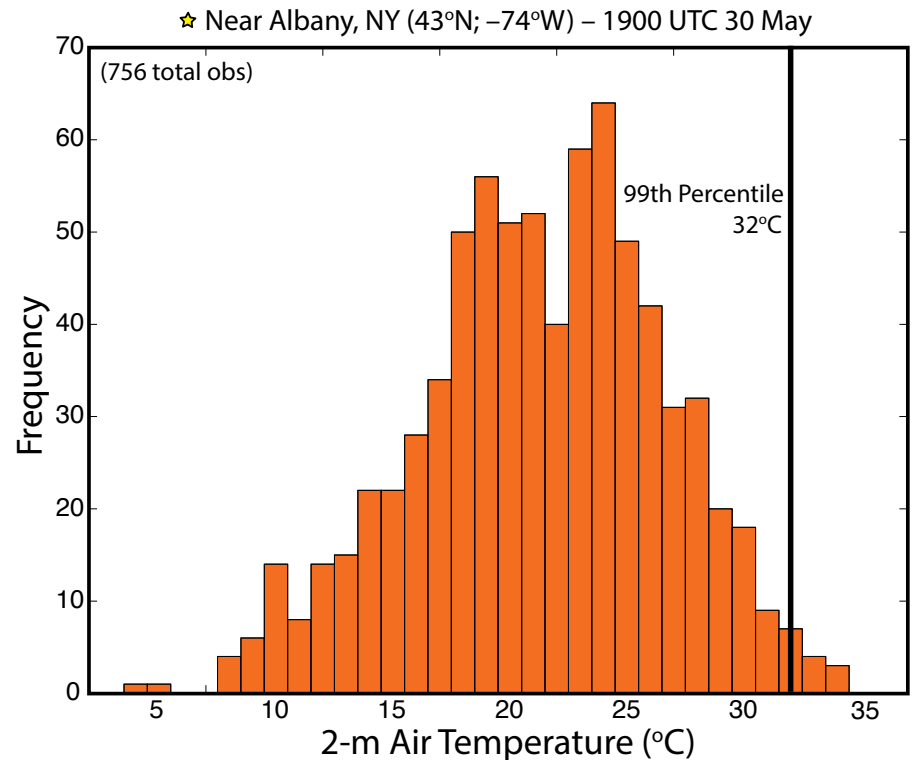


Extreme Event Identification

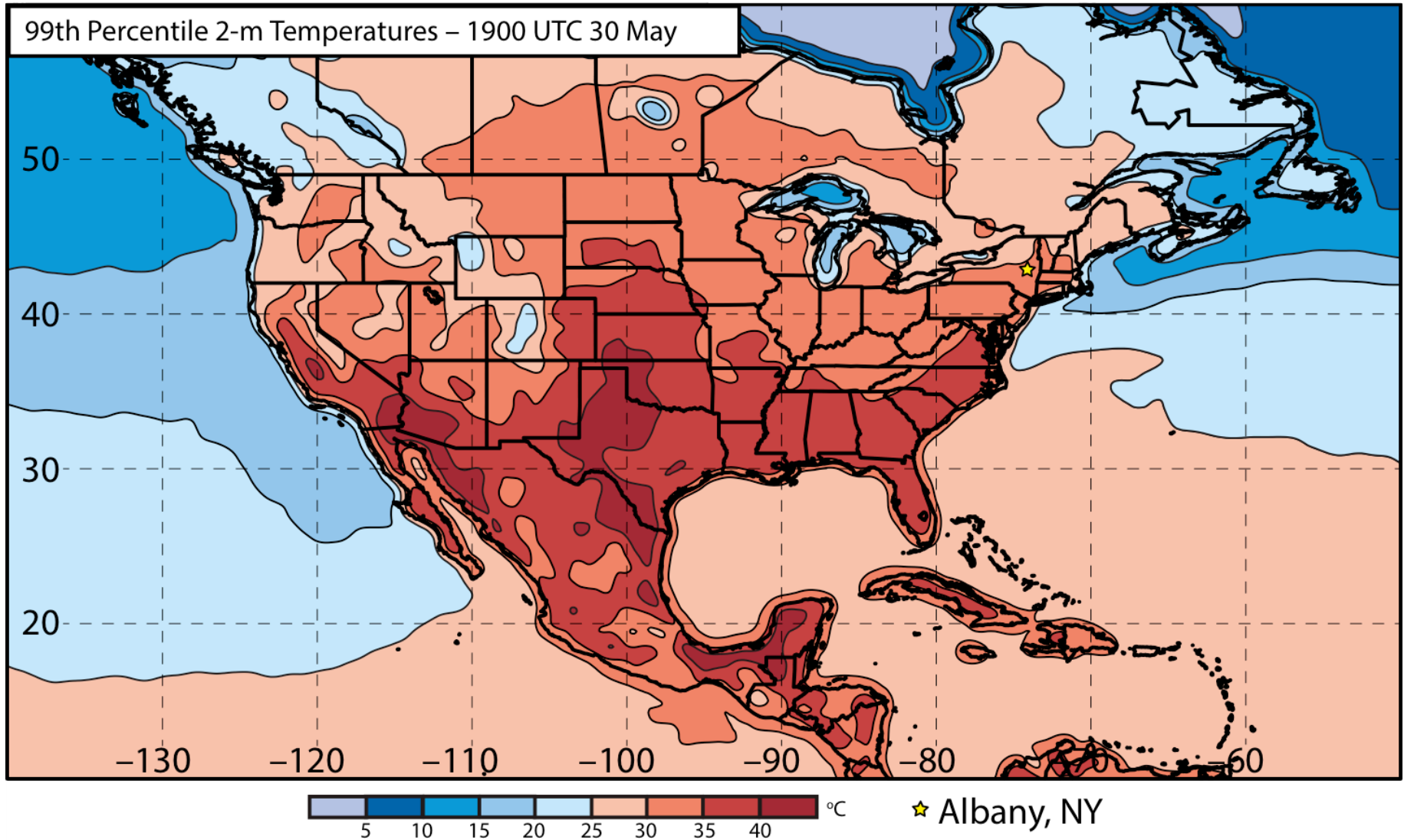
Extreme Warm Events: (A similar methodology is used for cold events (i.e, 1st percentile)

- Employed 1-h forecasts of 2-m temperature from the CFSR ($0.5^\circ \times 0.5^\circ$) at 6-h intervals
- Compiled data for each grid point within 21-day windows centered on each analysis time for 36 years, 1979–2014
 - Each grid point has 756 (21×36) data points for each analysis time
- Determined the temperature that corresponds to the **99th percentile** for each grid point at a given analysis time



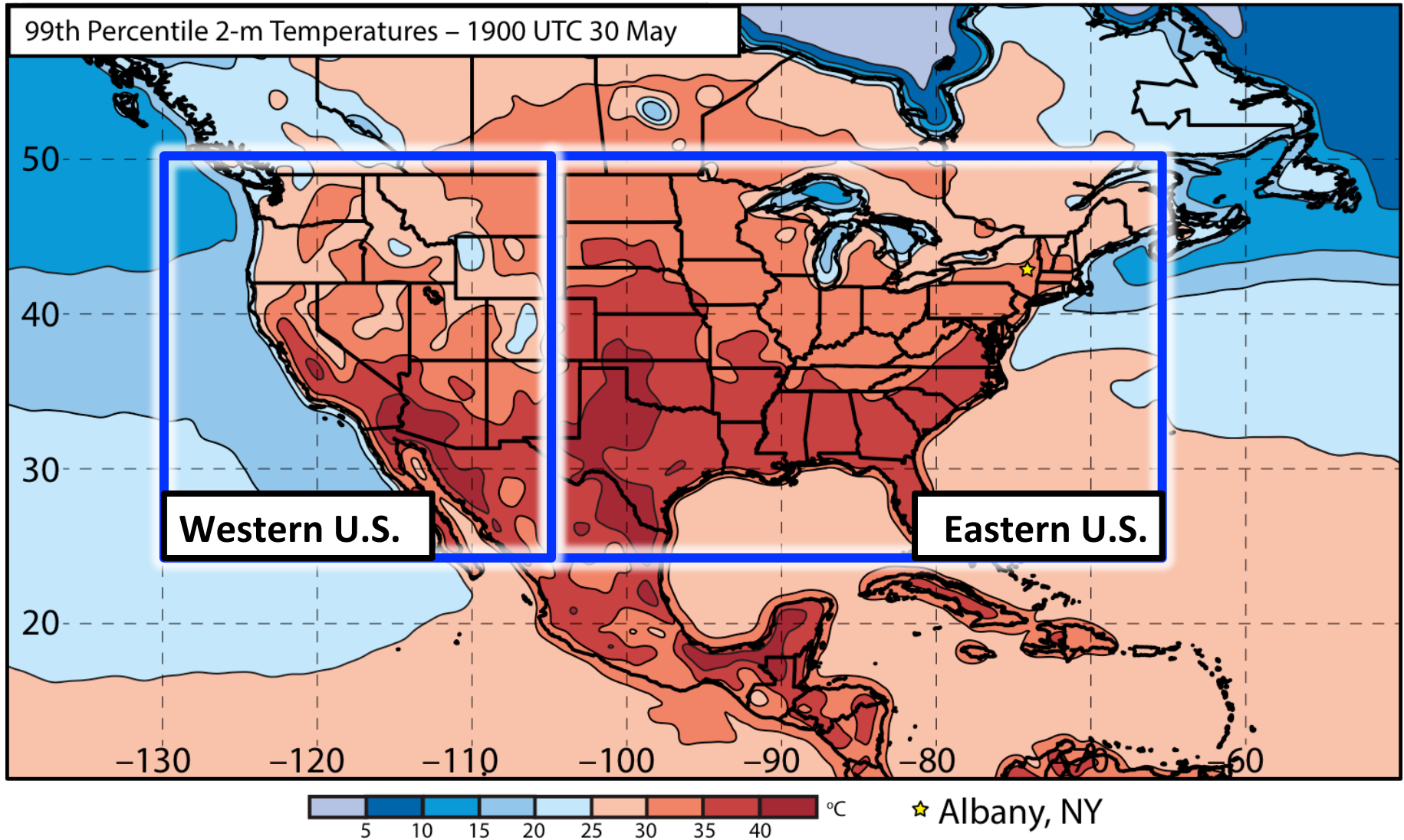
Frequency distribution of 2-m temperature at 1900 UTC 30 May for a grid point near Albany, NY

Extreme Event Identification



The 99th percentile temperature at a particular time varies geographically

Extreme Event Identification

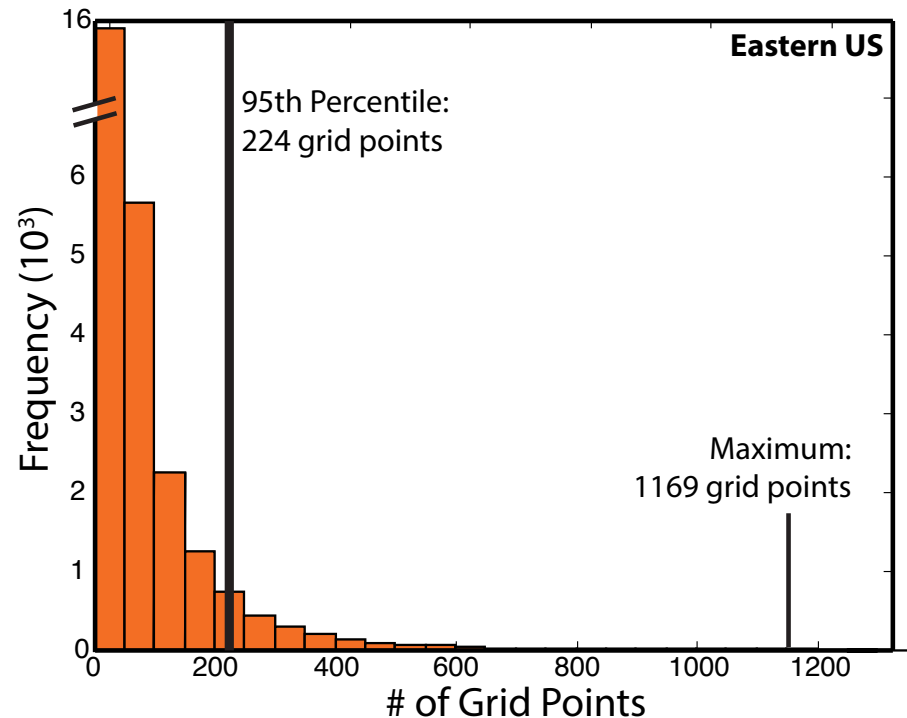


Split the CONUS into two domains for event identification

Extreme Event Identification

Extreme Warm Events:

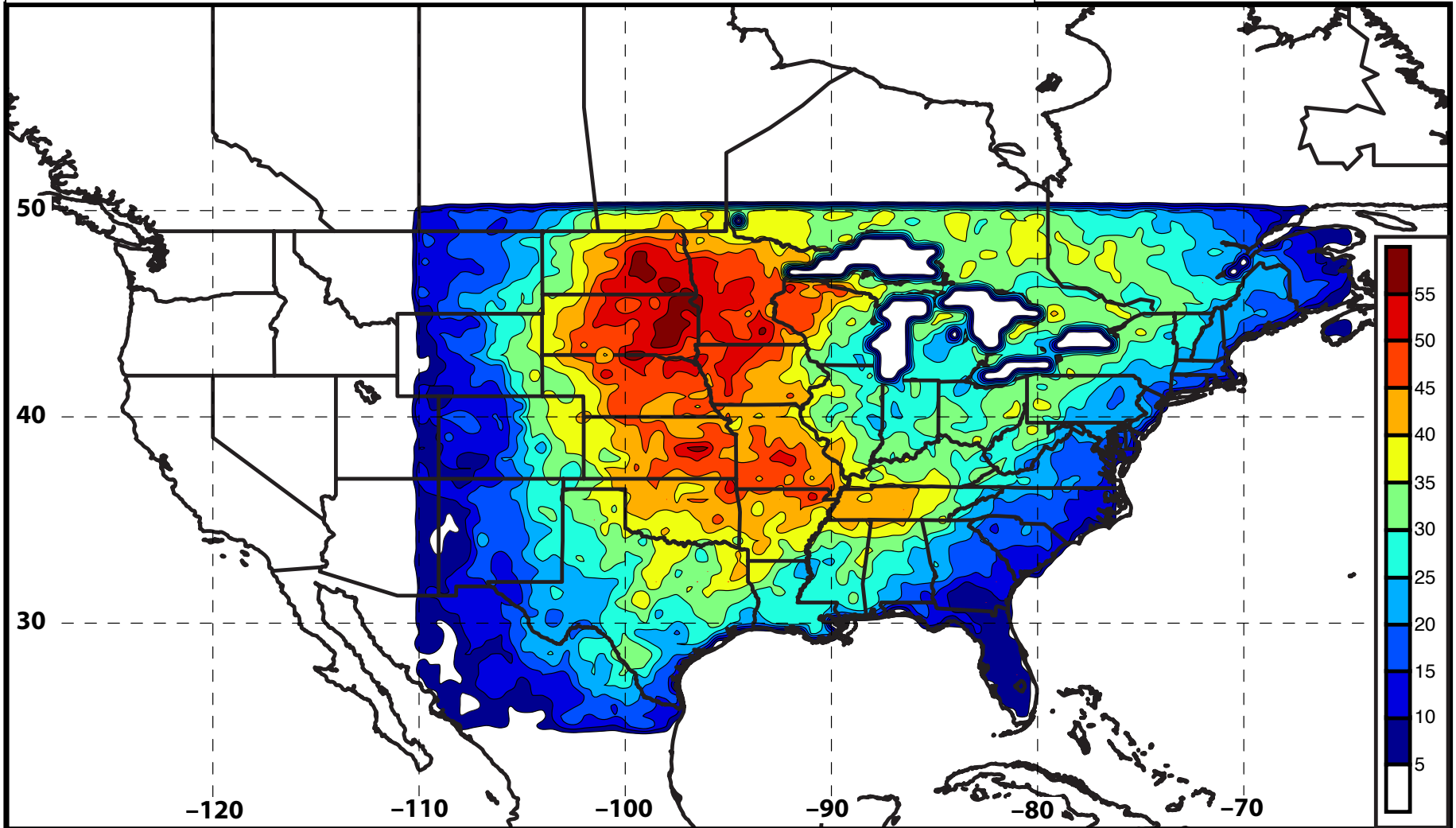
- Cataloged times during which at least one grid point was characterized by a temperature $> 99^{\text{th}}$ percentile
- Ranked times within each domain by the number of grid points $> 99^{\text{th}}$ percentile
- Identified times that rank in the **top 5%** in terms of the number of grid points $> 99^{\text{th}}$ percentile within each domain as **extreme warm events**



Frequency distribution of times exhibiting at least one grid point $> 99^{\text{th}}$ percentile

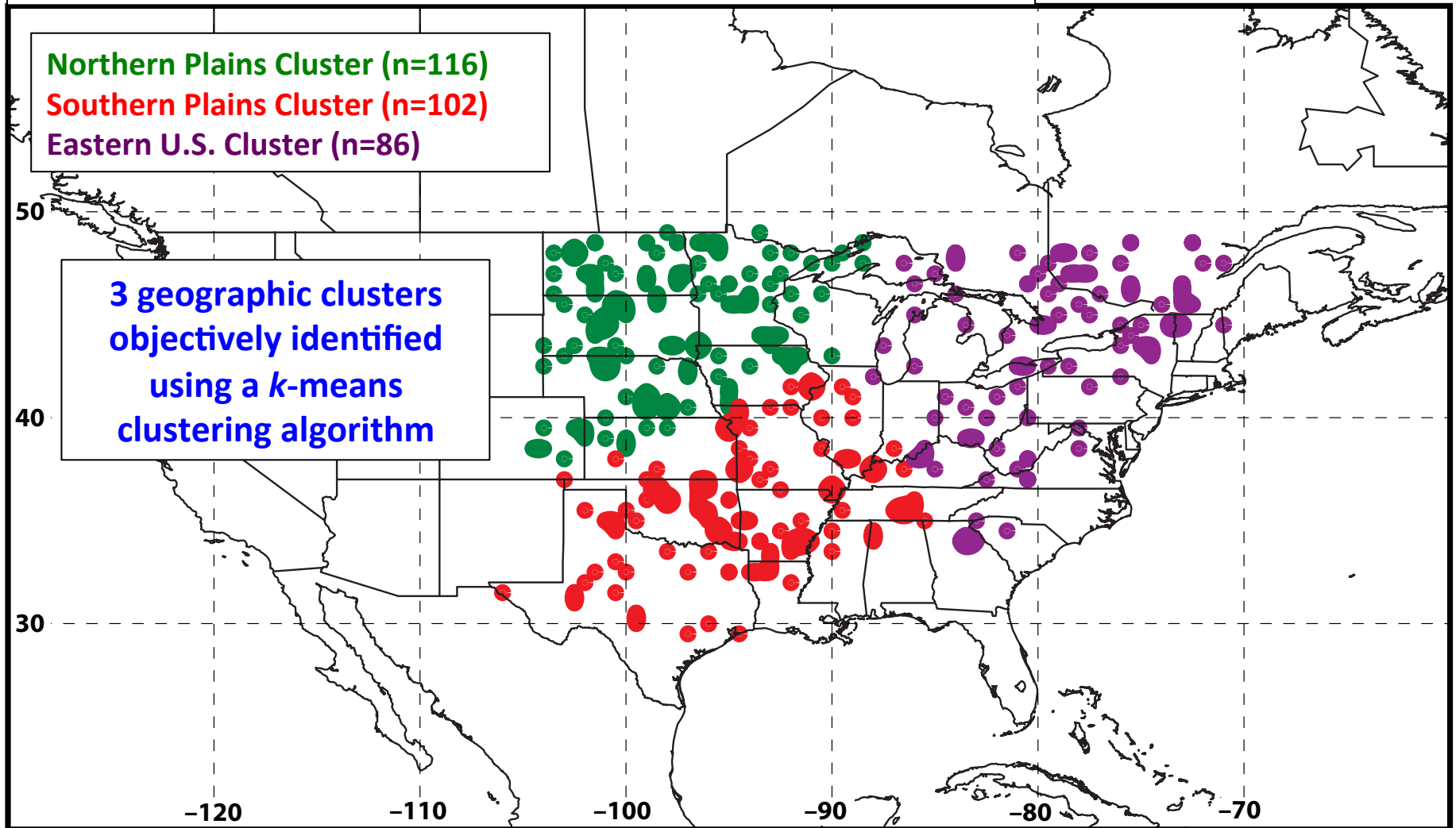
Extreme Event Identification

Extreme Warm Event Frequency: Eastern U.S. Domain (n = 304)



Extreme Event Identification

Extreme Warm Event Centroids: Eastern U.S. Domain (n = 304)



Extreme Event Identification

Extreme Precip. Events:

- Employed CPC Unified Gauge-Based Analysis of Daily Precipitation over CONUS during 1979–2014 ($0.25^\circ \times 0.25^\circ$)
- Compiled data within 21-day windows centered on each time for all 36 years
 - Each grid point has (21×36) 756 data points for a given time
- Determined the precipitation values that correspond to the 99th percentile for each grid point at a given time (only for days precipitation was observed)
- Identified times that rank in the **top 5%** in terms of the number of grid points $> 99^{\text{th}}$ percentile within each domain as **extreme precipitation events**
- Similar methodology as employed for temperature events

Extreme Event Identification

Temperature

Eastern U.S. (**1st % Cold**):

- Threshold: 221 grid points
Areal Equivalent: $\sim 7.0^\circ \times 7.0^\circ$ box
- After QC: 226 events

Eastern U.S. (**99th % Warm**):

- Threshold: 224 grid points
Areal Equivalent: $\sim 7.0^\circ \times 7.0^\circ$ box
- After QC: 304 events

Western U.S. (**1st % Cold**):

- Threshold: 125 grid points
Areal Equivalent: $\sim 5.0^\circ \times 5.0^\circ$ box
- After QC: 271 events

Western U.S. (**99th % Warm**):

- Threshold: 144 grid points
Areal Equivalent: $\sim 5.5^\circ \times 5.5^\circ$ box
- After QC: 264 events

Precipitation

Eastern U.S. (**99th %**):

- Threshold: 211 grid points
Areal Equivalent: $\sim 3.5^\circ \times 3.5^\circ$ box
- After QC: 351 events

Western U.S. (**99th %**):

- Threshold: 141 grid points
Areal Equivalent: $\sim 2.75^\circ \times 2.75^\circ$ box
- After QC: 333 events

Quality control: Events within 24-h of another event were considered to be the same event.