# ATM 419/563 – Geogrid, projections, and map factors

Spring, 2024 – Fovell

**Due Thursday, February 15, by start of class.**

Set up a domain centered somewhere on Earth and evaluate several map projections in order to recognize potential accuracy and performance issues involved with various domain setups relating to effective resolutions. **I strongly suggest you use this assignment to start thinking about where you want to place the domain for your final project simulations.**

In your lab space, create a directory called GEOGRID and copy into it the `make_all_links.sh`, `namelist.wps`, and `max.csh` files from your SNOW directory. Execute `make_all_links.sh`. Then design a single **60 x 60 point** domain, at **48 km resolution**, centered somewhere on Earth. Report your `ref_lat` and `ref_lon` on the back side. You can set `stand_lon` = `ref_lon` or not, as you wish or need. Report `stand_lon` on the back side, too.

You will run `geogrid.exe` at least **4 times**, for four different configurations. Two versions will use Lambert and there will be one each with Mercator and Polar Stereographic. For Lambert #1, use `truelat1` = `truelat2` = `ref_lat`, and for Lambert #2 use the more traditional values of `truelat1` = 30 and `truelat2` = 60. For Mercator ("mercator") and Polar Stereographic ("polar"), use `truelat1` = `ref_lat` (`truelat2` is not used and is ignored). You can run `geogrid.exe` on multiple cpus: `srun -p batch -n 4 geogrid.exe`

For each of these four domains, use `ncview` or `max.csh` as shown in class to determine the max and min values of `MAPFAC_M`, and report them. **You can use the NCL script `plotgrids.ncl` to look at the domains you have created BUT you'll have to follow the procedure outlined below.** (Consider doing that **first** as it can catch problems with configuring the domain!) From the map factors, compute the largest and smallest grid spacings in your domain.

ATTACH A PICTURE OF YOUR DOMAIN. Consider using WRF_plot_SNOW2023.ipynb, and sending output file "model_terrain.png".

For more information, please refer to `http://www2.mmm.ucar.edu/wrf/users/docs/user_guide_v4/v4.2/users_guide_chap3.html`.

`ref_lat`: _____, `ref_lon`: _____, `stand_lon`: _____.

| Projection | Map factor minimum | Map factor maximum | Grid spacing largest | Grid spacing smallest |
|---|---|---|---|---|
| Lambert #1 | | | | |
| Lambert #2 | | | | |
| Polar | | | | |
| Mercator | | | | |

**To run plotgrids.ncl:**

1. Open a session on **headnode7.rit.albany.edu**
2. Execute the `old` command at the prompt
3. Move to your working directory
4. Execute `ncl plotgrids.ncl`