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MRCC
Midwestern Regional Climate Center

Rescaling gridded climate data to US Census Tracts

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Making climate data more usable in social science

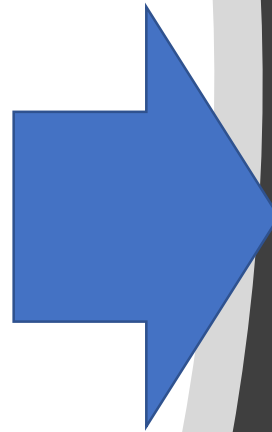
Goal is to make it easier for non-climatologists to compare climate data to demographic-based research

- Rescale nClimGrid-Daily temperature data to 2020 Census Tracts
- Maximum, minimum and average temperature
- 1951 – Present (1895-Present to come)
- Quantify expected errors associated with rescaling



nClimGrid-Daily

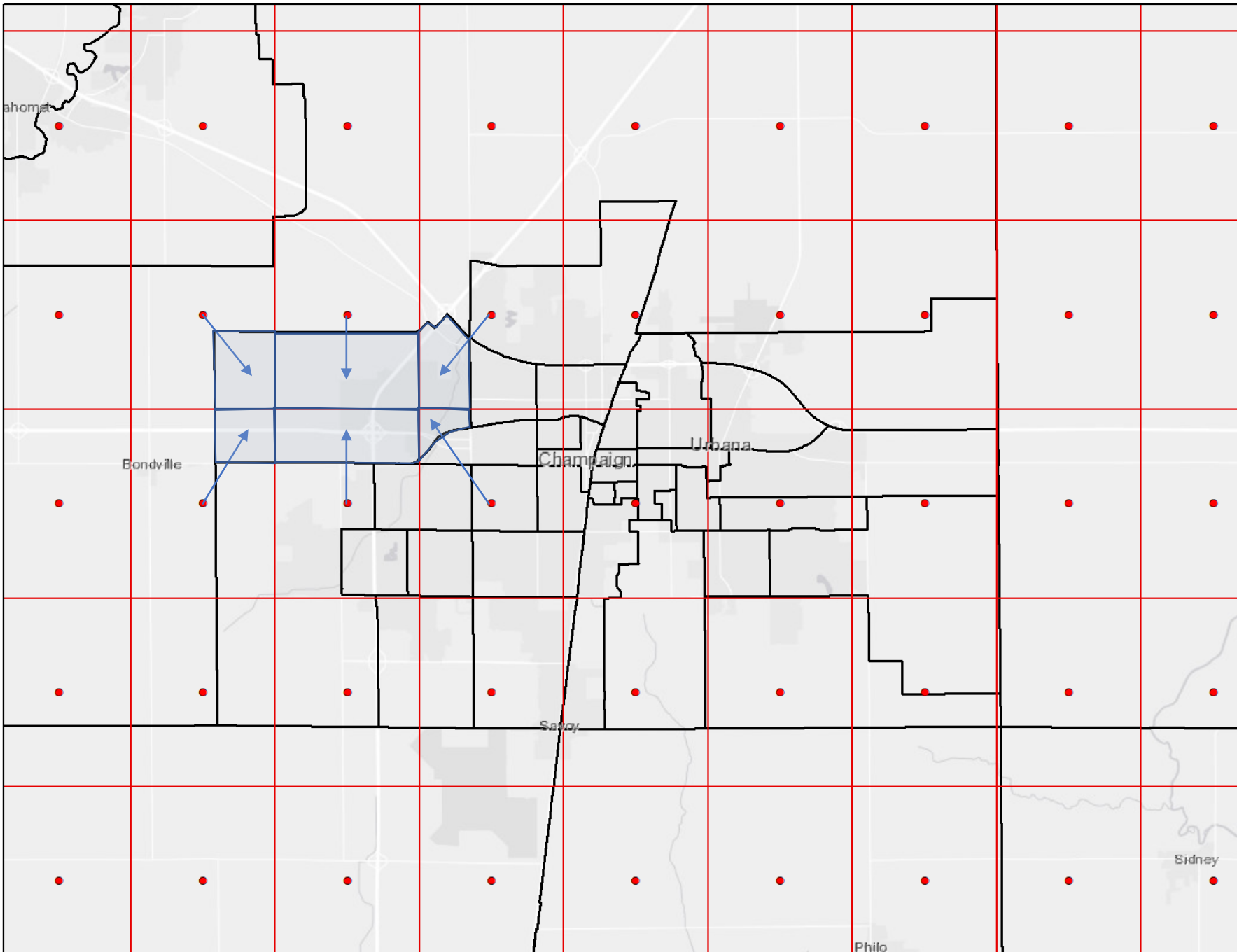
- Daily grid point values of minimum, maximum, and average temperature
- Grid extent: -125°W → -67°W
24°N → 49°N
- 1385 x 596 gridpoints (825,460)
- (1/24)° grid spacing (~5 x 5 km)
- Derived from GHCN-Daily dataset (Vose et al., 2014; Menne et al., 2009, 2014)
- 1895 (1951) - Present



Census Tracts

- 83,070 U.S. Census Tracts (CT)
- Census tracts can be larger or smaller than nClimGrid gridcell
- Census tracts may include gridpoints for which temperature data is not defined
- Intersections of census tracts and grid cells are identified using ESRI ArcGIS and output as subdomains
- Computational code creates mapping: grid → CT
- Temperatures then scaled in processing code using the contributing area of each grid cell to census tract and normalized by total contributed area (not total area of census tract)





Champaign/Urbana and Vicinity

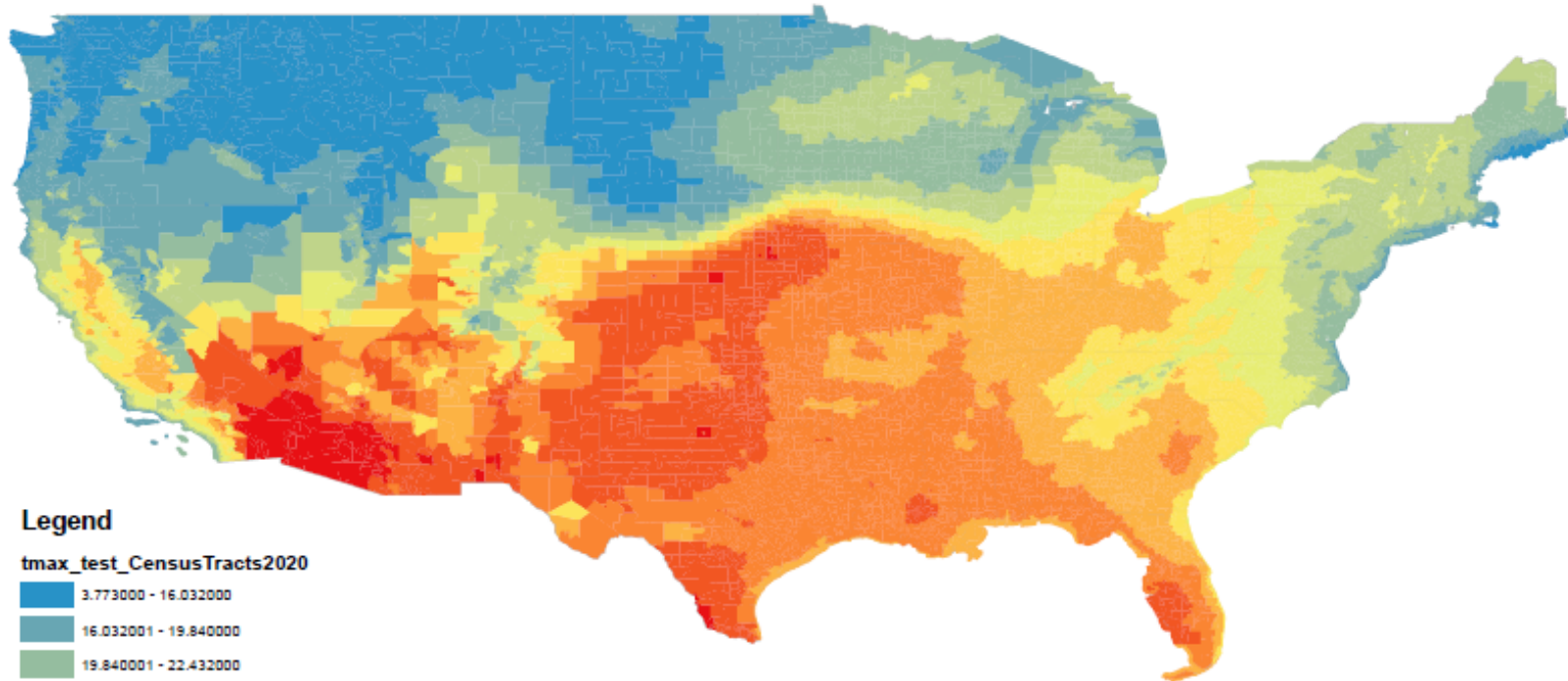
Census tract boundaries (black)
Grid cell boundaries (red)

Areal averaging methodology:

- Each grid point value contributes to census tract value according to normalized area: $(\text{contributed area})/(\text{sum of contributed areas})$.

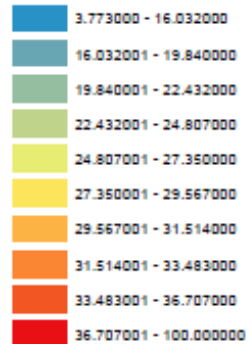
1 June 2000 maximum temperature (°C) Rescaled to Contiguous-US Census Tracts

2020 census tracts



Legend

tmax_test_CensusTracts2020



- Error analysis underway
- Remaps census tract estimates back to nClimGrid parent grid and compare to input grid
- Quantify both spatial and temporal (e.g. seasonal) variation in expected error as well as bias
- Dataset complete by early May

Thank You!

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