



The National Climate Predictions and Projections (NCPP) Platform:

Development of Capacity to Support Planning and Management

NCPP Core Team

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MAPP / CPO / Webinar



Practitioner's Dilemma (EOS, Nov 12, 2013)



- *The climate adaptation practitioner faces a bewildering choice of downscaled datasets*
- *Systematic comparisons of downscaling methods are rare*
- *Existing studies do not allow for comparison of advantages and disadvantages of downscaling methods – description of uncertainty*
- *Information is not easily usable*



Outline

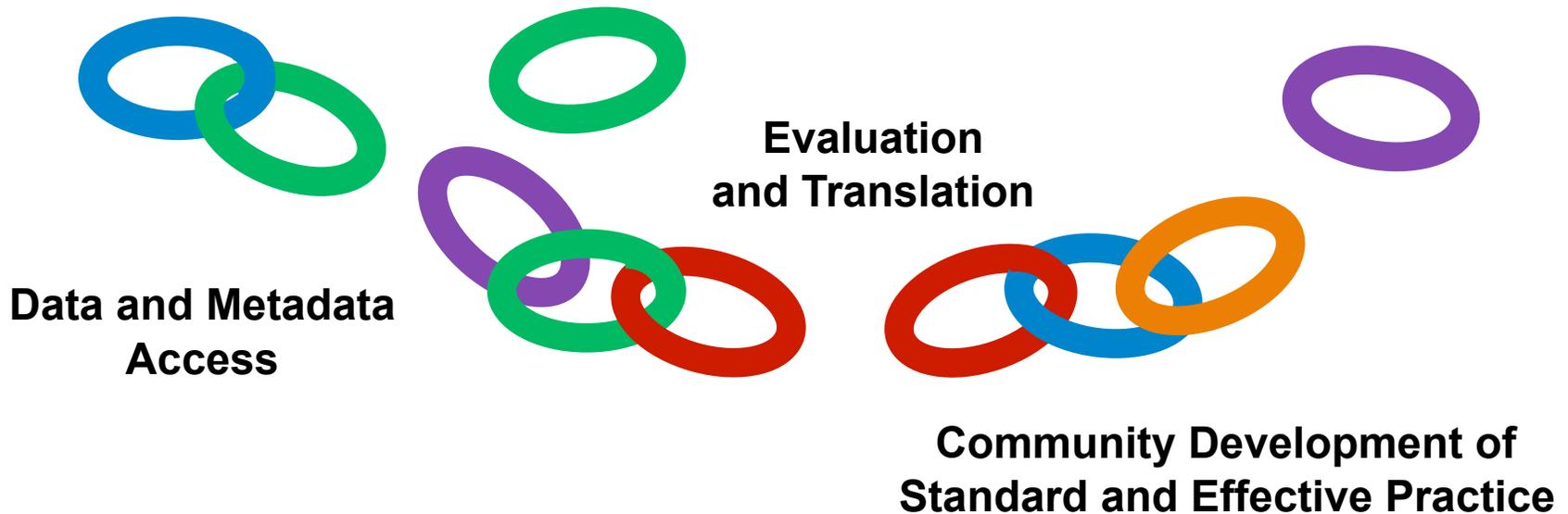
- Practitioner's Dilemma
- Supply Chain
 - Climate Data → → Data Users
- Released Products
- New capabilities
 - Example: Evaluation of Heat Index
 - Example: Localization of information
- Going forward



Supply Chain for Practitioners

In U.S. we have capacity. We can do adaptation and resource planning. But it is not easy. The need to incorporate climate into planning is increasing. Links in the supply chain exist. Some links are connected. But the end-to-end chain needs to be built and maintained.

NCPD works within the community to complete the chain through:





Four Core Focuses to Link the Chain

Data and Metadata Access

Evaluation and Screening Tools

Translation and Interpretation Tools

Community Development of Standard
and Effective Practice

Planned, Managed, Continuous Improvement & Development

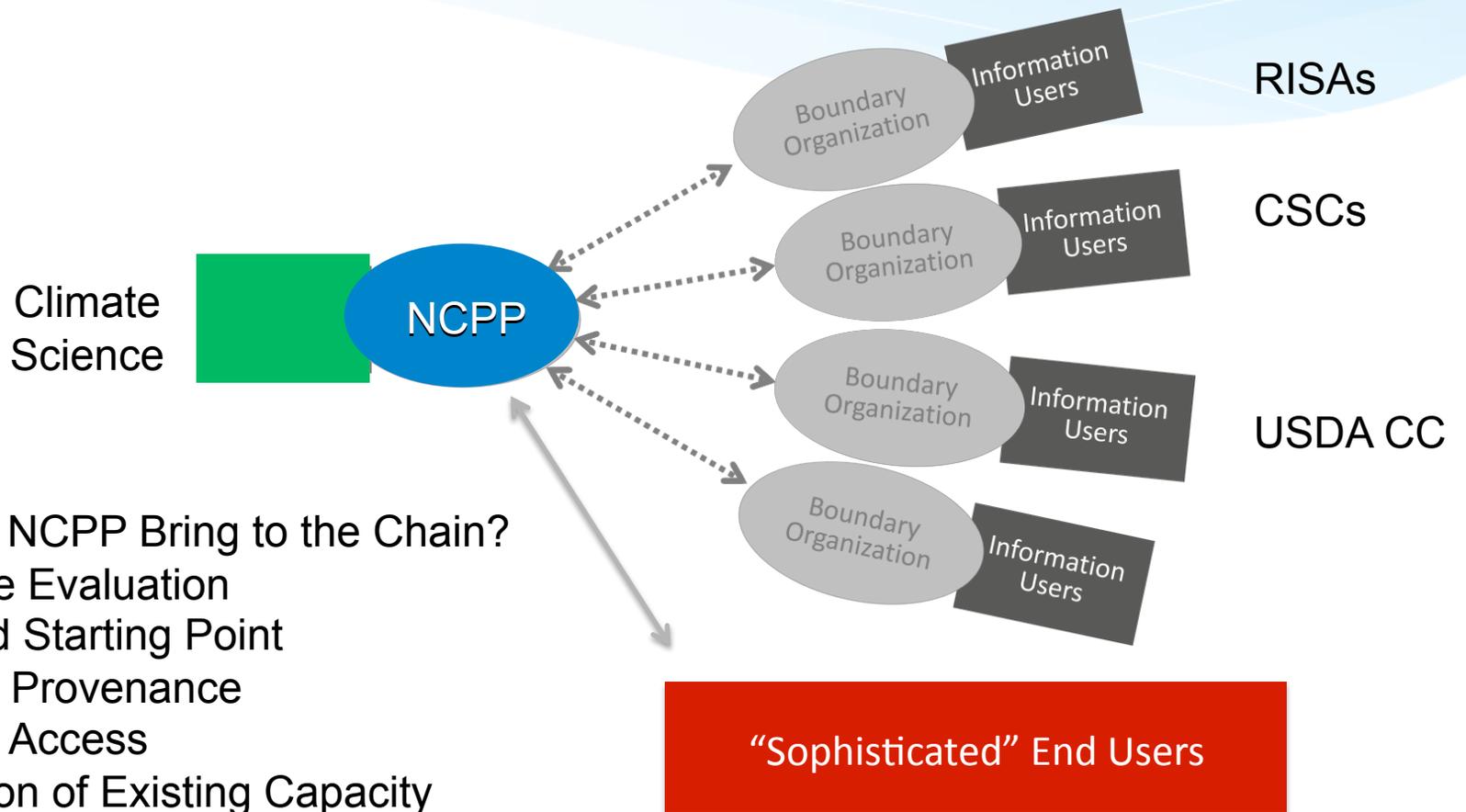
Climate Data \leftrightarrow Scientific Analysis \leftrightarrow Synthesis \leftrightarrow Application

Information Technologists \leftrightarrow Scientists \leftrightarrow Application Practitioners



Chain of Organizations

Key Chain Model: Adapted from Lemos et al (2013, in review)



What Does NCPP Bring to the Chain?

- Objective Evaluation
- Standard Starting Point
- Tools for Provenance
- Tools for Access
- Integration of Existing Capacity
- Development of New Capacity



Released Products

Science Products

- [QED Data Workshop \(eval\)](#)
 - Community (Appl., IT, Science)
 - Product & Service Design
 - NCP in Supply Chain
- [Practitioners Dilemma \(EOS\)](#)
 - Evaluation and Usability
- [Protocols for Evaluation](#)
 - Observations
 - Stationarity (Perfect Model)
 - Synthetic Data (Known Answer)
- [Metrics for Evaluation](#)
 - Standard statistical description
 - Comparison
- [Downscaled Data Portal](#)
 - Information on access to data
 - Standard descriptions
- [Evaluation Data Holdings](#)
 - Evaluation Use Cases / Directory Structure / ESGF / Advanced Data Search

Technical Products

- [ClimateTranslator \(alpha\)](#)
 - Suite of products / integrated services
 - Graphical interface to OCGIS
- [OpenClimateGIS \(OCGIS\) \(beta\)](#)
 - Converts climate data to usable formats
 - Spatial, temporal fit
- [CoG](#)
 - Collaborative workspaces
 - Links across projects
- [Metadata](#)
 - Schemas and Controlled Vocabularies
 - Intl. collaborators: ES-DOC, CORDEX
 - Tools for collection, display, comparison
- [Advanced Data Search](#)
 - ESGF-based search
 - Directory structure
 - Interface to evaluation data holdings



CoG Advanced Data Search: Evaluation Database and Metadata

Advanced Data Search

Evaluation

Evaluation Data [-]
 « Any
 = arm gfdl 2.1 (3)

Variable / Index [-]
 « Any
 = hd35 (3)

Metric [-]
 « Any
 = max (3)

Averaging Interval [+]

Month [-]
 « Any
 = august (3)

Season

Enter text

Total Number of Results: 3
 -1-

1. Activity=eval, Evaluation_data=arm_gfdl_2.1, Variable=hd35, Metric=max, Parameter=hd35mmaxm, Frequency=august, Period=1971-2000, Region=us48
 [[Show Metadata](#)] [[Show Files](#)]
2. Activity=comp, Comparison_data=maurer02v2, Evaluation_data=arm_gfdl_2.1, Comparison_metric=bias, Variable=hd35, Metric=max, Parameter=hd35mmaxm, Frequency=august, Period=1971-2000, Region=us48
 [[Show Metadata](#)] [[Show Files](#)]

maurer02v2_arm_gfdl_2.1_bias_hd35mmaxm_max_august_1971-2000.nc

[HTTP Download](#)

Format: nc

maurer02v2_arm_gfdl_2.1_bias_hd35mmaxm_max_august_1971-2000.png



Format: png

[Full Image Metadata](#)

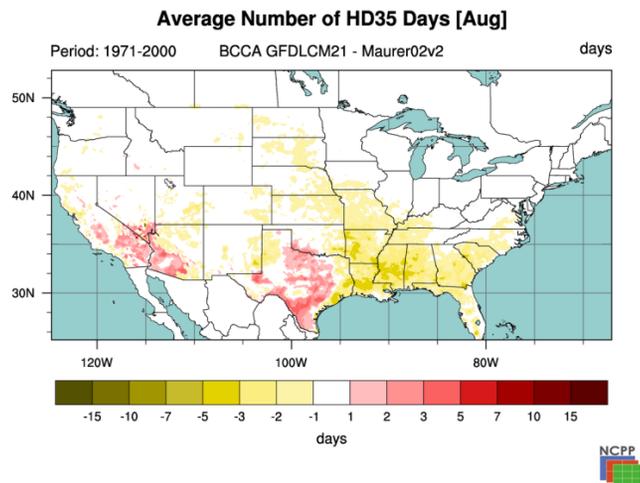
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 [[Show Metadata](#)] [[Show Files](#)]



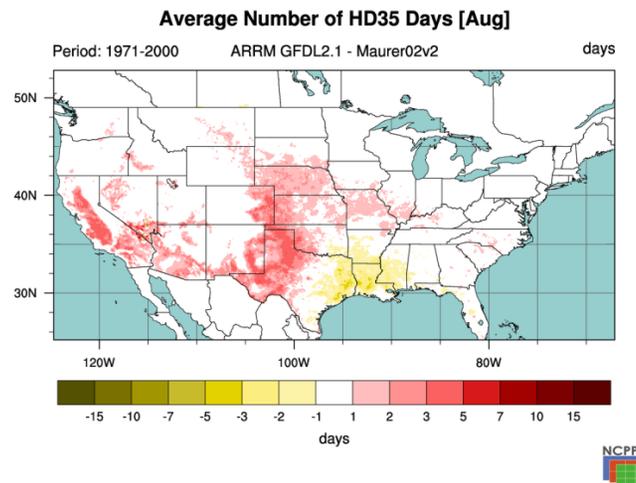


Evaluation and Comparison: Days above 35 C / One GCM / Two Downscaling

Downscaling 1



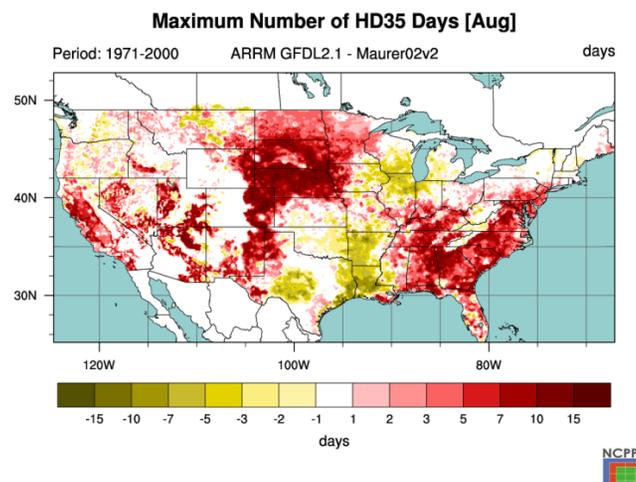
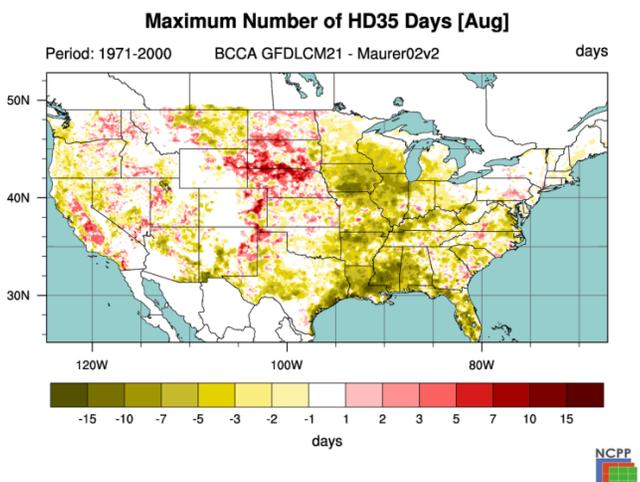
Downscaling 2



Standard Evaluation of Indices: Comparison to Obs over 1971-2000 Evaluation Period

Plots:

- Top and Bottom Mean and Max # of August Days
- Right and Left Same GCM two downscaling methods
- Differences +/- 15 days
- Patterns? Random?

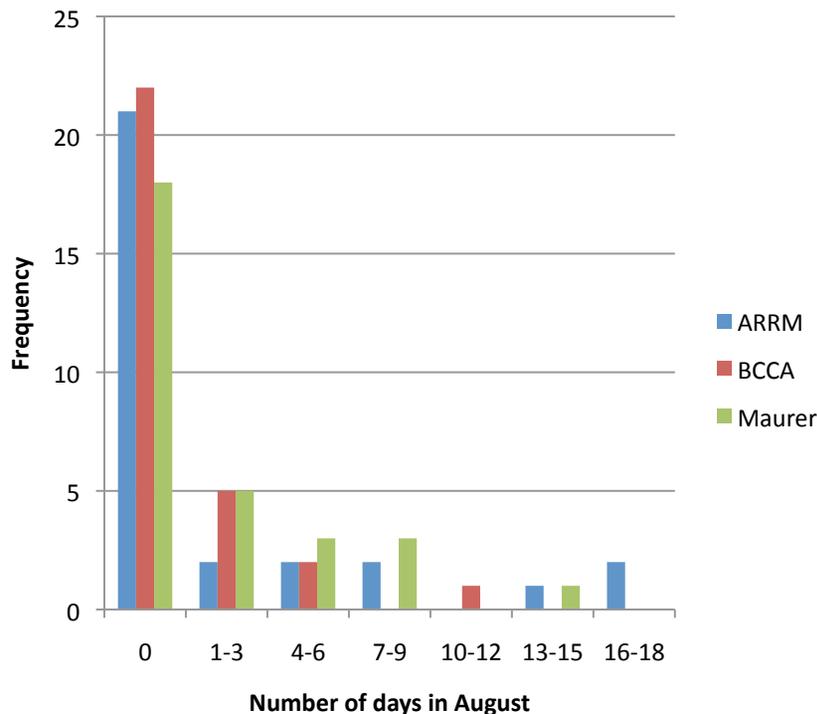




ClimateTranslator / OpenClimateGIS

Select: Dataset, Variable, Geography, Time, Calculate an Index?, Spatial Aggregation ...

Frequency histogram of number of hot days for August, 30 year period, Tmax above 35C for Wake county, NC, downscaled GFDL CM2.1



Returns Data Suitable for GIS Programs, R statistics, ... → tools that the applications specialist uses in their world.

Plots: Hot (> 35 C) days, Wake County, NC (Subset of previous plots) (1971-2000 evaluation)

- Red: Downscaling 1
- Blue: Downscaling 2
- Green: Gridded Observations

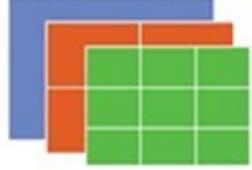
Downscaling 1 & 2 different on the extremes, neither like observations.



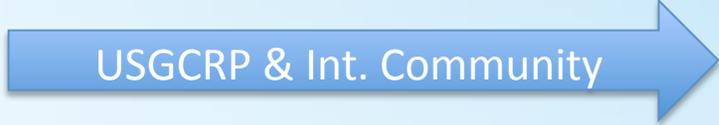
Strategic Plans / Engagement

- USGCRP: [Strategic Plan](#)
 - Science for adaptation and mitigation
 - Inform adaptation decisions
 - Enhance global change Information
 - Ongoing capacity
 - Increase engagement
- NOAA ([PPI goals](#))
 - Partnerships for Climate Adaptation and Mitigation
 - ... Sustained, reliable climate services
 - ... Informed science, service, stewardship decisions

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Working with

USGCRP & Int. Community 

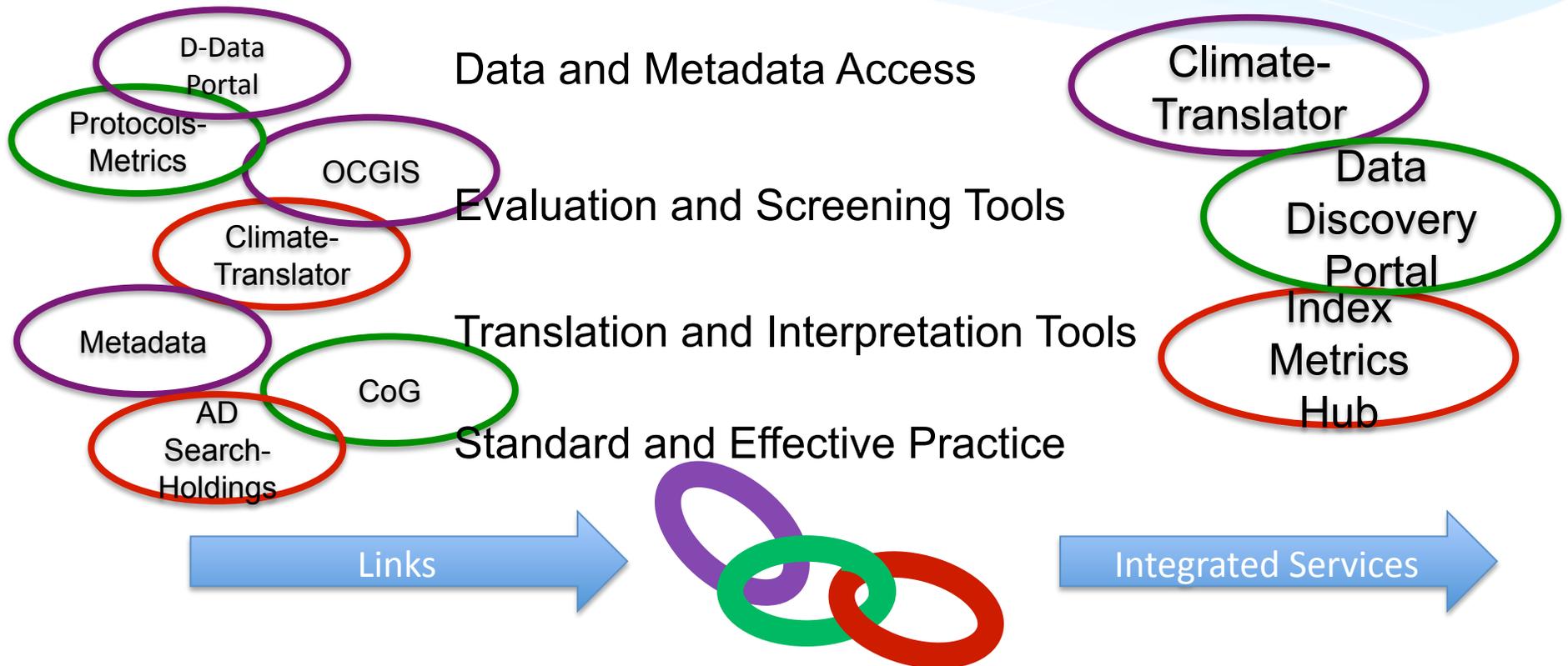
- USGS
 - CIDA
 - CSC (esp. NC)
- NARCCAP
- NCAR
- RISAs
 - GLISA
 - WWA
 - through CSAT
- NOAA
 - ESRL
 - GFDL
 - CIRES
 - CPC
- [Link to CoG](#)
- CEQ (through CDC)
 - NCPP extension
- Open Data Initiative
 - Expose data
- ES-DOC
 - Community standards
 - Metadata
- CORDEX
- Forest Service / USDA
- Class at Michigan
 - Students (HCI, IAR, AOSS)
- NASA JPL: RCMES



Going Forward

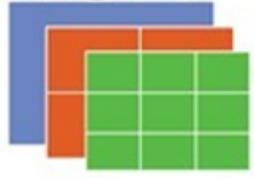
Link and smooth the Supply Chain

NCPP: Brings capacity in objective evaluation, standards, translation, provenance,



Continued: Integration, Standards, Ensembles, Services, Usability

NCPP





NE S II



Localization: Example Counties

ClimateTranslator interface to OpenClimateGIS

ClimateTranslator Workflow: Step 1 of 3

Disclaimer: the ClimateTranslator and underlying OpenClimateGIS software are *beta* versions.

Data Selection

Please select a *dataset category*, a *dataset*, and a *variable*
(when selecting a *dataset package*, a *variable* selection is not necessary).

Dataset Category

Dataset

Variable

Geo-Spatial Selection

Optionally, you may select either a *shape* geometry, a *bounding box*, or a *point*.
If no selection is made, the full dataset geo-spatial extent will be processed.

Shape: Type: **Geometry:**
Warren

Type of data

Specific dataset

Variable

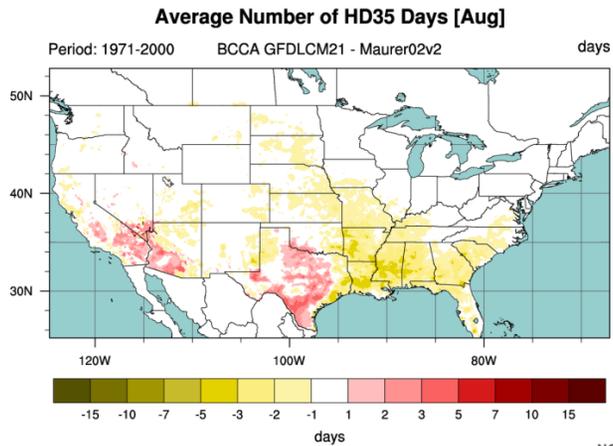
Geography

Followed by: Time, Calculate an Index?, Spatial Aggregation ...



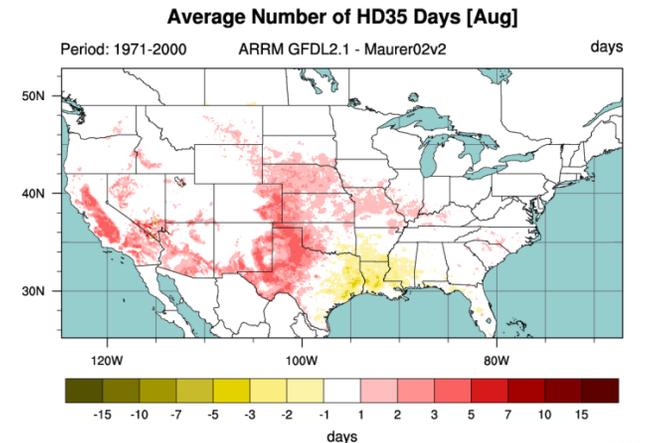
Evaluation and Comparison: Days above 35 C / Single GCM / Two Downscalings

BCCA

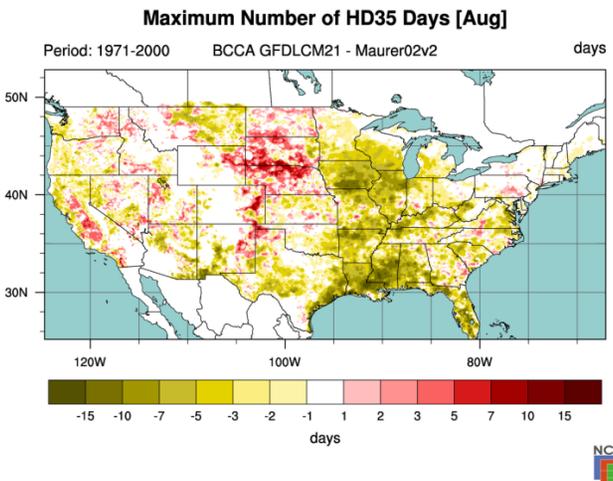


← Mean # Days →

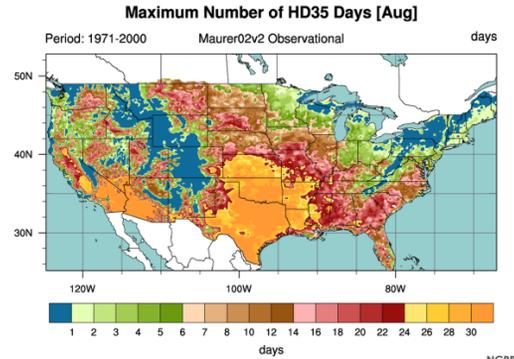
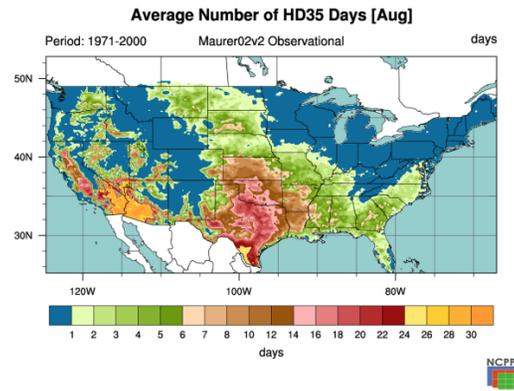
ARRM



Gridded Observations



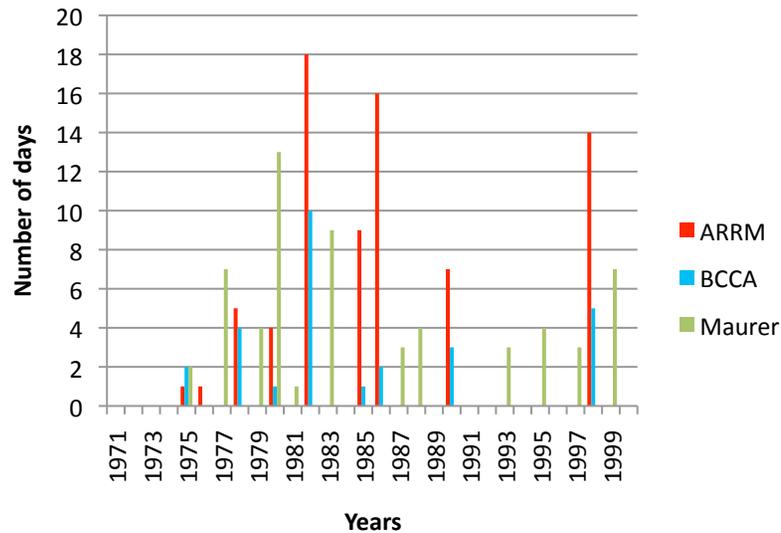
← Max # Days →





Hot days (Aug) Wake County by Year

Number of hot days with Tmax above 35 degC, 1971-2000, observed and downscaled GFDLCM2.1 data, WAKE county, NC



- Years in this plot are notional for downscaled model.
- Note: Observations show hot days in more years. Models show a higher number of hot days in fewer years.