AOSC 652: Analysis Methods in AOSC

Assignment #11: Advanced Plotting of Satellite Data
Due: Wednesday, 16 November 2016 (5 pm)

Name: _____

Animation path: _____

100 points total

Late penalty: <u>30 pts per day</u>

This assignment involves writing a routine in either **Python**, **IDL**, **Matlab**, or **some other language of your choosing** that displays both map projection of OMI total ozone column and the monthly record of ozone, over the site that you selected for Assignment #3. You should consult Assignment #3, and all of your files and routines developed for Assignment #3, for the completion of this new assignment.

In week 3, you downloaded map projections plots of OMI total column ozone. Here, you will make these map projections plots (top part of image), and place the total ozone time series interpolated to a location of your choosing, for the selected month, below the map projection. Best if you use the same locations and month that you had selected for Assignment #3.

You may complete this exercise using any other routine capable of producing map projection plots from satellite data read from a HDF file. If you are going to use software other than Python or IDL to complete this exercise, *please let one of the instructors know on Friday, 11 Nov*.

We have placed three files (*.m, *.py, and *.pro) in directory

> ~rjs/aosc652/week_11/hw_shell/

that will be of use if you decide to complete using either Matlab, Python, or IDL. Please have a look at the appropriate file.

Your assignment is to:

a) download a month's worth of HDF files containing total ozone column data from NASA via ftp:

i.e.:

> ftp acdisc.gesdisc.eosdis.nasa.gov
> cd data
> cd opendap2
> cd Aura_OMI_Level3
> cd OMTO3d.003
>> to get March 2016 data, enter:
> cd 2016
> prompt
> mget *2016m03*he5

Note: Ross will review step a) in class on Friday!

b) using the appropriate shell code as a starting point should you so desire, create a program that produces the OMI total ozone onto a map projection (either a northern hemisphere, southern hemisphere, or global projection, depending on your location). This figure should be placed at the top of your plotting window. Please indicate the date at the top of each figure.

In the same plotting window, plot the time series of total ozone column for the location you have chosen, stopping on the date of the upper plot (i.e., as was done in Assignment #3).

c) Create a separate figure for each day of the month. Best to use PNG file (Tim will review making PNGs with IDL on Friday), and best to also have the filename of each figure reflect the day of month. You should be able to do all of this using one code.

d) Using the figures you have created, re-produce the "animation" you made for Assignment #3. You are welcome to use OpenOffice Impress to complete this part of the assignment, but probably best to use PowerPoint on either a PC or Mac platform.

For this assignment, please turn in:

> 1) the full pathname of your animation (likely either a *.odp or *.ppt file), which you can write on the first page of this assignment;

> 2) all code used to complete the <u>this assignment</u> (i.e., no need to turn in the FORTRAN used to obtain the time series of ozone over the specific location, since presumably you will use the same file as used for Assignment #3)

> 3) a hardcopy of the last image of the animation

> Note: if your FORTRAN code used to complete Assignment #3 had a "bug", as noted in our grading of this assignment, then please <u>fix the "bug"</u>, <u>print out</u> a copy of the FORTRAN code and <u>include</u> with your package, and also use a pen to *<u>highlight the new code that fixes the bug</u>*.