

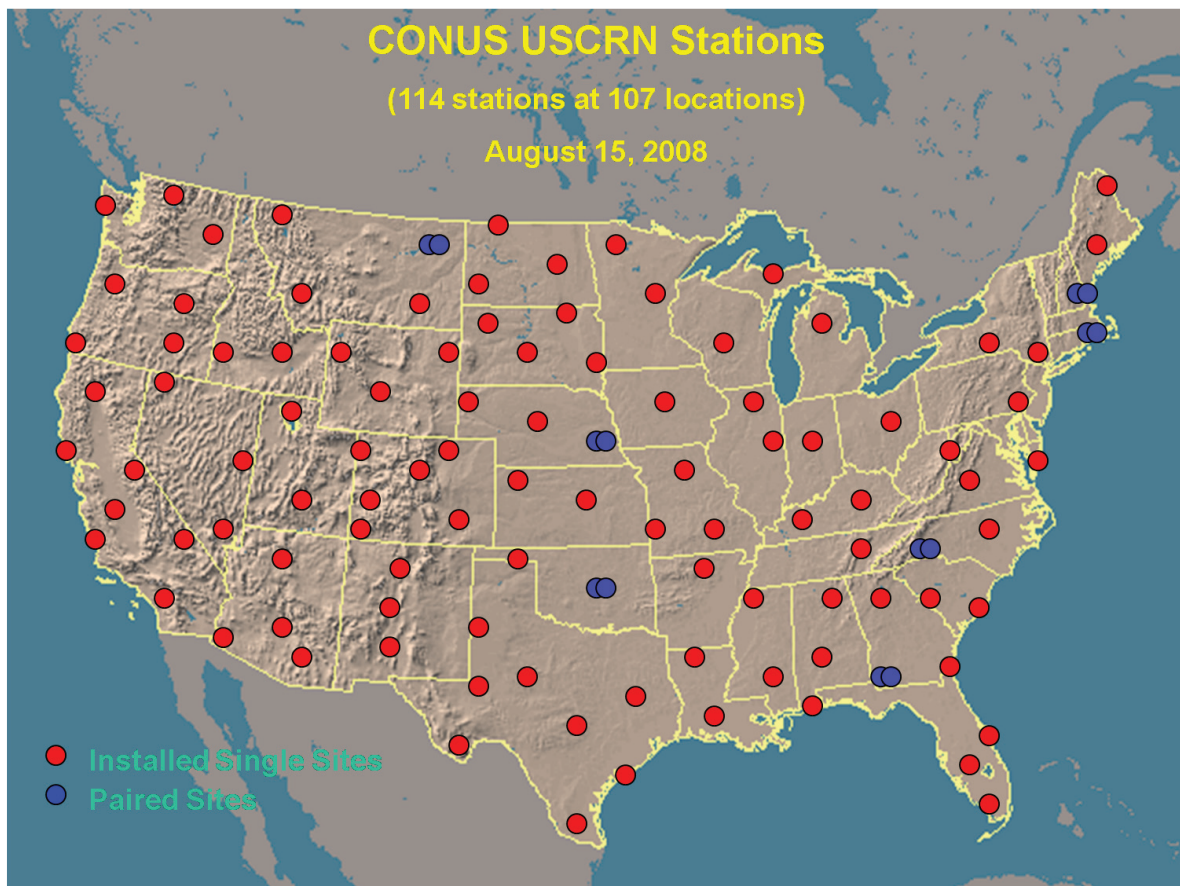


Air Resources Laboratory

Climate Reference Network

What We Do

The Air Resources Laboratory (ARL) provides essential information and tools for decision-makers to understand how and why climate has changed and what changes might occur in the future. An important aspect of this research is supporting the U.S. Climate Reference Network (USCRN). The USCRN implements the ten climate monitoring principles www.ncdc.noaa.gov/crn/crnclimmonprin.html recommend by the National Research Council (NRC 1999), that were proposed by Thomas Karl et al. (NCDC, 1995).



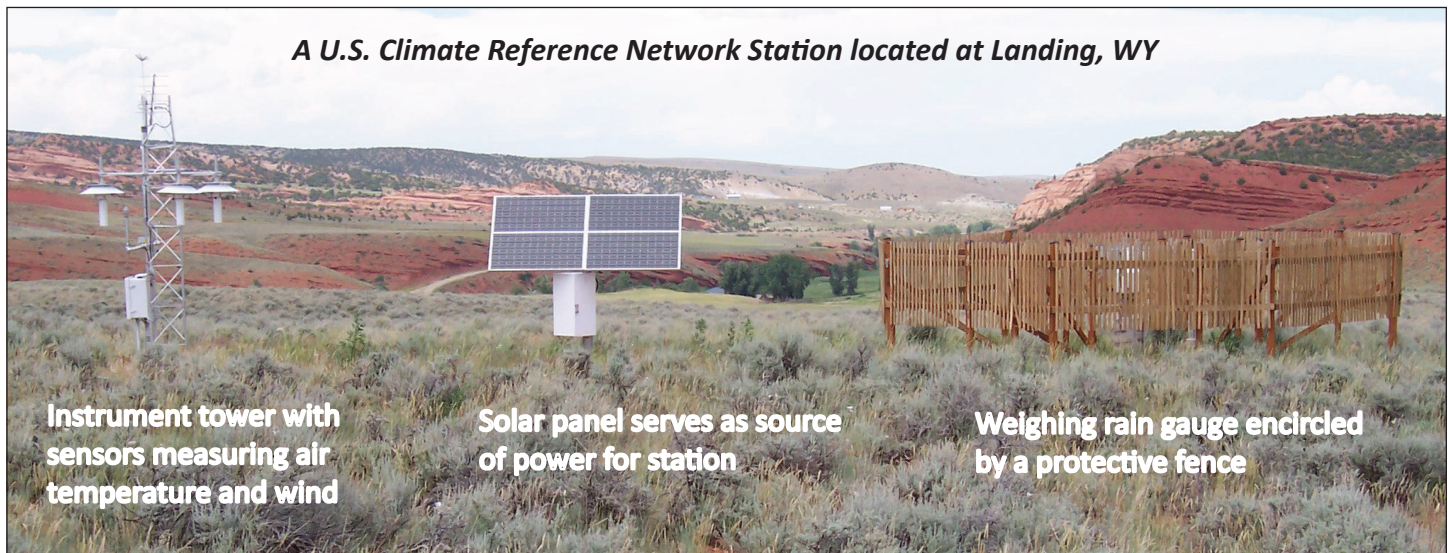
*A map of the Continental United States (CONUS) U.S. Climate Reference Network stations.
Seven locations have paired sites for data comparisons.*

The USCRN consists of 114 stations in the 48 contiguous States and an additional 7 stations installed in extreme environments in Alaska, Hawaii and Canada. Each station is strategically placed away from urban and suburban influences to avoid any possible misinterpretation of changes observed. The USCRN reports multiple observations per hour for temperature and precipitation. This temporal resolution of the data provides additional climate information, such as precipitation intensity and duration of extreme events. More recently, the USCRN stations are being equipped with soil moisture, soil temperature, and relative humidity sensors, which are supported by the National Integrated Drought Information System.

ARL is one of three NOAA offices cooperating in the USCRN program. ARL provides the engineering design and measurement capabilities and expertise for the stations, including the deployment and maintenance of the sites and regular calibration of the sensors. ARL also provides analysis of emerging sensor technologies for future applications. High quality data for all sites in near-real time are provided by NOAA's National Climatic Data Center.

There are five parameters recorded by the USCRN:

- ◇ Air temperature obtained through the use of a temperature probe placed inside a white-painted aspirated solar shield with a DC-powered fan to aid in the circulation of ambient air. There are three air temperature sensors and shields located at each USCRN site.
- ◇ Wind speed measured with a three-cup anemometer assembly with a magnet-reed switch, which produces contact closures whose frequency is proportional to wind speed.
- ◇ Solar radiation monitored via a silicon pyranometer that measures solar radiation from the entire hemisphere.
- ◇ Precipitation amount recorded with a weighing gauge. The precipitation in the container is weighed with three sensors with a frequency output. There is also a secondary tipping bucket gauge.
- ◇ Surface temperature of the ground measured with an infrared thermometer.



Why It Is Important

The lack of high quality surface measurements of precipitation and air temperature historically has hampered the ability of climate scientists to fully characterize the national and regional climate signals with confidence. The USCRN provides the Nation with a climate-quality benchmark observing system for real-time measurements of air temperature and precipitation that meets national commitments to monitor the climate of the United States for the next 50 – 100 years. The USCRN network also provides a platform of opportunity to add additional sensors (i.e. wind, pressure) for future climate monitoring activities.

Proper maintenance and operation of the USCRN is a top priority for NOAA. Society and the economy benefit due to better forecast accuracy helping to protect lives and property.

For More Information:

ARL Climate Reference Network

www.atdd.noaa.gov

National Climatic Data Center

www.ncdc.noaa.gov/oa/climate/uscrn

Air Resources Laboratory

www.arl.noaa.gov

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Ref: Karl, T.R., V.E. Derr, D.R. Easterling, C.K. Folland, D.J. Hoffman, S. Levitus, N.Nicholls, D.E. Parker, and G.W. Withee, 1995: Critical issues for long-term climate monitoring. *Climatic Change*, 31, 185-221.

Ref: National Research Council (NRC), 1999: *Adequacy of Climate Observing Systems*, National Academy Press, Washington, D.C.