



1ª Monan Regional Model Trainning

06/08/2024

14h00 -16h45



Monan Regional Model Training 14:00-15:30 - Parte1



Monan Regional Model Training Program



- a) Overview**
- b) Download**
- c) Setup modules**
- d) Copy data**
- e) Compiles Tools Pre-processing Source**
- f) Compile Model Source**
- g) Compile Post-Processing Source**
- h) Control Execution Scripts**



1-Planejamento

Why Invest in the MONAN-Regional setup?

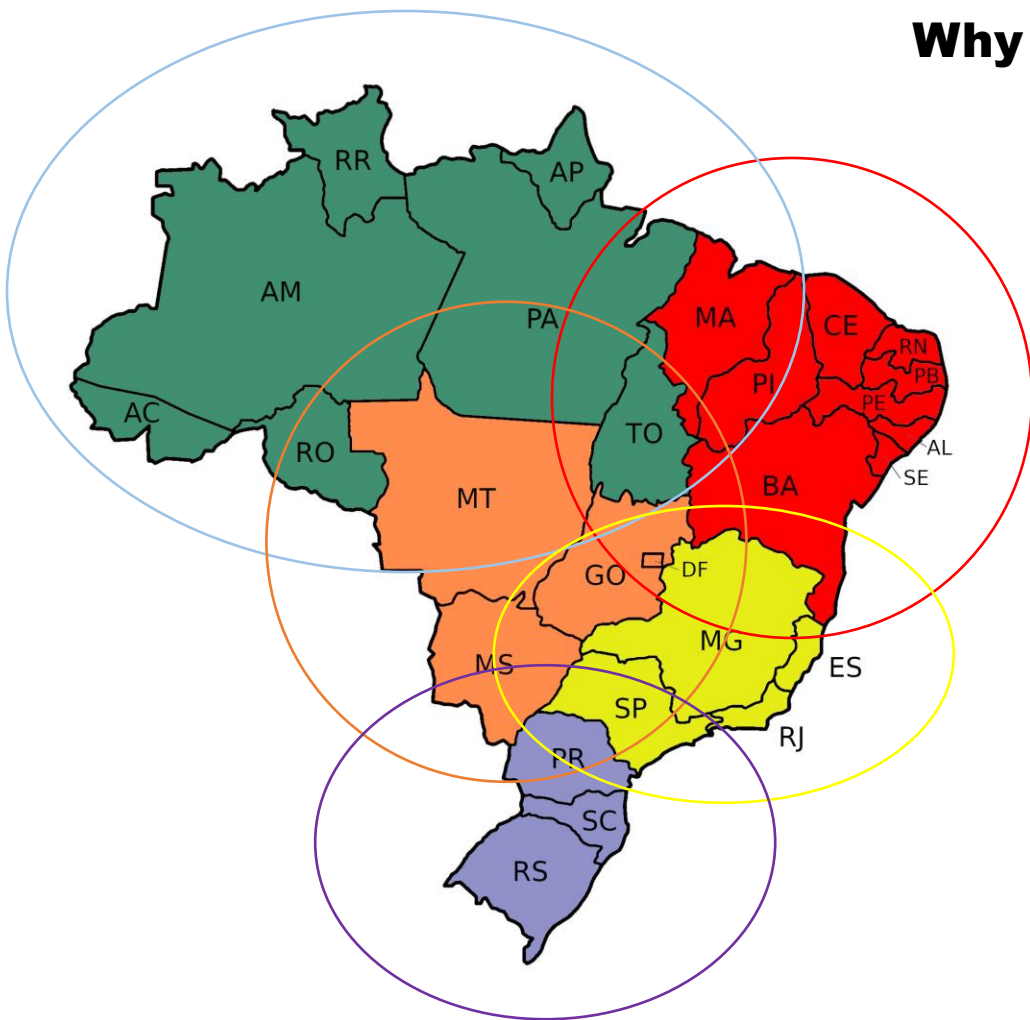
"Limited Computational Availability.

Each region has individual NWP needs.

Physical processes of different scales act differently in each region.

Collaboration in the exchange of information about the skill of the MONAN model for each region.

Collaboration between meteorological centers, universities, companies, etc."





Link oficial

<https://github.com/monanadmin/MONAN-Model.git>



monan git - Pesquisar x monanadmin/MONAN-Model: M x Inbox (503) - paulo.kubota@inpe x +

https://github.com/monanadmin/MONAN-Model

monanadmin / MONAN-Model

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Code Issues 1 Pull requests Discussions Actions Projects Security Insights

MONAN-Model Public

Watch 9 Fork 23 Star 3

main 14 Branches 8 Tags

Go to file Add file Code

deniseiras deleting test_code_reviewer.yml fee7210 · last week 133 Commits

doc	Initial version of MONAN (0.1.0)	last year
src	Updated README.md; Removed orig folder	last month
test	Initial version of MONAN (0.1.0)	last year
.gitignore	Initial commit	last year
GF_ConvPar_nml	#542 - updating GF_ConvPar_nml	last month
INSTALL	Initial version of MONAN (0.1.0)	last year
LICENSE	Initial version of MONAN (0.1.0)	last year
Makefile	implementing the physics monan package, GF scheme as in ...	2 months ago
README.md	Update README	last month

Obter o código do modelo do link

About

MONAN - Model for Ocean-IaNd-Atmosphere Prediction

Readme

View license

Activity

Custom properties

3 stars

9 watching

23 forks





Link pessoal

git clone https://github.com/pkubota/monan_regional.git



pkubota/monan_regional: Limited Area Regional Model

https://github.com/pkubota/monan_regional/tree/main

pkubota / monan_regional

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main 1 Branch 0 Tags

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About

Limited Area Regional Model

Readme Activity 0 stars 2 watching 0 forks

Releases

No releases published
[Create a new release](#)

Packages

No packages published
[Publish your first package](#)

File	Commit	Time
model	Add files via upload	8 minutes ago
pos	Add files via upload	2 days ago
pre	Add files via upload	26 minutes ago
run	Add files via upload	41 minutes ago
README.md	Update README.md	27 days ago

monan_regional

Obter a estrutura
do modelo
regional do link



Step 1 - Download Structure of the MONAN-Regional



```
ssh -YC aluno##@egeon-login.cptec.inpe.br
```

```
[aluno##@egeon-login1 ~]$ pwd  
/home/aluno##
```

slow hard disk

```
[aluno##@egeon-login1 ~]$ cd /mnt/beegfs/aluno##
```

change directory

```
[aluno##@egeon-login1 aluno##]$ pwd  
/mnt/beegfs/aluno##
```

fast hard disk

Download monan_regional

```
[aluno##@egeon-login1 aluno##]$ git clone https://github.com/pkubota/monan_regional.git
```



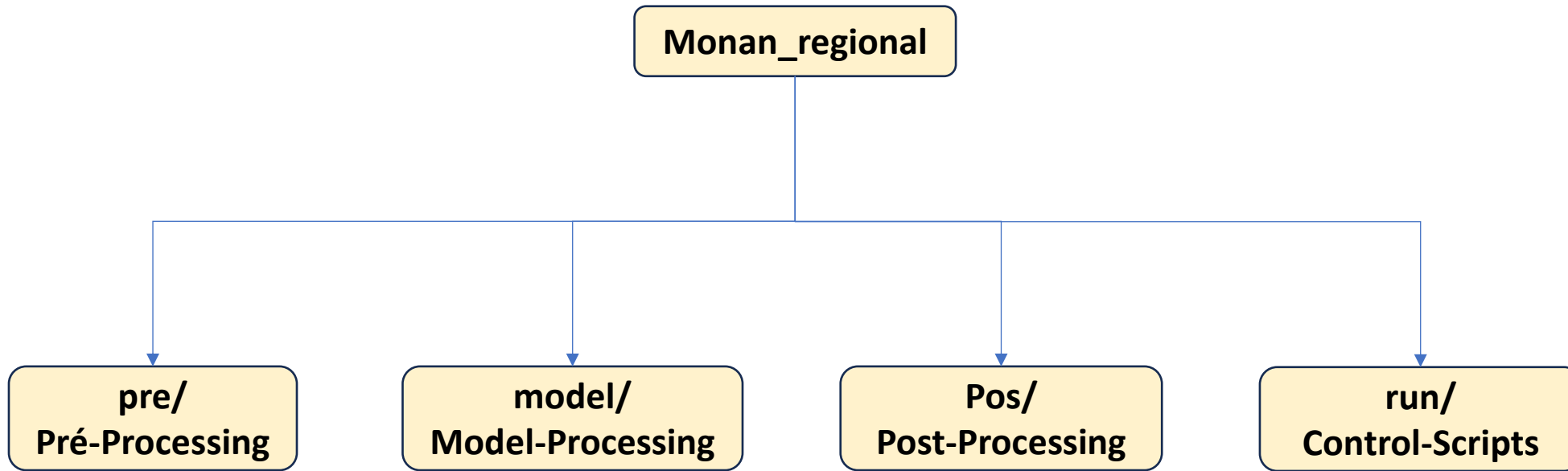
Step 1 - Download Structure of the MONAN-Regional



```
git clone https://github.com/pkubota/monan_regional.git
```




Step 2 - Structure of the monan_regional





Step 2 - Model control script permission change

```
[aluno##@egeon-login1 aluno##]$ pwd  
/mnt/beegfs/aluno##
```

check the directory

```
[aluno##@egeon-login1 aluno##]$ cd monan_regional/run
```

change directory

```
[aluno##@egeon-login1 run]$ pwd  
/mnt/beegfs/aluno##/monan_regional/run
```

check the directory

```
[aluno##@egeon-login1 run]$ chmod 777 *
```

permission change

```
[aluno##@egeon-login1 run]$ ls  
copy_data.bash      load_monan_app_modules.sh  
readme              run_GradsCtl.bash  
runModel.bash       runPost.bash  
runPre.bash         scripts
```

List files



Step 3 – Load the necessary modules



Load Modules



Step 3 – Load the necessary modules

```
[aluno##@egeon-login1 run]$ source load_monan_app_modules.sh
```

```
pip install netCDF4
```

```
[aluno##@egeon-login1 run]$ pip install netCDF4
```

Required for the
MPAS-Limited-Area python package

```
pip install numpy
```

```
[aluno##@egeon-login1 run]$ pip install numpy
```

```
[aluno##@egeon-login1 run]$ source load_module_gnu_lib.bash
```



Step 4 - Copy of fixed data, tables, and scripts

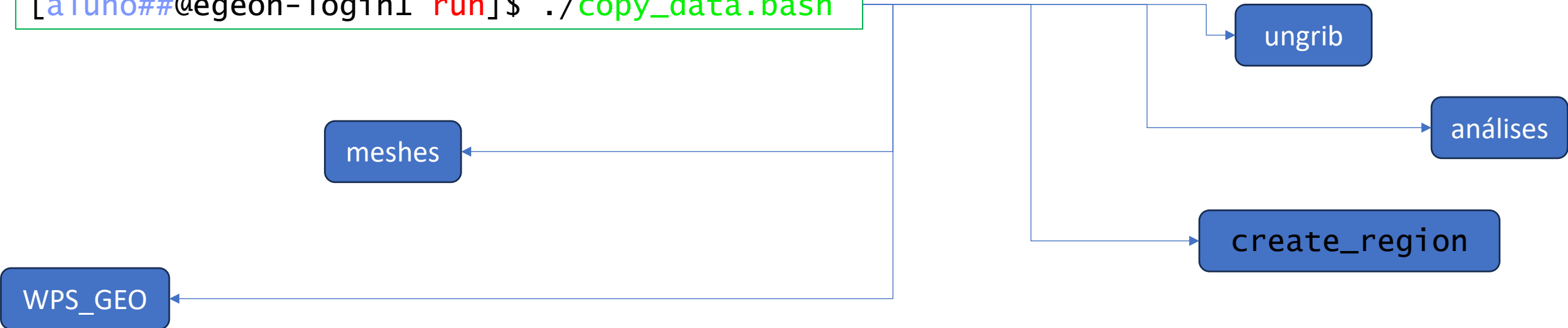


Copy /Data/Table/Exec



Step 4 - Copy of fixed data, tables, and scripts

```
[aluno##@egeon-login1 run]$ ./copy_data.bash
```



albedo_modis	hcnvx	landuse_30s_with_lakes	orogwd_1deg	ssib_landuse_10m
albedo_ncep	hlennw	landuse_5m	orogwd_20m	ssib_landuse_5m
bnu_soiltype_bot	hlens	maxsnowalb	orogwd_2deg	topo_10m
bnu_soiltype_top	hlensw	maxsnowalb_modis	orogwd_30m	topo_2m
clayfrac_5m	hlenw	modis_landuse_20class_15s	readme	topo_30s
crop	hslop	modis_landuse_20class_30s	sandfrac_5m	topo_5m
erod	hstdv	modis_landuse_20class_30s_with_lakes	soiltemp_1deg	topo_gmted2010_30s
greenfrac	hzmax	modis_landuse_21class_30s	soiltype_bot_10m	varsso
greenfrac_fpar_modis	islope	nlcd2006_11_30s	soiltype_bot_2m	varsso_10m
hangl	lai_modis_10m	nlcd2006_11_9s	soiltype_bot_30s	varsso_2m
hanis	lai_modis_30s	nlcd2011_can_11_9s	soiltype_bot_5m	varsso_5m
hasynw	lake_depth	nlcd2011_imp_11_9s	soiltype_top_10m	
hasys	landuse_10m	nudapt44_1km	soiltype_top_2m	
hasysw	landuse_2m	NUDAPT44_1km	soiltype_top_30s	
hasyw	landuse_30s	orogwd_10m	soiltype_top_5m	



Compiles Source Grid_Rotate



Step 5 – Compile Preprocessing Tools

```
[aluno##@egeon-login1 run]$ pwd  
/mnt/beegfs/aluno##/monan_regional/run
```

check the directory

```
[aluno##@egeon-login1 run]$ cd ..  
[aluno##@egeon-login1 monan_regional]$ ls  
model  pos  pre  README.md  run
```

Return to the main directory

```
[aluno##@egeon-login1 monan_regional]$ pwd  
/mnt/beegfs/aluno##/tmp/monan_regional
```

check the directory

change directory

```
[aluno##@egeon-login1 monan_regional]$ cd pre/sources/MPAS-Tools/grid_rotate/
```

```
[aluno##@egeon-login1 grid_rotate]$ pwd  
/mnt/beegfs/aluno##/monan_regional/pre/sources/MPAS-Tools/grid_rotate
```

check the directory

```
[aluno##@egeon-login1 grid_rotate]$ make
```

Compile program



Compiles Source model



Step 6 – Compile Model

```
[aluno##@egeon-login1 grid_rotate]$ pwd  
/mnt/beegfs/aluno##/monan_regional/pre/sources/MPAS-Tools/grid_rotate
```

check the directory

```
[aluno##@egeon-login1 run]$ cd ../../../../  
[aluno##@egeon-login1 monan_regional]$ pwd  
/mnt/beegfs/aluno##/monan_regional
```

Return to the main directory

```
[aluno##@egeon-login1 monan_regional]$ ls  
model  pos  pre  README.md  run
```

List files

change directory

```
[aluno##@egeon-login1 monan_regional]$ cd model/sources/MONAN-Model_v8.1.0_egeon.gnu940
```

```
[aluno##@egeon-login1 monan_regional]$ pwd  
/mnt/beegfs/aluno##/monan_regional/model/sources/MONAN-Model_v8.1.0_egeon.gnu940
```

check the directory

```
[aluno##@egeon-login1 MONAN-Model_v8.1.0_egeon.gnu940]$ tar -zxvf MONAN-Model_v8.1.0_egeon.gnu940.tar.gz
```

```
[aluno##@egeon-login1 MONAN-Model_v8.1.0_egeon.gnu940]$ ./make.sh
```

Compile program



Compiles Source Post-Processing



Step 7 – Post-processing

```
[aluno##@egeon-login1 monan_regional]$ pwd  
/mnt/beegfs/aluno##/monan_regional/model/sources/MONAN-Model_v8.1.0_egeon.gnu940
```

check the directory

```
[aluno##@egeon-login1 run]$ cd ../../../../  
[aluno##@egeon-login1 monan_regional]$ pwd  
/mnt/beegfs/aluno##/monan_regional
```

Return to the main directory

```
[aluno##@egeon-login1 monan_regional]$ ls  
model  pos  pre  README.md  run
```

List files

```
[aluno##@egeon-login1 monan_regional]$ cd pos/sources/convert_mpas_v0.1.0_egeon.gnu940
```

change directory

```
[aluno##@egeon-login1 convert_mpas_v0.1.0_egeon.gnu940]$ pwd  
/mnt/beegfs/aluno##/tmp/monan_regional/pos/sources/convert_mpas_v0.1.0_egeon.gnu940
```

check the directory

```
[aluno##@egeon-login1 convert_mpas_v0.1.0_egeon.gnu940]$ tar -zxvf convert_mpas_v0.1.0_egeon.gnu940.tar.gz
```

```
[paulo.kubota@egeon-login1 convert_mpas_v0.1.0_egeon.gnu940]$ ./make.sh
```

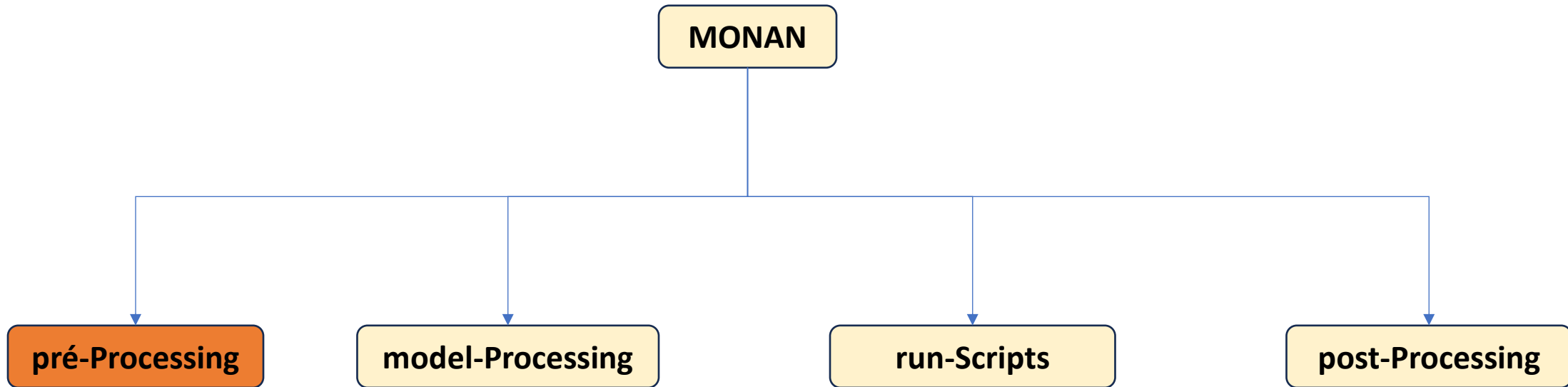
Compile program



Structure of the MONAN



Structure of the MONAN

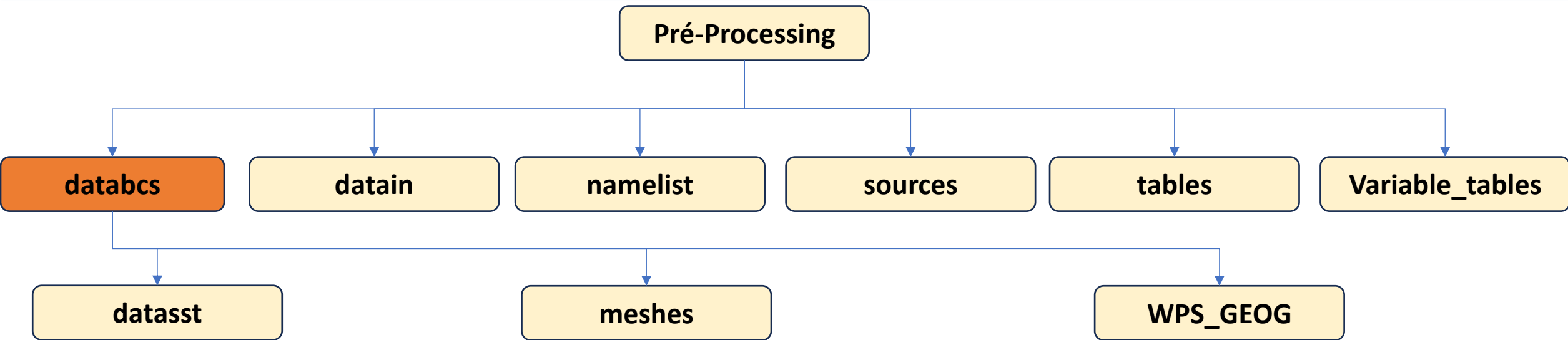
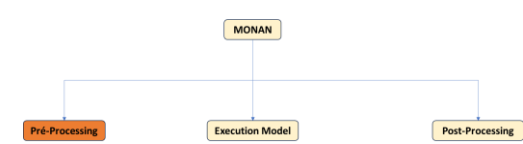




Pré-Processing

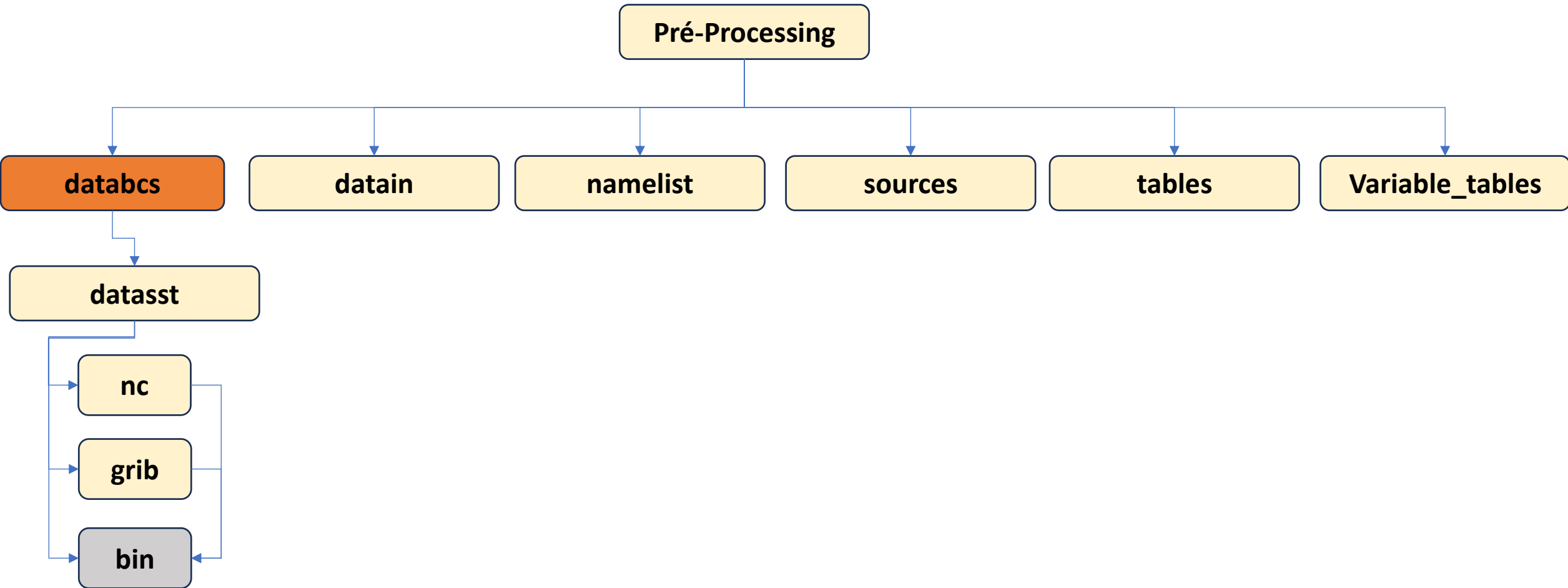
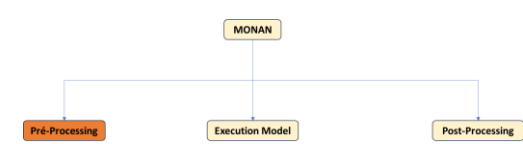


Pré-Processing





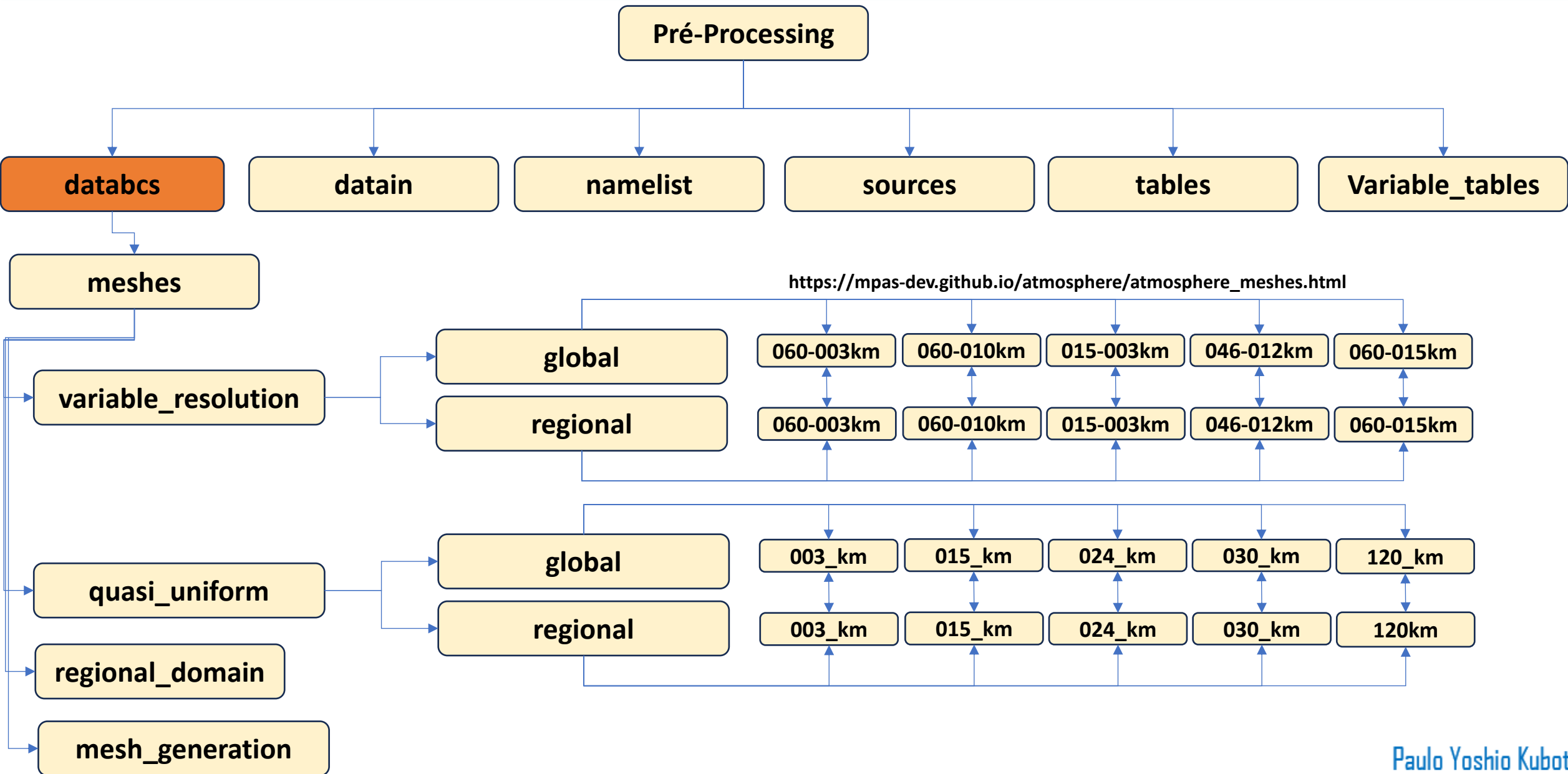
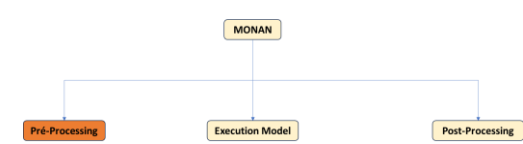
Pré-Processing



SST:1997-01-01_00	SST:1997-08-08_00	SST:1998-03-15_00	SST:1998-10-20_00	SST:1999-05-27_00
SST:1997-01-02_00	SST:1997-08-09_00	SST:1998-03-16_00	SST:1998-10-21_00	SST:1999-05-28_00
SST:1997-01-03_00	SST:1997-08-10_00	SST:1998-03-17_00	SST:1998-10-22_00	SST:1999-05-29_00
SST:1997-01-04_00	SST:1997-08-11_00	SST:1998-03-18_00	SST:1998-10-23_00	SST:1999-05-30_00

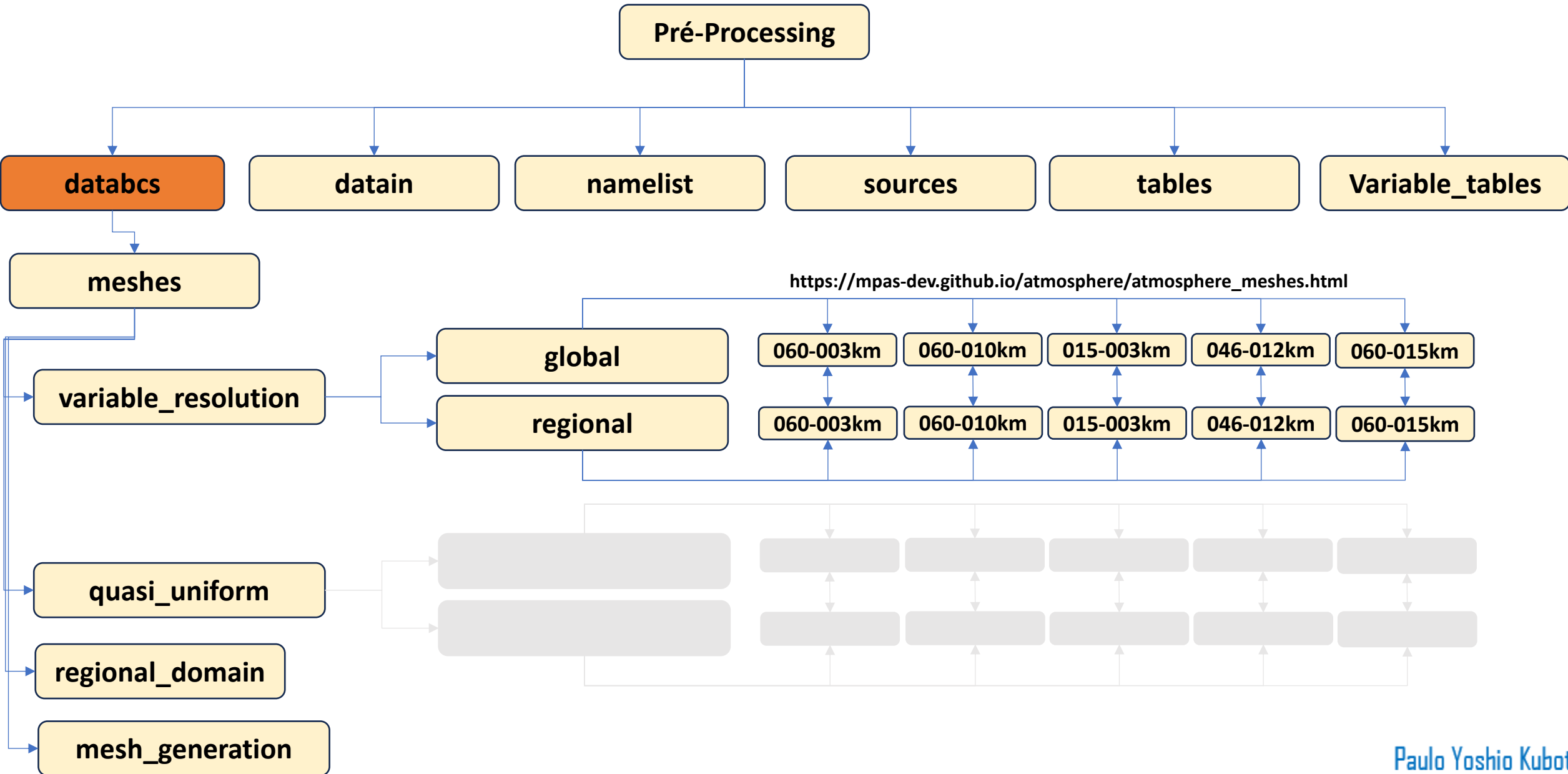
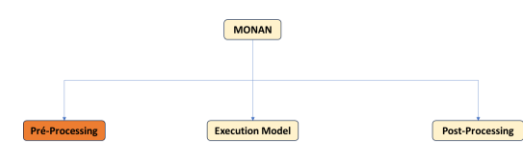


Pré-Processing



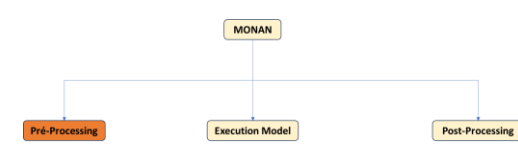


Pré-Processing





Pré-Processing



Variable-resolution meshes

92-km – 25-km mesh

This mesh contains 163842 horizontal grid cells, with the refinement region spanning approximately 60 degrees of latitude/longitude.

46-km – 12-km mesh

This mesh is like the 92-km – 25-km mesh, but with twice the horizontal resolution and 655362 horizontal grid cells.

60-km – 15-km mesh

This mesh contains 535554 horizontal grid cells, with the refinement region spanning approximately 55 degrees of latitude and 110 degrees of longitude.

60-km – 10-km mesh

This mesh contains 999426 horizontal grid cells, with the refinement region spanning approximately 80 degrees of latitude/longitude.

60-km – 3-km mesh

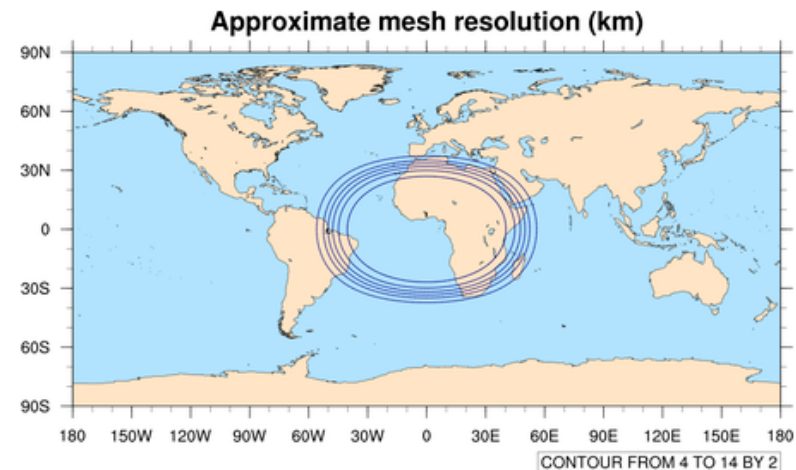
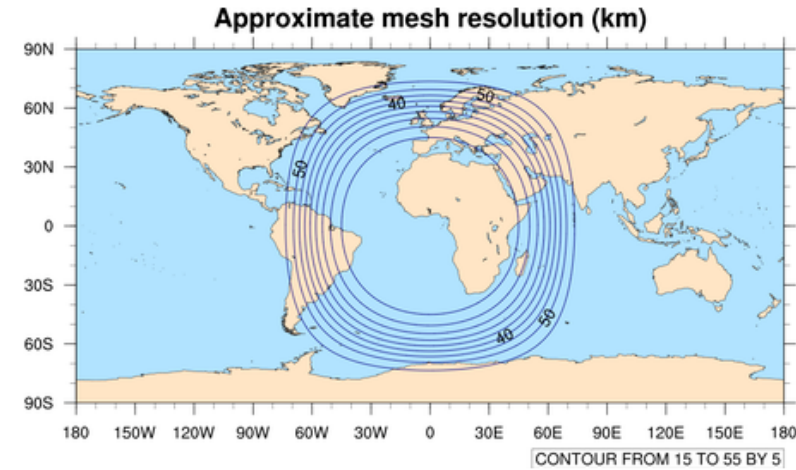
This mesh contains 835586 horizontal grid cells, with the refinement region spanning approximately 16 degrees of latitude/longitude.

15-km – 3-km mesh (Circular refinement)

This mesh contains 6488066 horizontal grid cells, with the circular refinement region spanning approximately 60 degrees of latitude/longitude.

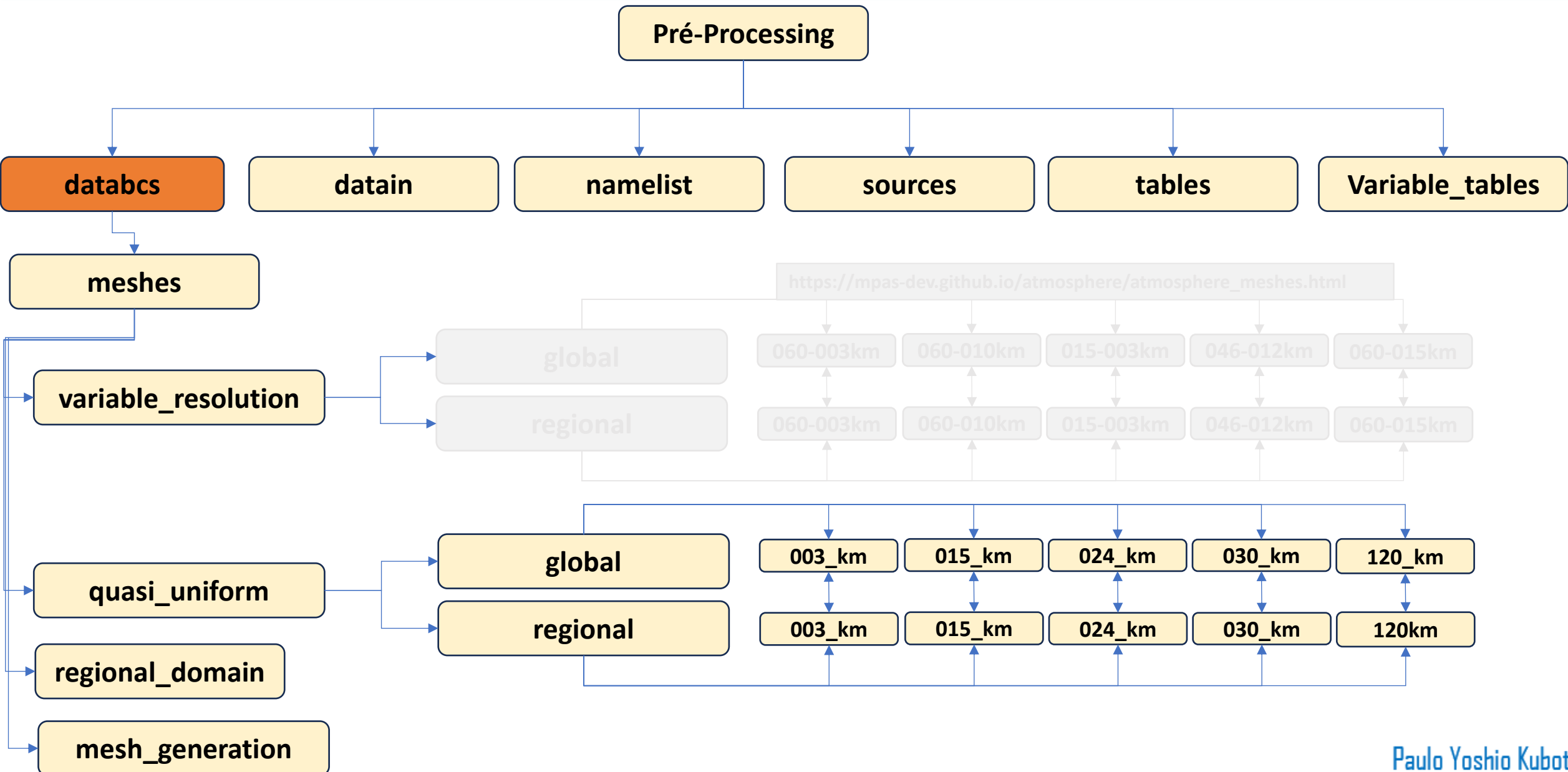
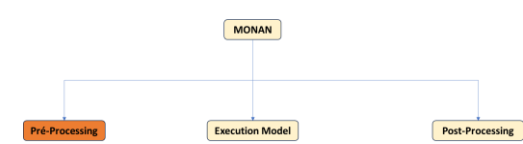
15-km – 3-km mesh (Elliptical refinement)

This mesh contains x5.8060930 horizontal grid cells, with the elliptical refinement region spanning approximately 60 degrees of latitude and 80 degrees of longitude.



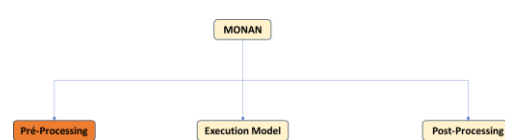


Pré-Processing





Pré-Processing



Quasi-uniform meshes and static files

480-km mesh (2562 horizontal grid cells)

[Download the 480-km mesh](#) (1.5 MB)
[Download the 480-km static file](#) (1.0 MB)

384-km mesh (4002 horizontal grid cells)

[Download the 384-km mesh](#) (2.4 MB)
[Download the 384-km static file](#) (2.3 MB)

240-km mesh (10242 horizontal grid cells)

[Download the 240-km mesh](#) (6.3 MB)
[Download the 240-km static file](#) (4.0 MB)

120-km mesh (40962 horizontal grid cells)

[Download the 120-km mesh](#) (25.7 MB)
[Download the 120-km static file](#) (16.2 MB)

60-km mesh (163842 horizontal grid cells)

[Download the 60-km mesh](#) (106 MB)
[Download the 60-km static file](#) (69.6 MB)

48-km mesh (256002 horizontal grid cells)

[Download the 48-km mesh](#) (182 MB)
[Download the 48-km static file](#) (174 MB)

30-km mesh (655362 horizontal grid cells)

[Download the 30-km mesh](#) (436 MB)
[Download the 30-km static file](#) (296 MB)

24-km mesh (1024002 horizontal grid cells)

[Download the 24-km mesh](#) (685 MB)
[Download the 24-km static file](#) (525 MB)

15-km mesh (2621442 horizontal grid cells)

[Download the 15-km mesh](#) (1659 MB)
[Download the 15-km static file](#) (1366 MB)

12-km mesh (4096002 horizontal grid cells)

(Download link below following *Important notes*).

10-km mesh (5898242 horizontal grid cells)

(Download link below following *Important notes*).

7.5-km mesh (10485762 horizontal grid cells)

(Download link below following *Important notes*).

5-km mesh (23592962 horizontal grid cells)

(Download link below following *Important notes*).

3.75-km mesh (41943042 horizontal grid cells)

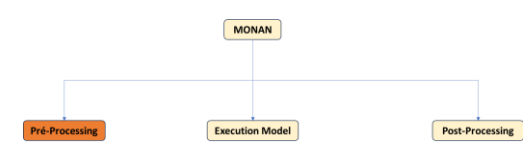
(Download link below following *Important notes*).

3-km mesh (65536002 horizontal grid cells)

(Download link below following *Important notes*).



Pré-Processing



[Download the 12-km mesh](#) (2713 MB)
[Download the 12-km static file](#) (2447 MB)

[Download the 10-km mesh](#) (3916 MB)
[Download the 10-km static file](#) (2947 MB)

[Download the 7.5-km mesh](#) (6936 MB)
[Download the 7.5-km static file](#) (6489 MB)

[Download the 5-km mesh](#) (15487 MB)
[Download the 5-km static file](#) (14508 MB)

[Download the 4-km mesh](#) (23721 MB)
[Download the 4-km static file](#) (21458 MB)

[Download the 3.75-km mesh](#) (27246 MB)
[Download the 3.75-km static file](#) (25242 MB)

[Download the 3-km mesh](#) (42007 MB)
[Download the 3-km static file](#) (38624 MB)

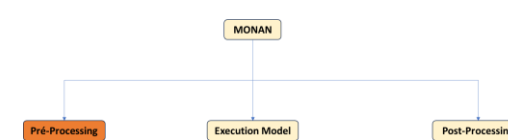
Important notes for dense meshes

The 3-d fields that exist in the model at higher resolution can easily exceed the 4 GB limit imposed by the classic netCDF format. When creating atmospheric initial conditions (i.e., the "init.nc" file), and when writing output streams from the model with 3-d fields, **it is necessary to use an "io_type" that supports large variables, such as "pnetcdf,cdf5" or "netcdf4"**. For more information on selecting the "io_type" of a stream, refer to Chapter 5 in the Users' Guide.

Note that when processing the GWDO static fields, each MPI task will need to allocate ~4 GB of additional memory to hold the global 30-arc-second terrain dataset. In many cases, under-subscribing batch nodes in order to avoid exceeding memory limits may be necessary.



Pré-Processing



Para regiões elípticas, a definição da região se parece com o seguinte:

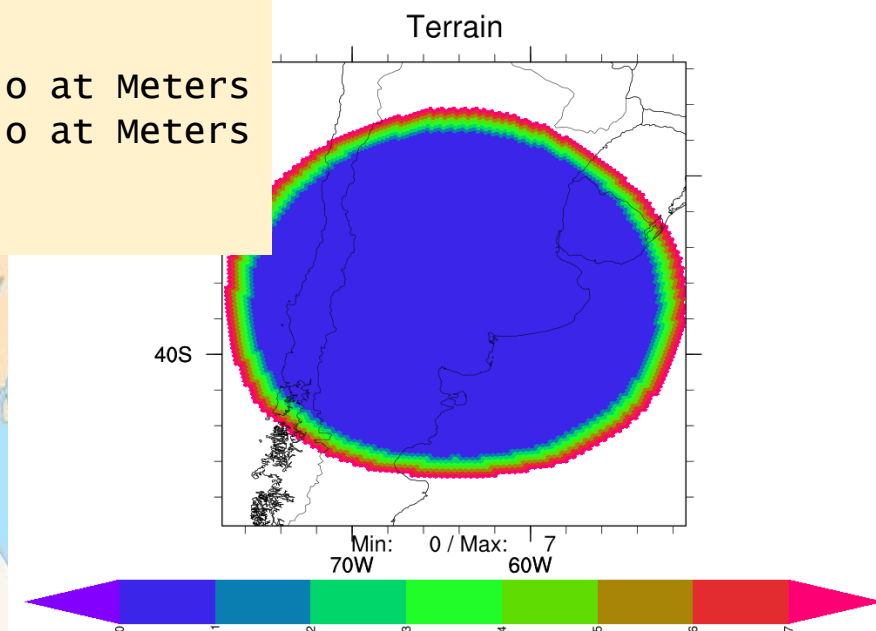
"Point" fornece a latitude e longitude no centro da elipse,

"Semi-major-axis" e "Semi-minor-axis" estão em metros,

"Orientation-angle" dá a rotação dos eixos da elipse.

```
Name: Su1
Type: ellipse
Point: -30.03306, -51.230000
Semi-major-axis: 1000000 # Raio at Meters
Semi-minor-axis: 1000000 # Raio at Meters
Orientation-angle: 45
```

"Point" gives the latitude and longitude at the center of the ellipse, "Semi-major-axis" and "Semi-minor-axis" are in meters, and "Orientation-angle" gives the rotation of the axes of the ellipse

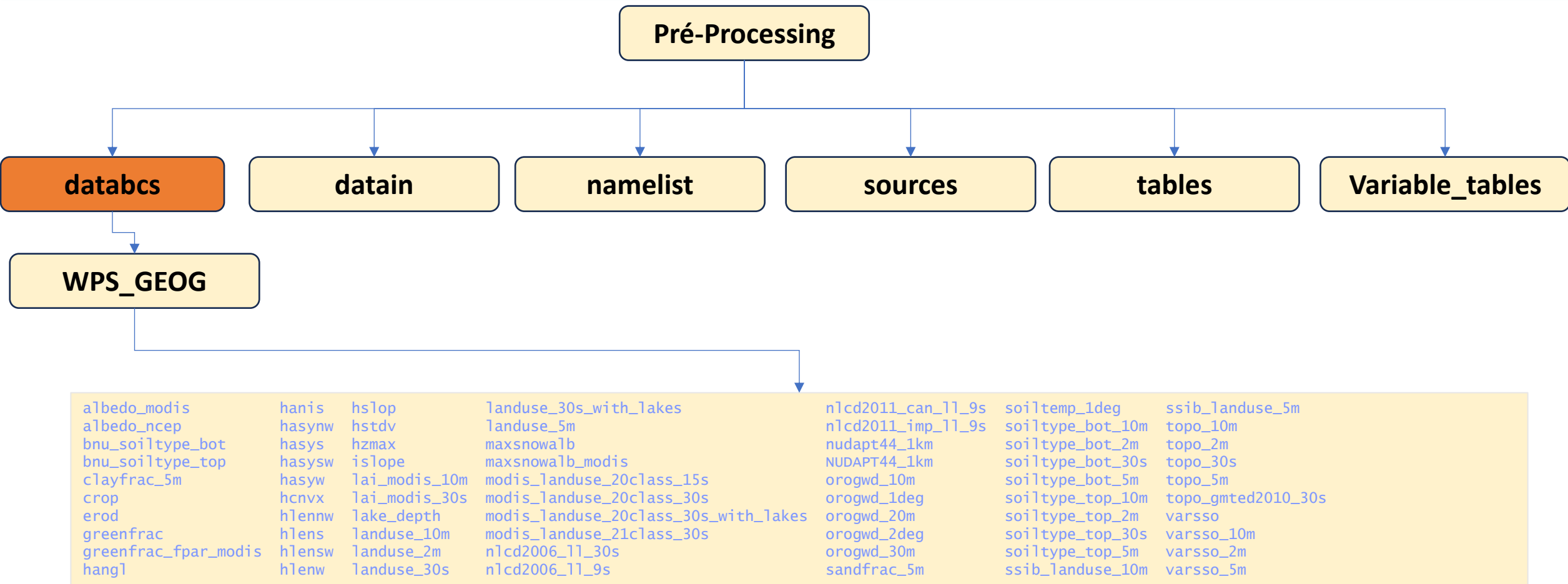
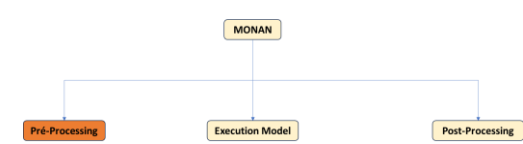


regional_domain

CentroOeste.ellipse.pts	PortoAlegre.ellipse.pts	Nordeste.ellipse.pts
Sudeste.ellipse.pts	Norte.ellipse.pts	Su1.ellipse.pts
Peru.ellipse.pts	Argentina.ellipse.pts	

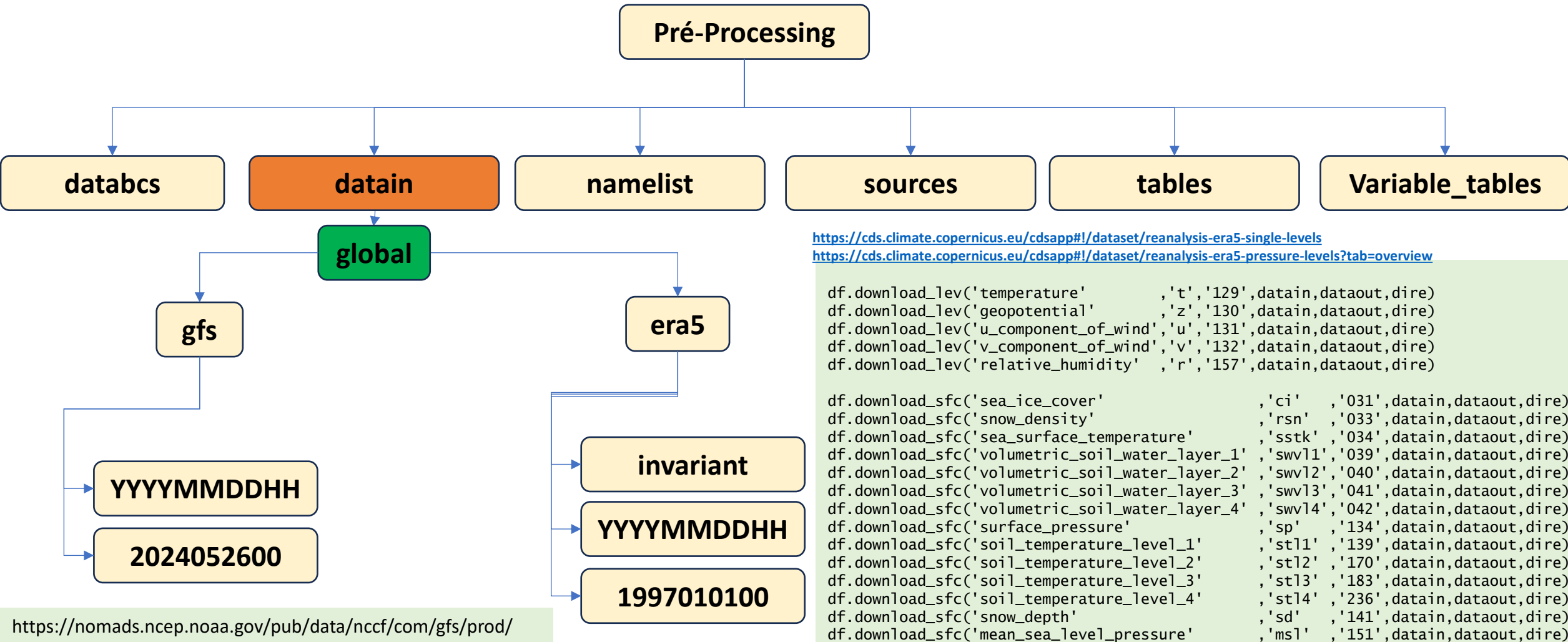
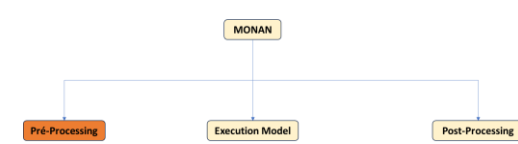


Pré-Processing





Pré-Processing



<https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels>
<https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-pressure-levels?tab=overview>

```
df.download_lev('temperature' , 't', '129', datain, dataout, dire)  
df.download_lev('geopotential' , 'z', '130', datain, dataout, dire)  
df.download_lev('u_component_of_wind', 'u', '131', datain, dataout, dire)  
df.download_lev('v_component_of_wind', 'v', '132', datain, dataout, dire)  
df.download_lev('relative_humidity' , 'r', '157', datain, dataout, dire)
```

```
df.download_sfc('sea_ice_cover' , 'ci' , '031', datain, dataout, dire)  
df.download_sfc('snow_density' , 'rsn' , '033', datain, dataout, dire)  
df.download_sfc('sea_surface_temperature' , 'sstk' , '034', datain, dataout, dire)  
df.download_sfc('volumetric_soil_water_layer_1' , 'swv11' , '039', datain, dataout, dire)  
df.download_sfc('volumetric_soil_water_layer_2' , 'swv12' , '040', datain, dataout, dire)  
df.download_sfc('volumetric_soil_water_layer_3' , 'swv13' , '041', datain, dataout, dire)  
df.download_sfc('volumetric_soil_water_layer_4' , 'swv14' , '042', datain, dataout, dire)  
df.download_sfc('surface_pressure' , 'sp' , '134', datain, dataout, dire)  
df.download_sfc('soil_temperature_level_1' , 'st11' , '139', datain, dataout, dire)  
df.download_sfc('soil_temperature_level_2' , 'st12' , '170', datain, dataout, dire)  
df.download_sfc('soil_temperature_level_3' , 'st13' , '183', datain, dataout, dire)  
df.download_sfc('soil_temperature_level_4' , 'st14' , '236', datain, dataout, dire)  
df.download_sfc('snow_depth' , 'sd' , '141', datain, dataout, dire)  
df.download_sfc('mean_sea_level_pressure' , 'msl' , '151', datain, dataout, dire)  
df.download_sfc('10m_u_component_of_wind' , '10u' , '165', datain, dataout, dire)  
df.download_sfc('10m_v_component_of_wind' , '10v' , '166', datain, dataout, dire)  
df.download_sfc('2m_dewpoint_temperature' , '2d' , '167', datain, dataout, dire)  
df.download_sfc('2m_temperature' , '2t' , '168', datain, dataout, dire)  
df.download_sfc('skin_temperature' , 'skt' , '235', datain, dataout, dire)
```

<https://nomads.ncep.noaa.gov/pub/data/nccf/com/gfs/prod/>

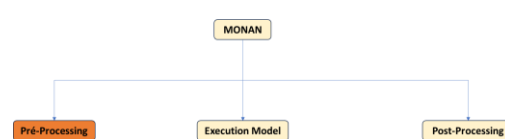


Condições Iniciais e de Contorno do GFS para o MONAN regional.



Pré-Processing

<https://nomads.ncep.noaa.gov/pub/data/nccf/com/gfs/prod/>



ncep gdas final analysis - x NCAR RDA Dataset d0830 x Index of /pub/data/nccf/com/gfs/prod/ Caixa de entrada (1.289) - x ChatGPT - Python

https://nomads.ncep.noaa.gov/pub/data/nccf/com/gfs/prod/gfs.20240728/00/atmos/

Index of /pub/data/nccf/com/gfs/prod/gfs.20240728/00/atmos

Name	Last modified	Size
------	---------------	------

Parent Directory		-
bufr.t00z/	28-Jul-2024 04:20	-
gfs.t00z.atman1.nc	28-Jul-2024 03:41	13G
gfs.t00z.atmf000.nc	28-Jul-2024 03:34	6.3G
gfs.t00z.atmf001.nc	28-Jul-2024 03:35	6.4G
gfs.t00z.atmf002.nc	28-Jul-2024 03:35	6.3G
gfs.t00z.atmf003.nc	28-Jul-2024 03:37	6.4G
gfs.t00z.atmf004.nc	28-Jul-2024 03:36	6.4G
gfs.t00z.atmf005.nc	28-Jul-2024 03:36	6.4G
gfs.t00z.atmf006.nc	28-Jul-2024 03:39	6.4G
gfs.t00z.atmf007.nc	28-Jul-2024 03:36	6.5G
gfs.t00z.atmf008.nc	28-Jul-2024 03:37	6.4G
gfs.t00z.atmf009.nc	28-Jul-2024 03:39	6.4G
gfs.t00z.atmf010.nc	28-Jul-2024 03:37	6.5G
gfs.t00z.atmf011.nc	28-Jul-2024 03:37	6.5G
gfs.t00z.atmf012.nc	28-Jul-2024 03:38	6.4G
gfs.t00z.bufrsnd.tar.gz	28-Jul-2024 04:20	174M
gfs.t00z.goessimpgrb2.0p25.f000	28-Jul-2024 03:39	3.7M
gfs.t00z.goessimpgrb2.0p25.f000.idx	28-Jul-2024 03:39	417
gfs.t00z.goessimpgrb2.0p25.f003	28-Jul-2024 03:41	3.7M
gfs.t00z.goessimpgrb2.0p25.f003.idx	28-Jul-2024 03:39	449
gfs.t00z.goessimpgrb2.0p25.f006	28-Jul-2024 03:41	3.7M
gfs.t00z.goessimpgrb2.0p25.f006.idx	28-Jul-2024 03:41	449
gfs.t00z.goessimpgrb2.0p25.f009	28-Jul-2024 03:41	3.7M
gfs.t00z.goessimpgrb2.0p25.f009.idx	28-Jul-2024 03:41	449
gfs.t00z.goessimpgrb2.0p25.f012	28-Jul-2024 03:42	3.3M
gfs.t00z.goessimpgrb2.0p25.f012.idx	28-Jul-2024 03:42	453
gfs.t00z.goessimpgrb2.0p25.f015	28-Jul-2024 03:44	3.3M
gfs.t00z.goessimpgrb2.0p25.f015.idx	28-Jul-2024 03:44	453
gfs.t00z.goessimpgrb2.0p25.f018	28-Jul-2024 03:45	3.7M
gfs.t00z.goessimpgrb2.0p25.f018.idx	28-Jul-2024 03:45	453
gfs.t00z.goessimpgrb2.0p25.f021	28-Jul-2024 03:45	3.7M
gfs.t00z.goessimpgrb2.0p25.f021.idx	28-Jul-2024 03:45	453
gfs.t00z.goessimpgrb2.0p25.f024	28-Jul-2024 03:46	3.3M
gfs.t00z.goessimpgrb2.0p25.f024.idx	28-Jul-2024 03:46	453
gfs.t00z.goessimpgrb2.0p25.f027	28-Jul-2024 03:47	3.7M
gfs.t00z.goessimpgrb2.0p25.f027.idx	28-Jul-2024 03:47	453

Link para obter dados
globais do modelo GFS
para criar as condições
iniciais/contorno do
modelo MONAN

Lista de interesse
Ideias



Pesquisar



POR
PTB2



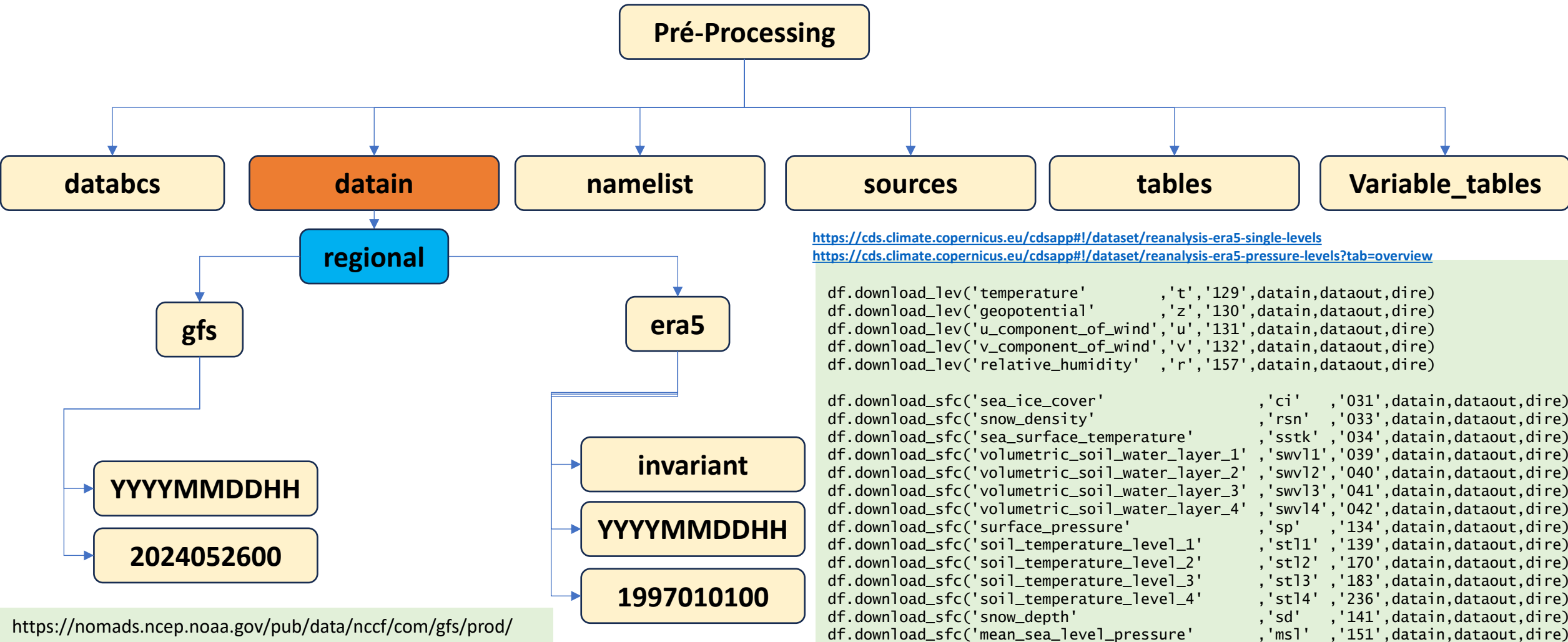
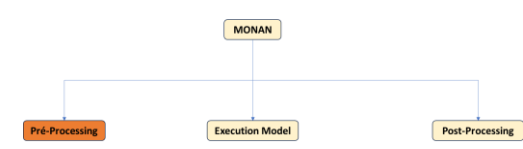
20:28
05/08/2024



Paulo Yoshio Kubota



Pré-Processing



<https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels>
<https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-pressure-levels?tab=overview>

```
df.download_lev('temperature' , 't', '129', datain, dataout, dire)  
df.download_lev('geopotential' , 'z', '130', datain, dataout, dire)  
df.download_lev('u_component_of_wind', 'u', '131', datain, dataout, dire)  
df.download_lev('v_component_of_wind', 'v', '132', datain, dataout, dire)  
df.download_lev('relative_humidity' , 'r', '157', datain, dataout, dire)
```

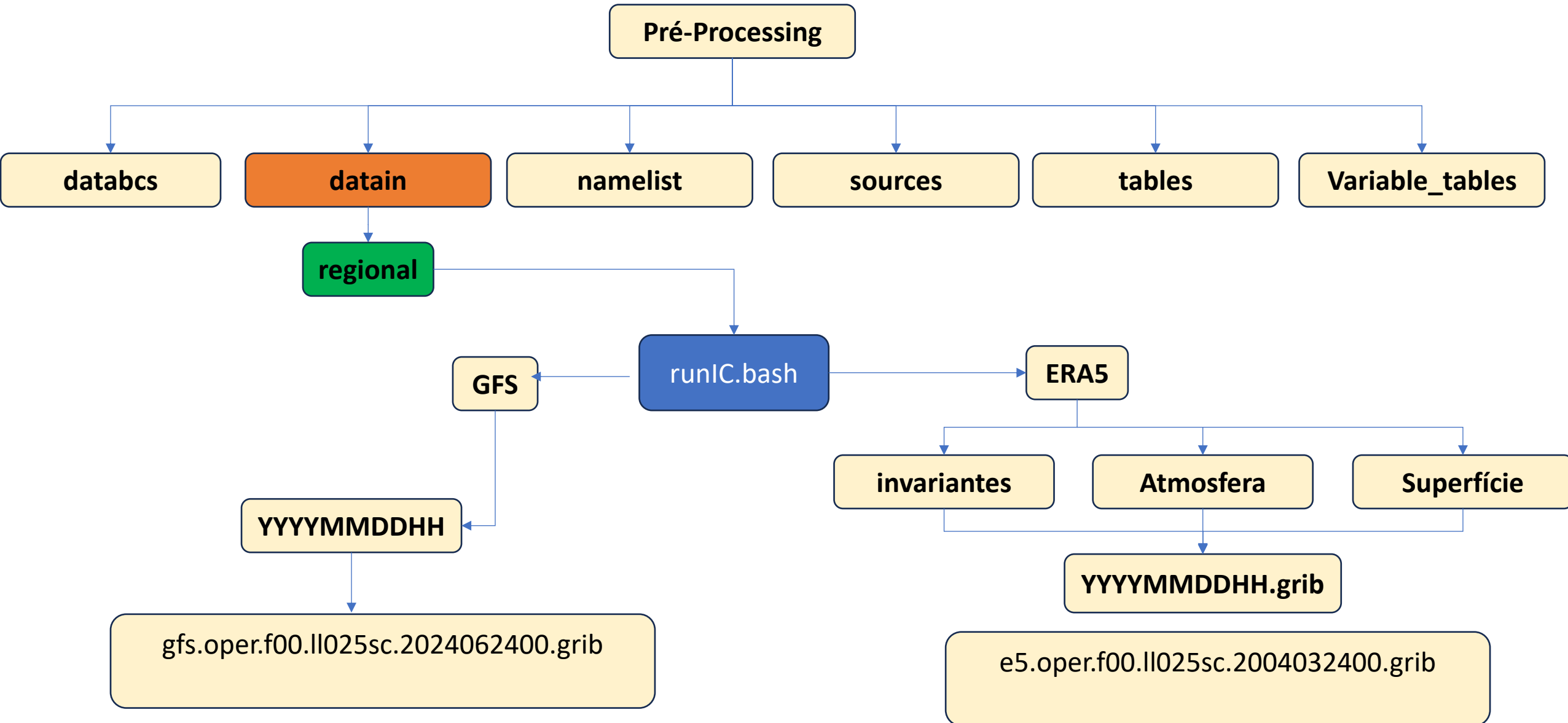
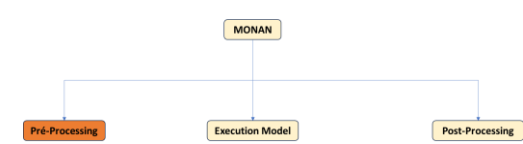
```
df.download_sfc('sea_ice_cover' , 'ci' , '031', datain, dataout, dire)  
df.download_sfc('snow_density' , 'rsn' , '033', datain, dataout, dire)  
df.download_sfc('sea_surface_temperature' , 'sstk' , '034', datain, dataout, dire)  
df.download_sfc('volumetric_soil_water_layer_1' , 'swv11' , '039', datain, dataout, dire)  
df.download_sfc('volumetric_soil_water_layer_2' , 'swv12' , '040', datain, dataout, dire)  
df.download_sfc('volumetric_soil_water_layer_3' , 'swv13' , '041', datain, dataout, dire)  
df.download_sfc('volumetric_soil_water_layer_4' , 'swv14' , '042', datain, dataout, dire)  
df.download_sfc('surface_pressure' , 'sp' , '134', datain, dataout, dire)  
df.download_sfc('soil_temperature_level_1' , 'st11' , '139', datain, dataout, dire)  
df.download_sfc('soil_temperature_level_2' , 'st12' , '170', datain, dataout, dire)  
df.download_sfc('soil_temperature_level_3' , 'st13' , '183', datain, dataout, dire)  
df.download_sfc('soil_temperature_level_4' , 'st14' , '236', datain, dataout, dire)  
df.download_sfc('snow_depth' , 'sd' , '141', datain, dataout, dire)  
df.download_sfc('mean_sea_level_pressure' , 'msl' , '151', datain, dataout, dire)  
df.download_sfc('10m_u_component_of_wind' , '10u' , '165', datain, dataout, dire)  
df.download_sfc('10m_v_component_of_wind' , '10v' , '166', datain, dataout, dire)  
df.download_sfc('2m_dewpoint_temperature' , '2d' , '167', datain, dataout, dire)  
df.download_sfc('2m_temperature' , '2t' , '168', datain, dataout, dire)  
df.download_sfc('skin_temperature' , 'skt' , '235', datain, dataout, dire)
```



Condições Iniciais e de Contorno do ERA5 para o MONAN regional.



Pré-Processing





Plataforma Copernicus, ERA5.



- <https://cds.climate.copernicus.eu/api-how-to>

For Windows users, please read [How to install and use CDS API on Windows](#).

For macOS users, please read [How to install and use CDS API on macOS](#).

For Linux users, please proceed as follows:

1. Install the CDS API key
2. Install the CDS API client
3. Use the CDS API client for data access

Install the CDS API key

1. If you don't have an account, please self register at the [CDS registration](#) page and go to the steps below.
2. If you are not logged, please [login](#) and go to the step below.
3. Copy the code displayed beside, in the file `$HOME/.cdsapirc` (in your Unix/Linux environment).

```
url: https://cds.climate.copernicus.eu/api/v2
key: {uid}:{api-key}
```

Install the CDS API client

The CDS API client is a python based library. It provides support for both Python 2.7.x and Python 3.

You can install the CDS API client via the package management system `pip`, by running on Unix/Linux the command shown in the box beside.

```
$ pip install cdsapi
```

1. Cadastro no site.
2. Configuração da chave de acesso pessoal no `~/.bashrc`
3. Instalar aplicativo do Python: `pip install cdsapi`.

```
1. #!/usr/bin/env python
import cdsapi
c = cdsapi.Client()
c.retrieve("reanalysis-era5-pressure-levels",
{
    "variable": "temperature",
    "pressure_level": "1000",
    "product_type": "reanalysis",
    "year": "2008",
    "month": "01",
    "day": "01",
    "time": "12:00",
    "format": "grib"
}, "download.grib")
```



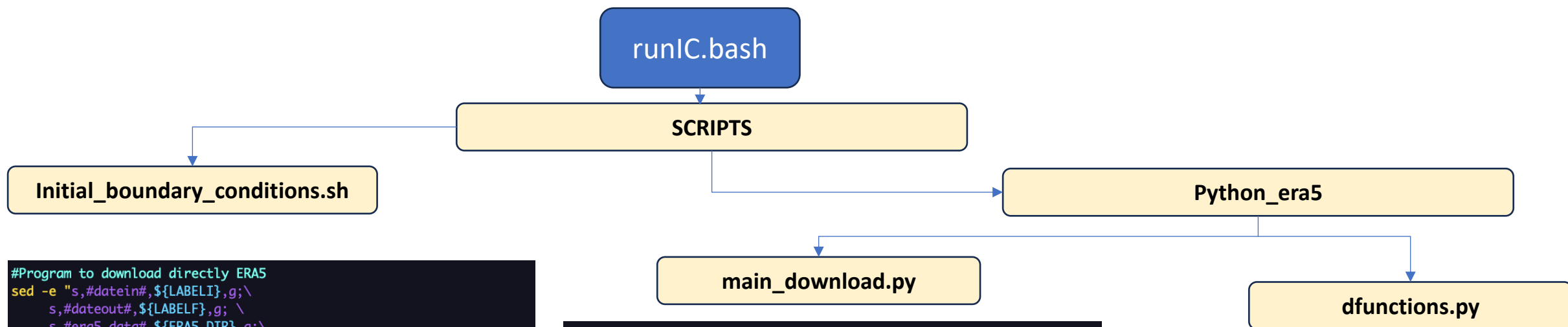
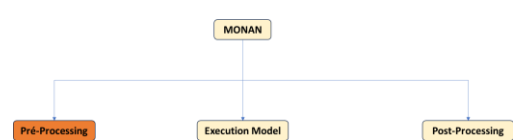
```
#!/bin/bash -x
#-----#
#          DIMNT/INPE          #
#-----#
#BOP
#
# !SCRIPT: runIC.bash
#
# !DESCRIPTION:
#   Script para gerar as condições iniciais e de contorno para o MONAN
#   Realiza as seguintes tarefas:
#   Baixa as condições iniciais (CI) do ERA5 e do GFS
#
# !CALLING SEQUENCE:
#
# ./runIC.bash
#
# IC_HOME   : Lugar para baixar os dados
# EXP_IBC    : Tipo de condição a ser usada. ERA5 OU GFS
# EXPNAME    : Nome do experimento
# LABELI     : Data inicial do experimento
# LABELF     : Data final do experimento
# HOURS_STEP_BC: Passo de tempo em horas para baixar as CI
# LAT_INI    : Latitude Inicial
# LAT_FIN    : Latitude Final
# LON_INI    : Longitude Inicial
# LON_FIN    : Longitude Final

# !REVISION HISTORY:
# 02/08/2024: Separado do runpre
#
# !REMARKS:
#
# !Criated by: Jhonatan A. A. Manco
```

```
IC_HOME=/pesq/dados/bamc/public_jhona
#FURAÇÃO CATARINA
export EXP_IBC=ERA5 #GFS
# Data inicial
export LABELI=2004032400
# Data final
export LABELF=2004032800
#Nome do Experimento
export EXPNAME="CATARINA"
#Passo em horas para baixar as IC
HOURS_STEP_BC=1
# RECORTE CONTENDO A REGIÃO A RODAR
LAT_INI=20
LAT_FIN=-70
LON_INI=-100
LON_FIN=-10
```



Pré-Processing



```

#Program to download directly ERA5
sed -e "s,#datein#,{LABELI},g;\
s,#dateout#,{LABELF},g;\
s,#era5_data#,{ERA5_DIR},g;\
s,#lat_init#,{LAT_INI},g;\
s,#lat_fin#,{LAT_FIN},g;\
s,#lon_init#,{LON_INI},g;\
s,#lon_fin#,{LON_FIN},g;\
s,#nh#,{ERA5_BCHOURSSTEP},g" \
${SCRDIR}/python_era5/main_download.py > \
${BNDDIR}/python/main_download_era5_${LABELI}_${LABELF}.py

echo "Condicao de contorno inexistente !"
echo "Sera baixada do ERA5"
echo "$0 ${LABELI}"

cd ${BNDDIR}/python

#*****
echo "RUN: python main_download_era5_${LABELI}_${LABELF}.py"
#
python main_download_era5_${LABELI}_${LABELF}.py
#
#*****
    
```

```

#Level variables
df.download_lev('temperature'      , 't', '129', date, dire, lat, lon)
df.download_lev('geopotential'     , 'z', '130', date, dire, lat, lon)
df.download_lev('u_component_of_wind', 'u', '131', date, dire, lat, lon)
df.download_lev('v_component_of_wind', 'v', '132', date, dire, lat, lon)
df.download_lev('relative_humidity' , 'r', '157', date, dire, lat, lon)

#Surface variables
df.download_sfc('sea_ice_cover'      , 'ci' , '031', date, dire, lat, lon)
df.download_sfc('snow_density'      , 'rsn' , '033', date, dire, lat, lon)
df.download_sfc('sea_surface_temperature' , 'sstk' , '034', date, dire, lat, lon)
df.download_sfc('volumetric_soil_water_layer_1' , 'swvl1' , '039', date, dire, lat, lon)
df.download_sfc('volumetric_soil_water_layer_2' , 'swvl2' , '040', date, dire, lat, lon)
df.download_sfc('volumetric_soil_water_layer_3' , 'swvl3' , '041', date, dire, lat, lon)
df.download_sfc('volumetric_soil_water_layer_4' , 'swvl4' , '042', date, dire, lat, lon)
df.download_sfc('surface_pressure'      , 'sp' , '134', date, dire, lat, lon)
df.download_sfc('soil_temperature_level_1' , 'stl1' , '139', date, dire, lat, lon)
df.download_sfc('soil_temperature_level_2' , 'stl2' , '170', date, dire, lat, lon)
df.download_sfc('soil_temperature_level_3' , 'stl3' , '183', date, dire, lat, lon)
df.download_sfc('soil_temperature_level_4' , 'stl4' , '236', date, dire, lat, lon)
df.download_sfc('snow_depth'            , 'sd' , '141', date, dire, lat, lon)
df.download_sfc('mean_sea_level_pressure' , 'msl' , '151', date, dire, lat, lon)
df.download_sfc('10m_u_component_of_wind' , '10u' , '165', date, dire, lat, lon)
df.download_sfc('10m_v_component_of_wind' , '10v' , '166', date, dire, lat, lon)
df.download_sfc('2m_dewpoint_temperature' , '2d' , '167', date, dire, lat, lon)
df.download_sfc('2m_temperature'         , '2t' , '168', date, dire, lat, lon)
df.download_sfc('skin_temperature'        , 'skt' , '235', date, dire, lat, lon)

#invariant
df.download_sfc('geopotential'      , 'z' , '129', date, dire, lat, lon)
df.download_sfc('land_sea_mask'     , 'lsm' , '172', date, dire, lat, lon)
    
```

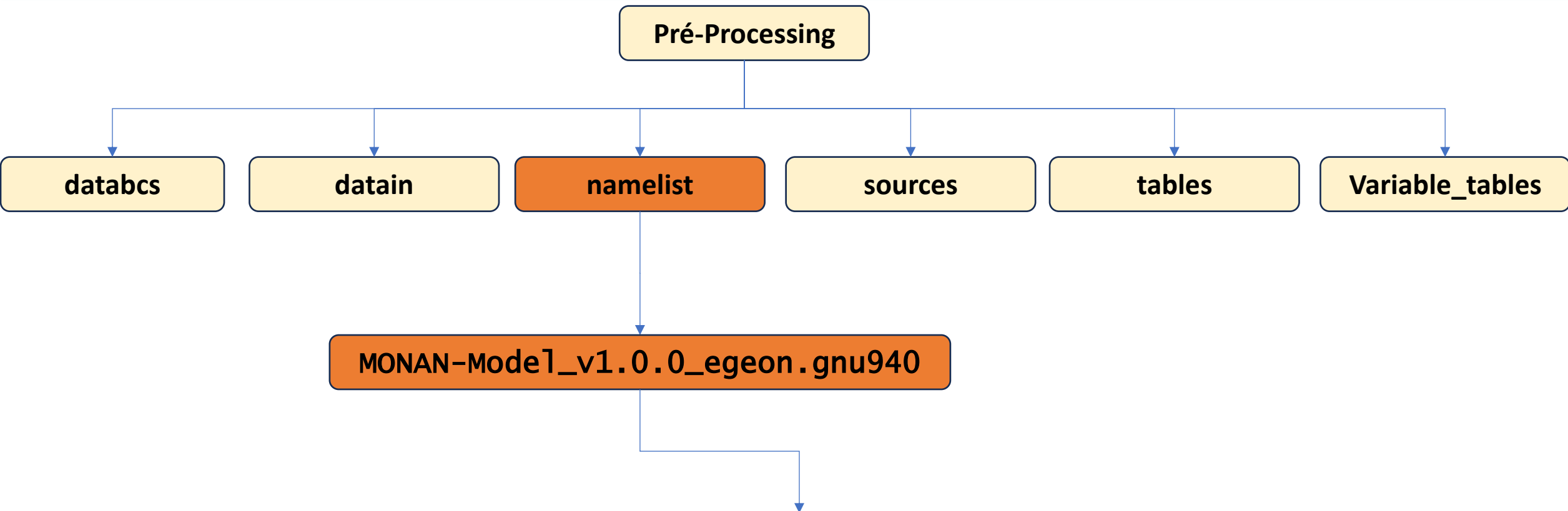
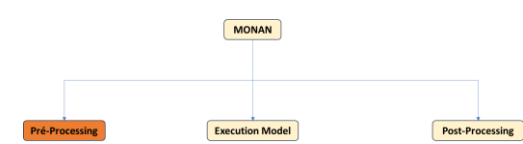
```

def download_lev(var,vname,vnum,datain,dire,lat,lon):

    name = 'e5.oper.an.pl.128_%s_%s.ll025sc.%s'%(vname,vnum,datain)
    c.retrieve("reanalysis-era5-pressure-levels",
    {
        "variable": var,
        "pressure_level": [
            '1000', '975', '950', '925', '900',
            '875', '850', '825', '800', '775',
            '750', '700', '650', '600', '550',
            '500', '450', '400', '350', '300',
            '250', '225', '200', '175', '150',
            '125', '100', '70', '50', '30',
            '20', '10', '7', '5', '3',
            '2', '1',
        ],
        "area": [
            lat[0], lon[0], lat[1],
            lon[1],
        ],
    })
    
```



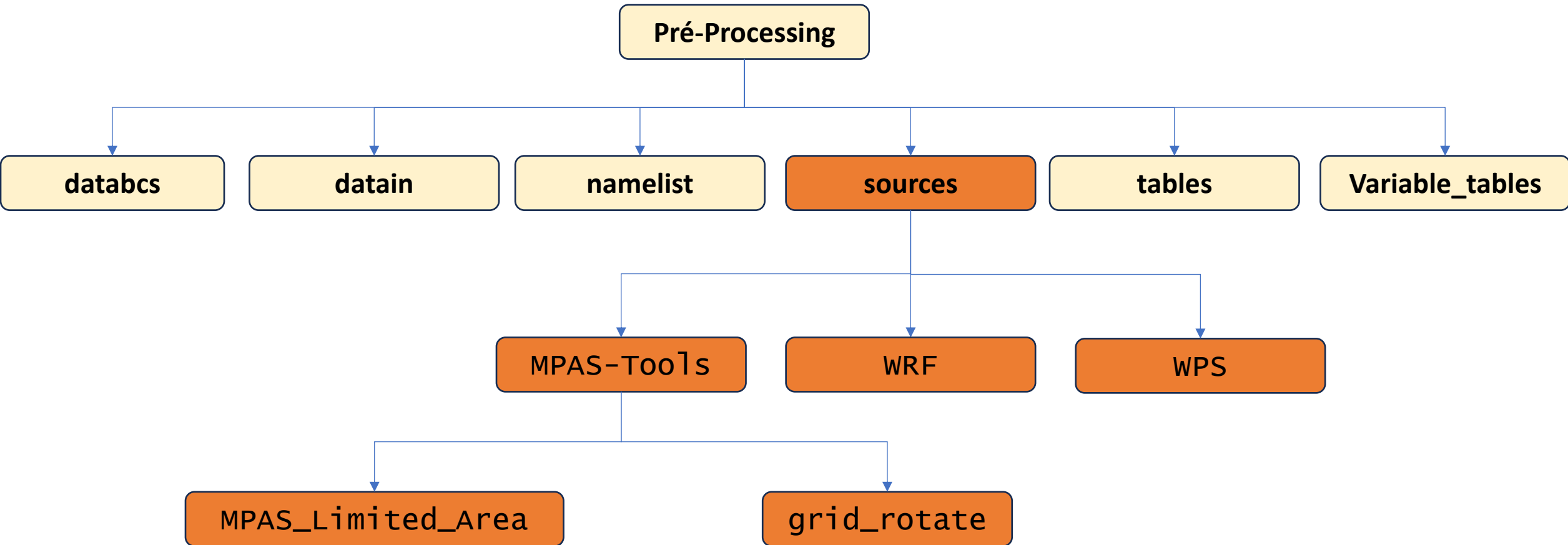
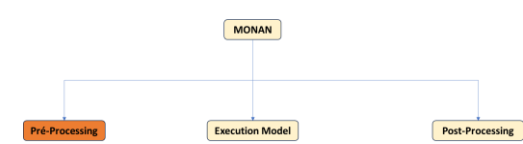
Pré-Processing



<code>namelist.init_atmosphere.LBC.regional</code> <code>namelist.init_atmosphere.SST</code> <code>namelist.init_atmosphere.SST.global</code> <code>namelist.init_atmosphere.SST.regional</code> <code>namelist.init_atmosphere.STATIC</code> <code>namelist.init_atmosphere.STATIC.global</code> <code>namelist.init_atmosphere.STATIC.regional</code> <code>namelist.init_atmosphere.TEMPLATE</code> <code>namelist.init_atmosphere.TEMPLATE.global</code>	<code>namelist.init_atmosphere.TEMPLATE.regional</code> <code>namelist.wps.LBC.regional</code> <code>namelist.wps.SST</code> <code>namelist.wps.TEMPLATE</code> <code>namelist.wps.TEMPLATE.global</code> <code>namelist.wps.TEMPLATE.regional</code> <code>readme</code> <code>streams.init_atmosphere.LBC.regional</code> <code>streams.init_atmosphere.SST</code>	<code>streams.init_atmosphere.SST.global</code> <code>streams.init_atmosphere.SST.regional</code> <code>streams.init_atmosphere.STATIC</code> <code>streams.init_atmosphere.STATIC.global</code> <code>streams.init_atmosphere.STATIC.regional</code> <code>streams.init_atmosphere.TEMPLATE</code> <code>streams.init_atmosphere.TEMPLATE.global</code> <code>streams.init_atmosphere.TEMPLATE.regional</code>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

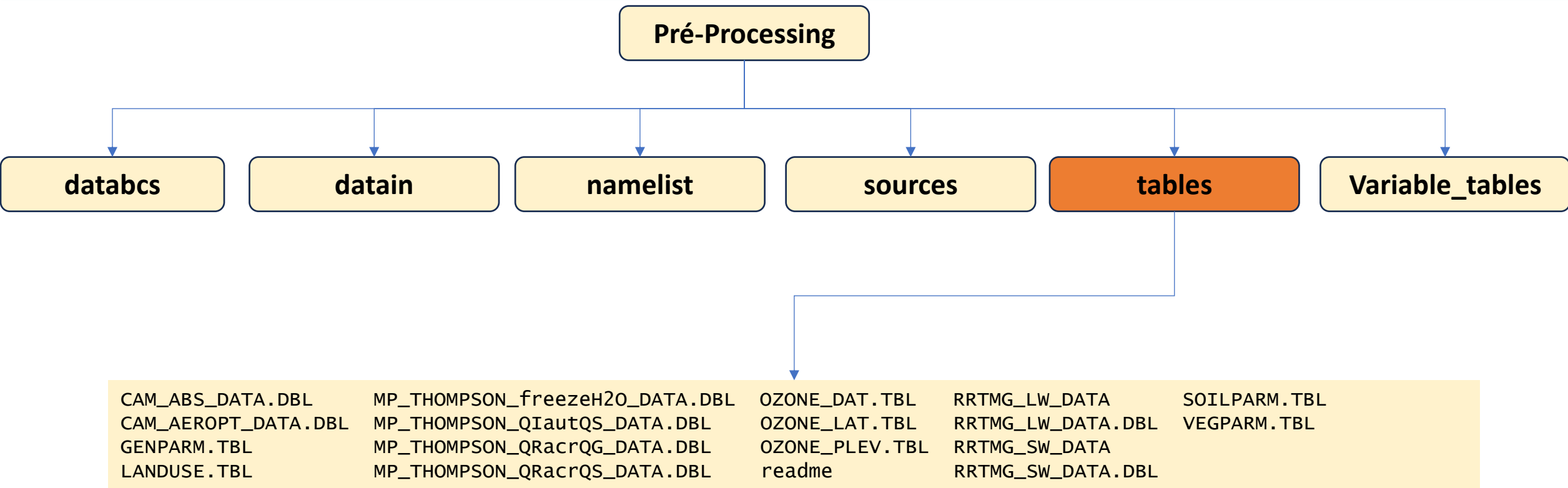
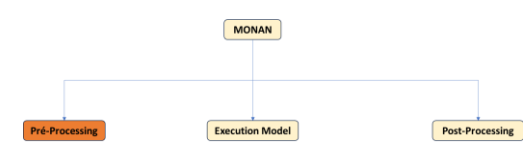


Pré-Processing



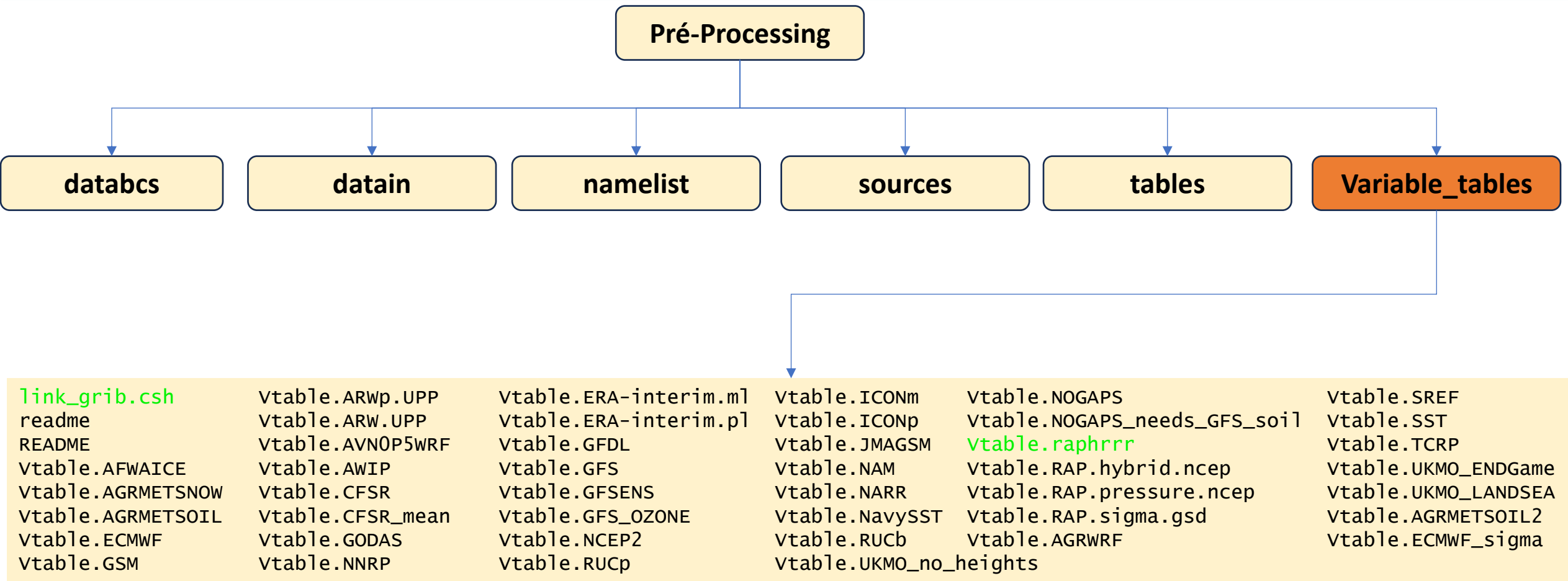
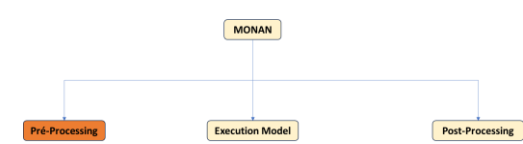


Pré-Processing



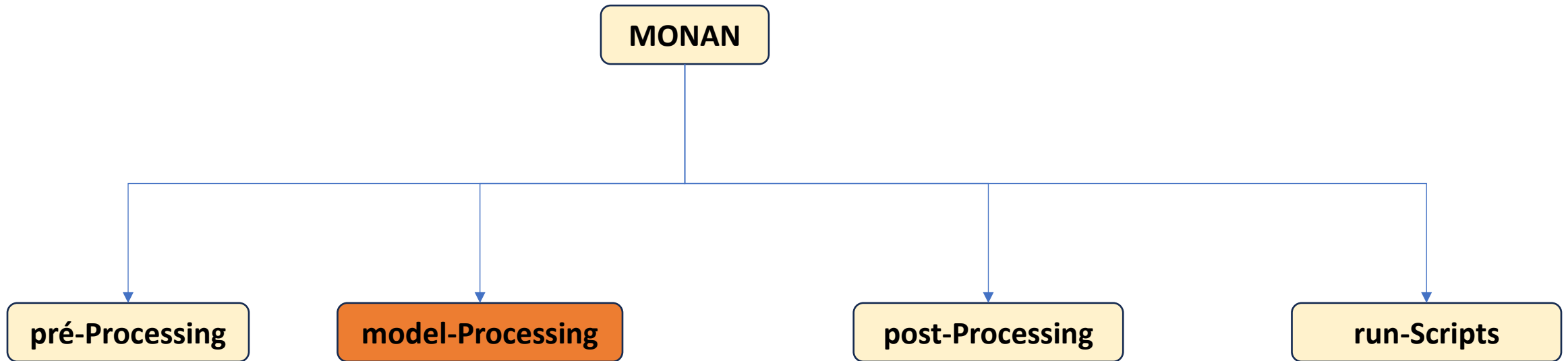


Pré-Processing



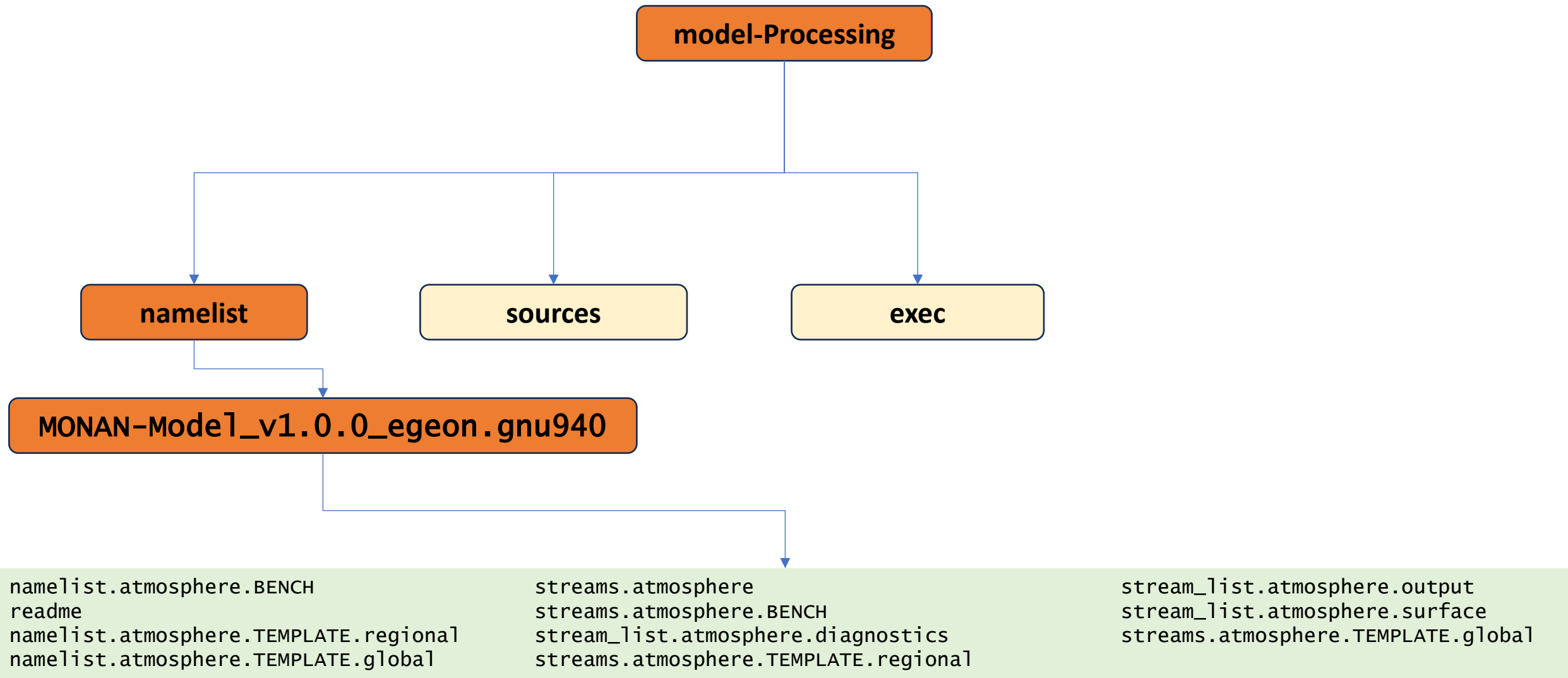


model-Processing



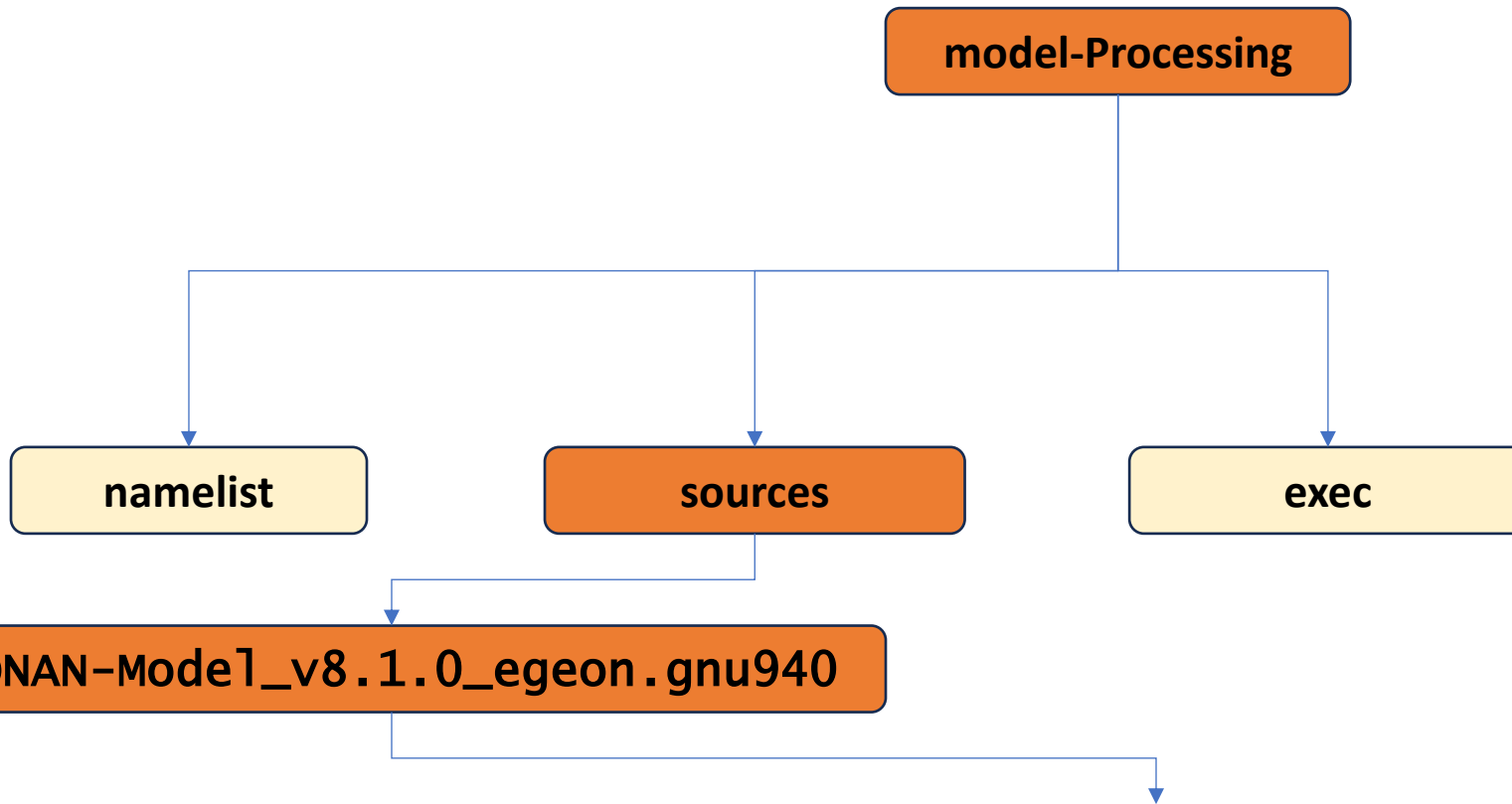


Model-Processing





Model-Processing



bin	Load_monan_app_modules.sh	pio1.f90	stream_list.atmosphere.diagnostics	testing_and_setup
default_inputs	makefile	pio2.f90	stream_list.atmosphere.output	
docs	make.sh	readme	stream_list.atmosphere.surface	
INSTALL	namelist.atmosphere	README.md	streams.atmosphere	
LICENSE	namelist.init_atmosphere	src	streams.init_atmosphere	



model-Processing

namelist

sources

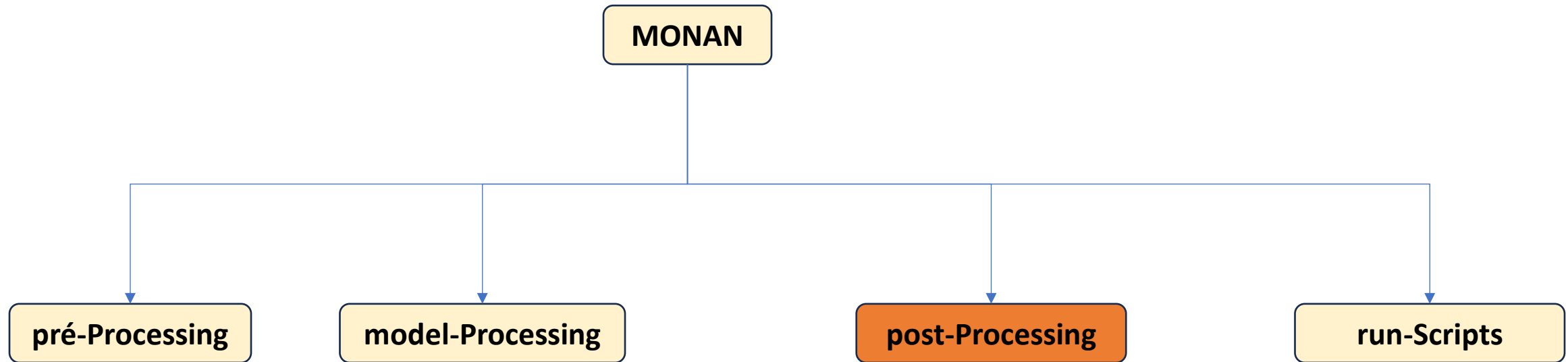
exec

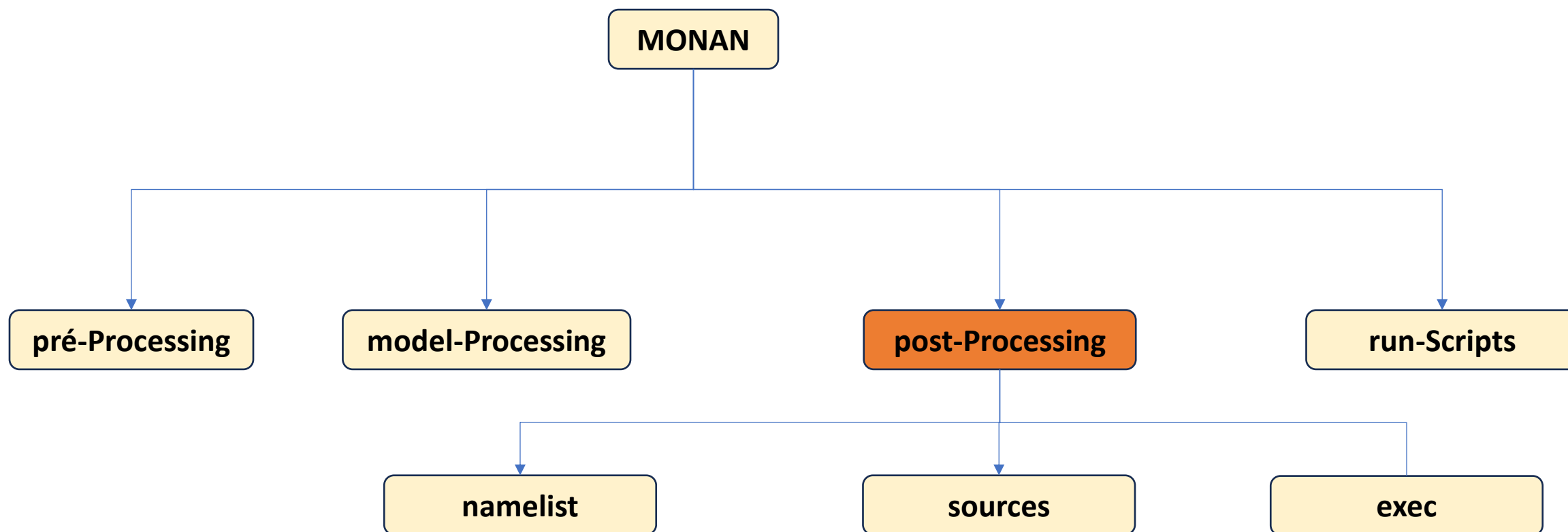
MONAN-Model_v8.1.0_egeon.gnu940

```
Exec/atmosphere_model  
Exec/build_tables  
Exec/init_atmosphere_model
```



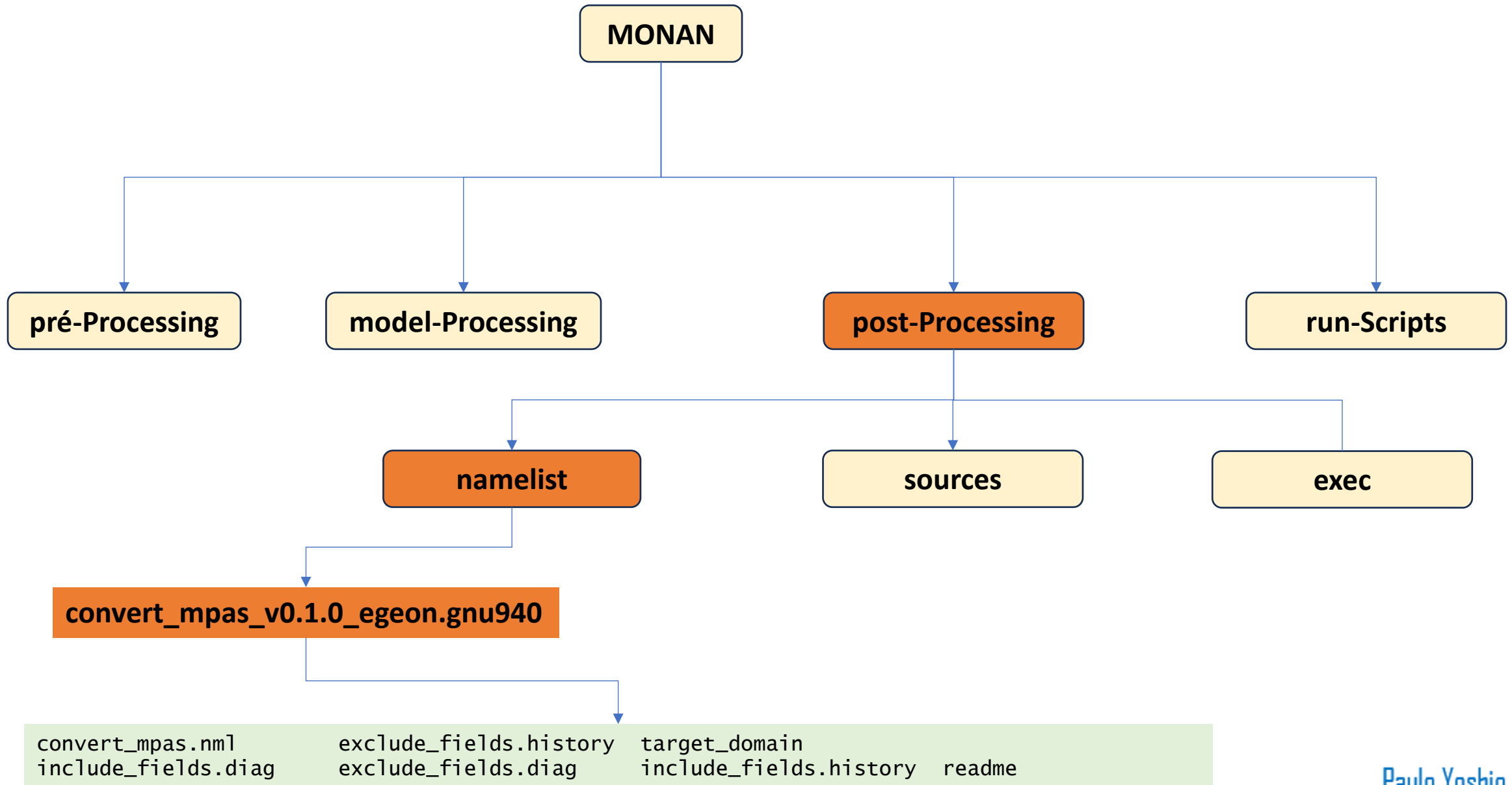
Post-Processing

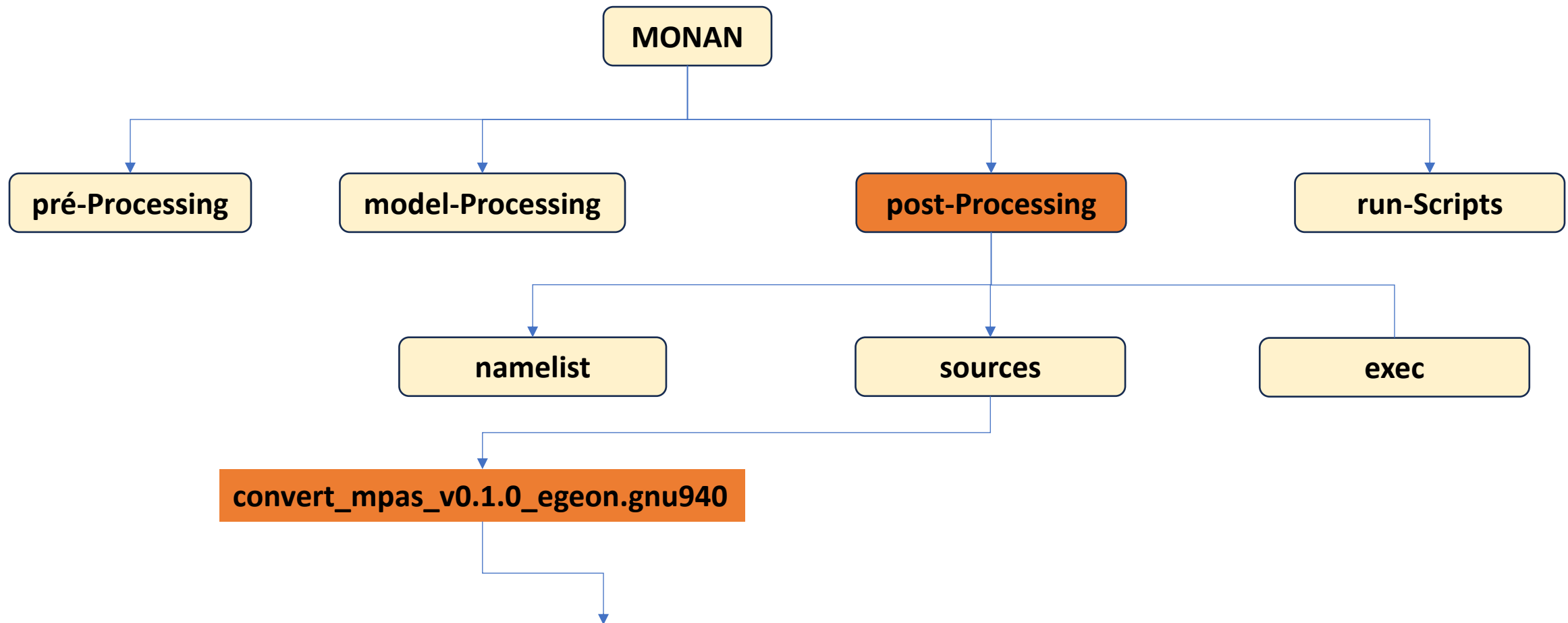






Post-Processing





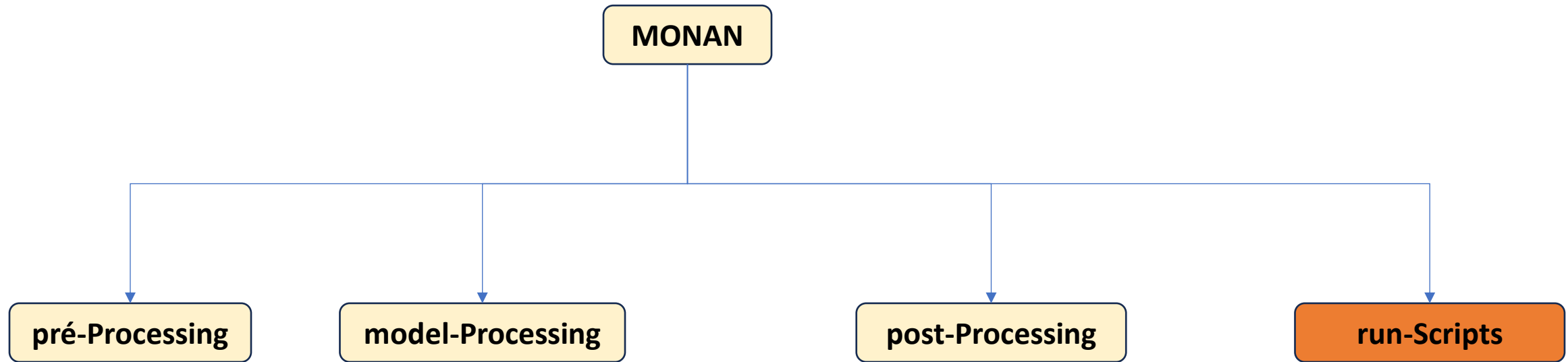
Load_module_convert_mpas.bash Makefile make.sh README.md src

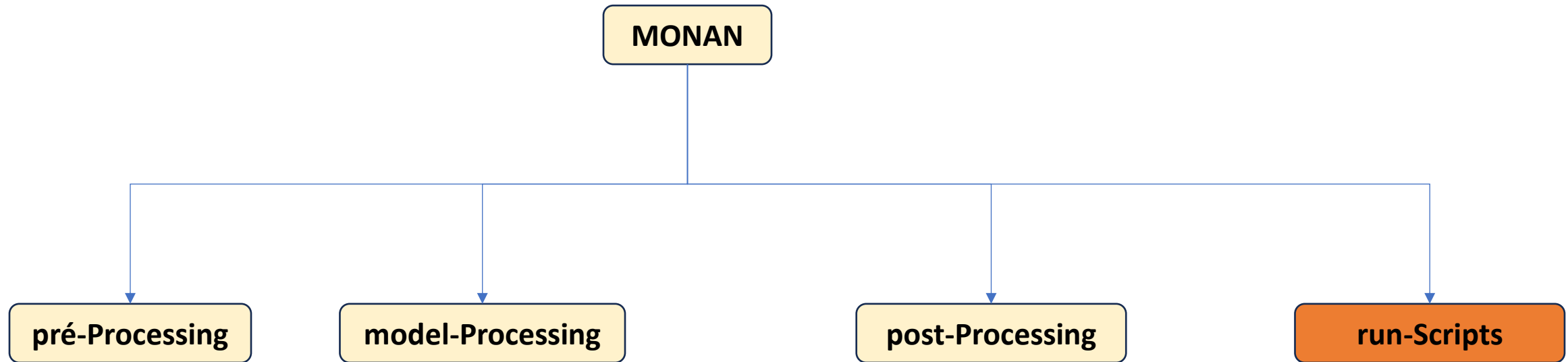


Monan Regional Model Training 13:30-16:45 - Parte2



Execution Control





copy_data.bash	runModel.bash	scripts	readme
load_monan_app_modules.sh	runPost.bash	runPre.bash	



Step 8 – Execute Pre-processing Scripts Control

```
[aluno##@egeon-login1 aluno##]$ pwd
```

check the directory

/mnt/beegfs/aluno##

```
[aluno##@egeon-login1 aluno##]$ cd monan_regional/run
```

change directory

```
[aluno##@egeon-login1 run]$ pwd
```

check the directory

/mnt/beegfs/aluno##/monan_regional/run

```
[aluno##@egeon-login1 run]$ ./runPre.bash
```

Execute the script without passing the arguments

```
[aluno##@egeon-login1 run]$ ./runPre.bash
```

check the information

```
.....
.....
.....
.
```



Step 8 – Execute Pre-processing Scripts Control



```
[aluno##@egeon-login1 run]$ ./runPre.bash
```

```
+ '[' -z '' ']'
+ unset __lmod_vx
+ '[' 0 -ne 7 ']'
+ usage
+ sed -n '/^# !CALLING SEQUENCE:/,/^# !/{p}' ./runPre.bash
+ head -n -1
# !CALLING SEQUENCE:
#
#./runPre.bash EXP_NAME EXP_RES LABELI LABELF Domain AreaRegion TypeGrid
#
# o EXP_NAME : Forcing: ERA5, GFS, etc.
# o EXP_RES : Resolution: 1024002 (24km), 2621442
# o LABELI : Initial: date 2015030600
# o LABELF : End: date 2015030600
# o Domain : global or regional
# o AreaRegion : Sul, Nordeste, Norte, Sudeste, CentroOeste, Peru, Argentina
# o TypeGrid : quasi_uniform or variable_resolution
#
# For benchmark:
#
#./runPre.bash GFS 2621442 2024042700 2024050100 regional Sul quasi_uniform
#./runPre.bash GFS 1024002 2024042700 2024050100 regional Sul quasi_uniform
#
#
#./runPre.bash GFS 535554 2024042700 2024050100 regional Sul variable_resolution
#./runPre.bash GFS 163842 2024042700 2024050100 regional Sul variable_resolution
#
#
+ exit 1
```

Execution Control



Step 8 – Execute Pre-processing Scripts Control

```
[aluno##@egeon-login1 run]$ ./runPre.bash GFS 163842 2024042700 2024050100 regional Peru variable_resolution
```



Sul
Nordeste
Norte
Sudeste
CentroOeste
Peru
Argentina

```
$ more Peru.ellipse.pts
```

```
Name: Peru  
Type: ellipse  
Point: -12.0431800, -77.0282400  
Semi-major-axis: 1000000      # Raio at Meters  
Semi-minor-axis: 1000000     # Raio at Meters  
Orientation-angle: 45
```




Step 8 – Execute Pre-processing Scripts Control



```
[aluno##@egeon-login1 run]$ ./runPre.bash GFS 163842 2024042700 2024050100 regional Argentina variable_resolution
```



Sul
Nordeste
Norte
Sudeste
CentroOeste
Peru
Argentina

```
$ more Argentina.ellipse.pts
```

```
Name: Argentina  
Type: ellipse  
Point: -36.6203, -64.2906  
Semi-major-axis: 1000000 # Raio at Meters  
Semi-minor-axis: 1000000 # Raio at Meters  
Orientation-angle: 45
```



Step 8 – Execute Pre-processing Scripts Control



Group-1

[aluno##@egeon-login1 run]\$./runPre.bash GFS 163842 2024042700 2024050100 regional sul variable_resolution

Group-2

[aluno##@egeon-login1 run]\$./runPre.bash GFS 163842 2024042700 2024050100 regional sudeste variable_resolution

Group-3

[aluno##@egeon-login1 run]\$./runPre.bash GFS 163842 2024042700 2024050100 regional Nordeste variable_resolution

Group-4

[aluno##@egeon-login1 run]\$./runPre.bash GFS 163842 2024042700 2024050100 regional Norte variable_resolution

Group-5

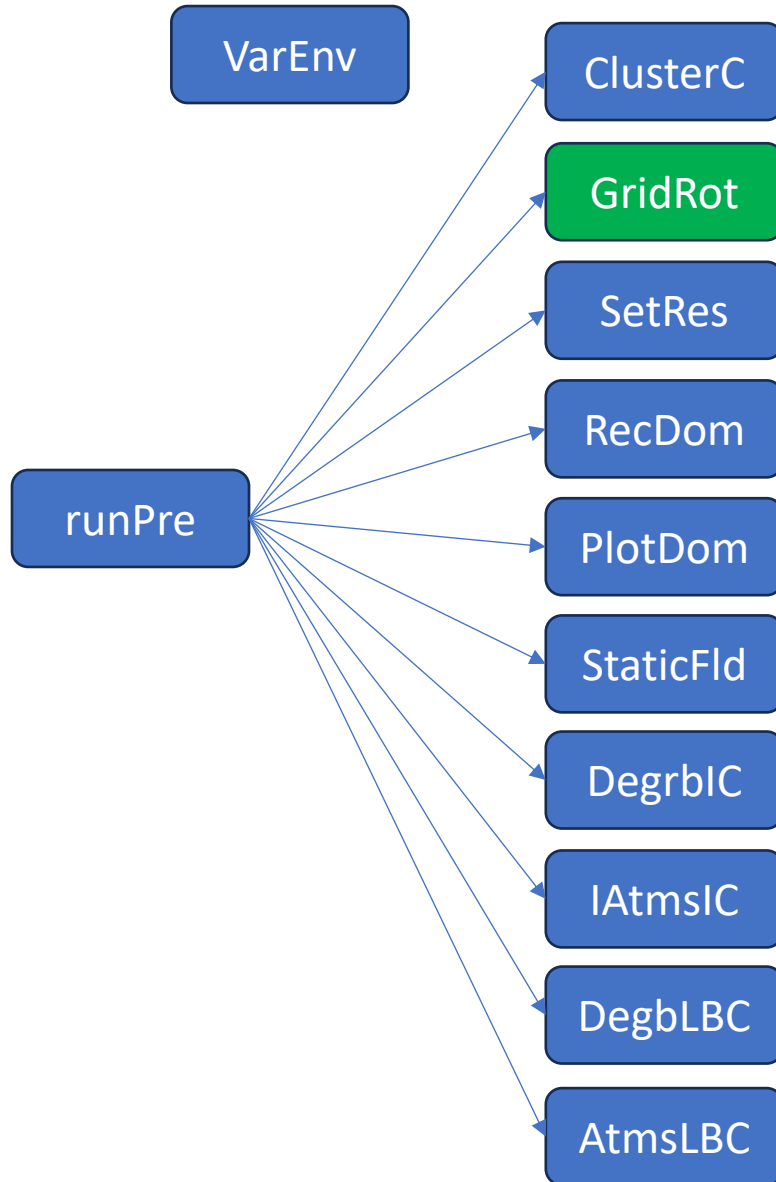
[aluno##@egeon-login1 run]\$./runPre.bash GFS 163842 2024042700 2024050100 regional CentroOeste variable_resolution

Group-6

[aluno##@egeon-login1 run]\$./runPre.bash GFS 163842 2024042700 2024050100 regional Peru variable_resolution

Group-7

[aluno##@egeon-login1 run]\$./runPre.bash GFS 163842 2024042700 2024050100 regional Argentina variable_resolution



```
source scripts/VarEnvironmental.bash
source scripts/Function_SetClusterConfig.bash
source scripts/Function_GridRotate.bash
source scripts/Function_SetResolution.bash
source scripts/Function_RecDomain.bash
source scripts/Function_PlotDomain.bash
source scripts/Function_Static.sh
source scripts/Function_Degrib_IC_GFS.bash
source scripts/Function_InitAtmos_IC_GFS.bash
source scripts/Function_Degrib_LBC_GFS.bash
source scripts/Function_InitAtmos_LBC_GFS.bash
```

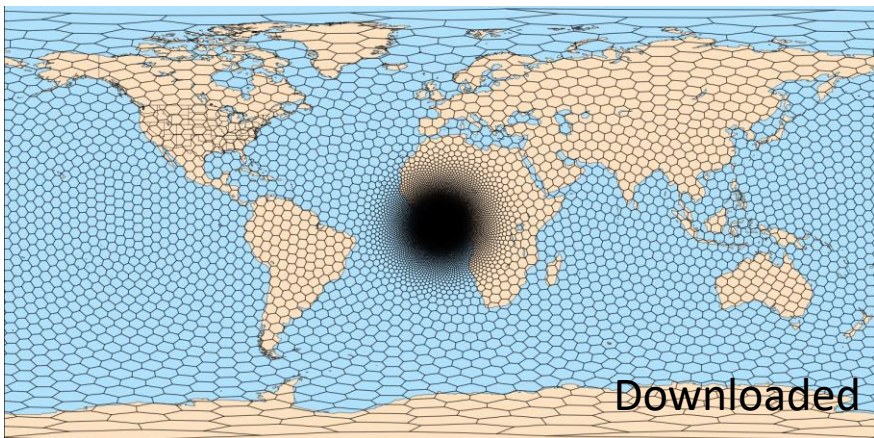


Criando malhas de área limitada: Região circular com refinamento

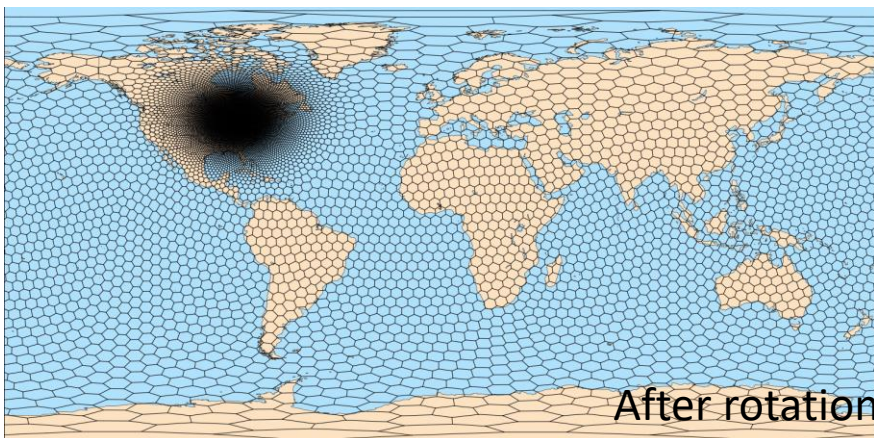


Criar malhas de área limitada a partir de malhas "pai(global)" de resolução variável funciona igualmente bem...

1. Rotacione o refinamento para uma região de interesse usando a ferramenta `grid_rotate` descrita anteriormente.



`grid_rotate`



```
source scripts/Function_GridRotate.bash
```

```
cat<<EOF>${path_exe}/namelist.input
&input
  config_original_latitude_degrees = 0
  config_original_longitude_degrees = 0

  config_new_latitude_degrees = ${clat}
  config_new_longitude_degrees = ${clon}
  config_birdseye_rotation_counter_clockwise_degrees = 0
/
EOF
```

```
./grid_rotate ${input_filename} ${output_filename}
```

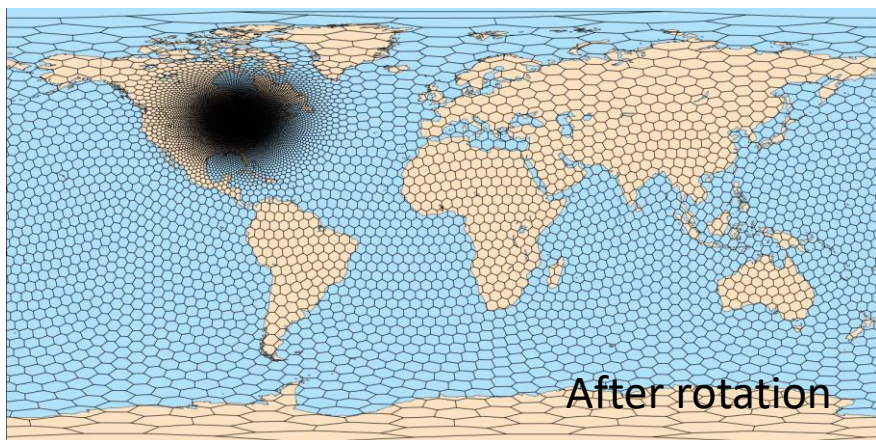



Criando malhas de área limitada: Região circular com refinamento



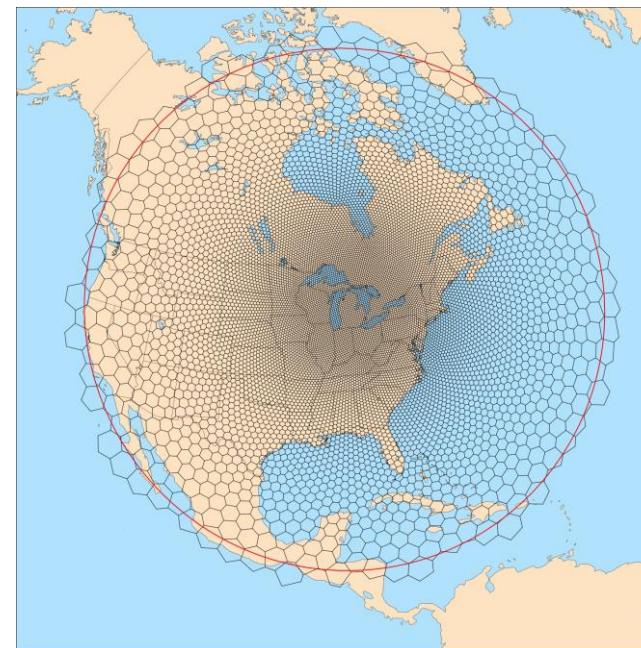
Criar malhas de área limitada a partir de malhas "pai(global)" de resolução variável funciona igualmente bem...

1. Rotacione o refinamento para uma região de interesse usando a ferramenta `grid_rotate` descrita anteriormente.



MPAS-Limited-Area

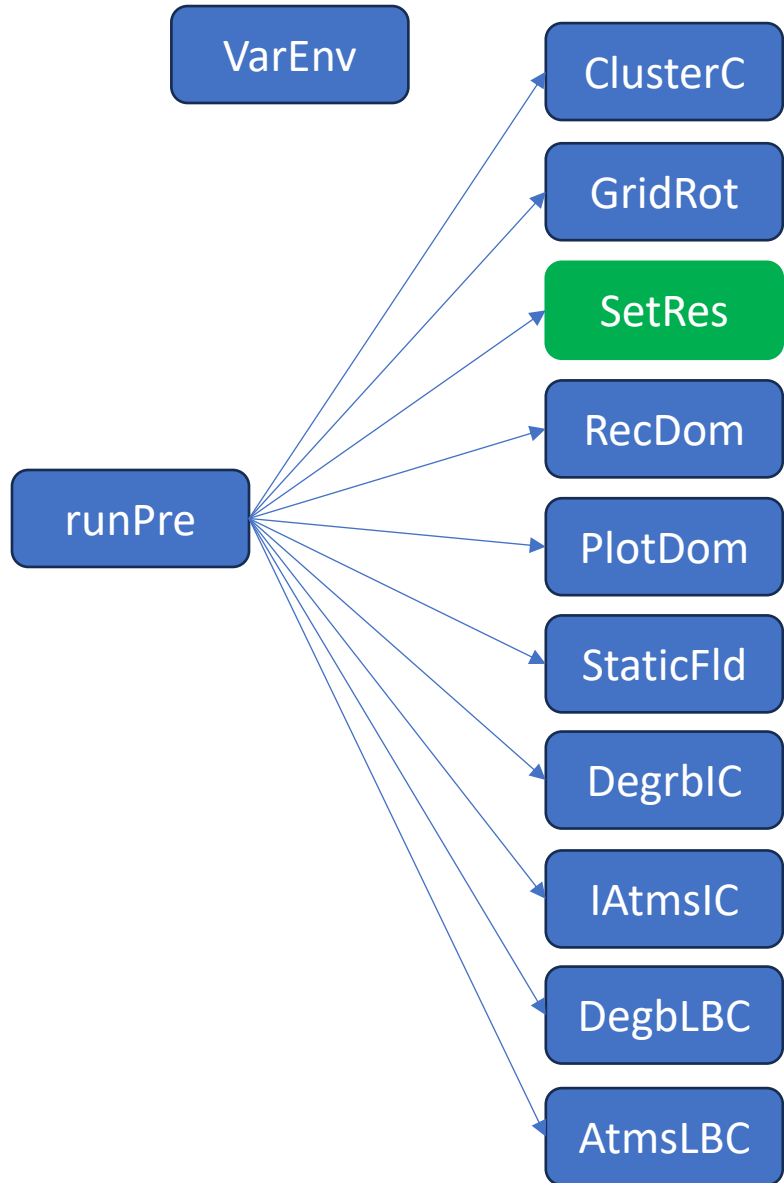
2. Extraia uma malha de área limitada usando a ferramenta MPAS-Limited-Area.



```
create_region    ${AreaRegion}.ellipse.pts    ${RES_KM}/g${frac}.${EXP_RES}.grid.nc
```

```
more su1.ellipse.pts
```

```
Name: su1
Type: ellipse
Point: -30.03306, -51.230000
Semi-major-axis: 1000000    # Raio at Meters
Semi-minor-axis: 1000000    # Raio at Meters
Orientation-angle: 45
```



```
source scripts/VarEnvironmental.bash
source scripts/Function_SetClusterConfig.bash
source scripts/Function_GridRotate.bash
source scripts/Function_SetResolution.bash
source scripts/Function_RecDomain.bash
source scripts/Function_PlotDomain.bash
source scripts/Function_Static.sh
source scripts/Function_Degrib_IC_GFS.bash
source scripts/Function_InitAtmos_IC_GFS.bash
source scripts/Function_Degrib_LBC_GFS.bash
source scripts/Function_InitAtmos_LBC_GFS.bash
```



```
if [ ${TypeGrid} = 'variable_resolution' ]; then

case "`echo ${EXP_RES} | awk '{print $1/1 }'`" in
    835586)RES_KM='060_003km';frac=20;len_disp=3000 ;;
    535554)RES_KM='060_015km';frac=4 ;len_disp=15000 ;;
    163842)RES_KM='092_025km';frac=4 ;len_disp=25000 ;;
esac

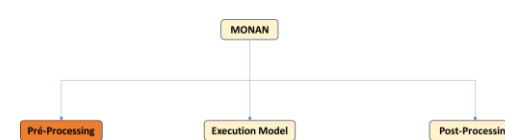
else

case "`echo ${EXP_RES} | awk '{print $1/1 }'`" in
65536002)RES_KM='003_km';frac=1;len_disp=3000 ;;
2621442)RES_KM='015_km';frac=1;len_disp=15000 ;;
1024002)RES_KM='024_km';frac=1;len_disp=24000 ;;
655362)RES_KM='030_km';frac=1;len_disp=30000 ;;
256002)RES_KM='048_km';frac=1;len_disp=48000 ;;
163842)RES_KM='060_km';frac=1;len_disp=60000 ;;
40962)RES_KM='120_km';frac=1;len_disp=120000 ;;
10242)RES_KM='240_km';frac=1;len_disp=240000 ;;
4002)RES_KM='384_km';frac=1;len_disp=384000 ;;
2562)RES_KM='480_km';frac=1;len_disp=480000 ;;
esac
fi
```

```
source scripts/Function_SetResolution.bash
```

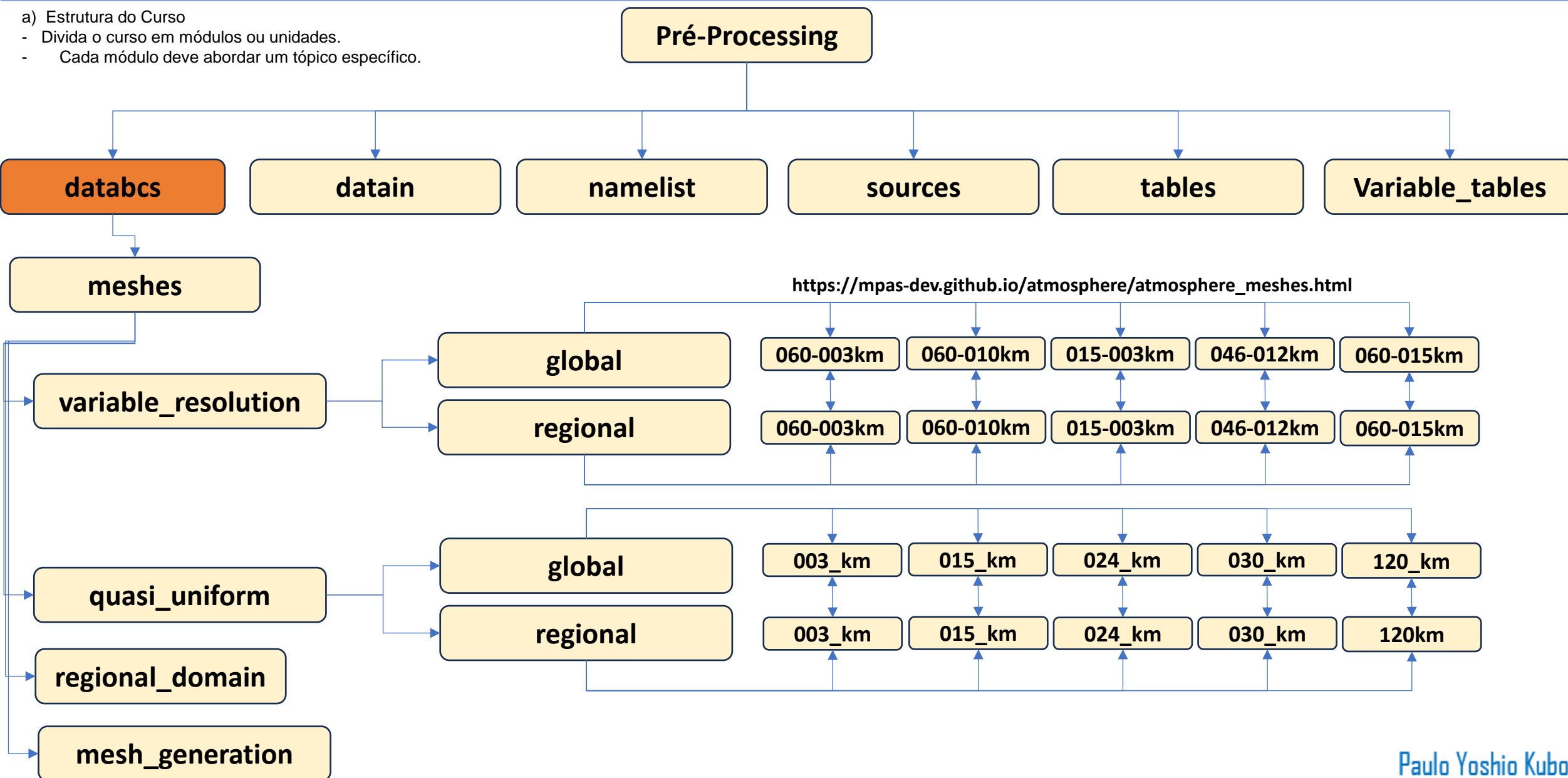


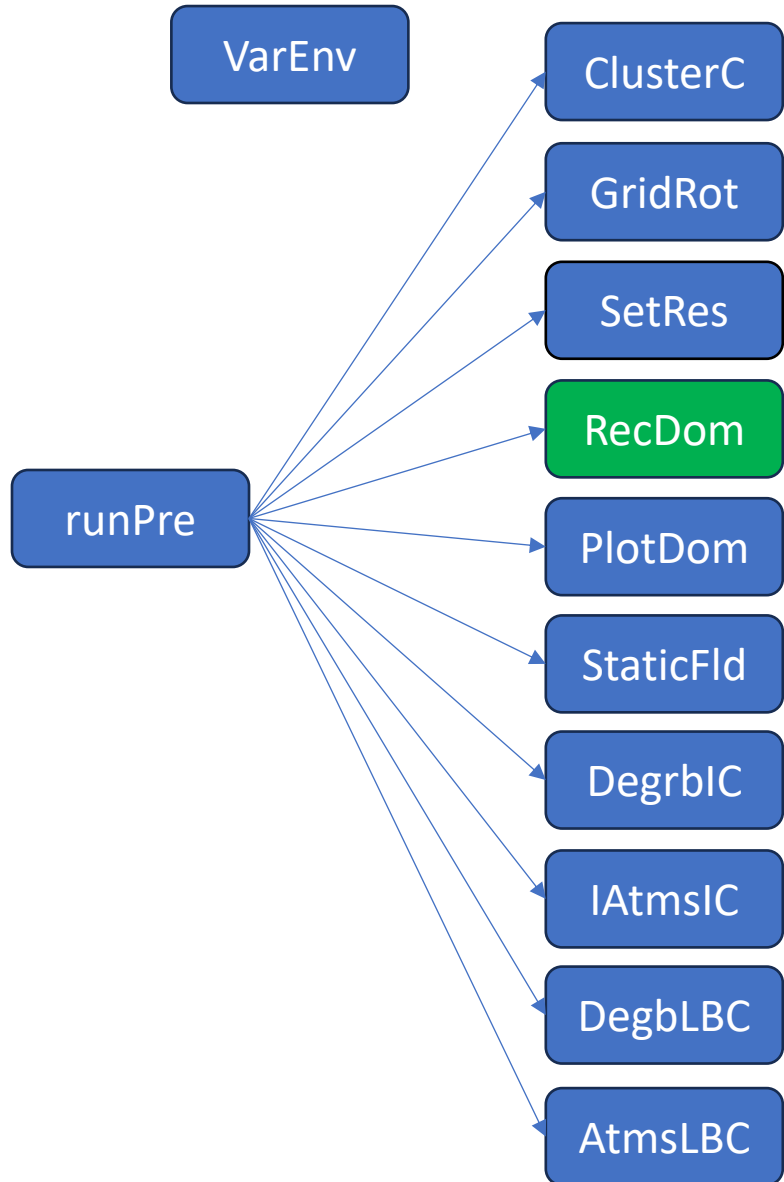
Pré-Processing



a) Estrutura do Curso

- Divide o curso em módulos ou unidades.
- Cada módulo deve abordar um tópico específico.





```
source scripts/VarEnvironmental.bash
source scripts/Function_SetClusterConfig.bash
source scripts/Function_GridRotate.bash
source scripts/Function_SetResolution.bash
source scripts/Function_RecDomain.bash
source scripts/Function_PlotDomain.bash
source scripts/Function_Static.sh
source scripts/Function_Degrib_IC_GFS.bash
source scripts/Function_InitAtmos_IC_GFS.bash
source scripts/Function_Degrib_LBC_GFS.bash
source scripts/Function_InitAtmos_LBC_GFS.bash
```

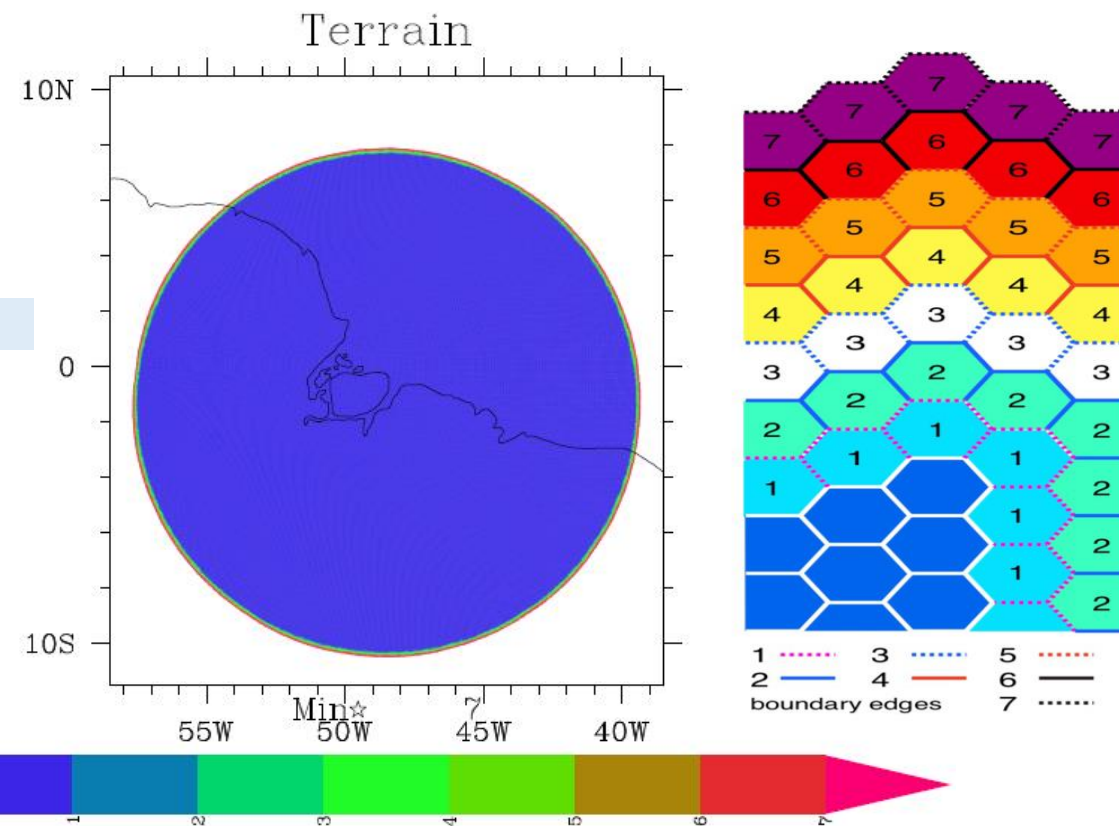
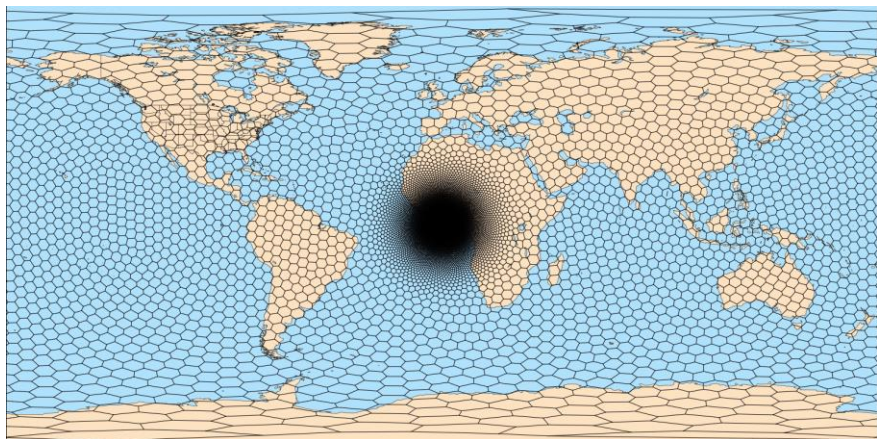


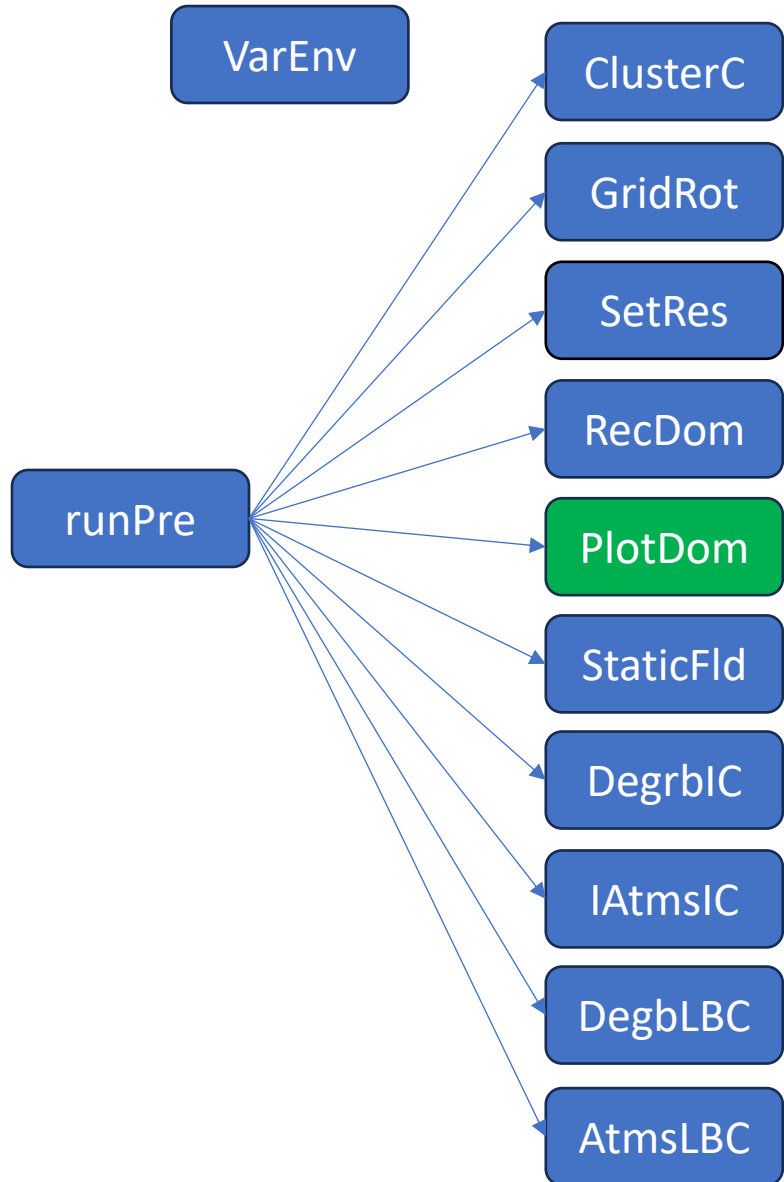
more regional/003_km/Belem.ellipse.pts

```
Name: Belem
Type: ellipse
Point: -1.3, -48.5
Semi-major-axis: 1000000 # Raio at Meters
Semi-minor-axis: 1000000 # Raio at Meters
Orientation-angle: 45
```

```
source scripts/Function_RecDomain.bash
```

```
create_region    ${AreaRegion}.ellipse.pts    ${RES_KM}/g${frac}.${EXP_RES}.grid.nc
```





```
source scripts/VarEnvironmental.bash
source scripts/Function_SetClusterConfig.bash
source scripts/Function_GridRotate.bash
source scripts/Function_SetResolution.bash
source scripts/Function_RecDomain.bash
source scripts/Function_PlotDomain.bash
source scripts/Function_Static.sh
source scripts/Function_Degrib_IC_GFS.bash
source scripts/Function_InitAtmos_IC_GFS.bash
source scripts/Function_Degrib_LBC_GFS.bash
source scripts/Function_InitAtmos_LBC_GFS.bash
```



```
sed -e "s,#FILEDATA#,$${FILEDATA},g;s,#startlon#,$${startlon},g;s,#endlon#,$${endlon},g;s,#startlat#,$${startlat},g;s,#endlat#,$${endlat},g" \
    ${DIR_MESH}/plot_region.nc1 > ${pathin}/plot_region.nc1
```

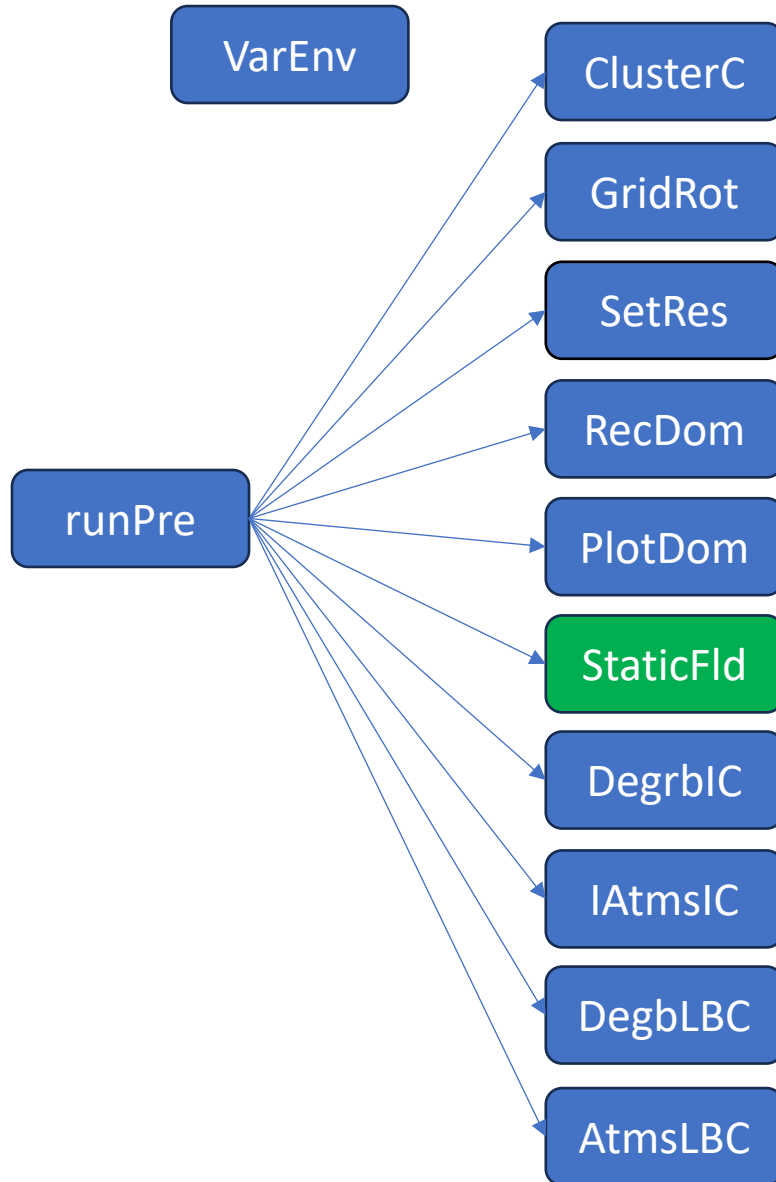
AreaRegional.ellipse.pts



```
${path_nc1}/nc1      ${pathin}/plot_region.nc1
```



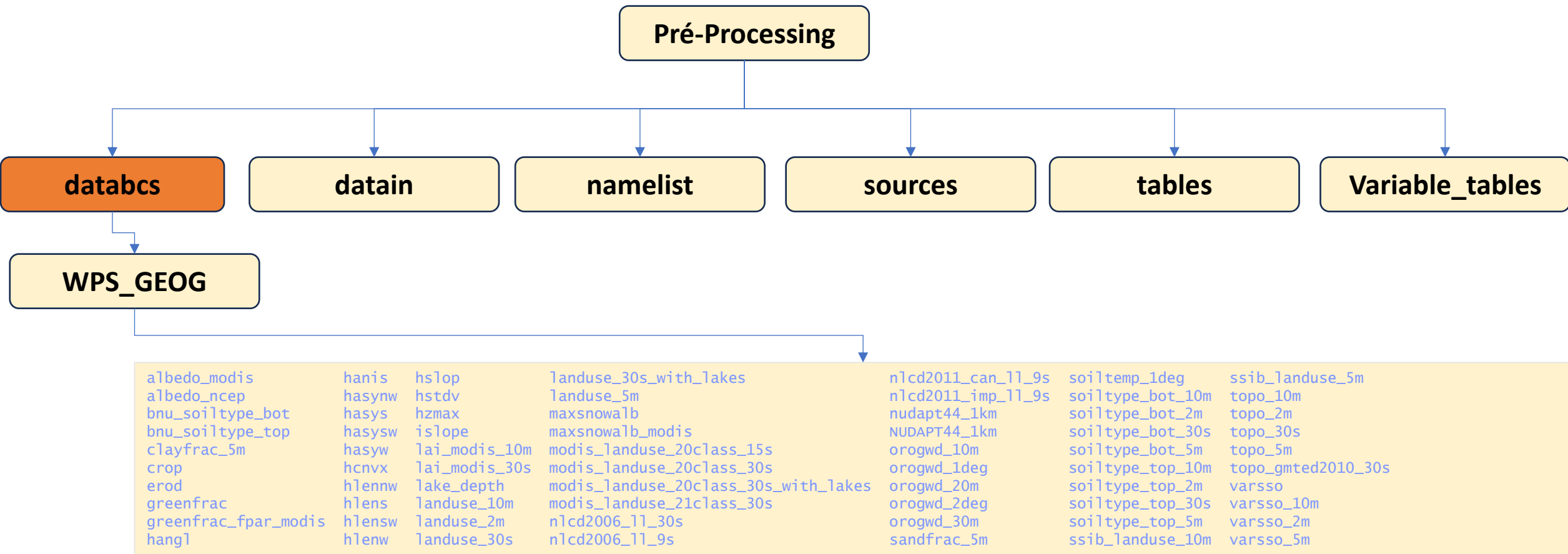
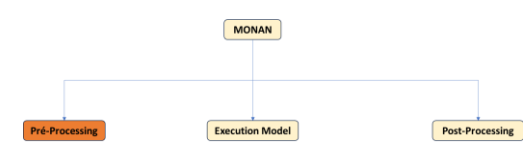
runPre.bash



```
source scripts/VarEnvironmental.bash
source scripts/Function_SetClusterConfig.bash
source scripts/Function_GridRotate.bash
source scripts/Function_SetResolution.bash
source scripts/Function_RecDomain.bash
source scripts/Function_PlotDomain.bash
source scripts/Function_Static.sh
source scripts/Function_Degrib_IC_GFS.bash
source scripts/Function_InitAtmos_IC_GFS.bash
source scripts/Function_Degrib_LBC_GFS.bash
source scripts/Function_InitAtmos_LBC_GFS.bash
```



Pré-Processing

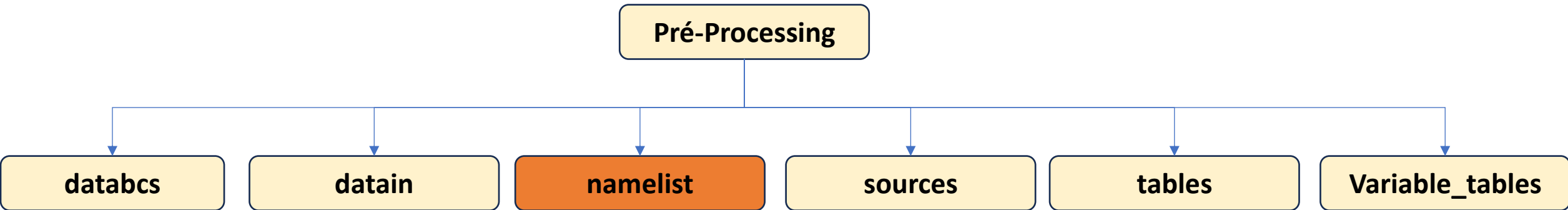
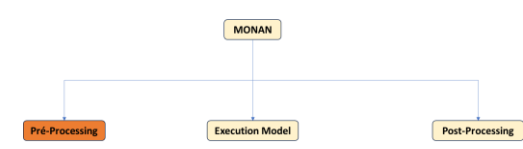


source scripts/Function_Static.sh

namelist.init_atmosphere
streams.init_atmosphere



Pré-Processing



streams.init_atmosphere

```
<streams>
<immutable_stream name="input"
  type="input"
  filename_template="Su1.1024002.grid.nc"
  input_interval="initial_only" />

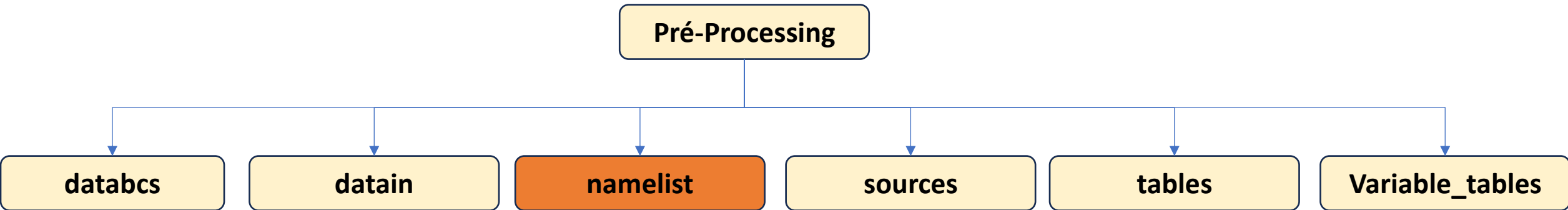
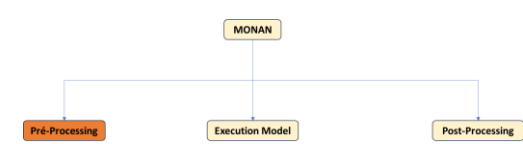
<immutable_stream name="output"
  type="output"
  filename_template="Su1.1024002.static.nc"
  packages="initial_conds"
  output_interval="initial_only" />

<immutable_stream name="surface"
  type="output"
  filename_template="Su1.1024002.sfc_update.nc"
  filename_interval="none"
  packages="sfc_update"
  output_interval="86400" />

</streams>
```




Pré-Processing



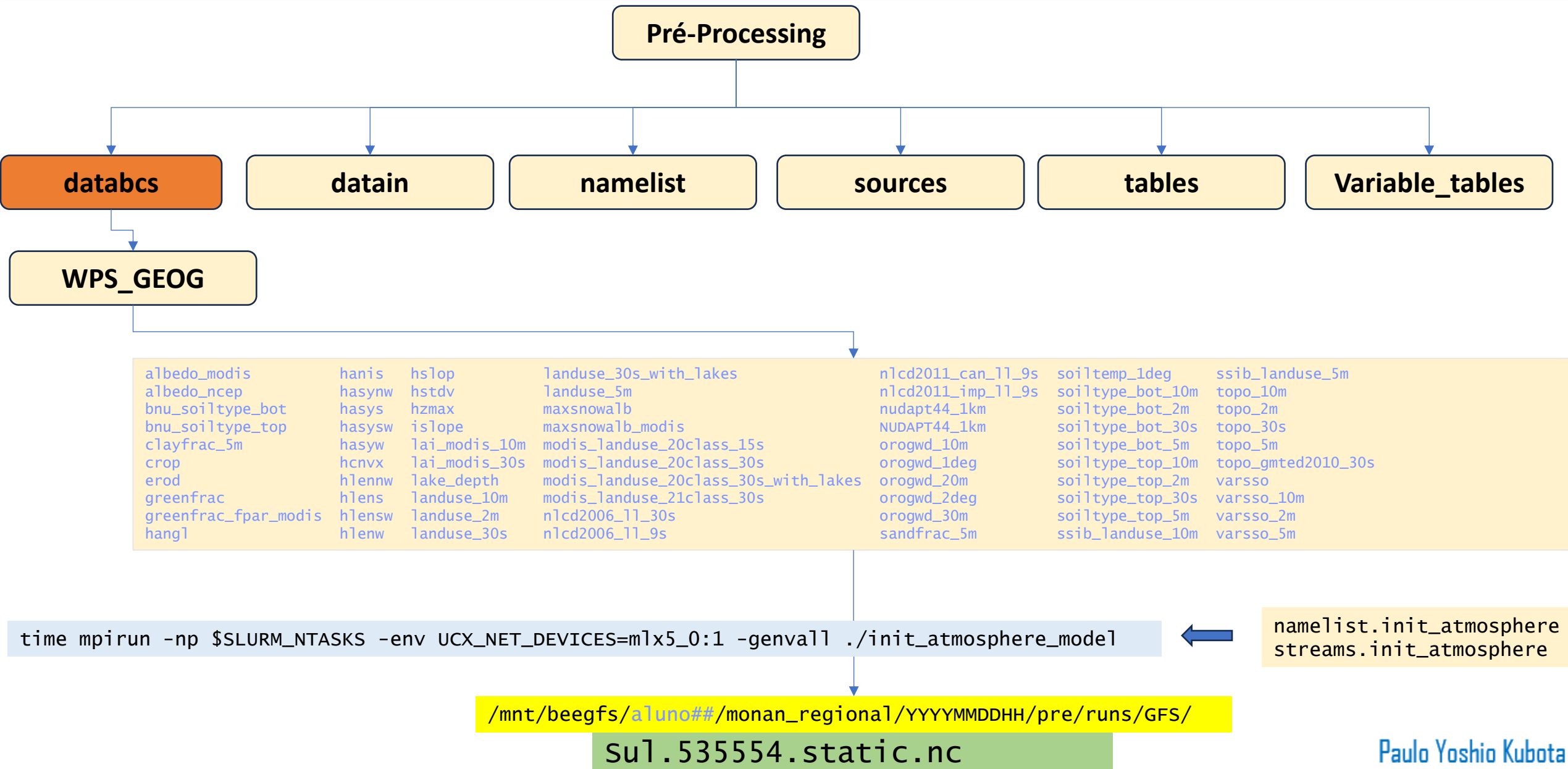
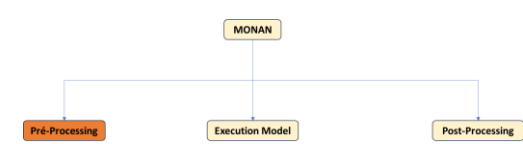
namelist.init_atmosphere

```
&nhyd_model
  config_init_case = 7    ! necessary
  config_theta_adv_order = 3
  config_coef_3rd_order = 0.25
  config_interface_projection = 'linear_interpolation'
/
&dimensions
  config_nvertlevels = 1
  config_nsoillevels = 1
  config_nfglevels = 1
  config_nfgsoillevels = 1
/
&data_sources
  config_geog_data_path =
'/mnt/beegfs/paulo.kubota/tmp/monan_regional/pre/databcs/WPS_GEOG/'
  config_met_prefix = 'CFSR'    ! not necessary to static files
  config_sfc_prefix = 'SST'
  config_fg_interval = 86400
  config_landuse_data = 'MODIFIED_IGBP_MODIS_NOAH'
  config_topo_data = 'GMTED2010'
  config_vegfrac_data = 'MODIS'
  config_albedo_data = 'MODIS'
  config_maxsnowalbedo_data = 'MODIS'
  config_supersample_factor = 3
  config_30s_supersample_factor = 1
  config_use_spechumd = false
/
```

```
&vertical_grid
  config_ztop = 30000.0
  config_nsmterrain = 1
  config_smooth_surfaces = true
  config_dzmin = 0.3
  config_nsm = 30
  config_tc_vertical_grid = true
  config_blend_bdy_terrain = false
/
&interpolation_control
  config_extrap_airtemp = 'lapse-rate'
/
&preproc_stages
  config_static_interp = true
  config_native_gwd_static = true
  config_vertical_grid = false
  config_met_interp = false
  config_input_sst = false
  config_frac_seaice = false
/
&io
  config_pio_num_iotasks = 0
  config_pio_stride = 1
/
&decomposition
  config_block_decomp_file_prefix = 'Su1.1024002.graph.info.part.'
/
```

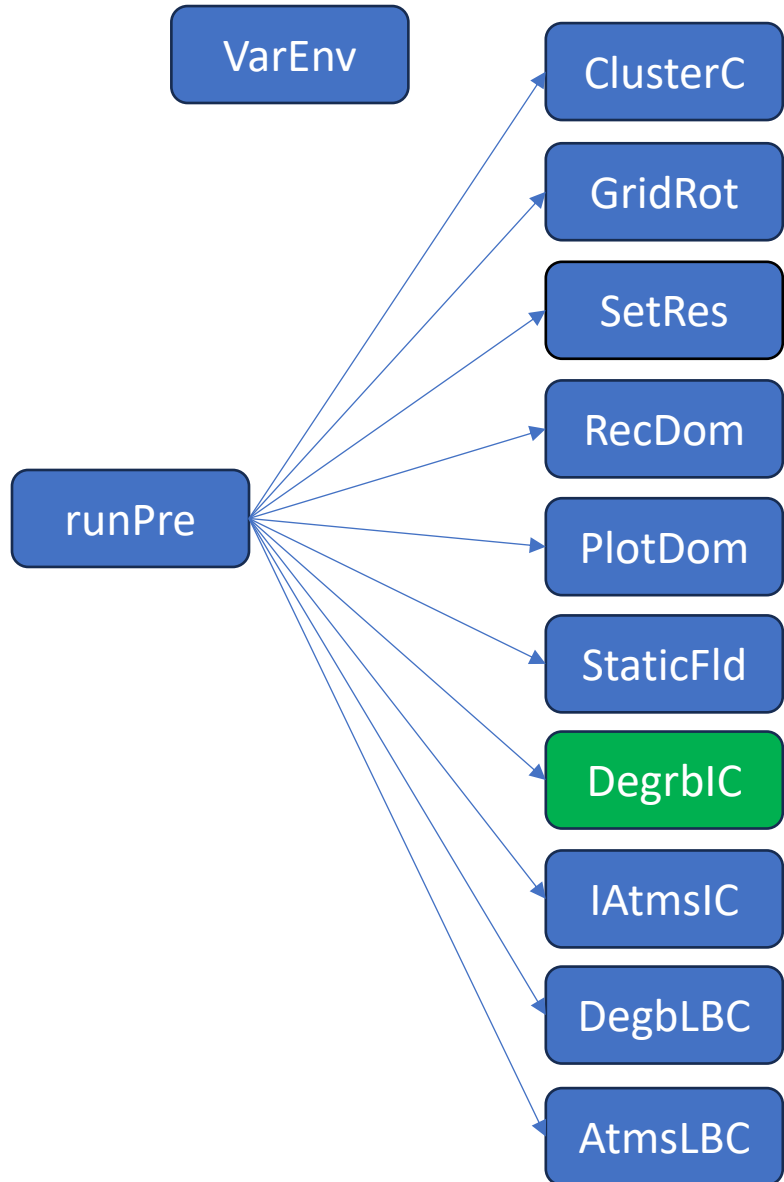



Pré-Processing





runPre.bash



```
source scripts/VarEnvironmental.bash
source scripts/Function_SetClusterConfig.bash
source scripts/Function_GridRotate.bash
source scripts/Function_SetResolution.bash
source scripts/Function_RecDomain.bash
source scripts/Function_PlotDomain.bash
source scripts/Function_Static.sh
source scripts/Function_Degrib_IC_GFS.bash
source scripts/Function_InitAtmos_IC_GFS.bash
source scripts/Function_Degrib_LBC_GFS.bash
source scripts/Function_InitAtmos_LBC_GFS.bash
```



source scripts/Function_Degrib_IC_GFS.bash

more namelist.wps

```
&share
wrf_core = 'ARW',
max_dom = 1,
start_date = '2024-04-27_00:00:00',
end_date   = '2024-04-27_00:00:00',
interval_seconds = 10800,
io_form_geogrid = 2,
debug_level = 0,
/

&geogrid
/

&ungrib
out_format = 'WPS',
prefix = 'GFS',
/

&metgrid
/
```

gfs.t00z.pgrb2.0p25.f000.2024042700.grib2

link_grib.csh

Standardizes the file name of the input for pre-processing

GRIBFILE.AAA

Getting the variable to create initial condition for MONAN

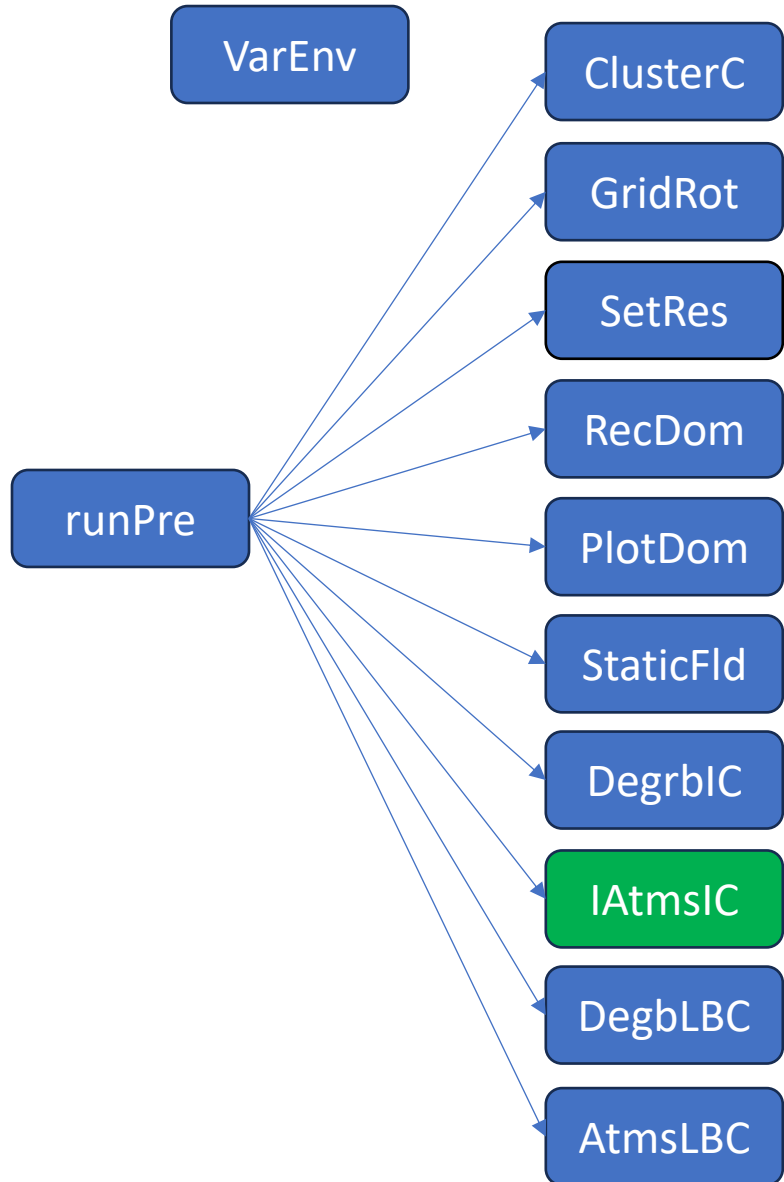
mpirun -np 1 ./ungrib.exe

/mnt/beegfs/aluno##/monan_regional/YYYYMMDDHH/pre/runs/GFS/

FILE:2024-04-27_00



runPre.bash



```
source scripts/VarEnvironmental.bash
source scripts/Function_SetClusterConfig.bash
source scripts/Function_GridRotate.bash
source scripts/Function_SetResolution.bash
source scripts/Function_RecDomain.bash
source scripts/Function_PlotDomain.bash
source scripts/Function_Static.sh
source scripts/Function_Degrib_IC_GFS.bash
source scripts/Function_InitAtmos_IC_GFS.bash
source scripts/Function_Degrib_LBC_GFS.bash
source scripts/Function_InitAtmos_LBC_GFS.bash
```



source scripts/Function_InitAtmos_IC_GFS.bash

more streams.init_atmosphere.TEMPLATE.regional

FILE3:2024-04-27_00

su1.535554.static.nc

```
<streams>
<immutable_stream name="input"
  type="input"
  filename_template="#x1#.RESNPTS.static.nc"
  input_interval="initial_only" />

<immutable_stream name="output"
  type="output"
  filename_template="#x1#.RESNPTS.init.nc"
  packages="initial_conds"
  output_interval="initial_only" />

<immutable_stream name="surface"
  type="output"
  filename_template="#x1#.RESNPTS.sfc_update.nc"
  filename_interval="none"
  packages="sfc_update"
  output_interval="86400" />

</streams>
```

"Interpolation of the variables of the initial condition to the resolution of the Voronoi mesh"

mpirun -np \$SLURM_NTASKS -env UCX_NET_DEVICES=mlx5_0:1 -genval1 ./init_atmosphere_model

su1.1024002.init.nc



```
&nhyd_model
  config_init_case = 7          ! creating a real-data initial conditions
  file
    config_start_time = '#LABELI#'
    config_stop_time = '#LABELI#'
    config_theta_adv_order = 3
    config_coef_3rd_order = 0.25
  /
&dimensions
  config_nvertlevels = 55 !number of vertical levels to be used in MPAS
  config_nsoillevels = 4  !number of soil layers to be used in MPAS
  config_nfglevels = 38   !number of vertical levels in intermediate file
  config_nfgsoillevels = 4 !number of soil layers in intermediate file
/
&data_sources
  config_geog_data_path = '#GEODAT#'
  config_met_prefix = 'FILE3'
  config_sfc_prefix = 'SST'
  config_fg_interval = 86400
  config_landuse_data = 'MODIFIED_IGBP_MODIS_NOAH'
  config_topo_data = 'GMTED2010'
  config_use_spechumd = true
/
&vertical_grid
  config_ztop = 30000.0          !model top height (m)
  config_nsmterrain = 1          !number of smoothing passes for
  terrain
    config_smooth_surfaces = true !whether to smooth zeta surface
    config_dzmin = 0.3
    config_nsm = 30
    config_tc_vertical_grid = true
    config_blend_bdy_terrain = true
  /
```

source scripts/Function_InitAtmos_IC_GFS.bash

FILE3:2024-04-27_00

Sul.535554.static.nc

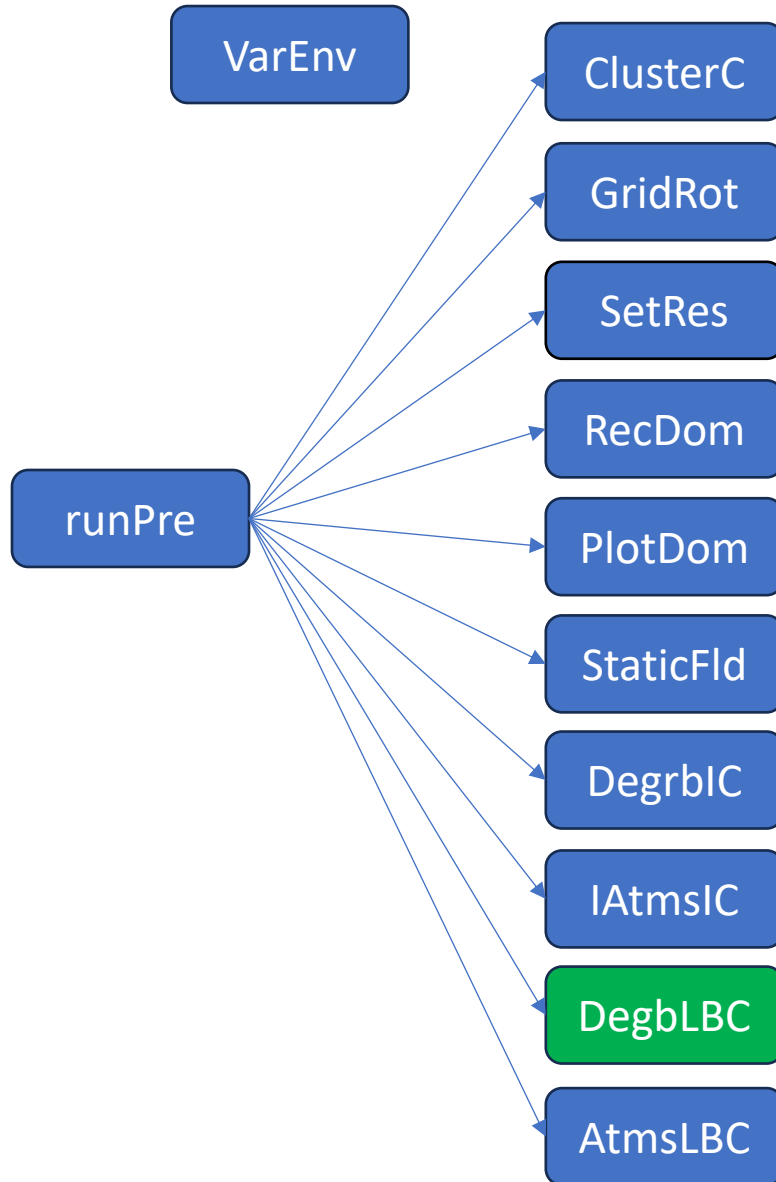
"Interpolation of the variables of the initial condition to the resolution of the Voronoi mesh"

mpirun -np \$SLURM_NTASKS -env UCX_NET_DEVICES=m1x5_0:1 -genval1 ./init_atmosphere_model

/mnt/beegfs/aluno##/monan_regional/YYYYMMDDHH/pre/runs/GFS/

Sul.1024002.init.nc

time mpirun -np \$SLURM_NTASKS -env UCX_NET_DEVICES=m1x5_0:1 -genval1 ./init_atmosphere_model



```
source scripts/VarEnvironmental.bash
source scripts/Function_SetClusterConfig.bash
source scripts/Function_GridRotate.bash
source scripts/Function_SetResolution.bash
source scripts/Function_RecDomain.bash
source scripts/Function_PlotDomain.bash
source scripts/Function_Static.sh
source scripts/Function_Degrib_IC_GFS.bash
source scripts/Function_InitAtmos_IC_GFS.bash
source scripts/Function_Degrib_LBC_GFS.bash
source scripts/Function_InitAtmos_LBC_GFS.bash
```



source scripts/Function_Degrib_LBC_GFS.bash

gfs.t00z.pgrb2.0p25.f000.*****.grib2

more namelist.wps

```
&share
wrf_core = 'ARW',
max_dom = 1,
start_date = '2024-04-27_00:00:00',
end_date   = '2024-05-01_00:00:00',
interval_seconds = 10800,
io_form_geogrid = 2,
debug_level = 0,
/
&geogrid
/
&ungrib
out_format = 'WPS',
prefix = 'GFS',
/
&metgrid
/
```

link_grib.csh

Standardizes the file name of the input for pre-processing

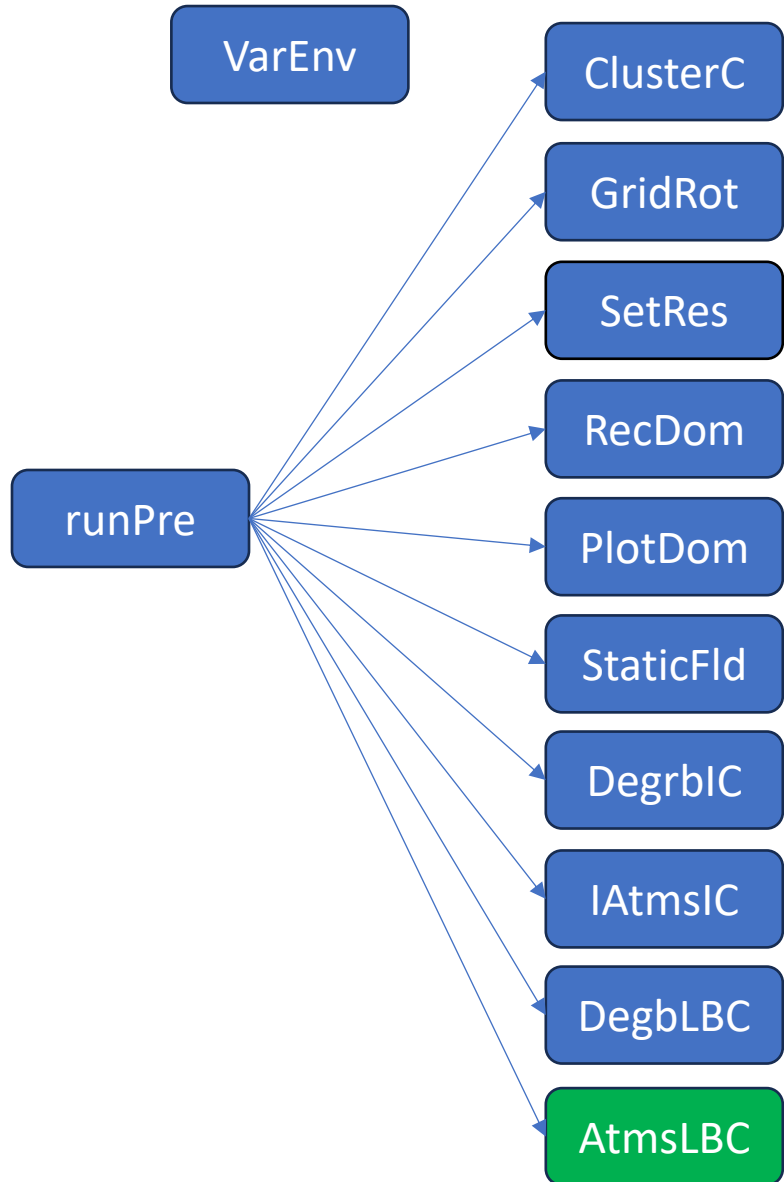
GRIBFILE.***

mpirun -np 1 ./ungrib.exe

Getting the variable to create boundary condition for MONAN

/mnt/beegfs/aluno##/monan_regional/YYYYMMDDHH/pre/runs/GFS/

```
FILE:2024-04-27_00 FILE:2024-04-27_03 FILE:2024-04-27_06 FILE:2024-04-27_09 FILE:2024-04-27_12 FILE:2024-04-27_15
FILE:2024-04-27_18 FILE:2024-04-27_21 FILE:2024-04-28_00 FILE:2024-04-28_03 FILE:2024-04-28_06 FILE:2024-04-28_09
FILE:2024-04-28_12 FILE:2024-04-28_15 FILE:2024-04-28_18 FILE:2024-04-28_21 FILE:2024-04-29_00 FILE:2024-04-29_03
FILE:2024-04-29_06 FILE:2024-04-29_09 FILE:2024-04-29_12 FILE:2024-04-29_15 FILE:2024-04-29_18 FILE:2024-04-29_21
FILE:2024-04-30_00 FILE:2024-04-30_03 FILE:2024-04-30_06 FILE:2024-04-30_09 FILE:2024-04-30_12 FILE:2024-04-30_15
FILE:2024-04-30_18 FILE:2024-04-30_31 FILE:2024-05-01_00
```

```
source scripts/VarEnvironmental.bash
source scripts/Function_SetClusterConfig.bash
source scripts/Function_GridRotate.bash
source scripts/Function_SetResolution.bash
source scripts/Function_RecDomain.bash
source scripts/Function_PlotDomain.bash
source scripts/Function_Static.sh
source scripts/Function_Degrib_IC_GFS.bash
source scripts/Function_InitAtmos_IC_GFS.bash
source scripts/Function_Degrib_LBC_GFS.bash
source scripts/Function_InitAtmos_LBC_GFS.bash
```



more streams.init_atmosphere.LBC.regional

```
<streams>
<immutable_stream name="input"
  type="input"
  filename_template="#x1#. #RESNPTS#.init.nc"
  input_interval="initial_only" />

<immutable_stream name="lbc"
  type="output"
  filename_template="lbc.$Y-$M-$D_$h.$m.$s.nc"
  filename_interval="output_interval"
  packages="lbc"
  output_interval="3:00:00" />

</streams>
```

/mnt/beegfs/aluno##/monan_regional/YYYYMMDDHH/pre/runs/GFS/

```
FILE:2024-04-27_00 FILE:2024-04-27_03 FILE:2024-04-27_06 FILE:2024-04-27_09
FILE:2024-04-27_12 FILE:2024-04-27_15 FILE:2024-04-27_18 FILE:2024-04-27_21
FILE:2024-04-28_00 FILE:2024-04-28_03 FILE:2024-04-28_06 FILE:2024-04-28_09
FILE:2024-04-28_12 FILE:2024-04-28_15 FILE:2024-04-28_18 FILE:2024-04-28_21
FILE:2024-04-29_00 FILE:2024-04-29_03 FILE:2024-04-29_06 FILE:2024-04-29_09
FILE:2024-04-29_12 FILE:2024-04-29_15 FILE:2024-04-29_18 FILE:2024-04-29_21
FILE:2024-04-30_00 FILE:2024-04-30_03 FILE:2024-04-30_06 FILE:2024-04-30_09
FILE:2024-04-30_12 FILE:2024-04-30_15 FILE:2024-04-30_18 FILE:2024-04-30_31
FILE:2024-05-01_00
```

time mpirun -np \$SLURM_NTASKS -env UCX_NET_DEVICES=mlx5_0:1 -genval1 ./init_atmosphere_model



more namelist.init_atmosphere.LBC.regional

```
&nhyd_model
  config_init_case = 9          ! the LBCs processing case
  config_start_time = '#LABELI#'
  config_stop_time = '#LABELF#'
  config_theta_adv_order = 3
  config_coef_3rd_order = 0.25
/
&dimensions
  config_nvertlevels = 55      !number of vertical levels to be used in MPAS
  config_nsoillevels = 4       !number of soil layers to be used in MPAS
  config_nfglevels = 38       !number of vertical levels in intermediate file
  config_nfgsoillevels = 4     !number of soil layers in intermediate file
/
&data_sources
  config_geog_data_path = '#GEODAT#'
  config_met_prefix = 'GFS'
  config_sfc_prefix = 'SST'
  config_fg_interval = 10800
  config_landuse_data = 'MODIFIED_IGBP_MODIS_NOAH'
  config_topo_data = 'GMTED2010'
  config_use_spechumd = true
/
&vertical_grid
  config_ztop = 30000.0        !model top height (m)
  config_nsmterrain = 1        !number of smoothing passes for terrain
  config_smooth_surfaces = true !whether to smooth zeta surfaces
  config_dzmin = 0.3
  config_nsm = 30
  config_tc_vertical_grid = true
  config_blend_bdy_terrain = true
/
```

```
&interpolation_control
  config_extrap_airtemp = 'linear'
/
&preproc_stages
  config_static_interp = false      !only static files
  config_native_gwd_static = false  !only static files
  config_vertical_grid = true       !only these three stages should be enabled
  config_met_interp = true          !only these three stages should be enabled
  config_input_sst = false          !only sst files
  config_frac_seaice = true         !only these three stages should be enabled
/
&io
  config_pio_num_iotasks = 0
  config_pio_stride = 1
/
```

time mpirun -np \$SLURM_NTASKS -env UCX_NET_DEVICES=m1x5_0:1 -genval1 ./init_atmosphere_model



/mnt/beegfs/aluno##/monan_regional/YYYYMMDDHH/pre/runs/GFS/

```
FILE:2024-04-27_00 FILE:2024-04-27_03 FILE:2024-04-27_06 FILE:2024-04-27_09
FILE:2024-04-27_12 FILE:2024-04-27_15 FILE:2024-04-27_18 FILE:2024-04-27_21
FILE:2024-04-28_00 FILE:2024-04-28_03 FILE:2024-04-28_06 FILE:2024-04-28_09
FILE:2024-04-28_12 FILE:2024-04-28_15 FILE:2024-04-28_18 FILE:2024-04-28_21
FILE:2024-04-29_00 FILE:2024-04-29_03 FILE:2024-04-29_06 FILE:2024-04-29_09
FILE:2024-04-29_12 FILE:2024-04-29_15 FILE:2024-04-29_18 FILE:2024-04-29_21
FILE:2024-04-30_00 FILE:2024-04-30_03 FILE:2024-04-30_06 FILE:2024-04-30_09
FILE:2024-04-30_12 FILE:2024-04-30_15 FILE:2024-04-30_18 FILE:2024-04-30_31
FILE:2024-05-01_00
```

```
time mpirun -np $SLURM_NTASKS -env UCX_NET_DEVICES=mlx5_0:1 -genval1 ./init_atmosphere_model
```

/mnt/beegfs/aluno##/monan_regional/YYYYMMDDHH/pre/runs/GFS/

1bc.2024-04-27_21.00.00.nc	1bc.2024-04-29_12.00.00.nc	1bc.2024-04-28_00.00.00.nc	1bc.2024-04-29_15.00.00.nc
1bc.2024-04-28_03.00.00.nc	1bc.2024-04-29_18.00.00.nc	1bc.2024-04-28_06.00.00.nc	1bc.2024-04-29_21.00.00.nc
1bc.2024-04-28_09.00.00.nc	1bc.2024-04-30_00.00.00.nc	1bc.2024-04-28_12.00.00.nc	1bc.2024-04-30_03.00.00.nc
1bc.2024-04-27_00.00.00.nc	1bc.2024-04-28_15.00.00.nc	1bc.2024-04-30_06.00.00.nc	1bc.2024-04-27_03.00.00.nc
1bc.2024-04-28_18.00.00.nc	1bc.2024-04-30_09.00.00.nc	1bc.2024-04-27_06.00.00.nc	1bc.2024-04-28_21.00.00.nc
1bc.2024-04-30_12.00.00.nc	1bc.2024-04-27_09.00.00.nc	1bc.2024-04-29_00.00.00.nc	1bc.2024-04-30_15.00.00.nc
1bc.2024-04-27_12.00.00.nc	1bc.2024-04-29_03.00.00.nc	1bc.2024-04-30_18.00.00.nc	1bc.2024-04-27_15.00.00.nc
1bc.2024-04-29_06.00.00.nc	1bc.2024-04-30_21.00.00.nc	1bc.2024-04-27_18.00.00.nc	1bc.2024-04-29_09.00.00.nc
1bc.2024-05-01_00.00.00.nc			



Step 9 – Execute Model Scripts Control

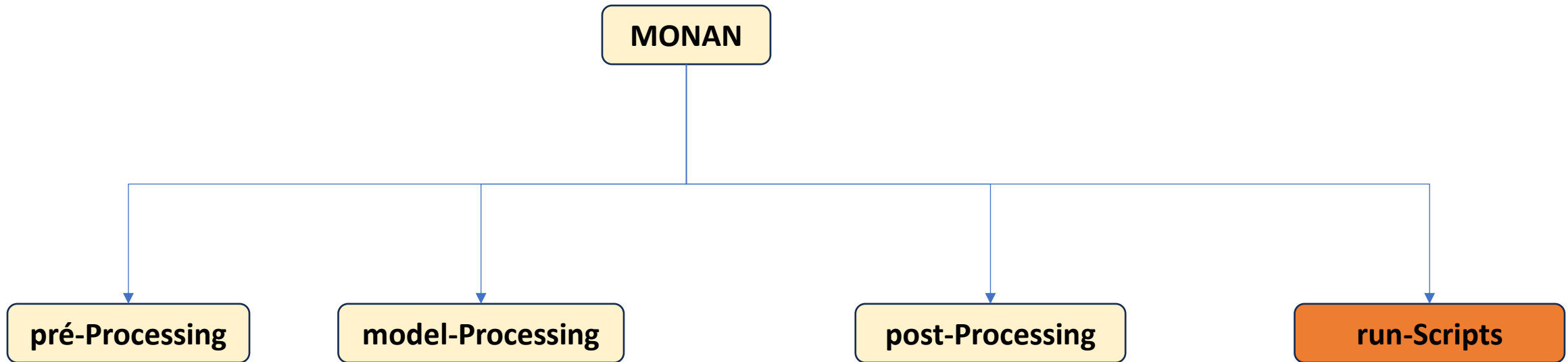


```
[aluno##@egeon-login1 run]$ pwd  
/mnt/beegfs/aluno##/monan_regional/run
```

check the directory



Execution Control



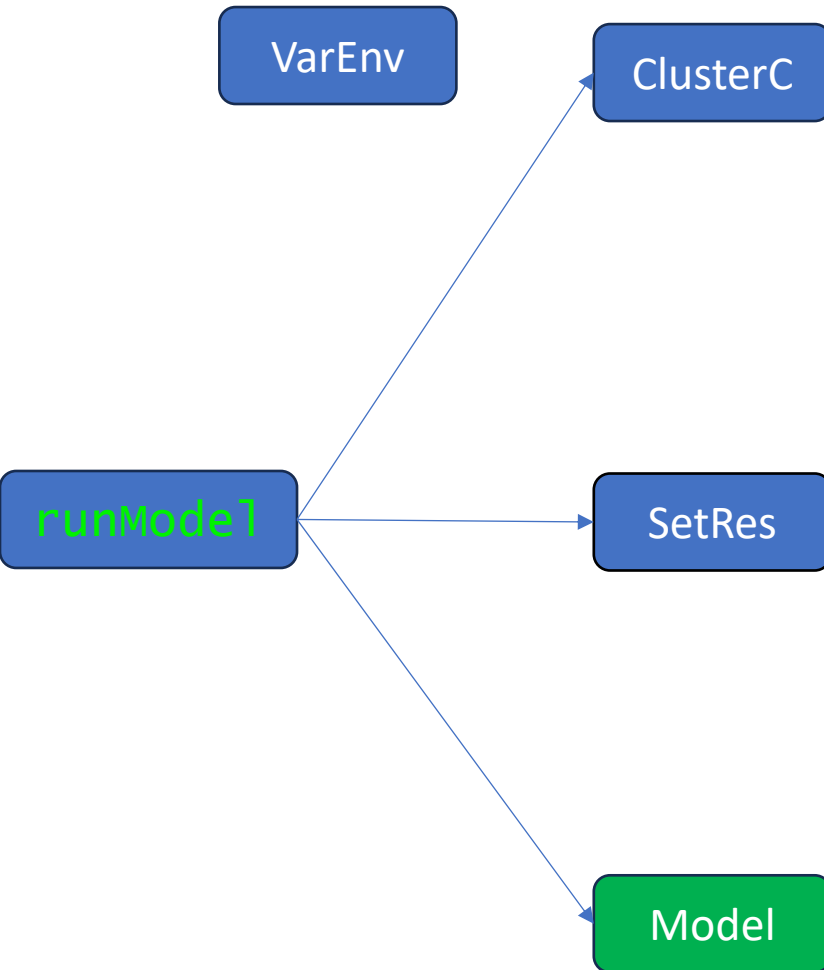
```
[aluno##@egeon-login1 run]$ ls
```

check the files

```
copy_data.bash      runModel.bash      scripts      readme
load_monan_app_modules.sh  runPost.bash      runPre.bash
```



runModel.bash



```
source scripts/VarEnvironmental.bash
source scripts/Function_SetClusterConfig.bash
source scripts/Function_SetResolution.bash
source scripts/Function_RunModel.bash
```



Step 9 – Execute Model Scripts Control



```
[aluno##@egeon-login1 run]$ pwd  
/mnt/beegfs/aluno##/monan_regional/run
```

check the directory

```
[aluno##@egeon-login1 run]$ ./runModel.bash
```

Execute the script without
passing the arguments

```
[aluno##@egeon-login1 run]$ ./runModel.bash  
.....  
.....  
.....  
.
```

check the information



Step 9 – Execute Model Scripts Control

runModel.bash



./runModel.bash

```
+ '[' -z '' ']'
+ case "$-" in
+ __lmod_vx=x
+ '[' -n x ']'
+ set +x
Shell debugging temporarily silenced: export LMOD_SH_DBG_ON=1 for this output (/opt/ohpc/admin/lmod/lmod/init/bash)
Shell debugging restarted
+ unset __lmod_vx
+ '[' 0 -ne 7 ']'
+ usage
+ sed -n '/^# !CALLING SEQUENCE:/,/^# !/{p}' ./runModel.bash
+ head -n -1
# !CALLING SEQUENCE:
#
# ./runModel.bash  ${EXP_NAME} ${EXP_RES}  ${LABELI}  ${LABELF}  ${Domain}  ${AreaRegion}  ${TypeGrid}
#
#          o EXP_NAME    : Forcing: ERA5, CFSR, GFS, etc.
#          o EXP_RES     : mesh npts : 535554 etc
#          o LABELI      : Initial: date 2015030600
#          o LABELF      : End: date 2015030600
#          o Domain      : Domain: global or regional
#          o AreaRegion  : PortoAlegre, Belem, global
#          o TypeGrid    : quasi_uniform or variable_resolution
#
# For benchmark:
#
# ./runModel.bash    GFS    2621442    2024042700    2024050100    regional    Su1    quasi_uniform
# ./runModel.bash    GFS    1024002    2024042700    2024050100    regional    Su1    quasi_uniform
#
#
# ./runModel.bash    GFS    535554    2024042700    2024050100    regional    Su1    variable_resolution
# ./runModel.bash    GFS    163842    2024042700    2024050100    regional    Su1    variable_resolution
#
```



Step 9 – Execute Model Scripts Control

```
[aluno##@egeon-login1 run]$ ./runModel.bash GFS 163842 2024042700 2024050100 regional Peru variable_resolution
```



Sul
Nordeste
Norte
Sudeste
CentroOeste
Peru
Argentina

```
$ more Peru.ellipse.pts
```

```
Name: Peru  
Type: ellipse  
Point: -12.0431800, -77.0282400  
Semi-major-axis: 1000000      # Raio at Meters  
Semi-minor-axis: 1000000      # Raio at Meters  
Orientation-angle: 45
```



Step 9 – Execute Model Scripts Control



```
[aluno##@egeon-login1 run]$ ./runModel.bash GFS 163842 2024042700 2024050100 regional Argentina variable_resolution
```



Sul
Nordeste
Norte
Sudeste
CentroOeste
Peru
Argentina

```
$ more Argentina.ellipse.pts
```

```
Name: Argentina  
Type: ellipse  
Point: -36.6203, -64.2906  
Semi-major-axis: 1000000 # Raio at Meters  
Semi-minor-axis: 1000000 # Raio at Meters  
Orientation-angle: 45
```



&physics

```

config_sst_update = false          ! if updating sea-ice and SST with an surface.nc file,
                                   ! set to true, and edit the 'surface' stream in the
                                   ! streams.atmosphere file accordingly

config_sstdiurn_update = false
config_deepsoiltemp_update = false
config_radtlw_interval = '00:30:00' !time interval between calls to parameterization of long-wave radiation 'DD_HH:MM:SS' or 'none' (default: 00_00:30:00)
config_radtsw_interval = '00:30:00' !time interval between calls to parameterization of short-wave radiation 'DD_HH:MM:SS' or 'none' (default: 00_00:30:00)
config_pbl_interval = 'none'        !time interval between calls to parameterization of pbl layer (hidden by default) 'DD_HH:MM:SS' or 'none' (default: none)
config_conv_interval = 'none'       !time interval between calls to parameterization of convection (hidden by default) 'DD_HH:MM:SS' or 'none' (default: none)
config_camrad_abs_update = '06:00:00' !time interval between updates of absorption/emission coeffs in CAM rad (hidden by default) 'DD_HH:MM:SS' or 'none' (default:
                                   !06:00:00)

config_greeness_update = '24:00:00' !time interval between updates of greeness fraction (hidden by default) 'DD_HH:MM:SS' or 'none' (default: 24:00:00)
config_bucket_update = '00:05:00'  !time interval between updates of accumulated rain and radiation diagnostics 'DD_HH:MM:SS' or 'none' (default: none)
config_physics_suite = 'mesoscale_reference' !Choice of physics suite 'mesoscale_reference','convection_permitting','none' (default:mesoscale_reference)
config_microp_scheme = 'mp_wsm6'    !configuration for cloud microphysics schemes (hidden by default)
                                   ! 'suite','mp_wsm6','mp_thompson','mp_kessler','off' (default: suite)

config_convection_scheme = 'cu_grell_freitas' !configuration for convection schemes (hidden by default)
                                   ! 'suite','cu_kain_fritsch','cu_tiedtke','cu_ntiedtke','cu_grell_freitas','off' (default: suite)

config_radt_cld_scheme = 'suite'      !configuration for calculation of horizontal cloud fraction (hidden by default)
                                   ! 'suite','cld_fraction','cld_incidence' (default: suite)

config_radt_lw_scheme = 'suite'       !configuration for long-wave radiation schemes (hidden by default)
                                   ! 'suite','rrtmg_lw','cam_lw','off' (default: suite)

config_radt_sw_scheme = 'suite'       !configuration for short-wave radiation schemes (hidden by default)
                                   ! 'suite','rrtmg_sw','cam_sw','off' (default: suite)

config_lsm_scheme = 'suite'           !configuration for land-surface schemes (hidden by default)
                                   ! 'suite','noah','off' (default: suite)

config_gwdo_scheme = 'suite'          !configuration of gravity wave drag over orography (hidden by default)
                                   ! 'suite','bl_yso_gwdo','off' (default: suite)

config_sfclayer_scheme = 'sf_monin_obukhov' !configuration for surface layer-scheme (hidden by default)
                                   ! 'suite','sf_monin_obukhov','sf_mynn','off' (default: suite)

config_pbl_scheme = 'bl_mynn'         ! 'suite' !configuration for planetary boundary layer schemes (hidden by default)
                                   ! 'suite','bl_yso','bl_mynn','off' (default: suite)

```



(base) [paulo.kubota@egeon-login1 GFS]\$ more streams.atmosphere

```
<streams>
<immutable_stream name="input"
  type="input"
  filename_template="Su1.1024002.init.nc"
  input_interval="initial_only" />
<immutable_stream name="restart"
  type="input;output"
  filename_template="restart.$Y-$M-$D_$h.$m.$s.nc"
  input_interval="initial_only"
  output_interval="1_00:00:00" />
<stream name="output"
  type="output"
  filename_template="history.$Y-$M-$D_$h.$m.$s.nc"
  output_interval="24:00:00" >

  <file name="stream_list.atmosphere.output"/>
</stream>
<stream name="diagnostics"
  type="output"
  filename_template="diag.$Y-$M-$D_$h.$m.$s.nc"
  output_interval="1:00:00" >

  <file name="stream_list.atmosphere.diagnostics"/>
</stream>
<immutable_stream name="iau"
  type="input"
  filename_template="Su1.1024002.AmB.$Y-$M-$D_$h.$m.$s.nc"
  filename_interval="none"
  packages="iau"
  input_interval="initial_only" />
<immutable_stream name="lbc_in"
  type="input"
  filename_template="lbc.$Y-$M-$D_$h.$m.$s.nc"
  filename_interval="input_interval"
  packages="limited_area"
  input_interval="3:00:00" />

</streams>
```



runModel.bash



Group-1

```
[aluno##@egeon-login1 run]$./runModel.bash GFS 163842 2024042700 2024050100 regional sul variable_resolution
```

Group-2

```
[aluno##@egeon-login1 run]$./runModel.bash GFS 163842 2024042700 2024050100 regional Sudeste variable_resolution
```

Group-3

```
[aluno##@egeon-login1 run]$./runModel.bash GFS 163842 2024042700 2024050100 regional Nordeste variable_resolution
```

Group-4

```
[aluno##@egeon-login1 run]$./runModel.bash GFS 163842 2024042700 2024050100 regional Norte variable_resolution
```

Group-5

```
[aluno##@egeon-login1 run]$./runModel.bash GFS 163842 2024042700 2024050100 regional CentroOeste variable_resolution
```

Group-6

```
[aluno##@egeon-login1 run]$./runModel.bash GFS 163842 2024042700 2024050100 regional Peru variable_resolution
```

Group-7

```
[aluno##@egeon-login1 run]$./ runModel.bash GFS 163842 2024042700 2024050100 regional Argentina variable_resolution
```



runModel.bash



streams.atmosphere

namelist.atmosphere

Sul.1024002.init.nc

1bc.2024-04-27_21.00.00.nc

```
time mpirun -np $SLURM_NTASKS -env UCX_NET_DEVICES=mlx5_0:1 -genval1 ./atmosphere_model
```

/mnt/beegfs/[aluno##](#)/monan_regional/YYYYMMDDHH/model/runs/GFS/

diag.2024-04-27_00.00.00.nc	diag.2024-04-28_02.00.00.nc	diag.2024-04-29_04.00.00.nc	diag.2024-04-30_06.00.00.nc
diag.2024-04-27_01.00.00.nc	diag.2024-04-28_03.00.00.nc	diag.2024-04-29_05.00.00.nc	diag.2024-04-30_07.00.00.nc
diag.2024-04-27_02.00.00.nc	diag.2024-04-28_04.00.00.nc	diag.2024-04-29_06.00.00.nc	diag.2024-04-30_08.00.00.nc
diag.2024-04-27_03.00.00.nc	diag.2024-04-28_05.00.00.nc	diag.2024-04-29_07.00.00.nc	diag.2024-04-30_09.00.00.nc
diag.2024-04-27_04.00.00.nc	diag.2024-04-28_06.00.00.nc	diag.2024-04-29_08.00.00.nc	diag.2024-04-30_10.00.00.nc
diag.2024-04-27_05.00.00.nc	diag.2024-04-28_07.00.00.nc	diag.2024-04-29_09.00.00.nc	diag.2024-04-30_11.00.00.nc
diag.2024-04-27_06.00.00.nc	diag.2024-04-28_08.00.00.nc	diag.2024-04-29_10.00.00.nc	diag.2024-04-30_12.00.00.nc
diag.2024-04-27_07.00.00.nc	diag.2024-04-28_09.00.00.nc	diag.2024-04-29_11.00.00.nc	diag.2024-04-30_13.00.00.nc
diag.2024-04-27_08.00.00.nc	diag.2024-04-28_10.00.00.nc	diag.2024-04-29_12.00.00.nc	diag.2024-04-30_14.00.00.nc
diag.2024-04-27_09.00.00.nc	diag.2024-04-28_11.00.00.nc	diag.2024-04-29_13.00.00.nc	diag.2024-04-30_15.00.00.nc
diag.2024-04-27_10.00.00.nc	diag.2024-04-28_12.00.00.nc	diag.2024-04-29_14.00.00.nc	diag.2024-04-30_16.00.00.nc
diag.2024-04-27_11.00.00.nc	diag.2024-04-28_13.00.00.nc	diag.2024-04-29_15.00.00.nc	diag.2024-04-30_17.00.00.nc
diag.2024-04-27_12.00.00.nc	diag.2024-04-28_14.00.00.nc	diag.2024-04-29_16.00.00.nc	diag.2024-04-30_18.00.00.nc
diag.2024-04-27_13.00.00.nc	diag.2024-04-28_15.00.00.nc	diag.2024-04-29_17.00.00.nc	diag.2024-04-30_19.00.00.nc
diag.2024-04-27_14.00.00.nc	diag.2024-04-28_16.00.00.nc	diag.2024-04-29_18.00.00.nc	diag.2024-04-30_20.00.00.nc
diag.2024-04-27_15.00.00.nc	diag.2024-04-28_17.00.00.nc	diag.2024-04-29_19.00.00.nc	diag.2024-04-30_21.00.00.nc
diag.2024-04-27_16.00.00.nc	diag.2024-04-28_18.00.00.nc	diag.2024-04-29_20.00.00.nc	diag.2024-04-30_22.00.00.nc
diag.2024-04-27_17.00.00.nc	diag.2024-04-28_19.00.00.nc	diag.2024-04-29_21.00.00.nc	diag.2024-04-30_23.00.00.nc
diag.2024-04-27_18.00.00.nc	diag.2024-04-28_20.00.00.nc	diag.2024-04-29_22.00.00.nc	diag.2024-05-01_00.00.00.nc
diag.2024-04-27_19.00.00.nc	diag.2024-04-28_21.00.00.nc	diag.2024-04-29_23.00.00.nc	history.2024-04-27_00.00.00.nc
diag.2024-04-27_20.00.00.nc	diag.2024-04-28_22.00.00.nc	diag.2024-04-30_00.00.00.nc	history.2024-04-28_00.00.00.nc
diag.2024-04-27_21.00.00.nc	diag.2024-04-28_23.00.00.nc	diag.2024-04-30_01.00.00.nc	history.2024-04-29_00.00.00.nc
diag.2024-04-27_22.00.00.nc	diag.2024-04-29_00.00.00.nc	diag.2024-04-30_02.00.00.nc	history.2024-04-30_00.00.00.nc
diag.2024-04-27_23.00.00.nc	diag.2024-04-29_01.00.00.nc	diag.2024-04-30_03.00.00.nc	history.2024-05-01_00.00.00.nc
diag.2024-04-28_00.00.00.nc	diag.2024-04-29_02.00.00.nc	diag.2024-04-30_04.00.00.nc	Sul.1024002.init.nc
diag.2024-04-28_01.00.00.nc	diag.2024-04-29_03.00.00.nc	diag.2024-04-30_05.00.00.nc	



Step 10 – Execute Post-processing Scripts Control



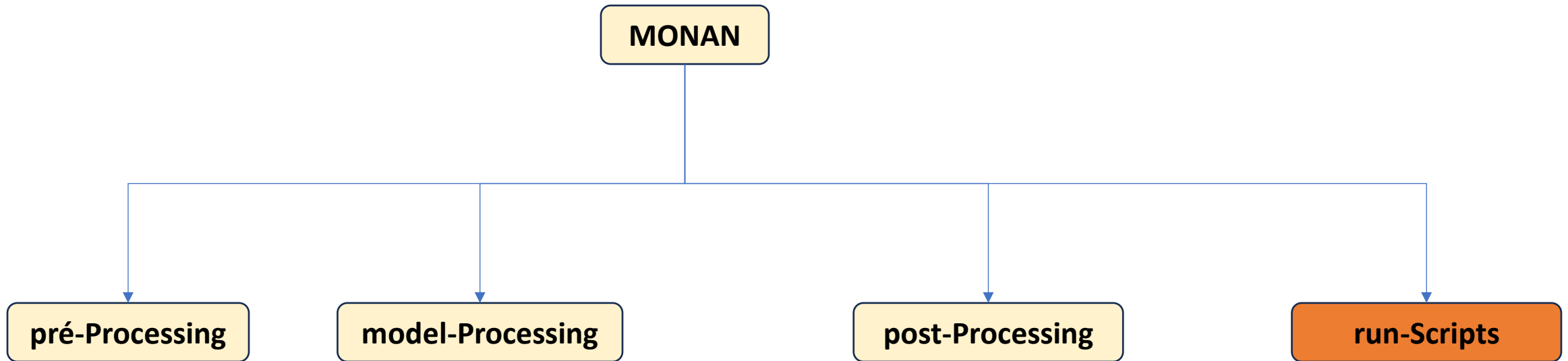
```
[aluno##@egeon-login1 run]$ pwd  
/mnt/beegfs/aluno##/monan_regional/run
```

check the directory



Step 10 – Execute Post-processing Scripts Control

Execution Control



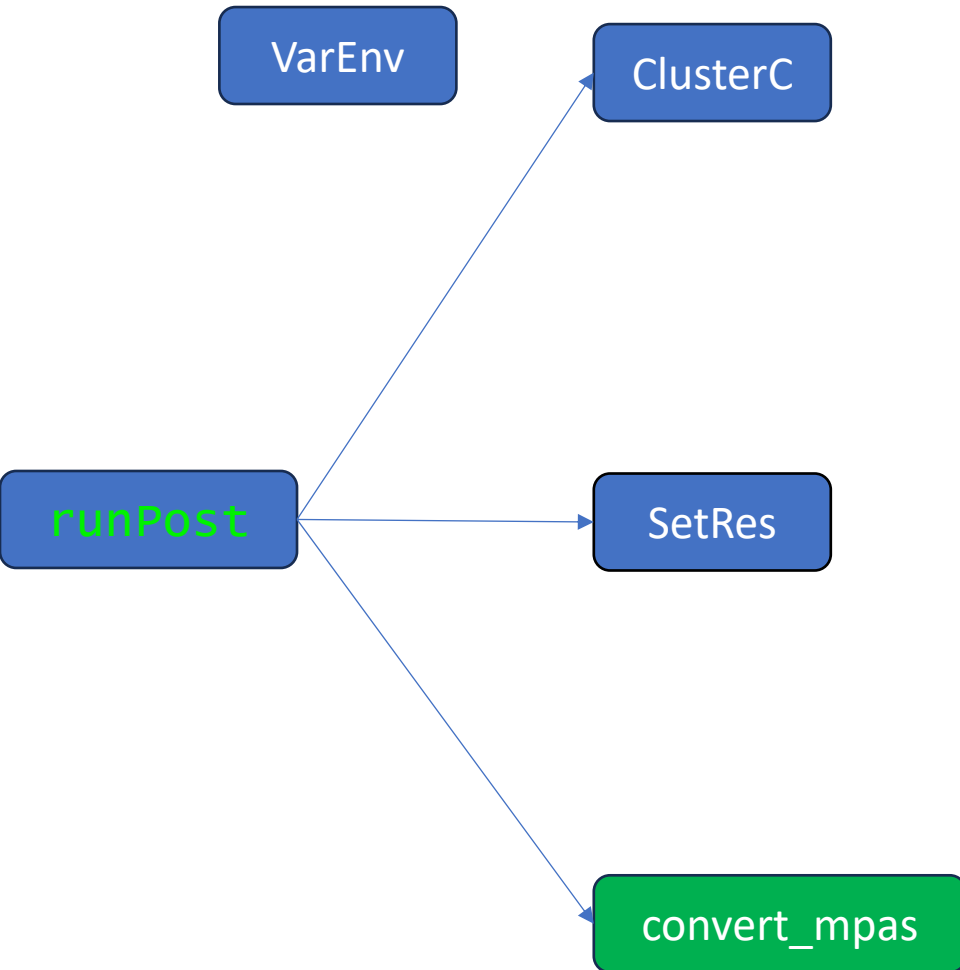
```
[aluno##@egeon-login1 run]$ ls
```

check the files

```
copy_data.bash      runModel.bash      scripts      readme
load_monan_app_modules.sh  runPost.bash      runPre.bash
```



runPost.bash



```
source scripts/VarEnvironmental.bash
source scripts/Function_SetClusterConfig.bash
source scripts/Function_SetResolution.bash
source scripts/Function_RunPost.bash
```



Step 10 – Execute Post-processing Scripts Control

```
[aluno##@egeon-login1 run]$ pwd
/mnt/beegfs/aluno##/monan_regional/run
```

check the directory

```
[aluno##@egeon-login1 run]$ ./runPost.bash
```

Execute the script without passing the arguments

```
[aluno##@egeon-login1 run]$ ./runPost.bash
.....
.....
.....
.
```

check the information



Step 10 – Execute Post-processing Scripts Control

runPost.bash



./runPost.bash

```
+ '[' 0 -ne 7 ']'
+ usage
+ sed -n '/^# !CALLING SEQUENCE:/,/^\# !/{p}' ./runPost.bash
+ head -n -1
# !CALLING SEQUENCE:
#
# ./runPost.bash ${EXP_NAME} ${EXP_RES} ${LABELI} ${LABELF} ${Domain} ${AreaRegion} ${TypeGrid}
#
#
# For GFS datasets
#
# ./runPost.bash GFS 535554 2024042700 2024050100 regional PortoAlegre variable_resolution
#
# o EXP_NAME : Forcing: ERA5, CFSR, GFS, etc.
# o EXP_RES : mesh npts : 535554 etc
# o LABELI : Initial: date 2015030600
# o LABELF : End: date 2015030600
# o Domain : Domain: global or regional
# o AreaRegion : PortoAlegre, Belem, global
# o TypeGrid : quasi_uniform or variable_resolution
#
#
# For benchmark:
#
#
# ./runPost.bash GFS 2621442 2024042700 2024050100 regional Su1 quasi_uniform
# ./runPost.bash GFS 1024002 2024042700 2024050100 regional Su1 quasi_uniform
#
#
# ./runPost.bash GFS 535554 2024042700 2024050100 regional Su1 variable_resolution
# ./runPost.bash GFS 163842 2024042700 2024050100 regional Su1 variable_resolution
#
+ exit 1
```



Step 10 – Execute Post-processing Scripts Control



```
[aluno##@egeon-login1 run]$ ./runPost.bash GFS 163842 2024042700 2024050100 regional Peru variable_resolution
```



Sul
Nordeste
Norte
Sudeste
CentroOeste
Peru
Argentina

```
$ more Peru.ellipse.pts
```

```
Name: Peru  
Type: ellipse  
Point: -12.0431800, -77.0282400  
Semi-major-axis: 1000000      # Raio at Meters  
Semi-minor-axis: 1000000     # Raio at Meters  
Orientation-angle: 45
```



Step 10 – Execute Post-processing Scripts Control



```
[aluno##@egeon-login1 run]$ ./runPost.bash GFS 163842 2024042700 2024050100 regional Argentina variable_resolution
```



Sul
Nordeste
Norte
Sudeste
CentroOeste
Peru
Argentina

```
$ more Argentina.ellipse.pts
```

```
Name: Argentina  
Type: ellipse  
Point: -36.6203, -64.2906  
Semi-major-axis: 1000000 # Raio at Meters  
Semi-minor-axis: 1000000 # Raio at Meters  
Orientation-angle: 45
```



Step 10 – Execute Post-processing Scripts Control

runPost.bash



```
$ more convert_mpas.nml
```

```
&config_convert_mpas  
  verticalCoord = 'Pressure'    ! 'MPAS_Model' or  
  'Pressure '  
  nVertLevels = 55  
  nOznLevels = 59  
  nMonths = 12  
  nSoilLevels = 4  
  nIsobaricLev= 27  
/
```

```
$ more target_domain
```

```
nlat = 220  
nlon = 220  
startlat = -11.5  
startlon = -58.5  
endlat = 10.5  
endlon = -38.5
```

```
exclude_Fields  
include_fields
```



Group-1

```
[aluno##@egeon-login1 run]$./runPost.bash GFS 163842 2024042700 2024050100 regional sul variable_resolution
```

Group-2

```
[aluno##@egeon-login1 run]$./runPost.bash GFS 163842 2024042700 2024050100 regional Sudeste variable_resolution
```

Group-3

```
[aluno##@egeon-login1 run]$./runPost.bash GFS 163842 2024042700 2024050100 regional Nordeste variable_resolution
```

Group-4

```
[aluno##@egeon-login1 run]$./runPost.bash GFS 163842 2024042700 2024050100 regional Norte variable_resolution
```

Group-5

```
[aluno##@egeon-login1 run]$./runPost.bash GFS 163842 2024042700 2024050100 regional CentroOeste variable_resolution
```

Group-6

```
[aluno##@egeon-login1 run]$./runPost.bash GFS 163842 2024042700 2024050100 regional Peru variable_resolution
```

Group-7

```
[aluno##@egeon-login1 run]$./runPost.bash GFS 163842 2024042700 2024050100 regional Argentina variable_resolution
```




Step 10 – Execute Post-processing Scripts Control

runPost.bash



/mnt/beegfs/aluno##/monan_regional/YYYYMMDDHH/model/runs/GFS/

```
diag.2024-04-27_00.00.00.nc  diag.2024-04-28_02.00.00.nc  diag.2024-04-29_04.00.00.nc  diag.2024-04-30_06.00.00.nc
diag.2024-04-27_01.00.00.nc  diag.2024-04-28_03.00.00.nc  diag.2024-04-29_05.00.00.nc  diag.2024-04-30_07.00.00.nc
diag.2024-04-27_02.00.00.nc  diag.2024-04-28_04.00.00.nc  diag.2024-04-29_06.00.00.nc  diag.2024-04-30_08.00.00.nc
diag.2024-04-27_03.00.00.nc  diag.2024-04-28_05.00.00.nc  diag.2024-04-29_07.00.00.nc  diag.2024-04-30_09.00.00.nc
diag.2024-04-27_04.00.00.nc  diag.2024-04-28_06.00.00.nc  diag.2024-04-29_08.00.00.nc  diag.2024-04-30_10.00.00.nc
diag.2024-04-27_05.00.00.nc  diag.2024-04-28_07.00.00.nc  diag.2024-04-29_09.00.00.nc  diag.2024-04-30_11.00.00.nc
diag.2024-04-27_06.00.00.nc  diag.2024-04-28_08.00.00.nc  diag.2024-04-29_10.00.00.nc  diag.2024-04-30_12.00.00.nc
.....
```

convert_mpas.nml

exclude_fields
include_fields

target_domain

```
time mpirun -np $SLURM_NTASKS -env UCX_NET_DEVICES=mlx5_0:1 -genvall ./convert_mpas
```

/mnt/beegfs/aluno##/monan_regional/YYYYMMDDHH/pos/runs/GFS/

```
MONAN_DIAG_R_POS_ERA5_2019052500_2019052500.mm.x4.163842L55.nc  MONAN_DIAG_R_POS_ERA5_2019052500_2019052513.mm.x4.163842L55.nc
MONAN_DIAG_R_POS_ERA5_2019052500_2019052501.mm.x4.163842L55.nc  MONAN_DIAG_R_POS_ERA5_2019052500_2019052514.mm.x4.163842L55.nc
MONAN_DIAG_R_POS_ERA5_2019052500_2019052502.mm.x4.163842L55.nc  MONAN_DIAG_R_POS_ERA5_2019052500_2019052515.mm.x4.163842L55.nc
MONAN_DIAG_R_POS_ERA5_2019052500_2019052503.mm.x4.163842L55.nc  MONAN_DIAG_R_POS_ERA5_2019052500_2019052516.mm.x4.163842L55.nc
MONAN_DIAG_R_POS_ERA5_2019052500_2019052504.mm.x4.163842L55.nc  MONAN_DIAG_R_POS_ERA5_2019052500_2019052517.mm.x4.163842L55.nc
MONAN_DIAG_R_POS_ERA5_2019052500_2019052505.mm.x4.163842L55.nc  MONAN_DIAG_R_POS_ERA5_2019052500_2019052518.mm.x4.163842L55.nc
```



Step 10 – Execute Post-processing Scripts Control

runPost.bash



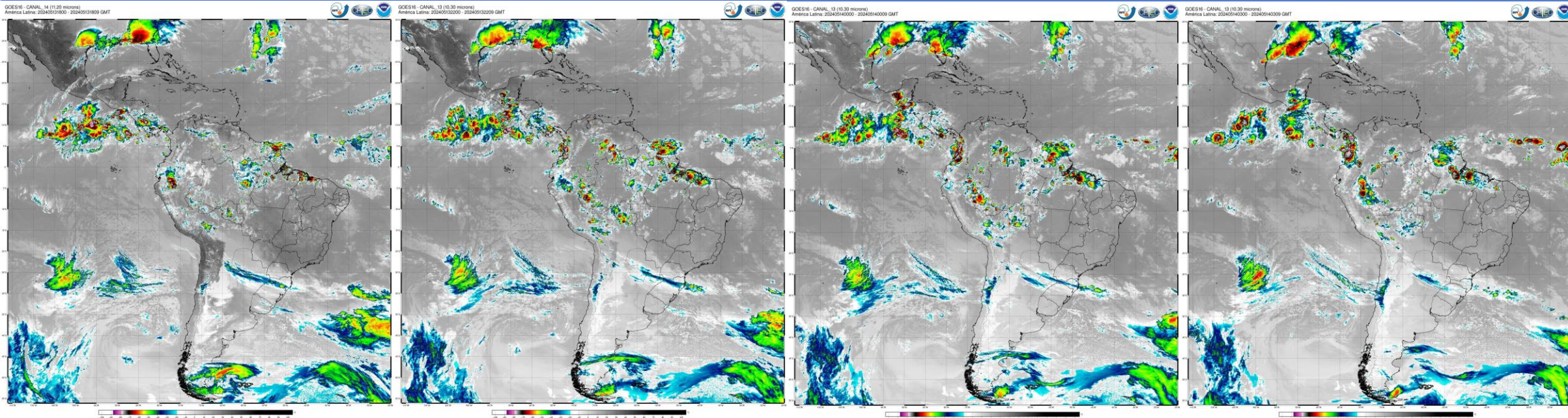
MONAN DIAG G MOD GFS YYYYMMDDHH yyymmddhh.mm.xRESL55.nc

--

Name of the model	: MONAN
Type of output table (frequency)	: DIAG, HISTORY, etc
Type for horizontal domain	: G for global; R for regional.
Type of model format available	: MOD for model, POS for post processed output files
Type of Initial condition source used	: GFS, ERA5, etc,
Initial condition date	: YYYYMMDDHH,
Forecast final date	: <u>yyymmddhh</u> ,
Resolution	: x1.1024002,
Number of levels	: 55.
File format	: .nc



runPost.bash

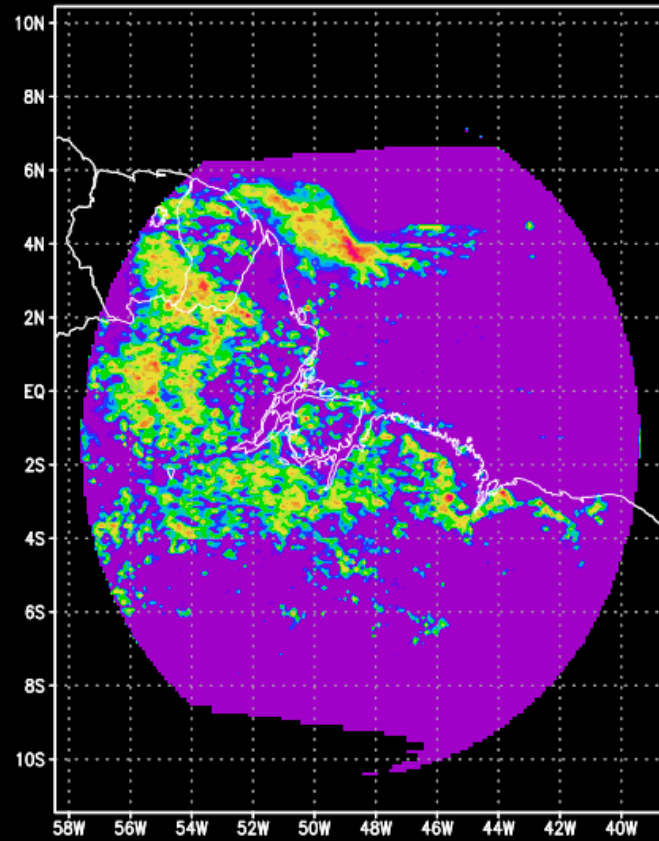




runPost.bash

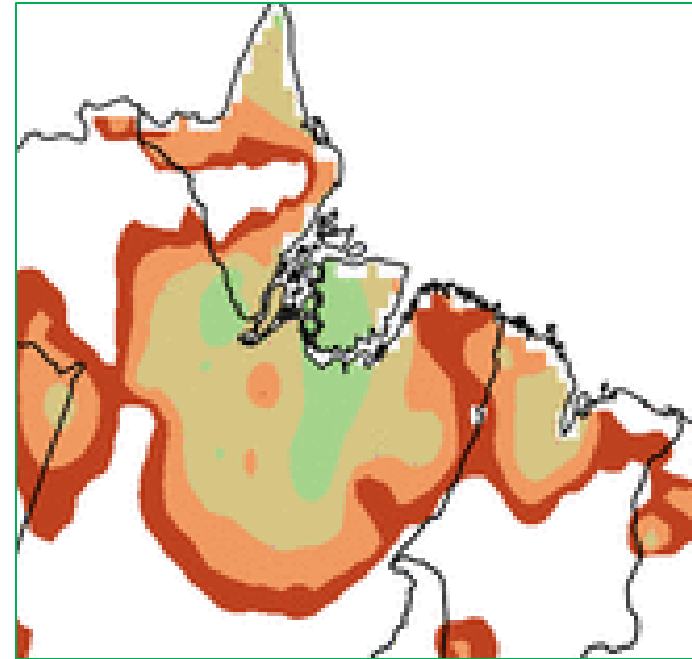


c/ conveccao profunda



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2024-05-27-14:19

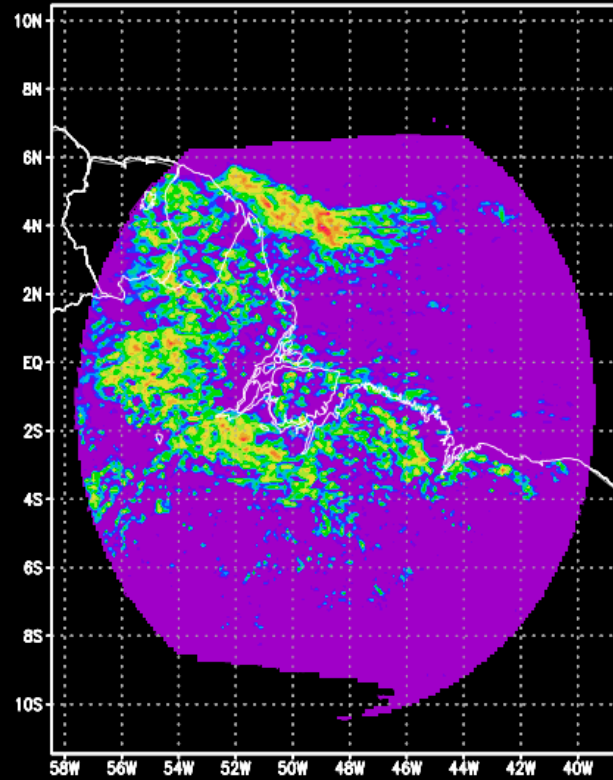




runPost.bash

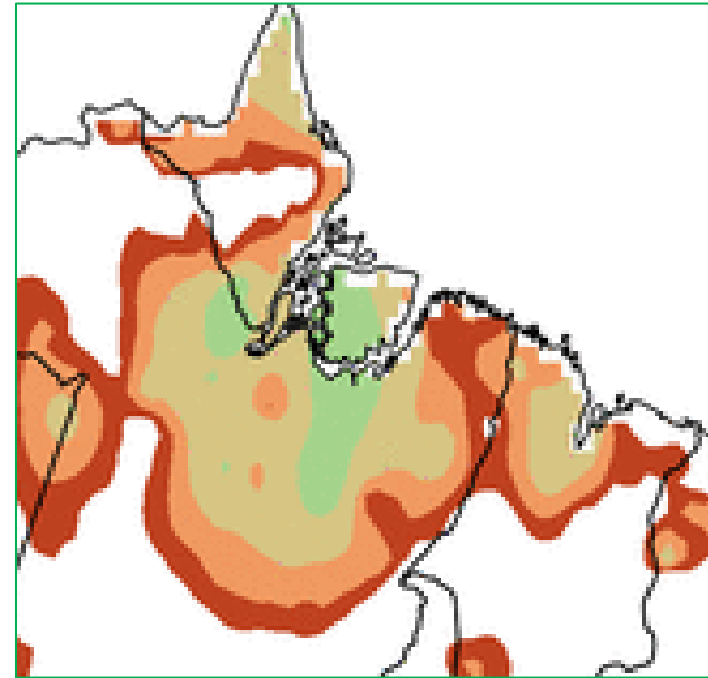


s/ conveccao profunda



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runModel.bash





Execution Control





Execution Control





Execution Control

