Update and Discussion
IDF Curve Development for the Chesapeake Watershed

Art DeGaetano, Cornell University
Tania Lopez Cantu and Costa Samaras, Carnegie Mellon University
Michelle Miro, Rand Corp.
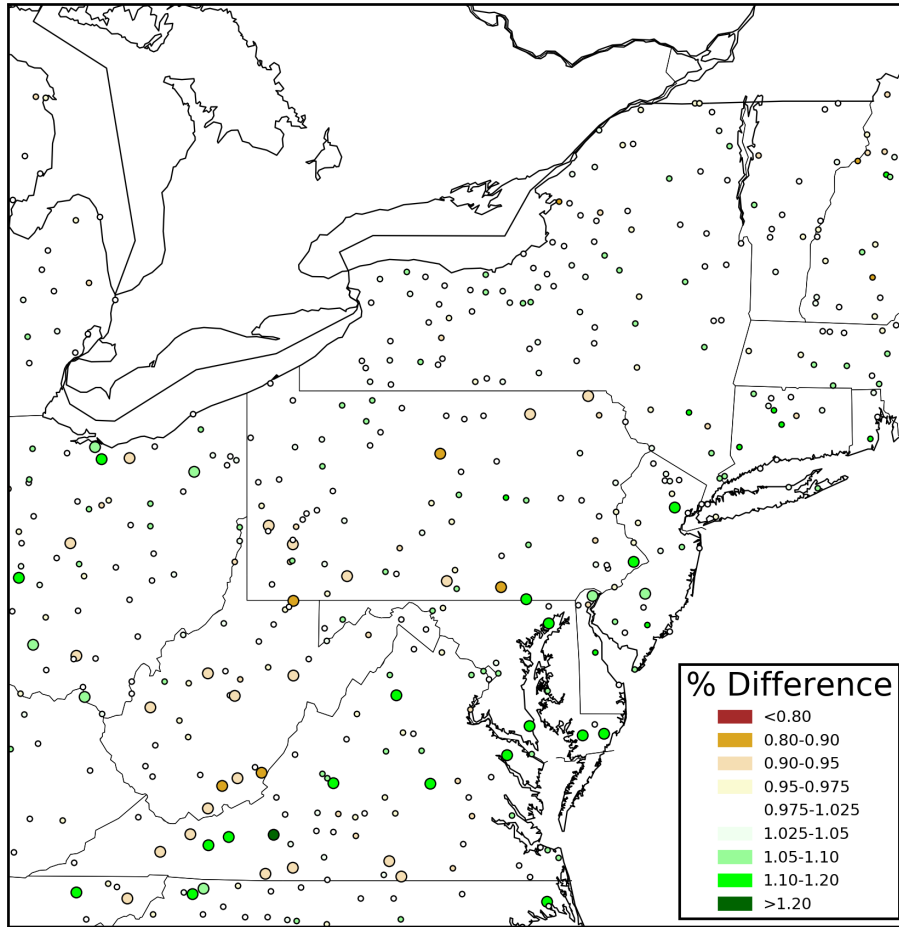
Cornell University
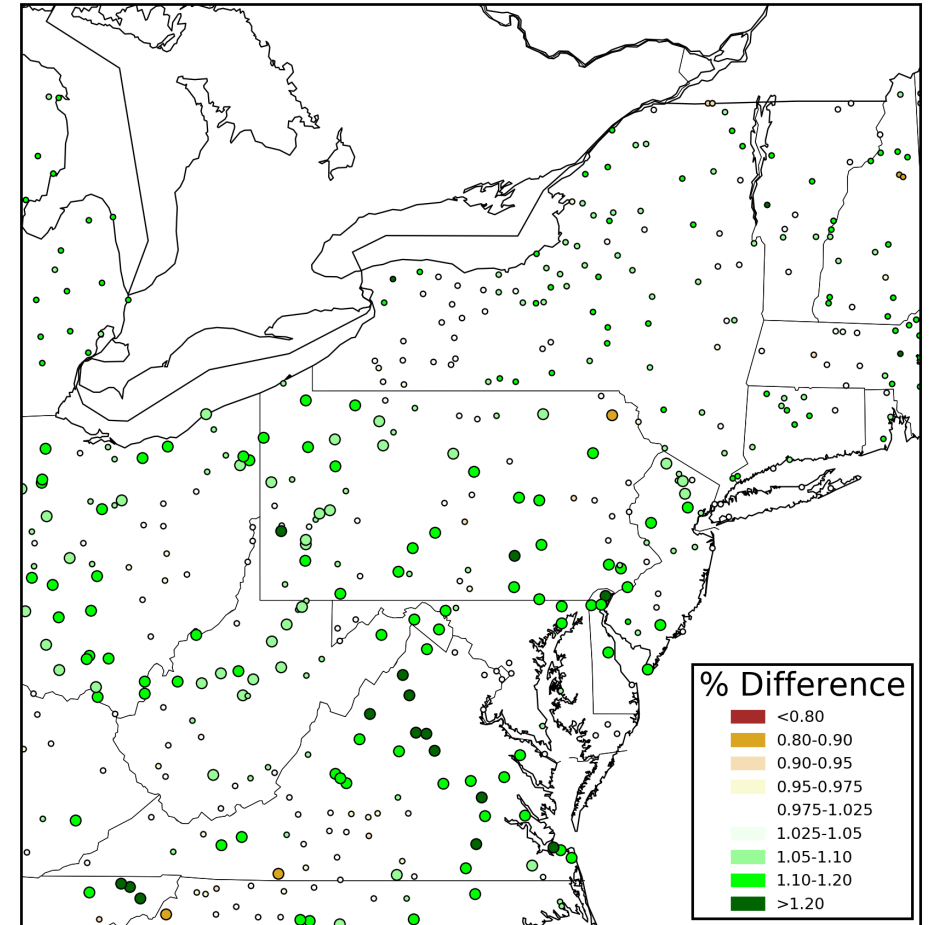
Northeast Regional Climate Center

Research Tasks

1) Evaluate downscaling methods and climate model combinations to assess their ability to replicate historical precipitation extremes;

2) Downscale projected precipitation extremes for future time periods;

3) Quantify methodological and climate model uncertainties;

4) Develop probabilistic intensity duration frequency (IDF) curves;

5) Develop and host a web-based tool and engage in outreach
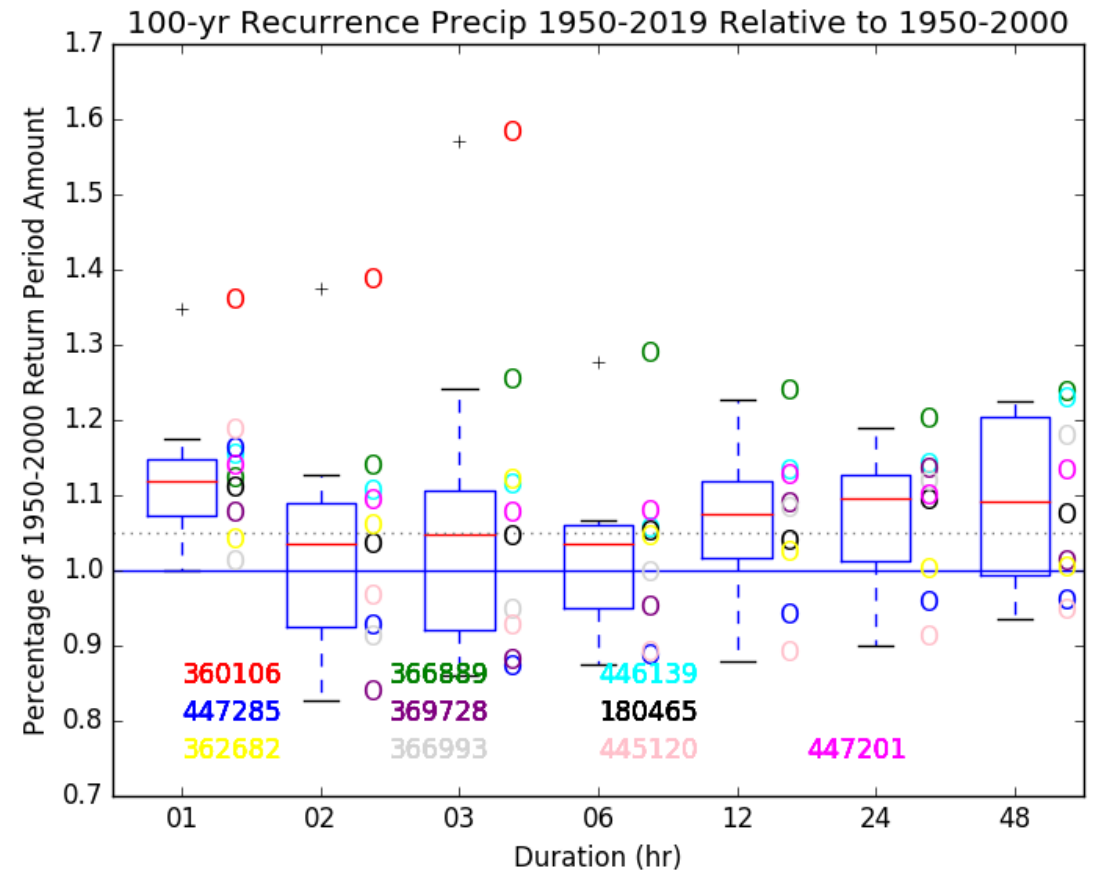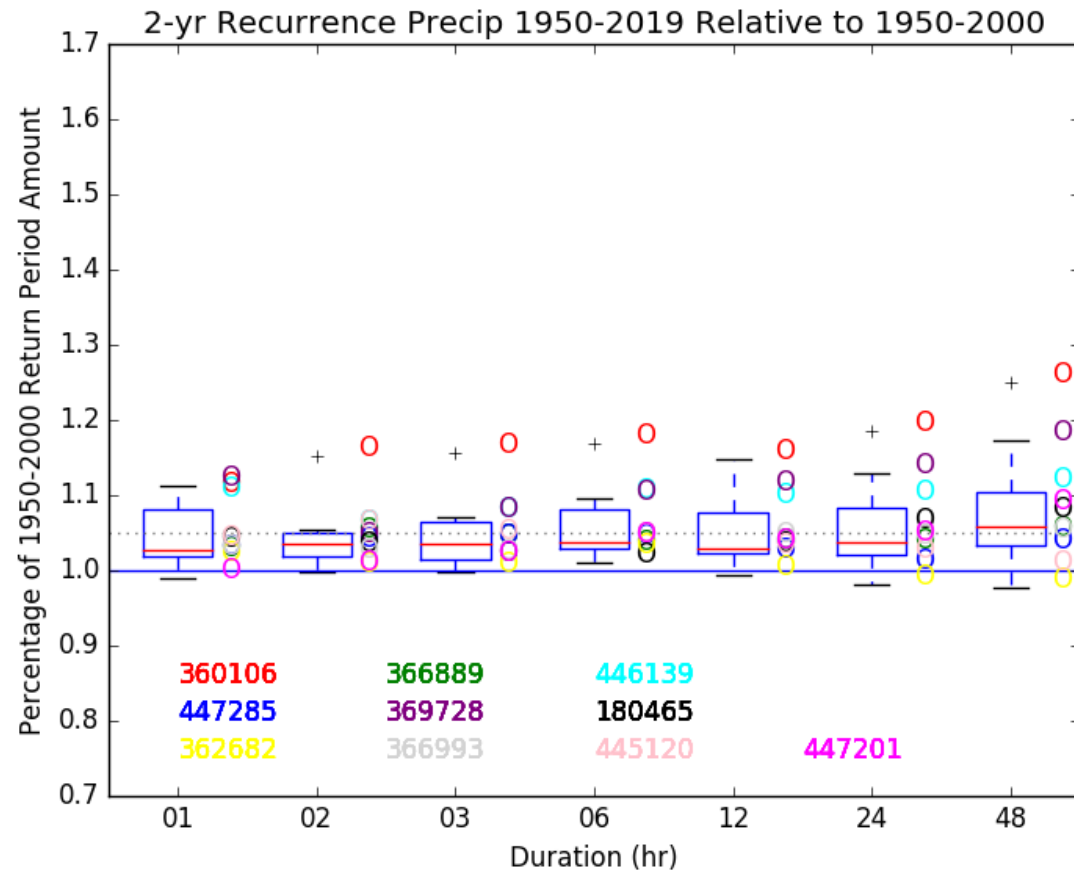
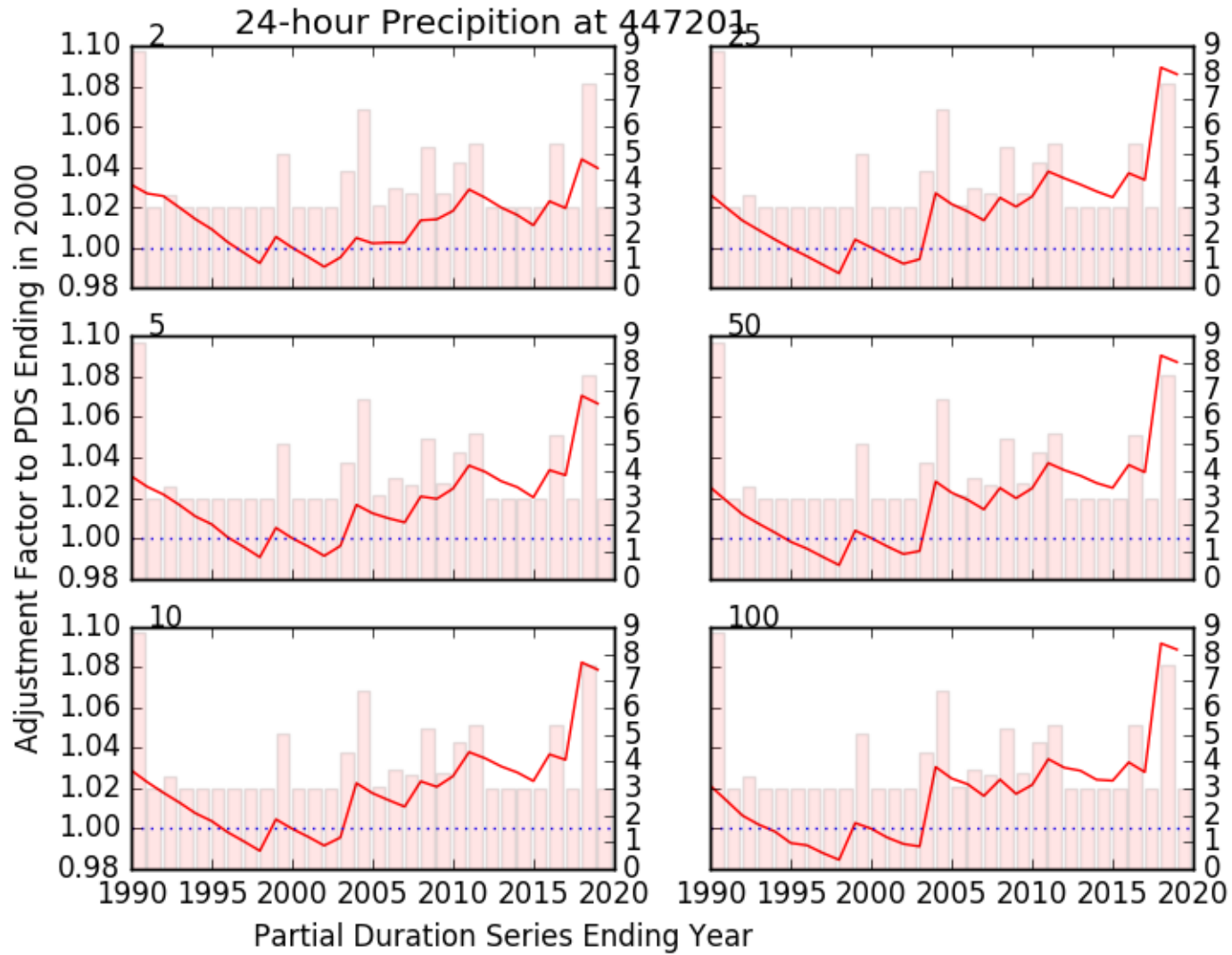# Simulation of NOAA Methodology

2-year ARI

100-year ARI

1950-2019 vs. Atlas 14 Period (1950-2000)
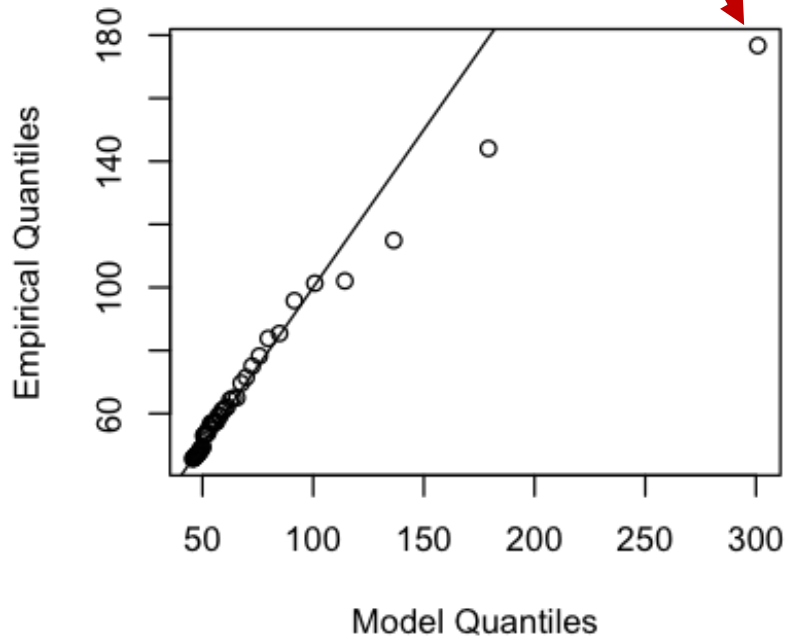

2-yr Recurrence Precip 1950-2019 Relative to 1950-2000

100-yr Recurrence Precip 1950-2019 Relative to 1950-2000
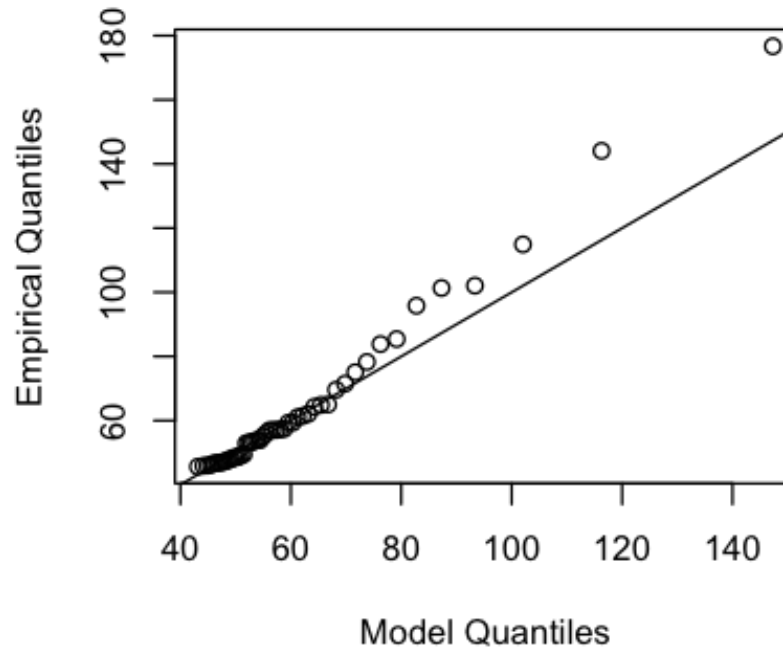
Event Drivers at Richmond

24-hour Precipition at 447201

Diagnostic plots when fitting 50 years of data with **different methods**
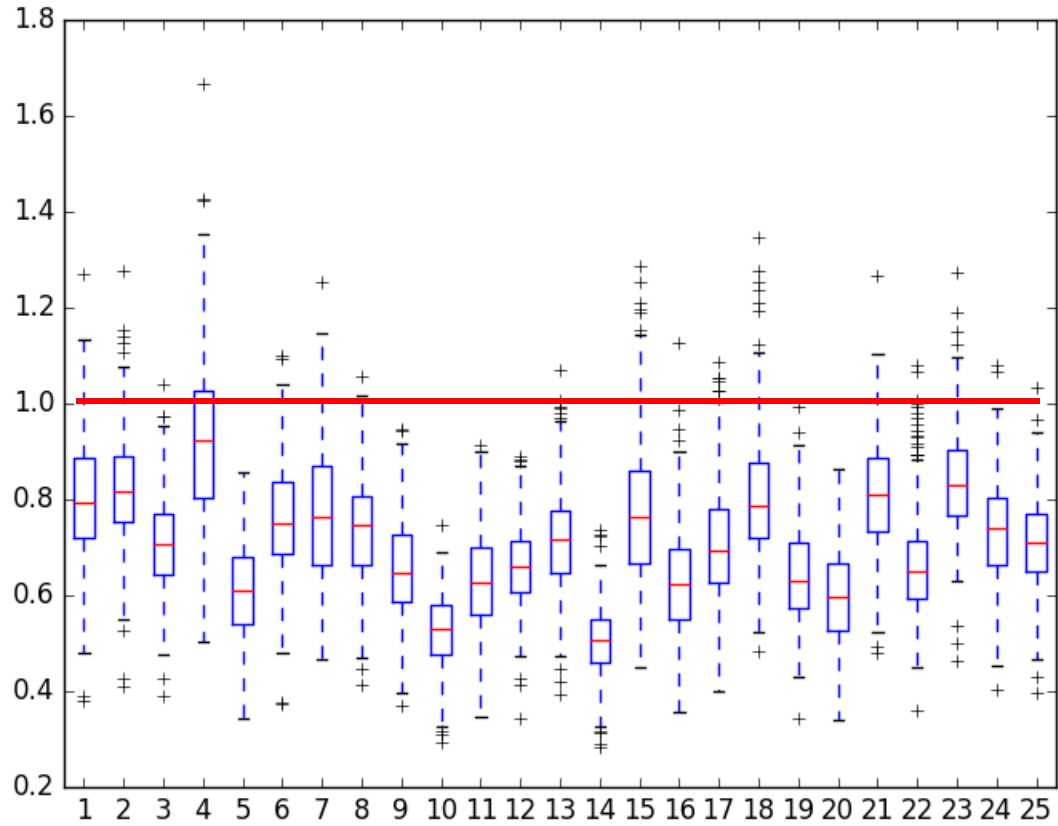
Large UNDERESTIMATE of ARI

Small OVERestimate of ARI

Maximum Likelihood

L-Moments

GMLE

Dataset: LOCA
Model: ACCESS 1-0
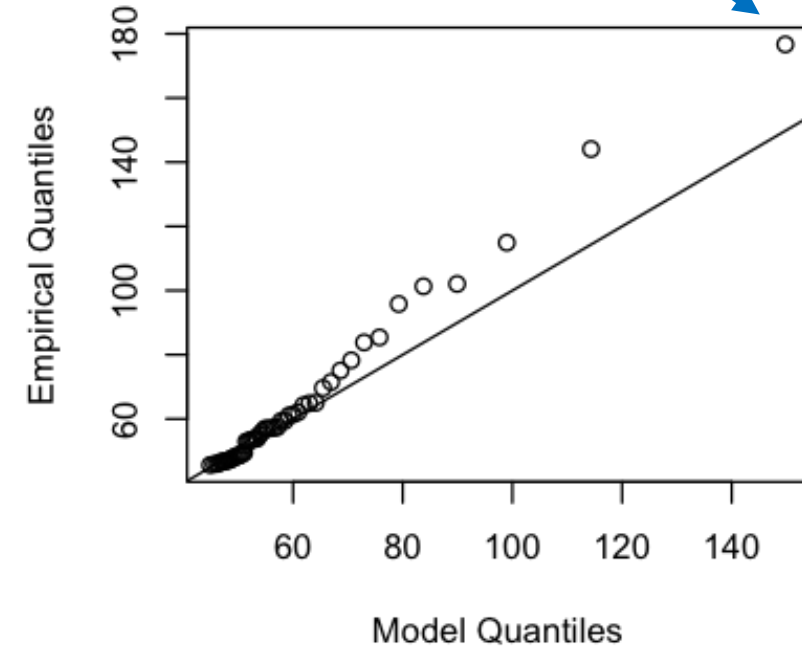
Same as MLE, but uses a prior distribution to constrain the shape parameter to a physically possible range, between 0.5 and -0.5
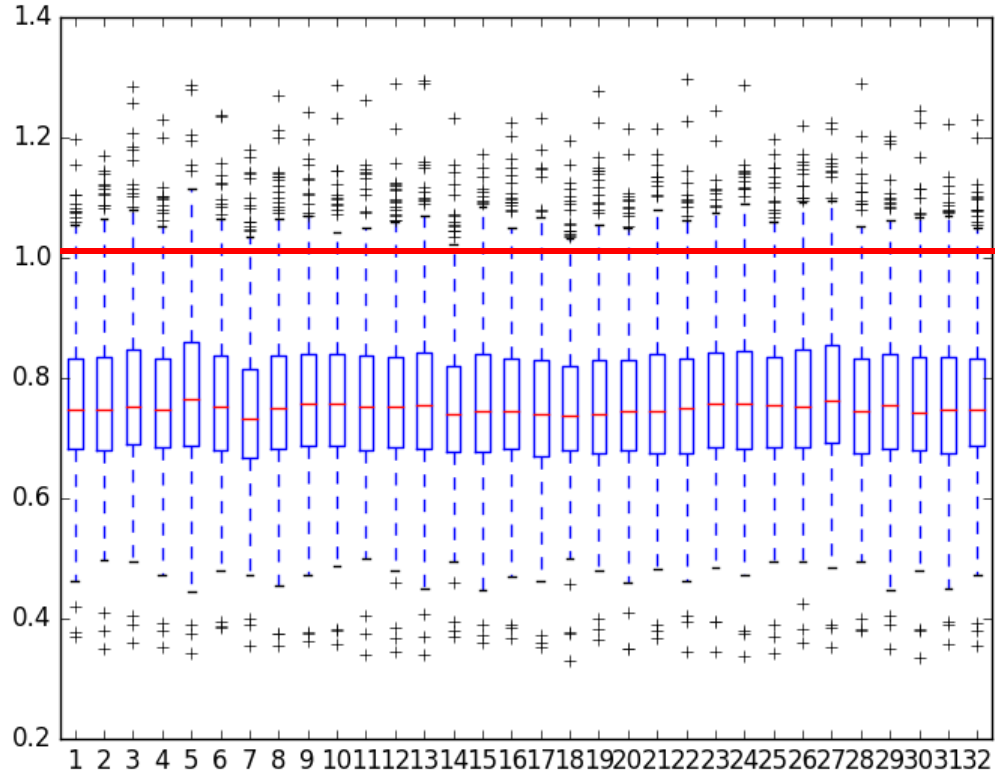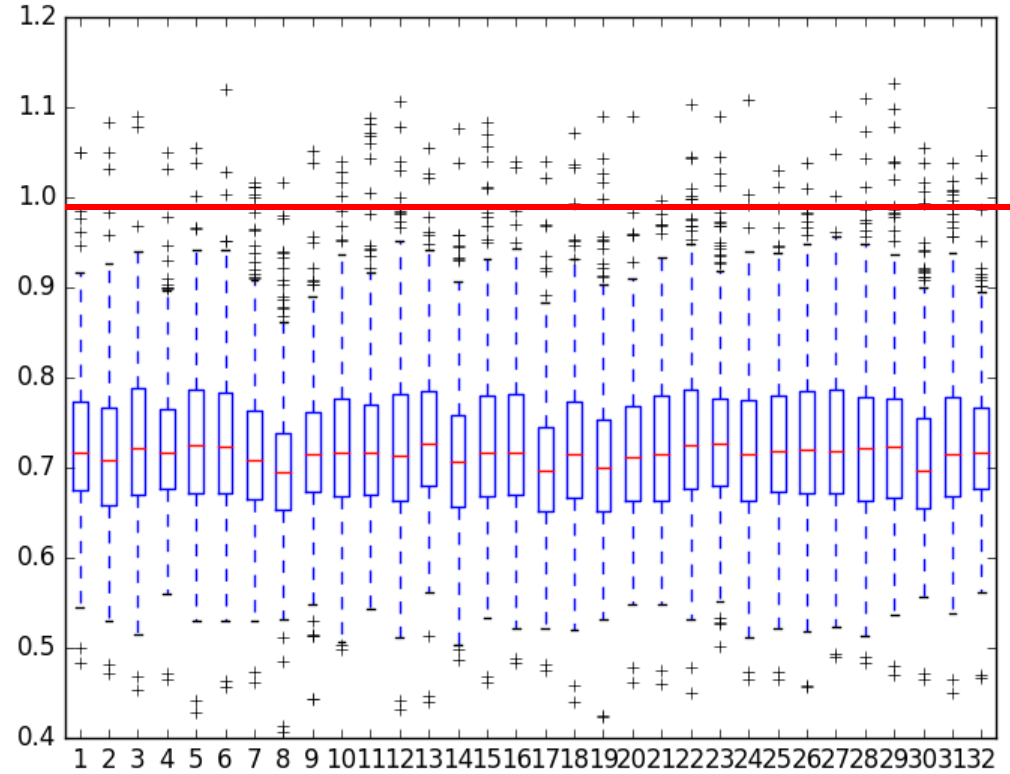
Cornell University

BIAS

2-year bias CMIP5 1-day

100-year bias CMIP5 1-day
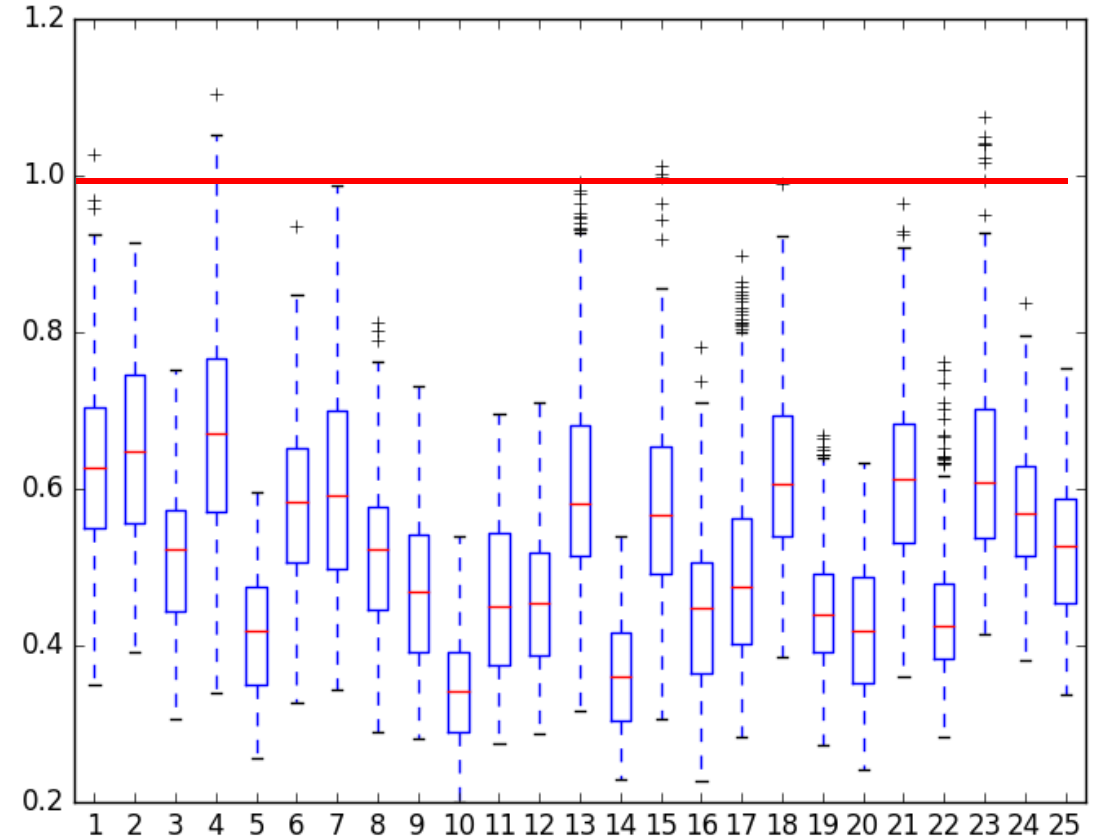
BIAS

2-year bias LOCA 1-day

100-year bias LOCA 1-day

2050-2099 Adjustment to Current Storm

2-year

2050-2099 Adjustment to Current Storm
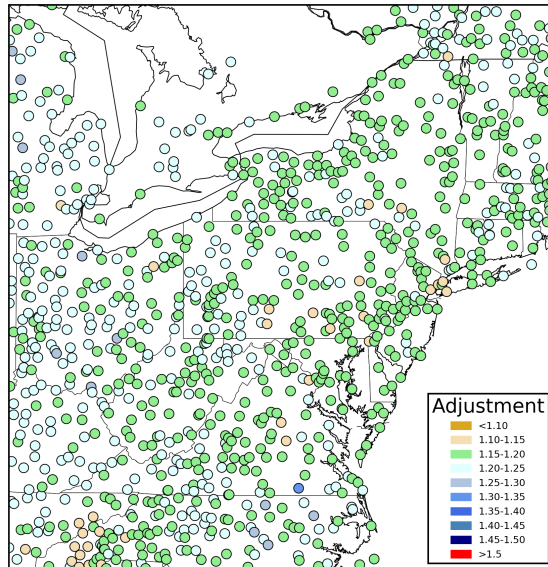
100-year
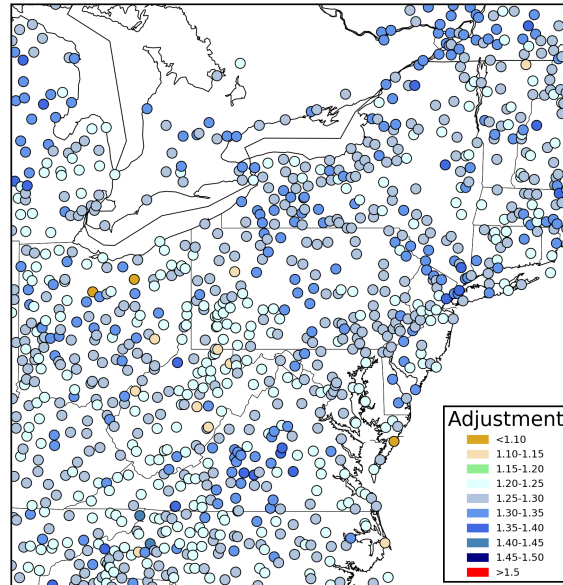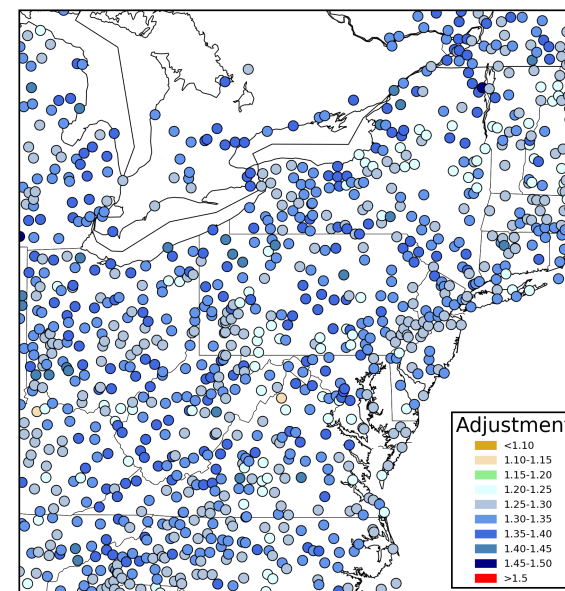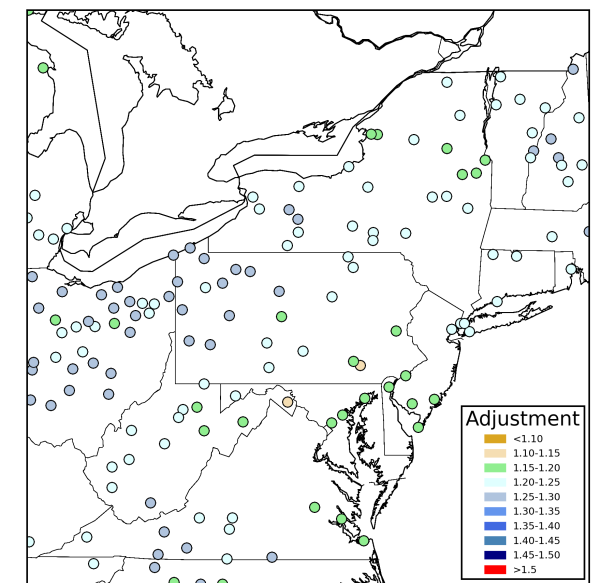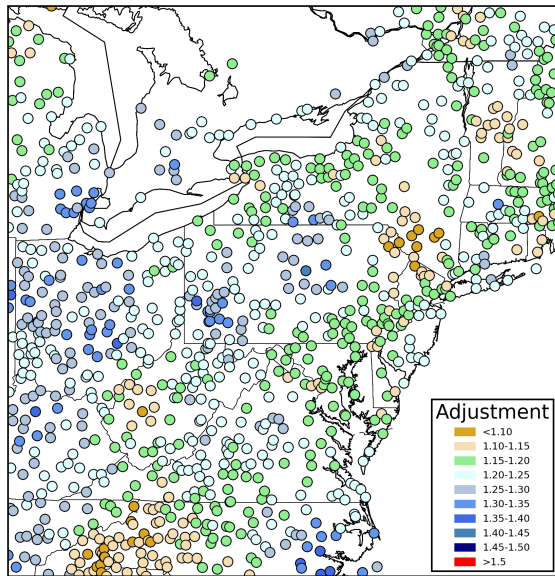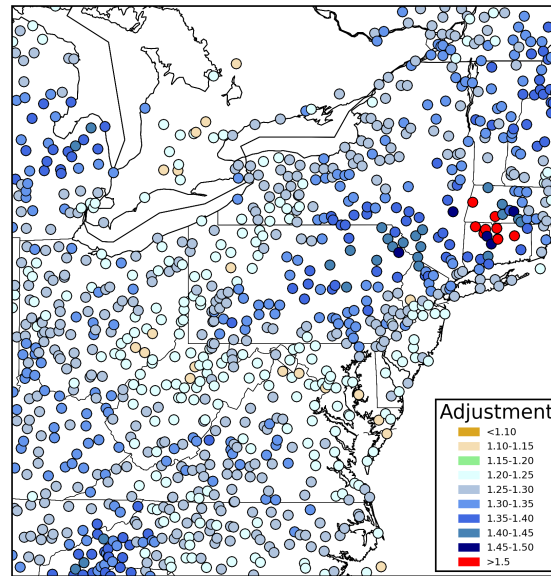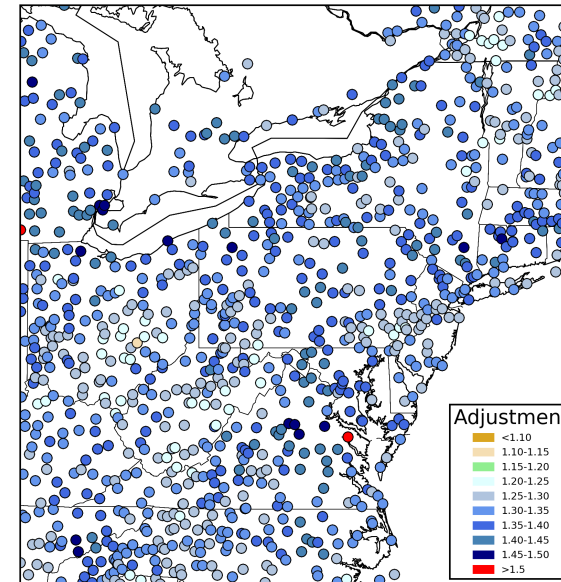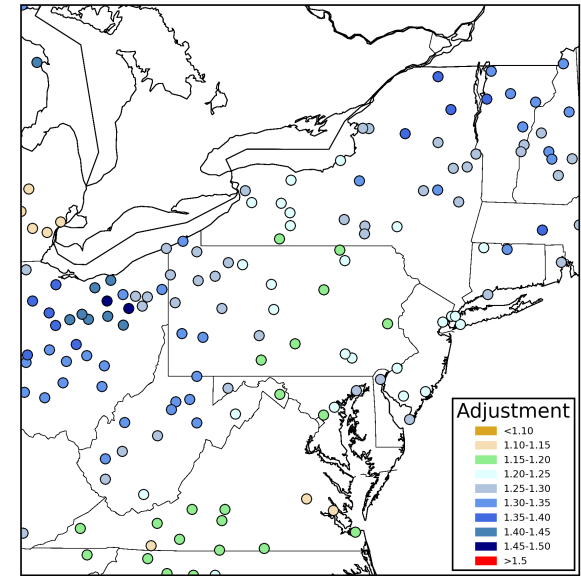

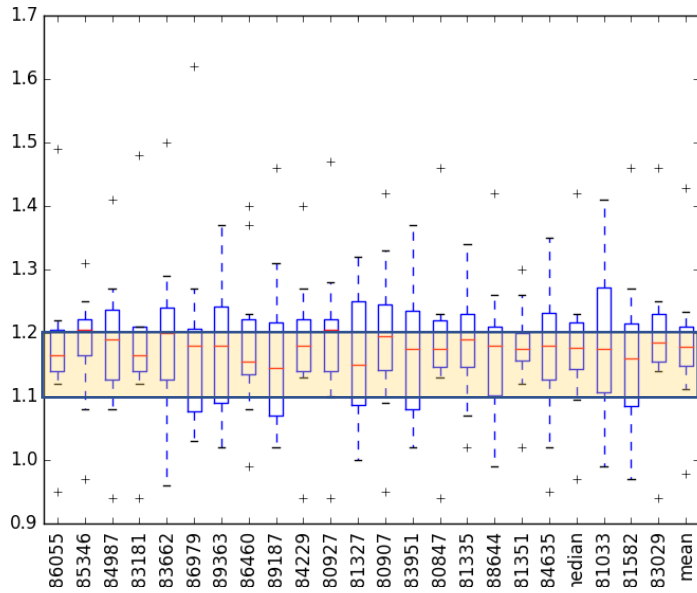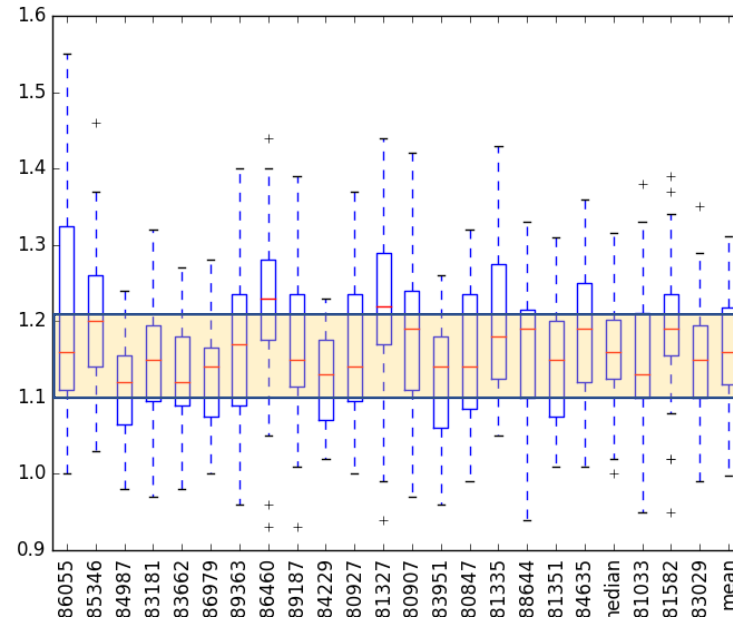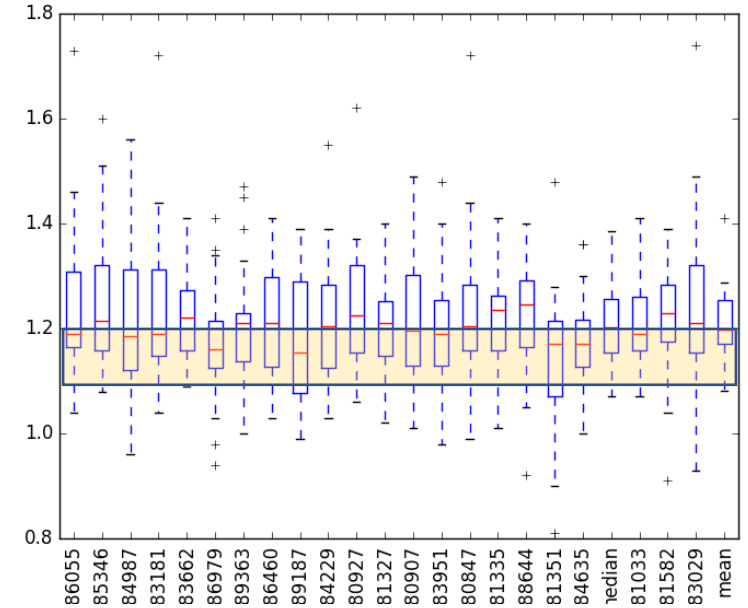CORDEX　　　　LOCA　　　　CMIP5　　　　CMIP6

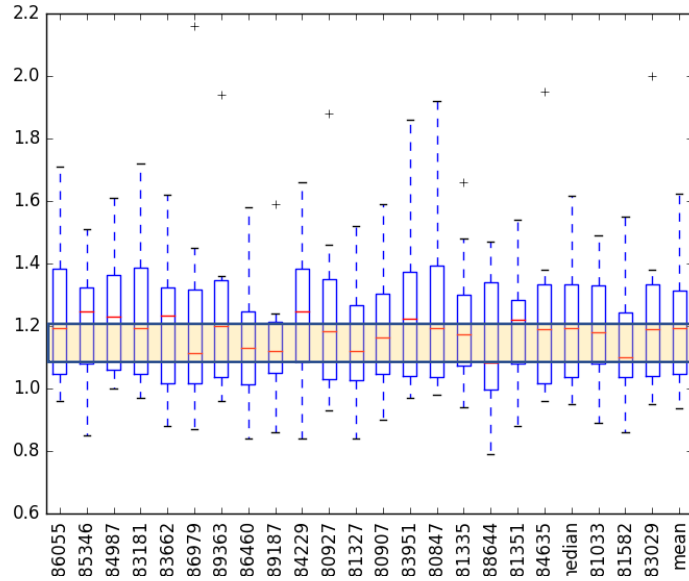# 2050-2099 Adjustment Select Stations

2-year

CORDEX

LOCA

CMIP5
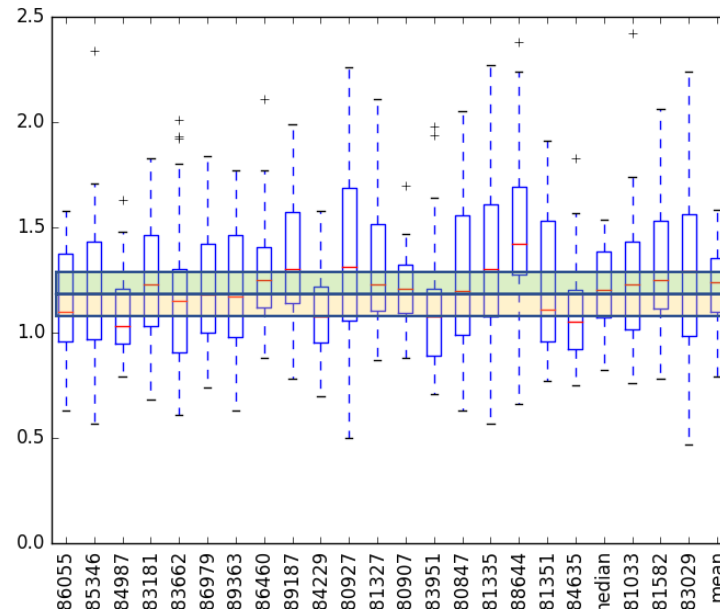
2050-2099 Adjustment Select Stations
100-year
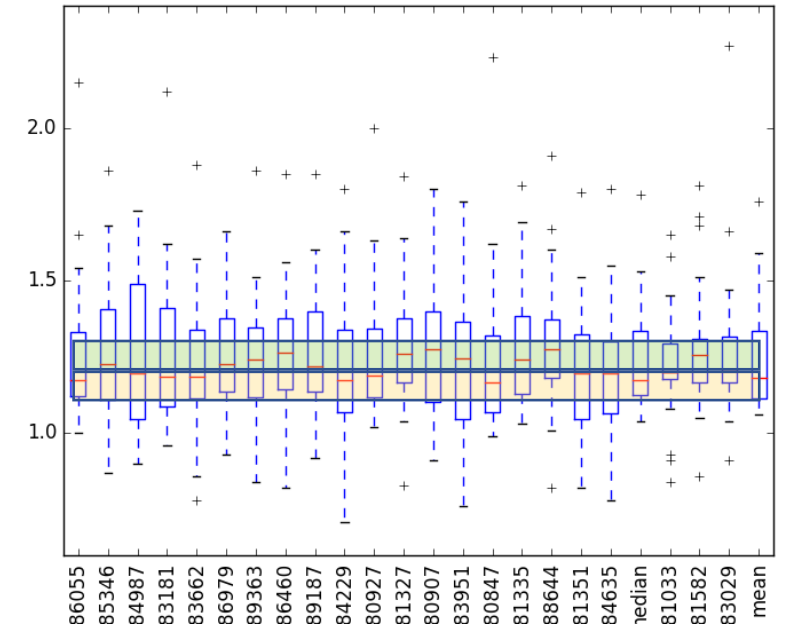
CORDEX
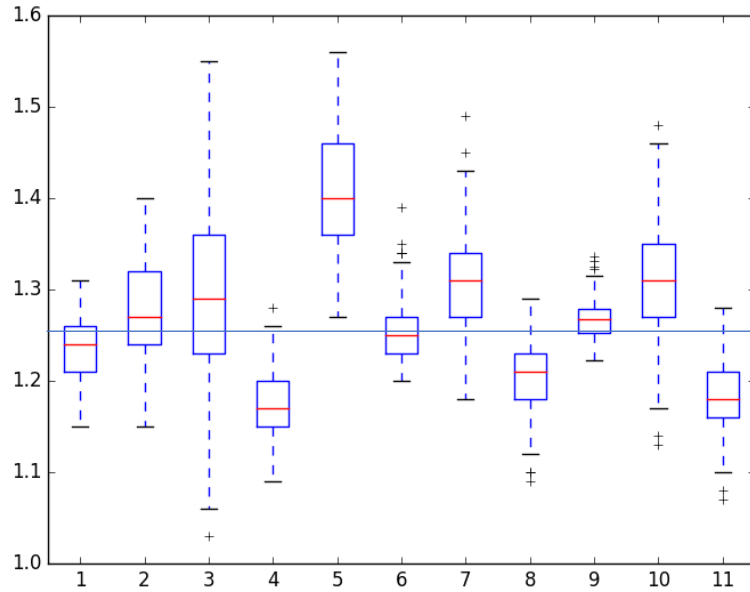
LOCA

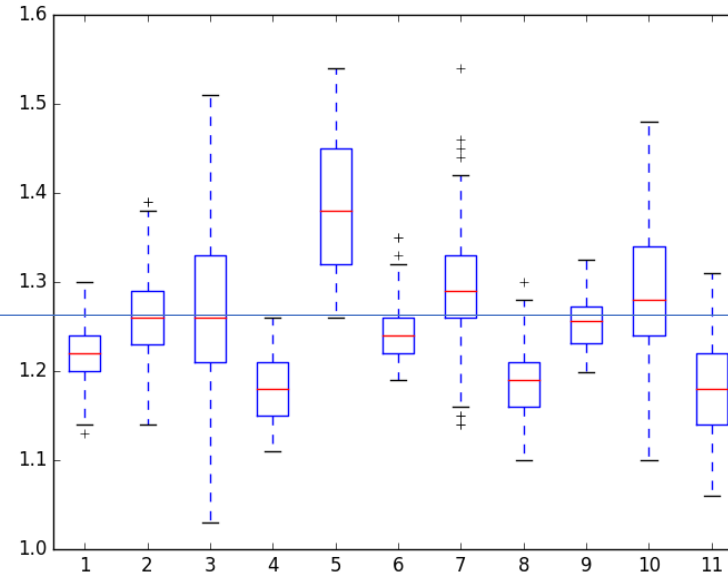### CMIP5

Cornell University

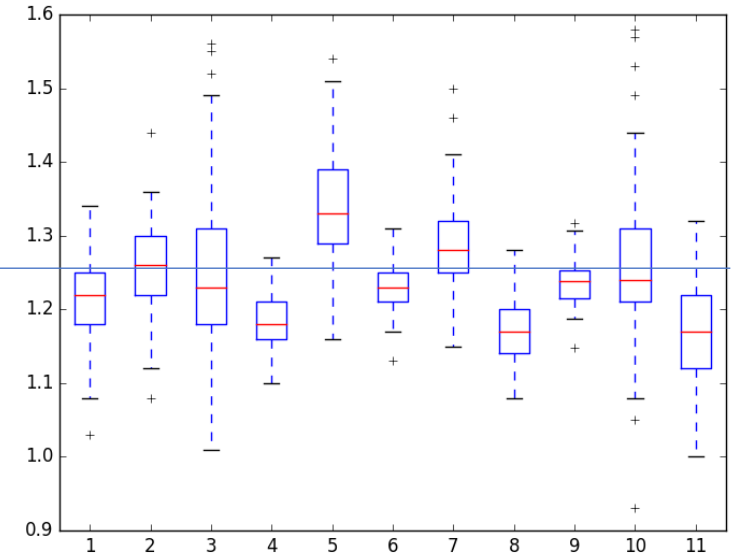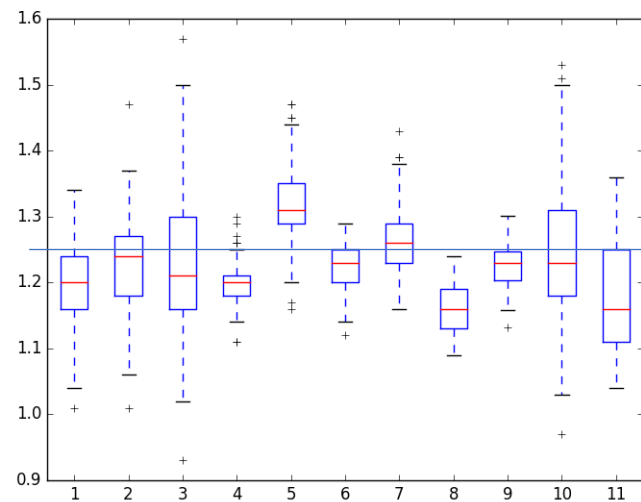Northeast Regional Climate Center

Hourly CMIP6 2-year
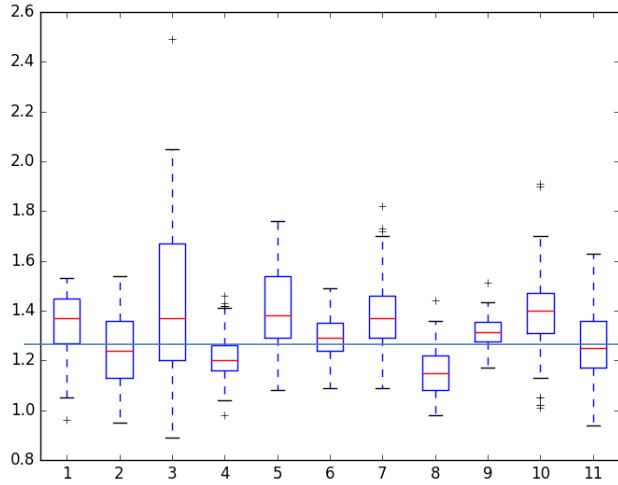

2050-2099 3hr

2050-2099 6hr
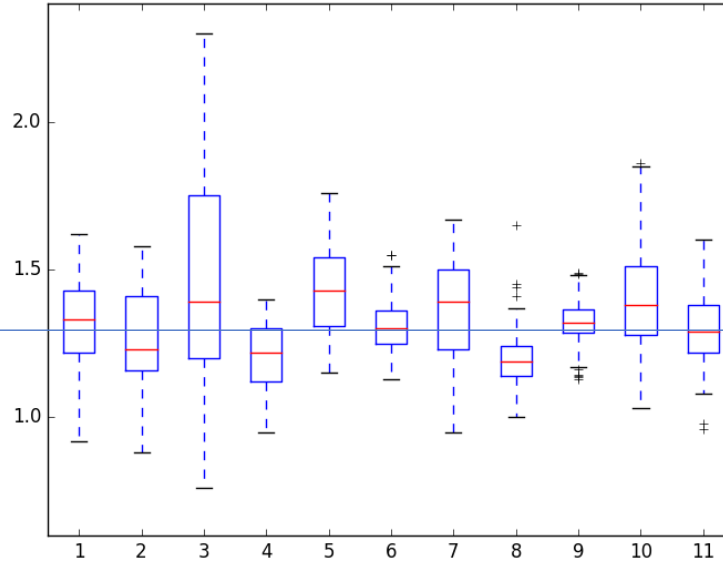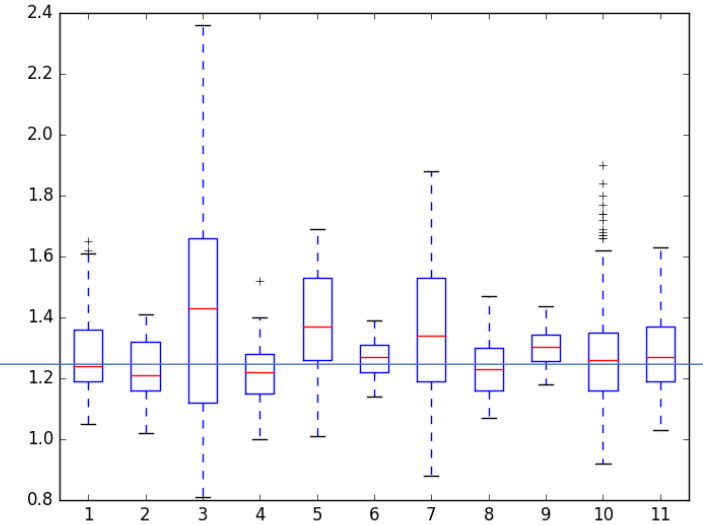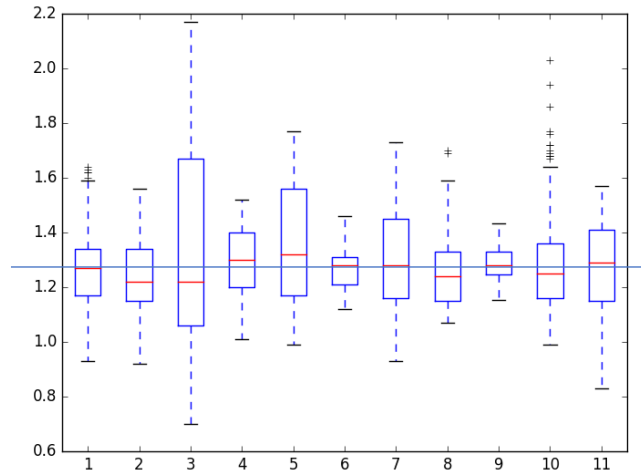
2050-2099 12 hr

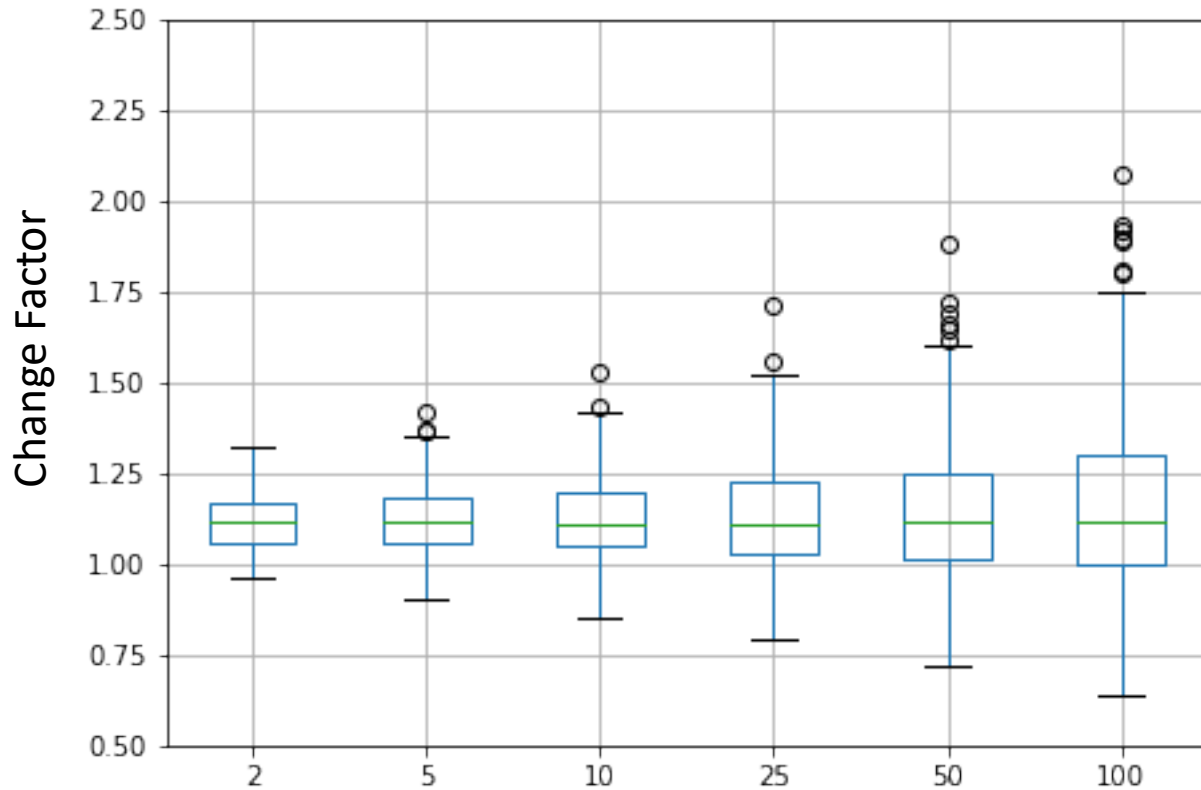2050-2099 24 hr

Hourly CMIP6 100-year

2050-2099 3hr

2050-2099 6hr

2050-2099 12 hr

2050-2099 24 hr

Hourly CORDEX 100-year

GFDL-ESM2M.WRF
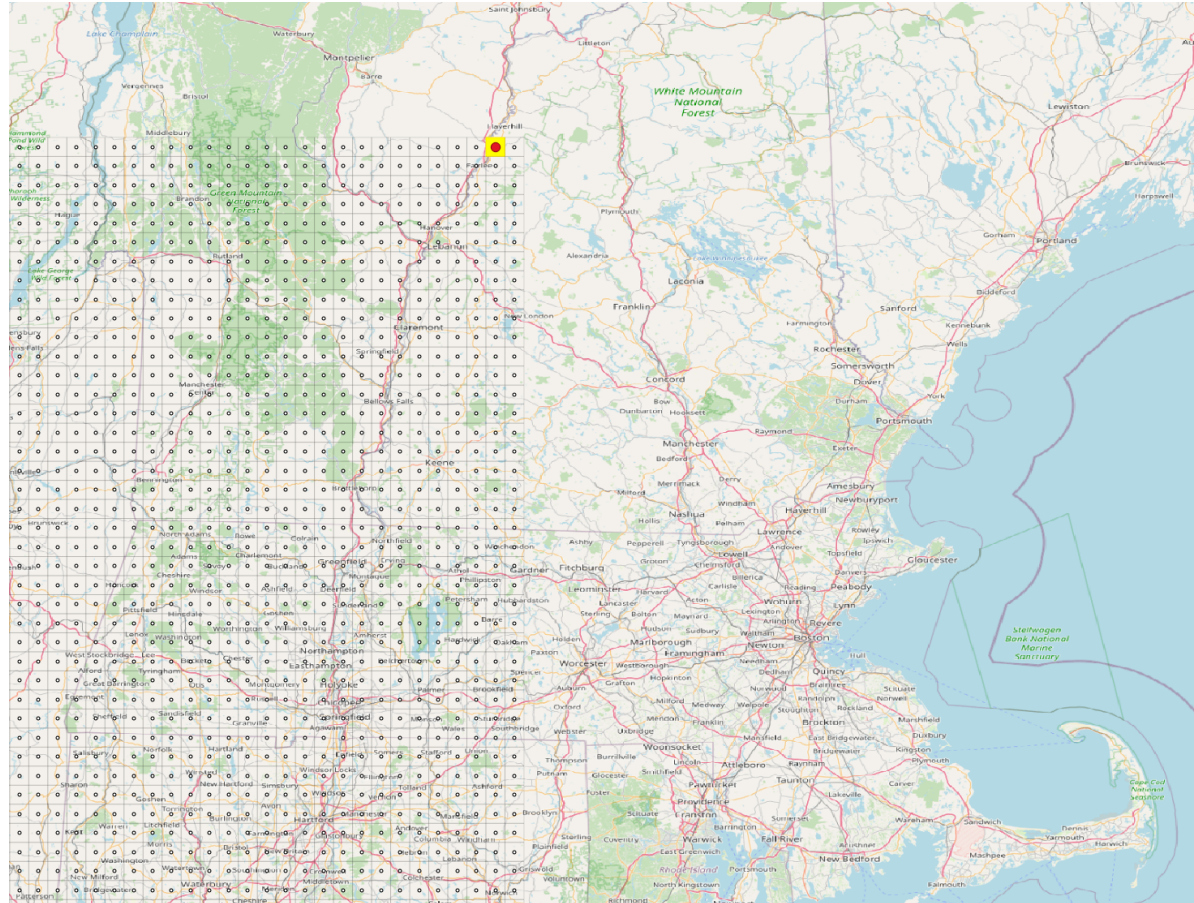
| RCP 8.5 (2020-2070) | RCP 8.5 (2050-2100) |

Grid Resolution

Dataset: LOCA

LOCA RCP 8.5 2050-2100 Full Domain
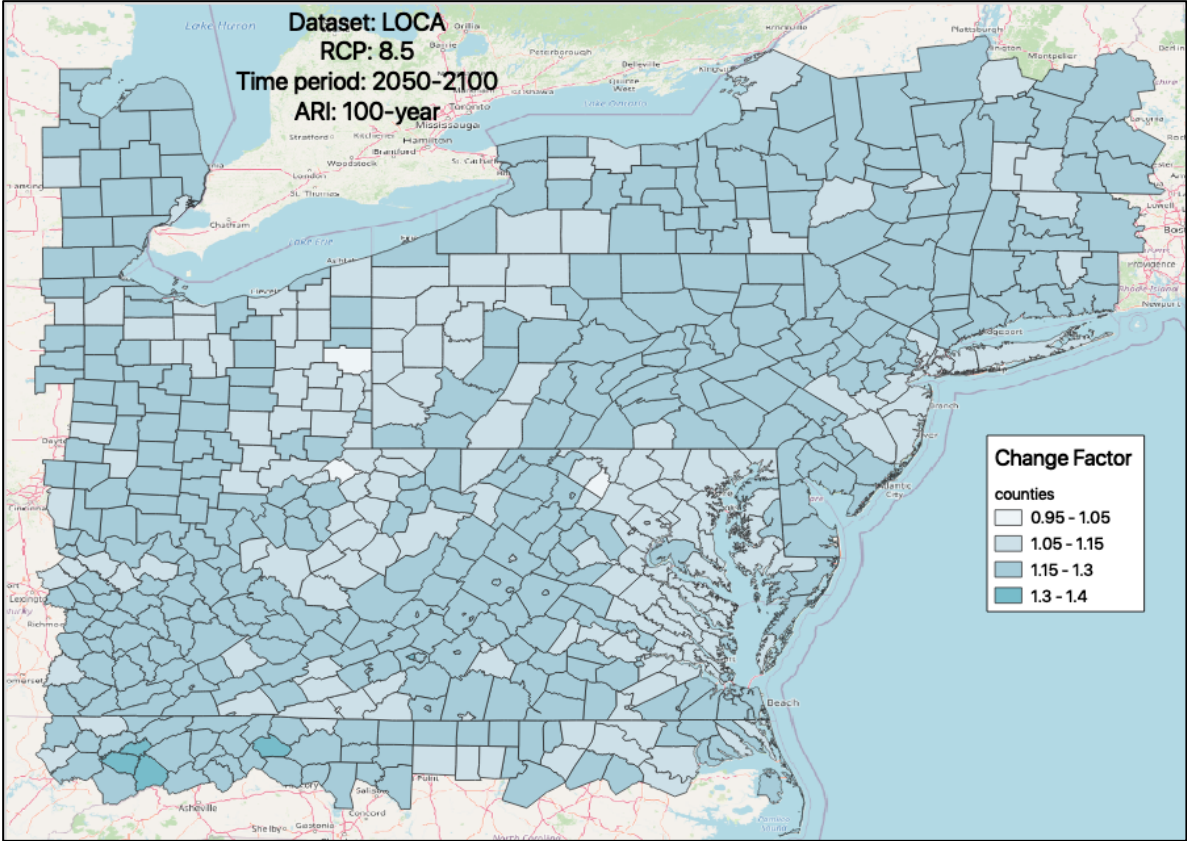
Website Vision

Website Vision

Dataset: LOCA
RCP: 8.5
Time period: 2050-2100
ARI: 100-year

Change Factor

counties
0.95 - 1.05
1.05 - 1.15
1.15 - 1.3
1.3 - 1.4

Harrisburg, PA

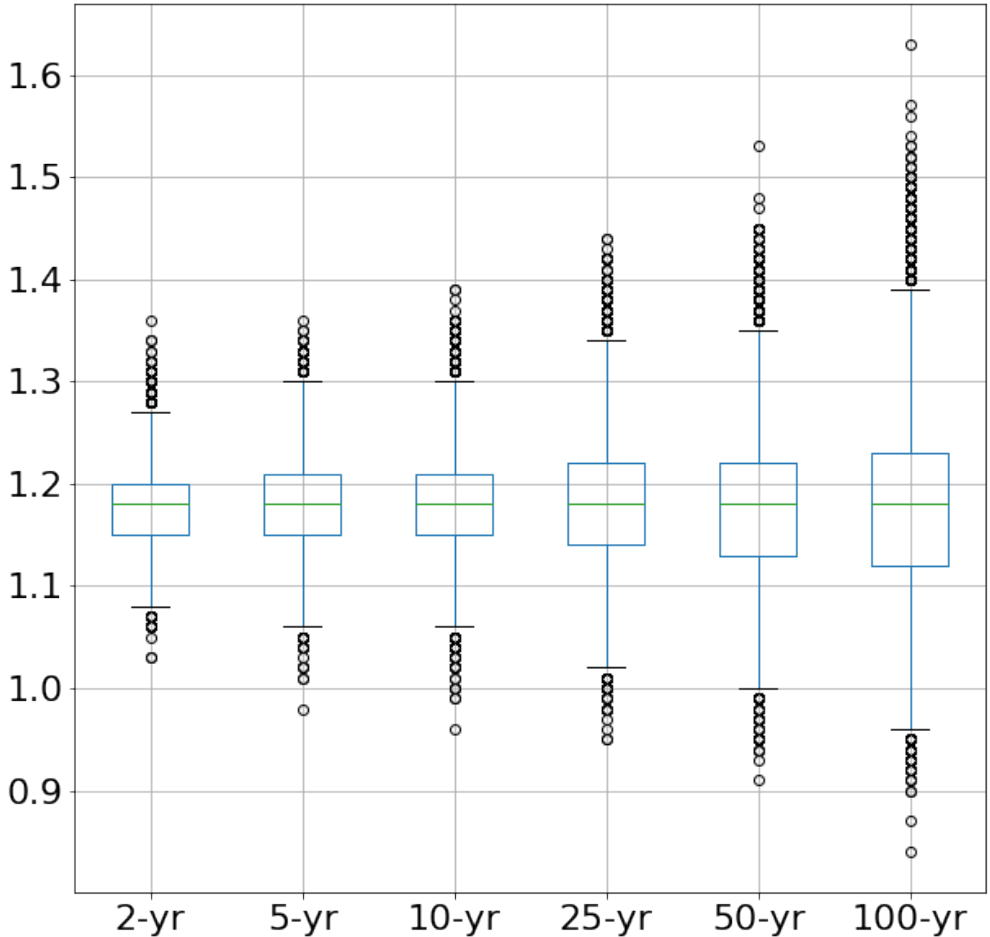Precipitation Depth (inches)

Atlas 14

Average Recurrence Interval (years)

Cornell University
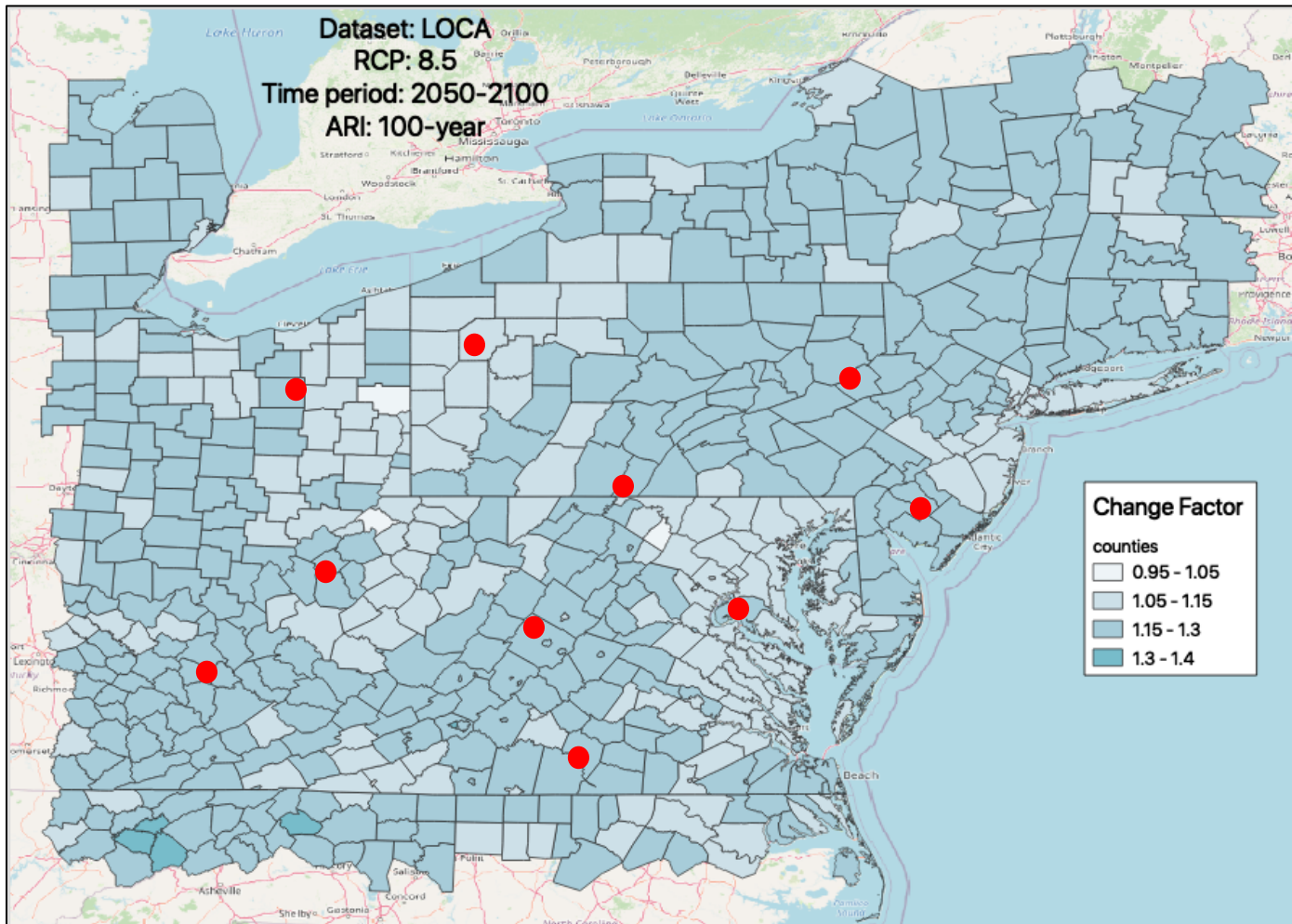
Northeast Regional
Climate Center