IOOS Data Services with the THREDDS Data Server

Rich Signell
USGS, Woods Hole

IOOS DMAC Workshop
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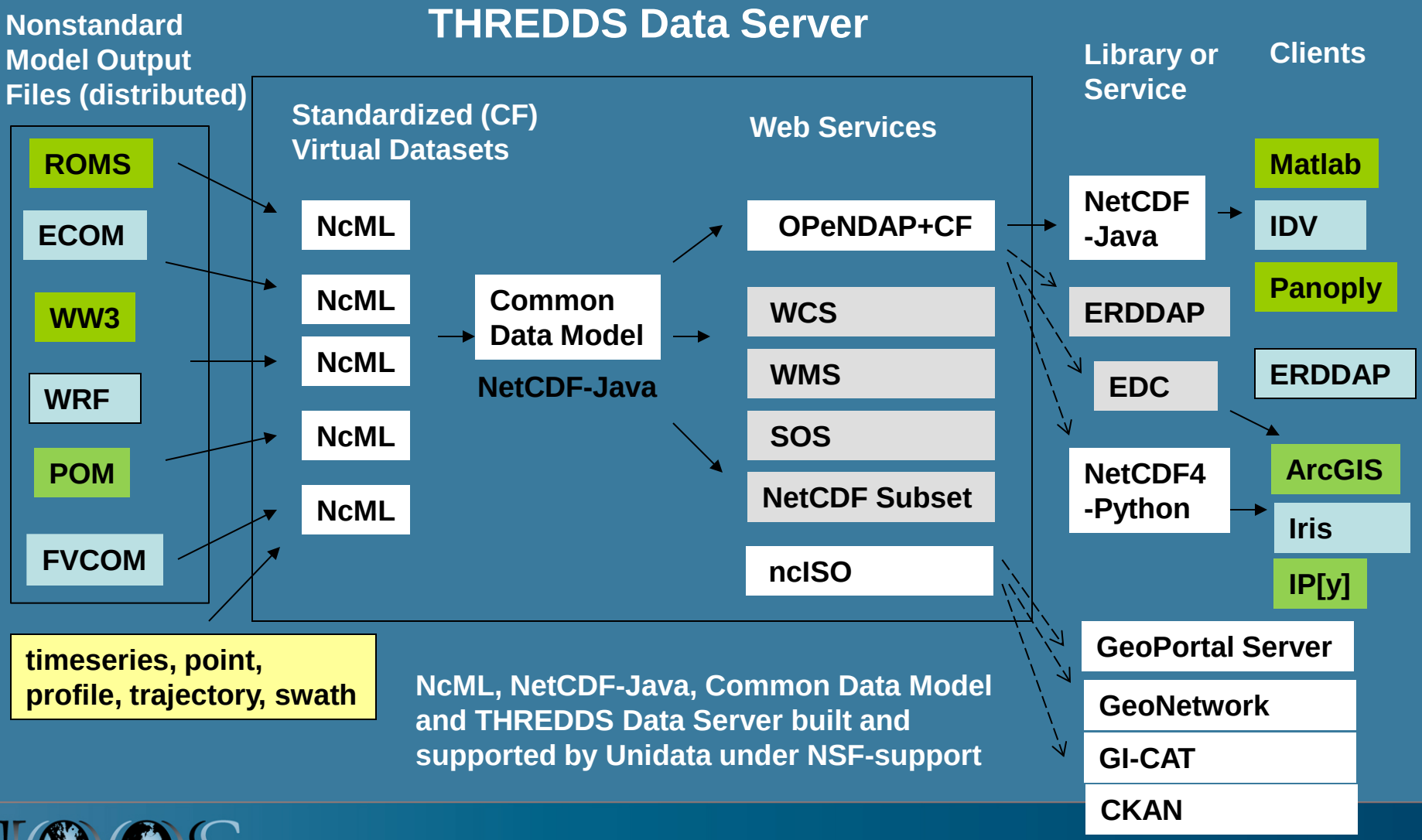
INTEGRATED OCEAN OBSERVING SYSTEM
IOOS

IOOS Recommended Web Services and Data Encodings

Data Type	Web Service	Encoding
In-situ data (buoys, piers, towed sensors)	OGC Sensor Observation Service (SOS)	XML based on OGC Observations and Measurements (O&M)
Gridded data (model outputs, satellite)	OPeNDAP with Climate and Forecast Conventions	DAP using Climate and Forecast (CF) conventions
Images of data	OGC Web Map Service (WMS)	GeoTIFF, PNG etc. -possibly with standardized styles

IOOS Model Data Interoperability Design



NCTOOLBOX: test_cf_ugrid3.m

C:\cygwin\home\rsignell\distro\nctoolbox\demos\contrib\test_cf_ugrid3.m

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```
% TEST_CF_UGRID3
% Compare water levels from 3 different unstructured gri
% models that use UGRID conventions (http://bit.ly/cf_ug
% comparison with no model specific code
titl{1}='ADCIRC';
uris{1}='http://testbedapps.sura.org/thredds/dodsC/inund
vars{1}='zeta';
times{1}=[2008 9 13 06 0 0];

titl{2}='SELFE';
uris{2}='http://testbedapps.sura.org/thredds/dodsC/inund
vars{2}='elev';
times{2}=[2008 9 13 06 0 0];

titl{3}='FVCOM';
uris{3}='http://testbedapps.sura.org/thredds/dodsC/inund
vars{3}='zeta';
times{3}=[2008 9 13 06 0 0];
% bounding box for figures
ax=[-95.4519  -87.3856   28.0   31.0]
% color range for figures
cax=[0 5];

% There is nothing model specific in the loop below!
for i=1:length(uris)
  tic
  % Initialize dataset object
  nc=ncgeodataset(uris{i});
  %get geovariable object
  zvar=nc.geovariable(vars{i});
  % Find the coordinate variables
  lon=zvar.getlondata(:);
```

Figure 1

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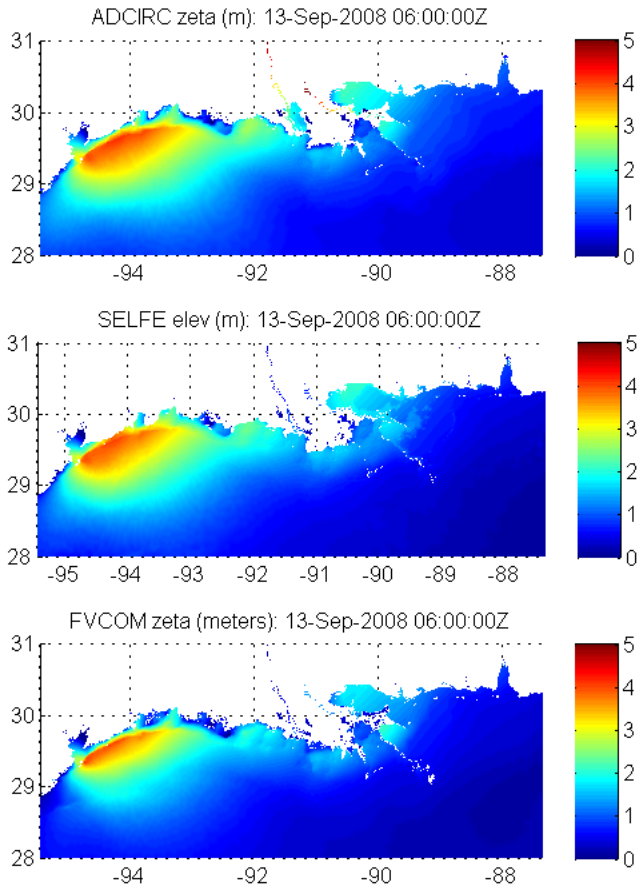
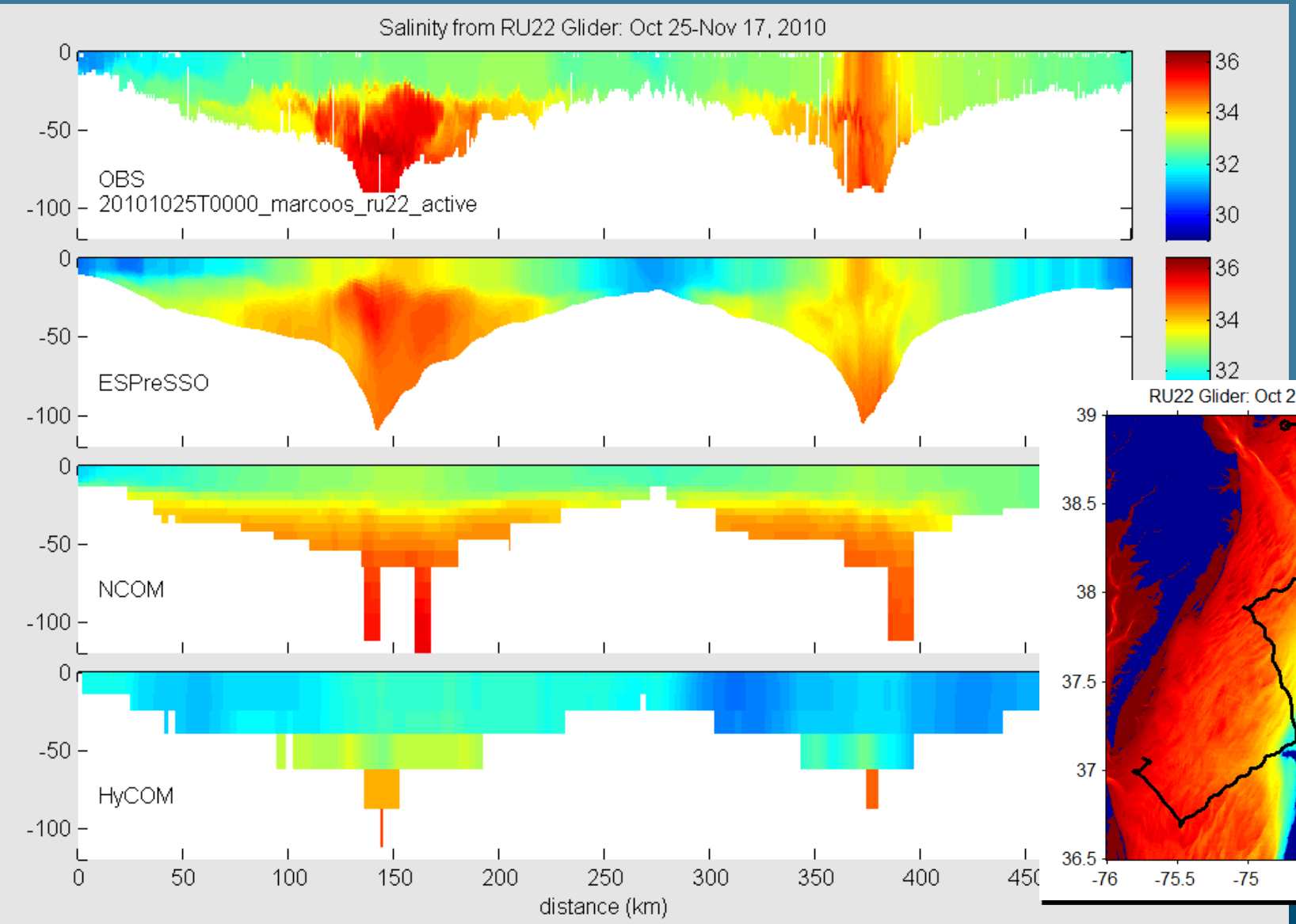


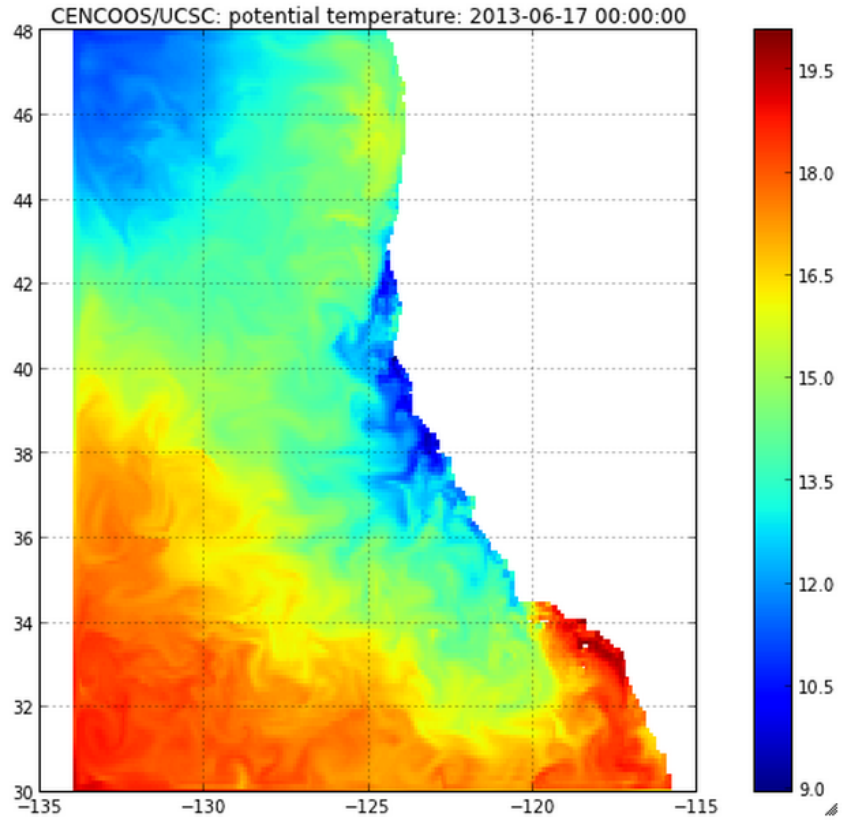
Glider Comparison with nc_genslice.m

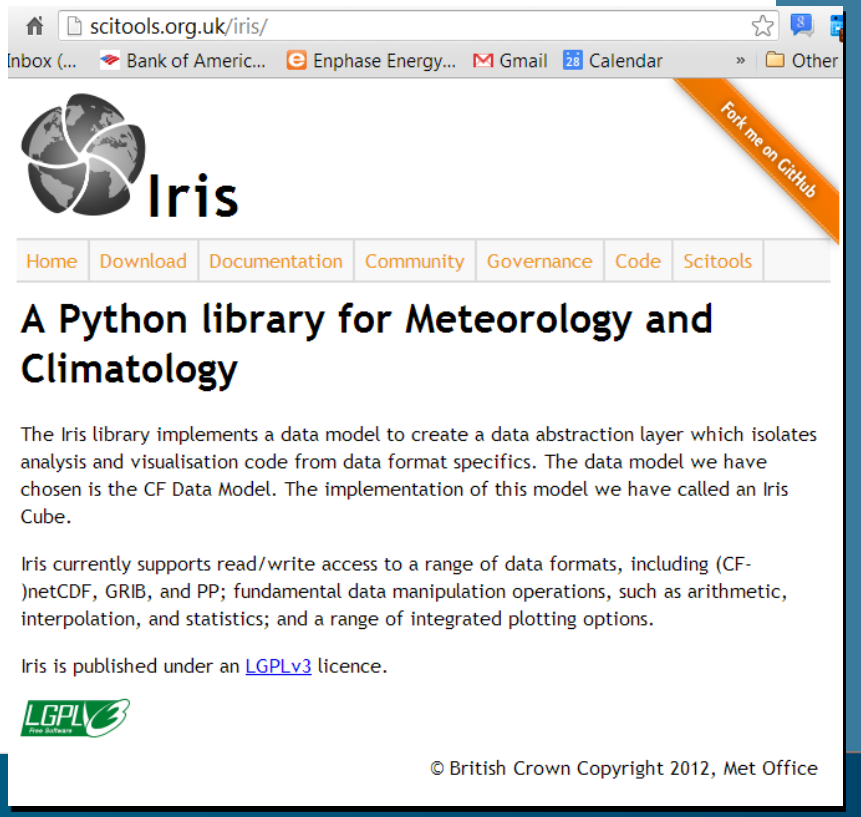


Access with Python using Iris

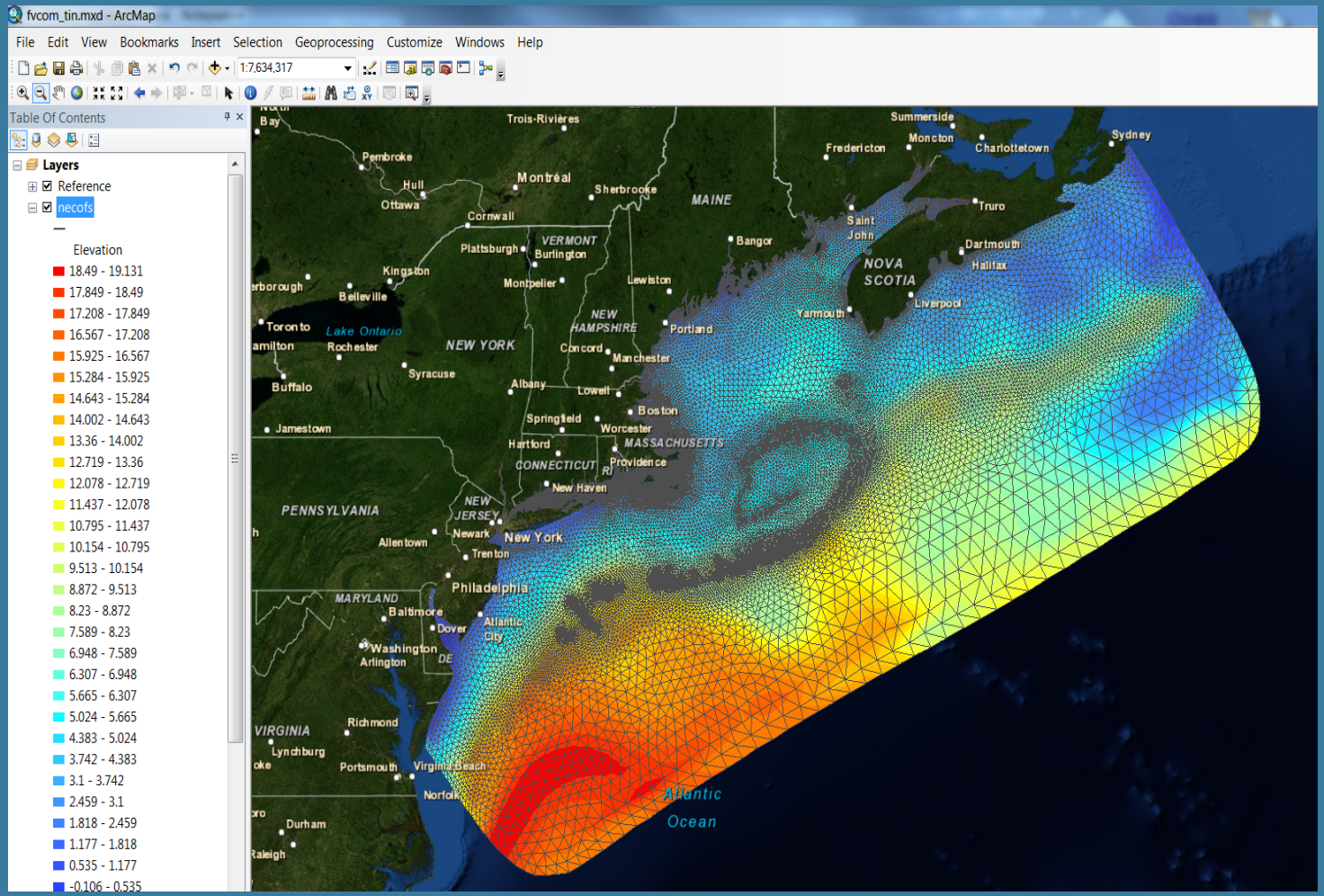
```
In [33]: model='CENCOOS/UCSC'
url='http://oceanmodeling.pmc.ucsc.edu:8080/thredds/dodsC/ccsnrt/fmrc/CCSNRT_Aggregation_best.ncd'
var='potential temperature'
lev=-1
slice=var_lev_date(url=url,var=var, mytime=mytime, lev=lev)
myplot(slice,model=model)

slice retrieved in 297.561164 seconds
```

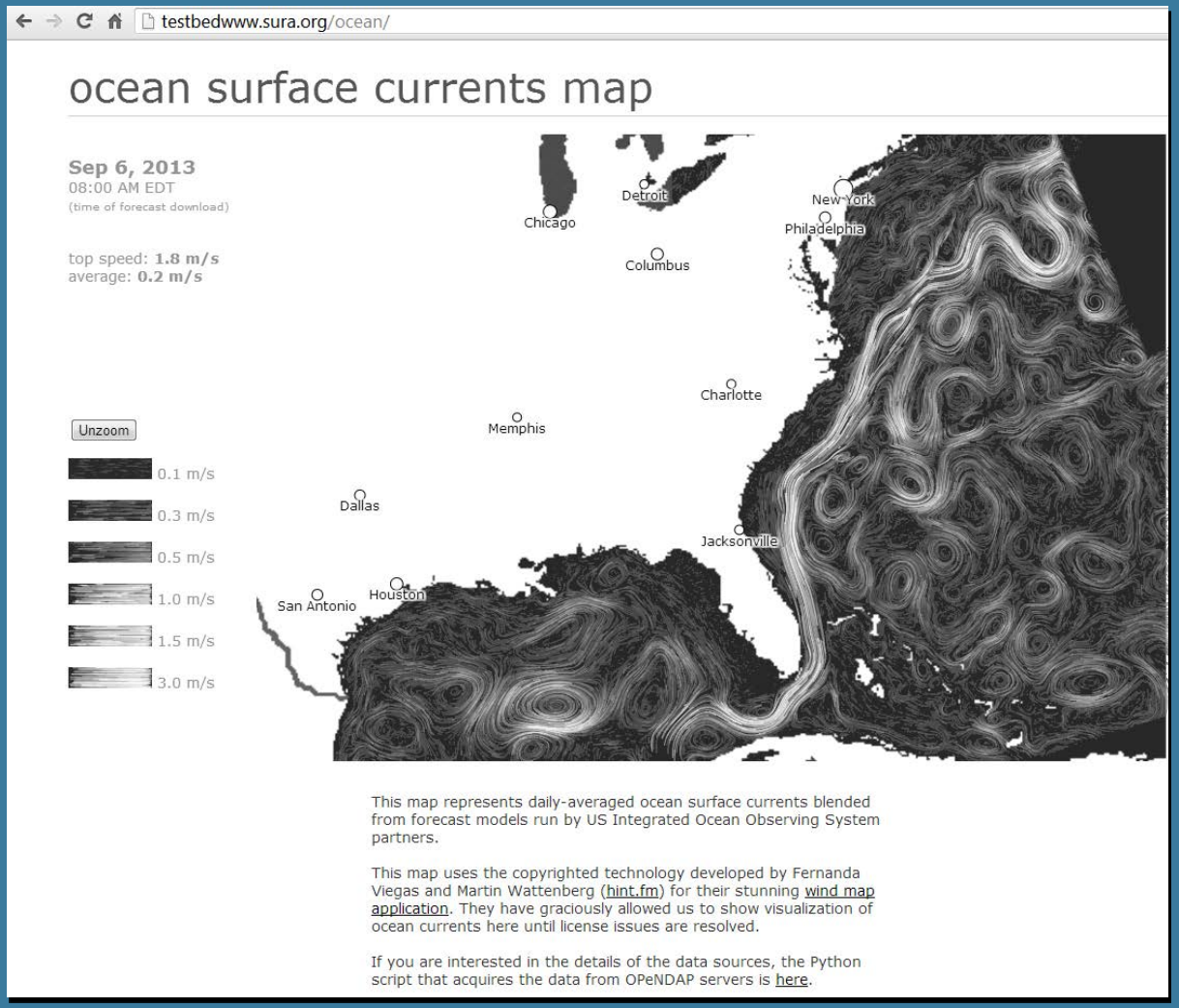




NECOFS Access in ArcGIS (using the dap2arc python toolbox)

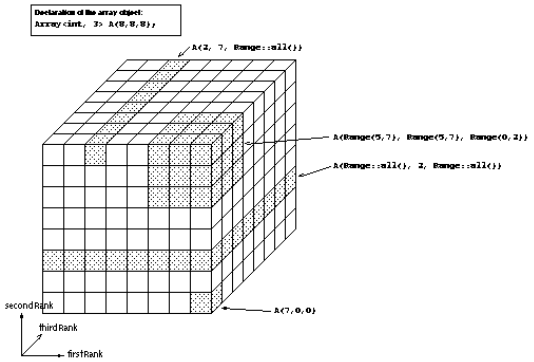


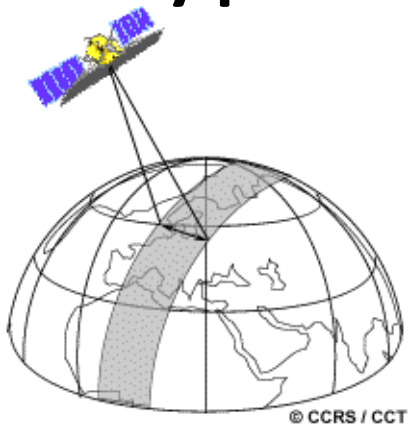
Ocean Surface Currents Map

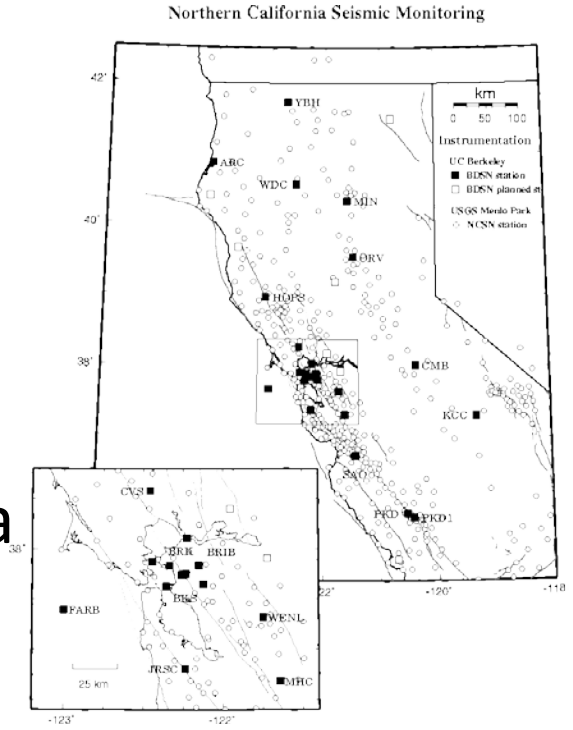


CDM: Scientific Feature Types

- Gridded Data
- Radial Data
- Swath Data
- Discrete Sampling Features
  - Point data
  - Station data
  - Profile data
  - Trajectory (e.g., aircraft track) data







Feature Types

- **point**: a single data point (having no implied coordinate relationship to other points)
- **timeSeries**: a series of data points at the same spatial location with monotonically increasing times
- **trajectory**: a series of data points along a path through space with monotonically increasing times
- **profile**: an ordered set of data points along a vertical line at a fixed horizontal position and fixed time
- **timeSeriesProfile**: a series of profile features at the same horizontal position with monotonically increasing times
- **trajectoryProfile**: a series of profile features located at points ordered along a trajectory

Setting up THREDDS catalogs

- Examples of setting up model output
- Example setting up time series data
- Where to document THREDDS/NcML best practices and examples?
- Let’s try github and gis.stackexchange.com