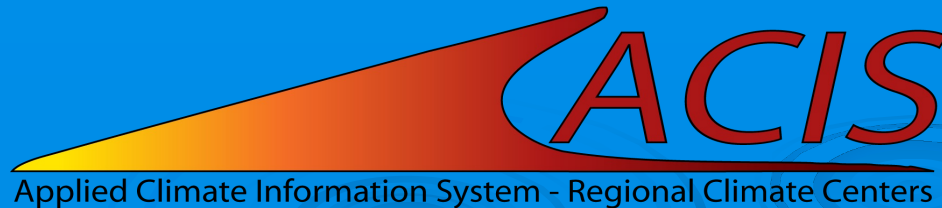


Autumn ACIS Fridays Training Session III

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ACIS Web Services Tools

- Documentation

- https://www.rcc-acis.org/docs_webservices.html
- All calls with examples and sample programs

- ACIS QueryBuilder

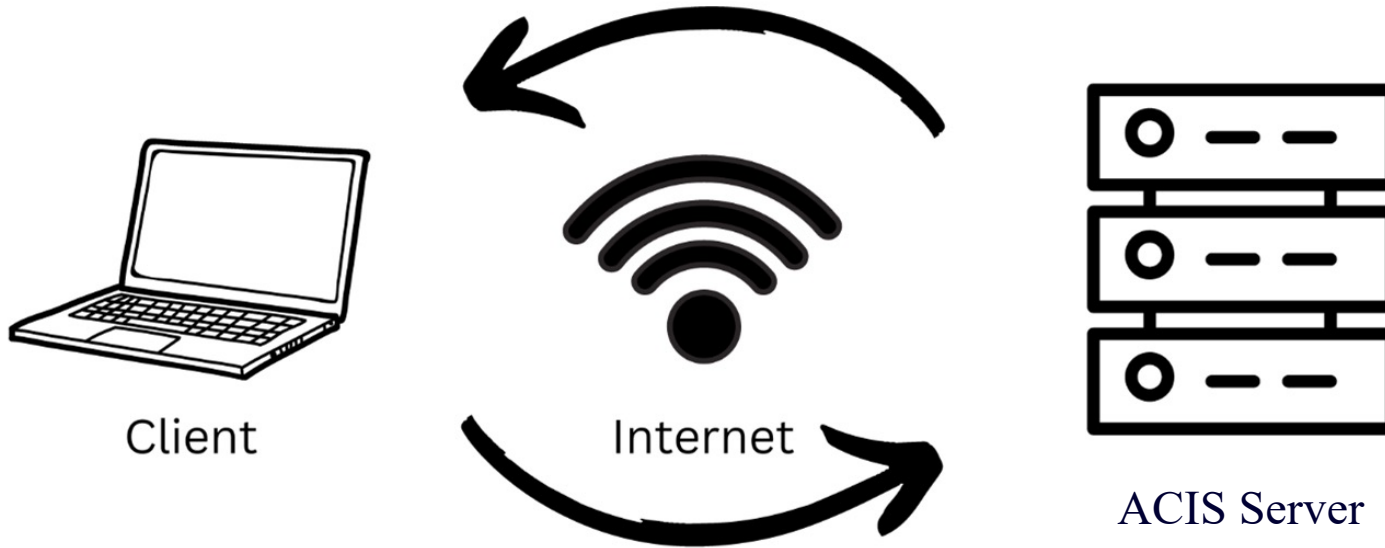
- <https://builder.rcc-acis.org>
- Teaching tool used in these training sessions

- Training Session Recordings

- https://www.nrcc.cornell.edu/workshops/acis_training/acis_training.html

ACIS Web Services

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



Stn[✓]Meta, Stn[✓]Data, MultiStnData, GridData
parameters

StnMeta Parameter JSON

```
{  
  "state":["ct","ri"],  
  "cwa":"box",  
  "sdate":"2023-1",  
  "edate":"2023-10",  
  "meta":["name","state","ll"]  
}
```

StnData Parameter JSON

```
{  
  "sid": "kddl",  
  "sdate": "2023-1",  
  "edate": "2023-10",  
  "elems": [  
    {"name": "pcpn", "interval": [0,1], "duration": 1,  
     "reduce": "sum", "maxmissing": "1", "smry": "sum"},  
    {"name": "pcpn", "interval": [0,1], "duration": 1,  
     "reduce": "sum", "maxmissing": "1", "smry": "sum", "normal": "departure"}  
  ]  
}
```

MultiStnData Parameter JSON

```
{
  "state":["ct","ri"],
  "cwa":"box",
  "sdate":"2023-1",
  "edate":"2023-10",
  "elems":[
    {"name":"pcpn","interval":[0,1],"duration":1,
     "reduce":"sum","maxmissing":"1","smry":"sum"},
    {"name":"pcpn","interval":[0,1],"duration":1,
     "reduce":"sum","maxmissing":"1","smry":"sum","normal":"departure"}
  ],
  "meta":["name","state","ll"]
}
```

MultiStnData Areas

- Area selections:
 - county (FIPS code, e.g. 09001)
 - climdiv (climate division, e.g. NY09)
 - cwa (NWS County Warning Area, e.g. BOX)
 - basin (Hydrologic Unit Code (HUC), e.g. 01090205)
 - state (postal abbreviation, e.g. NE)
 - bbox (bounding box W,S,E,N, e.g. [-90, 40, -88, 41])
 - sids (station ids, e.g. 171175,176905)

MultiStnData and StnData JSON Results

```
{ "sids": "kbdl", "sdate": "2023-1", "edate": "2023-2",  
  "elems": [  
    { "name": "pcpn", "interval": [0,1], "duration": 1, "reduce": "sum", "smry": "sum" },  
    { "name": "pcpn", "interval": [0,1], "duration": 1, "reduce": "sum", "smry": "sum", "normal": "departure" }  
  ],  
  "meta": ["name"]  
}
```

StnData results:

```
{  
  "meta": { "name": "HARTFORD-BRADLEY INTL ARPT" },  
  "data": [  
    [ "2023-01", "5.81", "2.53" ], [ "2023-02", "1.83", "-1.30" ]  
  ],  
  "smry": [ "7.64", "1.23" ]  
}
```

MultiStnData results:

```
{  
  "data": [  
    {  
      "meta": { "name": "HARTFORD-BRADLEY INTL ARPT" },  
      "data": [  
        [ "5.81", "2.53" ], [ "1.83", "-1.30" ]  
      ],  
      "smry": [ "7.64", "1.23" ]  
    }  
  ]  
}
```


MultiStnData Examples

- Monthly data for PA climate division 10
- Consecutive hot days/nights in Maricopa County, AZ
- Frosts/Freezes in northern New York

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>

GridData – Gridded Datasets

Code	Name	Description	Area	Period
1	nrcc-nn	NRCC Natural Neighbor	Contiguous US	1950-present
2	mpe	Multi-Sensor Precipitation	Contiguous US	2006-present
3	nrcc-model	NRCC Model	US East of Rockies	Temperature: 1980-present Precipitation: 2002-present
21	prism	PRISM Climate Group	Contiguous US	Daily: 1981-present Monthly: 1895-present

GridData – Gridded Datasets

Name	Description	Area	Period
ncei-norm:91-20	NCEI Gridded Monthly Normals	Contiguous US	-
livneh	Livneh	Contiguous US	1950-2018
loca	LOCA	Contiguous US	1950-2099
snap	SNAP	Alaska	Temperature: 1970-2099
-- coming --	NCEI nClimGrid	Contiguous US	Daily: 1951-present Monthly: 1895-present

GridData

- Similar syntax to StnData and MultiStnData calls
- Additional capabilities
 - Area summaries
 - Image output
- Some differences
 - Only "reduce" keyword is allowed in elems (no "add")
 - "run_xx_yyy" reduction is not available
 - Normals/departures are not available in elems
 - Only temperature and precipitation (varies by dataset)

GridData – Single Grid Point

StnData params: {"sid":"304174","sdate":"20231001","edate":"20231007","elems":"1,2"}

GridData params: {"grid":"nrcc-nn","loc":-76.5,42.5,"sdate":"20231001","edate":"20231007","elems":"1,2"}

```
["2023-10-01", "72", "43"]  
["2023-10-02", "75", "45"]  
["2023-10-03", "77", "48"]  
["2023-10-04", "80", "50"]  
["2023-10-05", "82", "53"]  
["2023-10-06", "79", "60"]  
["2023-10-07", "69", "55"]
```

```
["2023-10-01", 72, 44.6875]  
["2023-10-02", 75, 46.40625]  
["2023-10-03", 76.875, 49.3125]  
["2023-10-04", 80.375, 52.3125]  
["2023-10-05", 82.8125, 54.5]  
["2023-10-06", 79.375, 60.59375]  
["2023-10-07", 69.125, 55.5]
```

Differences

- Call to GridData instead of StnData
- Specify the grid of interest
- Specify location (longitude, latitude) instead of station id

GridData – Grid Data Output

MultiStnData params: {"state":"RI","date":"202309",
"elems":[{"name":"pcpn","interval":[0,1],"duration":1,"reduce":"sum"}]}

GridData params: {"grid":"nrcc-model","state":"RI","date":"202309",
"elems":[{"name":"pcpn","interval":[0,1],"duration":1,"reduce":"sum"}]}

```
["data":[[["2023-09",[5.08,5.08,5.03,5.01,4.92,5.25,5.63,6.88,7.38,7.35,6.93,-999,-999,-999,-999,-999,-999,-999,-999,-999],  
[5.36,5.09,4.83,4.87,4.95,5.26,5.43,6.56,5.6,6.77,6.46,6.46,6.34,6.2,6.79,-999,-999,-999,-999,-999],  
[5.1,5.1,4.98,4.79,5.01,4.96,5.6,5.6,6.16,6.06,6.06,5.92,6.27,6.05,6.4,6.9,-999,-999,-999,-999,7.69],  
[5.99,4.99,5.13,5.15,5.43,5.43,5.22,5.82,5.82,6.15,6.15,5.95,5.85,6.06,6.76,7.29,6.98,6.91,6.91,7.41,7.55],  
...  
[10.1,10.25,10.8,9.63,11.32,11.39,11.39,11.83,12.77,12.77,11.61,12.22,12.67,13.62,11.8,9.02,8.87,7.74,7.72,7.01,7.38],  
[7.88,8.47,9.63,9.4,9.4,9.63,11.39,11.83,12.26,13.04,11.88,11.88,11.73,13.44,11.59,10.66,8.87,7.92,7.6,7.08,7.08],  
[7.63,8.08,8.99,8.83,8.86,9.63,9.43,10.8,11.63,11.63,10.58,11.09,10.42,10.72,11.59,9.87,8.57,6.84,6.84,7.65,7.43],  
[7.6,7.56,8.18,8.83,8.52,8.75,9.01,9.01,10.44,10.88,10.31,9.97,10.42,8.61,8.9,7.77,7.77,7.58,6.89,6.77,7.18]]]]]
```

Differences

- Call to GridData instead of MultiStnData
- Specify the grid of interest

GridData Examples

- Monthly normal temperature for a bounding box (meta)
- Grid area reductions
- Next time - maps



Questions

