



Post-processing Tools (3): RIP4 (*WRF-ARW* & *WRF-NMM*)

Cindy Bruyère

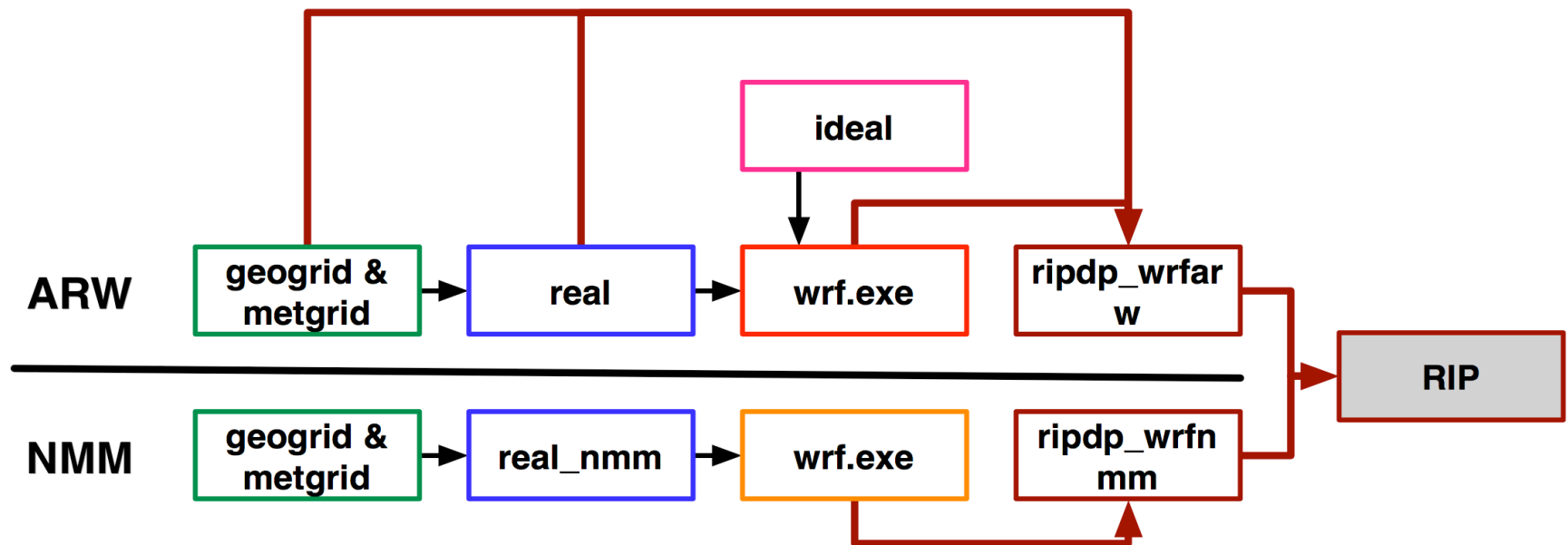
RIP4

- **Read Interpolate Plot version 4**
- **Develop by Mark Stoelinga (UW/NCAR) & MMM/NCAR Staff**
- **Originally developed for the MM5 model**
- **Generate a number of graphical plots**
 - *Horizontal, cross-section, skewT*

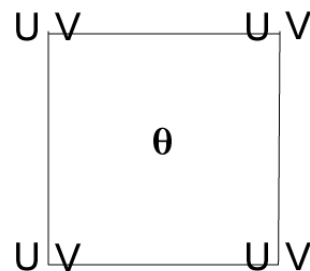
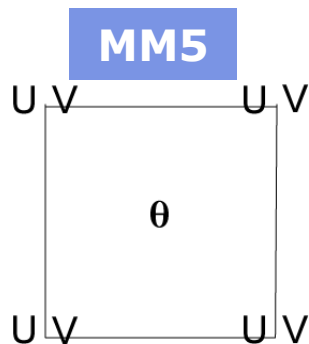
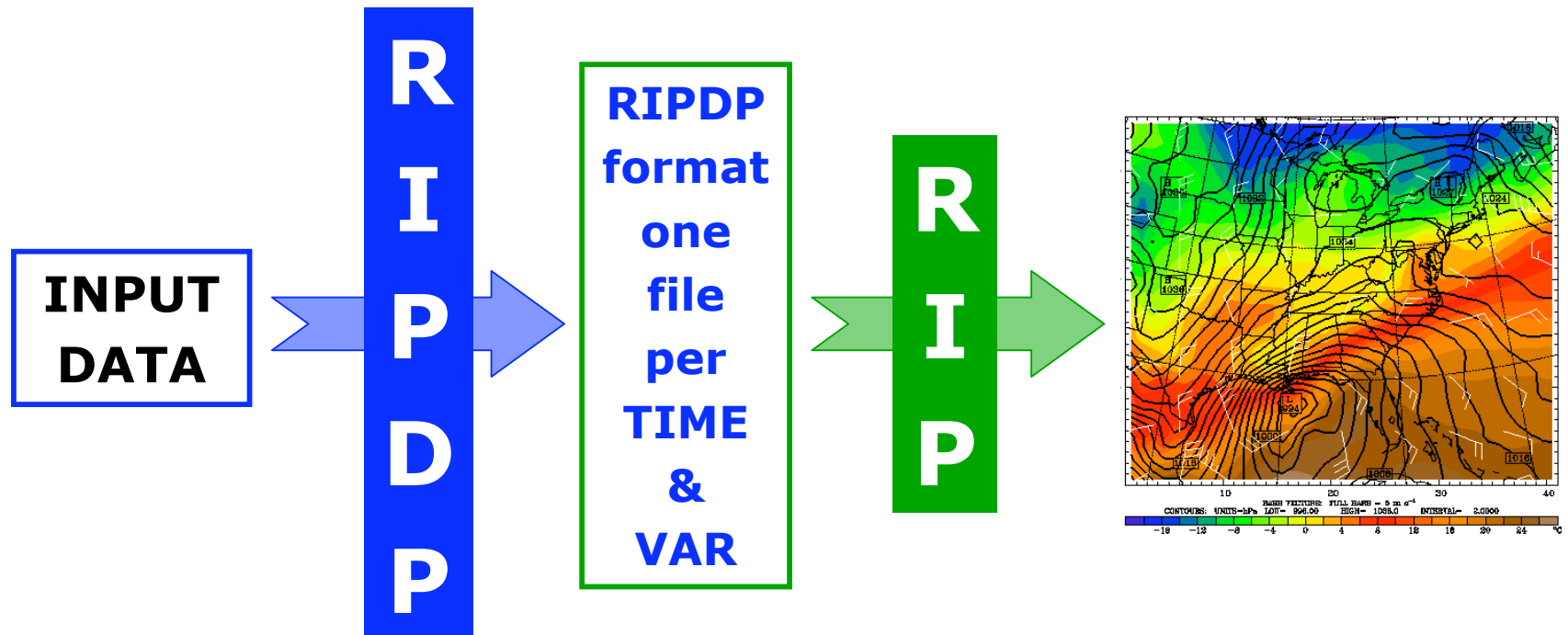
Important versions

ARW WRF output:	version 4.0
ARW idealized data:	version 4.1
WPS (ARW WRF):	version 4.2
NMM WRF output:	version 4.3
Current version:	version 4.4

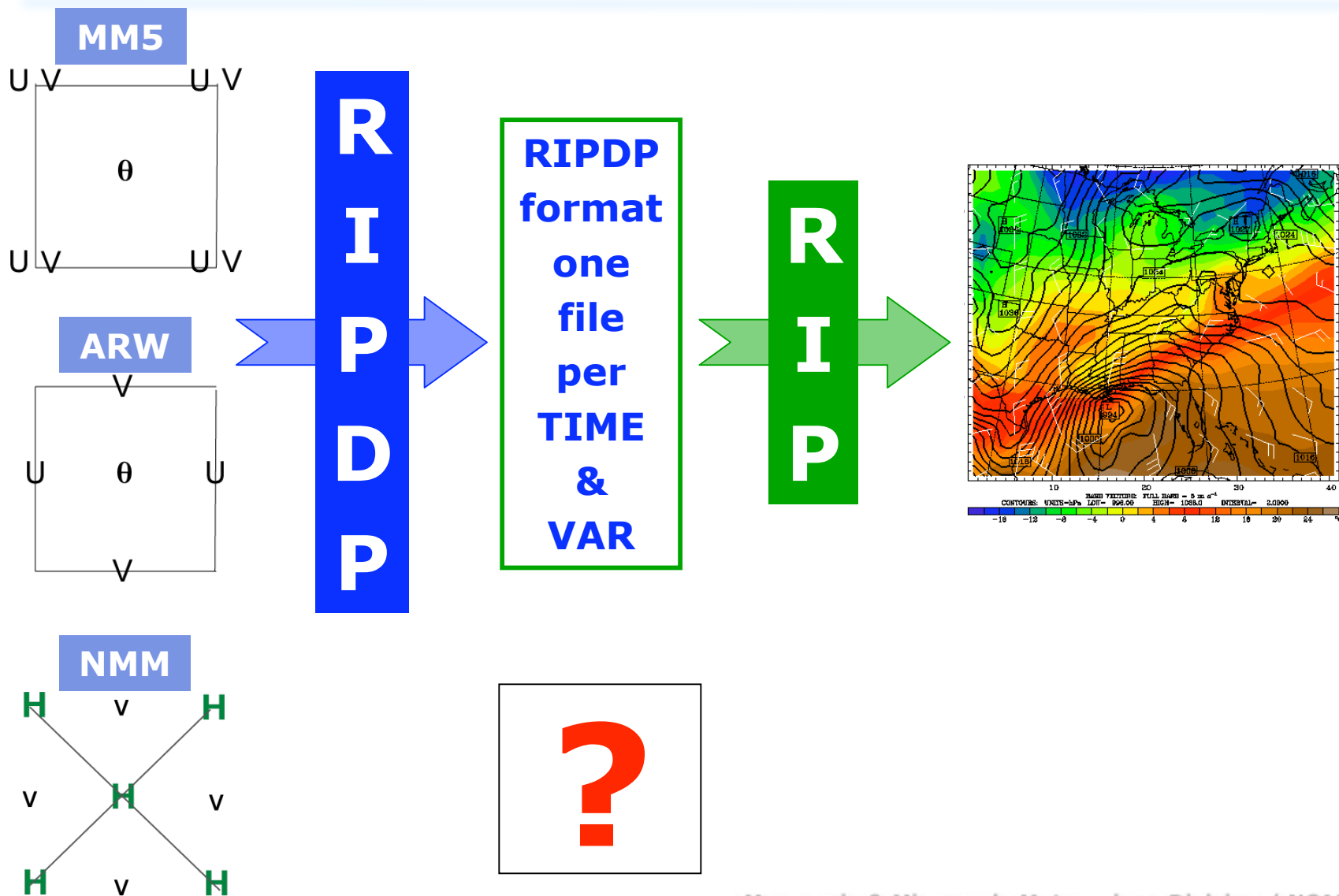
RIP4 Input Data



RIP4

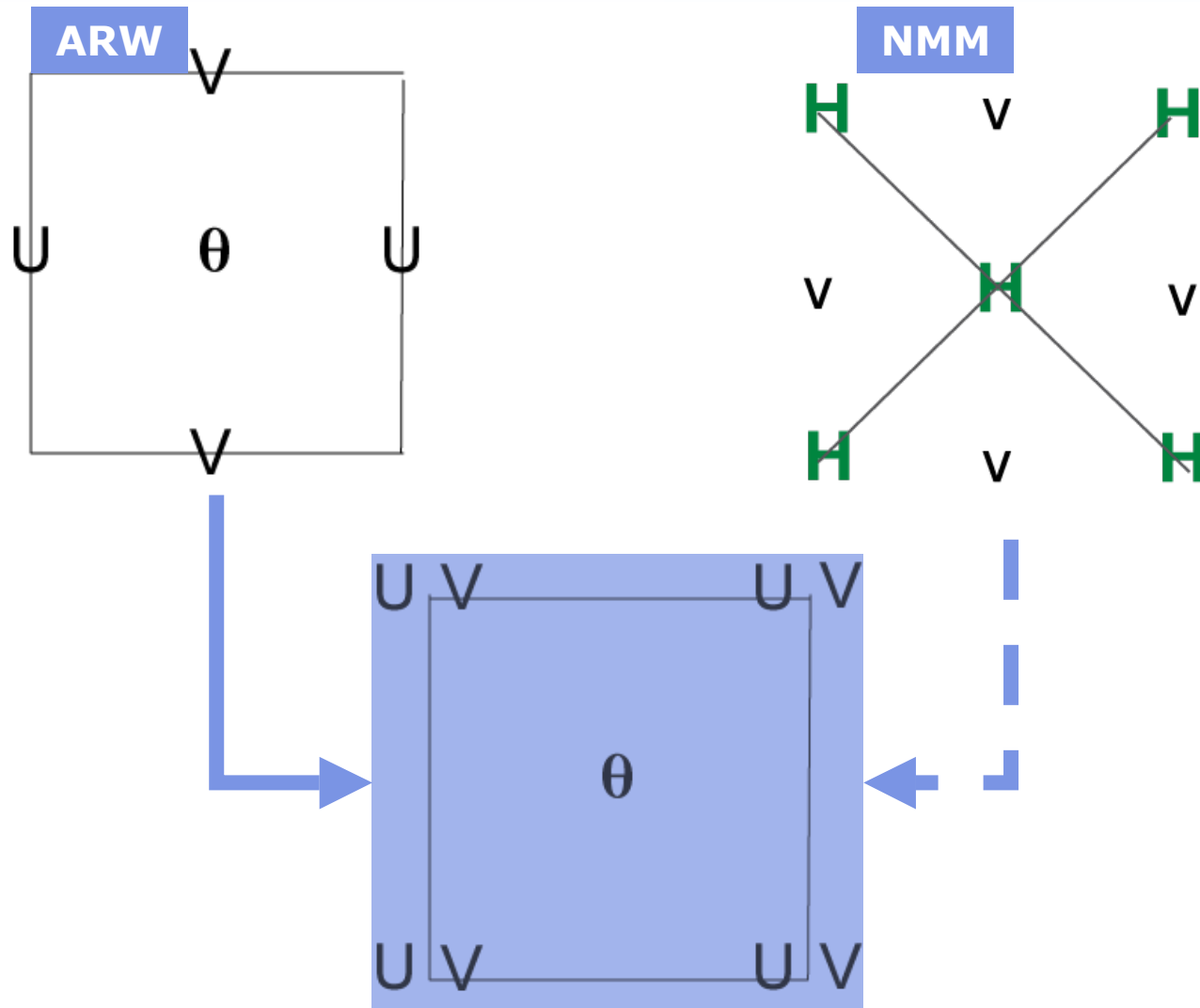


RIP4 - Grids

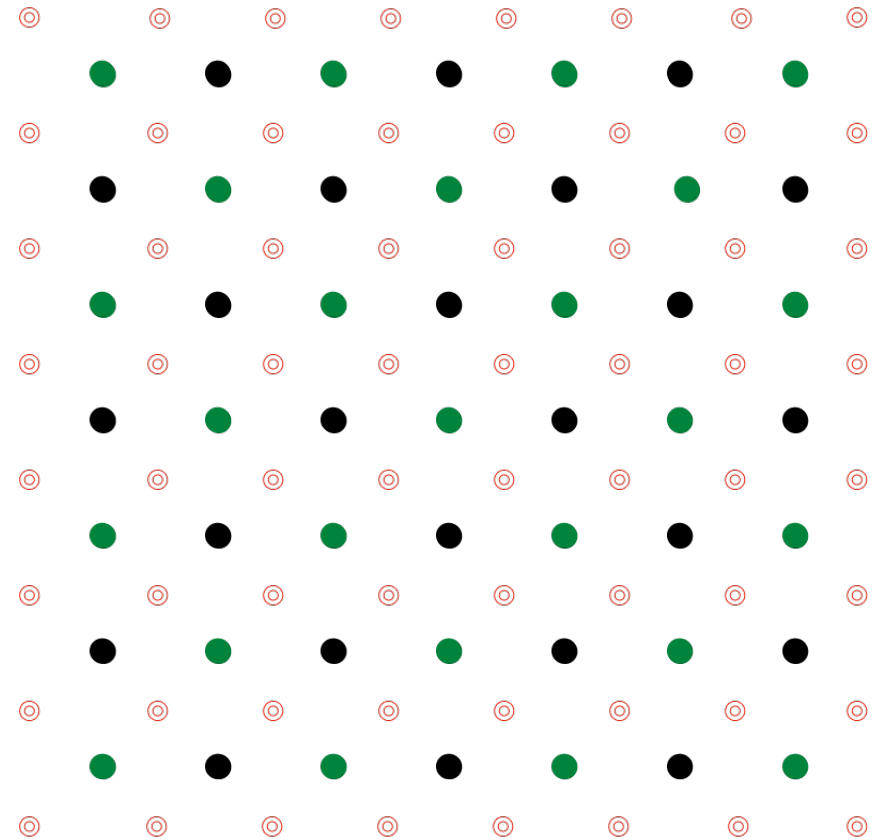
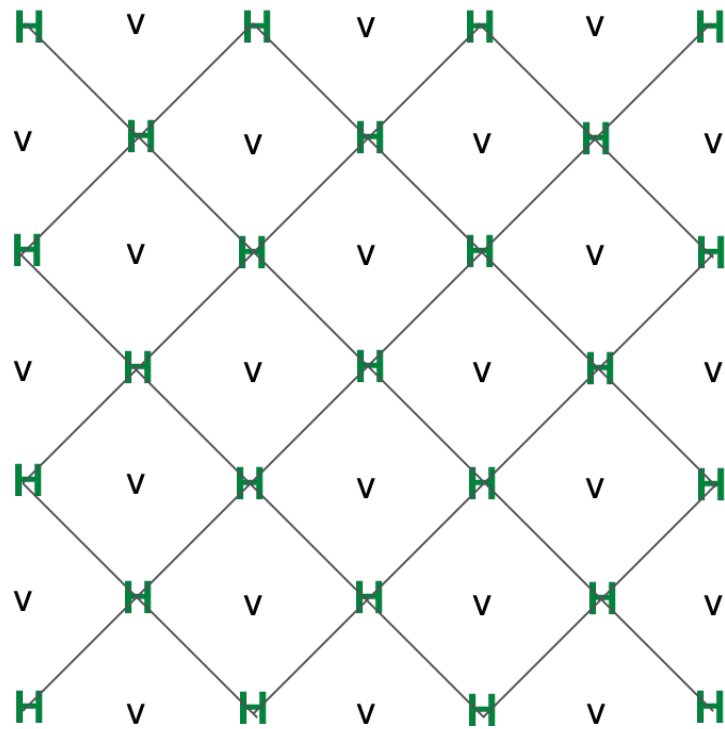




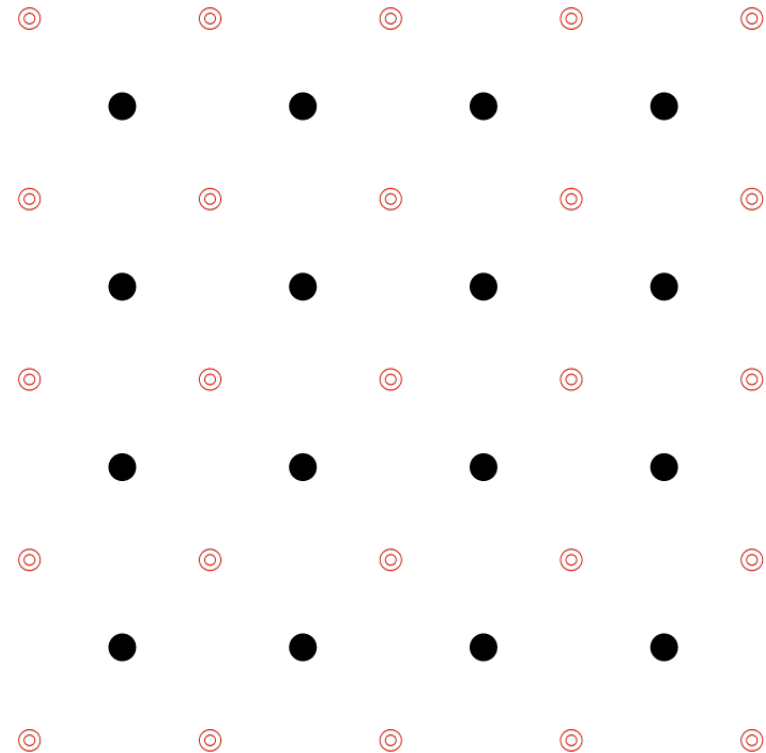
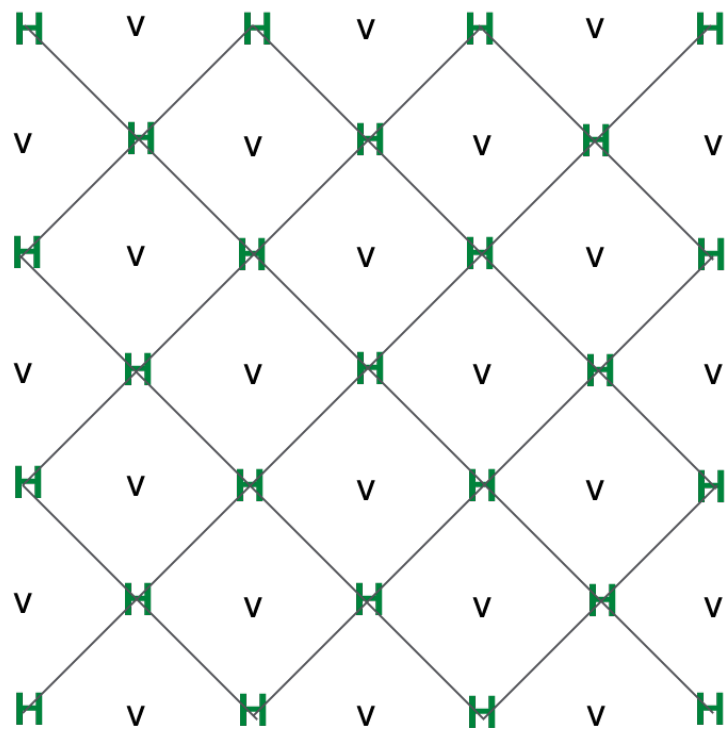
RIP4 - WRF Grids



RIP4 - NMM Grid (*iinterp 0*)



RIP4 - NMM Grid (*iinterp 1*)



new projection ; no direct relationship

General

- **Requires NCAR Graphics low-level routines**
 - <http://ngwww.ucar.edu>
- **NCL Version 5:**
 - <http://www.ncl.ucar.edu>
 - Released November 2007
 - Combine NCL and NCAR Graphics
 - Open Source
 - *Recommended*

General

- **Documentation**

- In program tar file under the **Doc/** directory
- <http://www.mmm.ucar.edu/wrf/users/docs/ripug.htm>
- http://www.dtcenter.org/wrf-nmm/users/docs/user_guide/RIP/ripug.htm

General

- **Download Code:**

- http://www.mmm.ucar.edu/wrf/users/download/get_source.html
- <http://www.dtcenter.org/wrf-nmm/users/downloads/index.php>

- **OnLine Tutorial:**

- <http://www.mmm.ucar.edu/wrf/users/graphics/RIP4/RIP4.htm>
- <http://www.dtcenter.org/wrf-nmm/users/OnLineTutorial/NMM/RIP/index.php>

RIP4 on your computer

- **set environment variables**

```
setenv RIP_ROOT /usr/$USER/RIP4 (rip_root)
setenv NCARG_ROOT /usr/local/ncarg (/usr/local/ncl)
```

- **Edit *Makefile* to define paths to netCDF library and include file on your computer:**

NETCDFLIB and *NETCDFINC*

- **make <machine type>** (*it'll make suggestions*)

make linux (example)

- **RIP4 has 2 parts (RIPDP and RIP)**

ripdp_mm5

ripdp_wrfarw

ripdp_wrfnmm

ripdp

- **ripdp_wrfxxx**
RIP Data Preparation for WRF (ARW / NMM)
- **RIPDP** converts different input file formats (*WRF - netCDF*) into RIP input format (*B - grid*)
- **RIPDP** puts each **Variable** at each **Time** into a separate file – **LOTS** of files

└─→ **mkdir RIPDP**

Running ripdp

Optional

```
ripdp_wrfxxx [-n namelist-file] \
<model_data_name> [basic/all] \
<input_file1 input_file2>
```

Example

```
ripdp_wrfarw RIPDP/arw all wrfout*
```

```
ripdp_wrfnmm RIPDP/nmm all wrfout*
```

use directory as part of the
model_data_name

ripdp namelist

- **Use namelist to add control**

- **ptimes** (*times for ripdp to process*)

0,1,2,3,4,5,6 (*0,1,2,3,4,5,6*)

0,-6,1 (*0,1,2,3,4,5,6*)

0, 2,-4,1, 6 (*0, 2,3,4, 6*)

- **tacc:** *input files not on exact times*

history_interval=10 ; time_step=180 (3 min)

*Output times uneven (29_00:00, 29_00:09,
29_00:21, 29_00:30)*

history_ interval=12 ;time_step=180 (3 min)

*Output times even (29_00:00, 29_00:12,
29_00:24, 29_00:36:00)*

- **discard:** *fields if 'all' is selected on the command line*

- **retain:** *fields if 'basic' is selected on the command line*

NMM only

ripdp namelist

- **iinterp = 1:** interpolate to a new B-grid
- **dskmcib:** grid spacing, in km, of the coarse domain on which the new B-grid will be based
- **miycorsib, mjxcorsib:** number of grid points in the y and x directions of new B-grid
- **nprojib:** map projection number (0: none/ideal, 1: LC, 2: PS, 3: ME, 4: SRCE) of new B-grid
- **xlatcib, xloncib:** central latitude and longitude of new B-grid
- **truelat1ib, truelat2ib:** two true latitudes of new B-grid
- **miyib, mjxib:** number of grid points in the y and x directions, of the fine domain
- **yicornib, xjcornib:** coarse domain y and x locations of the lower left corner point of the fine domain
- **dskmib:** grid spacing, in km, of the fine domain

- read the output generated by *ripdp*
- read **User Input File (UIF)** (*rip_sample.in*)
 - **First** section is a list of general parameters (*namelist format*)
 - **Second** section is a series of plots in the Plot Specification Table (PST)
- generate meta file

Running rip

- Edit the **User Input File (UIF)**
- **setenv NCARG_ROOT /usr/local/ncarg**
setenv NCARG_ROOT /usr/local/ncl
(if you installed NCL version 5)
- **setenv RIP_ROOT *your-rip-directory***
 - *Can overwrite this with **rip_root** in input namelist*

Running rip

- **rip [-f] model-data-set-name \ rip-execution-name**
 - created by ripdp
 - User Input File (UIF)

Example

rip [-f] RIPDP/xxx rip_sample.in

use directory as part of the model_data_set_name

output
[rip_sample.out]
rip_sample.TYPE

rip UIF

&userin
.....
&end
&trajcalc
.....
&end

Namelist controlling general parameters

Namelist for trajectory calculations
Only used if itrajcalc=1, in userin namelist

=====

----- Plot Specification Table -----

=====

feld=
feld=
=====

Frame specification group (FSG)

=====

feld=
feld=
=====

Plot specification line (PSL)

=====

**Plot
Specification
Table (PST)**



rip namelist - *&userin*

- **Use namelist to control**
 - processing times, intervals
 - title information
 - text quality on a plot
 - whether to do time series, trajectory, or to write output for Vis5D
- **Full explanation for namelist variables is available in the user document**

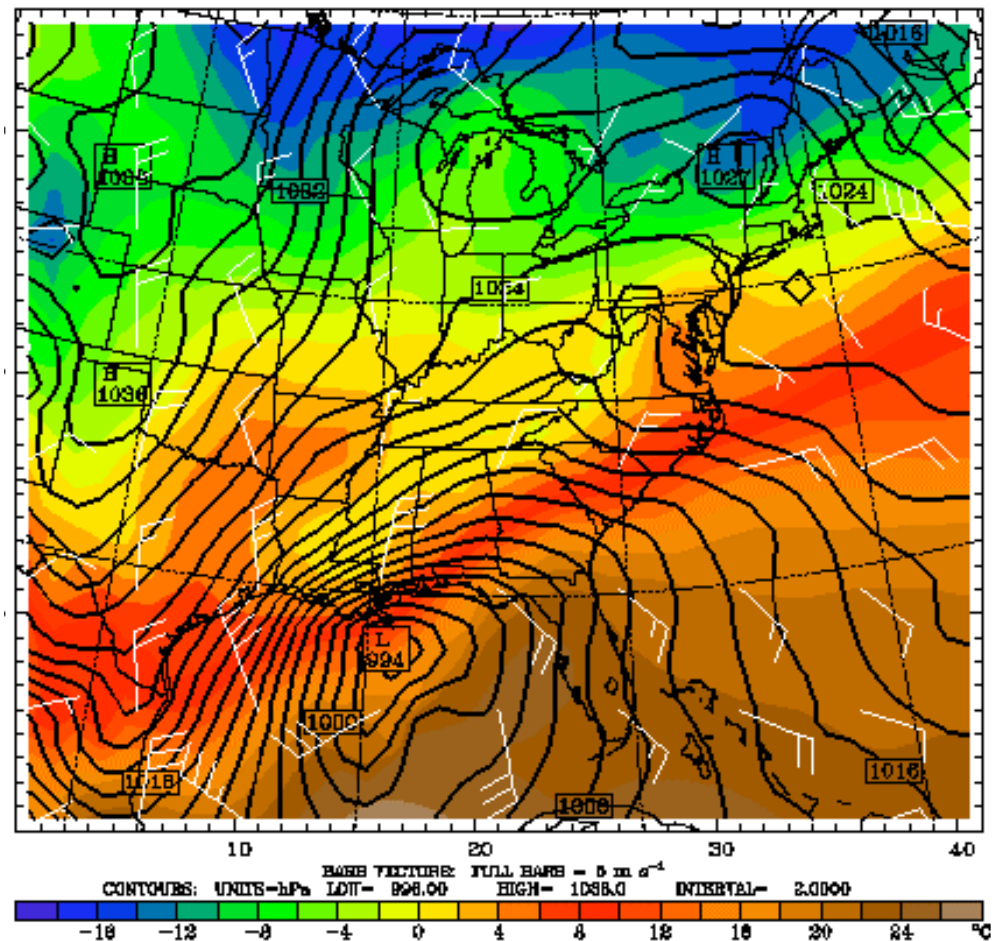
rip namelist - *&userin*

- **idotitle** – first part of first title line
- **titlecolor** – color of title lines
- **ptimes, ptimeunits** – times to process
- **tacc** – tolerance for processing data
- **timezone** –display of local time
- **iusedaylightrule** – 1 applied, 0 not applied
- **iinittime** – plotting of initial time
- **ivalidtime** – plotting of valid time
- **inearsth** – plot times as 2 / 4 digits
- **flmin, frmax, fbmin, ftmax** – frame size
- **ntextq** – text quality

rip namelist - *&userin*

- **ntextcd** – text font
- **fcoffset** – 12 means hour 12 of the MM5 forecast is considered hour 0 by you
- **idotser** – generate time series output
- **idescriptive** – more descriptive titles
- **icgmsplit** – split metacode into several files
- **maxfld** – reserve memory for RIP (10-15)
- **itrajcalc** – 0, 1 ONLY when doing trajectory calculations (*use also namelist trajcalc*)
- **imakev5d** – 0, 1 generate Vis5D data
- **rip_root** - override RIP_ROOT
- **ncarg_root** - output type: X11, cgm, pdf, ps

Temperature @ lowest sigma level
Sea Level Pressure
Winds @ lowest sigma level



Creating a Plot

```
&userin
```

```
.....
```

```
&end
```

```
&trajcalc
```

```
.....
```

```
&end
```

```
=====
```

```
----- Plot Specification Table -----
```

```
=====
```

```
feld=tmc; ptyp=hc; vcor=s; levs=1fb; >
```

```
  cint=2; cmth=fill; >
```

```
  cosq=32,light.violet,-16,blue, >
```

```
  0,yellow,16,orange,32,light.gray
```

```
feld=slp; ptyp=hc; cint=2; linw=2
```

```
feld=uuu,vvv; ptyp=hv; vcmx=1; >
```

```
  colr=white;intv=5
```

```
feld=map; ptyp=hb
```

```
feld=tic; ptyp=hb
```

```
=====
```

levs=2fb
levs=1,2,3
levs=800,500
levs=800,-300,100

Summary: How to run RIP4?

- **Compile the code**
make *<machine type>*
- **Run ripdp_wrfxxx**
Create a new directory for the output
- **Set environment variables**
setenv NCARG_ROOT /usr/local/ncarg (*/usr/local/ncl*)
setenv RIP_ROOT *your-rip-directory* (*or in namelist*)
- **Edit the User Input File (UIF)**
- **Run rip**