Utility Programs 14

14 Utility Programs

14.1 Purpose

A number of utility programs are available to users. These programs are intended to assist users to work with MM5 input and output data. These programs and program tar files may be found from NCAR's anonymous ftp site: ftp://ftp.ucar.edu/mesouser/MM5V3/Util, and NCAR SCD disk: /fs/othrorgs/home0/mesouser/MM5V3/Util.

14.2 Utility Programs

14.2.1 readv3.f

Function -

This utility reads all V3 MM5 output files, print out the header, partial sub-header, and a value from all fields in the dataset.

This program can be used as an essential component to build user's utility program for data processing and analysis.

How to Run It -

This program is written in free-formatted FORTRAN. To compile it on a Compaq machine:

```
f90 -free -convert big_endian readv3.f
```

To compile on a Linux machine, type

```
pgf90  -Mfreeform -pc 32 -byteswapio readv3.f
```

To compile on a SGI, type

f90 -freeform *readv3.f*

To run it, type

a.out *v3-filename*

14.2.2 ieeev3.csh

Function -

This script converts MM5 modeling system output data from Cray binary to standard IEEE data. It only runs on Crays (since it needs to read Cray data).

How to Run It -

Obtain the script from ~mesouser/MM5V3/Util on NCAR's IBM, or ftp://ftp.ucar.edu/mesouser/MM5V3/Util directory. To run it, type

ieeev3.csh *v3-filename-in-Cray-format*

It creates an IEEE file with the name *v3-filename-in-Cray-format.ieee*.

14.2.3 V2-to-V3 Converter

Function -

This utility converts all V2 modeling system output to that of V3, including boundary condition file. It is intended for users who have data in V2 format and would like to use them in V3 system.

How to Run It -

This program is written in free-formatted FORTRAN 90. The program is built with a main program and a few modules. To compile it, simply type 'make', and two executables will be built: v22v3.exe and readv3.exe. To run it, type

v22v3.exe *v2-filename*

The file name for the converted file is *v2-filename.v3*. To convert V2's boundary condition file, one must convert both the boundary file and the mminput file that corresponds to the boundary file together. For example,

v22v3.exe *mminput_domain1 bdyout_domain1*

It will create three files for V3 named *mminput_domain1.v3, bdyout_domain1.v3* and *lowbdy.v3* (which is a new file in V3 containing the lower boundary condition fields such as substrate temperature and SST).

14.2.4 V3-to-V2 converter

Function -

This utility converts ONLY V3 MM5 model output to that of V2. This is intended for users to make a smooth transition until all utility programs a user has developed are converted for V3.

How to Run It -

This program is written in free-formatted FORTRAN 90, and built similarly as the program v22v3. To compile it, simply type ‘make’, and it will build two executables: v32v2.exe, and readv2.exe. To run it, type

v32v2.exe *v3-mm5-filename*

It will create an output file named *v3-mm5-filename.v2*

14.2.5 Get Scripts

Function -

These job scripts may be used to obtain analysis data for REGRID from NCAR’s data archive. It can be run on NCAR’s IBM either interactively or in batch mode. One should also be able to run it on other NCAR/SCD machines which have access to MSS.

The available scripts are:

get_on84	NCEP GDAS data in ON84 format (*dss.ucar.edu/datasets/ds082.0*)
get_ncep	NCEP GDAS data in GRIB format (*dss.ucar.edu/datasets/ds083.0*)
get_fnl	NCEP Final Analysis data in GRIB format (*dss.ucar.edu/datasets/ds083.2*)
get_nnrp	NCEP Global Reanalysis data in GRIB format (*dss.ucar.edu/datasets/ds090.0*)
get_awip	NCEP Eta model data (the AWIP data, GRID 212) (*dss.ucar.edu/datasets/ds609.2*)
get_era	ECMWF Reanalysis data (*dss.ucar.edu/datasets/ds115)*
get_toga	ECMWF Toga data (*dss.ucar.edu/datasets/ds111.2)*

How to Run It -

Obtain the script for the data you wish to download from ~mesouser/MM5V3/Util, and edit the dates at the top of the script to specify the times you are interested in, and run the script:

startdate	Start date from which data will be extracted, *format YYYY-MM-DD+HH*
ndates	Number of time periods (eg, if data is available in 12 hour intervals, ndates=3, will give you 24 hours of data, but if the data is available every 6 hours, ndates=3 will only give you 12 hours of data)
itimint	Interval of available data (default is the available time)

Once completed the extracted data will be available in:

```
/ptmp/$USER/REGRID/pregrid/nnrp (for NNRP data);
/ptmp/$USER/REGRID/pregrid/era (for ERA data);
/ptmp/$USER/REGRID/pregrid/grib_misc (for AWIP data);
  etc.
```

14.2.6 Fetch

Function -

This job script may be used to obtain data for LITTLE_R and RAWINS from NCAR's data archive. It can be run on NCAR's IBM either interactively or in batch mode. One should also be able to run it on other NCAR/SCD machines which have access to MSS.

How to Use It -

This program is written in free-formatted FORTRAN 90, and built in a program tar file. To use it, get *fetch-little_r-data.deck.ibm* from ~mesouser/MM5V3/Util directory if a user wants to obtain data for LITTLE_R (fetch.deck is also in LITTLE_R/util directory in the program tar file), or get *fetch-rawins-data.deck.ibm* from the same directory if obtaining data for Rawins. Edit the deck to define starting and ending dates (starting_date and ending_date in the deck). Either type

```
fetch-little_r-data.deck.ibm
```

to run it interactively (in /ptmp/$USER), or type

```
llsubmit fetch-little_r-data.deck.ibm
```

to submit the deck to IBM as a batch job.

14.2.7 Cray-to-IBM Converters

Function -

There are 2 programs that will convert Cray bindary data to IEEE formatted data.

These programs must run on NCAR's IBM, since they require a special library.

cray2ibm.f	covert MM5 V3 output from Cray binary to IEEE formatted data
cray2ibm-intermediate.f	convert intermediate files (as produced by pregrid) from Cray binary to IEEE formatted data

How to Use It -

The programs can be obtained from NCAR's computer under the ~mesouser/MM5V3/Util directory. To compile on IBM, type

```
xlf90 -O -o cray2ibm.exe cray2ibm.f  -L/usr/local/lib32/r8i4 -lncaru
```

OR

```
xlf90 -O -o cray2ibm.exe cray2ibm-intermediate.f  -L/usr/local/lib32/r8i4 -lncaru
```

To run it, type

cray2ibm.exe *filename*

14.2.8 tovis5d

Function -

This utility converts MM5 V3 (and MM5 V2) σ-level data (MMINPUT_DOMAINx and MMOUT_DOMAINx) to the form Vis5D can accept. This program can also calculate some diagnostic fields selected by user with namelist option.

How to Run It -

The new version of tovis5d program is written in FORTRAN 90. The program tar file can be downloaded from ftp://ftp.ucar.edu/mesouser/MM5V3/Util/tovis5d.tar.gz. When it is uncompressed and untared, a directory TOVIS5D/ should be built. To compile the program, cd to TOVIS5D, type 'make', which will return a list of make commands one can use. To compile on a Compaq Alpha machine, type 'make dec'. If 'make' is successful, the executable named tovis5d will be built and linked to the top directory. To select namelist options, edit tovis5d.csh. To run it, type

tovis5d.csh *mm5-filename*

It creates a file for Vis5D named *vis5d.file*. It will also create a log file named tovis5d.log. For detailed instructions, please read the README file inside the tar file.

14.2.9 MM5toGrADS

Function -

MM5toGrADS is a utility program for the MM5 modeling system that convert MM5 output to data that can be displayed with the GrADS software (which can be freely downloaded from *http://grads.iges.org/grads*). The advantage of this software is that it does not need any special libraries to run, and the user can create plots interactively. To be able to display the data, GrADS must be loaded on your system, and a user must have at least a basic understanding of the GrADS software.

Development of this software has primarily been done by George H Bryan from Pennsylvania State University. This software are been supported by mesouser since the beginning of 2002.

MM5toGrADS can plot output from most of the MM5 programs; TERRAIN_DOMAINx, REGRID_DOMAINx, LITTLE_R_DOMAINx, RAWINS_DOMAINx, MMINPUT_DOMAINx, LOWBDY_DOMAINx, and MMOUT_DOMAINx.

Namelist -

Table 14-1: MM5toGrADS namelist RECORD1

Namelist Variable	Description
TIMIN	First model output time that must be processed.
TIMAX	Last model output time to process. Set this to -99 to get all times from TIMIN to the last time available in the input file.
NSKIP	Skip increment.
IFLINUX	If you need to byteswap data on your machine, set to 1.
IFMAP	Interpolate the map background
IFSFC	Set to 1 if only processing the surface data.
IFSKEW	Set to 0 if 3D fields are generated, or to 1 if data from a single point is required.
ISKW JSKW	The i and j point location if generating data for a single point only (case where IFSKEW=1)
ZTYPE	=1, data will be displayed on the native vertical coordinate of the dataset =2, data will be interpolated to pressure levels (must also set plev)
plev	pressure levels to interpolate to (for ZTYPE=2)

RECORD10,11,12,13 are lists of switches to either plot (“1”) or skip (“0”) a specific variable.

- RECORD10, are a list of native 3D variables that can be plotted,
- RECORD11, are a list of derived 3D variables,
- RECORD12, are native 2D variables; and
- RECORD13, are derived 2D variables.

How to Run It -

1) Obtain the source code tar file from one of the following places:

Anonymous ftp:
ftp://ftp.ucar.edu/mesouser/MM5V3/MM5toGrADS.TAR.gz

On NCAR MSS:
/MESOUSER/MM5V3/MM5toGrADS.TAR.gz

2) gunzip the file, untar it. A directory MM5toGrADS will be created. cd to MM5toGrADS.

3) Type ‘make’ to create an executable for your platform.

4) Edit the namelist to set up the plotting parameters, and choose which fields must be processed.

5) Edit the mm5_to_grads.csh script to indicate input and output file names.

6) Create the graphics output by running the mm5_to_grads.csh script
This will generate the grads **.dat** and **.ctl** files

7) View the output by invoking the GrADS software:
Example: grads -l -c “open *grads_output*”
(where *grads_output*, is the **.ctl** file created in step 6)