Everything you want to know on GEMDM but were afraid to ask …

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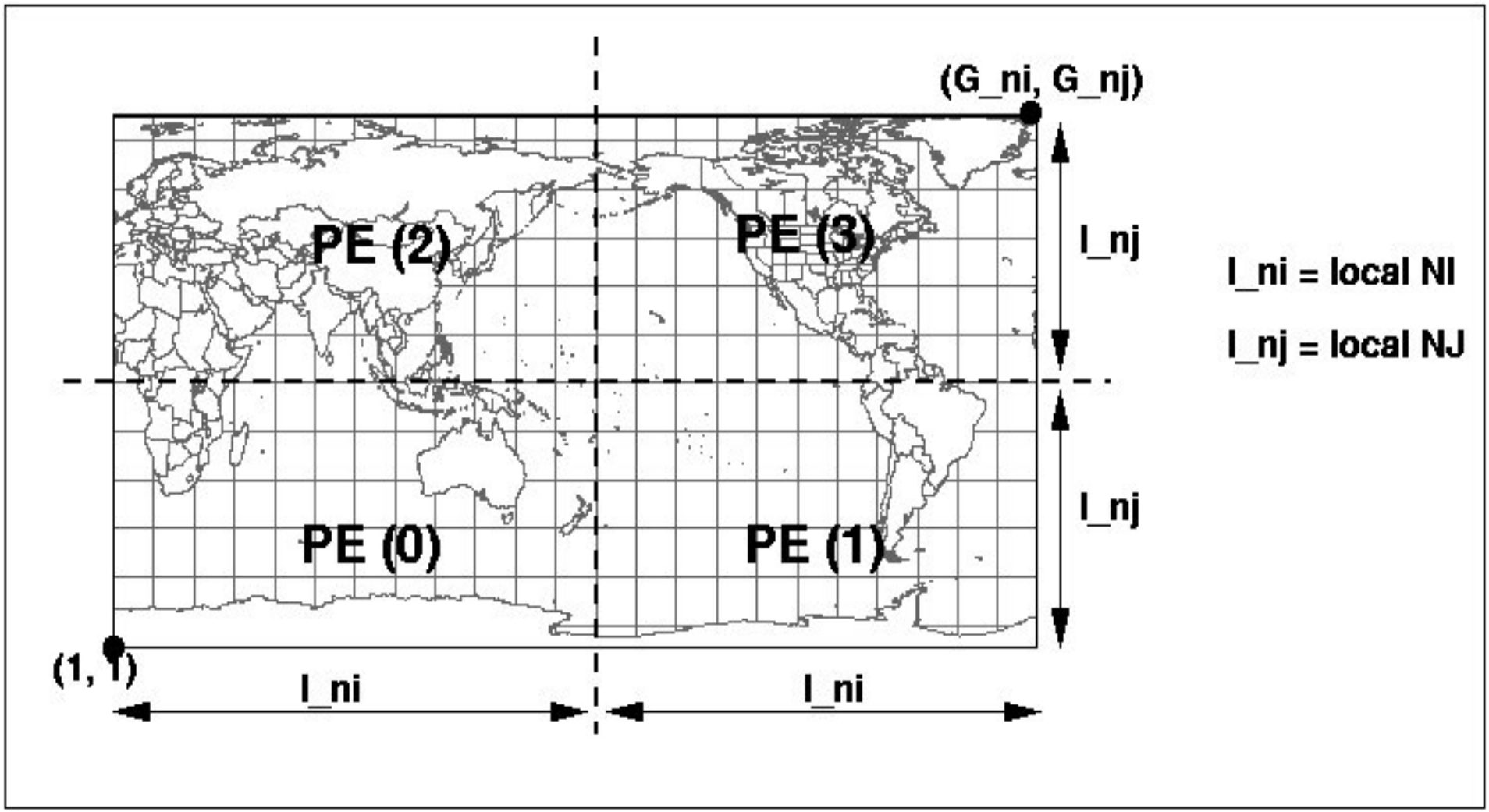
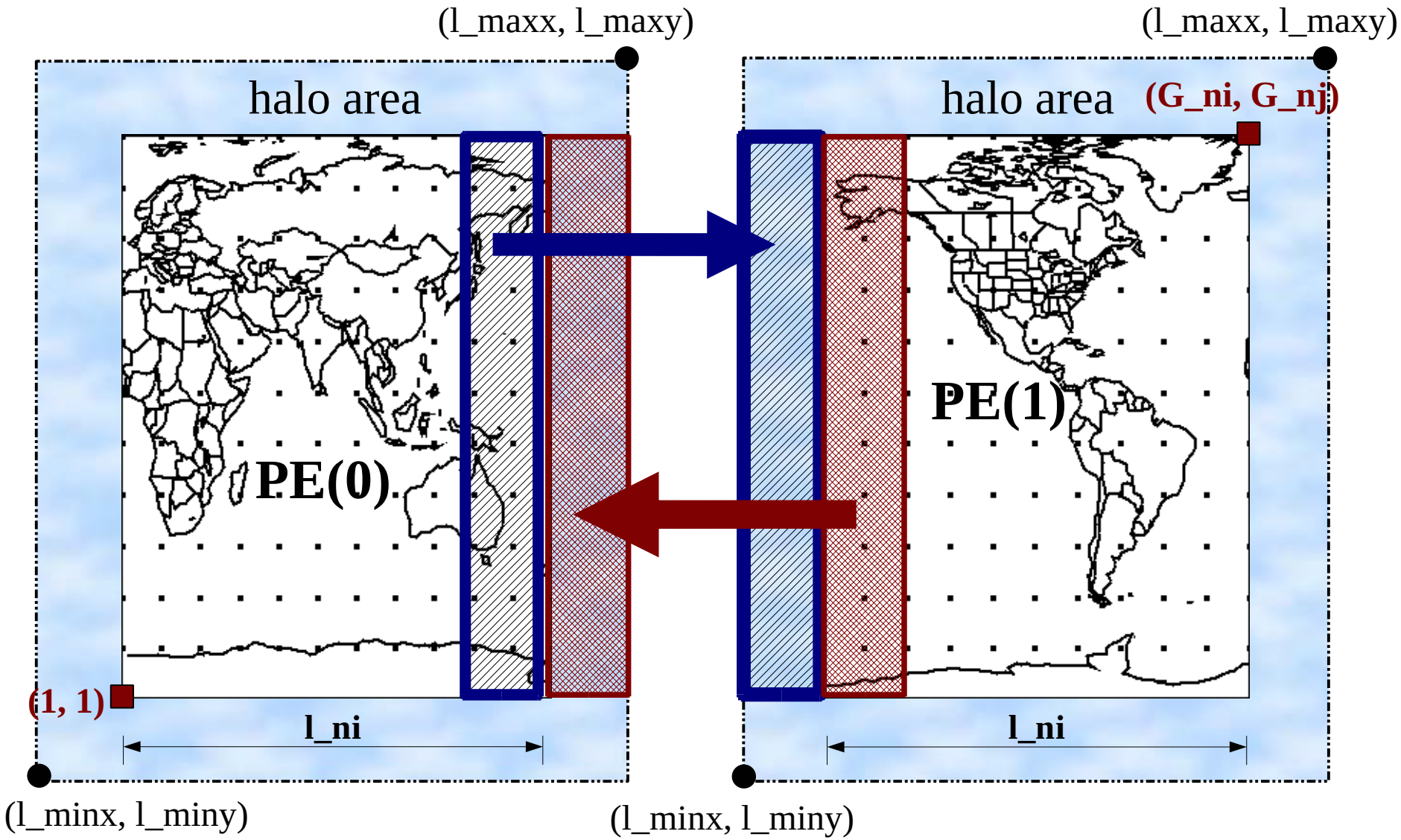
GEM DISTRIBUTED MEMORY

Ptopo_npex=2, Ptopo_npey=2



Message Passing Interface (MPI)



GEMDM History

v_2.0.0 ---> July 13, 2000 (first release, now obsolete)
v_3.1.2 ---> April 27, 2004 (operational global run)
v_3.2.0 ---> October 22, 2004 (operational regional run)
v_3.2.1 ---> July 31, 2005 (unreleased)
v_3.2.2 ---> December ?, 2005 (meso-global test runs)

Important Note before beginning...

Remove
.cshrc
in
$HOME

GEMDM ENVIRONMENT

. r.sm.dot gem [version]

example:

. r.sm.dot gem 3.2.1

$gem **$PATH**

echo **$PATH**
/usr/local/ssh/bin:/opt/pgi/linux86/bin:/data/dormrb04/tmpdirs/armnviv/90788106/bin:/users/dor/armn/viv/ovbin**.../usr/local/env/armnlib/modeles/GEMDM/v_3.2.1/scripts:/usr/local/env/armnlib/modeles/GEMDM/v_3.2.1/bin/IRIX64**

echo **$gem**
/usr/local/env/armnlib/modeles/GEMDM_shared/v_3.2.1

```
pollux 26% cd $gem
pollux 27% pwd
/usr/local/env/armnlib/modeles/GEMDM_shared/v_3.2.1
pollux 28% ls
Makefile_AIX       RCS_DYN/           patches/
Makefile_IRIX64    bin/               run_configs/
Makefile_Linux     dfiles/            scripts/
RCS/               doc/               src/
RCS_4DVAR/         lib/               src_4d/
pollux 29%
```

doc – documentation
src – source code
RCS – archived source (same as “src” but with “,v”)
scripts – control commands
patches – patch code
run_configs – sample run configs
lib – libraries
bin – binaries (Not model binaries!)

NO DEFAULT MODEL EXECUTABLES

maingemntr_${ARCH}_${version}.Abs

ie:

maingemntr_AIX_3.2.0.Abs
maingemntr_IRIX64_3.2.0.Abs
maingemntr_Linux_3.2.0.Abs

maingemdm_${ARCH}_${version}.Abs

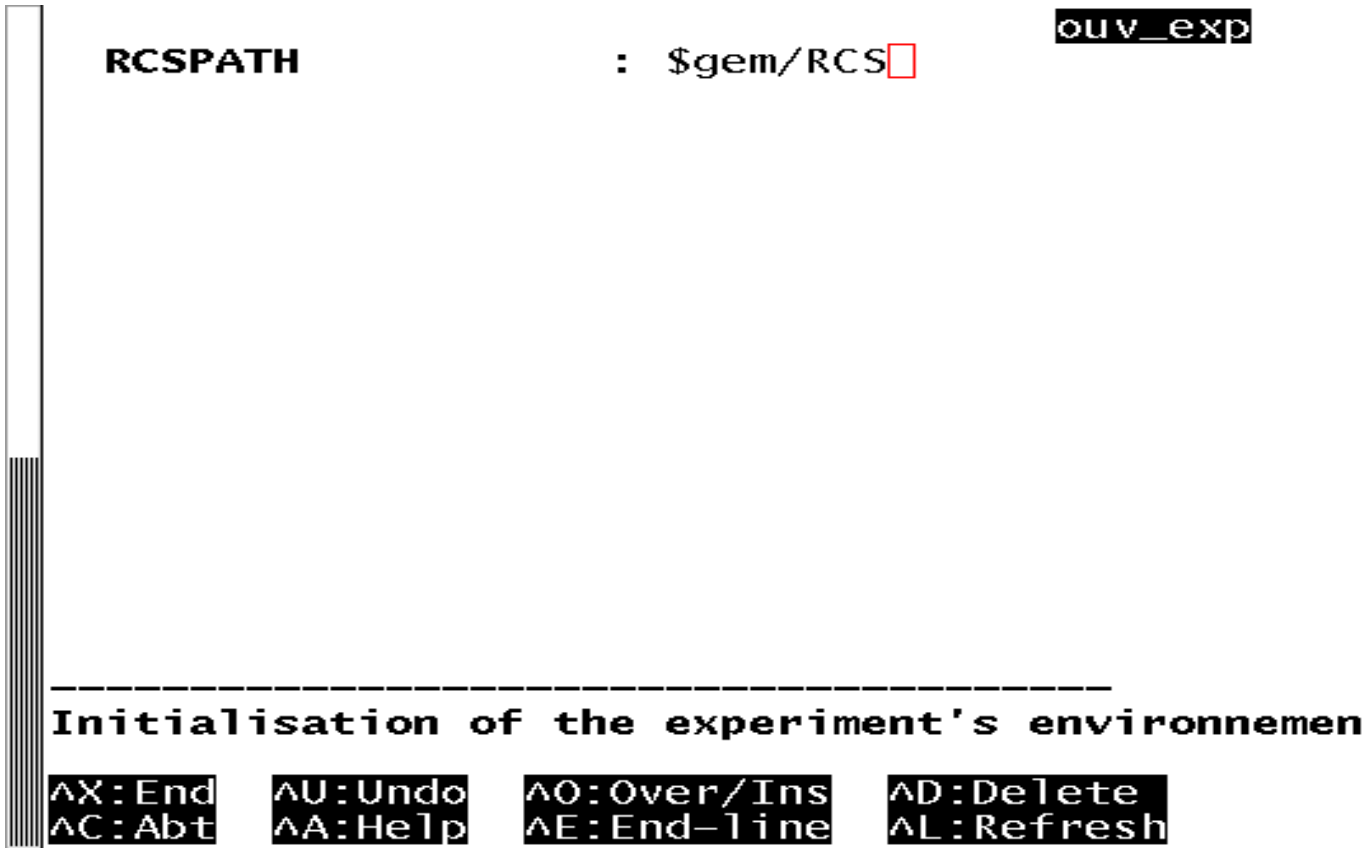
ie:

maingemdm_AIX_3.2.0.Abs
maingemdm_IRIX64_3.2.0.Abs
maingemdm_Linux_3.2.0.Abs

Setup for your Working Directory

```
lorentz 5% . r.sm.dot gem 3.2.1
lorentz 6% cd $HOME
lorentz 7% mkdir exp321
lorentz 8% cd exp321
lorentz 9% ouv_exp
```


```
Opening experiment 'base' press RETURN to confirm
or give the name of the experiment to open
```


ouv_exp
RCSPATH : $gem/RCS
Initialisation of the experiment's environnemen
^X:End ^U:Undo ^O:Over/Ins ^D:Delete
^C:Abt ^A:Help ^E:End-line ^L:Refresh

Setup for your Working Directory **cont'd**

```
lorentz 5% . r.sm.dot gem 3.2.1
lorentz 6% cd $HOME
lorentz 7% mkdir exp321
lorentz 8% cd exp321
lorentz 9% ouv_exp
Opening experiment 'base' press RETURN to confirm
or give the name of the experiment to open

Creating the RCS directory
RCS/histoire,v <-- histoire
initial revision: 1.0
done
RCS/.exper_cour,v <-- .exper_cour
initial revision: 1.0
done
RCS/.exper_cour,v --> .exper_cour
revision 1.0
done
```

Setup for your Working Directory **cont'd**

lorentz 11% ls
RCS/

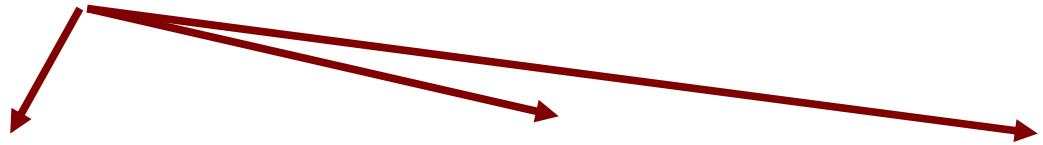
lorentz 12% ls **-a**
./ ../ .exper_cour RCS/

lorentz 13% cat .exper_cour
RCSPATH=”/usr/local/env/armnlib/modeles/GEMDM_shared/v_3.2.1/RCS”
RCSBASE=”base”

lorentz 14%

Setup for your Working Directory **cont'd**

lorentz 15% **r.make_exp** ← **etagere**



lorentz 16% ls -a
./ ../ **.**exper_cour **Makefile** RCS/ **arbre_de_dependance** **make_cdk**

lorentz 17% mkdir process
lorentz 18% mkdir output
lorentz 19% mkdir malibLinux *(for storing *.o Linux files)*

lorentz 20% ls
Makefile arbre_de_dependance **malibLinux/** **process/**
RCS/ make_cdk **output/**

Setup for your Working Directory **cont'd**

```
lorentz 5% . r.sm.dot gem 3.2.1
lorentz 6% cd $HOME
lorentz 7% mkdir exp321
lorentz 8% cd exp321
lorentz 9% ouv_exp (etagere utility)
lorentz 10% r.make_exp
lorentz 11% mkdir process output malibLinux
lorentz l2%  make gem
lorentz 13% ls
Makefile                    maingemdm_Linux_3.2.1.Abs*   malibLinux/
RCS/                        maingemntr_Linux_3.2.1.Abs*  output/
arbre_de_dependance         make_cdk                     process/
```

Disk quota exceeded?

lorentz 21% ls

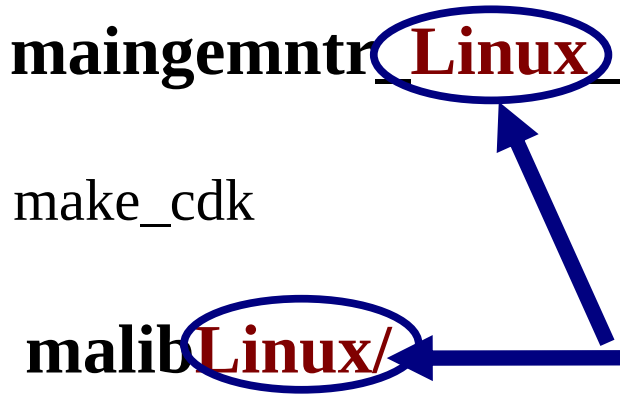
Makefile
outcfg.out
RCS/
output/
arbre_de_dependance
process/
gem_settings.nml

maingemdm_Linux_3.2.1.Abs*

maingemntr_Linux_3.2.1.Abs*

make_cdk

malib/Linux/



$ARCH (machine)
Linux (PC)
AIX (Azur)
IRIX64 (Pollux)

Use “linkit” or make soft links!

Use of **linkit** highly recommended for each machine **arch**itecture

```
lorentz 22%  echo $ARCH
Linux
lorentz 23%  export storage_model=/data/local/armnviv
lorentz 24%  linkit
lorentz 25%  ls
Makefile                    maingemdm_Linux_3.2.1.Abs@
  outcfg.out
RCS/                        maingemntr_Linux_3.2.1.Abs@
  output@
arbre_de_dependance         make_cdk
  process@
gem_settings.nml            malibLinux@
```

Making the GEM absolutes *(LINUX example)*

lorentz 21% **make gem**

```
Options prises dans:
/usr/local/env/armnlib/include/Linux/Compiler_rules
USING /home/dormrb02/linux_local/env/armnlib/PGI-CMC_5.2-4_multi/sarge
Compiler Rules applied
using mpif90-2.1.4
Compiler Rules applied
r.pgf90 -tp px -fpic -byteswapio -I. -I/usr/local/env/armnlib/include -Wl,-rpath
,/usr/local/env/armnlib/lib/Linux -L/usr/local/env/armnlib/mpich-1.2.4/lib bidon
.o -L/users/dor/armn/viv/userlibs/Linux -L/usr/local/env/armnlib/modeles/GEMDM/v
_3.2.1/lib/Linux -L/usr/local/env/armnlib/modeles/PHY/v_4.3/lib/Linux -L/usr/loc
al/env/armnlib/lib/Linux -tp px -fpic -byteswapio -I. -I/usr/local/env/armnlib/i
nclude -Wl,-rpath,/usr/local/env/armnlib/lib/Linux -o maingemdm_Linux_3.2.1.Abs
-lgem -lgem_4dvar_stubs -lphy -lprof_003 -lmodulopt -lrpn_comm207 -lrtools -llap
ack -lblas -lmassvp4 -lpriv -lrmn_007 -lmpich -lmpichf90 -lmpich

Commande effectuee:
mpif90 -L/users/dor/armn/viv/userlibs/Linux -L/usr/local/env/armnlib/modeles/GEM
DM/v_3.2.1/lib/Linux -L/usr/local/env/armnlib/modeles/PHY/v_4.3/lib/Linux -L/usr
/local/env/armnlib/lib/Linux -tp px -fpic -byteswapio -I. -I/usr/local/env/armnl
ib/include -Wl,-rpath,/usr/local/env/armnlib/lib/Linux -o maingemdm_Linux_3.2.1.
Abs bidon.o -lgem -lgem_4dvar_stubs -lphy -lprof_003 -lmodulopt -lrpn_comm207 -l
rtools -llapack -lblas -lmassvp4 -lpriv -lrmn_007 -lmpich
```

lorentz 22% ls

Makefile	**maingemdm_Linux_3.2.1.Abs@**	malibLinux@
RCS/	**maingemntr_Linux_3.2.1.Abs@**	output@
arbre_de_dependance	make_cdk	process@

Making GEM absolutes
Loading with **mes_recettes**

(go to your working directory)

lorentz 24% **vi mes_recettes** ← **etagere**

COMM=rpn_comm208
PHY_VERSION=4.2
#commented line

← (ie:add lines like these to modify or add to the original setup in **$gem/RCS/.recettes** **$gem/RCS/.cibles**)

lorentz 25% ls

Makefile	**maingemdm_Linux_3.2.1.Abs@**	malibLinux@
RCS/	**maingemntr_Linux_3.2.1.Abs@**	output@
arbre_de_dependance	make_cdk	process@
mes_recettes		

lorentz 26% **r.make_exp**

lorentz 27% **make gem**

Making GEM absolutes
Compiling-Loading **modified code (*.ftn)**
(with no new dependencies)

lorentz 23% omd_exp rhs.ftn ← **etagere**

extraction of version of module rhs.ftn
from directory /usr/local/env/armnlib/modeles/GEMDM_shared.....

lorentz 24% vi rhs.ftn

lorentz 26% make rhs.o

lorentz 26% ls malibLinux/

rhs.o

lorentz 27% make gem

Making GEM absolutes
Compiling-Loading **modified code (*.cdk)**
(with no new dependencies)

lorentz 23% omd_exp rhsc.cdk

extraction of version of module rhsc.cdk
from directory /usr/local/env/armnlib/modeles/GEMDM_shared.....

lorentz 24% vi rhsc.cdk
lorentz 25% make clean
lorentz 26% rm malibLinux/*.o ***(clean does not clean everything!)***

lorentz 28% make objloc

lorentz 29% ls malibLinux/

adw_main_3_int.o bac.o out_vmm.o rhs.o set_rhs.o sol_main.o
adw_main_3_intlag.o nli.o pre.o set_list.o set_sor.o wdpers.o

lorentz 27% make gem

Making GEM absolutes
Compiling-Loading **modified code**
(with new dependencies)

New dependencies occur when:

1) a brand new *.ftn routine has been created
2) a *.cdk routine is added to a *.ftn routine

lorentz 25% make clean ← **etagere**
lorentz 26% rm malibLinux/*.o
lorentz 27% r.make_exp ← **etagere**
lorentz 28% make objloc

Recreate the new dependencies

lorentz 29% make gem

Source Code

```
pollux 26% cd $gem
pollux 27% pwd
/usr/local/env/armnlib/modeles/GEMDM_shared/v_3.2.1
pollux 28% ls
Makefile_AIX       RCS_DYN/           patches/
Makefile_IRIX64    bin/               run_configs/
Makefile_Linux     dfiles/            scripts/
RCS/               doc/               src/
RCS_4DVAR/         lib/               src_4d/
pollux 29%
```

in $GEM/src

```
lorentz 34% dir
total 3280
drwxr-xr-x  2 armnmod armn 16384 Jul 25 17:16 ./
drwxr-xr-x  4 armnmod armn    29 Jul 13 15:28 ../
-rw-r--r--  1 armnmod armn   912 Jul 13 16:09 acq.cdk
-rw-r--r--  1 armnmod armn   827 Jul 13 16:09 acq_int.cdk
-rw-r--r--  1 armnmod armn 15973 Jul 13 16:09 acqui.ftn
-rw-r--r--  1 armnmod armn 16189 Jul 13 16:09 adw.cdk
-rw-r--r--  1 armnmod armn  5748 Jul 13 16:09 adw_cfl_lam.ftn
-rw-r--r--  1 armnmod armn  3141 Jul 13 16:09 adw_ckbd.ftn
-rw-r--r--  1 armnmod armn  8681 Jul 13 16:09 adw_ckbd_lam.ftn
-rw-r--r--  1 armnmod armn  4724 Jul 13 16:09 adw_exch_1.ftn
-rw-r--r--  1 armnmod armn  9040 Jul 13 16:09 adw_exch_2.ftn
-rw-r--r--  1 armnmod armn  2367 Jul 13 16:09 adw_exch_3.ftn
-rw-r--r--  1 armnmod armn  5478 Jul 13 16:09 adw_interp.ftn
-rw-r--r--  1 armnmod armn  4555 Jul 13 16:09 adw_interp2.ftn
--More--
```

Making GEM absolutes
Loading with a **patch**

lorentz 23% **ls $gem/patches**
README_p1 README_p2 **README_p3** p1/ p2 **p3/**
(go to your working directory) (read this!)
lorentz 24% ls
Makefile **maingemdm_Linux_3.2.1.Abs*** malibLinux/
RCS/ **maingemntr_Linux_3.2.1.Abs*** output/
arbre_de_dependance make_cdk process/

lorentz 25% **vi .exper_cour** ← **etagere**

RCSPATH="/usr/local/env/armnlib/modeles/GEMDM_shared/v_3.2.1/RCS"
RCSBASE="base"
MyPatches='GEMDM/3.2.1/p3' . patch_exp.dot (add this line)

lorentz 26% **r.make_exp** ← Regenerate Makefile
lorentz 27% **make gem**

Making GEM absolutes
Compiling-Loading modified code from a **patch**

lorentz 25% **vi .exper_cour**

RCSPATH=”/usr/local/env/armnlib/modeles/GEMDM_shared/v_3.2.1/RCS”
RCSBASE=”base”
ExtraOptions=-ignore_conflicts MyPatches='GEMDM/3.2.1/p3' . patch_exp.dot

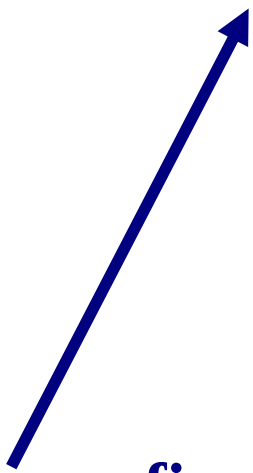
(add this line instead)

lorentz 26% **r.make_exp** ⟵ Regenerate Makefile
lorentz 26% omd_exp hzd_ho.ftn e_nml.cdk *(extract decks)*

lorentz 27% **r.make_exp** *(if new dependencies)*
lorentz 28% make objloc *(if modifying *.cdk)*
lorentz 29% make hzd_ho.o
lorentz 30% **make gem**

Configuration Files

```
pollux 26% cd $gem
pollux 27% pwd
/usr/local/env/armnlib/modeles/GEMDM_shared/v_3.2.1
pollux 28% ls
Makefile_AIX       RCS_DYN/           patches/
Makefile_IRIX64    bin/               run_configs/
Makefile_Linux     dfiles/            scripts/
RCS/               doc/               src/
RCS_4DVAR/         lib/               src_4d/
pollux 29%
```



lorentz 23% cp $gem/**run_configs**/dbg1/* .

lorentz 24% ls

Makefile
RCS/
arbre_de_dependance
configexp.dot.cfg
gem_settings.nml
maingemdm_Linux_3.2.1.Abs*
maingemntr_Linux_3.2.1.Abs*
make_cdk
malibLinux/
outcfg.out
output/
process/

gem_settings.nml

&grid
Grd_typ_S='GU', Grd_ni=23, Grd_nj=12,
/

&ptopo
Ptopo_npex=2, Ptopo_npey=2,
Ptopo_nblocx=1, Ptopo_nblocy=1
/

&gement
Out1_etik_s = 'MYRUN',
Topo_filmx_L = .true., Topo_init_L = .true.,
P_pbl_schsl_s = 'FCREST',
/

&gem_cfgs
hyb = 0.000, 0.011, 0.027, 0.051, 0.075,
0.101, 0.127, 0.155, 0.185, 0.219,
0.258, 0.302, 0.351, 0.405, 0.460,
0.516, 0.574, 0.631, 0.688, 0.744,
0.796, 0.842, 0.884, 0.922, 0.955,
0.980, 0.993, 1.000,
Grd_rcoef = 1.6, Pres_ptop = 10.,
Step_total = 6, Step_rsti = 999,
Step_gstat = 1, Lctl_debug=.true.,
Schm_phyms_L = .true.,
Out3_nbitg = 32,
/

&physics
P_pbl_bndlr_s = 'clef',
P_cond_conv_s = 'oldkuo', P_cond_stcon_s='newsund',
P_cond_schlct_s = 'conres','nil',
P_serg_srsus_L=.false., P_zong_znsus_L=.false.,
/

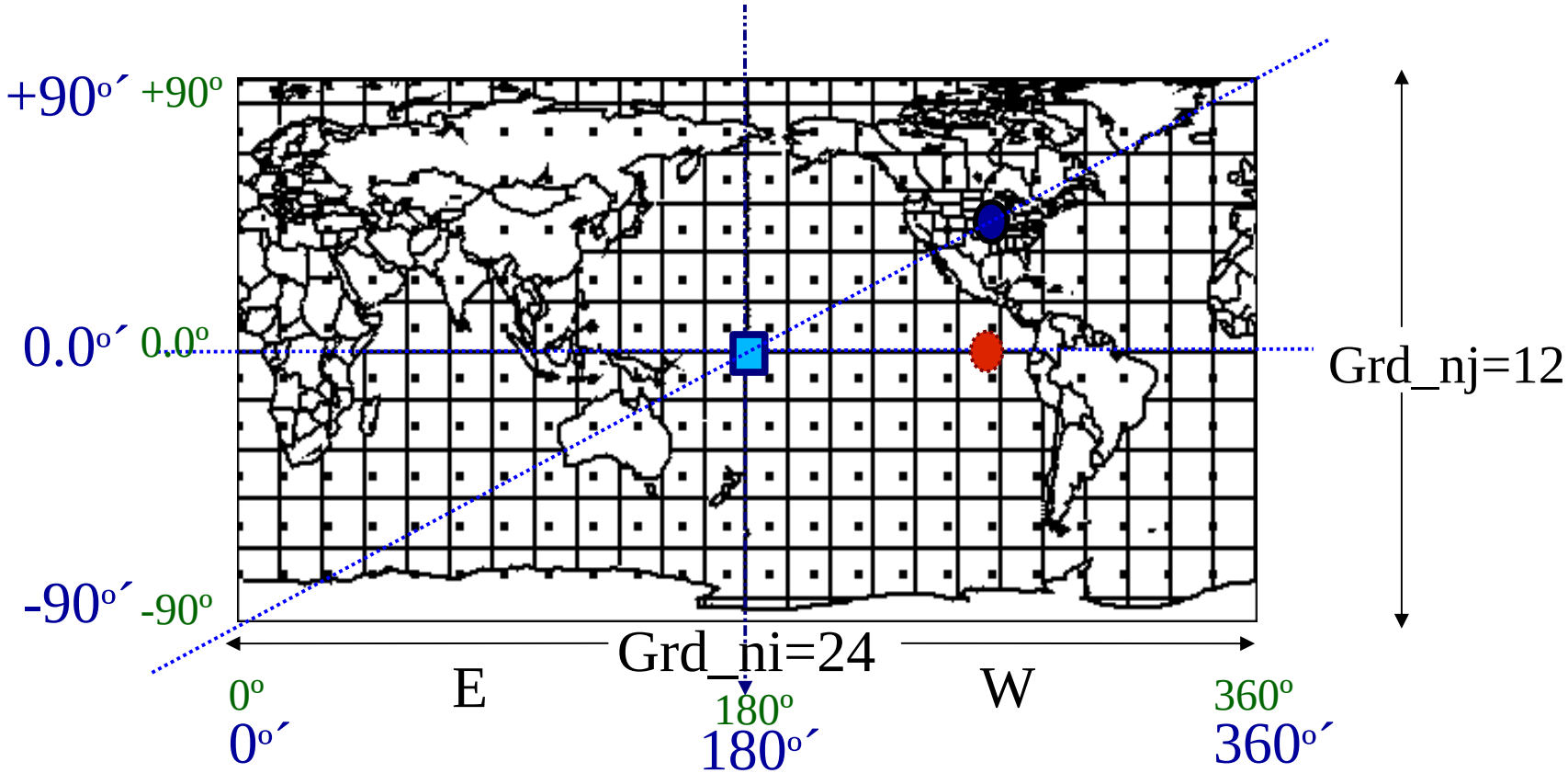
gem_settings.nml ('grid' namelist)

Grd_typ_S

- GU – Global Uniform
- GV – Global Variable
- LU – LAM Uniform

Global Uniform grid – not rotated

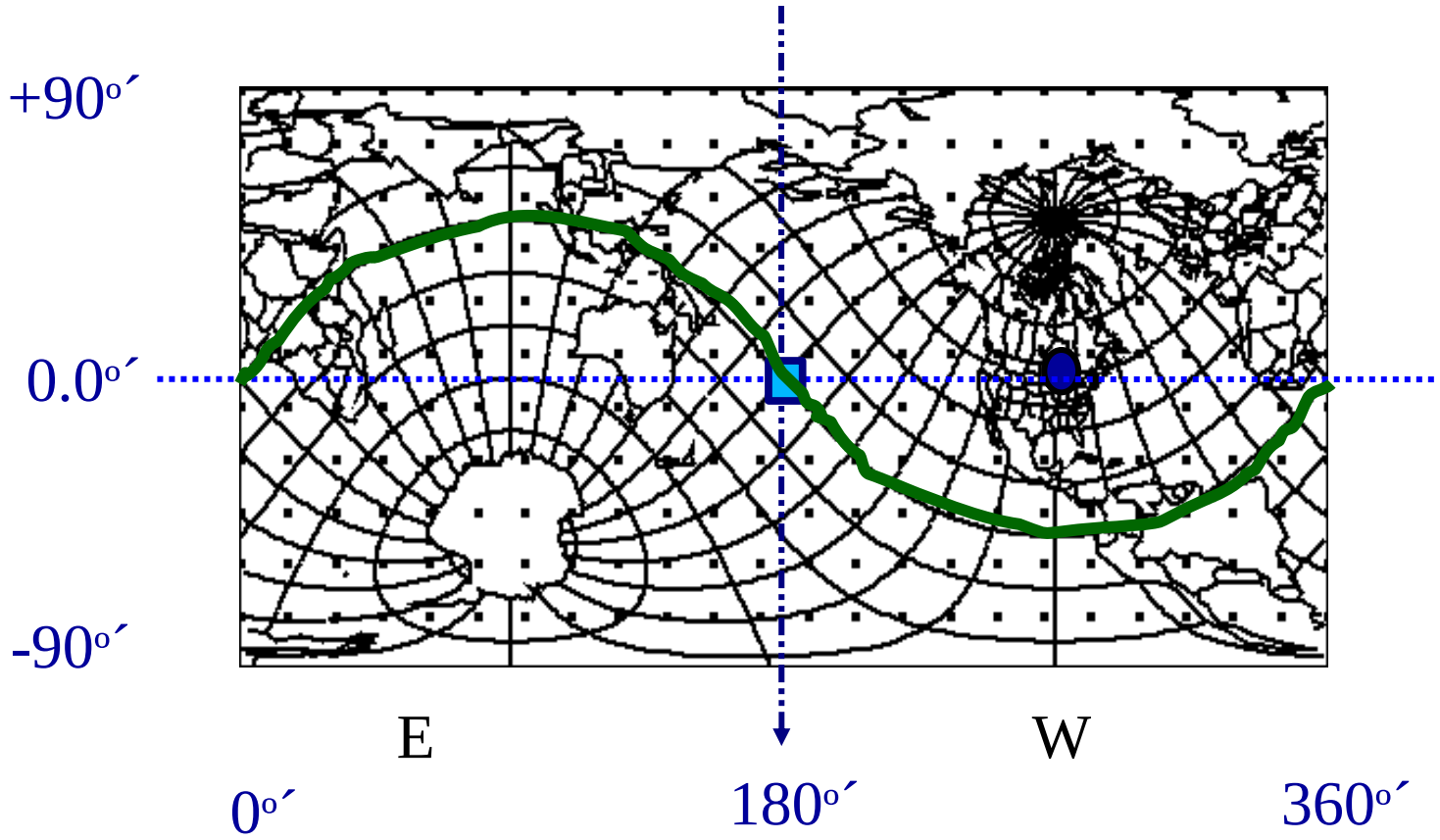
- Grd_xlon1=180., Grd_xlat1=0., (geographical
- Grd_xlon2=270., Grd_xlat2=0., coordinates)
- Grd_xlon2=270., Grd_xlat2=45.,

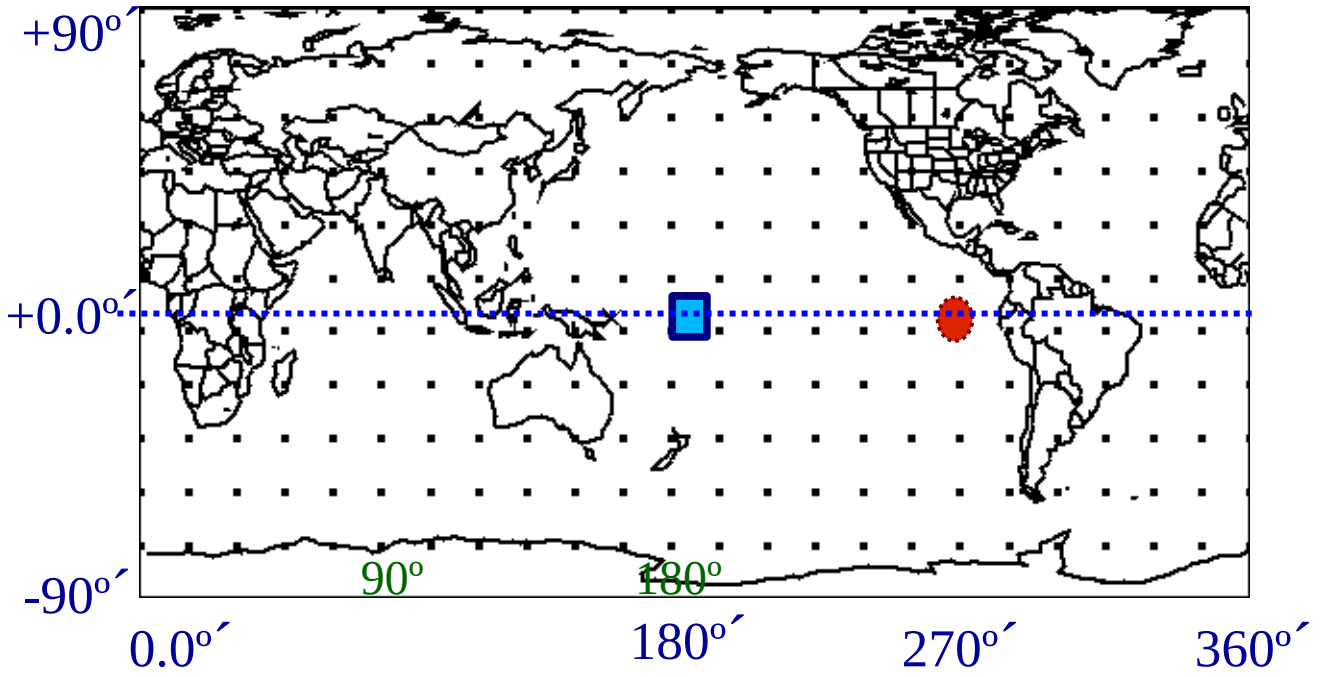


Global Uniform grid – rotated

Grd_roule=.true.,

- Grd_xlon1=180., Grd_xlat1=0., (geographical
- Grd_xlon2=270., Grd_xlat2=45., coordinates)

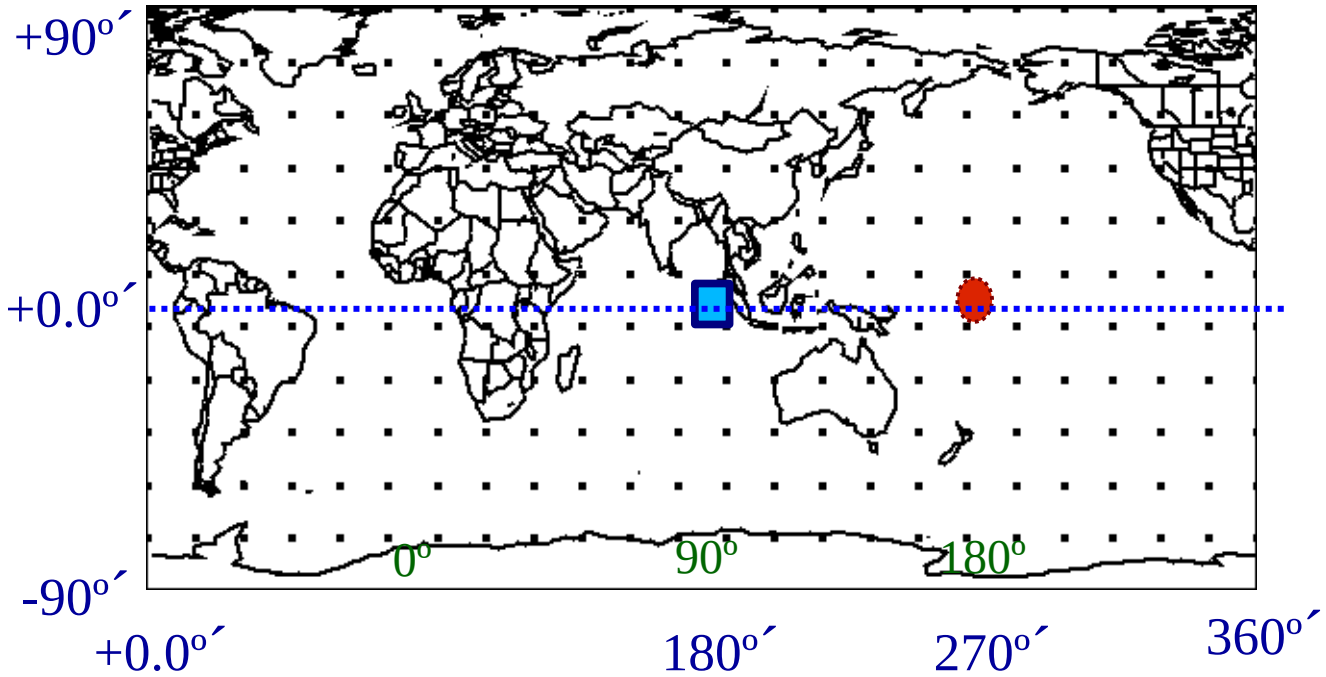




Grd_xlon1=180.,
Grd_xlat1=0.,
Grd_xlon2=270.,
Grd_xlat2=0.,

(xlat1,xlon1)

(xlat2,xlon2)



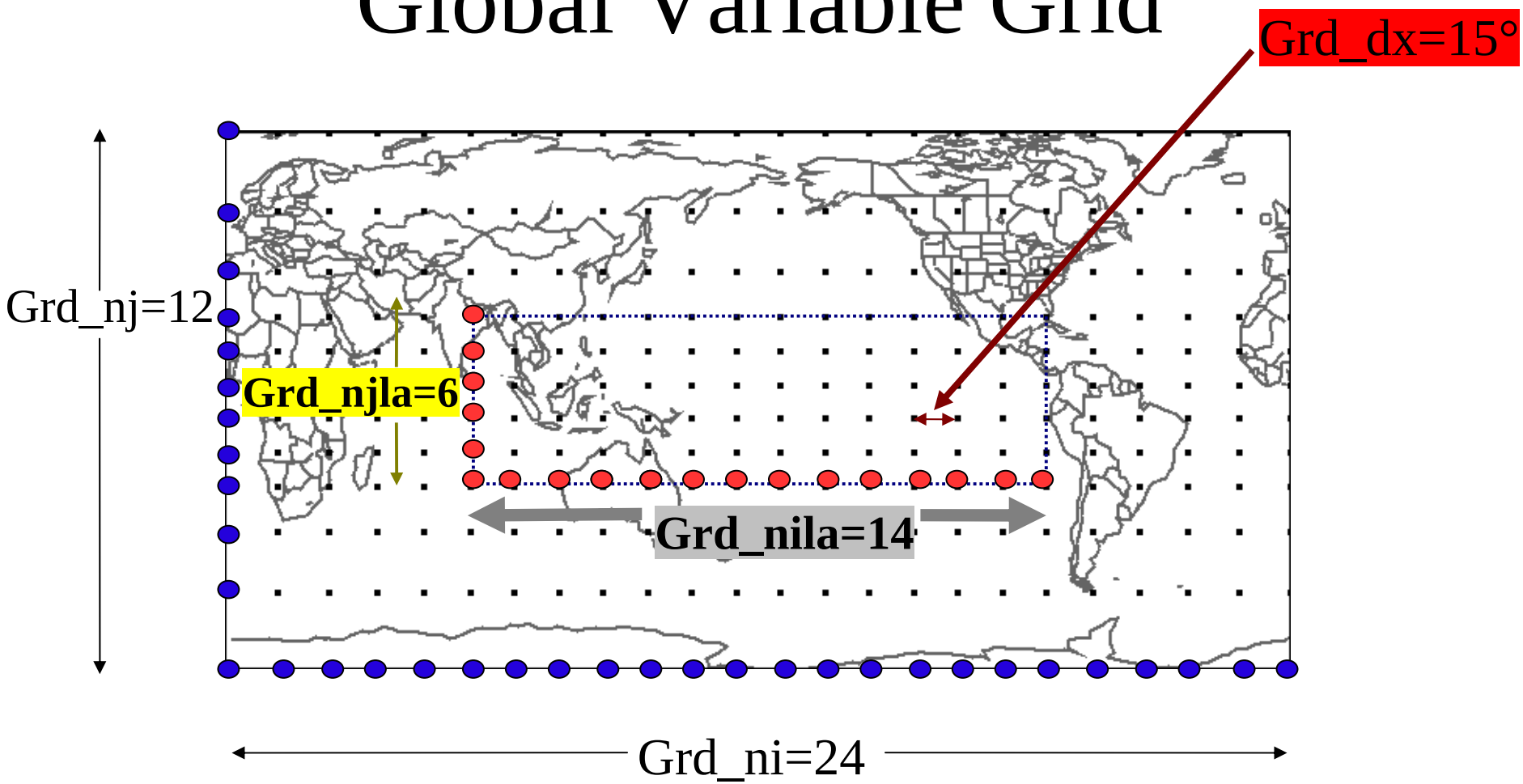
Grd_xlon1=90.,
Grd_xlat1=0.,
Grd_xlon2=180.,
Grd_xlat2=0.,
Grd_roule=.true.

gem_settings.nml ('grid' namelist)

Global Variable (GV) Grid

```
&grid
Grd_typ_S='GV', Grd_roule=.true.,
Grd_ni=24, Grd_nj=12,
Grd_nila=14, Grd_njla=6,
Grd_dx =15.0, Grd_dy = 10.0
/
```

Global Variable Grid

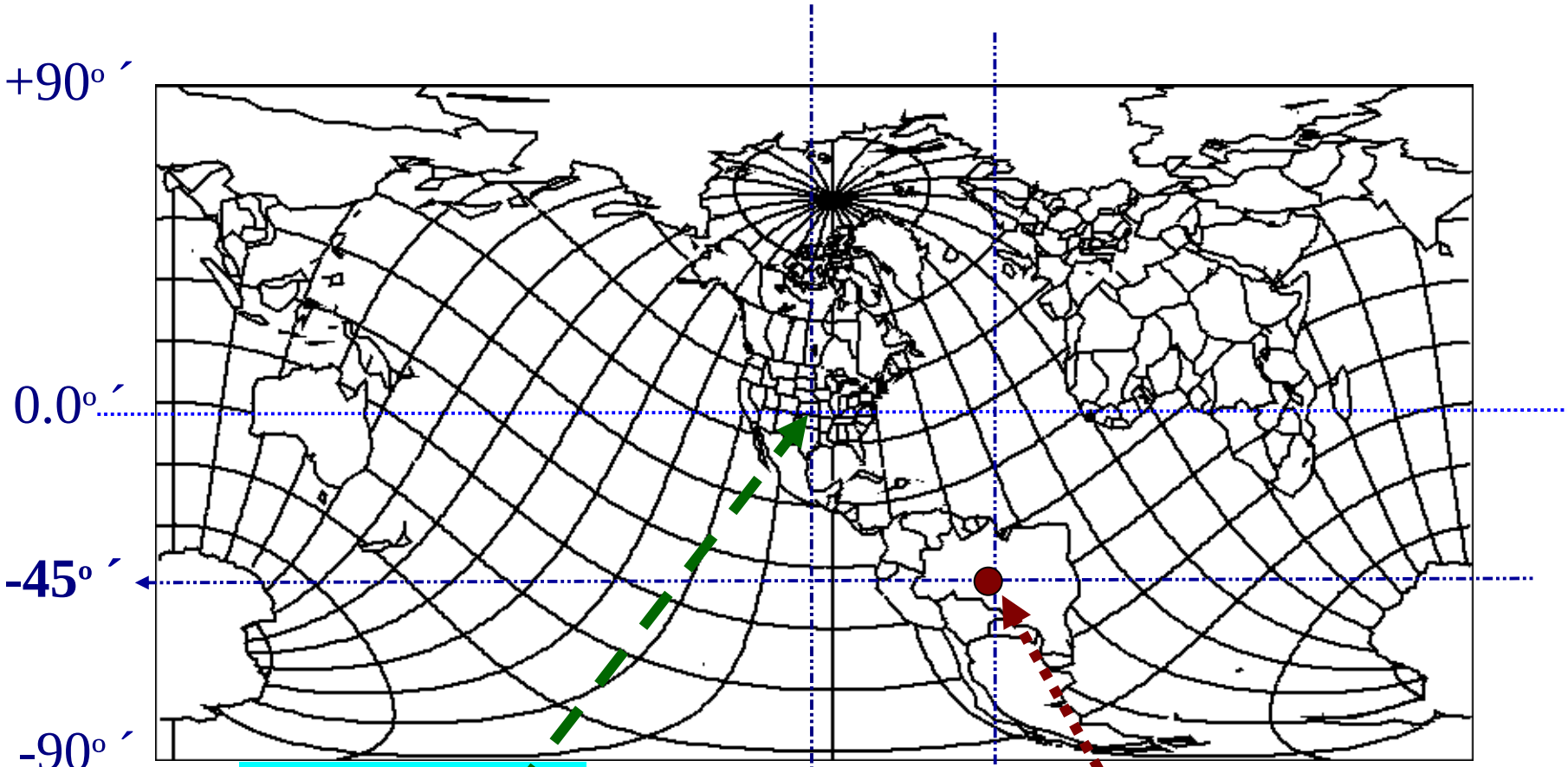


gem_settings.nml ('grid' namelist)

LAM Uniform (LU) Grid

```
&grid
Grd_typ_S='LU', Grd_roule=.true.,
Grd_ni=60, Grd_nj=60,
Grd_dx =0.9, Grd_dy = 0.9,
Grd_iref = 30, Grd_jref = 30,
Grd_lonr = 225., Grd_latr = -45.,
Grd_xlon1 = -96.2, Grd_xlat1 = 35.,
Grd_xlon2 = 0., Grd_xlat2 = 0.,
/
```

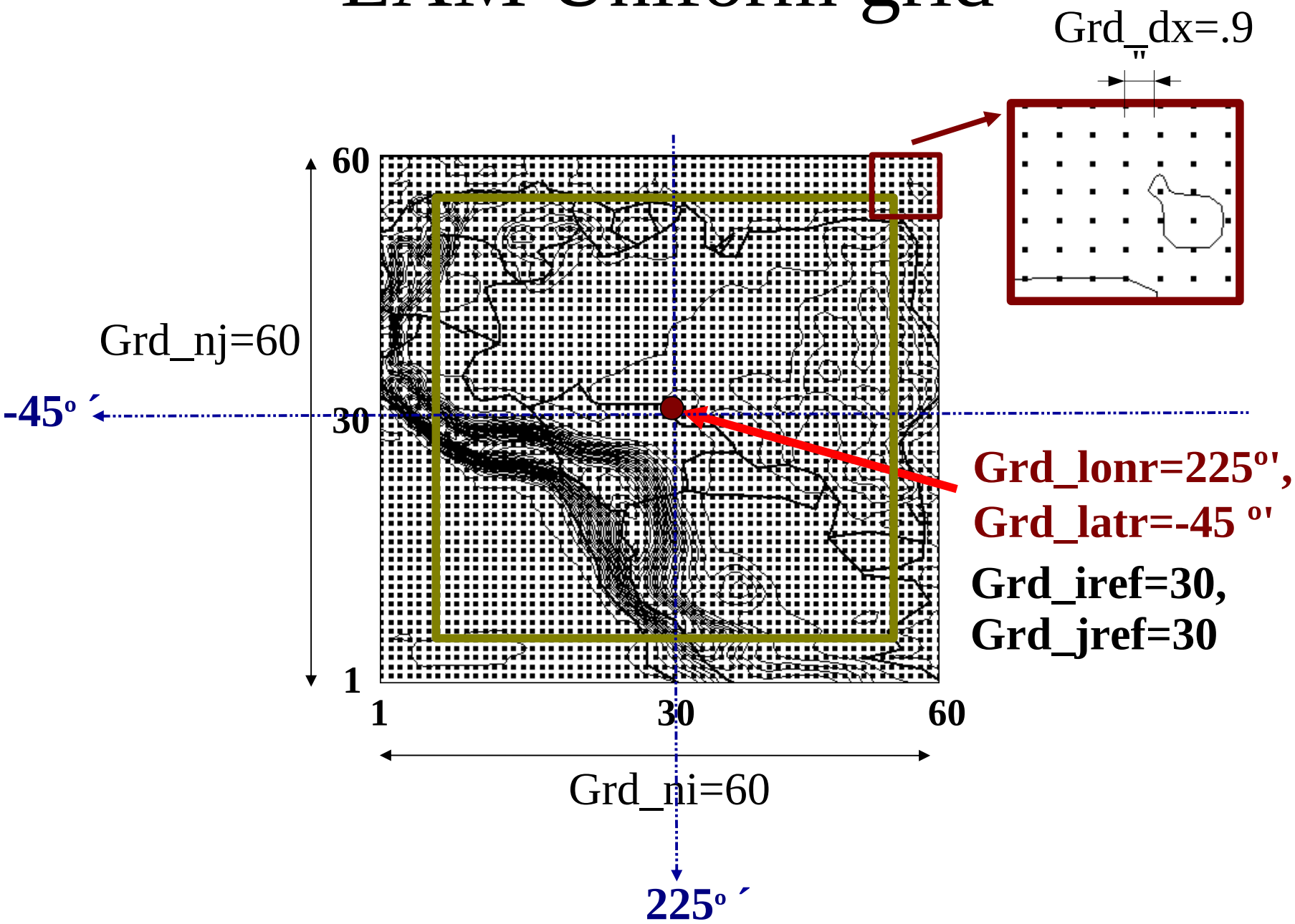
LAM Uniform grid



(Geographical Coordinates)
Grd_xlon1=-96.2,
Grd_xlat1=35.,
Grd_xlon2=0.,
Grd_xlat2=0.,
Grd_roule=.true.

Grd_lonr=225.,
Grd_latr=-45.

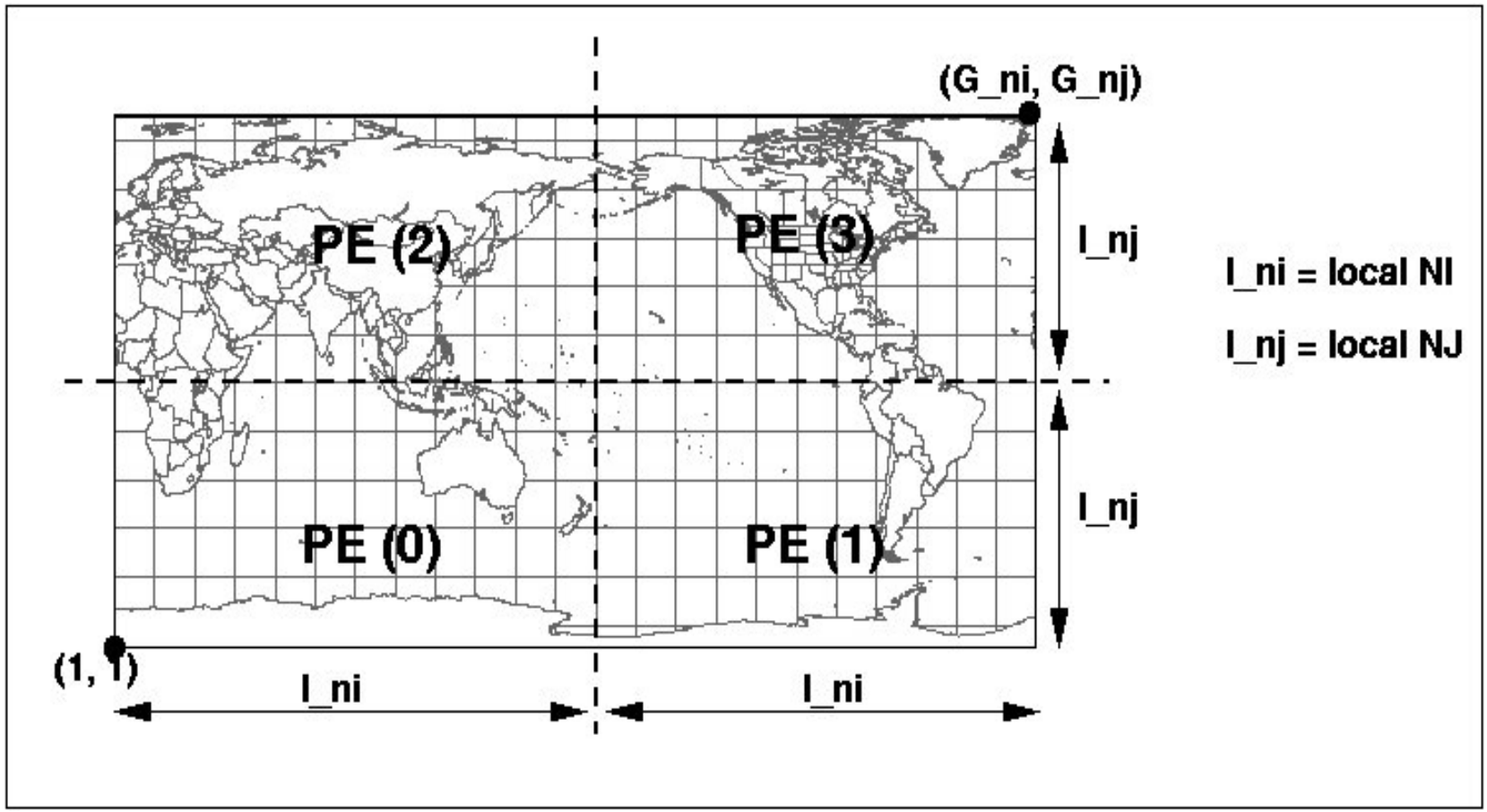
LAM Uniform grid



gem_settings.nml ('ptopo' namelist)

Basic topology definition

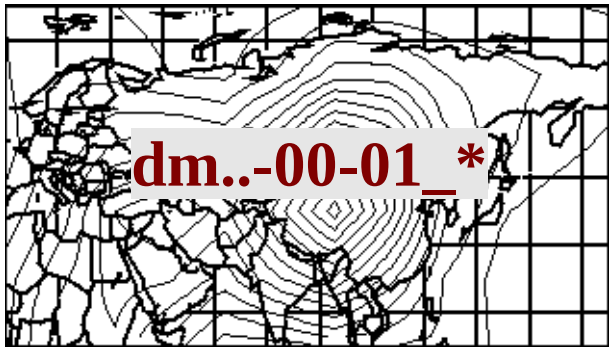
```
&ptopo
Ptopo_npex=2, Ptopo_npey=2,
/
```

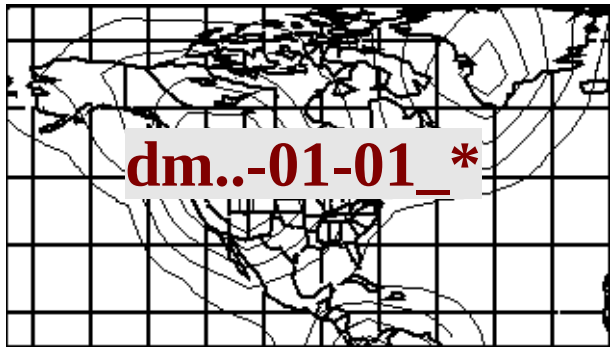


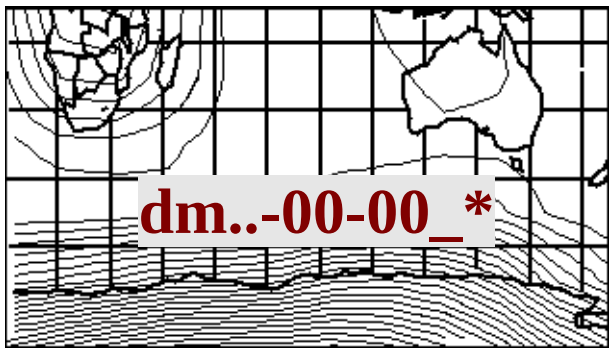
gem_settings.nml ('ptopo' namelist)

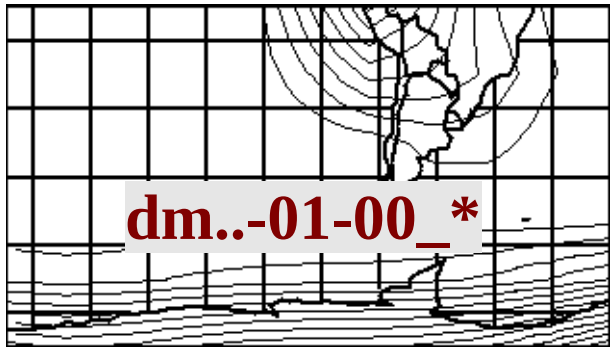
Block topology definition for output files

```
&ptopo
Ptopo_npex=2, Ptopo_npey=2,
Ptopo_nblocx=2, Ptopo_nblocy=2,
/
```





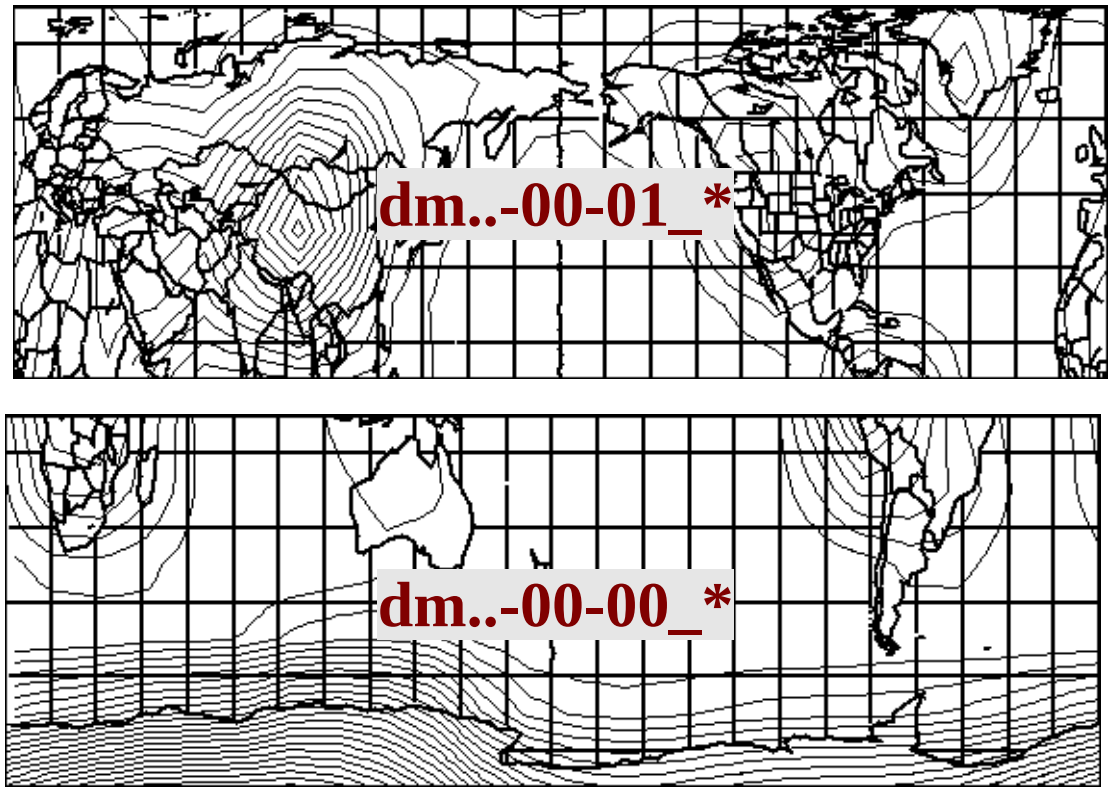




gem_settings.nml ('ptopo' namelist)

Block topology definition for output files

&ptopo
Ptopo_npex=2, Ptopo_npey=2,
Ptopo_nblocx=1, Ptopo_nblocy=2,
/



gem_settings.nml ('gem_cfgs' namelist)

Controls for main program GEMDM

&gem_cfgs

hyb = 0.000, 0.011, 0.027, 0.051, 0.075,
0.101, 0.127, 0.155, 0.185, 0.219,
0.258, 0.302, 0.351, 0.405, 0.460,
0.516, 0.574, 0.631, 0.688, 0.744,
0.796, 0.842, 0.884, 0.922, 0.955,
0.980, 0.993, 1.000,

Grd_rcoef = 1.6, **Pres_ptop** = 10.,
Step_total = 6, **Step_rsti** = 999,
Step_gstat = 1, **Lctl_debug**=.true.,
Schm_phyms_L = .true.,
Out3_nbitg = 32,

/

outcfg.out

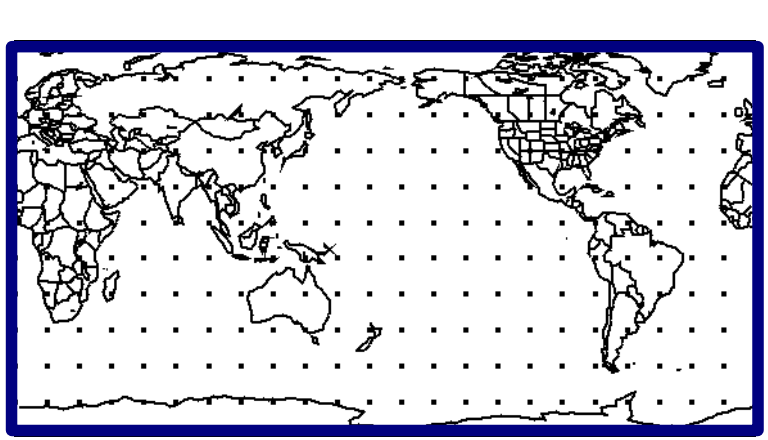
```
grid=1,model;
grid=2,core;
grid=3,reduc,4,10,5,11

levels=1,eta, -1;
levels=3,eta, 0;
levels=4,eta,<18,20,1>;
levels=2,pres,[1000.,950., 800.,700.,500.,250.,20.]

steps=1,step,[0,2],<5,10,2>;
steps=2,hour,<0.,6.,1.>;

sortie([ME,PN,P0,TT], grid,1, levels,2, steps,2)
sortie_p([Z0, MT, MG, PR], grid,1, levels,1,
 steps,1)

filtre([GZ,TT], coef, 0.5, pass,2)
xnbit([Z0],bits, 32)
```

outcfg.out

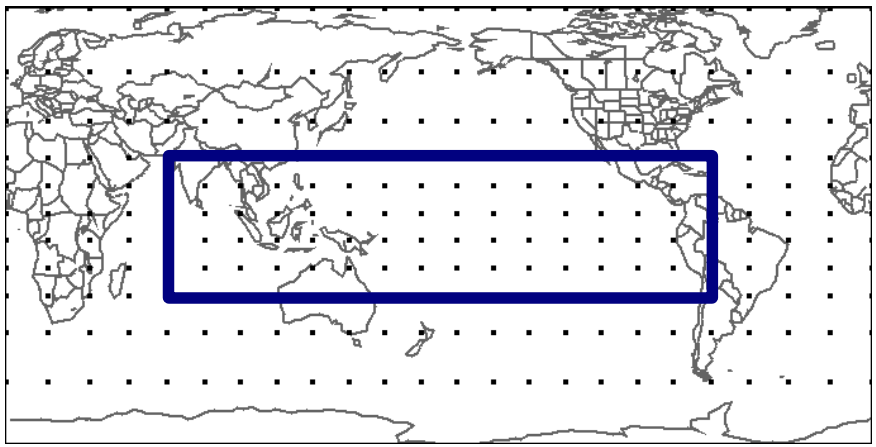
```
grid=1,model;
grid=2,core;
grid=3,reduc,4,10,5,11

levels=1,eta, -1;
levels=3,eta, 0;
levels=4,eta,<18,20,1>;
levels=2,pres,[1000.,950., 800.,700.,500.,250.,20.]

steps=1,step,[0,2],<5,10,2>;
steps=2,hour,<0.,6.,1.>;

sortie([ME,PN,P0,TT], grid,1, levels,2, steps,2)
sortie_p([Z0, MT, MG, PR], grid,1, levels,1,
 steps,1)

filtre([GZ,TT], coef, 0.5, pass,2)
xnbit([Z0],bits, 32)
```

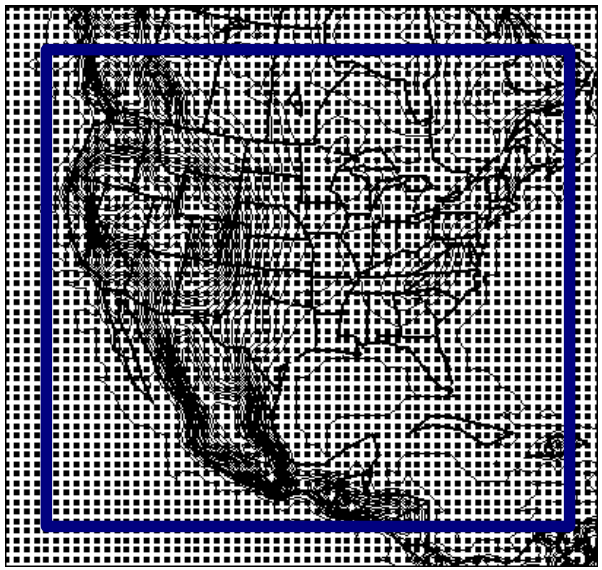
grid =

grid=1,model;

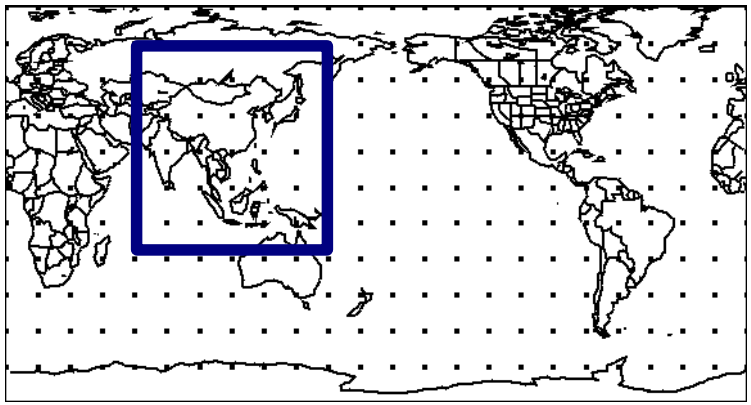


grid=1,core;





grid=1,reduc,4,10,5,11;
(x1,x2,y1,y2)



outcfg.out

```
grid=1,model;
grid=2,core;
grid=3,reduc,4,10,5,11

levels=1,eta, -1;
levels=3,eta, 0;
levels=4,eta,<18,20,1>;
levels=2,pres,[1000.,950., 800.,700.,500.,250.,20.]

steps=1,step,[0,2],<5,10,2>;
steps=2,hour,<0.,6.,1.>;

sortie([ME,PN,P0,TT], grid,1, levels,2, steps,2)
sortie_p([Z0, MT, MG, PR], grid,1, levels,1,
 steps,1)

filtre([GZ,TT], coef, 0.5, pass,2)
xnbit([Z0],bits, 32)
```

levels, steps

levels=1,eta, -1; (1,2,3...G_nk)
levels=3,eta, 0; (G_nk)
levels=4,eta,<18,20,1>; (18,19,20)
levels=2,pres,[1000.,950., 800.,700.,500.,250.,20.] (as is)

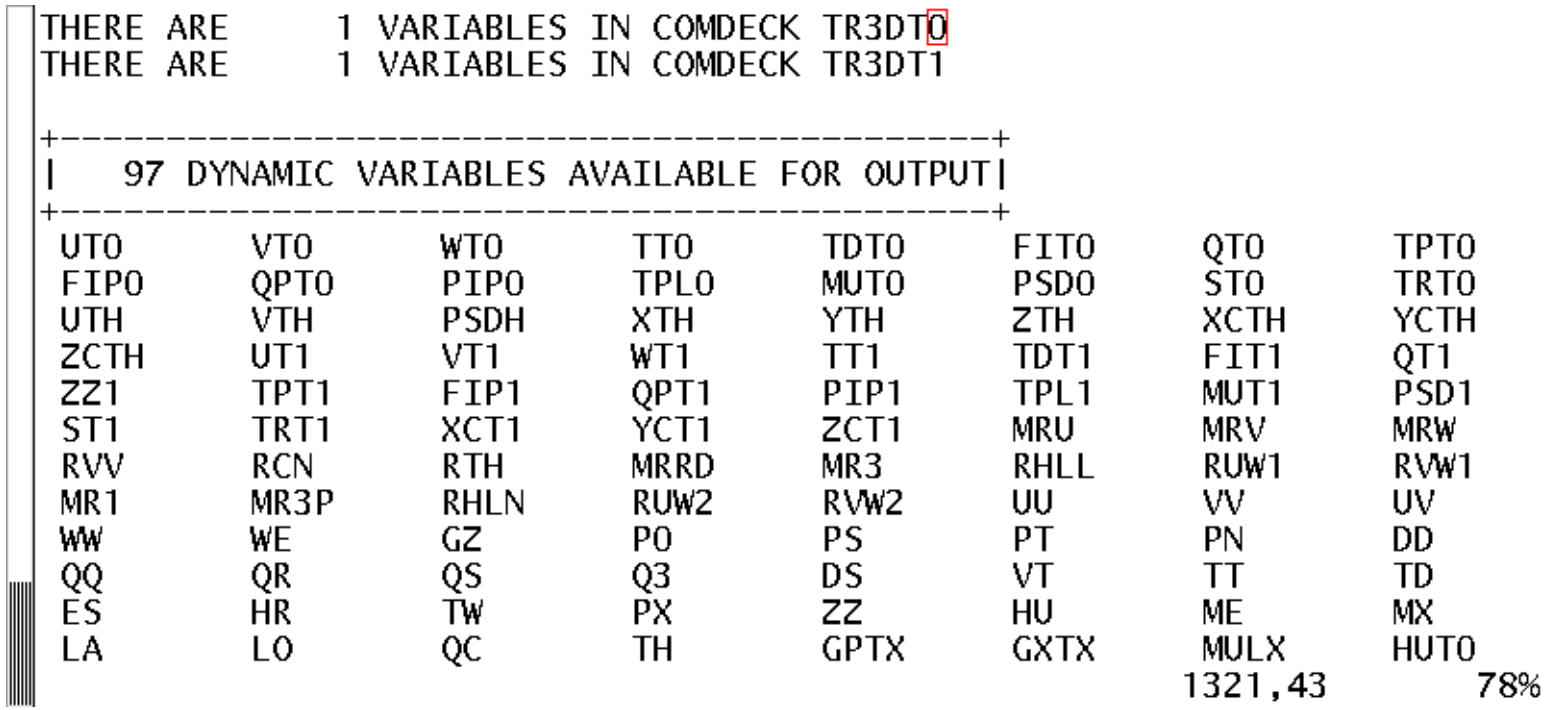
steps=1,step,[0,2],<5,10,2>; (0,2,5,7,9)
steps=2,hour,<0.,6.,1.>; (0,1,2,3,4,5,6)

outcfg.out

```
grid=1,model;
grid=2,core;
grid=3,reduc,4,10,5,11

levels=1,eta, -1;
levels=3,eta, 0;
levels=4,eta,<18,20,1>;
levels=2,pres,[1000.,950., 800.,700.,500.,250.,20.]

steps=1,step,[0,2],<5,10,2>;
steps=2,hour,<0.,6.,1.>;

sortie([ME,PN,P0,TT], grid,1, levels,2, steps,2)
sortie_p([Z0, MT, MG, PR], grid,1, levels,1,
 steps,1)

filtre([GZ,TT], coef, 0.5, pass,2)
xnbit([Z0],bits, 32)
```

sortie

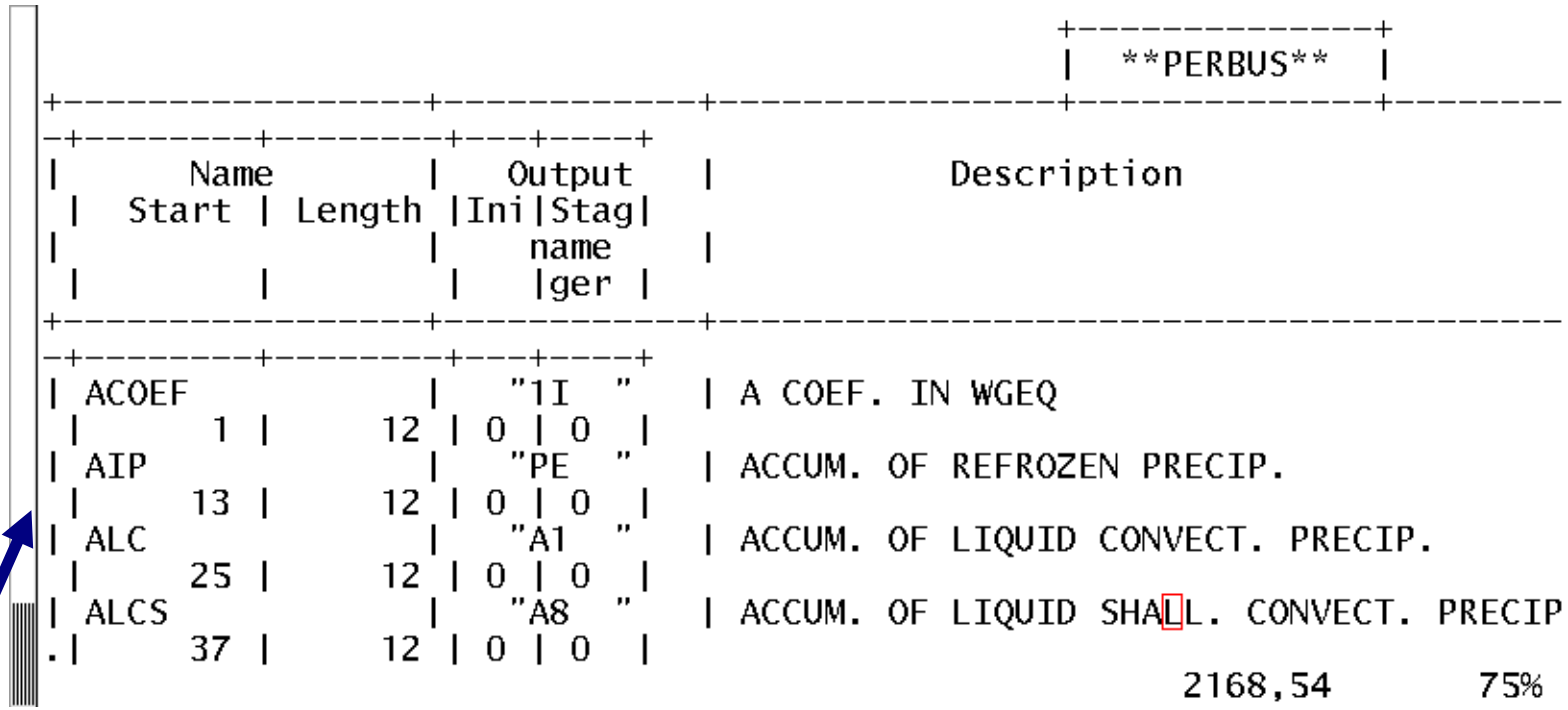
sortie([ME,PN,P0,TT], grid,1, levels,2, steps,2)



sortie_p

sortie_p([Z0, MT, MG, PR], grid,1, levels,1, steps,1)

sortie_p([ALC,ACOEF],grid,2,levels,1,steps,2)



```
                                                          +--------------+
                                                          |  **PERBUS**  |
+-----------------+-----------+----------------+-------------+--------
-+--------+--------+---+----+
|      Name        |   Output   |           Description
 |  Start | Length |Ini|Stag|
|                  |    name    |
 |        |        |   |ger |
+-----------------+-----------+-----------------------------------
-+--------+--------+---+----+
| ACOEF            |   "1I  "   | A COEF. IN WGEQ
 |       1 |     12 | 0 | 0  |
| AIP              |   "PE  "   | ACCUM. OF REFROZEN PRECIP.
 |      13 |     12 | 0 | 0  |
| ALC              |   "A1  "   | ACCUM. OF LIQUID CONVECT. PRECIP.
 |      25 |     12 | 0 | 0  |
| ALCS             |   "A8  "   | ACCUM. OF LIQUID SHALL. CONVECT. PRECIP
.|      37 |     12 | 0 | 0  |
                                                      2168,54       75%
```

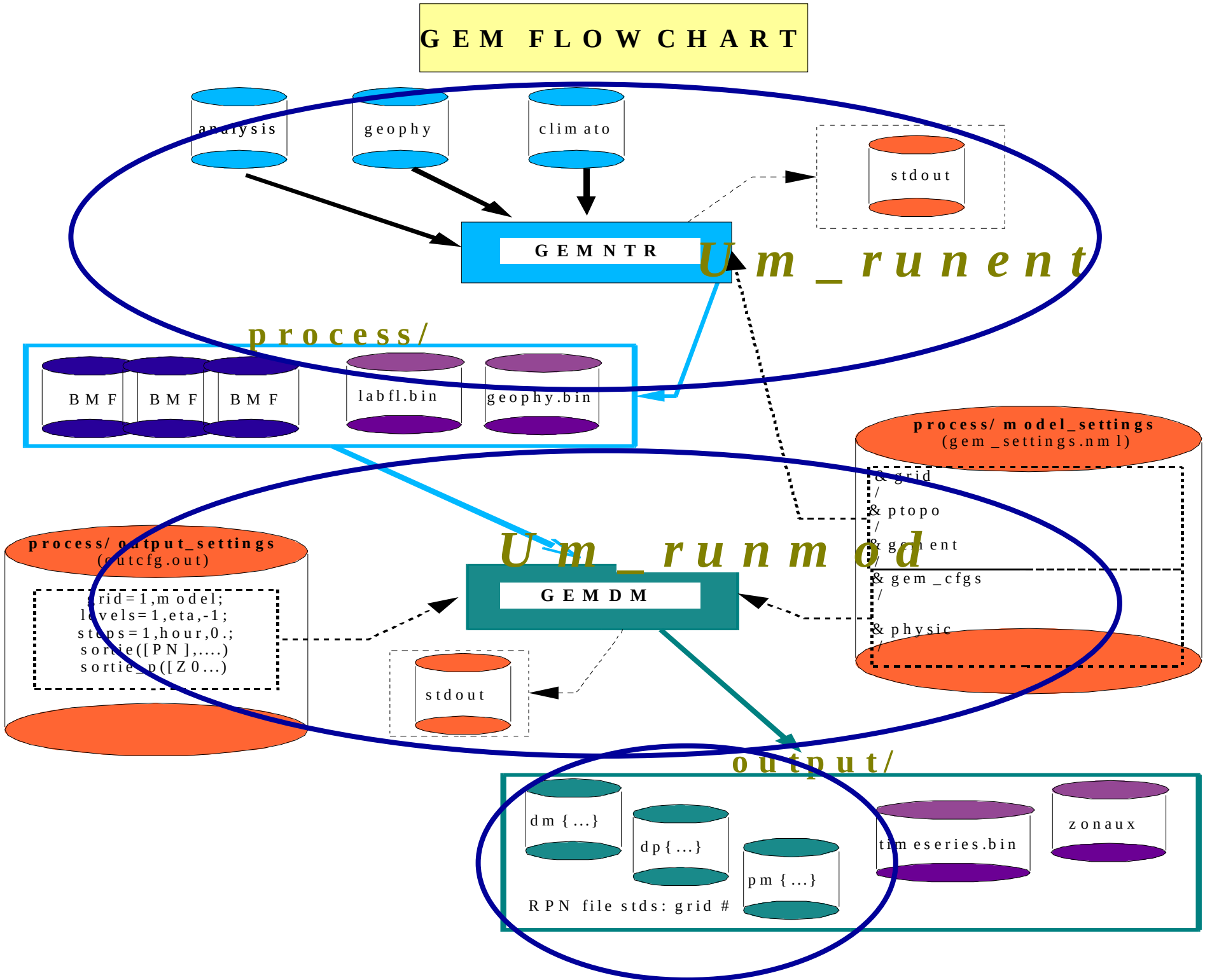
Fields available for output may not mean that they have values!

Running GEMDM
(interactive- pollux,Linux only)

lorentz 25% ls

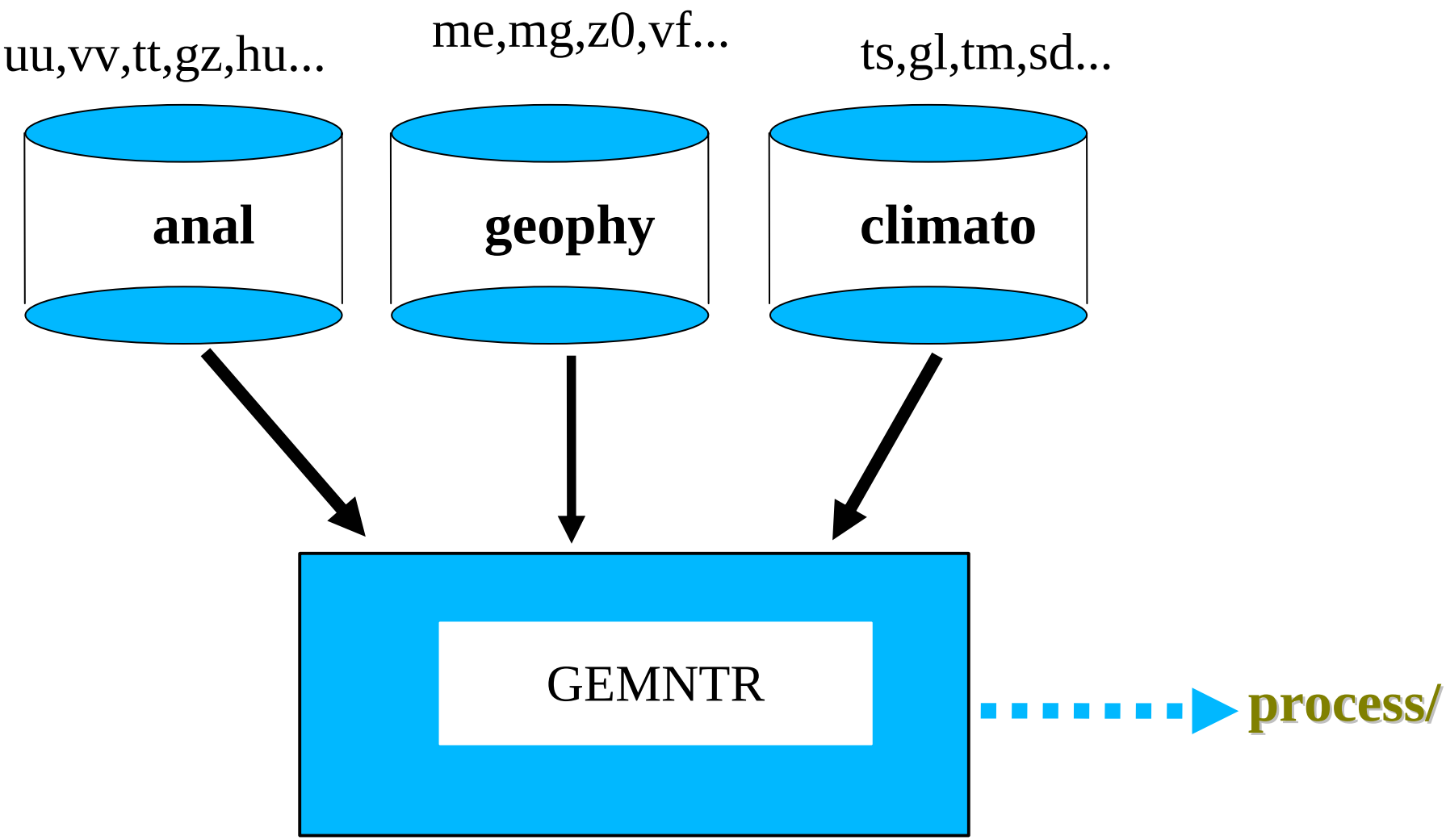
Makefile	maingemdm_Linux_3.2.1.Abs@	
outcfg.out	**gem_settings.nml**	
RCS/	maingemntr_Linux_3.2.1.Abs@	**output@**
arbre_de_dependance	make_cdk	**process@**
malibLinux@		

lorentz 26% Um_runent.sh > out_gemntr (horizontal int,split)
(Um_runent.sh -h for help)
lorentz 27% Um_runmod.sh > out_gempp (vertical int, integ)
(Um_runmod.sh -h for help)


GEM FLOW CHART
analysis
geophy
climato
stdout
GEMNTR
Um_runent
process/
BMF
BMF
BMF
labfl.bin
geophy.bin
process/ model_settings
(gem_settings.nml)
&grid
/
&ptopo
/
&gdcent
/
&gem_cfgs
/
&physic
/
process/ output_settings
(outcfg.out)
grid=1,model;
levels=1,eta,-1;
steps=1,hour,0.;
sortie([PN],....)
sortie_p([Z0...)
Um_runmod
GEMDM
stdout
output/
dm{...}
dp{...}
pm{...}
RPN file stds: grid #
timeseries.bin
zonaux

Um_runent (global)

(start)

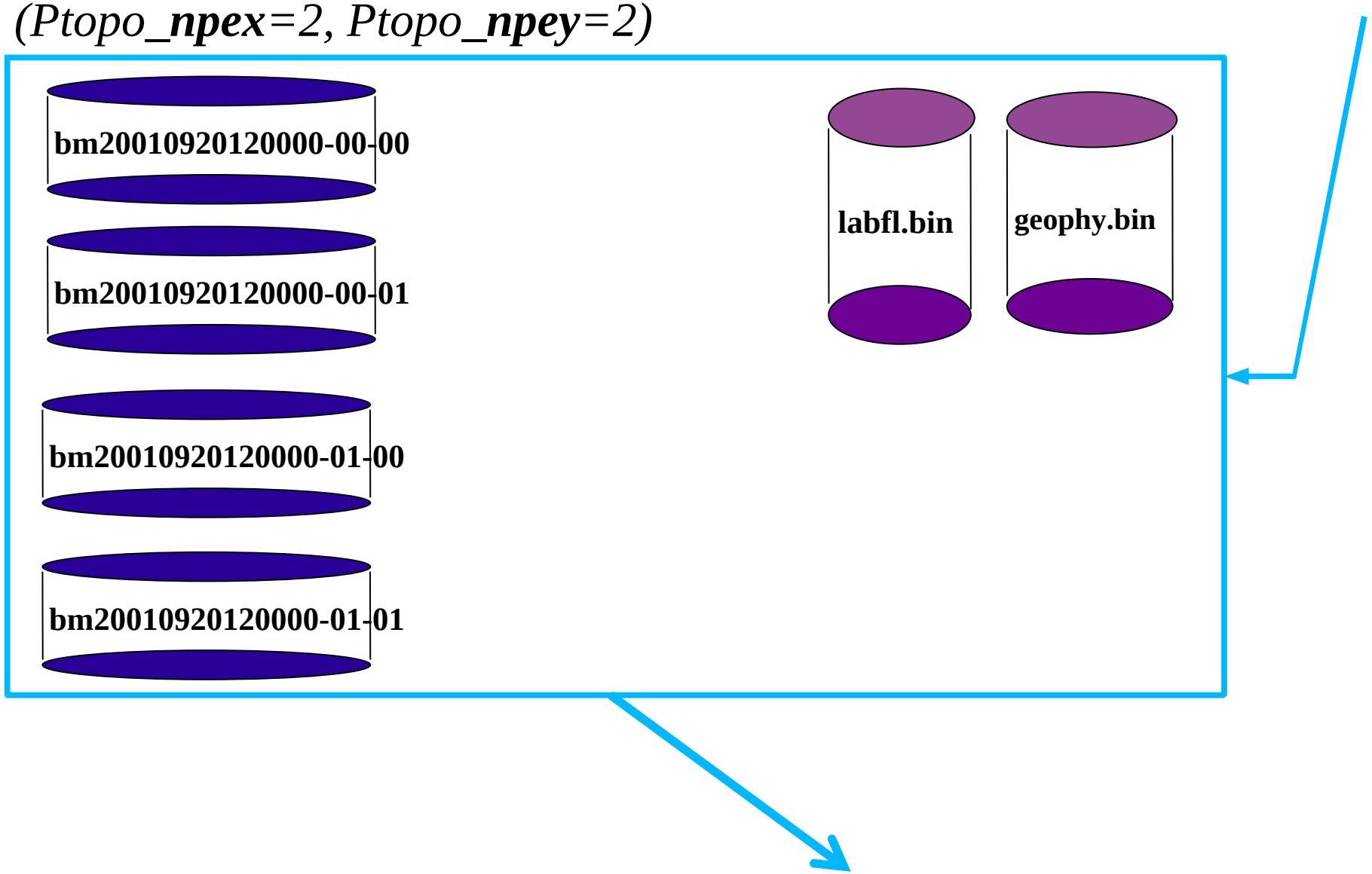


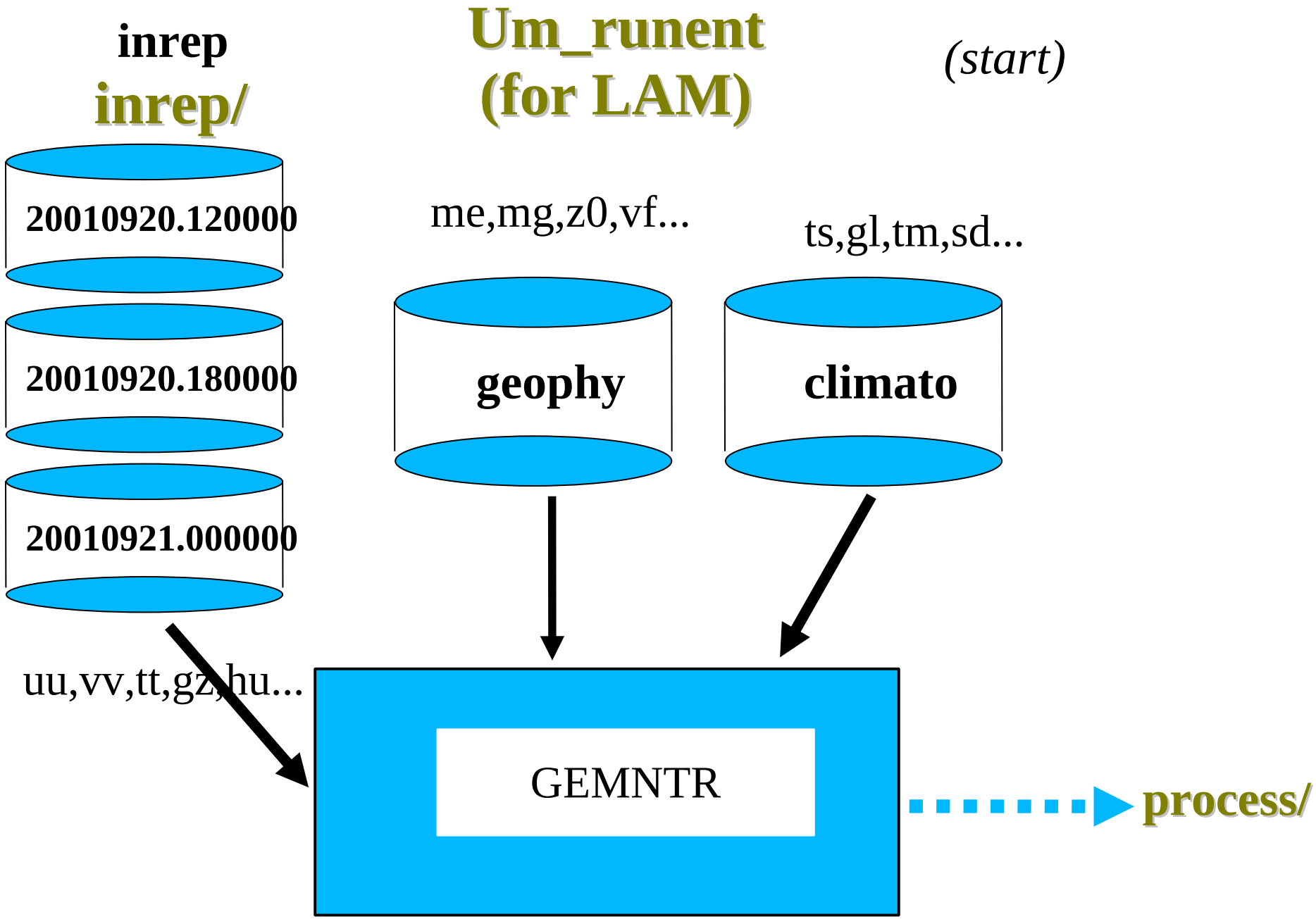
Um_runent (global)

process/

(end)

*(Ptopo_**npex**=2, Ptopo_**npey**=2)*

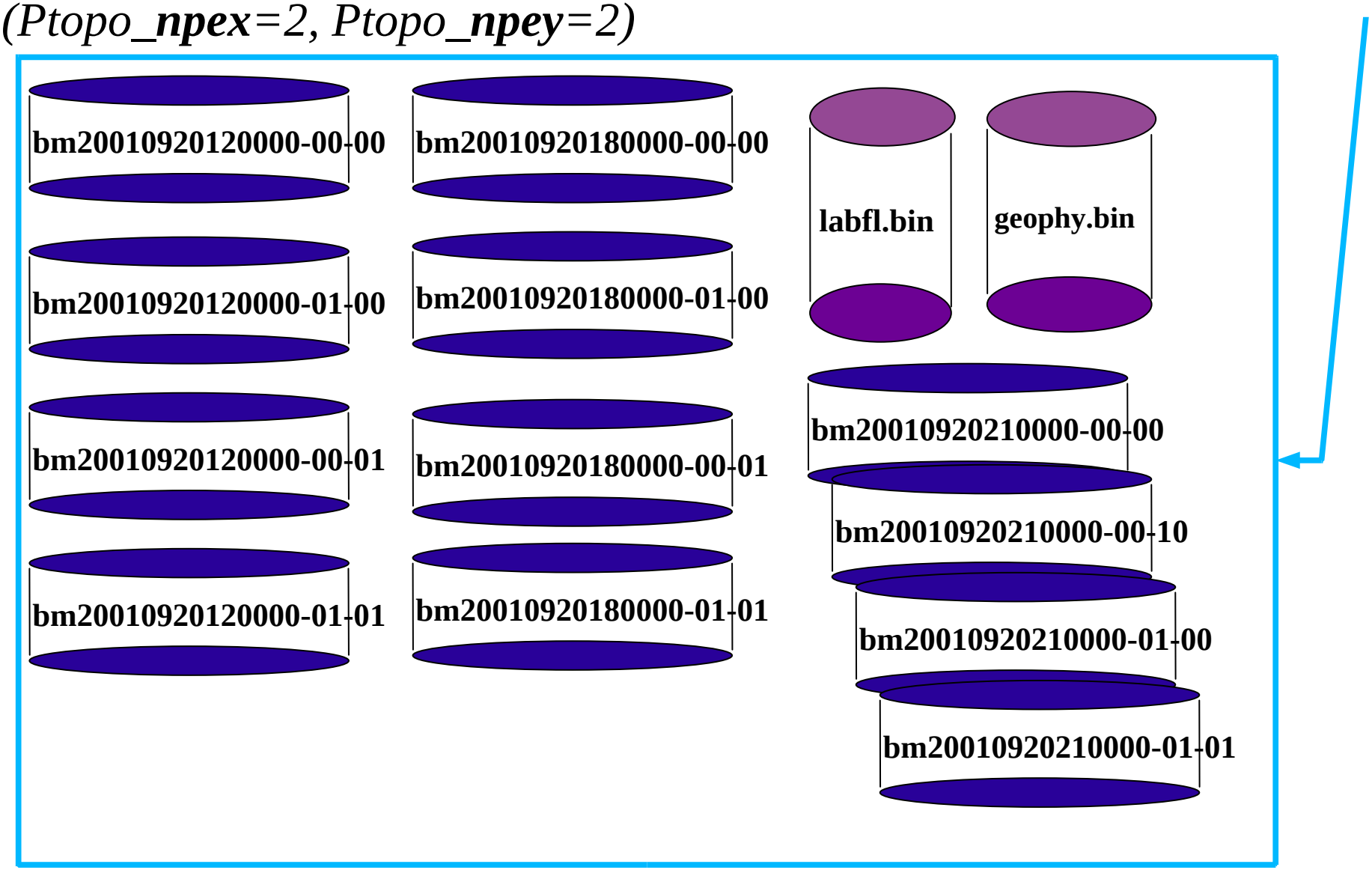



inrep
inrep/
Um_runent
(for LAM)
(start)
20010920.120000
20010920.180000
20010921.000000
me,mg,z0,vf...
ts,gl,tm,sd...
geophy
climato
uu,vv,tt,gz,hu...
GEMNTR
process/

Um_runent (LAM) process/

(end)

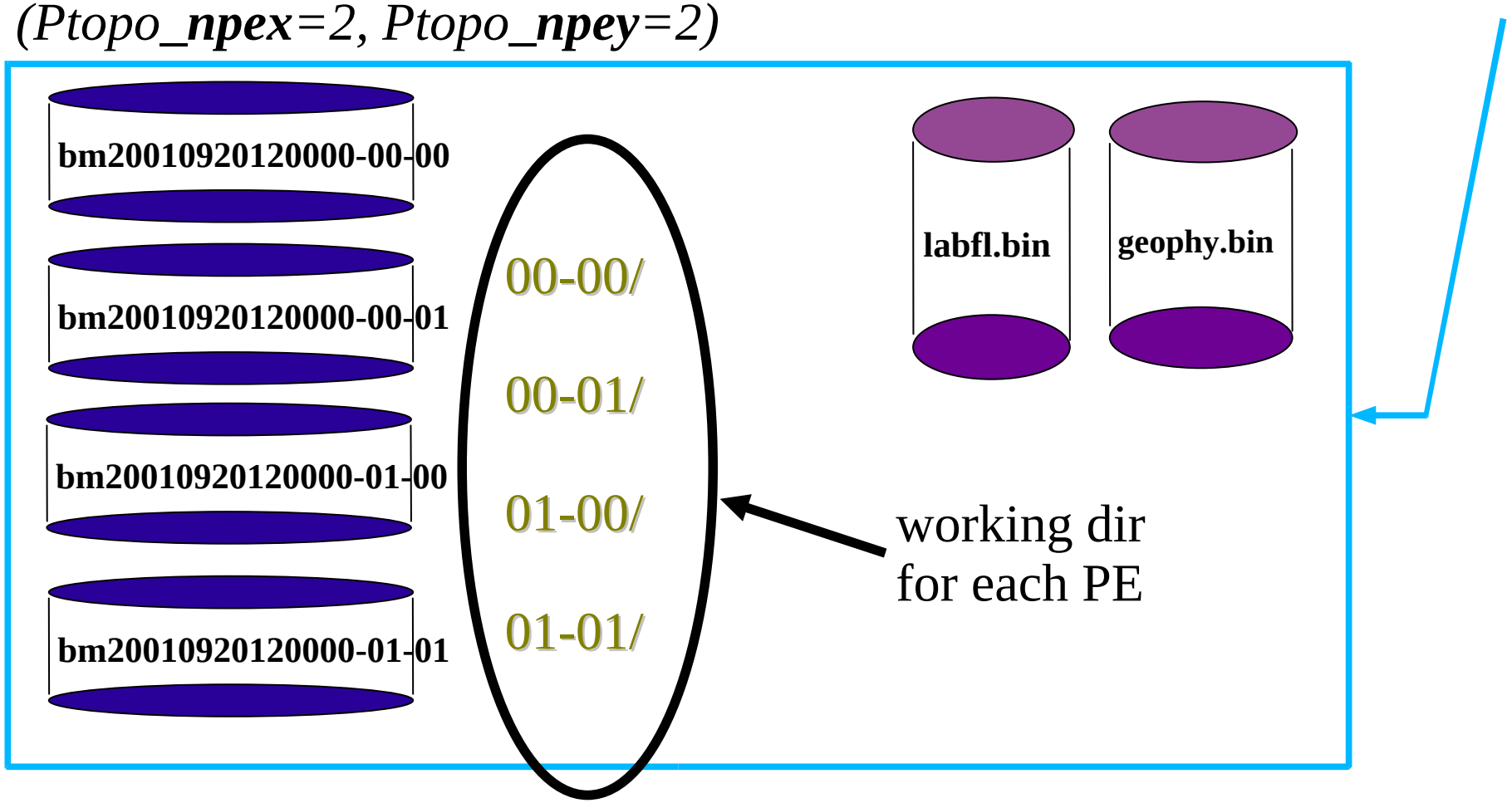
*(Ptopo_**npex**=2, Ptopo_**npey**=2)*



Um_runmod *(start)*

process/

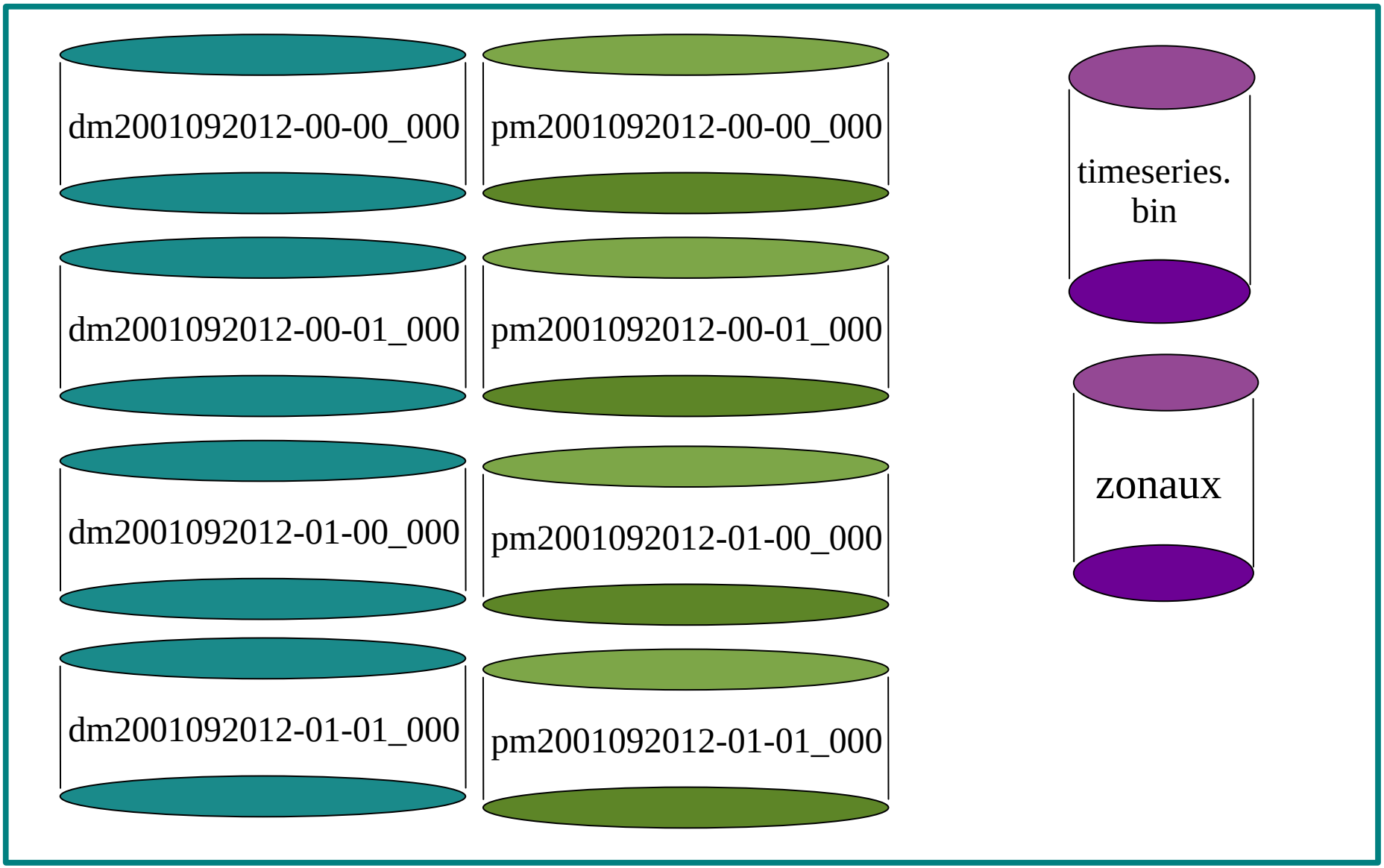
*(Ptopo_**npex**=2, Ptopo_**npey**=2)*



Um_runmod *(end)*

*(Ptopo_**nblocx**=2,Ptopo_**nblocy**=2)*

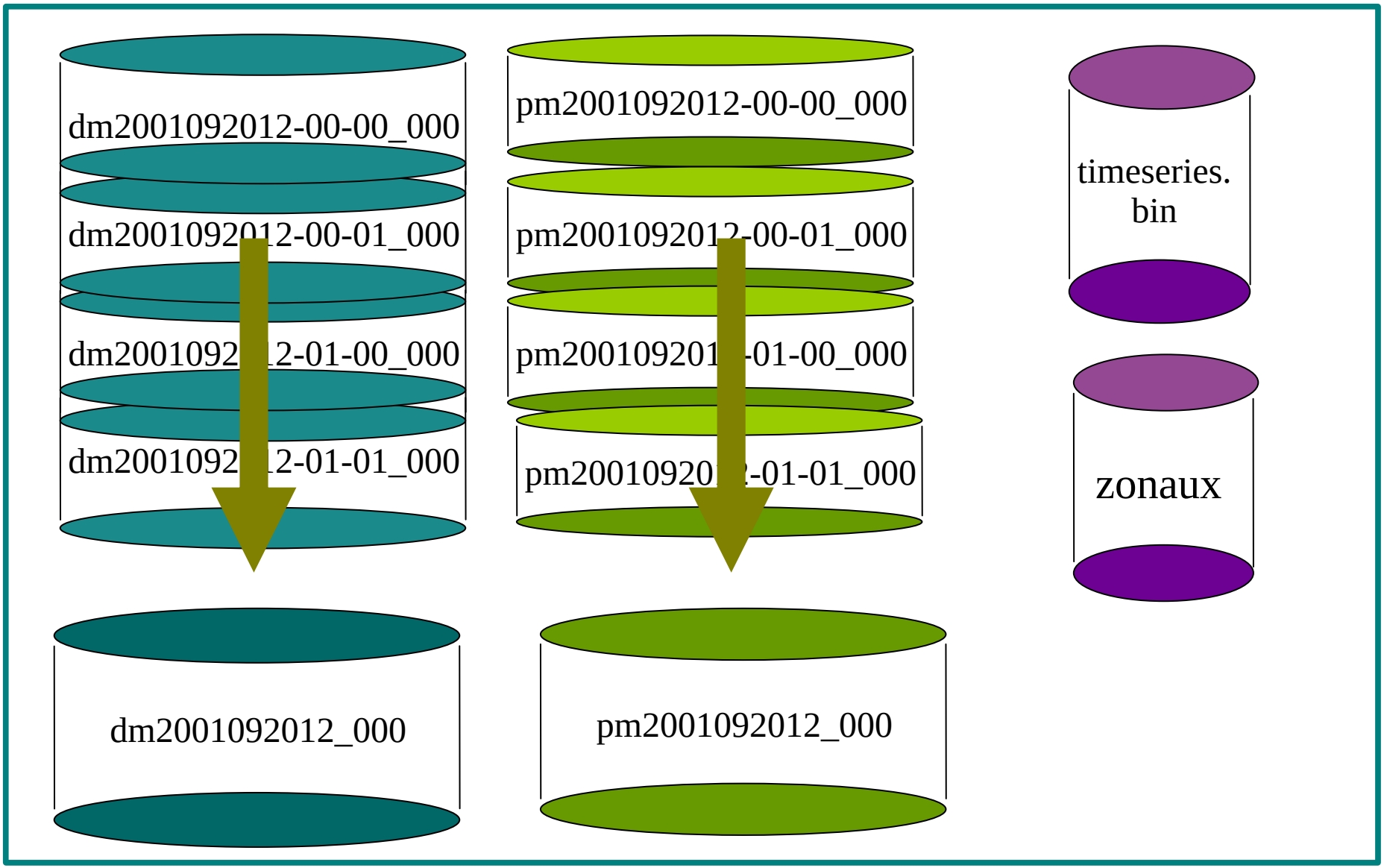
output/



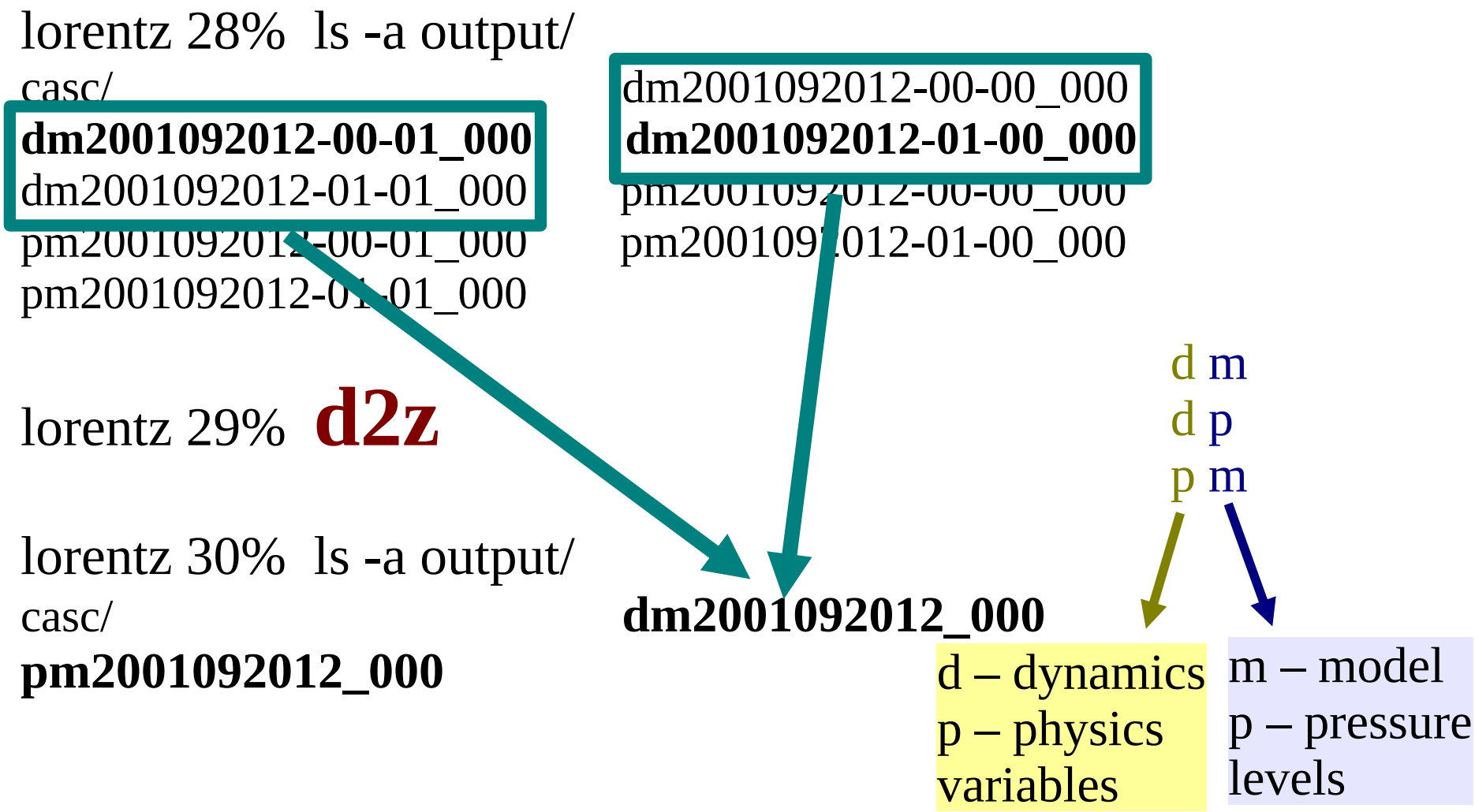
d2z *(post-processing)*

*(Ptopo_**nblocx**=2,Ptopo_**nblocy**=2)*

output/



Diese to **Z** grid
(d2z)



Running Batch

Example given for **AZUR**

but first....

Account Setup for Batch Runs: (where do batch experiments run?)

```
lorentz 56%  cd $HOME
lorentz 57%  mkdir gem
lorentz 58%   cd gem

lorentz 59%  ln -s /fs/mrb/02/armn/armnviv azur
lorentz 60%   ln -s /data/dormrb04/armn/armnviv pollux
lorentz 61%   ln -s /data/local/armn/armnviv lorentz

lorentz 62%   ls
azur@  lorentz@ pollux@
```

`hostname`

Account Setup for Batch Runs
Where do batch run listings go?

lorentz 63% cd $HOME
lorentz 64% **mkdir listings**
lorentz 65% **cd listings**
lorentz 66% ln -s /fs/mrb/02/armn/armnviv/listings **azur**
lorentz 67% ln -s /data/dormrb04/armn/armnviv/listings **pollux**
lorentz 68% ln -s /data/local/armn/armnviv/listings **lorentz**

lorentz 69% ls
azur@ lorentz@ pollux@

configexp.dot.cfg

exp=**v321c**;
mach=azur;
model=gem;
t=400;
cm=12G;
npeOMP=1;
xfer=lorentz:/data/local2/armn/armnviv/stuff;
absaddres=;
anal=;
d2z=1;
inrep=;
climato=;
geophy=;

Batch Configuration cont'd

Next, login in to target machine for BATCH run

pollux 30% rlogin azur

c1f01p8m 1% **cd $HOME/v3.2.1**

c1f01p8m 2% **. r.sm.dot gem**

(Make these soft links)

c1f01p8m 3% ls

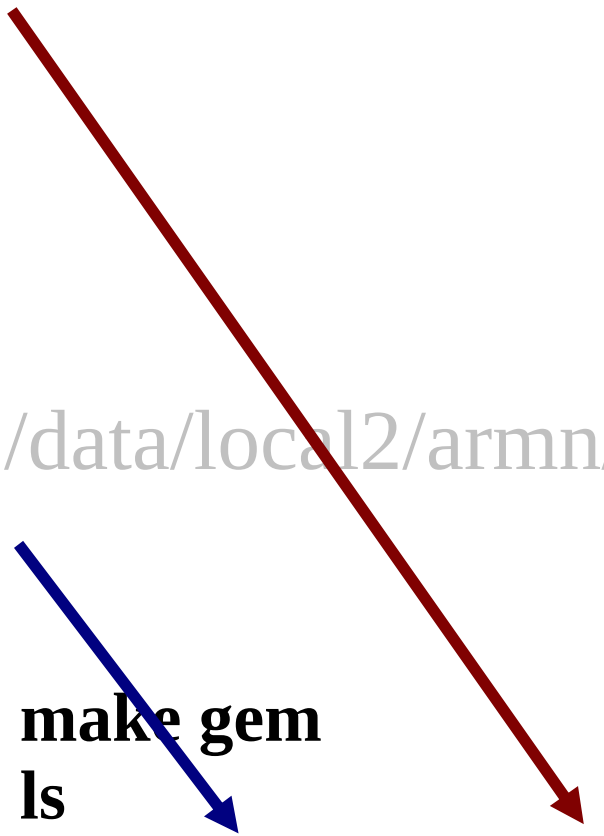
Makefile	maingemdm_AIX_3.2.1.Abs@
RCS/	maingemntr_AIX_3.2.1.Abs@
arbre_de_dependance	make_cdk
abc/	malibAIX/

configexp.dot.cfg

exp=**v321c**;
mach=azur;
model=gem;
t=400;
cm=12G;
npeOMP=1;
xfer=lorentz:/data/local2/armn/armnviv/stuff;
absaddres=;
anal=;

c1f01p8m 3% make gem
c1f01p8m 4% ls

Makefile	maingemdm_**AIX**_3.2.1.Abs@
RCS/	maingemntr_**AIX**_3.2.1.Abs@
arbre_de_dependance	make_cdk
abc/	malibAIX/



configexp.dot.cfg

exp=**v321c**;
mach=azur;
model=gem;
t=400;
cm=12G;
npeOMP=1;
xfer=lorentz:/data/local2/armn/armnviv/stuff;
absaddres=/fs/mrb/01/armn/armnviv/abs/t/;
anal=;

c1f01p8m 3% cd /fs/mrb/01/armn/armnviv/abs/t
c1f01p8m 4% ls
maingemdm_**AIX**_3.2.1.Abs * maingemntr_**AIX**_3.2.1.Abs *

Batch Run Setup

c1f01p8m 1% **. r.sm.dot gem 3.2.1**
c1f01p8m 2% cd $HOME/exp321
c1f01p8m 3% linkit
c1f01p8m 4% **make gem**
c1f01p8m 5% mkdir **abc**

c1f01p8m 7% ls
Makefile
RCS/
arbre_de_dependance
abc/
maingemdm_Linux_3.2.1.Abs@
maingemntr_Linux_3.2.1.Abs@
maingemdm_AIX_3.2.1.Abs@
maingemntr_AIX_3.2.1.Abs@
make_cdk
malibAIX@
malibLinux@

c1f01p8m 6% cp **$gem**/run_configs/dbg1/* **abc**/

c1f01p8m 8% ls **abc**/
configexp.dot.cfg gem_settings.nml outcfg.out

Submitting the Batch Run

c1f01p8m 9% ls

Makefile
RCS/
arbre_de_dependance
abc/
maingemdm_AIX_3.2.1.Abs@
maingemntr_AIX_3.2.1.Abs@
make_cdk
malibAIX@

c1f01p8m 10% Um_launch abc

c1f01p8m 11% ls $HOME/gem/azur/**v321c**

gem_settings.nml
outcfg.out
maingemntr_AIX_3.2.1Abs*
maingemdm_AIX_3.2.1.Abs*
output/
process/
xfer_job_811232*

configexp.dot.cfg

exp=v321c;
mach=azur;
model=gem;
t=400;
cm=12G;
npeOMP=1;
xfer=lorentz:/data/local2/armn/armnviv/stuff;
absaddres=;
anal=;
d2z=1;
inrep=;
climato=;
geophy=;

$HOME/gem/azur/v321c

$HOME/listings/[azur]
GEM_**v321c**_E_1491182.1 *(gemntr)*
GEM_**v321c**_M_1491182.1 *(gemdm)*
GEM_**v321c**_M_1491182.2 *(gemdm)*
GEM_**v321c**_M_1491182.3 *(gemdm)*
$HOME/listings/
GEM_**v321c**_1523732_PREPFT_32_1482792.1 *(d2z)*
GEM_**v321c**_1523732_FT_32_1122414.1 *(xfer)*

configexp.dot.cfg

exp=v321c; (experiment name)

mach=azur;

model=gem;

t=400; (wall clock: max 10800s)

cm=12G; (max 13.5 GB)

npeOMP=1; (max 4)

xfer=lorentz:/data/local2/armn/armnviv/stuff;

absaddres=;

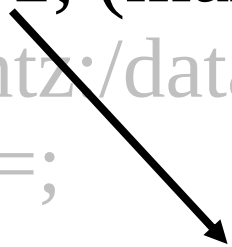
anal=;

d2z=1;

inrep=;

climato=;

geophy=;



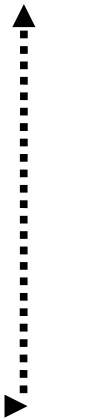
Azur will accept requested number of CPUs to be divisible by 8 *(Unless request is less than 8 cpus)*

Number of CPUs requested = **Ptopo_npex*Ptopo_npey*npeOMP**

configexp.dot.cfg

exp=**v321c**;
mach=azur;
model=gem;
t=400;
cm=12G;
npeOMP=1;
xfer=lorentz:/data/local2/armn/armnviv/stuff;
absaddres=;
anal=;
d2z=1;
inrep=;
climat
geophy

```
c1f01p8m 6%   ls $HOME/gem/azur/v321c

gem_settings.nml                  output/
outcfg.out                        process/
maingemntr_AIX_3.2.1Abs*          xfer_job_811232*
maingemdm_AIX_3.2.1.Abs*
```



Helpful Scripts

findfft -gnimin 24 -gnimax 30

gni=24
gni=25
gni=27
gni=30

findtopo -gni 24 min 12 -max 14

checktopo -gni 240 -gnj 120 -gnk 58 -npx 1 -npy 16 -vspng

FFT – fast fourier transform (for uniform grids only)

findfft -gnimin 24 -gnimax 30

gni=24
gni=25
gni=27
gni=30

findfft -gnimin 60 -gnimax 66 -pw 7 -pe 7

gni=62
gni=64

Finding a working topology
(for Ptopo_npex, Ptopo_npey only)

findtopo -gni 24 min 12 -max 14

npe=12 is OK for gni=24
npe=13 is NOT ok for gni=24
npe=14 is NOT ok for gni=24

checktopo -gni 240 -gnj 120 -gnk 58 -npx 1 -npy 16 -vspng

npx= 1 is OK for G_ni=240
For Vspng:npy= 16 is OK for (G_ni/npex)=15
npy= 16 is OK for G_ni=240
npy= 16 is NOT OK for G_nj=120; use findtopo
npx= 1 is OK for G_nk=58
npx= 1 is OK for Schm_nith=58-1

Default model scripts

```
pollux 26% cd $gem
pollux 27% pwd
/usr/local/env/armnlib/modeles/GEMDM_shared/v_3.2.1
pollux 28% ls
Makefile_AIX       RCS_DYN/           patches/
Makefile_IRIX64    bin/               run_configs/
Makefile_Linux     dfiles/            scripts/
RCS/               doc/               src/
RCS_4DVAR/         lib/               src_4d/
pollux 29%
```

default scripts

lorentz 8% ls

Um_launch	**Um_maindriver.sh**	
Um_runmod.sh		
Um_runent.sh	**Um_shipstuff**	**Um_xfer**
runent	**runmod**	**findfft**
findtopo	**d2z**	

Overiding model scripts...

(to affect specific batch runs or interactive runs)

Copy and modify default script(s) to your working directory *(for only *.sh scripts)*

example:

```
c1f01p8m 4%   cd $HOME/v3.2.1
c1f01p8m 5%   cp $GEM/scripts/Um_runent.sh .
c1f01p8m 6%   ls
Makefile                    maingemdm_AIX_3.2.1.Abs@
RCS/                        maingemntr_AIX_3.2.1.Abs@
arbre_de_dependance         make_cdk       Um_runent.sh
  abc/                        malibAIX/

c1f01p8m 5%  vi   Um_runent.sh
c1f01p8m 5%  Um_launch   abc
```

Overiding any model scripts...

(to affect all runs using a particular version)

Copy and modify default script to

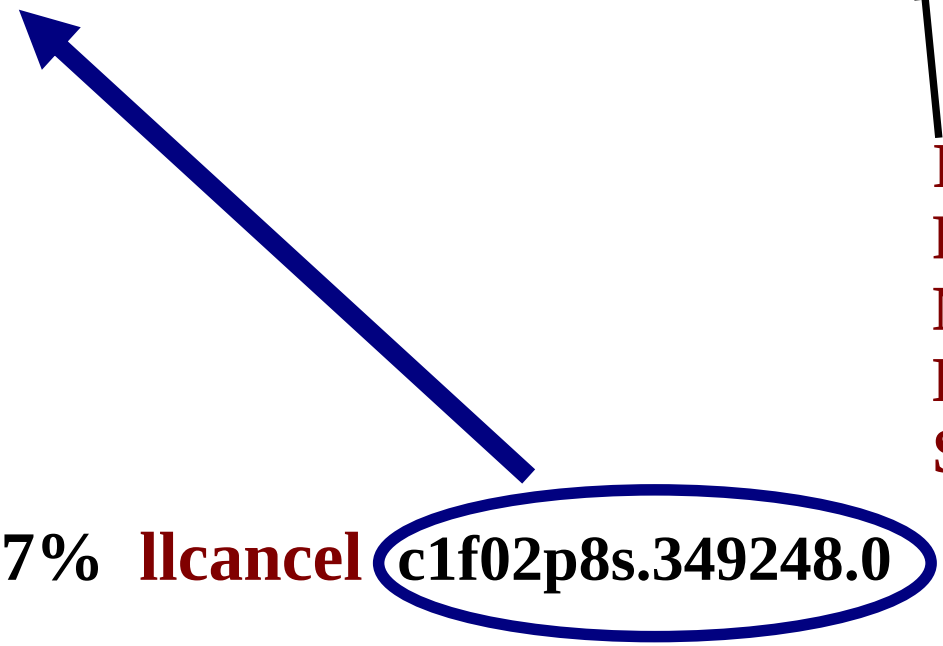
$HOME/modeles/GEMDM/**{version}**/scripts/

```
c1f01p8m 4%   mkdir
  $HOME/modeles/GEMDM/v_3.2.1/scripts/

c1f01p8m 5%   cp  $GEM/scripts/d2z

  $HOME/modeles/GEMDM/v_3.2.1/scripts/
c1f01p8m 6%   vi  $HOME/modeles/GEMDM/v_3.2.1/scripts/d2z

c1f01p8m 7%   ls $HOME/modeles/GEMDM/v_3.2.1/scripts/
d2z*

c1f01p8m 8%   cd  $HOME/v3.2.1/

c1f01p8m 9%   Um_launch abc
```

Useful Azur commands

c1f01p8m 6% **llq -u armnviv**

c1f02p8s.349248.0 armnviv 11/22 18:23 I 50 development



I – idle
R – running
NQ – not queued
E – pre-empted
ST – starting

c1f01p8m 7% llcancel c1f02p8s.349248.0

GEMDM changes constantly!

mail to **Majordomo @ec.gc.ca**

subscribe gem

subscribe phy

Useful knowledge when working with GEMDM

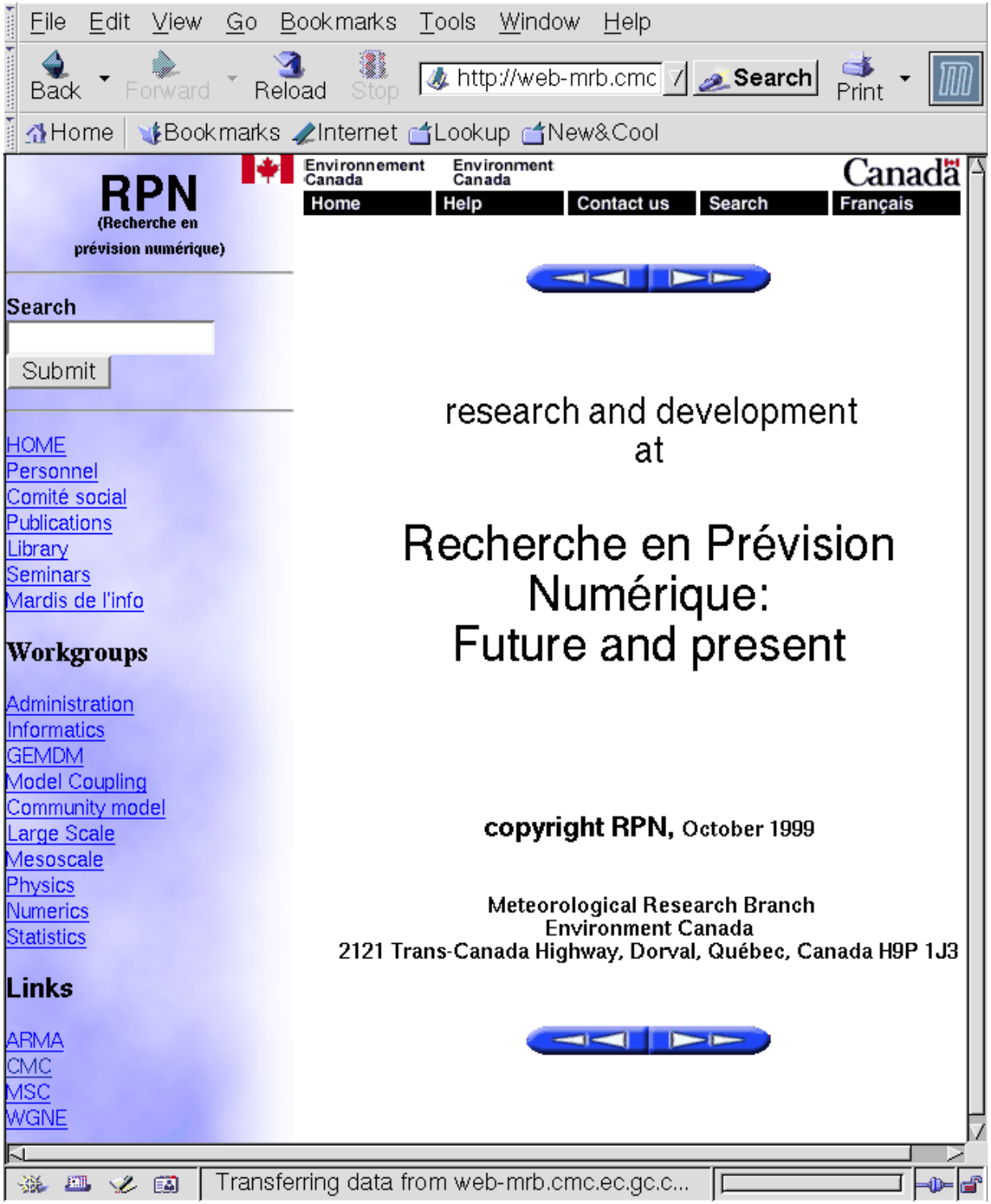
- RPN standard file utilities: editfst, xrec, pgsm, voir/xvoir
- Etagere: ouv_exp, omd_exp, r.make_exp
- Compiling, building executables: r.compile, r.build
- Submitting batch jobs: soumet, qsub
- Fortran, Unix shell (Make utilities)
- MPI (rpn_comm)

Hint: Documentation on these subjects can be found at the RPN website **Informatics**

RPN website

Informatics

GEMDM

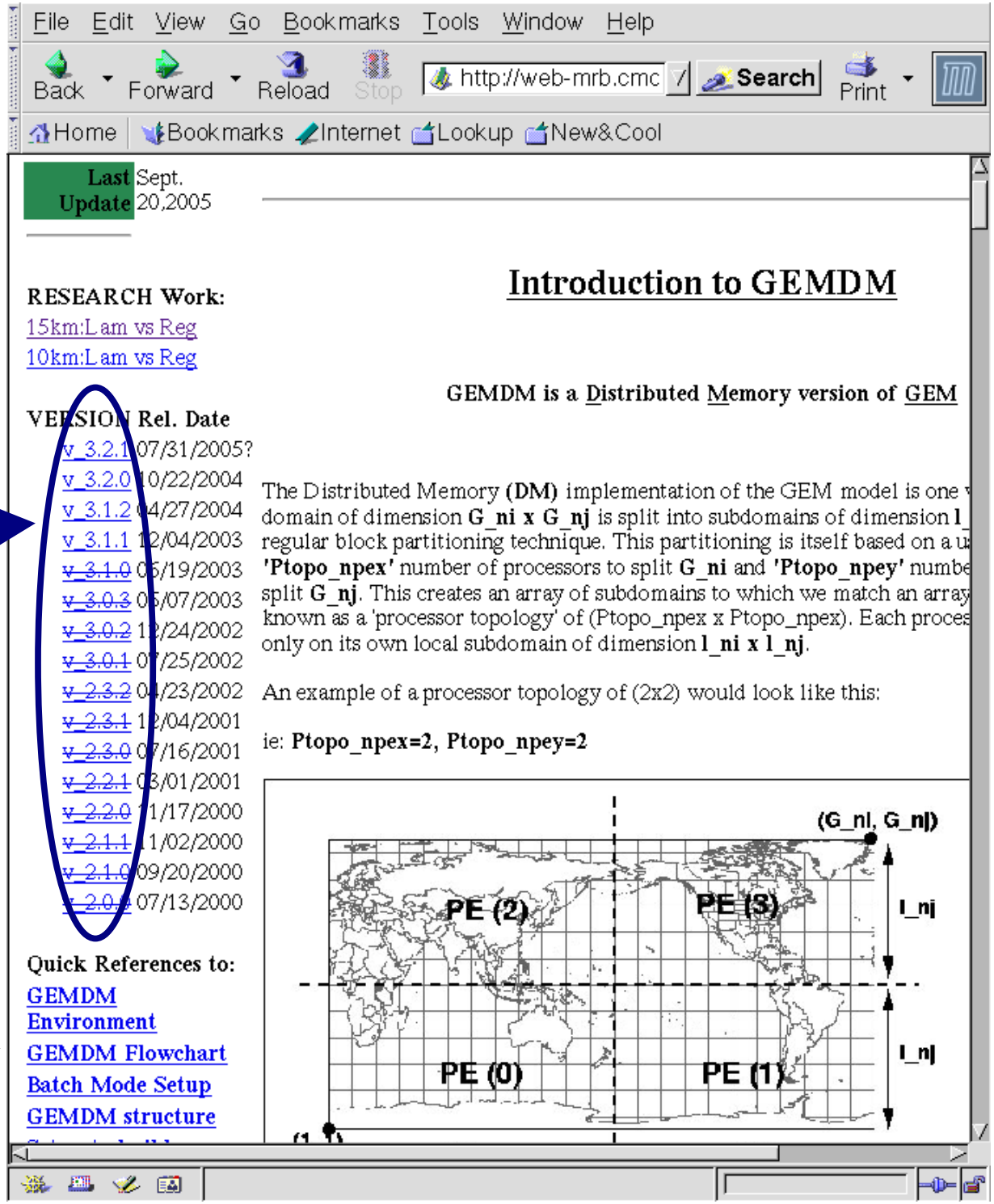


GEMDM website

Documentation for configuration files and release notes of each version

Quick references

(available soon …
"GEMDM workshop handout")



RPN Website:

http:notos.cmc.ec.gc.ca/mrb/rpn
or
http:web-mrb.cmc.ec.gc.ca/mrb/rpn

Questions?