Autumn ACIS Fridays Training Session IV

Keith Eggleston
Regional Climatologist
Northeast Regional Climate Center

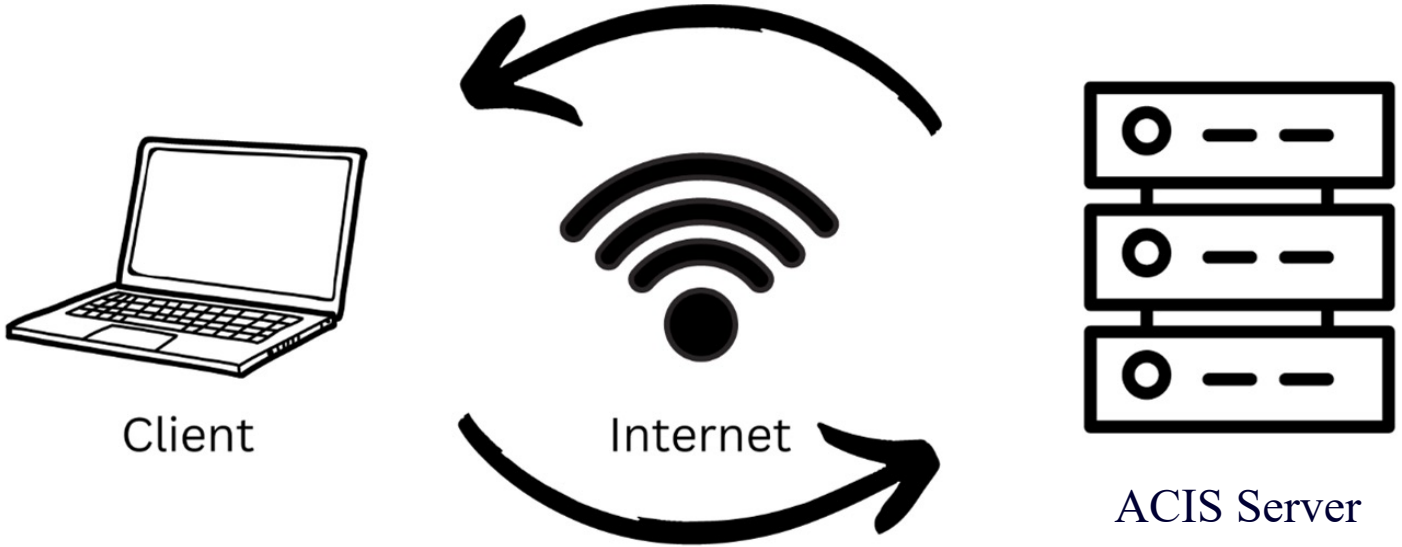
ACIS
Applied Climate Information System - Regional Climate Centers

ACIS Web Services Tools

- Documentation
  - https://www.rcc-acis.org/docs_webservices.html
  - All calls with examples and sample programs
- ACIS QueryBuilder
  - https://builder.rcc-acis.org
  - Teaching tool used in these training sessions
- Training Session Recordings
  - https://www.nrcc.cornell.edu/workshops/acis_training/acis_training.html

ACIS Web Services

JSON, CSV (limited), or PNG image (GridData)



StnMeta, StnData, MultiStnData, GridData

parameters

GridData

- GridData version 1
  - https://data.rcc-acis.org/GridData
- GridData version 2
  - Backward compatible with version 1
  - Additional datasets and capabilities
  - https://grid2.rcc-acis.org/GridData

Review – Types of GridData Returns

- Data for single grid point
- Grid of data for an area
- Grid area reductions

GridData Maps

- Ways to obtain maps:
  1. Specify "output":"json" and "image" object
     - PNG image embedded as "data" in JSON return
  2. Specify "output":"image" and "image" object
     - Just PNG image returned
  3. Specify "output":"geotiff" and "image" object
     - Just Geotiff image returned

GridData Image Object

Key	Description	Default
info_only	If only information about the map is desired, not an image, this should be set to "1".	*(false)*
proj	Map projection. lcc = Lambert Conformal Conic.	lcc (centered on continental US)
overlays	Array of types of map overlays - "state" and/or "county". Line width and color can also be specified, separated by colons. For example, ["state:2:red","county:1:blue"].	*(no overlays)*
interp	Type of interpolation. Options are "cspline" for cubic spline or "none" for no interpolation.	cspline
cmap	Color map. Definitions from matplotlib (case-sensitive).	jet
levels	Contour levels. An array of values to be used as contour levels.	*(selected by server)*
width*	Width of image in pixels. Only width or height should be specified - not both. The other dimension will be scaled appropriately.	-
height*	Height of image in pixels. See note above.	-
	** either width or height is required*	

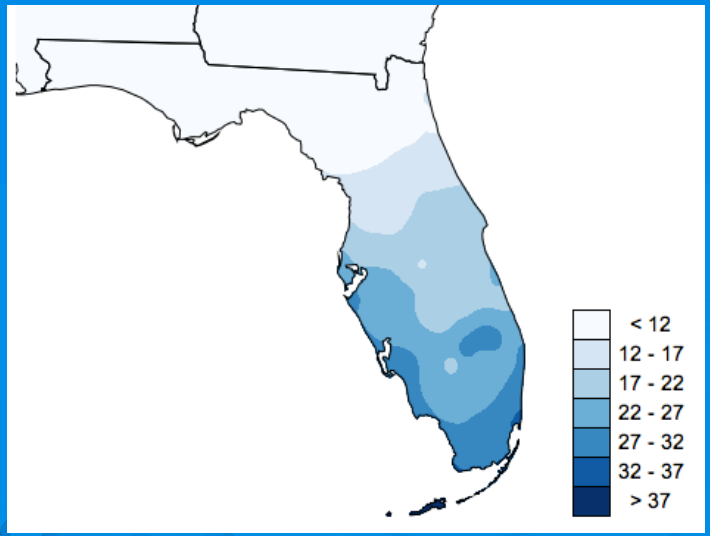
GridData Image Query

Request:

{"grid":"nrcc-nn","state":"FL","date":"1985-01","output":"json",
"elems":[{"name":"mint","interval":[0,1],"duration":1,"reduce":"min"}],
"image":{"proj":"lcc", "overlays":"state","interp":"cspline","cmap":"Blues","width":350,
"levels":[12,17,22,27,32,37]}}

JSON return:

{"size":[350,326],
"range":[1.21,40.23],
"cmap":["#f7fbff","#d6e5f4","#abcfe5","#6baed6",
"#3787c0","#105ba4","#08306b"],
"levels":[12,17,22,27,32,37],
"data_bbox":[[-87.95,24.45],[-79.71,31.07]],
"histogram":[16215,3127,5849,6022,3191,355,206],
"data":"data:image/png;base64…}



(color bar not included)

GridData Example

- Florida min temperature map (from previous slide)
- Precipitation map (build)

LOCA

- Statistically downscaled dataset
- Period of record: 1950-2099
- 32 individual global climate models (e.g. GFDL-CM3)
- Precomputed all-model summaries (monthly only):
  - allmax – highest of all 32 LOCA models
  - allmin – lowest of all models
  - allmedian – median of all models
  - wmean – weighted mean all models
- Available for 2 emissions scenarios: rcp4.5 and rcp8.5
- "grid" parameter has the form - "name:model:scenario"

LOCA2 (coming soon)

- Statistically downscaled dataset
- Period of record: 1950-2099
- 10 individual global climate models
- Same precomputed all-model summaries (monthly only):
  - allmax, allmin, allmedian, wmean
- Available for 3 emissions scenarios:
  - ssp245, ssp375, ssp585

GridData: LOCA Examples

- February avg min temperature - wmean
- Annual max temperature - single model
- Percent of summer days ≥ 90 degrees

GridData: Nested elements

- Perform multiple reductions on data:
  - Example: 30-year average of monthly sums
- Necessary for pre-computed monthly values (i.e. LOCA all-model summaries, ncei-norms, PRISM monthly, and upcoming nClimGrid monthly)
- Element "name" is replaced by an "elem" object
  - "elem":{"name":"pcpn","interval":[0,1],"duration":1,"reduce":"sum"}

GridData: Nested Examples

- Summer precipitation projection
- 10-year mean of Feb 1-15 total precipitation
- Texas 15-year avg summer max temperature map

Questions