Laboratory Exercise - 4 : Working with cartopy

CE670a: Environmental Geodesy — Date: Jan 31,2020
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Objective:

Read temperature data from netCDF4 and Plot map using cartopy.

Task

1. Download gridded monthly temperature data from given link-
   http://berkeleyearth.lbl.gov/auto/Global/Gridded/Complete_TAVG_LatLong1.nc

2. Install cartopy and netCDF4 libraries in the system.
   Open anaconda prompt and type - "conda install cartopy" to install cartopy and type- "conda install netCDF4" to install netCDF4 library.

3. Import these libraries into python and read temperature data using netCDF4. What are the variables in the data?
   You can read more about given data here-
   http://berkeleyearth.lbl.gov/auto/Global/Gridded/Gridded_README.txt

4. Read average monthly temperature data (from climatology variable) from given file and plot it on scatter plot.

5. Visualize sample map in cartopy and use different projections i.e. Mercator projection, lambert azimuthal projection, equal area projection to visualize map.
   You can take the help of given tutorials-
   1. https://geohackweek.github.io/visualization/03-cartopy/
   2.https://github.com/groundhogday321/python-cartopy/blob/master/Python%20Cartopy.ipynb

6. Complete exercises given in above tutorials. Plot world map with various projections. Than choose any area of about $45^{o*}45^{o}$ in mid latitude and apply different projection on it. Understand the change and use of different projections.

7. Plot average temperature data on the map for any one month.
   https://scitools.org.uk/cartopy/docs/v0.15/matplotlib/advanced_plotting.html

Notes

1. No marks will be given for late submission.

2. Zero marks will be provided to both parties for cribbing each other's work.

3. Last date of submission- 07 Feb.2020

4. Additional references-

https://scitools.org.uk/cartopy/docs/latest/tutorials/understanding_transform.html

https://www.youtube.com/watch?v=4M2aiHvhr5Y

https://github.com/geohackweek/tutorial_contents/tree/master/visualization/notebooks