# ORCHIDEE-FM users' guide

# Get the last version of FM

- once you're login on idefix (and then asterix/obelix), create a NEW_FOLDER, goes into it and prompt :

> svn co http://forge.ipsl.jussieu.fr/igcmg/svn/modipsl/trunk modipsl

(password needed, ask Martial Mancip/Didier Solyga to add you to the users' list)

# mod.def modification

Prompt > cd modipsl/util

- open mod.def file. It lists only official versions. As the externalized version is not in the "official" version, you have to add the following lines in mode.def for downloading it

```
#-H- ORCHIDEE_EXT_SVN Modele ORCHIDEE with Externalisation of the parameters
#-H- ORCHIDEE_EXT_SVN ORCHIDEE_EXT with tag ORCHIDEE_1_9_5
#-H- ORCHIDEE_EXT_SVN IOIPSL with tag 2.2.1
#-H- ORCHIDEE_EXT_SVN libIGCM tag libIGCM_v1_9
#-H- ORCHIDEE_EXT_SVN FCM svn version PATCHED/FCM_V1.2
#-M- ORCHIDEE_EXT_SVN Didier.Solyga@lsce.ipsl.fr
#-C- ORCHIDEE_EXT_SVN IOIPSL/tags/v2_2_1/src   HEAD          8  IOIPSL/src      modeles
#-C- ORCHIDEE_EXT_SVN tags/libIGCM_v1_9         HEAD         10 libIGCM          .
#-C- ORCHIDEE_EXT_SVN PATCHED/FCM_V1.2          HEAD         13 tools/FCM/V1.2  .
#-C- ORCHIDEE_EXT_SVN branches/ORCHIDEE_EXT/ORCHIDEE              ?      14 .
#-C- ORCHIDEE_EXT_SVN branches/ORCHIDEE_EXT/ORCHIDEE_OL           ?      14 .
#-C- ORCHIDEE_EXT_SVN trunk/ORCHIDEE_OL/OOL_SEC_STO  ?        14 config/ORCHIDEE_OL/OOL_SEC_STO .
#-C- ORCHIDEE_EXT_SVN trunk/ORCHIDEE_OL/OOL_SEC       ?       14 . config/ORCHIDEE_OL
#-C- ORCHIDEE_EXT_SVN trunk/ORCHIDEE_OL/FORCESOIL     ?       14 . config/ORCHIDEE_OL
#-C- ORCHIDEE_EXT_SVN trunk/ORCHIDEE_OL/TESTSTOMATE   ?       14 . config/ORCHIDEE_OL
#-C- ORCHIDEE_EXT_SVN trunk/ORCHIDEE_OL/SPINUP        ?       14 . config/ORCHIDEE_OL
#-C- ORCHIDEE_EXT_SVN trunk/ORCHIDEE_OL/FLUXNET       ?       14 . config/ORCHIDEE_OL
```

- replace  branches/ORCHIDEE_EXT/ORCHIDEE  exactly by  branches/orchidee_FM/ORCHIDEE

- replace all the ORCHIDEE_EXT_SVN  by  ORCHIDEE_FM

```
#-H- ORCHIDEE_FM Modele ORCHIDEE with Externalisation of the parameters
#-H- ORCHIDEE_FM ORCHIDEE_EXT with tag ORCHIDEE_1_9_5
#-H- ORCHIDEE_FM IOIPSL with tag 2.2.1
#-H- ORCHIDEE_FM libIGCM tag libIGCM_v1_9
Etc...
#-C- ORCHIDEE_FM branches/orchidee_FM/ORCHIDEE                ?      14 .
#-C- ORCHIDEE_FM branches/orchidee_FM/ORCHIDEE_OL             ?      14 .
#-C- ORCHIDEE_FM trunk/ORCHIDEE_OL/OOL_SEC_STO  ?        14 config/ORCHIDEE_OL/OOL_SEC_STO .
#-C- ORCHIDEE_FM trunk/ORCHIDEE_OL/OOL_SEC       ?       14 . config/ORCHIDEE_OL
Etc ...
```

- If you prompt > ./model -h   it will show you all the versions you can download.

# mod.def modification (summary)

It means that you just add these lines :

```
#-H- ORCHIDEE_FM Modele ORCHIDEE with Externalisation of the parameters
#-H- ORCHIDEE_FM ORCHIDEE_FM with tag ORCHIDEE_1_9_5
#-H- ORCHIDEE_FM IOIPSL with tag 2.2.1
#-H- ORCHIDEE_FM libIGCM tag libIGCM_v1_9
#-H- ORCHIDEE_FM FCM svn version PATCHED/FCM_V1.2
#-M- ORCHIDEE_FM Didier.Solyga@lsce.ipsl.fr
#-C- ORCHIDEE_FM IOIPSL/tags/v2_2_1/src   HEAD        8  IOIPSL/src     modeles
#-C- ORCHIDEE_FM tags/libIGCM_v1_9       HEAD          10 libIGCM          .
#-C- ORCHIDEE_FM PATCHED/FCM_V1.2        HEAD          13 tools/FCM/V1.2  .
#-C- ORCHIDEE_FM branches/orchidee_FM/ORCHIDEE              ?      14 .
#-C- ORCHIDEE_FM branches/orchidee_FM/ORCHIDEE_OL           ?      14 .
#-C- ORCHIDEE_FM trunk/ORCHIDEE_OL/OOL_SEC_STO ?     14 config/ORCHIDEE_OL/OOL_SEC_STO .
#-C- ORCHIDEE_FM trunk/ORCHIDEE_OL/OOL_SEC     ?      14 . config/ORCHIDEE_OL
#-C- ORCHIDEE_FM trunk/ORCHIDEE_OL/FORCESOIL   ?      14 . config/ORCHIDEE_OL
#-C- ORCHIDEE_FM trunk/ORCHIDEE_OL/TESTSTOMATE ?      14 . config/ORCHIDEE_OL
#-C- ORCHIDEE_FM trunk/ORCHIDEE_OL/SPINUP      ?      14 . config/ORCHIDEE_OL
#-C- ORCHIDEE_FM trunk/ORCHIDEE_OL/FLUXNET     ?      14 . config/ORCHIDEE_OL
#-
```

# Copying the correct version

Still in the NEW_FOLDER/util   directory, prompt :
> ./model ORCHIDEE_FM

To create the Makefiles, prompt
> ./ins_make

Go to modipsl/modeles/ORCHIDEE_OL
(prompting   > cd ../modeles/ORCHIDEE_OL/  )

To compile the code, prompt the 3 following lines
> gmake  (takes 15 minutes, have a coffee break...ends with « orchidee_ol is OK »)
> gmake forcesoil
> gmake teststomate

Then, back to modipsl/util  (prompting   > cd ../../util  ), prompt
> ./ins_job

The model is now ready to be used.

# Spinup, run.def and Run files

You can create a new directory, with your future modeling tests. (will be called MODELING)
> cd PATH_TO_MODELING

Copy the following 3 necessary files in MODELING from my directory (already tested and ok files)
> cp /home/users/tlaunois/MODELE/run.def.forestry.fontainebleauAR5 run.def
> cp /home/users/tlaunois/MODELE/run_c13forestryAR5.bat run_forestry.bat
> cp /home/users/tlaunois/MODELE/spinup_c13forestryAR5.bat spinup_forestry.bat

Spinup and Run function will be further detailed.
run.def includes all the externalized parameters and options for the ORCHIDEE-FM runs

# ORCHIDEE-FM users' guide : Run.def (1)

<span style="color:red">Red options are the most important to check !</span>
Open the run.def
Here are the major options you should check/change, for almost all your runs.

<span style="color:olive">BAVARD</span> (1-10) : the higher it is, the more information you get in the output files
<span style="color:olive">ALMA_OUTPUT</span> : 2 sets of outputs are available. See the code to know if the outputs that interest you are « ALMA_OUTPUT format » or not.
<span style="color:olive">ATM_CO2</span> : constant default atmospheric $CO_2$ value
<span style="color:olive">ATM_CO2_file</span> : a file that contains a variable $CO_2$ value (measured, scenario...). If none, the constatn value is read

<span style="color:olive">SECHIBA_VEG__01</span> = 0.0
SECHIBA_VEG__02 = 0.0
SECHIBA_VEG__03 = 0.0
<span style="color:red">SECHIBA_VEG__04 = 2.0</span>
SECHIBA_VEG__05 = 0.0
<span style="color:red">SECHIBA_VEG__06 = 3.0</span>
Etc ...
Set 0 for non-existent PFT on the area you're looking at. Otherwise, set the proportion of each present species (the model recalculates it to get 100% after adding them all)

<span style="color:olive">SECHIBA_VEGMAX__01</span> = 0.0
SECHIBA_VEGMAX__02 = 0.0
SECHIBA_VEGMAX__03 = 0.0
<span style="color:red">SECHIBA_VEGMAX__04 = 1.0</span>
SECHIBA_VEGMAX__05 = 0.0
<span style="color:red">SECHIBA_VEGMAX__06 = 1.0</span>
Idem.

<span style="color:olive">SECHIBA_LAI__N</span> = X  (where X = max LAI for the PFT N, if not present in the restart file)
<span style="color:olive">SLOWPROC_HEIGHT__N</span> = X  (where X = vegetation height for each PFT)

<span style="color:olive">SOIL_FRACTIONS__01</span> = 0.49  (loam)
SOIL_FRACTIONS__02 = 0.29  (sand)
SOIL_FRACTIONS__03 = 0.22   (clay)

# ORCHIDEE-FM users' guide : Run.def (1)

=====FM-module part=====

Change the latitude and longitude of the grid point you're looking at.
Lat=48.4   (>0 = Northern hemisphere)
Long=2.7   (>0 = Eastward, compared with Greenwhich meridian)

STOMATE_FOREST_MANAGED16=1   (see comments for value of natural/human thinning you want to use)
earlycut=0   (see comments for the choice in a minimal density of tree)
nmaxtrees=10000 (initial tree density)
clearfirst=y  (your forest will be completely erased at the first year of the simulation ! Useful at the first year of the run, after a spinup, for example)

# ORCHIDEE-FM users' guide : spinup_forestry.bat
(1)

BINDIR = Path to the orchidee_ol script  (by default, it's in NEW1FOLDER/bin/)
BINFILE= orchidee_ol   (default name, until you copy it/change its name)

CLIMDIR = Path to the weather files you want to use

RUNDIR = the path to where you copied spinup_forestry.bat (useful to submit it on Obelix)

OUTLOC = where files will be saved

RUNDEF = path to the run.def file that should be used

Sechiba files :
Sechistlev = the higher it is, the more outputs you get (see the code to see which outputs appear at each level)
Sechistdt = the time-step for the outputs (daily/monthly...). It doesn't change the calculation step.
Stohistlev and Sechistdt = idem, for stomate files.

# Map limits
west_bound=2.5
east_bound=3
south_bound=48.0
north_bound=48.5
Give a 0.5 range, where to find the grid point you're looking at. Should match with run.def file longitude/latitude
(latitude >0 = northern hemisphere, longitude>0 = eastward, compared with Greenwhich meridian)

# Weather generator?
wg=y  (set it to 'y' if CLIMDIR points toward a daily/monthly dataset, 'n' if CLIMDIR already contains proper half-hourly measures)

# beginning/end of spinup
 let iout=1000  (number of years for the spinup)
 let YEAR=1953  (first year to use, in meteorological data)
 let start_year=0

remplace FORCING_FILE ${CLIMDIR}/force${YEAR}.nc #met_change
Replace this by the correct name of your meteorological data !
CAUTION !! 2 occurences to change + 1 commented line (not necessary to change) and 1 « echo » line (not necessary to change )

# Launching the spinup

Go into the folder that contains the « spinup.bat »

And prompt :
> qsub -q medium spinup.bat
check that the job is running ok by prompting
> qstat
If everything is ok, it should be listed as « Q » (queue) then « R » (running)
Otherwise, check the spinup.bat.eXXX and spinup.bat.oXXX to see what made it crash

For now, your outputs should contains folder, beginning in year 1000, ending at year 1358.

# ORCHIDEE-FM users' guide : run_forestry.bat (1)

BINDIR = Path to the orchidee_ol script  (by default, it's in NEW_FOLDER/bin/)
BINFILE= orchidee_ol   (default name, until you copy it/change its name)

CLIMDIR = Path to the weather files you want to use

RUNDIR = the path to where you copied spinup_forestry.bat (useful to submit it on Obelix)

OUTLOC = where files will be saved
SPINUP = where the spinup files are saved

co2file = a file that contains CO2 variations (if none, constant value given in run.def file willl be used)

RUNDEF = path to the run.def file that should be used

Sechiba files :
Sechistlev = the higher it is, the more outputs you get (see the code to see which outputs appear at each level)
Sechistdt = the time-step for the outputs (daily/monthly...). It doesn't change the calculation step.
Stohistlev and Sechistdt  = idem, for stomate files.

# Map limits
west_bound=2.5
east_bound=3
south_bound=48.0
north_bound=48.5
Give a 0.5 range, where to find the grid point you're looking at. Should match with run.def file longitude/latitude
(latitude >0 = northern hemisphere, longitude>0 = eastward, compared with Greenwhich meridian)

# Weather generator?
wg=y  (set it to 'y' if CLIMDIR points toward a daily/monthly dataset, 'n' if CLIMDIR already contains proper half-hourly measures)

# beginning/end of run
start_year=1953
let YEAR=1953
J=2000  (last_year)

remplace FORCING_FILE ${CLIMDIR}/force${YEAR}.nc #met_change
Replace this by the correct name of your meteorological data !

# Launching the run

Go into the folder that contains the « run.bat »

And prompt :
> qsub -q medium run.bat
check that the job is running ok by prompting
> qstat
If everything is ok, it should be listed as « Q » (queue) then « R » (running)
Otherwise, check the run.bat.eXXX and spinup.bat.oXXX to see what made it crash

# Useful links

Orchidee website
http://forge.ipsl.jussieu.fr/orchidee

How to copy and launch ORCHIDEE
http://forge.ipsl.jussieu.fr/orchidee/wiki/DownloadOrchidee

Technical details/syntax
http://forge.ipsl.jussieu.fr/orchidee/wiki/SubVersion

PDF with some examples
http://dods.ipsl.jussieu.fr/orchidee/Cours-ORCHIDEE-mai2011.pdf

For other Questions :
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