Installing and Running the WPS
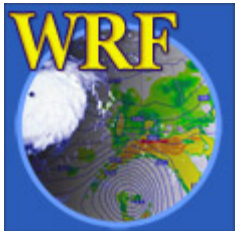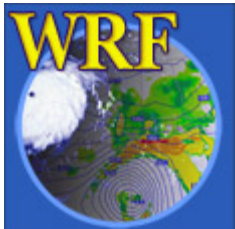
Michael Duda

Basic Steps

0) Check system requirements

1) Download source code

2) Download static terrestrial data

3) Install WRF

4) Install WPS

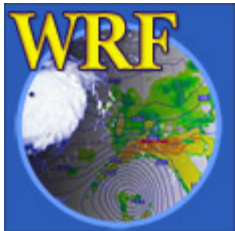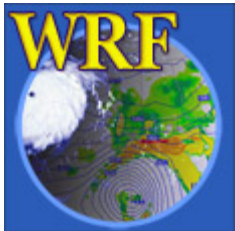5) Run

   a) geogrid

   b) ungrib

   c) metgrid

Basic Steps

0) Check system requirements

1) Download source code

2) Download static terrestrial data

3) Install WRF

4) Install WPS

5) Run

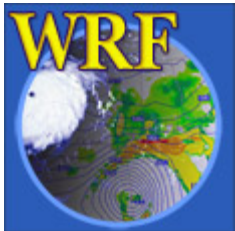   a) geogrid

   b) ungrib

   c) metgrid

0) Check system requirements

- For the pre-release version of WPS, the only supported system configuration is
  - Fedora Core 4 (& 5) Linux (32-bit)
  - Portland Group compilers

- Required libraries
  - **JasPer** (JPEG 2000 "lossy" compression library)
  - **PNG** ("lossless" compression library)
 - **zlib** (compression library used by PNG)

0) Check system requirements

- Required libraries (cont.)

  - **NetCDF** (needed by WRF and WPS)

  - **NCAR Graphics** (*optional but recommended –* used by graphical utility programs)

- Installation of these libraries is *not* part of the WPS installation script

  - We recommend having a system administrator install the required libraries before installing WRF or WPS

0) Check system requirements

- Support for other systems will be added before the official release (September 2006)

- *geogrid* and *metgrid* have been successfully compiled on IBM, OSF, Solaris, and others

- Compiling *ungrib* is trickier because of required libraries
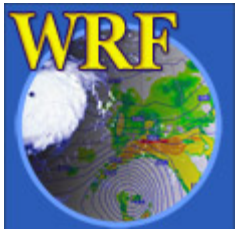
Basic Steps

0) Check system requirements

1) Download source code

2) Download static terrestrial data

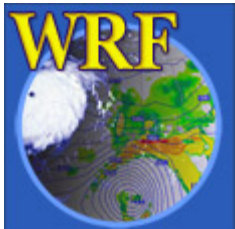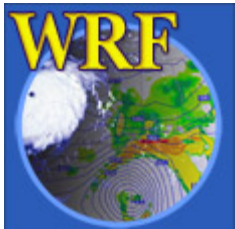3) Install WRF

4) Install WPS

5) Run

    a) geogrid

    b) ungrib

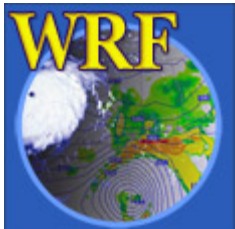   c) metgrid

1) Download source code

- WPS is designed to work with WRF v2.2 and later

  - Users with earlier versions of WRF should upgrade

- After WPS is released (September 2006)

  - Download `WPS.tar` file through WRF download page

  - WPS will work with new WRF release (which must also be downloaded)

1) Download source code

- For tutorial:

  - Check online tutorial notes for location of source code (probably `/wrfhelp/SOURCE_CODE`)

  - Tutorial source code is bundled with required version of WRF in file called `WPS+WRFV2.tar`

  - Copy the source code to your own directory

```
> cp /wrfhelp/SOURCE_CODE/WPS+WRFV2.tar ~
```

Basic Steps

0) Check system requirements

1) Download source code

2) Download static terrestrial data

3) Install WRF

4) Install WPS

5) Run

    a) geogrid

    b) ungrib

    c) metgrid
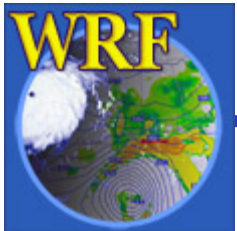
2) Download static terrestrial data

- The terrestrial fields interpolated by *geogrid* are supplied by NCAR through WRF download page

- Since these data are static, they only need to be downloaded once

- Some terrestrial fields are available in several resolutions
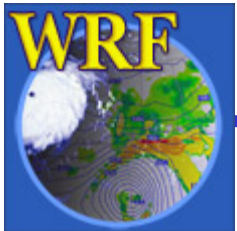
2) Download static terrestrial data

- From WRF download page, get full set of terrestrial data (all fields and resolutions)

- Choose either format to download

  - `geog.tar.bz2` – bzip2-compressed (242 MB)

    (smaller file, but requires bzip2 to uncompress)

  - `geog.tar.gz` – gzip-compressed (372 MB)

    (larger file, but more compatible)
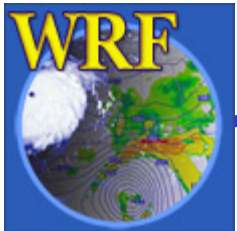
2) Download static terrestrial data

- The `geog.tar` file contains the following:

albedo_ncep – monthly surface albedo

greenfrac – monthly vegetation fraction

islope – slope index

landuse – land use category (30", 2', 5', and 10' resolutions)
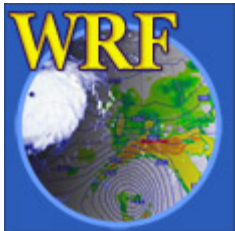
2) Download static terrestrial data

maxsnowalb – maximum snow albedo

soiltemp – annual mean deep soil temperature

soiltype_bot – bottom–layer soil type (30", 2', 5', and 10' resolutions)

soiltype_top – top–layer soil type (30", 2', 5', and 10' resolutions)
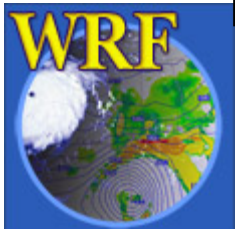
topo – topography height (30", 2', 5', and 10' resolutions)

2) Download static terrestrial data

- For tutorial:
    - All terrestrial data are located in a common directory (check tutorial notes for exact location; probably `/wrfhelp/GEOG_DATA/WPS_GEOG`)

- Outside of the tutorial: uncompress the data into a directory with ~10 GB of available space!
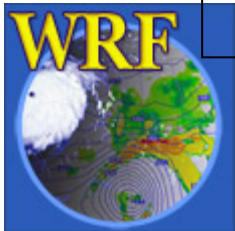
```
> tar xzf geog.tar.gz
> rm -f geog.tar.gz
```
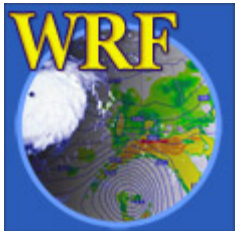
2) Download static terrestrial data

- After uncompressing `geog.tar.gz`

```
> ls

geog

> ls geog

albedo_ncep    landuse_30s        …        …

greenfrac      landuse_5m         …        …

islope         maxsnowalb         …        …

landuse_10m    soiltemp_1deg      …        …

landuse_2m     soiltype_bot_30s   …        …
```
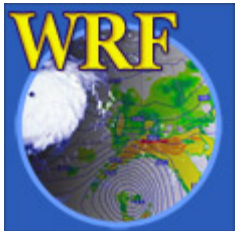
Basic Steps

0) Check system requirements

1) Download source code

2) Download static terrestrial data

3) Install WRF

4) Install WPS

5) Run

    a) geogrid

    b) ungrib

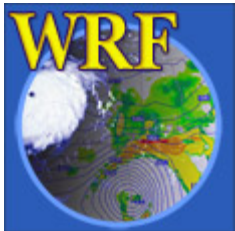   c) metgrid

3) Install WRF

- WPS requires WRF to be installed

  - WPS programs use WRF I/O API libraries to do file input and output

  - These I/O libraries are build when WRF is installed

- For information on how to install WRF, see the next lecture: "WRF ARW – How to set up and run?" by Dave Gill

Basic Steps

0) Check system requirements

1) Download source code

2) Download static terrestrial data

3) Install WRF

4) Install WPS

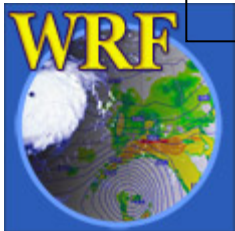5) Run

    a) geogrid

    b) ungrib

    c) metgrid

4) Install WPS

- Recall the directory where the WPS source code was downloaded (or copied) to

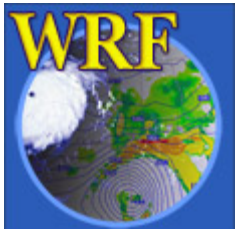- Change to that directory and un-tar the code

```
> tar xf WPS+WRFV2.tar

> cd WPS+WRFV2

> ls

WPS

WRFV2
```

Only for tutorial! After release, WRF must be installed separately (Step 3)

4) Install WPS

- For the tutorial: uncompressing WPS source code also gives WRF code

    – Let us assume that WRF has already been compiled in Step 3

- Change to the WPS directory and configure WPS for installation

4) Install WPS

```
> cd WPS

> ./configure

Will use NETCDF in dir: /standalone/local/netcdf-pgi

--------------------------------------------------------------

Please select from among the following supported platforms.

    1.  PC Linux i486 i586 i686, PGI compiler    serial

    2.  PC Linux i486 i586 i686, PGI compiler    DM parallel

    3.  PC Linux i486 i586 i686, Intel compiler  serial

    4.  PC Linux i486 i586 i686, Intel compiler  DM parallel


Enter selection [1-4] :
```
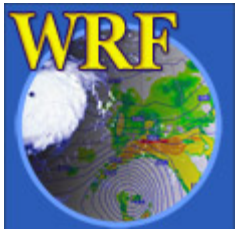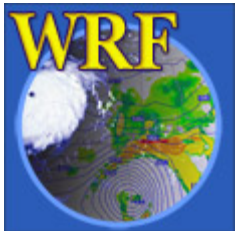
4) Install WPS

- When prompted by the configure script, select an option

```
Enter selection [1-4] : 1

------------------------------------------------------------

Configuration successful. To build the WPS, type: compile

------------------------------------------------------------
```
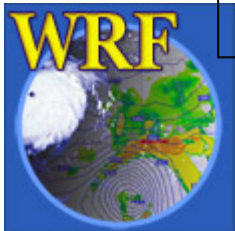
4) Install WPS

- If configuration was successful, compile:

```
> ./compile >&! compile.output
```

- After compilation, executables should exist in top-level WPS directory:

```
> ls -L *.exe

geogrid.exe

metgrid.exe

ungrib.exe
```
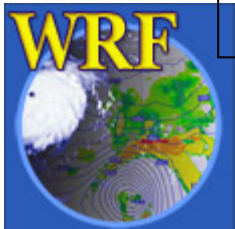
4) Install WPS

- If NCAR Graphics libraries are available:

```
> ./compile util >&! util.output
```
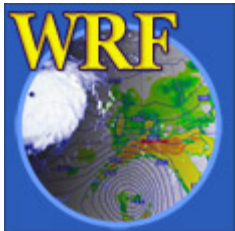
- After compilation, check for new executables:

```
> ls -L *.exe

geogrid.exe              plotfmt.exe

gribprint.exe            plotgrids.exe

metgrid.exe              ungrib.exe
```
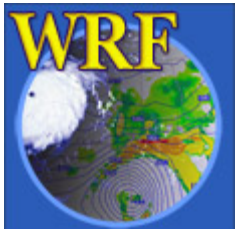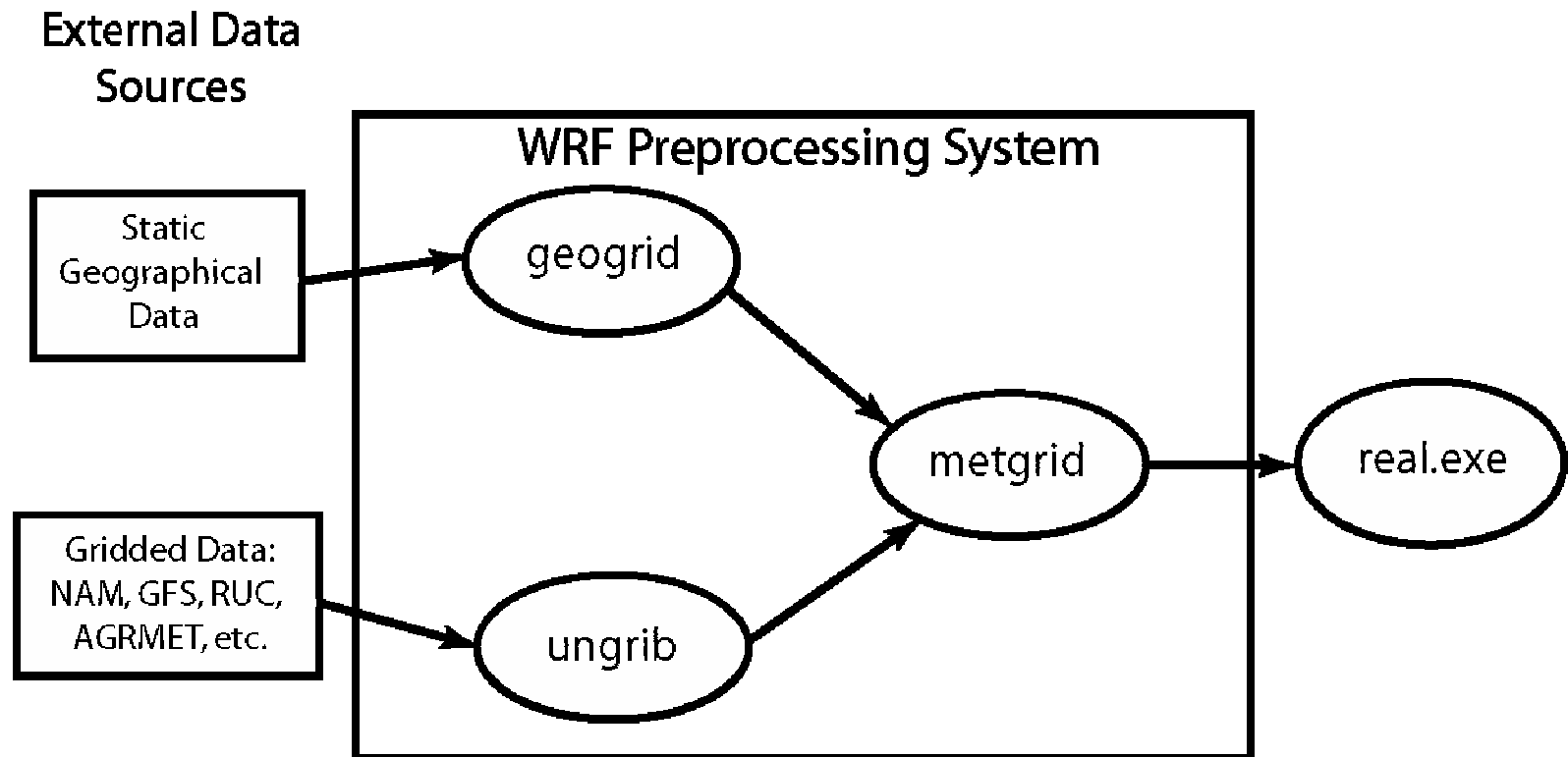
Basic Steps

0) Check system requirements

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2) Download static terrestrial data

3) Install WRF

4) Install WPS
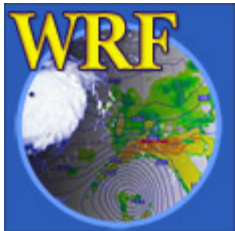
5) Run

    a) geogrid

    b) ungrib

    c) metgrid

5) Running WPS

- Briefly recall the data flow among programs:

Basic Steps

0) Check system requirements

1) Download source code

2) Download static terrestrial data

3) Install WRF

4) Install WPS

5) Run

    a) geogrid

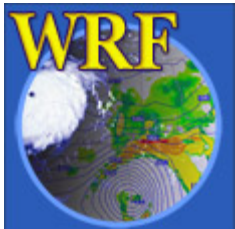   b) ungrib

    c) metgrid

5a) Running *geogrid*

Basic steps to run *geogrid*

1) Edit `namelist.wps` in the `WPS` directory

   – define projection and domain locations

   – specify path to static terrestrial data

A note about editing `namelist.wps`:

When running the WPS program *<program_name>*, it is only necessary to set variables in the sections *&share* and *&<program_name>*
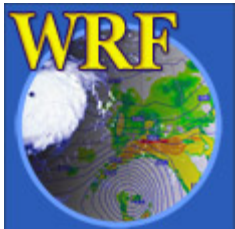
5a) Running *geogrid*

2) Run *geogrid.exe*

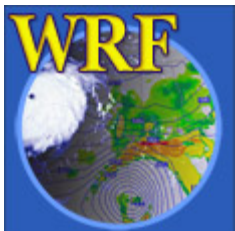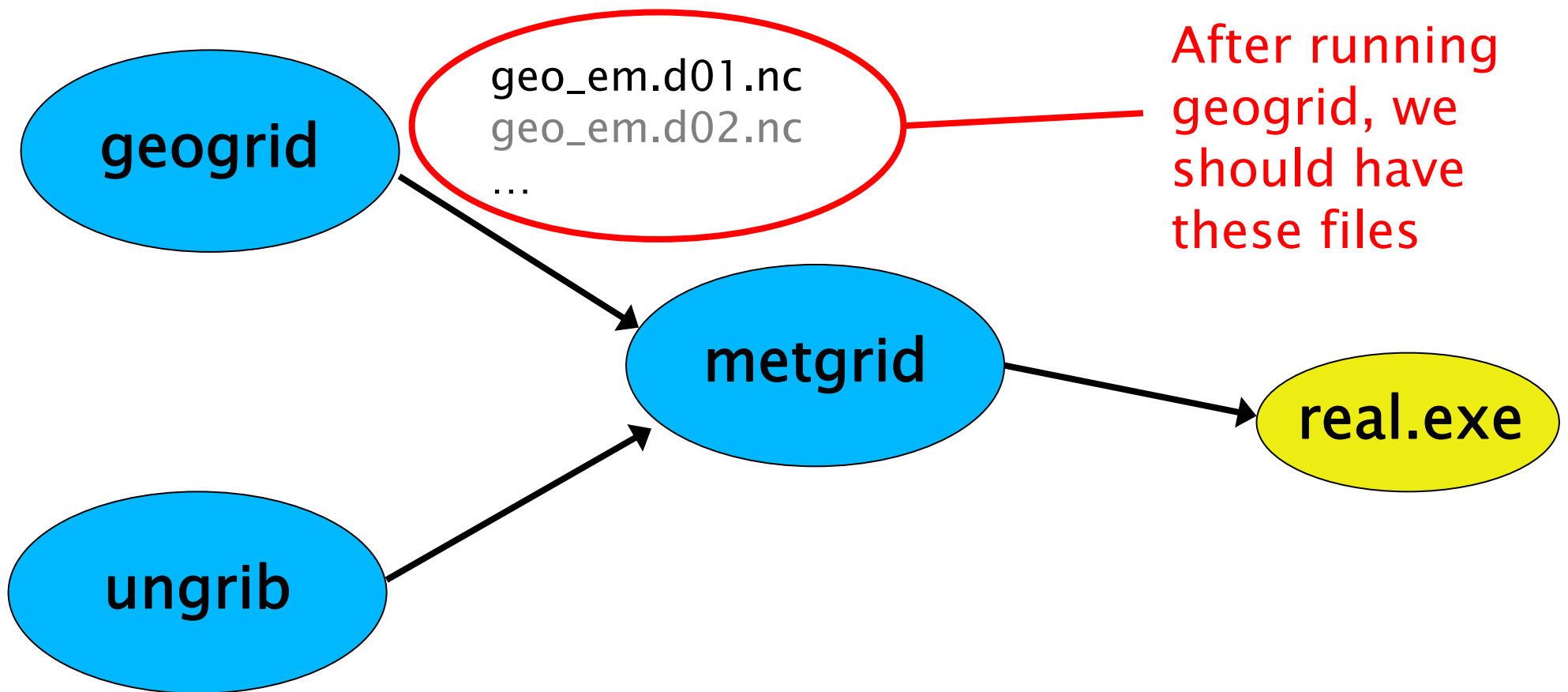3) Check geogrid output

    – Did geogrid run successfully?

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!   Successful completion of geogrid.      !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
```

    – Do `geo_em.d0N.nc` files exist?

    – Are the domains in their expected locations?
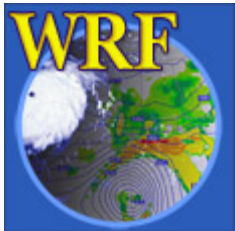
5a) Running *geogrid*

Basic Steps

0) Check system requirements

1) Download source code

2) Download static terrestrial data

3) Install WRF

4) Install WPS

5) Run

    a) geogrid

    b) ungrib

    c) metgrid
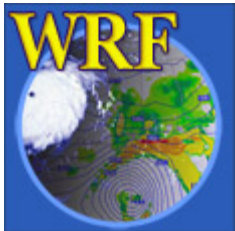
5b) Running *ungrib*

Basic steps to run *ungrib*

   1) Edit `namelist.wps`

     – specify starting and ending times for domains

     – specify interval of available data

   2) Link the proper Vtable to the file `Vtable`

   3) Link first-guess GRIB files to `GRIBFILE.AAA`, `GRIBFILE.AAB`, ...

5b) Running *ungrib*

Basic steps to run *ungrib* (cont.)
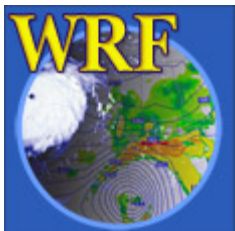
    4) Run *ungrib.exe*
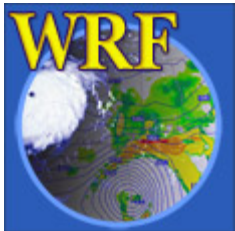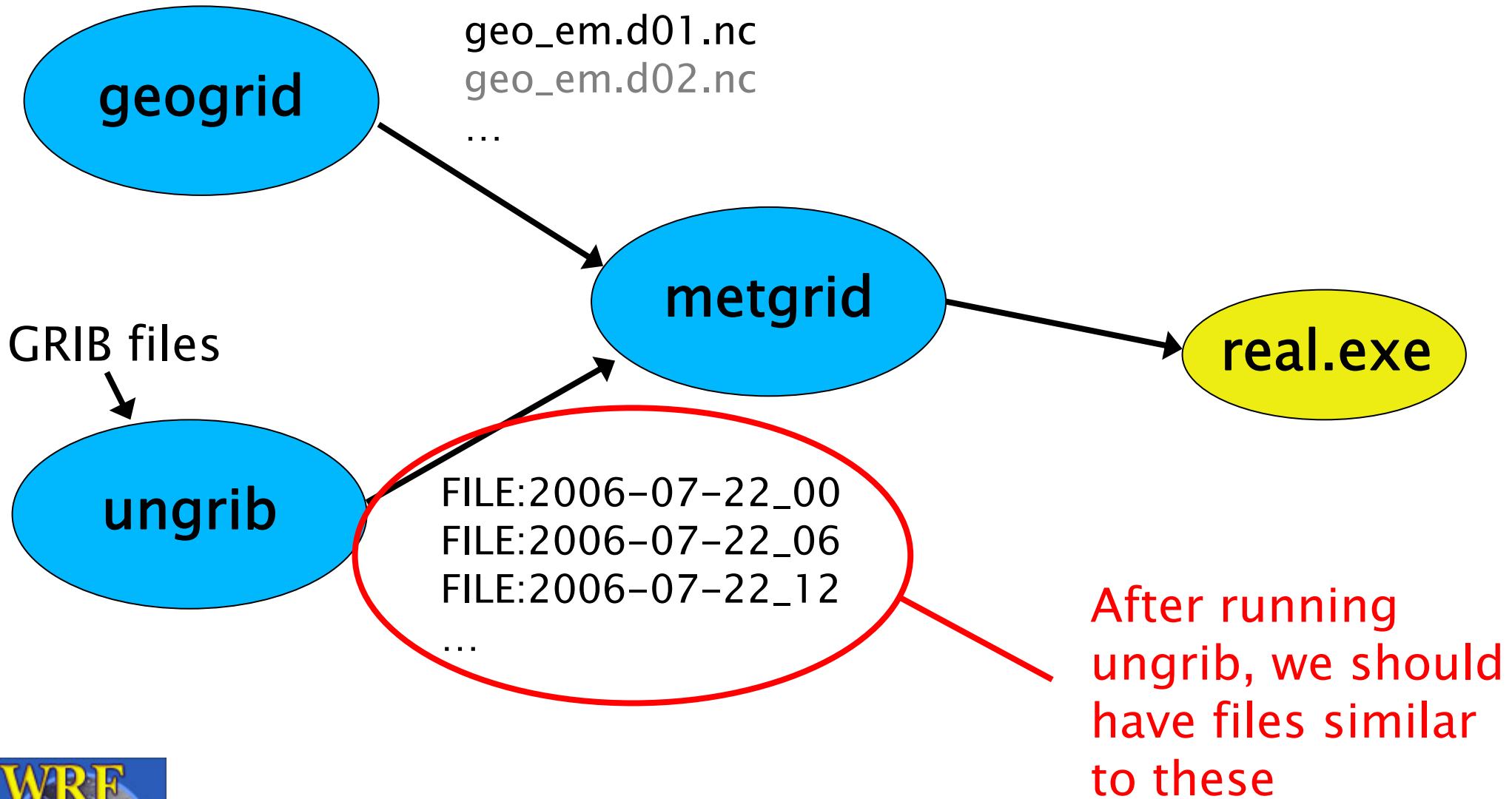
    5) Check ungrib output

        – Did ungrib run successfully?

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!   Successful completion of ungrib.     !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
```

        – Do `FILE:YYYY-MM-DD_HH` files exist?

        – Are all of the expected fields in the ungrib output files?

5b) Running *ungrib*

geogrid

geo_em.d01.nc
geo_em.d02.nc
...

GRIB files

metgrid

real.exe

ungrib

FILE:2006-07-22_00
FILE:2006-07-22_06
FILE:2006-07-22_12
...

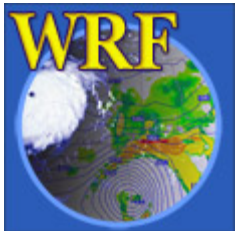After running
ungrib, we should
have files similar
to these

Basic Steps

0) Check system requirements

1) Download source code

2) Download static terrestrial data

3) Install WRF

4) Install WPS

5) Run

    a) geogrid

    b) ungrib

    c) metgrid

5c) Running *metgrid*
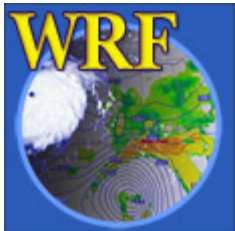
Basic steps to run *metgrid*

1) Edit `namelist.wps`

   - specify starting and ending times for all grids

   - specify path and prefix of ungrib output
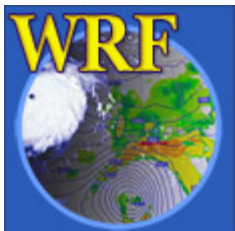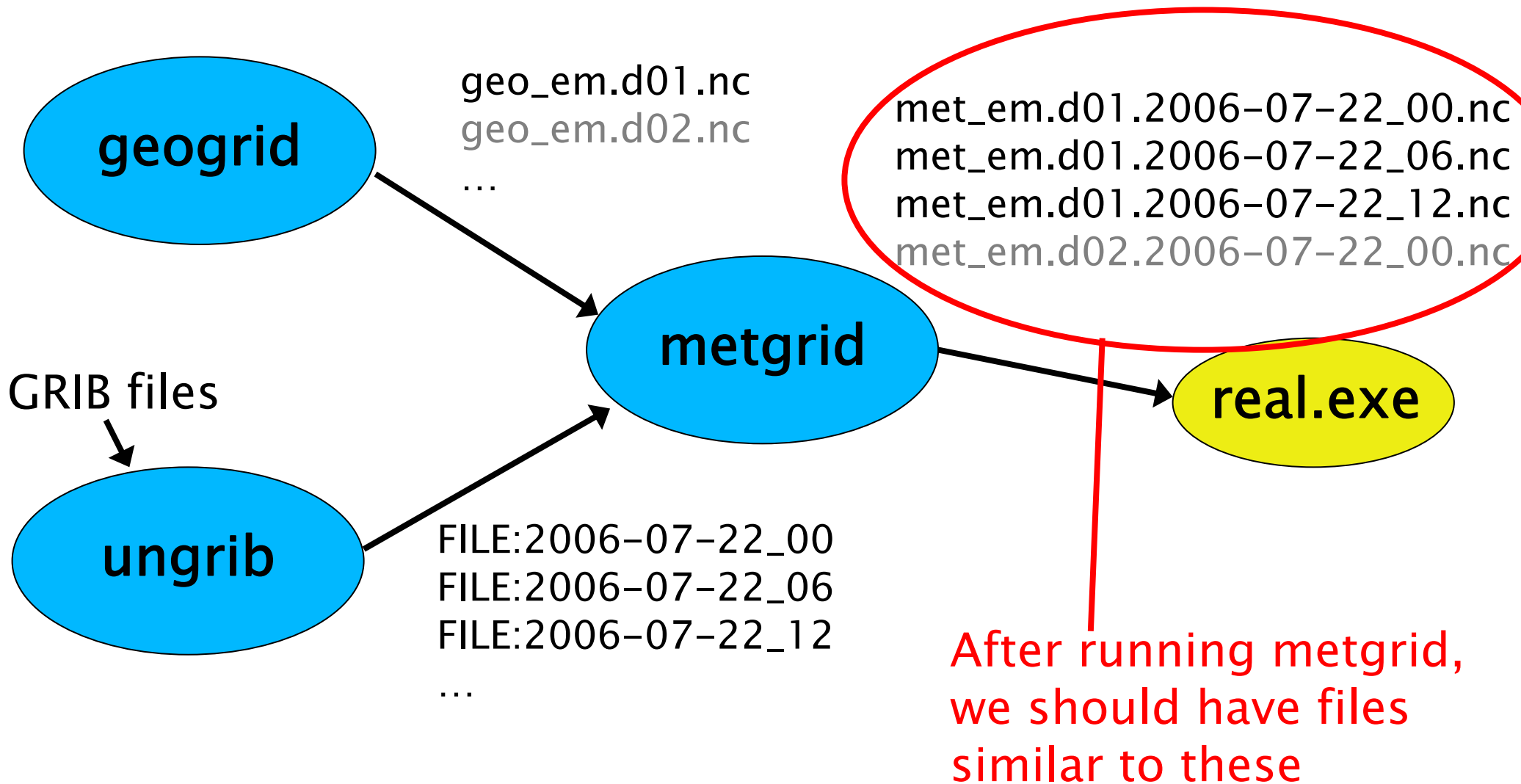
2) Run *metgrid.exe*

3) Check metgrid output

   - Did metgrid run successfully?

   - Do `met_em.d0N.YYYY-MM-DD_HH.nc`

   files exist?

5c) Running *metgrid*

geo_em.d01.nc
geo_em.d02.nc
...

geogrid

met_em.d01.2006-07-22_00.nc
met_em.d01.2006-07-22_06.nc
met_em.d01.2006-07-22_12.nc
met_em.d02.2006-07-22_00.nc

metgrid

real.exe

GRIB files

ungrib

FILE:2006-07-22_00
FILE:2006-07-22_06
FILE:2006-07-22_12
...

After running metgrid, we should have files similar to these

5) Summary

- The basic steps to running each WPS program can be summarized as:
  - Set variables in the `&share` and `&<program name>` sections in the `namelist.wps` file
    - E.g., for metgrid, edit &share and &metgrid sections
  - For ungrib, link `Vtable` and `GRIBFILE.???` files
  - Run the program executable
  - Check that the proper output files exist and contain good data