Autumn ACIS Fridays
Training Session IV

Keith Eggleston
Regional Climatologist
Northeast Regional Climate Center
ACIS Web Services Tools

- **Documentation**
  - [https://www.rcc-acis.org/docs_webservices.html](https://www.rcc-acis.org/docs_webservices.html)
  - All calls with examples and sample programs

- **ACIS QueryBuilder**
  - [https://builder.rcc-acis.org](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](https://www.nrcc.cornell.edu/workshops/acis_training/acis_training.html)
ACIS Web Services

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

Client

Internet

ACIS Server

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

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

* 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