

Idaho downscaling of simulated climate records and dissemination using GIS

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Outline

- Available datasets
- Validation
- Data Access
- ArcGIS 10 climate tools
- Future work

Available Downscaled Datasets from the University of Idaho

- Construct Analog
 - Downscaled daily
 - Tmax, Tmin, Prcp, 10m winds, RHmax, RHmin
 - Late 20th century (1971-2000)
 - Mid 21st century (2046-2065); A1B
 - Late 21st century (2081-2100); A1B
 - Spatial resolution: 8km
 - 13 Global Circulation Models
 - Available for the western United States

Available Downscaled Datasets from the University of Idaho

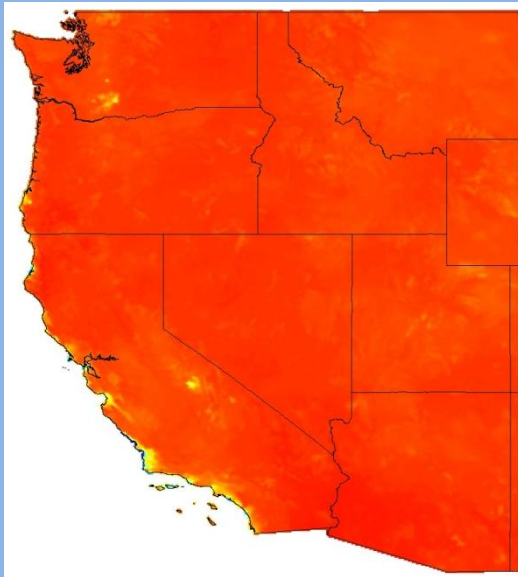
- Modified Bias Corrected Statistical Downscaling
 - Downscaled monthly
 - 20th and 21st century
 - Tmax, Tmin, Prcp
 - Spatial resolution: 4km
 - 21 models, 1-3 scenarios
 - Available for the Western United States
 - Downscaling based on z-scores rather than CDFs

Validation of Downscaled Products

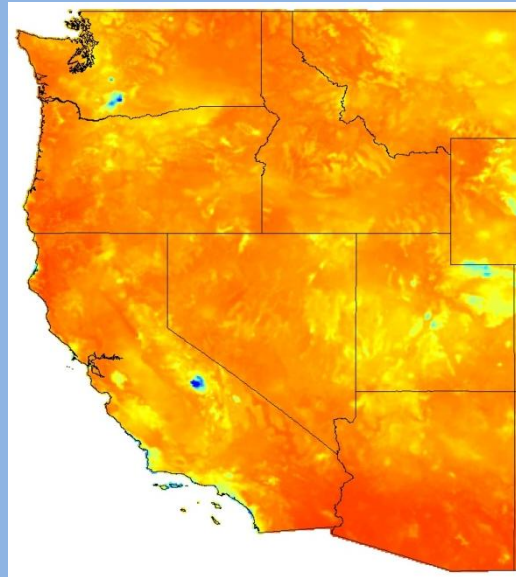
- NCEP Re-Analysis
- Leave-one-out method
 - Remove 1 year using remaining years to predict year left out
 - RMSE, R-value, bias
- Annual, Warm Season (May-Oct), Cool Season (Nov-Apr)

Validation BCSD

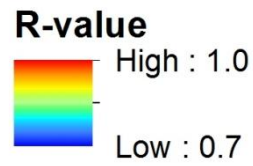
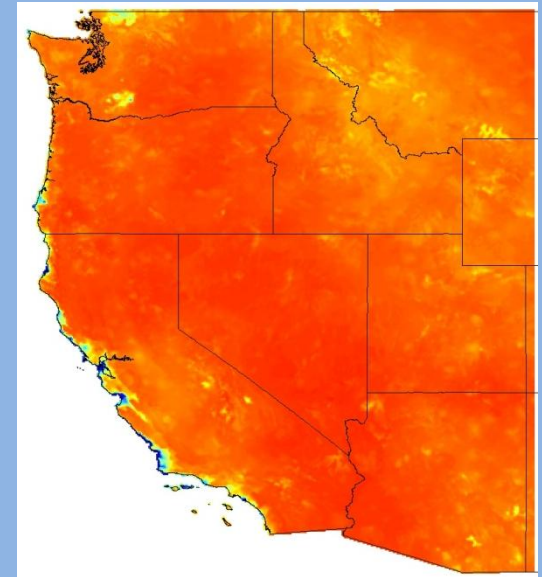
Annual



Cool Season



Warm Season

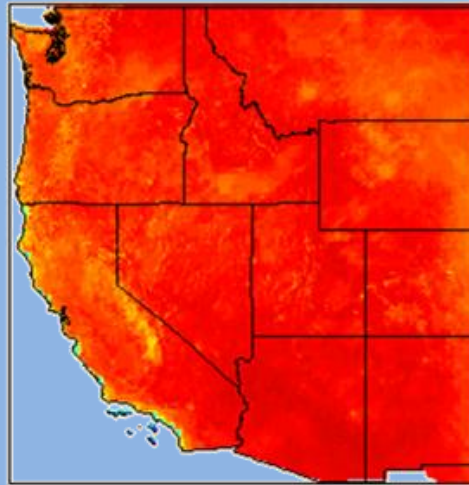


Validation MACA

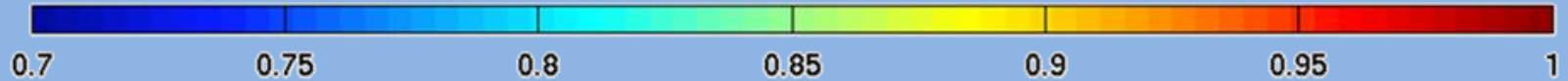
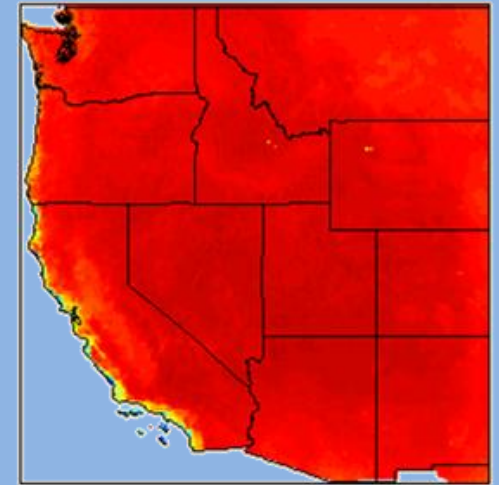
Annual



Cool Season



Warm Season



R-value

Climate Data Access

Interactive Numeric & Spatial Information Data Engine (INSIDE) - Mozilla Firefox

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Natural Color	Map Service, ArcMap layer
False Color	Map Service, ArcMap layer
SourceTile Footprint	Map Service, ArcMap layer

Hosted at ISU GIS TRC:

Natural and False Color	Image Service, ArcMap layer
Natural Color	Map Service, ArcMap layer
False Color	Map Service, ArcMap layer

Web Services

At the core of the data delivery and mapping capabilities of INSIDE Idaho are a set of services that allow for the efficient processing of geospatial data into deliverable data and maps. [Learn more...](#)

Idaho Basemap Layers

Popular map layers for Idaho [ArcMap (*.mxd) file].

Spatial Search

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Information about layer and links to data

Link 1
Link 2
Link 3

Idaho EPSCoR Data

Downscaled Climate Scenarios for Idaho...

GIS Data-UI Moscow Campus

Building footprints, pedestrian lights, parking stalls, aerial imagery, digital elevation. [Learn more...](#)

Done

Link to data access

Climate Data Access

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EPSCoR Browse

Records from Idaho EPSCoR Office:
Page 1 [Records 1 through 2 of 2]



Downscaled Climate Model Output for the Western United States from IPCC AR4 Scenarios [Bias Corrected Spatial Downscaling (BCSD) Method]
Idaho EPSCoR Office

These data are climate model outputs that have been downscaled to 4-km spatial resolution using the Bias Corrected Spatial Downscaling (BCSD) method. Moore and Walden have modified the BCSD method described by Wood et al (2002), Long-range experimental hydrologic forecasting for the eastern United States. *Journal of Geophysical Research-Atmospheres* 107: 4429-4443 and Salathe (2005), Downscaling simulations of future global climate with application to hydrologic modeling. *International Journal of Climatology* 25: 419-436. The modifications include a different interpolation scheme between GCM grid cells and a different approach to dealing with extreme values (Z-scores versus CDF method). The spatial resolution of these data are determined by the historical dataset used to derive statistical relationships between the GCM and past measurements. The 4-km Parameter-elevation Relationships on Independent Slopes Model (PRISM) data are used here from Daly et al, (1994), A statistical-topographic model for mapping climatological precipitation over mountainous terrain. *Journal of Applied Meteorology* 33: 140-158.

Access these Data:
[NetCDF \(Network Common Data Form\) File Download](#)
[Open-source Project for a Network Data Access Protocol \(OPeNDAP\)](#)

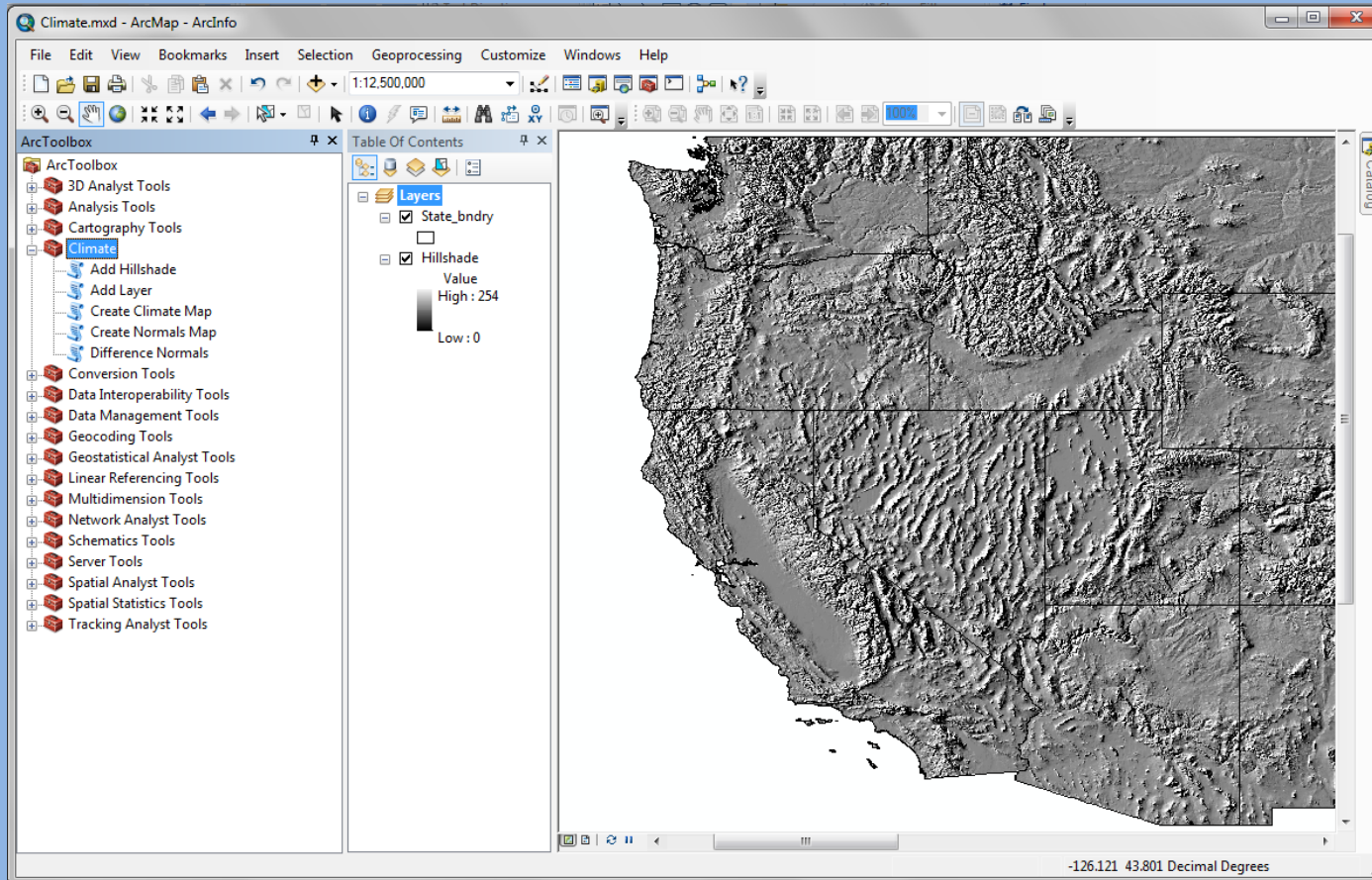


Downscaled Climate Model Output for the Western United States from IPCC AR4 Scenarios [Multivariate Adaptive Constructed Analog (MACA) Method]
Idaho EPSCoR Office

Wildfire adheres to meteorological enablers and drivers across a spectrum of timescales. However, a majority of downscaling methods are ill suited for wildfire application due to the lack of daily timescales and variables such as humidity and winds that are important for fuel flammability and fire spread. Two statistical downscaling methods, the daily Bias-Corrected Spatial Downscaling (BCSD) and the Multivariate Adapted Constructed Analogs (MACA), that directly incorporate daily data were validated over the Western United States with reanalysis data. While both methods outperformed the null interpolation only method,

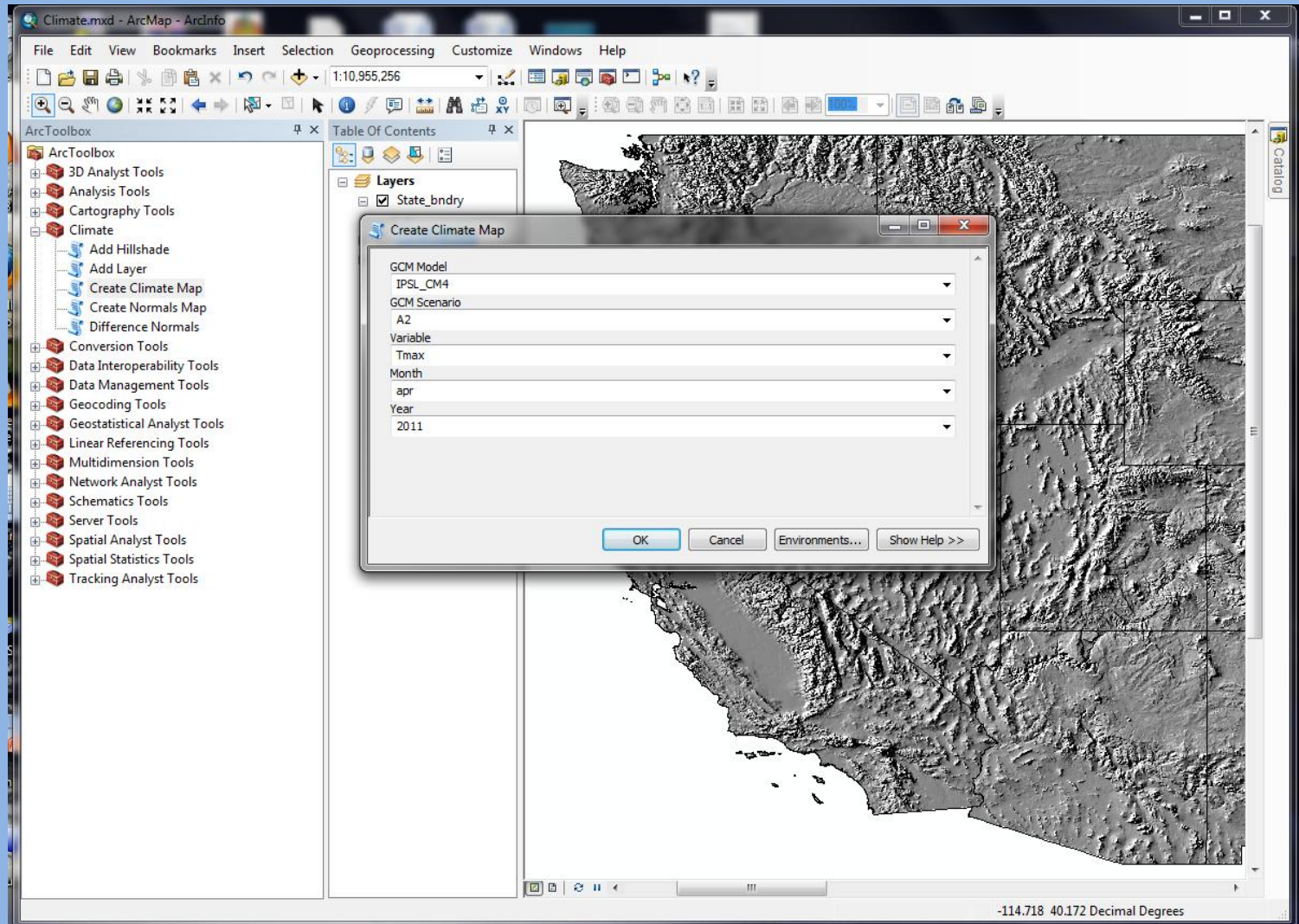
- Multiple ways to access the data via web
- Set of menus
- OPeNDAP

A Climate ArcGIS 10.0 Toolbox

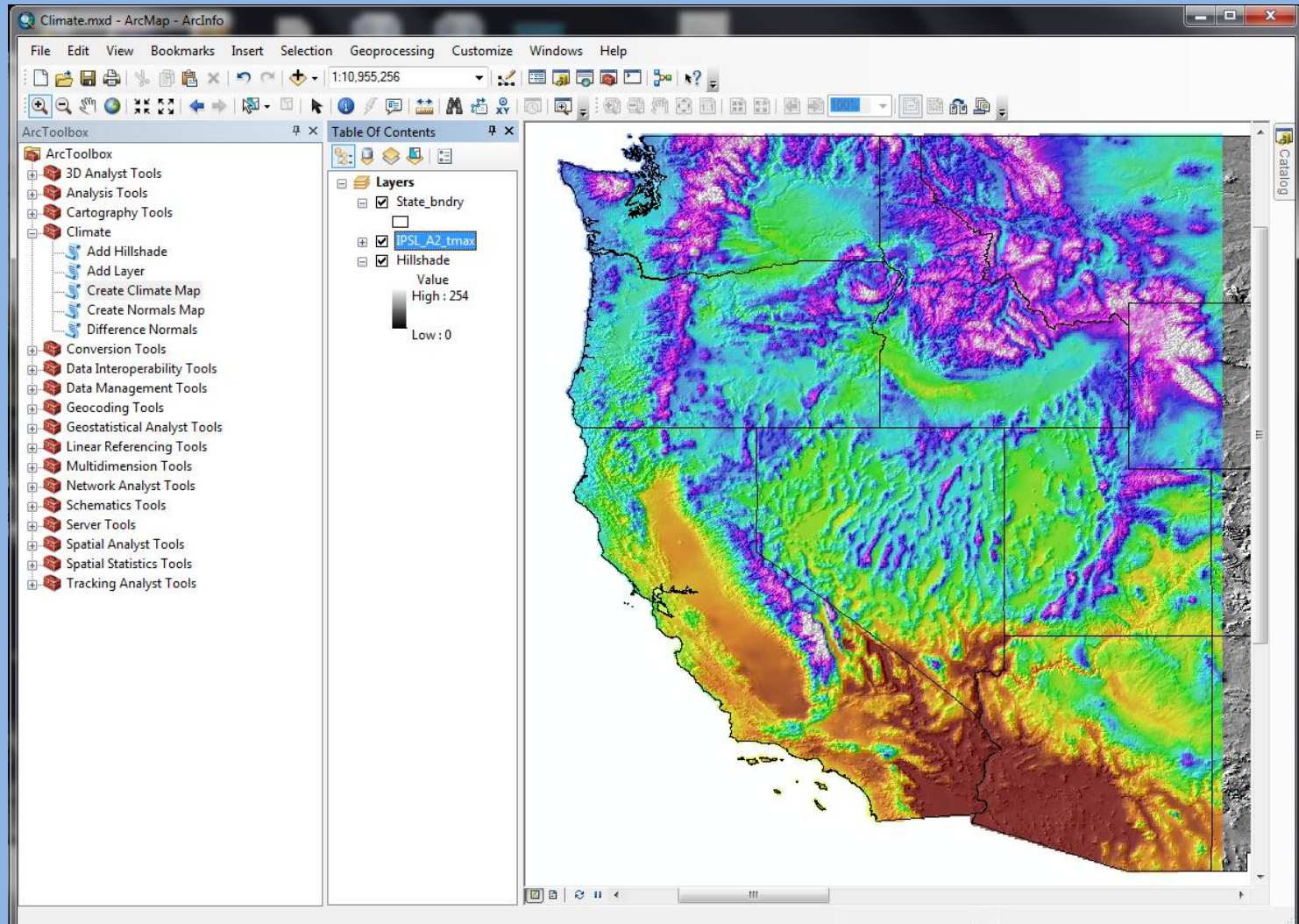


- Add Downscaled Data to Map
- Create Normals Raster
- Difference Normals Rasters

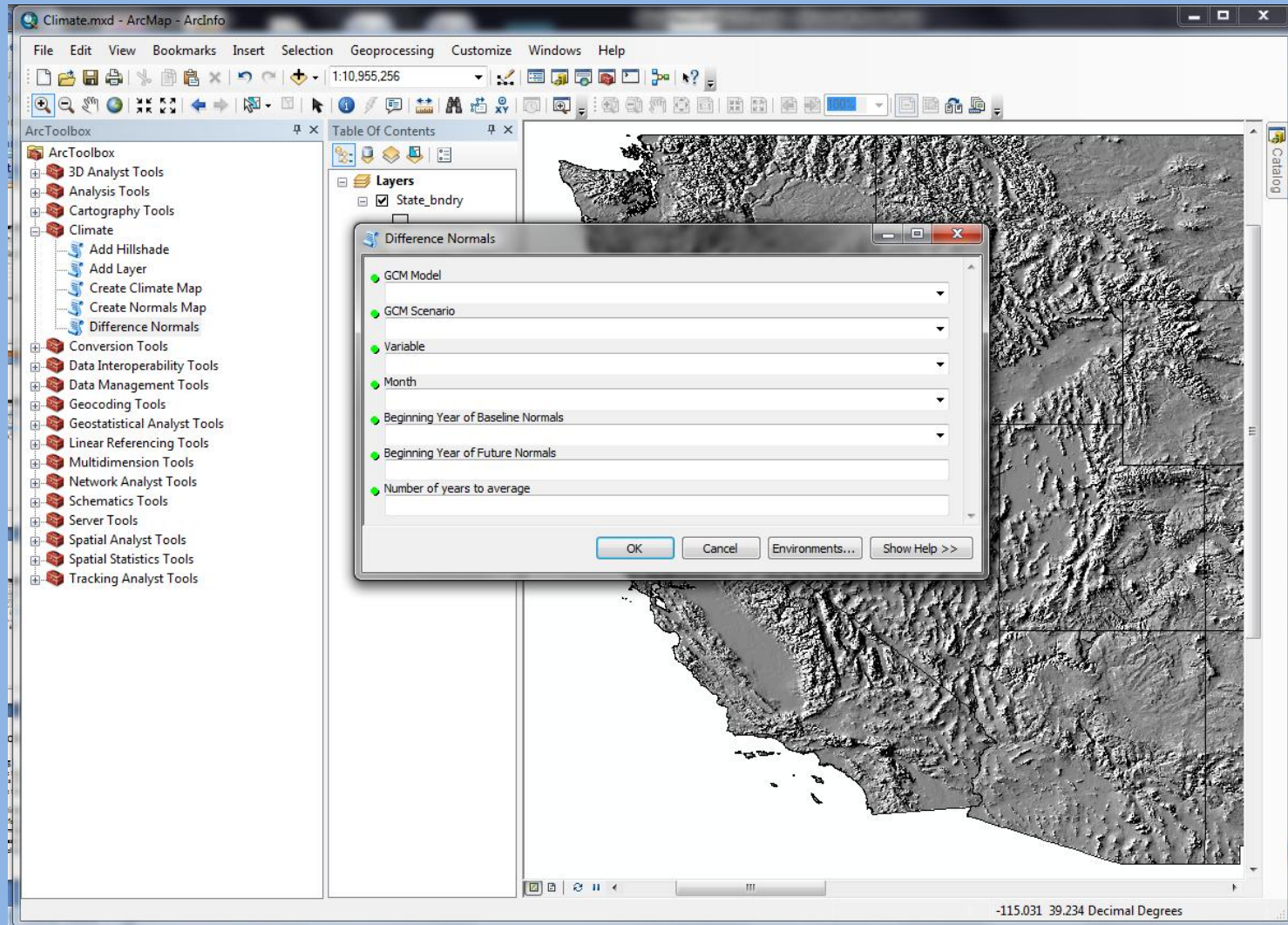
ArcGIS Integration—Adding the data



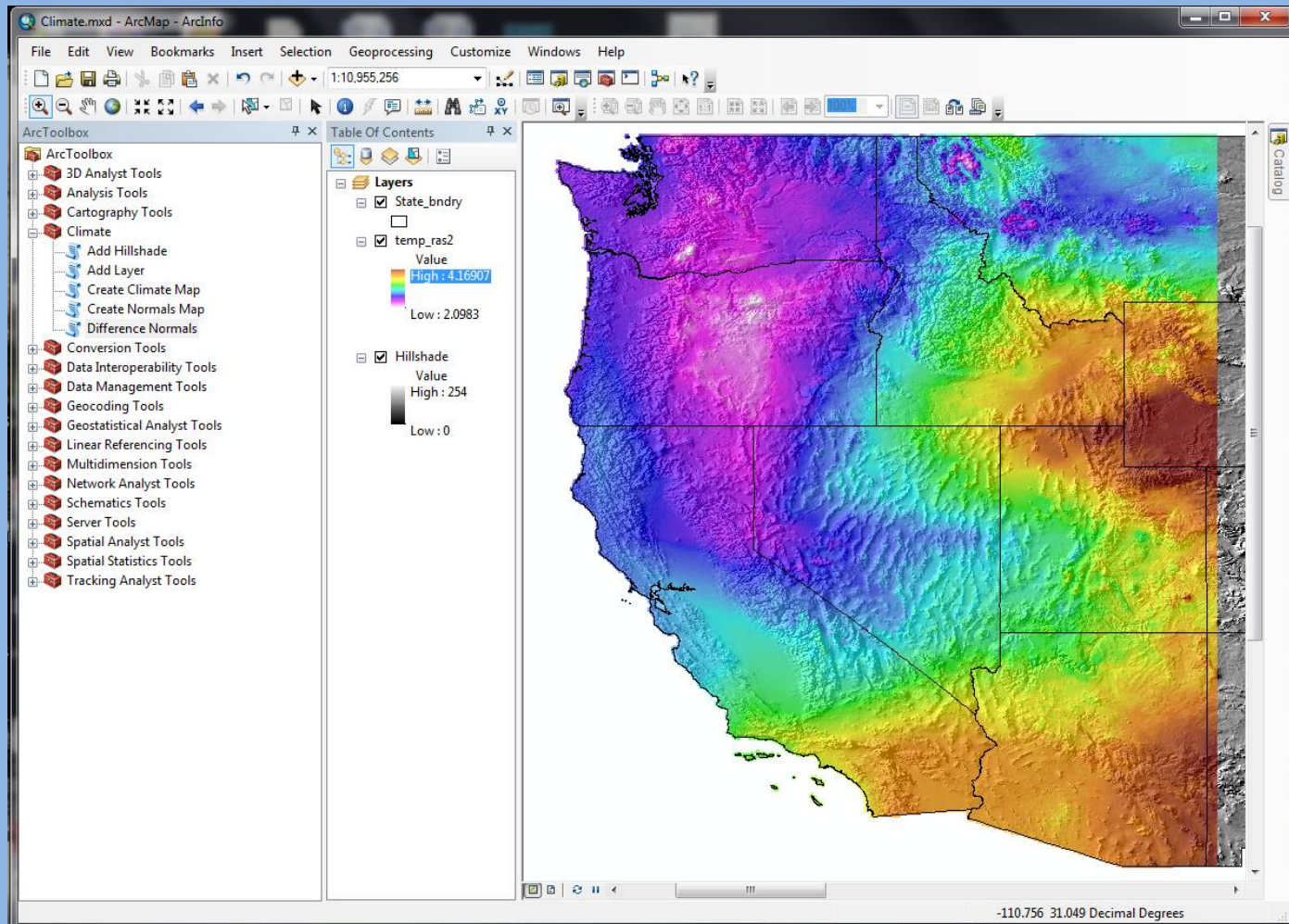
ArcGIS Integration—Adding the data



ArcGIS Integration—Difference Mapping



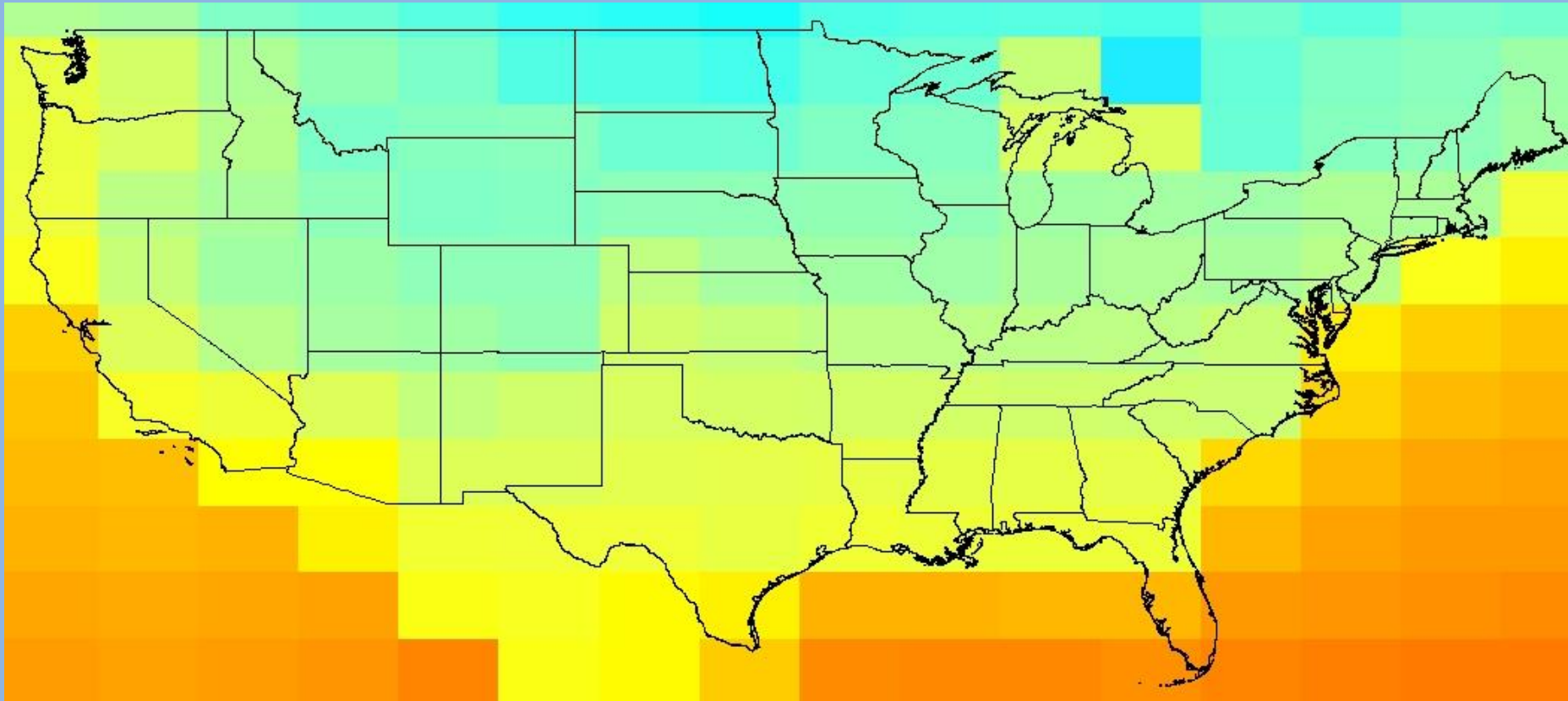
ArcGIS Integration—Difference Mapping



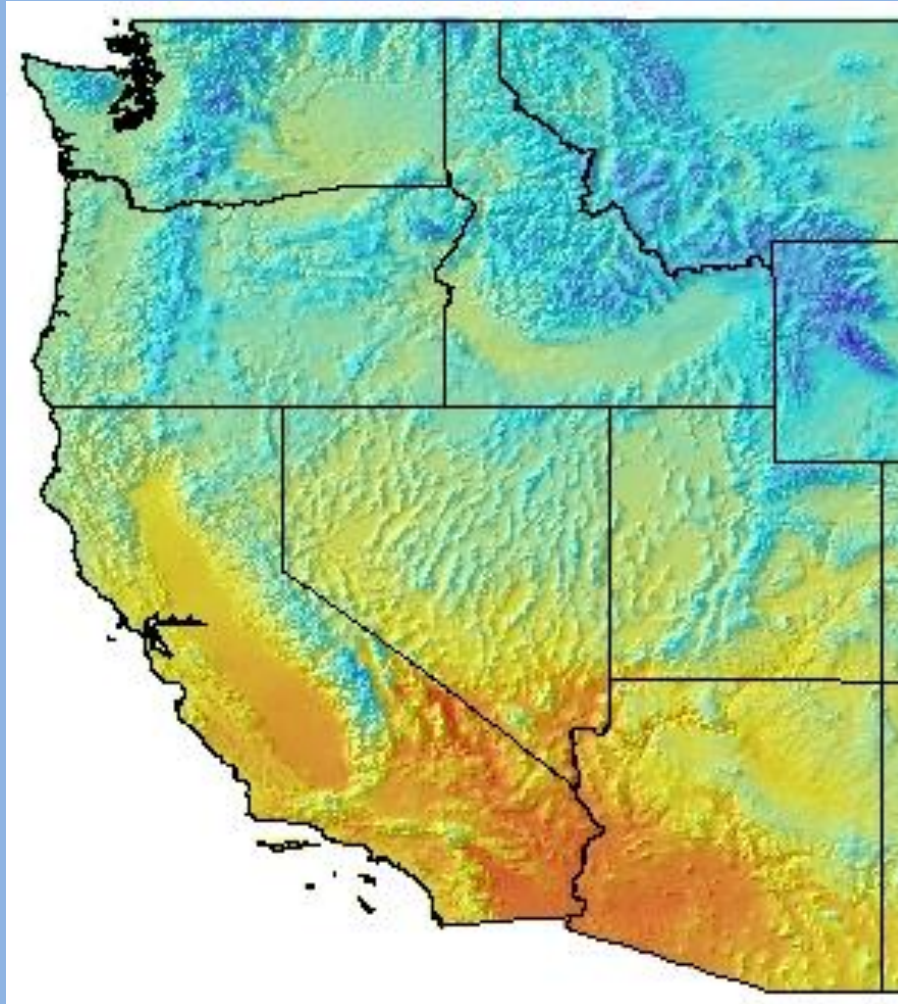
Ongoing and Future Work

- Downscaling
 - Downscale temperature and precipitation at 4km for contiguous United States
 - Downscale temperature and precipitation at 800 meter

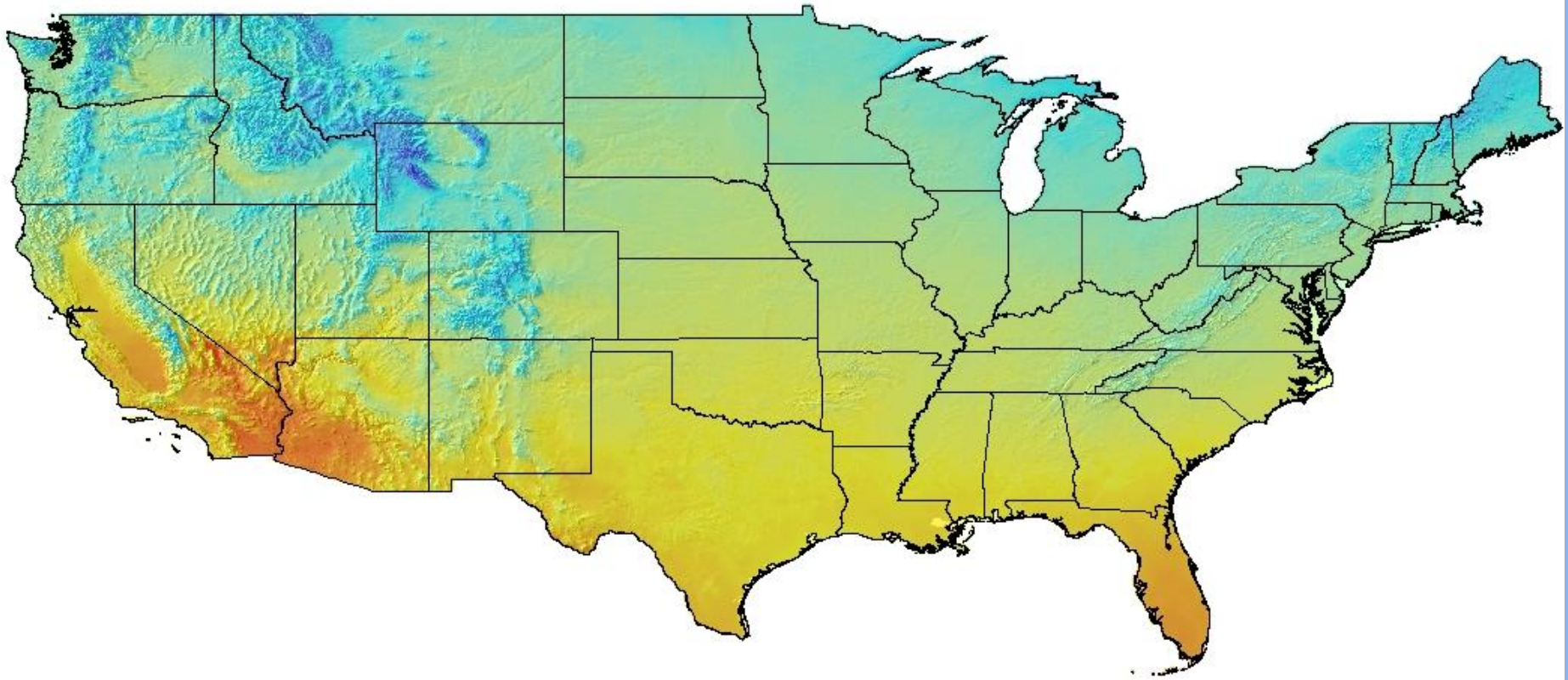
Ongoing and Future Work



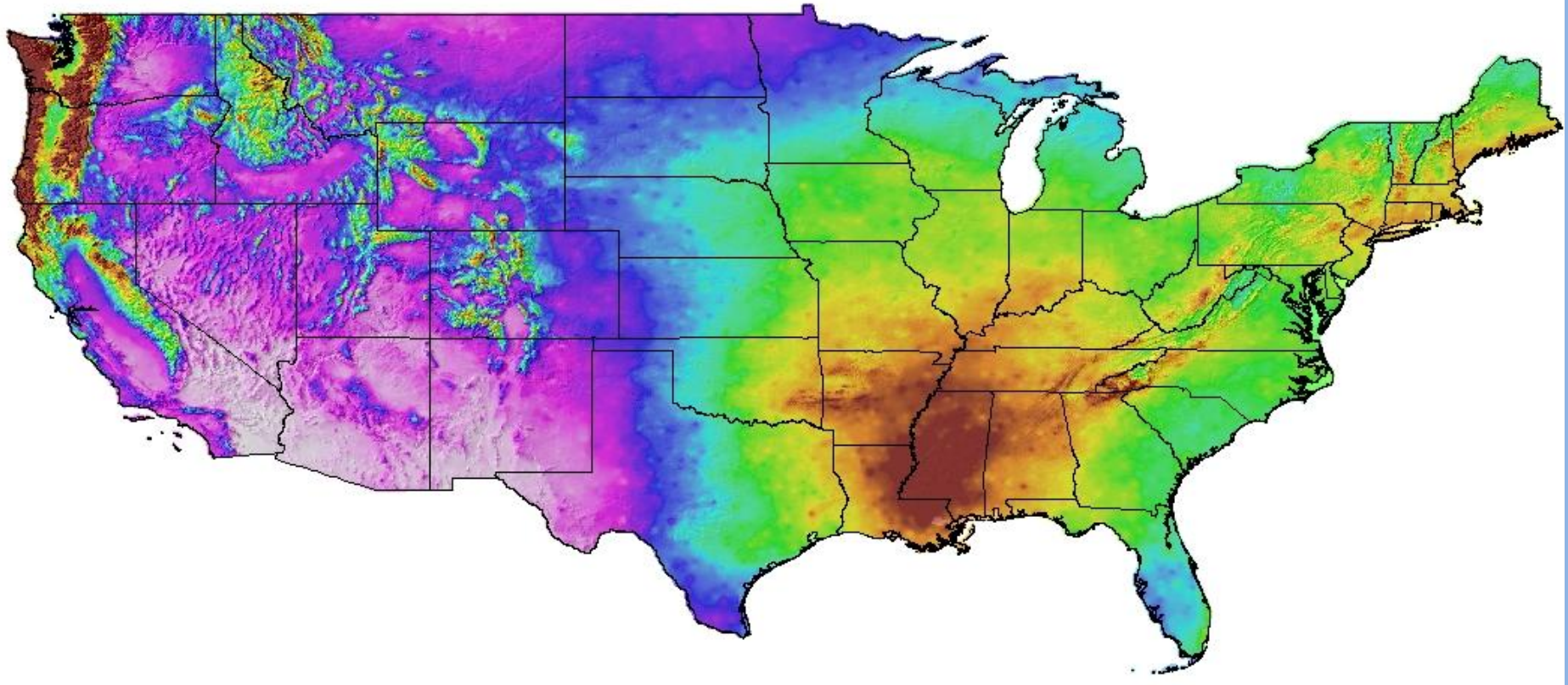
Ongoing and Future Work



Ongoing and Future Work



Ongoing and Future Work



Ongoing and Future Work

- Downscaling
 - Downscale temperature and precipitation at 4km for contiguous United States
 - Downscale temperature and precipitation at 800 meter
- GIS based climate tools
 - Averaging for location, time-series plotter, climographs, climate classification, etc.
 - MACA dataset inclusion
 - Scenario selection guidance