Prepare WRF Inputs

1. **GEOG files**: downloaded during WPS installation and placed in /phd/models/wrf2.2.1/WPS/geog. If you did not, then:
   a. Download the files from from http://www.mmm.ucar.edu/wrf/users/download/get_source.html.
   b. Click on returning users and enter your e-mail address.
   c. Choose WPS input data (geographical database).
   d. Mac automatically unzips these files.
   e. Go into the /WPS directory. Copy the geog.tar into it and detar it. It will create its own /geog directory.
   f. This path should be added to the namelist.wps: "geog_data_path = /phd/models/wrf2.2.1/WPS/geog".
   g. Delete the geog.tar file.
2. **GFS files**: Global Forecast System meteorology files have 1 degree resolution at 6-hour intervals. They are the easiest grib files to use with WRF, but they have lower resolution than NAM (see below). The WRF Manual recommends you get grib files closest to your simulated resolution. NOTE: All files after Feb 2008 are grib2 so WRF must be compiled to use this type of file.
   a. Go to the WRF User's Page website http://www.mmm.ucar.edu/wrf/users/
   b. Click on Downloads and choose Input Data from NCAR
   c. Choose NCEP Final Analysis (FNL from GFS) (ds083.2)
   d. The UCAR CISL database requires you to be a registered user. If you have not done so yet, click on "here" to sign up. Login with your email address and your password.
   e. Choose the year you would like to use and then the month.
   f. Review the files available and check the boxes next to the ones you want. Then press "Show Selected Files/Download Tar Files"
   g. You can review if the selected files are correct and then hit "Download the Selected Files as a Tar Files" to begin the download. The tar files will be placed in the ~/Downloads directory.
   h. These are very large files: just getting 10 files can take 30 minutes to download.
   i. Detar the files in the /phd/data/grib directory.
   j. The file names all begin with "fnl_" followed by the date in YYMMDD_HH_mm. Files should be about 25 MB each.
   k. Use the Vtable.GFS for this data
3. **NAM files**: North American Model meteorology files have 40 km resolution at 3-hour intervals. NOTE: All files after Feb 2008 are grib2 so WRF must be compiled to use this type of file.
   a. Go to the WRF User's Page website http://www.mmm.ucar.edu/wrf/users/
   b. Click on Downloads and choose Input Data from NCAR
   c. Choose NCEP Eta/NAM (ds609.2)
   d. The UCAR CISL database requires you to be a registered user. If you have not done so yet, click on "here" to sign up. Login with your email address and your password.
   e. Choose "3D_SF_anal".

f. Choose the year you would like to use. Surface files then can be downloaded by the month and 3D Analysis by half months. Keep in mind that you need both surface and 3D files to run WRF.
g. Review the files available and check the boxes next to the ones you want. Then press “Show Selected Files/Download Tar Files”
h. You can review if the selected files are correct and then hit “Download the Selected Files as a Tar Files” to begin the download. The tar files will be placed in the ~/Downloads directory.
i. These are very large files: just getting one month can take more than 2.5 hours to download.
j. Detar the files in the /phd/data/grib directory. This will create two directories named “{dates}_3Danal” and “{dates}_ SFanal”.
k. Delete (rm) all the *.tm12 files since they are not used for modeling purposes.
l. The filenaming convention is not as easy as that used for GFS files. Both 3D and SF files start with the date in “YYYYMMDD”. The next two digits are either “00” or “12” followed by “.AWIP3D00” or “AWIPSF00”. The final four digits are “tm” followed by 00, 03, 06, or 09 (you should have deleted all the tm12).
    (1) For “00” files ending with:
        (a) tm00 are for the same date 00Z
        (b) tm03 are for the prior date 21Z
        (c) tm06 are for the prior date 18Z
        (d) tm09 are for the prior date 15Z
    (2) For “12” files ending with:
        (a) tm00 are for the same date 12Z
        (b) tm03 are for the same date 09Z
        (c) tm06 are for the same date 06Z
        (d) tm09 are for the same date 03Z
    (3) Just to clarify, if you want to simulate 6-1-05 (24 hours in UTM), you will need:
        (1) 2005060100.AWIPSD.tm00 & 2005060100.AWIPSF.tm00 (midnight)
        (2) 2005060112.AWIPSD.tm09 & 2005060112.AWIPSF.tm09 (3:00 am)
        (3) 2005060112.AWIPSD.tm06 & 2005060112.AWIPSF.tm06 (6:00 am)
        (4) 2005060112.AWIPSD.tm03 & 2005060112.AWIPSF.tm03 (9:00 am)
        (5) 2005060112.AWIPSD.tm00 & 2005060112.AWIPSF.tm00 (noon)
        (6) 2005060200.AWIPSD.tm09 & 2005060200.AWIPSF.tm09 (3:00 pm)
        (7) 2005060200.AWIPSD.tm06 & 2005060200.AWIPSF.tm06 (6:00 pm)
        (8) 2005060200.AWIPSD.tm03 & 2005060200.AWIPSF.tm03 (9:00 pm)
        (9) 2005060200.AWIPSD.tm00 & 2005060200.AWIPSF.tm00 (midnight)
m. Use the Vtable.NAM for this data.

4. **NNRP files**: NCEP/NCAR Reanalysis Project meteorology has 2.5 degree resolution at 6-hour intervals.
    a. Go to the WRF User’s Page website http://www.mmm.ucar.edu/wrf/users/
    b. Click on Downloads and choose Input Data from NCAR
    c. Choose NCEP/NCAR Reanalysis (ds090.0)
    d. The UCAR CISL database requires you to be a registered user. If you have not done so yet, click on “here” to sign up. Login with your email address and your password.

e. Choose the year you would like to use. Files can then be downloaded by month.
f. Use the Vtable.NNRP for this data

5. **GDAS files**: Global Data Assimilation System analysis has 2.5 degree resolution at 12-hour intervals. The WRF websites notes that you may be able to use it if your entire domain stays in one hemisphere.
   a. Go to the WRF User's Page website http://www.mmm.ucar.edu/wrf/users/
   b. Click on Downloads and choose Input Data from NCAR
   c. Choose NCEP GRIB GDAS (ds083.0)
   d. The UCAR CISL database requires you to be a registered user. If you have not done so yet, click on "here" to sign up. Login with your email address and your password.
   e. Choose the year you would like to use. Files can then be downloaded by month.
   f. I'm not sure which Vtable to use.
6. **NARR files**: The North American Regional Reanalysis meteorology has 32 km resolution at 3-hour intervals so it is even more detailed than NAM. Unfortunately, it is released in January after the close of each year. This means it has no files for the current year.
   a. Go to the CISL Research Data Archive at http://dss.ucar.edu/
   b. Under Renalyses, click on NARR
   c. Choose NCEP GRIB GDAS (ds083.0)
   d. The UCAR CISL database requires you to be a registered user. If you have not done so yet, click on "here" to sign up. Login with your email address and your password.
   e. Click on 3-hourly data files. Files can then be downloaded by month.
   f. Use the Vtable.NARR for this data.
7. **RUC files**: The Rapid Uptake Cycle model provides 20 km meteorology output every hour.
   a. Go to the NOAA National Operationsal Model Archive and Distribution System (NOMADS) at http://nomads.ncdc.noaa.gov.
   b. Under "Data", click on "Access". Under "Data Access by Provider", click on "Rapid Uptake Cycle (RUC)." You want RUC for Domain 252 (20 km). When you find this table entry, click on "plot I ftp4u"
   c. On the Request Data form, choose date range, cycles (I chose just 0000: analysis), and forecast hours (I chose all for hourly data). Hit "build order".
   d. You will be assigned a Dataset Collection Order Number along with the number and total size of your slection. Hit "Select files for FTP". It could take several minutes to build your order depending on size.
   e. You will now see a list of all files from your request. You can check off individual files for ftp, but this is time consuming. Its better to click on "File Filter". Use the Filename Filter to choose a portion of the files (note that this can be done several times for a single order). There are also Metadata files that can be selected, where *.inv is wgrib inventory data and "fff" is a merged file witg *.idx for a GRADS gribmap index or *.ctl for GRADS data descriptor file. I chose to move one date at a time to ftp and then got all the "fff" files. Hit "select files."
   f. Now you'll see a page with the subset of files you selected. You can further reduce the files by choosing by level, variable, and/or subregion. I chose "all" for

levels and variables and did not use the subregion option for RUC. Make corrections by hitting the “back” button on your web browser. When these selections are made, enter your e-mail as your anonymous password and click on “Start FTP”.

g. It will take several minutes to move your files to the ftp server. At this point, you have the chose of hitting the browser “back” button to select more files. If you have all the files you want to download, go to the bottom of the page and click on the ftp address to begin the file transfer.
h. The files will appear in a “Finder” window. Open a second Finder window and go to the directory where you want to store RUC files. Select all and drag to the new location. I found it took about an hour to download a 24-hour day for hourly RUC files.
i. Use the Vtable.RUCp for isobaric coordinates.

8. **RUC soil files**: The Rapid Uptake Cycle land model requires RUC data on soil moisture and soil temperature in six layers, which is not available from NAM.
   a. Use the Vtable.RUCb for hybrid coordinates.
9. **AGRMET soil files**: The output of the Agricultural Meteorology Model can be used to supplement NAM when running the Noah Land Surface Model.

Monday, August 11, 2008