IPSLCM6.2 configuration - the ESM configuration

Table of Content

The IPSLCM6.2 configuration is a part of the IPSLCM6 family model describes here

1. Resolutions and configurations

IPSLCM6.2 model will be available at different resolutions/configurations :

- **VLR** : LMDZ 96x95x39-ORCHIDEE - NEMO-LIM2-PISCES ORCA2xL31. **under development**
- **LR** : LMDZ 144x144x79-ORCHIDEE - NEMO-LIM3-PISCES eORCA1xL75
- **MR1** : LMDZ 256x256x79-ORCHIDEE - NEMO-LIM3-PISCES eORCA1xL75 **under development**
- **MR025** : LMDZ 256x256x79-ORCHIDEE - NEMO-LIM3 eORCA025xL75
- **ESMCO2** : LMDZ 144x144x79-ORCHIDEE - NEMO-LIM3-PISCES eORCA1xL75 with interactive carbon cycle ocean/atmosphere.
- **ESMAER** : LMDZ 144x144x79-ORCHIDEE-INCA - NEMO-LIM3-PISCES eORCA1xL75 with interactive aerosols on atmosphere.

IPSLCM6.2 is composed of following components and tools (Oct. 2019) :

```
#-H- IPSLCM6.2_work  IPSLCM6.2_work coupled configuration
#-H- IPSLCM6.2_work  This configuration is under construction
#-H- IPSLCM6.2_work  NEMOGCM branch nemo_v3_6_STABLE revision 9455
#-H- IPSLCM6.2_work  SHACONEMO revision 279
#-H- IPSLCM6.2_work  XIOS trunk revision 1659
#-H- IPSLCM6.2_work  IOIPSL src trunk 4432
#-H- IPSLCM6.2_work  LMDZ6 trunk rev 3489
#-H- IPSLCM6.2_work  ORCHIDEE version branches/ORCHIDEE_2_2/ORCHIDEE revision 6189
#-H- IPSLCM6.2_work  OASIS3-MCT 2.0_branch rev 1818
#-H- IPSLCM6.2_work  IPSLCM6.2 latest revision
#-H- IPSLCM6.2_work  libIGCM trunk rev 1482
#-M- IPSLCM6.2_work  arnaud.caubel@lsce.ipsl.fr
#-C- IPSLCM6.2_work  IOIPSL/trunk                                    4432         8   IOIPSL         modeles
#-C- IPSLCM6.2_work  branches/ORCHIDEE_2_2/ORCHIDEE                  6189        14   ORCHIDEE       modeles
#-C- IPSLCM6.2_work  branches/OASIS3-MCT_2.0_branch/oasis3-mct       1818        15   oasis3-mct     .
#-C- IPSLCM6.2_work  LMDZ6/trunk                                     3559        11   LMDZ           modeles
#-C- IPSLCM6.2_work  CONFIG/UNIFORM/v6/IPSLCM6.2                     HEAD         8   IPSLCM6        config
#-C- IPSLCM6.2_work  trunk/libIGCM                                   1488        10   libIGCM        .
#-C- IPSLCM6.2_work  branches/2015/nemo_v3_6_STABLE/NEMOGCM          9455         7   .              modeles
#-C- IPSLCM6.2_work  trunk/ORCA1_LIM3_PISCES                          287        17   .              modeles/NEMOGCM/CONF
#-C- IPSLCM6.2_work  trunk/ORCA025_LIM3_PISCES                        287        17   .              modeles/NEMOGCM/CONF
#-C- IPSLCM6.2_work  trunk/INCA6                                                873              9   INCA             mode
#-C- IPSLCM6.2_work  XIOS/trunk                                      1659        12   XIOS           modeles
```

1.1. IPSLCM

The default configuration LR is exactly the same describes in IPSLCM6 configuration.

- To compile you will use the target **IPSLCM6-LR**
- For the experiments, you can choose between `EXPERIMENTS/IPSLCM/pdControl_TEST` and `EXPERIMENTS/IPSLCM/piControl_TEST`

1.2. IPSLESM

This configuration allow coupling with CO2 cycle or interactive aerosols. On this page we will describe how to use the existing **ESM** configurations : **ESMCO2** and **ESMAER**

2. Technicals Details

2.1. How to use it

To retrieve the configuration :

```
mkdir YOUR_DIRECTORY ; cd YOUR_DIRECTORY
svn_ano    # svn co http://forge.ipsl.jussieu.fr/igcmg/svn/modipsl/trunk modipsl
cd modipsl/util
./model  IPSLCM6.2_work
cd ../config/IPSLCM6.2
```

The compilation slightly differs from what has been done so far. Now we used a script named **compile_ipslcm6.sh** with several option (resolution, level of optimisation, full or partial recompilation) to compile the model

```
##########################################################################
# Usage of the script compile_ipslcm6.sh
#
##########################################################################

./compile_ipslcm6.sh [Options]


Options: [LR / VLR / MR1 / MR025] Model resolution, choose only one. Default: LR.
        [ESMCO2] Compile IPSLCM6 for CO2 interactif ocean/atmosphere.
        [ESMAER] Compile IPSLCM6 for AER interactif on atmosphere
        [-full] Full recompilation of all components. This option can be added to all other options.
        [-cleannemo] Full recompilation of NEMO component  only.
        [-debug / -dev / -prod] Level of optimization. One of these can be added to all other compile options. Default: -p


Example 1: Default compilation of IPSLCM6 for resoltion LR
         (Resolution atmos: 144x142x79, ocean: ORCA1)
./compile_ipslcm6.sh

Example 2: Compilation of IPSLCM6 for resolution MR025
          (atmos: 256x256x79, ocean: ORCA025, NOPISCES)
./compile_ipslcm6.sh MR025

Example 3: Compilation of IPSLCM6 for ESM CO2
./compile_ipslcm6.sh ESMCO2 -cleannemo

Example 4: Default resoltuion (LR) compiled in debug mode
./compile_ipslcm6.sh -debug

Example 5: Default compilation with full recompilation of all components. No clean is needed.
./compile_ipslcm6.sh -full

Example 6: Full recompilation of resolution MR05 in debug mode
./compile_ipslcm6.sh MR025 -debug -full
```

To compile and create the Job for **ESMCO2**

```
./compile_ipslcm6.sh ESMCO2

cp EXPERIMENTS/IPSLESM/CO2/piControl_TEST/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 ...
sbatch Job_MYJOBNAME # IDRIS
ccc_msub  Job_MYJOBNAME # TGCC
```

To compile and create the Job for **ESMAER**

```
./compile_ipslcm6.sh ESMAER

cp EXPERIMENTS/IPSLESM/AER/piControl_AER_TEST/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 ...
ccc_msub  Job_MYJOBNAME # TGCC
```

2.2. Restart files

ESMCO2 configuration starts from IPSLCM6 **CM61-pre-pi-01** simulation (1849-12-31) available from RESTART/IPSLCM6/PROD/piControl-spinup for all the components, except for the Coupler. The latter is taken from /ccc/store/cont003/gencmip6/p86cadul/IGCM_OUT/IPSLCM6/PROD/piControl-spinup/

2.3. Output level

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

2.4. Lengths, frequencies

2.4.1. 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.

2.4.2. Pack Frequency

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

```
PackFrequency=1Y
```

2.4.3. Rebuild frequency

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

2.5. How to add a parameter in NEMO's namelist?

- let find the parameter in namelist_ref. For example in modeles/NEMOGCM/CONFIG/SHARED/namelist_ref
- let find the namelist's name : for example &namicedyn
- let add a line with the new of the parameter in the file PARAM/namcouple_ESMCO2_ORCA1xLMD144142 in the &namicedyn section

2.6. What is the maximum length for a simulation name?

Due to limitation in NEMO, a simulation should have **less than 39 characters**.

2.7. Computing centres

2.7.1. TGCC Bull Curie thin nodes

Default configuration on **929 cores** allows you to run **13 simulated years per day**.