



CREATING WEATHER HISTORY

As every minute passes, the Mesonet collects weather observations that are rich in quality and quantity.

THE MESONET IS considered the gold standard for statewide weather networks because of the volume and quality of its weather observations. And, with more than 4 billion observations in its archive – all of which have been checked and rechecked for accuracy, it's easy to see why. "The Mesonet has the best quality assured meteorological data in the world," said Gary McManus, Associate State Climatologist for Oklahoma.

Even though the Mesonet is an automated system, there is a team of people behind the scenes making sure the weather observations are accurate and valid. There is an entire system of checks and balances in place including a calibration lab that checks each sensor, routine maintenance where sensors are periodically cleaned and tested, automated software that checks data in real-time and manual quality control which is done by quality assurance meteorologists, said Chris Fiebrich, Associate Director of the Mesonet.

Each observation is checked for accuracy and with 575,000 observations taken each day, this is a large task. "Whenever we receive data from a weather station, our computers run programs to make sure the values agree with neighboring stations, that they are within a specified range and that they also don't change more than a certain amount between observations," said Cindy Morgan, Mesonet meteorologist.



"The Mesonet has the best quality assured meteorological data in the world"

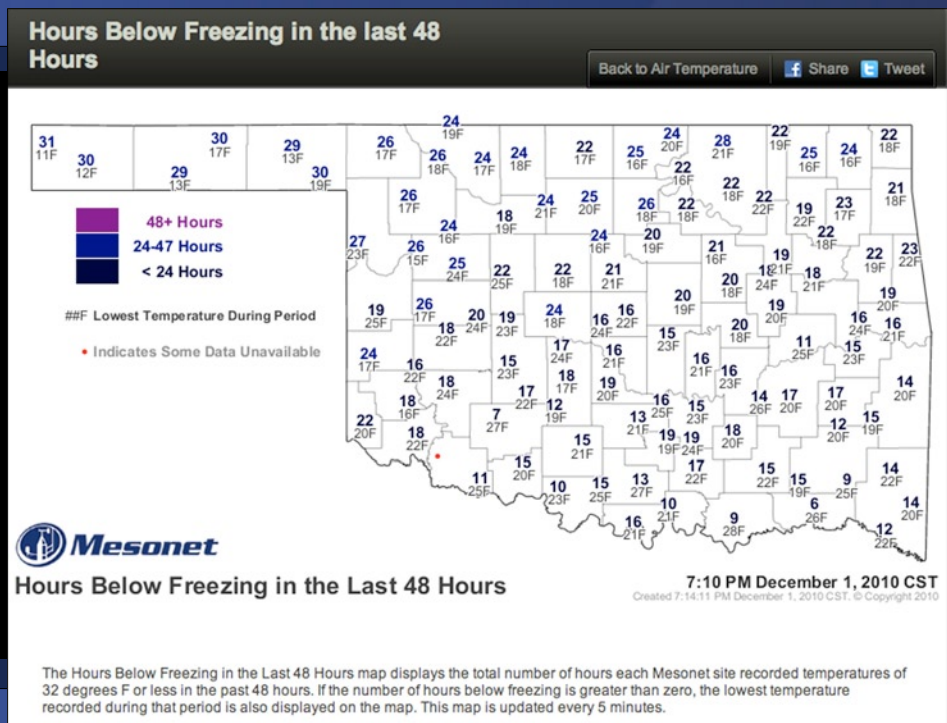
— GARY MCMANUS, ASSOCIATE STATE CLIMATOLOGIST

If a problem is found, the data are still saved, but removed from Mesonet websites so users don't see bad observations. The computer flags data if they fail quality assurance testing, but a meteorologist goes back and inspects the data to determine whether they are OK, said Morgan.

"We are producing a data set that can be trusted by everybody," said Fiebrich. "We want our data to be trusted no matter the application." Mesonet weather data are currently used by state officials, teachers, climatologists, Mesonet meteorologists, agriculturalists, students, researchers and many others. As the Mesonet continues to collect valuable weather information, it strives to meet the current and future needs of all Oklahomans.

Unavailable data

- If for any reason, data have been flagged, removed or are unavailable, a red dot will appear in its place.
- This is an “Hours Below Freezing” map. Notice the red dot in the southwestern portion of the state.
- These maps can be found by going to the “Weather” tab, then “Air Temperature.” The hours below freezing maps are located at the bottom of the page.



Instrument accuracy

- From the home page at www.mesonet.org, choose the “About” category from the top horizontal menu.
- On the left-hand side, there is a list of instruments to choose from, such as air temperature, wind measurements, etc. By clicking on one of these, you can see the specified accuracy of each sensor used in the Mesonet.

Mesonet

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Instruments

TAIR
Air Temperature (1.5 m)

The 5-minute average air temperature at a height of 1.5 meters above the ground.

- This sensor is quite rugged and accurate. Prior to 2009, the sensor was housed in a naturally-ventilated radiation shield. Such shields can create temperature errors of several degrees Celsius when the wind is calm (less than 1 m/sec) and solar radiation is high.
- Since 2009, the sensor is housed in an aspirated radiation shield, which continuously draws ambient air over the sensor, while protecting it from solar radiation.

Type	Sensor Used	Standards Units	Accuracy
Standard - Primary	Thermometrics Air Temperature 2004- Present; Vaisala HMP35C 1994-2003	degrees Celsius	± 0.5 °C

Thermometrics Air Temperature Sensor

TA9M
Air Temperature (9 m)

Same sensor as TAIR but positioned at 9 meters above ground level.

- This thermistor uses an un aspirated radiation shield, resulting in readings with a warm bias on calm, sunny days.

Type	Sensor Used	Standards Units	Accuracy
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WHERE TO FIND IT

Interesting findings

- Every Mesonet station is visited at least three times a year. Any interesting findings are chronicled on the website.
- From the home page at www.mesonet.org, choose "Site Passes" from the bottom of the screen.
- In this section, you can find accomplishments, site photos, interesting findings, and notes from the technicians.

Summer Pass 2010

The following images depict problems found by technicians that may affect data quality. Miscellaneous pictures taken during the pass are also shown. Click on an image to enlarge.

1. Bare plots not bare

Since Spring Pass 2010, vegetation intruded on the bare plot at some sites. Vegetation can act to insulate bare soil temperatures. Appropriate data were flagged. The worst offenders are displayed below.

Ardmore (ARD2) bare plot covered with tall vegetation 14 July 2010 (before). **Ardmore (ARD2) bare plot after vegetation removal (after).**

Bare soil temperature data from 10 June 2010 to 14 July 2010 were flagged as erroneous.

Webbers Falls (WEBR) **Shawnee (SHAW) bare**

Quality reports

- Quality reports are provided each month and posted to the website.
- These reports offer details about the maintenance of Mesonet stations and instruments.
- From the home page at www.mesonet.org, choose "Quality Assurance" from the bottom of the screen.

Mesonet

Weather Climate Programs About Contact

Download Monthly QA Report

October 2010
September 2010
August 2010
July 2010
June 2010
May 2010
April 2010
March 2010
February 2010
January 2010
December 2009
November 2009
October 2009
September 2009
August 2009

Quality Assurance

The Oklahoma Mesonet's quality-assurance (QA) consists of four principal components:

- 1) laboratory calibration,
- 2) on-site intercomparison,
- 3) automated QA, and
- 4) manual QA.

In the instrument laboratory, all sensors are calibrated to validate or improve upon factory calibrations.

On an annual basis, the accuracy of several types of sensors in the field is verified through comparison to calibrated reference sensors housed in a portable system.

To make a first pass through the 640,000+ observations that are received at the Mesonet each day, automated QA software includes numerous algorithms to evaluate the data received from remote stations.

Finally, the Mesonet's QA meteorologists employ numerous manual techniques to complement automated QA including analysis of monthly statistics to detect sensor drift or bias (click on a month and year to the left to download a PDF version of a Monthly Report). In addition to detecting problematic sensors, the QA meteorologists trace the true start time of each problem so that appropriate data can be manually flagged as erroneous. The QA meteorologists are responsible for communicating problems to, and coordinating with, appropriate field technicians to ensure proper resolution (see a list of the current outstanding tickets below).

Current Trouble Tickets in the Oklahoma Mesonet
(For questions regarding these tickets, contact gamgr@mesonet.org)

Station	Variable	Date Reported	Problem Description
HINT	Soil Temperature at 30 cm under Native Vegetation	2010-11-29 19:15:00	Sod Temperature at 30cm has a low bias compared to neighbors and other levels of soil temperature.
SEIL	Soil Temperature at 30 cm under Native Vegetation	2010-11-29 18:03:00	Sod Temperature at 30cm has developed a low bias compared to other levels.



Fa la la la la, la Niña

By Gary McManus, Associate State Climatologist

NOVEMBER WRAP-UP

The mild and dry weather Oklahoma experienced through the first two months of fall continued into November, thanks in large part to La Nina's influence, which brings an increased chance for mild and dry weather. The statewide average temperature during November finished 1.5 degrees above normal to rank as the 47th warmest since records began in 1895.

The Mesonet's precipitation gauges recorded an average of 1.91 inches across the state, 0.91 inches below normal, the 63rd driest since 1895. The northwestern quarter of the state had a good soaking of 2-3 inches during the month, but the remainder of the state remained significantly dry with 20-60 percent of normal rainfall.

Despite November's mild and dry weather, the extremes Oklahoma is well known for still occurred. High temperatures rose into the 70s and 80s late in the month with Waurika recording 85 degrees on the 24th ahead of a powerful cold front. The following morning's low temperature at Waurika fell to a frigid 27 degrees. Boise City and Goodwell bottomed out at a bone-chilling 8 degrees on that same day. Miami recorded the most precipitation during the month with 4.31 inches, while Boise City had less than a gulp of water at 0.01 inches.

FA LA LA LA LA, LA NIÑA

The updated outlooks for December and the rest of winter are out from the NWS' Climate Prediction Center and they are still indicating that a classic La Niña pattern will be present for the southern parts of the United States. The climate phenomenon, signaled by cooler-than-normal waters in the equatorial pacific and global disruptions of weather patterns, brings an increased chance for mild and dry weather throughout the southern one-third of the U.S., including Oklahoma.

The Drought Outlook shows a tendency for the persistence and development of drought in Oklahoma through January 2011 due in large part to La Niña. The latest U.S. Drought Monitor shows the spread of dry conditions across the state with moderate drought in central Oklahoma and abnormally dry conditions for much of northeastern Oklahoma.

8°F
REACHED

at Boise City and Goodwell,
the coldest temperature in
November

4.31
INCHES

of rain fell at the Miami
Mesonet station in November,
the wettest for the month

49.8°F
AVERAGE

temperature in Oklahoma
this November

0.01
INCHES

of rain fell at the Boise City
Mesonet station in November,
the driest for the month

MESONET

VS

MOTHER NATURE

WITH 120 STATIONS across Oklahoma, the Mesonet is fighting a constant battle with Mother Nature. Technicians travel across the state and visit each site to perform routine maintenance and also fix any problems there might be. “Technicians make it to each site a minimum of three times a year. We do three seasonal passes, spring, summer and fall,” said James Kilby, Mesonet Field Operations Manager. “Passes are mainly driven by vegetative growth. Since we don’t have vegetation growing in the winter, we don’t do a winter pass. However, the guys will go out in the winter if we have a sensor or communication problem.”

Mesonet sensors experience normal wear and tear and each instrument has a period of time where the data is guaranteed to be accurate. “Over the years, we’ve determined a field lifetime for each instrument,” said Kilby. “If the instruments go past their lifetime, it might skew the data. For all of the instruments, we have a set rotation schedule. Each instrument needs to be recalibrated in our lab after a certain period of time. The sensors are the heart of the network. Without maintenance it would affect the quality of the data.” Cleaning is also a major part of maintaining the sites. In the eastern part of the state, technicians deal with mold and mildew. In the western part, there is a lot of dust, said Kilby. “Basically, we clean the instrument shelters and sensors, making sure nothing is gobbled up,” said Phil Browder, Mesonet Electronic Field Technician.

Vegetation, critters, and “Billy Bobs” also challenge Mesonet technicians. Vegetation must be cut to a standard height and must be representative of the vegetation found outside of the site, said Browder. In addition to vegetation, technicians must fix problems caused by animals and insects. Critters like to dig up, chew, climb and use the instruments for shelter, said Browder. “There is also an infrequent problem with people shooting at the site or stealing solar panels. “You have the occasional Billy Bob that shoots up the wind anemometer or solar panel,” said Kilby. Regardless of the challenges, Mesonet technicians work hard to ensure that quality data is collected. “We are representatives of our network and we each take a lot of pride in our sites,” said Browder.



1. Mice damaged a sensor when they used part of a logger enclosure for a nest in fall 2007. **2.** A mud dauber nest was found covering a temperature sensor in summer 2003. **3.** Rodents, including gophers and prairie dogs, often damage sensors by digging them up or chewing on wires. This rodent hole was found in fall 2005.

CALENDAR

DECEMBER

- ▶ 12.24.10 to 12.31.10: Mesonet offices will be closed for the holidays.

JANUARY

- ▶ 1.7.11 to 1.8.11: KNID AGRIFEST, Enid, Okla. For information, call Maggie Hoey at 405-325-3126.
- ▶ 1.17.11 to 1.19.11: Oklahoma Agricultural Aviators Association Annual Meeting, Oklahoma City. For information, call Maggie Hoey at 405-325-3126.
- ▶ 1.20.11: Pre-collegiate Meteorology Program, Norman, Okla. For information, call Andrea Melvin at 405-325-2652.
- ▶ 1.21.11: Mesonet presentation at OSU, Stillwater, Okla. For information, call Andrea Melvin at 405-325-2652.
- ▶ 1.25.11: Pre-collegiate Meteorology Program, Norman, Okla. For information, call Andrea Melvin at 405-325-2652.

CONTACTS

Accessing recent (within the past 7 days)

Mesonet data

Contact: [Mesonet Operator](#)

Instrumentation, telecommunications, or other technical specifications

Contact: [Chris Fiebrich](#)

Mesonet agricultural data and products

Contact: [Al Sutherland](#)

Mesonet meteorological data

Contact: [OCS Data Requests](#)

K-12 educational outreach

Contact: [Andrea Melvin](#)

OK-First

Contact: [Nicole Giuliano](#)

OK-FIRE

Contact: [J.D. Carlson](#)

Not sure?

Contact: 405-325-2541 or [Chris Fiebrich](#).

FORECAST FOR DECEMBER [Click here to view the original maps from the Climate Prediction Center.](#)

