

NOAA Ocean Satellite Course
Oregon State University, March 27-29, 2007.
Prepared by LTJG Luke Spence, NOAA CoastWatch

ArcSatellite: Getting Satellite Data into ArcGIS

1. We'll start our class by downloading some satellite sea surface temperature data from the CoastWatch Browser. The CoastWatch Browsers were developed by Bob Simons of the CoastWatch West Coast Regional Node (<http://coastwatch.pfel.noaa.gov/>) to distribute the many datasets that CoastWatch handles from one easy data browser.

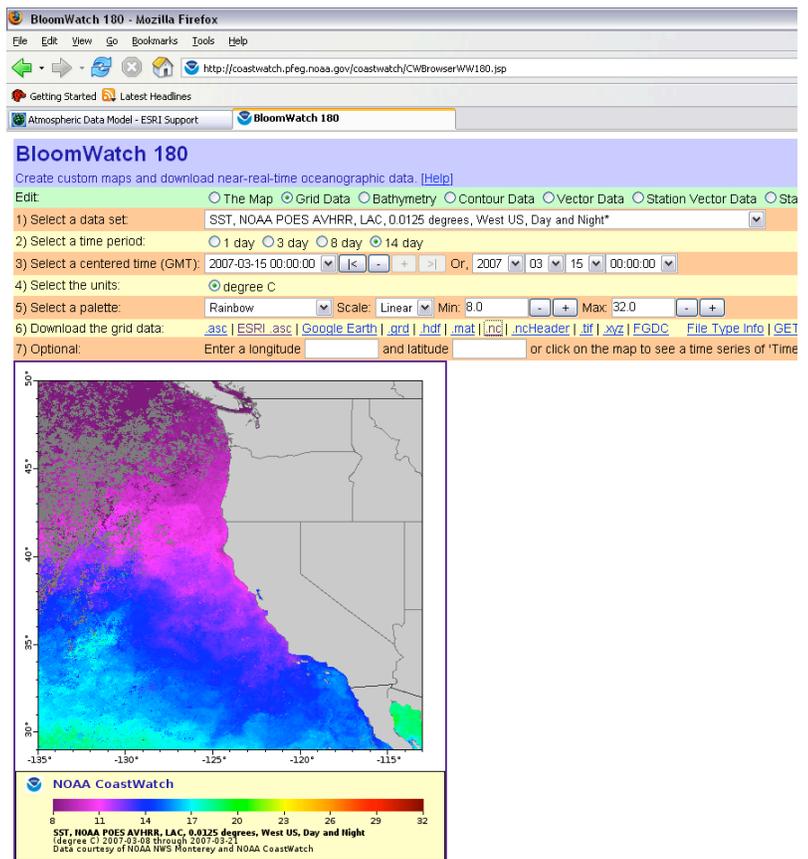
- First, create a working directory with write access.
- Open an internet browser, and navigate to the CoastWatch 180 browser at <http://coastwatch.pfel.noaa.gov/coastwatch/CWBrowserWW180.jsp>.

This browser distributes data for the entire world using longitude values from -180 to +180. This longitude format is preferred for importing data into Arc software. Other data browsers developed by CoastWatch include the West Coast Browser at

<http://coastwatch.pfel.noaa.gov/coastwatch/CWBrowser.jsp>, the Alaska Browser at <http://coastwatch.pfel.noaa.gov/coastwatch/CWBrowserAK.jsp>, the South America Browser at <http://coastwatch.pfel.noaa.gov/coastwatch/CWBrowserSA.jsp>, and the CoastWatch 360 Browser at <http://coastwatch.pfel.noaa.gov/coastwatch/CWBrowser360.jsp>.

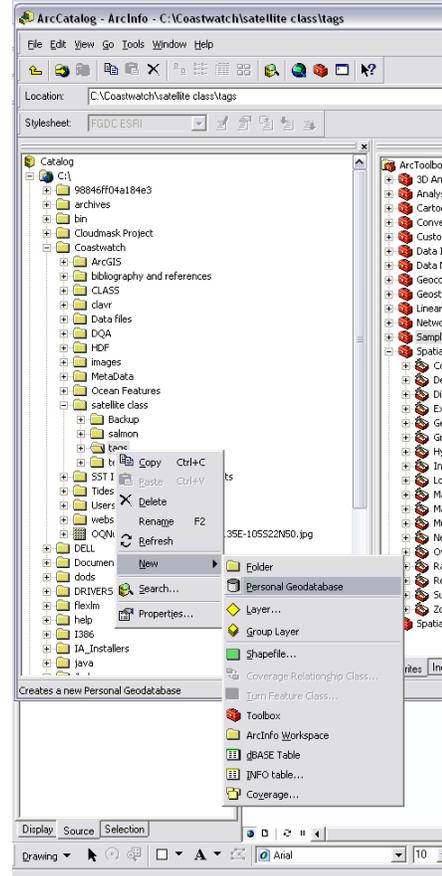
- Once the Browser is open, click on “The Map” button on the top row to access the map editing screen. Select the West US region (“W US”). Click on the “Grid Data” button on the top row to select the dataset and time period to download. Select the “SST, NOAA POES AVHRR, LAC, 0.0125 degrees, Day and Night” dataset from the dataset dropdown list. This is the local area coverage dataset for sea surface temperature from the AVHRR sensor on NOAA’s polar orbiting satellites (POES). Select the 14-day composite, and select any date in 2007 for the ending date (the date isn’t important for our current purposes).

Wait for the CoastWatch Browser to load the new data file into its display. Right above the data display (on line 6), there are links to download the grid data in a number of formats. Download your data file in the “ESRI .asc” format (ASCII) and the “.nc” format (NetCDF). We’ll import both of these formats to ArcGIS. With all the class hitting the Browser at once, it may take a long time to download. Especially considering that the ASCII files run about 24 MB for this spatial area, and the NetCDF files run about 11-12 MB.



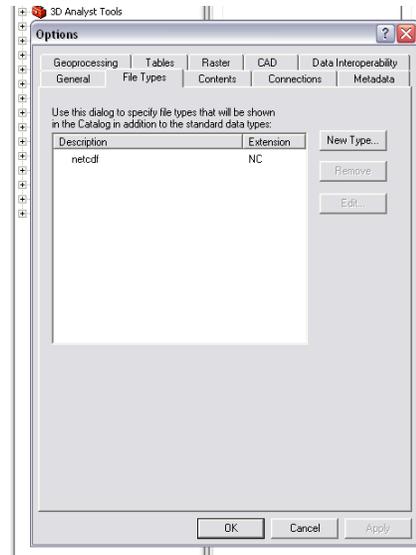
2. Open ArcCatalog, and in your working directory, create a Personal Geodatabase. Whenever possible, use this Personal Geodatabase to save the raster layers and features for this project.

- **To Create a Personal Geodatabase:** In ArcCatalog, in the file tree on the left hand side of the screen, right click on your working folder. Select “New – Personal Geodatabase”.



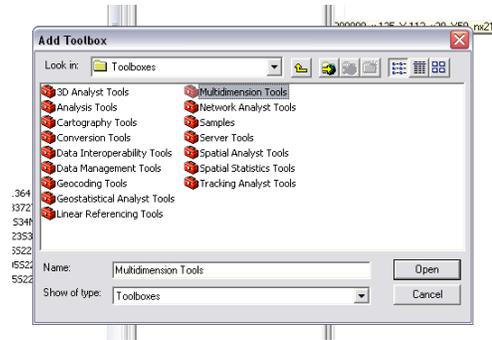
3. Make sure that NetCDF files are visible in ArcCatalog. Navigate to your working folder and check if you can see the NetCDF file you just downloaded from the CoastWatch Browser.

- **If NetCDF Files are not visible in ArcCatalog:** Open on the Tools Menu, and choose Options. Select the File Types Tab, and click the New Type button. For File Extension, type “nc”. For Description of Type, type “NetCDF”.



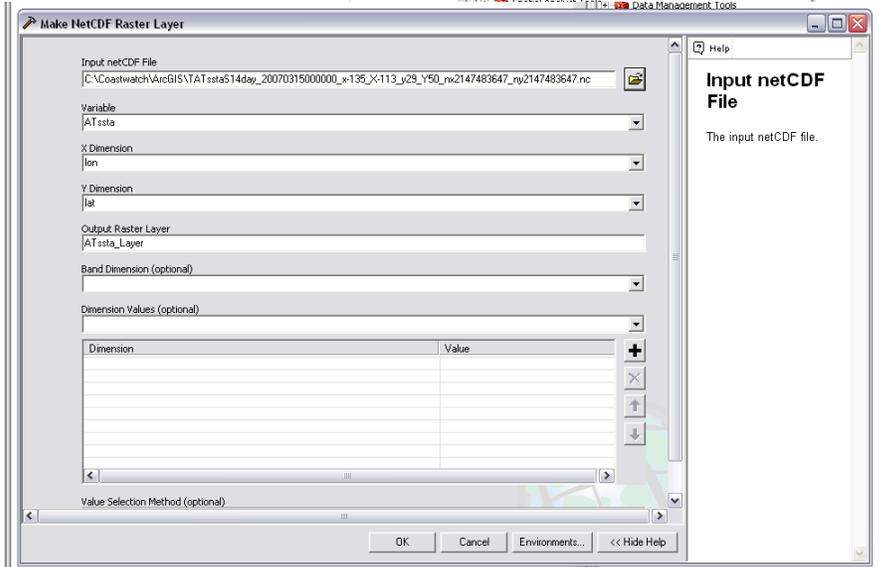
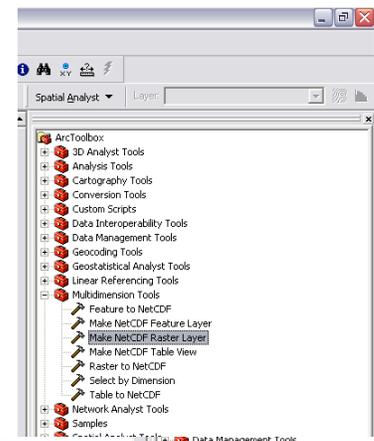
4. Open the ArcToolbox and make sure that the Multidimension Tools are present.

- **If the Multidimension Tools are not present in the ArcToolbox:** Open the “Window” menu and choose “ArcToolbox”. Right click in the empty space of ArcToolbox and select “Add Toolbox”. Navigate to the ArcGIS Toolbox folder (for example, C:\Program Files\ArcGIS\ArcToolbox\Toolboxes\). Choose “Multidimension Tools” and click the Open button. The Multidimension Tools should now be visible. Again, right click in the empty space of ArcToolbox and choose “Save Settings: To Default”.

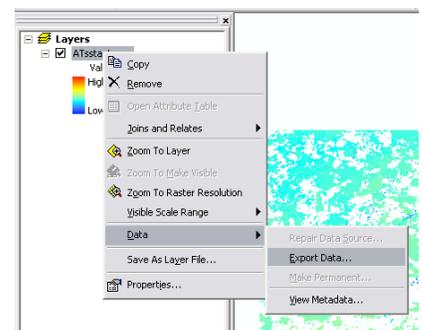


5. Now you will import and view the NetCDF file you downloaded from the CoastWatch Browser. Start ArcMap, and run the “Multidimension Tools: Make NetCDF to Raster Layer” tool to import the NetCDF file into ArcMap. The entire extent of the NetCDF file may not be visible in the layer you just imported. If that is the case, export the layer as a raster dataset in your Personal Geodatabase that you created. Remove the old layer, and add in this new layer you exported. The full extent of the data should now be visible.

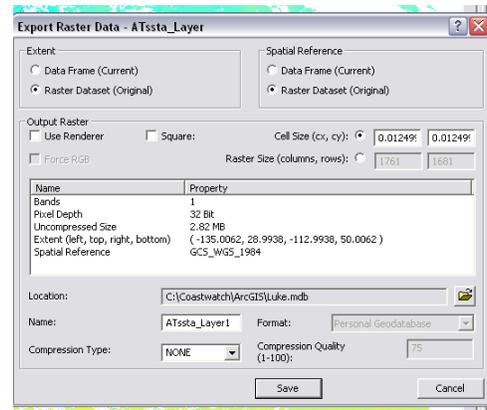
- **To Import NetCDF data into ArcMap:** Start ArcMap with a blank map. Open the ArcToolbox by opening the “Window” menu and selecting “ArcToolbox”. In the ArcToolbox, expand the MultiDimension Tools and double click on the “Make NetCDF Raster Layer” tool. For the Input NetCDF File, select the NetCDF file you downloaded from the Browser. For Variable, choose “ATssta”. This is the sea surface temperature variable we wish to plot. For X-Dimension, choose “lon” and for the Y-Dimension, choose “lat”. Leave the other options to their default values and click OK.



- **If the imported raster later does not display the full extent of the data:** On the layers panel on the left hand side of the screen, right click on the raster layer that was just added. Choose “Data: Export Data”. For the Export Data Options, choose: Extent: Raster Dataset (Original)



Spatial Reference: Raster Dataset (Original)
 Cell size selected
 Location: Choose your Personal Geodatabase
 Choose a name for the new raster dataset
 Click OK to export the data. When asked if you want to add the exported data to the map as a layer, choose yes. Right click on the old dataset and choose “Remove”. Now the only dataset present is the exported raster dataset that you just created. You should be able to see data for the same extent that you saw in the browser (Baja California up to British Columbia).



6. Now import and view the ASCII file you downloaded from the CoastWatch Browser. Run the “ASCII to Raster” tool in ArcToolbox to convert the ASCII file to a raster dataset. If you zoom in, you should see that each cell from the two imported files line up. You can also try to add a coastline layer to ensure that your data properly lines up with the coastline.

• **To Convert an ASCII file to a Raster:** In the ArcToolbox, open “Conversion Tools – To Raster – ASCII to Raster”. Select the .asc file you just downloaded as your input file. For the output raster, navigate to your Personal Geodatabase, and choose a name for your raster. Change the “Output data type” to FLOAT. Click OK to run the tool. Once the raster file has loaded into your screen, you can change the colorbar format by clicking on the raster’s colormap on the left side of the screen. Zoom out to view the full extent of the SST data you just added.

