

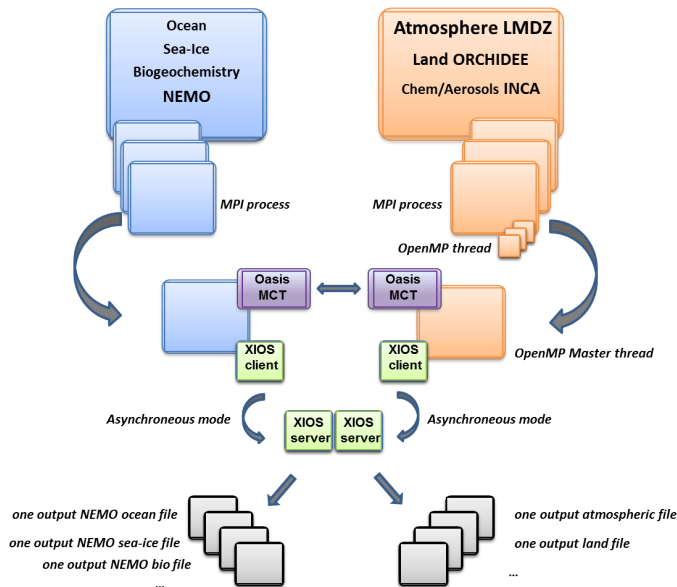
IPSLCM6 configuration

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1. Description of the configuration



IPSLCM6 model is available at different resolutions/configurations :

- IPSLCM6-LR : LMDZ 144x144x79-ORCHIDEE (CWRR) - NEMO-LIM3-PISCES eORCA1xL75. 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.
- IPSLCM6-MR : LMDZ 256x256x79-ORCHIDEE (CWRR) - NEMO-LIM3-PISCES eORCA1xL75

IPSLCM6-LR is composed of following components and tools (Oct. 2019) :

```
#-H- IPSLCM6.1.10-LR IPSLCM6.1.10-LR coupled configuration
#-H- IPSLCM6.1.10-LR 11th IPSLCM6.1-LR version
#-H- IPSLCM6.1.10-LR https://forge.ipsl.fr/igcmg/ticket/120
#-H- IPSLCM6.1.10-LR NEMOGCM branch nemo_v3_6_STABLE revision 9455
#-H- IPSLCM6.1.10-LR SHACONEMO revision 278
#-H- IPSLCM6.1.10-LR XIOS2 trunk revision 1550 branch xios-2.5
#-H- IPSLCM6.1.10-LR IOIPSL src tags 2_2_4
#-H- IPSLCM6.1.10-LR LMDZ6 LMDZ6/branches/IPSLCM6.0.15 rev 3554
#-H- IPSLCM6.1.10-LR ORCHIDEE version tags/ORCHIDEE_2_0/ORCHIDEE revision 5661
#-H- IPSLCM6.1.10-LR OASIS3-MCT 2.0_branch rev 1818
#-H- IPSLCM6.1.10-LR IPSLCM6 svn 4673
#-H- IPSLCM6.1.10-LR libIGCM trunk rev 1478
#-M- IPSLCM6.1.10-LR arnaud.caubel@lsce.ipsl.fr
#-C- IPSLCM6.1.10-LR IOIPSL/tags/v2_2_4/src HEAD 8 IOIPSL/src modeles
#-C- IPSLCM6.1.10-LR tags/ORCHIDEE_2_0/ORCHIDEE 5661 14 ORCHIDEE modeles
#-C- IPSLCM6.1.10-LR branches/OASIS3-MCT_2.0_branch/oasis3-mct 1818 15 oasis3-mct .
#-C- IPSLCM6.1.10-LR LMDZ6/branches/IPSLCM6.0.15 3554 11 LMDZ modeles
#-C- IPSLCM6.1.10-LR trunk/INCA6 825 9 INCA modeles
#-C- IPSLCM6.1.10-LR CONFIG/UNIFORM/v6/IPSLCM6 4673 8 IPSLCM6 config
#-C- IPSLCM6.1.10-LR trunk/libIGCM 1478 10 libIGCM .
#-C- IPSLCM6.1.10-LR branches/2015/nemo_v3_6_STABLE/NEMOGCM 9455 7 . modeles
#-C- IPSLCM6.1.10-LR trunk/ORCA1_LIM3_PISCES 278 17 . modeles/NEMOGCM/CONFIG
#-C- IPSLCM6.1.10-LR XIOS/branchs/xios-2.5 1550 12 XIOS modeles
```

2. Technical details

2.1. 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.fr/igcmg/svn/modipsl/trunk modipsl
cd modipsl/util
./model IPSLCM6.1.10-LR
cd ../config/IPSLCM6
gmake IPSLCM6-LR
cp EXPERIMENTS/IPSLCM/piControl_TEST/config.card .
vi config.card # modify JobName (at least) : MYJOBNAME (due to limitation in NEMO, a simulation should have ''less than 3
../util/ins_job # Check and complete job's header
cd MYJOBNAME
vi Job_MYJOBNAME # modify PeriodNb, adjust the time, headers ...
sbatch Job_MYJOBNAME # IDRIS
ccc_msub Job_MYJOBNAME # TGCC
```

This configuration is the reference configuration used for CMIP6 experiment. It allows to activate the "workflow CMIP6" which allows you to satisfy CMIP6 Data Request for a specific experiment (*_CMIP6 experiments). It is also possible to run without workflow CMIP6 (*_TEST experiments). Several experiments are available :

IPSLCM

- piControl_TEST
- pdControl_TEST
- dcppAhindcast_CMIP6
- historical_CMIP6
- historical_STRATAER
- piControl-spinup_CMIP6
- piControl_CMIP6
- scenario_CMIP6

IPSLESM

- piControl_AER_TEST

LMDZOR

- amip
- amip_CMIP6
- amip_nudge
- clim_360d
- clim_pdControl

LMDZ

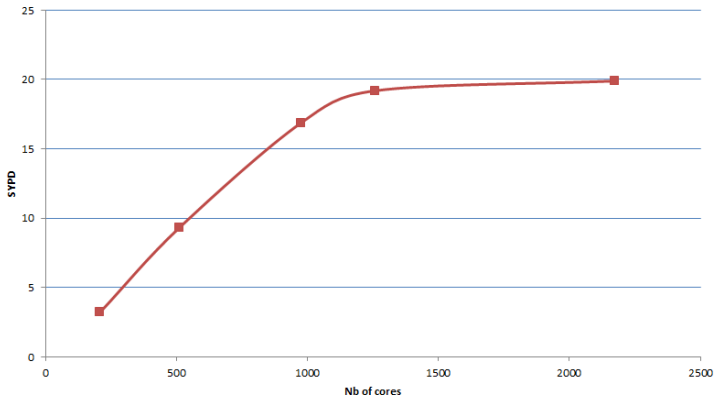
- clim_360d
- CREATE_amip
- CREATE_clim_360d

All the information related to the use of the model to run a CMIP6 experiment is available [here](#).

2.2. Computing performances

The basic configuration LR (default configuration) ran smoothly on Curie TGCC and Ada IDRIS machines (not anymore in service) and used 960 computing cores : 12 process for XIOS, 360 processes for NEMO, and 71 MPI processes and 8 OpenMP threads for LMDZ. This configuration allows you to run 16 simulated years per day.

The scalability of IPSLCM6-LR on Irene SKL is:



2.3. Restart files

Default restart files are defined in config.card of each experiment accordingly to the protocol of the experiment. You have to check the default restart files of the experiment you want to use are coherent with what you want to do.

2.4. Output level

By default, only **monthly outputs** and **low output levels** are activated in *TEST experiment. CMIP6 experiment uses CMIP6 workflow which generates high output levels accordingly to the CMIP6 Data Request.

2.5. Lengths, frequencies

2.5.1. Period length

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

```
PeriodLength=1Y
```

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

2.5.2. Pack Frequency

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

```
PackFrequency=1Y
```

2.5.3. Rebuild frequency

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

2.6. Computing centres

This configuration runs on TGCC-Irene-SKL and at IDRIS-JeanZay.

2.6.1. IDRIS-JeanZay

Because of JeanZay architecture (computing nodes based on sockets of 20 cores), we advice you to use 2, 4, 5, 10 or 20 OpenMP threads for LMDZ-ORCHIDEE component. By default, the number of OpenMP threads defined in config.card is 8. To change that, you have to edit and modify config.card as follows :

```
[Executable]
#D- For each component, Real name of executable, Name of executable for oasis
ATM= (gcm.e, lmdz.x, 71MPI, 10OMP)
```

Do not forget to install a new Job (command ins_job) in order to take into account these modifications.