

MM5 Pre- and Post-Processing Programs' Update

Cindy Bruyère and Wei Wang

National Center for Atmospheric Research*, P.O. Box 3000, Boulder CO 80307

1. INTRODUCTION

Current release for most of the pre- and post-processing programs is version 3.6, released in December 2002. INTERPB and RIP has release version 3.2, and the MM5toGrADS converter is release 3.1.

Few major developments were done on most of the pre- and post-processing programs, except for the RIP code.

This report is a summary of the new capabilities in version 3.6. A complete description of all changes and bug fixes to the pre- and post-processing programs are available from the change logs in: <http://www.mmm.ucar.edu/mm5/mm5v3/v3prep.html>

2. CHANGES AND NEW CAPABILITIES IN V3.6

a. TERRAIN

A couple of small changes went into TERRAIN for release 3.6, most of them related to improving the scripts. The biggest change in TERRAIN was a correction to the code when using TRUELAT1=TRUELAT2 for the Lambert-Conformal projection.

b. REGRID

A new capability is the generation of intermediate files for seaice fraction. Seaice fraction is used when the polar physics option (IPOLAR=1) is switched on in MM5. Due to the nature of the data the creation of these files were built in as a separate job from pregrid.

Seaice fractional data is available from the *Near Real-TimeSSM/I EASE-Grid Daily Global Ice Concentration and Snow Extent. Boulder, CO, USA: National Snow and Ice Data Center.*

This data can be obtained from their web site at <http://nsidc.org/data/nise1.html>

Vtables were added for use with NCEP AVN and AFWA AGRMET data streams.

REGRID/pregrid can now also process data on Mercator projections

Changes to REGRID/regridder include a correction with the bilinearly interpolation across input data boundaries when input data (such as for AVN data) cross the 0 degree longitude, and a fix to allow RUC input data to have longitude values less than 180 degrees. All the new variables that will be needed

when making use of the new Noah LSM in the MM5 code are also passed through to the nest programs.

c. RAWINS

No new development was done on the RAWINS code. Changes in version 3.6 was restricted to a bug fix, related to the change to allow 500 rather than 50 time periods to be processed. And the addition of a script to run on NCAR's IBM computers.

d. LITTLE_R

New utility routine *window_obs.f* was added. This utility can be used to limit observations within a window domain. Using this utility to reduce the input file sizes will reduce LITTLE_R run time considerably. This utility must be compiled and run separately.

A fix was added to detect and skip impossible location observations (like pole for Mercator). The default namelist was updated to allow 4 scans in Cressman scheme.

A batch job script to run on NCAR's IBM was added.

e. INTERPF

Add an option to use a different method to compute surface pressure. This option is controlled by the new namelist variable *psfc_method* in namelist record4. This new option improves surface pressure calculations for regions where strong inversion exists in the lower troposphere.

Add sea ice fraction field in the lower boundary file. This field may be used by MM5 model when polar physics option is chosen.

f. NESTDOWN

All additional Noah LSM variables were added. Fix the RH computation to change from specific humidity to mixing ratio.

g. INTERPB

To allow for MM5 output that may not be at equal times, INTERPB will process all times which are within 2 time-steps of the requested output time to be used.

Retrieving of surface pressure is now done as an inverse of the pp calculations done in INTERPF. Fix the RH computation to change from specific humidity to mixing ratio.

*The National Center for Atmospheric Research is sponsored by the National Science Foundation.

Intermediate files are now created for Mercator projections as well. And the LANDMASK field is added into the simulated regridder output.

h. GRAPH

Add new fields from the new polar and Noah LSM physics. Allow for `truelat1 = truelat2` for Lambert-Conformal maps, and `abs(truelat1) = 90` for polar stereographic maps. An integrated height option is added for REGRID data.

Correct a problem of plotting skew-T when specifying X and Y, and fix the virtual temperature error when integrating the hydrostatic equation to obtain heights from pressure level temperatures.

i. RIP

Some major development was done for the RIP programs. A summary of the bigger changes is given below. Details are available from <http://www.mmm.ucar.edu/mm5/mm5v3/v3rip-chg.html>.

The RIP Users' Guide has also been updated for all new changes that affect the user interface. <http://www.mmm.ucar.edu/mm5/documents/ripug.html>

Map drawing routines were substantially upgraded to allow for plotting of NCAR Graphics "Earth.." outlines, as well as RANGS/GSHHS outlines. UW's "M1" and "M3" outline sets, previously accessible only through UW's version of NCAR graphics by setting 'OU' to 'M1' or 'M3', are now generally accessible through the "hiresmap" function, if the appropriate outline data file is obtained from NCAR's ftp site.

Increase processed hours of output data from 999 to 9999. Adjustments has been made so that RIP can read RIPDP-produced data files with either the old 9-character time specification format or the new 10-character time specification format.

New fields: Dew point temperature in Kelvin (`tdk`) and in degrees C (`tda`); Saturated equivalent temperature (`sateth`); Eastward and northward components of velocity (`unor,vnor`); Precipitable water was re-defined into two types: `pcptw` (formerly called `pcpw`), which is total precipitable water or vapor plus hydrometeors, and `pcpwv`, which is precipitable water vapor (no hydrometeors). `pcpw` was retained for backward compatibility.

Corrections to old fields: A correction was made to surface temperature when plotted in degrees F. A bug in the southerly/westerly wind component calculation was fixed. Ceiling and visibility were changed so that they are plotted everywhere, not just over land.

The time series function was improved, to allow for different ways to specify the locations at which time series are desired, and to improve printing of times.

Additional functionality was added to the "nohl" keyword: `Z`, `T`, and `A`. These do not suppress the labeling of extremes, but change it. `nohl=Z` causes highs and lows to be labeled with "H" and "L" only, with no values shown; `nohl=T` causes highs and lows to be labeled with "W" (warm) and "C" (cold) only; and `nohl=A` causes highs and lows to be labeled with "A" (anticyclonic) and "C" (cyclonic) only.

j. MM5toGrADS

Add ability to display expanded domains, and add improved compiling options for Linux.

A correction was made to the counting of 2D variables if using input files other than `MMOUT_DOMAINx`.

3. NEW IN USER SUPPORT

a. IBM support

All programs and utilities have been ported to the IBM's, and batch deck scripts have been developed for all of them. Utilities have been developed to read old Cray data files on the IBM's.

"Get" scripts have been developed for AWIP and FNL data. These are currently only available from the `~mesouser` disk.

b. Web pages

The MM5 Home pages have been migrated to a new format, which we hope will be easy to navigate. The new pages no longer make use of frames, so regardless of where in the site a page is opened, the navigational bar will be available.

The FAQ pages have been enhanced with new questions and details on how to run on the NCAR IBM's.

All emails send out to the two mailing lists, `mm5-news` and `mm5-users@ucar.edu`, are automatically archived on the web and are available from: <http://www.mmm.ucar.edu/mm5/support/mm5news.html>; and <http://www.mmm.ucar.edu/mm5/support/mm5users.html>

c. On-Line Documents

The MM5 Tutorial class notes are now available online in html format: http://www.mmm.ucar.edu/mm5/documents/MM5_tut_Web_notes/TutTOC.html

4. SUMMARY

No major developments are foreseen of the pre- and post-processing programs. We do plan to start supporting Intel compilers, and will continue users support and fixes.