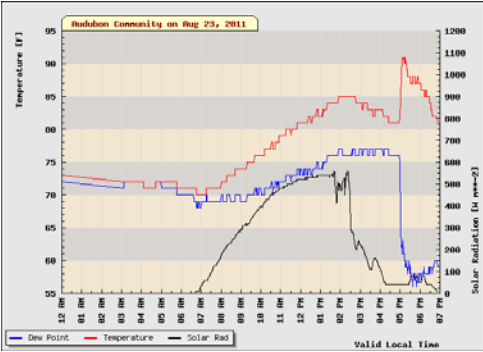
The dew point sensor at Anita appears to be out, but one clearly see the sudden rise in temperature at about 7:00pm, rising from 82 F to 96 F in 10 minutes.



Wind Speed, Gust, and Direction Plot

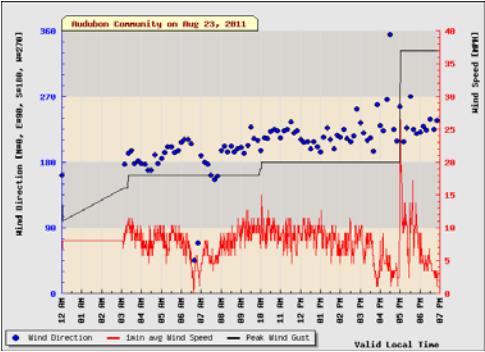
At 7:00pm the winds at the site rose from nearly calm to 39 mph, with a maximum recorded gust of 51 mph. There was little change in the wind direction.

Audubon Schoolnet Site



Temperature and Dew Point Plot

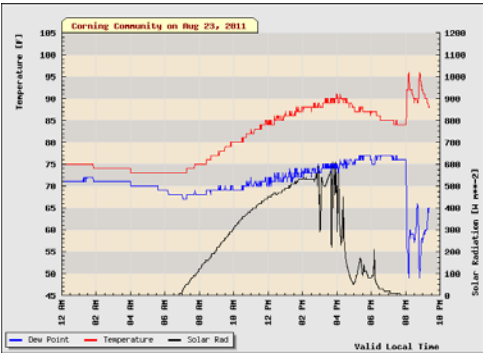
This is the earliest of the heat bursts recorded. Shortly after 5:00pm, the temperature spiked from 81 F to 91 F, and the dew point dropped to 57 F.



Wind Speed, Gust, and Direction Plot

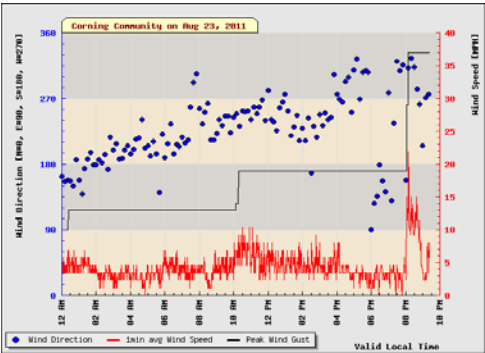
At 5:00pm, the winds jumped from calm to 26 mph, with a maximum recorded wind gust of 37 mph.

Corning Schoolnet Site



Temperature and Dew Point Plot

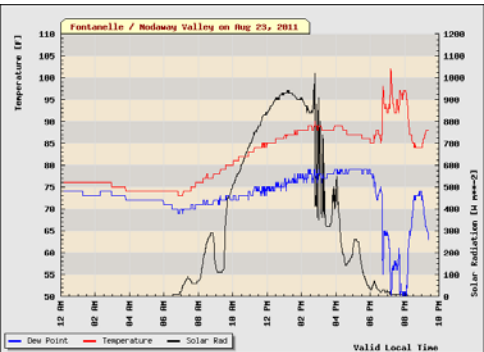
At 8:00pm, the temperature rose from 84 F to 96 F and the dew point dropped from 76 F to 49 F. There was a second heat burst with a similar drop around 9:00pm.



Wind Speed, Gust, and Direction Plot

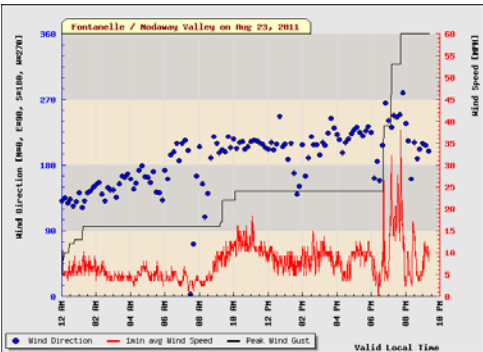
At 8:00pm, the winds at the site rose from nearly calm to 22 mph, with a maximum recorded gust of 37 mph.

Fontanelle Schoolnet Site



Temperature and Dewpoint Plot

There appears to have been multiple heat bursts from 7:00pm to 8:30pm. The highest temperature recorded in this time was 102 F, and the lowest dew point was 50 F.



Wind Speed, Gust, and Direction Plot

There were three main wind speed maximums from 6:30pm to 7:45pm between 27 mph and 39 mph. The highest wind gust recorded was 60 mph at 7:45pm.

Radar Data

The heat burst also appeared on velocity radar imagery from the Des Moines Doppler Radar, but there was little

