

Training Course : Real case

MesoNH Tutorial Class 12-15 November 2024

Presentation

Objectives :

- ▶ run a MESONH simulation in real case
- ▶ understand the different steps with 1 or 2 models
- ▶ discover and modify the namelists

Please :

Modify only what is asked in the namelists

Preparation

```
cd ~/MNH-V5-7-1/MY_RUN/KTEST
mkdir TP_CAS_REEL
cd TP_CAS_REEL
tar xvf ~/rodierq/tp_real_makefile.tar
export PREP_PGD_FILES=~/rodierq/PREP_PGD_FILES_WWW
```

For each new working terminal

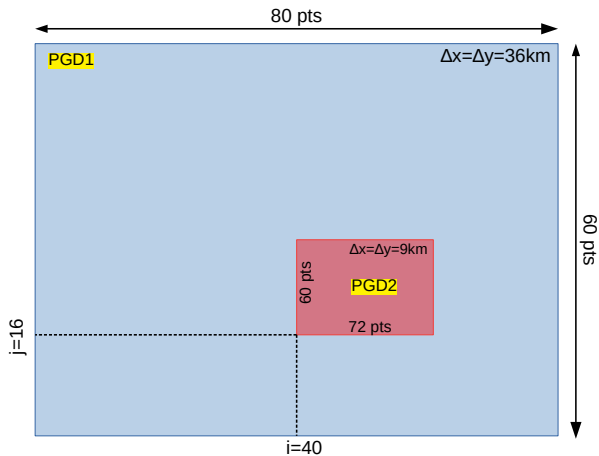
Load the profile :

```
source ~/MNH-V5-7-1/conf/profile_mesoh-LXgfortran-R8l4-
MNH-V5-7-1-MPIAUTO-DEBUG
```

Creation of all the PDG files

1. In the directory `001_pgd1`, run the step `PREP_PGD` to create the **dad's** PGD file named **PGD_36km** with :
 - ▶ a domain with 80 points in x-direction and 60 in y-direction
 - ▶ a mesh of 36 km in x and y
2. In the directory `002_pgd2`, run the step `PREP_PGD` to create the **son's** PGD file named **PGD_9km** with :
 - ▶ a domain with 72 points in x-direction and 60 in y-direction (number of points for the son's domain)
 - ▶ a mesh of 9 km in x and y
 - ▶ which start at point $i=40, j=16$ from dad's domain
3. In the directory `003_nest`, run the step `PREP_NEST_PGD`

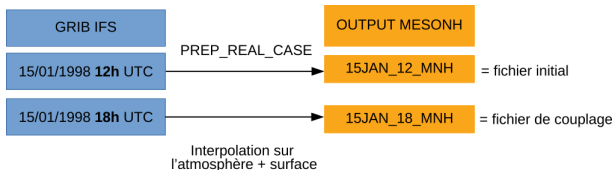
Creation of all the PGD files



Preparation of coupling files

The extraction of GRIB files is already done with `extractecmwf`. The files are in the directory `004_prep_real`

1. in the directory `004_prep_real` run the step `PREP_REAL_CASE` to make the initial file for dad's domain from the atmospheric file `ecmwf.El.19980115.12` named **15JAN_12_MNH**
2. run the step `PREP_REAL_CASE` to make the coupling file for dad's domain from the atmospheric file `ecmwf.El.19980115.18` named **15JAN_18_MNH**



Segment 1

We will now run the simulation with only one domain between 12h and 13h with a coupling file at 18h.

1. In the directory `005_run1`, modify the namelist in order to have :
 - ▶ 1 domain
 - ▶ 1 hour of simulation
 - ▶ 4 output files (every 15 minutes)
 - ▶ a time step of 100 s
 - ▶ the output files must be named : **16J36.1.SEG01.00n**
2. Run the MESONH simulation

Segment 2

1. In the directory `005_run1`, modify the namelist in order to restart the simulation for 1 hour. The output files must be named : **16J36.1.SEG02.00n**
2. Run the MESONH simulation

Segment 3

We will now run a simulation with the 2 domains between 14h and 15h.

We first create the initial file for son's domain.

1. In the directory `006_spa_mod1_mod2`, run the step SPAWNING (modify the namelist) to make the horizontal interpolation from the dad's domain to the child's domain at 14h (end of segment 2)
2. In the directory `007_preal`, modify the namelist in order to create the son's initial file named **15JAN_14_MNH2** (vertical interpolation after SPAWNING)

Segment 3

3. In the directory `008_run2`, modify the namelist in order to have :
 - ▶ 2 domains
 - ▶ 1 hour of simulation
 - ▶ 2 output files (every 30 minutes) for each domain
 - ▶ a time step of 100 seconds for the father and a ratio of 4 for the son
 - ▶ two-way interaction
 - ▶ the output files must be named : **16J36.1.SEG03.00n**
4. Run the MESONH simulation
5. In the directory `009_diag`, run the step DIAG on the files you want and plot some figures in `010_python`

Bonus

If you have finished early, here are some harder exercises.

3 domains

- ▶ add a 3rd domain located at the top-left of PGD1 with a 18km resolution (choose the domain size)
- ▶ run a simulation with the 3 domains for 2 hours starting at 12 UTC the 15/01/1998 with a frequency output of 1 hour.

Run domain 3 alone

- ▶ run a simulation with the domain 3 alone (coupled with domain 1 without grid-nesting) starting from the result of the previous simulation at **13** UTC the 15/01/1998 for one hour long