

Wikiprint Book

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The LMDZOR configurations: LMDZOR_v5 and LMDZOR_v5.2

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1. Description

LMDZOR is a configuration with LMDZ and ORCHIDEE models coupled together. There are different versions and the recommended version is LMDZOR_v5 or LMDZOR_v5.2. The 2 configurations LMDZOR_v5 and LMDZOR_v5.2 differs for the version of ORCHIDEE.

- In LMDZOR_v5 the CMIP5 version of ORCHIDEE is used. This configuration is the most closest to CMIP5 AMIP simulations. New physics in LMDZ can be activated.
- In LMDZOR_v5.2 a trunk version of ORCHIDEE is used. This configuration can use the CWRR hydrology scheme in ORCHIDEE. For LMDZ, same possibilities as LMDZOR_v5 are available. This configuration can be compiled and used in hybrid parallelization mode (MPI-OpenMP) after recompiling.

LMDZOR_v5 is an update of the LMDZOR_v4 version, which is an update of LMDZ4OR_v3.

2. The components' source

Using an unreferenced trunk version of LMDZ or ORCHIDEE might be difficult. All versions on the trunk are not evaluated.

2.1. LMDZ

The default version is a revision called *testing* on the LMDZ5 trunk. This revision is regularly updated. LMDZOR_v5 is compatible with all versions from LMDZ4_AR5. Each user must think about which version to use and adapt it to his/her scientific goal. See chapter [Download](#) for more details.

The LMDZ4_AR5 version is used for CMIP5 at IPSL. To retrieve this version with configuration LMDZOR_v5, change in `mod.def` as follow before extracting:

```
#-C- LMDZOR_v5 LMDZ4/branches/LMDZ4_AR5 XXXX 11 LMDZ models
```

To retrieve the LMDZ5 trunk (default) :

```
#-C- LMDZOR_v5 LMDZ5/trunk XXXX 11 LMDZ models
```

In both cases, `XXXX` must be replaced by the revision number you want or by `HEAD` for the latest version. **Be careful, all revisions on the trunk is not guaranteed.**

2.2. ORCHIDEE

- LMDZOR_v5: The ORCHIDEE version used is the 1.9.5. tag. This tag has been used for CMIP5.
- LMDZOR_v5.2: The ORCHIDEE version is a revision on the trunk. You can update to a later revision or a branch of ORCHIDEE. In that case, be aware that the configuration might not have been tested before. See chapter [Download](#) for more details.

3. The resolutions

The model resolution must be chosen during the compiling phase. There are different predefined resolutions to compile. The default resolution is called *basse résolution* (low resolution) 96x95x39. The existing resolutions have a target in the main Makefile, in `modipsl/config/LMDZOR_v5`. For example LMD144142-L39 corresponding to the resolution 144x142x39 is also called *la moyenne résolution* (medium resolution). If you want to add a new resolution, use an existing target as an example.

Some resolutions are not defined to run a simulation. If you want to change this you must add the corresponding `gcm.def` file [see here for the details](#).

4. Experiments

4.1. Initial and boundary conditions

By default you must create initial and boundary condition files for LMDZOR. See the details of [LMDZ](#). You can perform an experiment with ORCHIDEE with or without restart file. See the details of [ORCHIDEE](#). The predefined experiments have different boundary conditions specified in the `limit.nc` file.

4.2. Predefined experiments

There are two predefined experiments: `clim` and `amip`. The difference is for the boundary conditions.

- `clim` : the experiment uses boundary conditions (`limit.nc` file: surface temperature and sea ice fraction) produced with climatic `amip`. The same `limit.nc` file is used in the whole simulation. These files are created with job `CREATE_clim` in `EXPERIMENTS/LMDZ/CREATE_clim`.
- `amip` : the experiment has interannual boundary conditions produced by interannual `amip` files. These files are created with `CREATE_amip` in `EXPERIMENTS/LMDZ/CREATE_amip`.

There is a predefined experiment using LMDZ only in `EXPERIMENTS/LMDZ/clim`. It corresponds to the experiment `LMDZOR/clim` without ORCHIDEE and with a simplified land model in LMDZ.

4.3. ORCHIDEE experiments without stomate

In the ORCHIDEE experiments the `sechiba` and `stomate` sections are switched on by default. To deactivate the stomate component, see the ORCHIDEE model [here](#).

5. Parallelism

See the chapter for LMDZ model in platform documentation :

[DocmodelBlmdz](#)

6. Summary of the commands

```
svn co http://forge.ipsl.jussieu.fr/igcmg/svn/modipsl/trunk modipsl
cd modipsl/util
./model LMDZOR_v5
cd ../config/LMDZOR_v5
gmake # par défaut LMD9695-L39

# Creating start and limit.nc files (to be done once per resolution)
cp EXPERIMENTS/LMDZ/CREATE_clim/config.card .
../../util/ins_job
cd ELC-96x95x39
ccc_msub Job_ELC-96x95x39 / llsubmit Job_ELC-96x95x39

# The gcm
cp EXPERIMENTS/LMDZOR/clim/config.card .
vi config.card # modify JobName (at least) : MYJOBNAME
../../util/ins_job
cd MYJOBNAME
vi Job_MYJOBNAME
ccc_msub Job_MYJOBNAME / llsubmit Job_MYJOBNAME
```

7. How to retrieve ORCHIDEE_OL in a LMDZOR configuration?

In case you want to work in the coupled and in the associated forced modes simultaneously, you will find it useful to have two configurations sharing the same `modipsl`. To this end, you must change the `mod.def` file before retrieval. For example, you can add the `ORCHIDEE_OL` configuration to the `LMDZOR_v5` configuration. Be careful, the following example only works for an ORCHIDEE version containing a `ORCHIDEE/src_driver` directory (in the recent ORCHIDEE version and starting from the 1042 revision of the ORCHIDEE trunk, all sources including driver sources are in the ORCHIDEE directory).

In `modipsl/util/mod.def`, change the 2 following lines:

```
#-C- LMDZOR_v5 IOIPSL/trunk/src 1660 8 IOIPSL/src models
#-C- LMDZOR_v5 trunk/ORCHIDEE HEAD 14 ORCHIDEE models
```

and add the following line:

```
#-C- LMDZOR_v5 trunk/ORCHIDEE_OL HEAD 14 ORCHIDEE_OL config
```

Retrieve the configuration in modipsl/util: `"/model LMDZOR_v5"`. Start compiling and compile the libraries in modipsl/config/LMDZOR_v5 :

```
gmake # To compile the ORCHIDEE library and the gcm
gmake ORCHIDEE_DRIVER # To compile the drivers and link to the ORCHIDEE libraries
```

Once the compiling is done, you can work in config/LMDZOR_v5 for a coupled LMDZ-ORCHIDEE experiment or in modipsl/config/ORCHIDEE_OL for an offline experiment. You will therefore use the same sources for the two configurations.