

Evaluating Precipitation Extremes from a Sparse Network: the NOAA U.S. Climate Reference Network

Emma Scott¹, Ronald Leeper², and Michael Palecki³

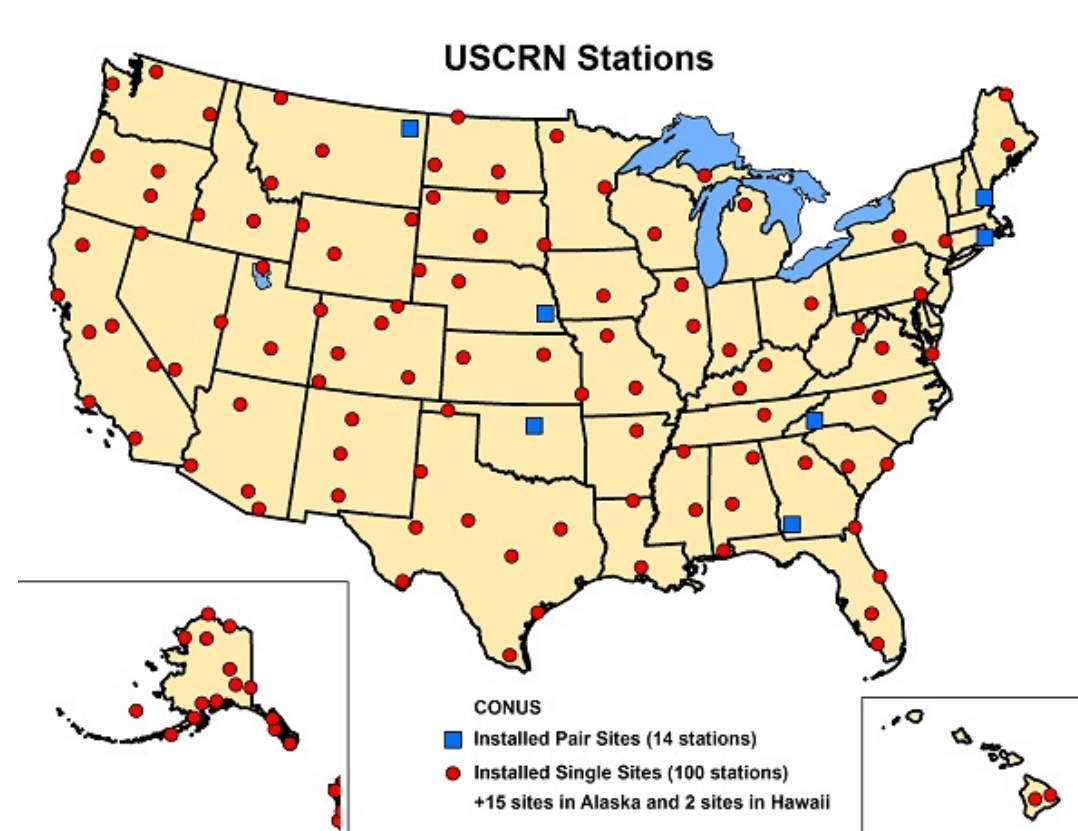
1. North Carolina State University, 2. Cooperative Institute for Climate and Satellites NC, 3. National Centers for Environmental Information

Background

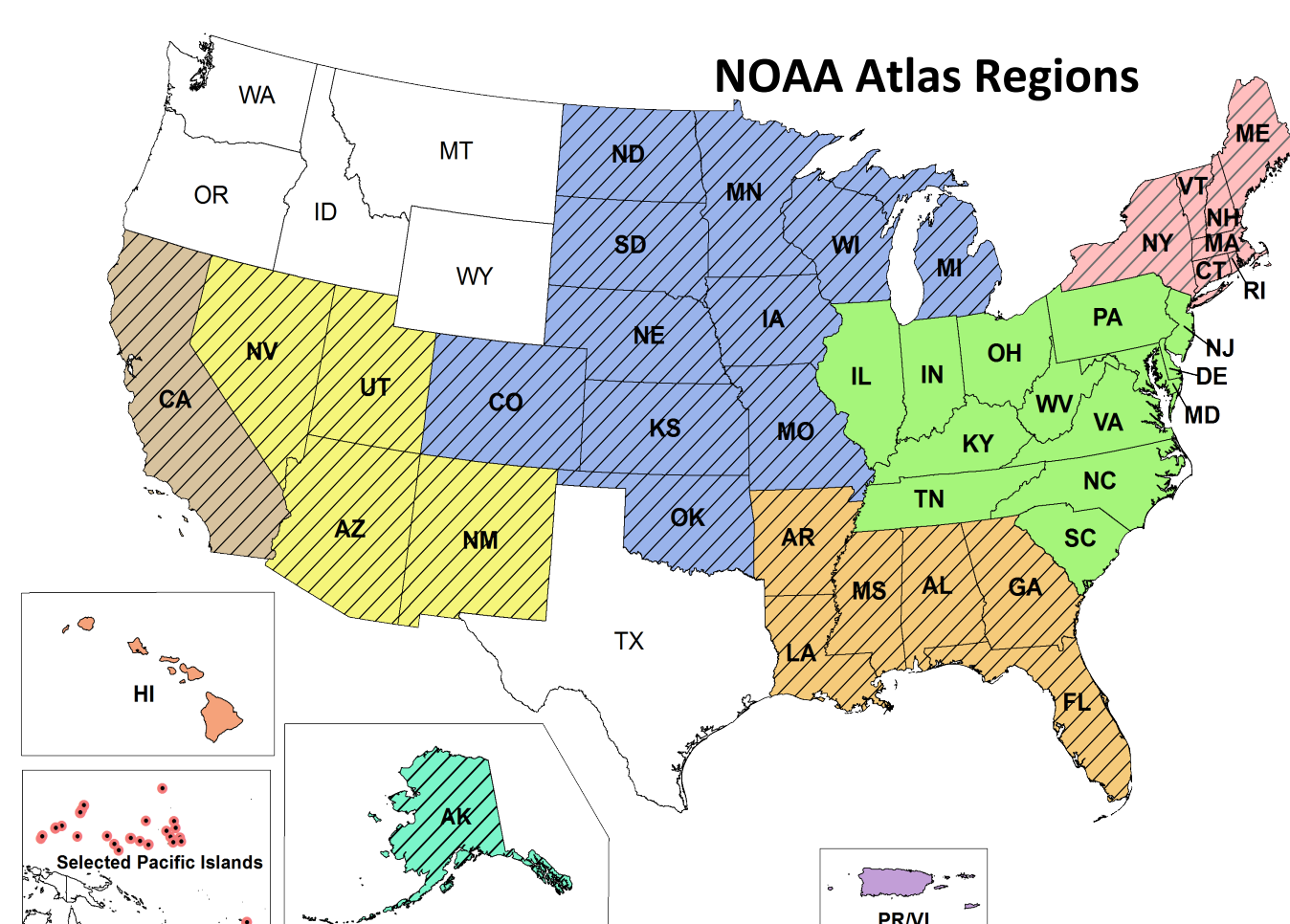
The US Climate Reference Network (USCRN) is a new network that was designed with climate monitoring science in mind. Because precipitation datasets may differ based on their temporal, spatial, and measurement resolution, it can be difficult to get consistent data for studies of precipitation extremes. There are two goals for this project: the first is to find the extreme precipitation events for stations in the network, and the second is to analyze how well the network has captured these events. If the USCRN has sufficient spatial coverage to capture expected extreme events, it could be used as a reference network for future research.

Datasets

- **USCRN (2006-2015):**
 - 114 CONUS stations
 - Shielded Geonor triple wire weighing gauge
 - Stations report precipitation over 0.2 mm at 5 minute resolution
 - Sparsely distributed and set up as a reference network
 - One of the only national networks with research quality shielding and measurements



- **NOAA Atlas 14 (20+ year climatology):**
 - ~1500 daily, 500 hourly, and 50 15-minute stations per region
 - Sub-hourly to 60-day extremes arranged by return interval and duration of event



Methods

- Precipitation extremes were compared for all USCRN sites.
- USCRN precipitation data was compared to NOAA Atlas 14 precipitation frequency estimates, in regions where NOAA Atlas 14 data were available.
- For each duration, rolling sums were computed based on USCRN 5-minute data
- Frequencies of exceedance of NOAA Atlas thresholds were calculated for each station.
- The frequency of exceedance was compared to the expected frequency per year. For instance, for a 5-year return interval, 0.2 counts/year would be expected.

Results

Spatial/Temporal Distribution:

