U.S. Climate Reference Network: Current Status and Future Directions

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The USCRN deployment in the continental U.S. was completed in September 2008, with a network of 114 stations at 107 locations (Figure 1). This spatial distribution is sufficient to explain 98% of the variance of the annual U.S. temperature average and 95% of the variance of the annual U.S. precipitation total. The locations were chosen with great care at very stable sites that are intended to remain rural and unchanged for the next 50-100 years. Therefore, between the site selection and the science-based observation techniques adhering to the best principles for climate observation, the USCRN climate records will not be required to be homogenized going forward, providing a premier time series record of national climate change as it occurs. The USCRN will also be valuable for climate monitoring from daily to annual scales, providing accurate assessments of climate extremes, cumulative variables such as heating and cooling degree days, and, in the near future, high-quality soil moisture and soil temperature observations. A deployment of 30 USCRN stations to Alaska is in progress, and the impending rollout of the USHCN-M regional climate change pilot project in the Southwest is based on USCRN practices.

Early observations from the first seven years of the USCRN will be examined to illustrate the value and utility of this science-based approach to climate observation. Triple configurations of both temperature sensors and precipitation gauge depth measurements insure data quality by providing independent measurements that can be cross-checked continuously, and also safeguard continuity against the failure or replacement of a single instrument. A new USCRN climate science project is beginning to take shape to supplement the ongoing instrumentation science work. Some of the near-term plans for this project will be presented, including the development of temperature and precipitation pseudo-normals, threading time series of historical observations to USCRN data, and exploring USCRN observations relevant to satellite and modeling calibration/validation. Outreach is taking place to encourage more use of USCRN observations in the climate stakeholder communities, and data access has been made easier for external users.

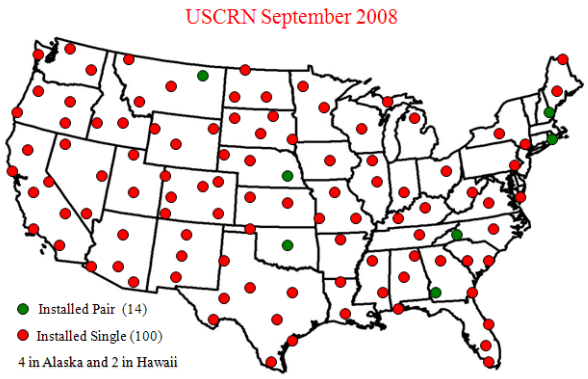

Figure 1. Location map for USCRN stations and network growth from 2004 to 2008 completion.

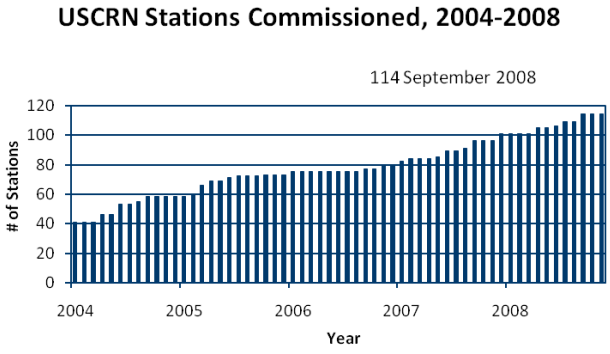

Figure 2. Time Series of Station Commissioning.