

Wikiprint Book

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Table of Content

The LMDZOR configurations	3
1. Description	3
2. The components' source	3
2.1. LMDZ	3
2.2. ORCHIDEE	3
3. The resolutions	3
4. Experiments	4
4.1. Initial and boundary conditions	4
4.2. Predefined experiments	4
4.3. ORCHIDEE experiments without stomata	4
5. Parallelism	4
6. Summary of the commands	4
7. How to retrieve ORCHIDEE_OL in a LMDZOR configuration?	4

The LMDZOR configurations

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1. Description

LMDZOR is a configuration in which the LMDZ and the ORCHIDEE models are coupled. There are different versions and the recommended version is LMDZOR_v5 described below. 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 is not recommended unless you have talked to the persons in charge of the models first. The outputs of each trunk update 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 [Setup](#).

The LMDZ4_AR5 version is used for CMIP5 at IPSL. To retrieve this version, change `mod.def` as follow :

```
#-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 the trunk HEAD is not guaranteed.**

2.2. ORCHIDEE

The ORCHIDEE version used is the 1.9.5. tag. This tag has been used for CMIP5.

It is possible to use the ORCHIDEE trunk but it is not guaranteed. To use the ORCHIDEE trunk you must change the IOIPSL version and change the LMDZ compiling. In `mod.def` :

```
The original lines :
#-C- LMDZOR_v5 IOIPSL/tags/v2_2_1/src HEAD 8 IOIPSL/src models
#-C- LMDZOR_v5 tags/ORCHIDEE_1_9_5/ORCHIDEE HEAD 14 ORCHIDEE models
deviennent :
#-C- LMDZOR_v5 IOIPSL/trunk/src 1660 8 IOIPSL/src models
#-C- LMDZOR_v5 trunk/ORCHIDEE HEAD 14 ORCHIDEE models
```

Once the retrieval is completed you must delete the preprocessing parameter `ORCHIDEE_NOOPENMP` of the LMDZ compilation in order to compile the ORCHIDEE trunk. To this end, remove `-cpp ORCHIDEE_NOOPENMP` in the `makelmdz_fm` call (in 2 places and at the end of the file) in `modipsl/config/LMDZOR_v5/AA_make`. Recreate the makefile with `ins_make`.

With the ORCHIDEE trunk, you can also compile the ORCHIDEE driver used in forced mode (offline). To this end use the `ORCHIDEE_DRIVER` target in the main makefile. This target can be used only with the ORCHIDEE trunk starting from the 1042 revision.

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 stomata

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

5. Parallelism

See the chapter for LMDZ model in platform documentation :

[DocImodelBlmdz](#)

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.