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)
Areal averaging methodology:
- Each grid point value contributes to census tract value according to normalized area: \(\frac{\text{contributed area}}{\text{sum of contributed areas}}\).
1 June 2000 maximum temperature (°C) Rescaled to Contiguous-US Census Tracts

- 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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