Wikiprint Book

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IPSLCM6 configurations

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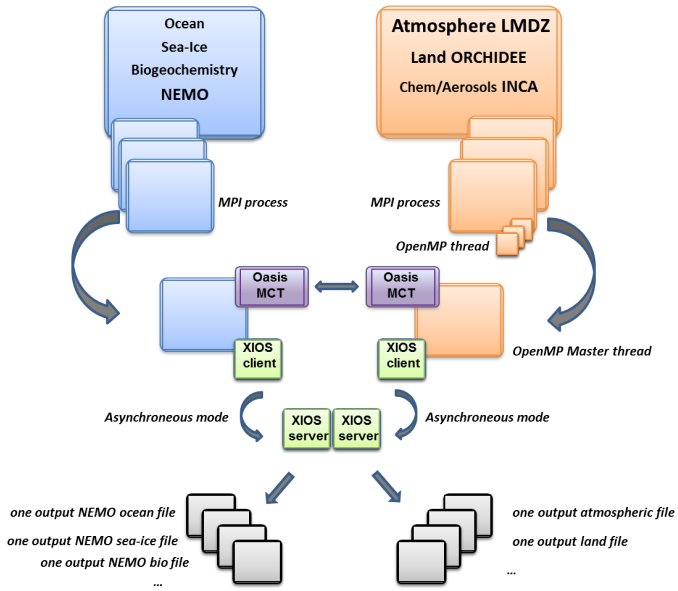
1. IPSLCM6 model

IPSLCM6 is **the IPSL coupled climate model** under development for the CMIP6 simulations including atmosphere, land, ocean, sea ice and carbon cycle. This model includes :

- model components :
  - **LMDZ** as atmospheric model ;
  - **NEMO** as ocean model including sea ice (LIM2/LIM3) and marine biogeochemistry (PISCES) ;
  - **ORCHIDEE** as land model ;
- tools :
  - **OASIS3-MCT** as parallel coupler ;
  - **XIOS** as I/O library ;
  - **libIGCM** as running environment (scripts) to run the model and to perform post processing ;

This model runs on **Curie-TGCC thin nodes**.



2. Resolutions and configurations

IPSLCM6 model will be available at different resolutions/configurations :

- **IPSLCM6A-VLR_rc0** : LMDZ(Old Physics) 96x95x39-ORCHIDEE (Choisnel) - NEMO-LIM2-PISCES ORCA2
- **IPSLCM6-LR** (under development, **not available**) : LMDZ 144x144x79-ORCHIDEE (CWRR) - NEMO-LIM3-PISCES eORCA1xL75

2.1. IPSLCM6A-LR_rc1

The resolution of LMDZ is 144x142 (2.5° in longitude and 1.5° in latitude) with 79 vertical levels. The ocean configuration is eORCA1L75 : global ocean with a tripolar grid with one South pole, one North pole above Siberia and one North pole above northern America. The resolution is 1°. In the tropical region, the latitudinal resolution decreases to 1/2°. There are 76 vertical levels, with 1m resolution near the surface, and 200m in the abyss.

For LMDZ, the new physics is used. Current test (Sept. 2015) is NP 5.17h.

IPSLCM6-VLR_rc1 is composed of following components and tools (Sept. 2015) :

```
#-H- IPSLCM6_rc1  IPSLCM6_rc1 coupled configuration
#-H- IPSLCM6_rc1  Working configuration started 27/03/2015
#-H- IPSLCM6_rc1  NEMOGCM branches/v3_6_STABLE/NEMOGCM revision 5618
#-H- IPSLCM6_rc1  XIOS branch xios-1.0 revision 592
#-H- IPSLCM6_rc1  IOIPSL/src svn tags/v2_2_2
#-H- IPSLCM6_rc1  LMDZ5 trunk revision 2327
#-H- IPSLCM6_rc1  ORCHIDEE version trunk rev 2724
#-H- IPSLCM6_rc1  OASIS3-MCT 2.0_branch rev 1129
#-H- IPSLCM6_rc1  IPSLCM6 svn
#-H- IPSLCM6_rc1  libIGCM trunk 1174
#-M- IPSLCM6_rc1  arnaud.caubel@lsce.ipsl.fr
#-C- IPSLCM6_rc1  IOIPSL/tags/v2_2_2/src                    HEAD         8  IOIPSL/src     modeles
#-C- IPSLCM6_rc1  trunk/ORCHIDEE                            2848        14  ORCHIDEE       modeles
#-C- IPSLCM6_rc1  branches/OASIS3-MCT_2.0_branch/oasis3-mct 1129        15  oasis3-mct     .
#-C- IPSLCM6_rc1  LMDZ5/trunk                               2327        11  LMDZ           modeles
#-C- IPSLCM6_rc1  CONFIG/UNIFORM/v6/IPSLCM6                 HEAD         8  IPSLCM6        config
#-C- IPSLCM6_rc1  trunk/libIGCM                             1174        10  libIGCM        .
#-C- IPSLCM6_rc1  branches/2015/nemo_v3_6_STABLE/NEMOGCM              5618         7  .              modeles
#-C- IPSLCM6_rc1  trunk/ORCA1_LIM3_PISCES                   HEAD        17  .              modeles/NEMOGCM/CONFIG
#-C- IPSLCM6_rc1  XIOS/branchs/xios-1.0                      604        12  XIOS           modeles
```

Caution : this is subject to quick changes !

2.1.1. How to use it

Here are the commands you need to know if you want to retrieve and compile the IPSLCM6 model and if you want to setup and run a piControl experiment (only piControl experiment is available):

```
mkdir YOUR_DIRECTORY ; cd YOUR_DIRECTORY
svn_ano # svn co http://forge.ipsl.jussieu.fr/igcmg/svn/modipsl/trunk modipsl
cd modipsl/util
./model IPSLCM6_rc1
cd ../config/IPSLCM6
gmake IPSLCM6-LR
cp EXPERIMENTS/IPSLCM6/EXP00/config.card .
vi config.card # modify JobName (at least) : MYJOBNAME, restarts
../../util/ins_job # Check and complete job's header
cd MYJOBNAME
vi Job_MYJOBNAME # modify PeriodNb, adjust the time, headers ...
llsubmit Job_MYJOBNAME # IDRIS
ccc_msub  Job_MYJOBNAME # TGCC
```

2.1.1.1. Specific command on TGCC Bull Curie thin nodes

The basic configuration (default configuration) uses **598 computing cores** or 38 nodes: 1 process for XIOS, 221 processes for NEMO, and 47 MPI processes and 8 OpenMP thread for LMDZ. You have to modify header of the Job script as follow :

```
#MSUB -n 598 # number of cores used by the Job (equal to the total number of process/threads : for example 47X8 + 221 + 1
#MSUB -x # Specify the node is not shared
#MSUB -E '--cpu_bind=none'
```

and config.card as follows :

```
#============================================================================
#D-- Executable -
[Executable]
#D- For each component, Real name of executable, Name of executable for oasis
ATM= (gcm.e, lmdz.x, 47MPI, 8OMP)
SRF= ("" ,"" )
SBG= ("" ,"" )
```

```
OCE= (opa, opa.xx  , 221MPI)
ICE= ("" ,"" )
MBG= ("" ,"" )
CPL= ("", "" )
IOS= (xios_server.exe, xios.x, 1MPI)
```

2.1.2. Restart files

Not available yet. Waiting for reference simulations.

2.1.3. Output level

By default, only **monthly outputs** and **low output levels** are activated.

2.1.4. Lengths, frequencies

2.1.4.1. Period length

Default period length is 1Y, i.e in config.card :

```
PeriodLength=1Y
```

Note that clean_month.job will remove last period files, i.e last simulated year files.

2.1.4.2. Pack Frequency

Default pack frequency is 1Y, i.e in config.card :

```
PackFrequency=1Y
```

2.1.4.3. Rebuild frequency

Since we run with XIOS (server mode) as output library, **the rebuild step is not needed anymore**.

2.1.5. Computing centres

2.1.5.1. TGCC Bull Curie thin nodes

Default configuration on **598 cores** allows you to run **3 simulated years per day**. Because of load-balancing (difference between ocean computing time and atmosphere computing time), not all configurations (in terms of number of process/threads) are efficient. If you want to run a configuration with less cores, ask Arnaud Caubel what would be the optimum configuration.