



## **Code environment :**

- code management principles
- management tools
- documentation
- how to ask for help
- the LMDZ community

# Code management



## Principles

The source code is managed with the version control system **SVN**

*Different versions of the code :*

- a development version, « *trunk* »
- branches sprouting from the trunk that are used in the development of the IPSL coupled model : « *IPSLCMX.Y.Z* » or for specific developments
- production/reference versions : « *prod* »
- « short-lived » branches for specific code developments

*How it's done :*

A small number of developers are allowed to write and commit on the official LMDZ SVN repository. Official modifications to the code are discussed in the weekly POIHL meeting.

A « commiteer » will retrieve the changes to be done, validate them and then commit them to the official LMDZ repository.

# Code management

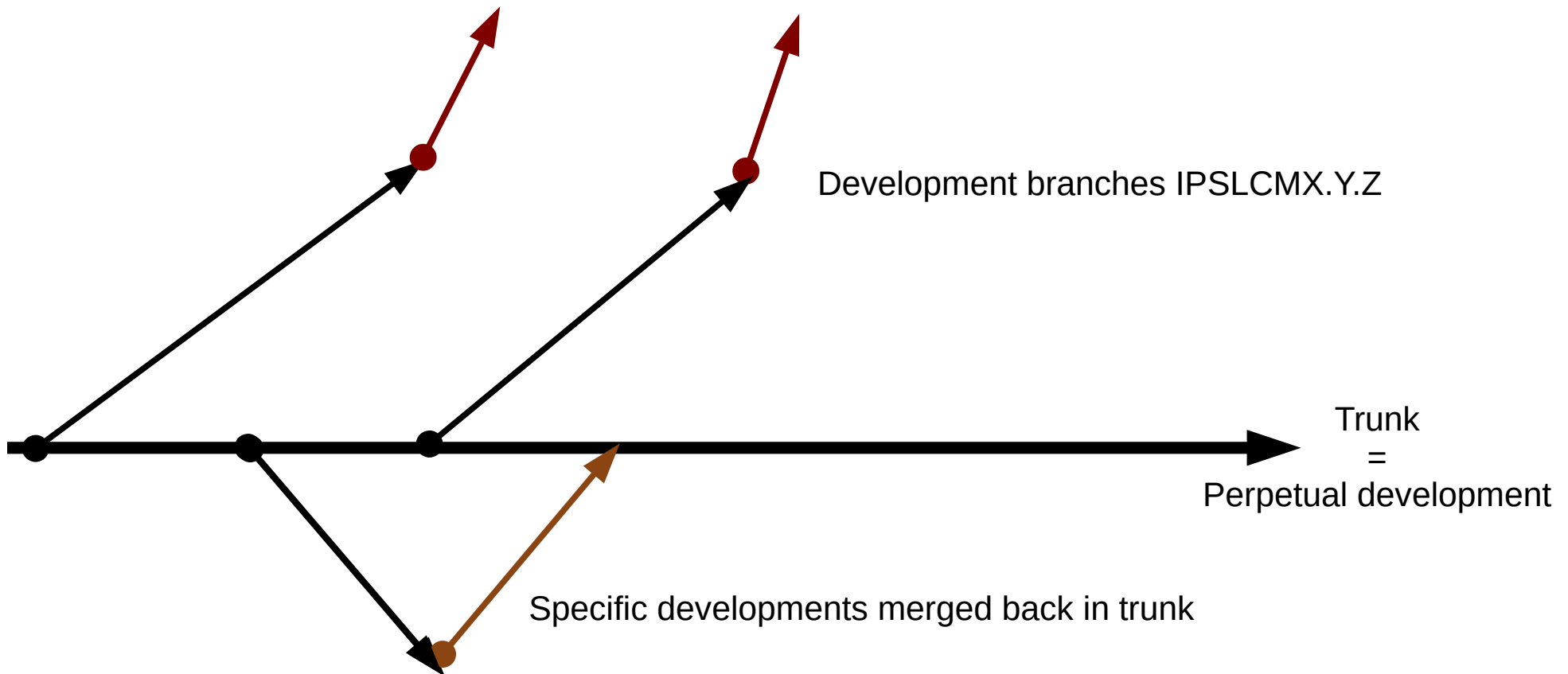


Production or reference branches

Development branches IPSLCMX.Y.Z

Trunk  
=  
Perpetual development

Specific developments merged back in trunk



# Code management



## Tools

### *Source code management :*

SVN (after CVS) on a dedicated server : [svn.lmd.jussieu.fr](http://svn.lmd.jussieu.fr)

Repository : <https://svn.lmd.jussieu.fr/LMDZ>

### *Project management :*

Trac: <http://trac.lmd.jussieu.fr/lmdz>

Source code explorer, bug reports management,  
Visual history of revisions (revtree)

**SOS-LMDZ**, <http://lmdz.lmd.jussieu.fr/sos-lmdz>,  
Main contact for all your LMDZ needs

# Code management



*Source code manager* : SVN

*Principles* :

The reference code is distributed from a centralised server on which the whole history of modifications is kept and made available. Each modification to the code has a version or release number in the historical record. To modify the code, one must « check out » a version of the model (downloading a copy of the code to one's local disk, the « working copy ») modify the code and then « commit » the modifications (uploading the modifications to the centralised server)

# Code management



Some useful svn commands :

*svn help* : for the online help

*svn checkout -r version URL*: to checkout a particular revision of the code

```
bash$ svn checkout -r 3599 http://svn.lmd.jussieu.fr/LMDZ/LMDZ6/trunk
A   trunk/bld.cfg
A   trunk/tools
A   trunk/tools/compare_real.py
A   trunk/tools/diffdef.sh
A   trunk/tools/fcm
...
Révision 3599 extraite.
```

*svn status* : displays the state of local files wrt some reference

```
bash$ svn status
M   makelmdz_fcm
D   libf/dyn3dmem/ce01.F90
D   libf/dyn3dmem/calfis_loc.F
D   libf/dyn3dmem/vitvert_loc.F
D   libf/dyn3dmem/convmass_loc.F
A + libf/dyn3dmem/convmass_loc.F90
```

# Code management



*svn info* : displays informations about local work directory and repository

```
bash$ svn info
Chemin : .
Chemin racine de la copie de travail : /tmp/trunk
URL : http://svn.lmd.jussieu.fr/LMDZ/LMDZ6/trunk
Relative URL: ^/LMDZ6/trunk
Racine du dépôt : http://svn.lmd.jussieu.fr/LMDZ
UUID du dépôt : e51f81be-29bc-408f-98e3-ee85b5628ff9
Révision : 3599
Type de nœud : répertoire
Tâche programmée : normale
Auteur de la dernière modification : fairhead
Révision de la dernière modification : 3599
Date de la dernière modification: 2019-11-05 16:36:23 +0100 (mar. 05 nov. 2019)
```

*svn update* : to update code wrt some reference

```
bash$ svn update -r 3600
Mise à jour de '.' :
U    libf/phylnmd/physiq_mod.F90
Actualisé à la révision 3600.svn update -r 2403
```

*svn upgrade* : needed if your svn client is newer than the one used to create a distribution. You probably will need to use it in the tutorials, if svn asks you to do it, you can trust it as it only affects your working copy

# Code management



*Project manager* : Trac: <https://trac.lmd.jussieu.fr/LMDZ>

The screenshot shows the Trac web interface for the LMDZ project. At the top left is the MD logo. To the right is a search box and a 'Search' button. Below these are navigation links: 'Login', 'Help/Guide', 'About Trac', and 'Preferences'. A horizontal menu contains 'Wiki', 'Timeline', 'Roadmap', 'Browse Source', 'View Tickets', 'Search', and 'Rev Tree'. The main content area displays 'wiki:WikiStart' and 'Last modified 2 months ago'. The title is 'Le serveur Trac LMDZ / The LMDZ trac server'. A yellow warning box on the right states: 'Le serveur Trac LMDZ / The LMDZ trac server. Vous êtes sur le serveur Trac du modèle LMDZ. You have reached the LMDZ model Trac server. Quelques points de départs/Starting Points'. The main text reads: 'Vous êtes sur le serveur Trac du modèle LMDZ. Trac est un système Open Source de gestion de projet. Il inclut' followed by a bulleted list: 'un wiki', 'un visualisateur de sources (interfacé au gestionnaire de sources svn)', and 'un gestionnaire de rapport de bug'. Below this, it says 'Vous êtes convié à utiliser ce système pour nous faire part de tous bugs rencontrés dans LMDZ ou nous proposer des améliorations.' and 'Les responsables'. There are links for 'IndexPages' and 'TracPresentation'. At the bottom, it says 'Les sources sont là'.

*Browse source* : <https://trac.lmd.jussieu.fr/LMDZ/browser/LMDZ6>

*Reports and tickets* : <https://trac.lmd.jussieu.fr/LMDZ/report>



# Code quality control



2 levels of quality control

- *Internal control*
- *External control*
- *Testing Releases*

# Code quality control



## Internal quality control :

- « continuous integration » :
  - at each commit on the svn server, the new revision is compiled and a simple bench is launched
  - each night, a script launches itself which :
    - verifies whether a new revision of the code is present on the SVN depot
    - in that case, the script prepares a new tar.gz file for the install\_lmdz.sh procedure then launches a number of simulations to test the « continuity » of the model:
      - 1) tests that the new model compiles and runs
      - 2) tests the numerical convergence of the model with respect to previous versions in old/new physics, debug, MPI\_OMP, isotopes
      - 3) tests restartibility by  $1 + 1 = 2$
      - 4) tests initialisation
      - 5) tests the isotope LMDZ version
    - when finished, sends a cryptic message with the results to the model developers

20210706.trunk                      3956                      OK                      SNDu-    OK2                      noc



20211102.trunk                      3998                      OK                      OK                      OK2                      OK



- every week, the 1D and 3D versions are tested for the weekly developer's meeting

# Code quality control



## External quality control :

- IPSL tests regularly and automatically a version of LMDZ that is used in coupled IPSL configurations. Installation, compilation and execution are thus tested on the supercomputers at our disposal.
- Similarly, LMDZ versions used in coupled LMDZ/ORCHIDEE configurations are also tested
- Recently, in the framework of the IPSL contribution to CMIP6, a range of quality control tests was defined for the whole coupled model (and thus necessarily LMDZ) and are launched for each release of the IPSLCM model. They include tests for restartability and reproducibility.

# The « Testing » Releases



## Special releases of the code :

Need to define intermediate versions for distribution purposes (working versions of modipsl configurations for example)

Since spring 2023, we've been setting up reference versions, known as "testings". About every two months (and on demand if necessary), the version under development is frozen and a battery of tests is launched: multi-physics tests, LMDZ\_Setup,1D, IPSLCM, ICOLMDZ, trusting LMDZOR, LAM, HighTune.

If digital convergence lost, tuning is launched.

Once all tests have been successfully passed, this version is considered the new reference version and recommended for service

They live here :

[https://lmdz.lmd.jussieu.fr/pub/src\\_archives/testing/](https://lmdz.lmd.jussieu.fr/pub/src_archives/testing/)

These testing releases are used to define the reference versions for production runs.

# Code documentation



## LMDZ code documentation:

We have found it impossible to offer a standard, exhaustive and evolutive document describing the inner workings of the model. Hence, we have decided that the LMDZ documentation would consist of various parts that we try to keep up to date :

- the LMDZ website : <http://lmdz.lmd.jussieu.fr>
- the new LMDZ « wikipedia » :  
<https://lmdz-forge.lmd.jussieu.fr/mediawiki/LMDZPedia/index.php/Accueil>
- the LMDZ course presentations : <http://lmdz.lmd.jussieu.fr/le-projet-lmdz/formation>
- the users-list : <mailto:lmdz-users@listes.ipsl.fr>
- the trac tool : <http://trac.lmd.jussieu.fr/LMDZ>

# Getting help

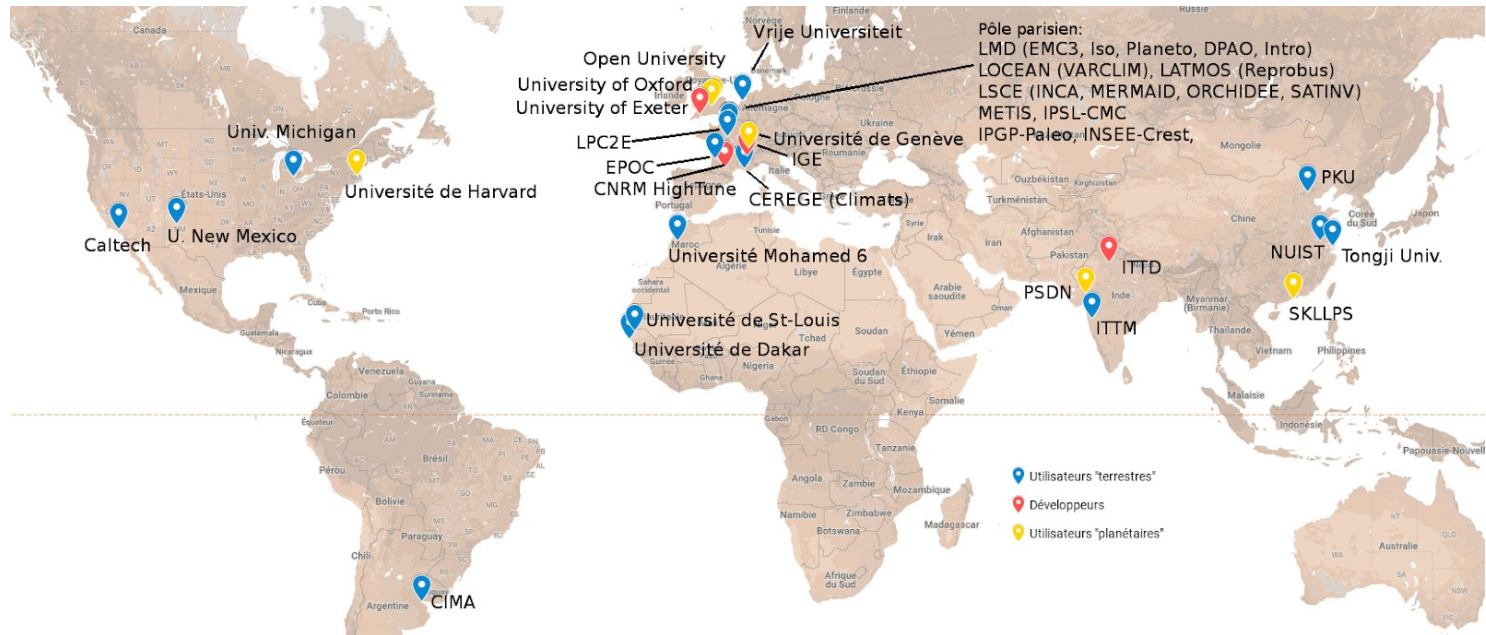


SOS-LMDZ, your contact for all LMDZ needs  
<http://lmdz.lmd.jussieu.fr/sos-lmdz>

## *How to find help and ask for it :*

- 1) Look at the website <http://lmdz.lmd.jussieu.fr>  
The LMDZPedia page  
<https://lmdz-forge.lmd.jussieu.fr/mediawiki/LMDZPedia>
- 2) Ask questions on lmdz-users list :  
<https://listes.ipsl.fr/sympa/info/lmdz-users>
- 3) Ask on the LMDZ mattermost channels  
#sos-lmdz, #lmdz-training-session-2023 (or other)  
<https://mattermost.lmd.ipsl.fr/lmdz/>

# The LMDZ community



The web site : <http://lmdz.lmd.jussieu.fr>

The mailing lists : [lmdz@listes.ipsl.fr](mailto:lmdz@listes.ipsl.fr) for general announcements

[lmdz-users@listes.ipsl.fr](mailto:lmdz-users@listes.ipsl.fr) for help, queries and general interactions

## Meetings :

- Weekly POIHL developers' meeting (every monday noon)
- PEDALONS' quarterly meeting mixing developers and users on a chosen topic (has its own slack channel)
- users' meeting every 2 or 3 years (announcement on the list and the website)