The ORCHIDEE_OL configurations

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1. Description

ORCHIDEE_OL is the generic name of the forced ORCHIDEE configurations. They are also called offline configurations. In this context the ORCHIDEE model is forced with climatic variables based on observations or on existing climatic simulations. Following executables can be compiled depending on the version:

- orchidee_ol : the standard driver for complete ORCHIDEE model
- orchideedriver : a new driver to run the complete ORCHIDEE model, this version is under development
- teststomate : *Currently not maintained*: to allow the vegetation to reach equilibrium
- forcesoil : *Currently not maintained*: to allow the carbon in the soil to reach equilibrium

2. Extract ORCHIDEE offline configurations

2.1. Extract a predefined configuration

Following predefined configurations exist currently for ORCHIDEE offline use, the install a different version of ORCHIDEE source code:

- ORCHIDEE_trunk : the latest version on the trunk. **Be careful: if you use this version the trunk results have not been evaluated!** This is often the version which is advised.
- ORCHIDEE_2_2 : a branch created from the tag ORCHIDEE_2_1. This branchs contains bug corrections and new developements needed for DYNAMICO
- ORCHIDEE_2_1 : the most recent tag, created from the trunk before inclusion of the nitrogen cycle in ORCHIDEE
- ORCHIDEE_2_0 : the CMIP6 version of ORCHIDEE
- ORCHIDEE_AR5 : the CMIP5 version, only sources code is extracted without configuration files

The configuration is extracted in modipsl/util using ./model. For example: ./model ORCHIDEE_trunk.

2.2. Extract a branch or another version of ORCHIDEE

If you want to use a branch or a personal version on the SVN file depository of ORCHIDEE, we recommend to change the ORCHIDEE_trunk configuration in mod.def and extract this version with ./model ORCHIDEE_trunk. Go here to learn more about how to change mod.def.

3. Resolution

The compiled executable can be used at all spatial resolutions (from local to global scales). The forcing file or the options in the parameter file determine the domain (LIMIT_WEST, LIMIT_EAST, LIMIT_NORTH and LIMIT_SOUTH) and the spatial resolution (MERID_RES and ZONAL_RES). Default in the configurations is global grid.

The *.resol* file does not exist for ORCHIDEE_OL because the executables can be used for all resolutions.

4. Compilation

The compiling is done from modipsl/config/ORCHIDEE_OL using

- *gmake* : the executable orchidee_ol can be used with XIOS or IOIPSL. The executable xios.server is also created.
- *gmake without_xios* : XIOS is not compiled and can not be used for the output.

Read more about compile methods here: ■https://forge.ipsl.jussieu.fr/orchidee/wiki/Documentation/UserGuide/CompileMethods

5. The experiments

In the ORCHIDEE_OL configuration, there are 4 directories containing experiments following the *classical logic* of configurations (as described in this manual) :

- OOL_SEC_STO : experiment with the orchidee_ol executable for a complete ORCHIDEE simulation.

- OOL_SEC: experiment with the orchidee_ol executable for a simulation with sechiba only (without stomate).You can also perform such an experiment in OOL_SEC_STO by deactivating stomate.
- TESTSTOMATE : experiment with the teststomate executable (for the carbon in the vegetation to reach equilibrium).
- FORCESOIL : experiment with the forcesoil executable (for the carbon in the soil to reach equilibrium).

There are 2 or 3 other directories(depending on the version) containing experiments which have a different structure. These experiments are looping over several sub-jobs. This documentation do not describe the usage of these specific experiments.

- SPINUP : this experiment loops on the various sub-experiments of OOL_SEC_STO, OOL_SEC, TESTSTOMATE and FORCESOIL.
- FLUXNET/ENSEMBLE : a chain of SPINUP on the FLUXNET site to validate ORCHIDEE.

6. XIOS / IOIPSL

XIOS can be used with ORCHIDEE_trunk configuration as option. All other versions can only run with IOIPSL output.

To run with XIOS with ORCHIDEE_trunk configuration you need to :

1. Compile using *gmake with_xios*
2. Activate XIOS by setting XIOS=y in section [UserChoices] in COMP/orchidee_ol.card. Use experiment OOL_SEC_STO, OOL_SEC or SPINUP_ANLYTIC.
3. To be more optimized: Activate XIOS in server mode. This is done by specifying XIOS as a specific component in config.card. In OOL_SEC_STO the file config.card.xios_server is an example for this. In config.card you need :

```
#D-- ListOfComponents -
[ListOfComponents]
SRF= (sechiba, orchidee_trunk)
SBG= (stomate, orchidee_trunk)
OOL= (orchidee_ol, OOL_trunk)
IOS= (xios, XIOS)

#D-- Executable -
[Executable]
SRF= ("", "")
SBG= ("", "")
OOL= (orchidee_ol, orchidee_ol, 31MPI)
IOS= (xios_server.exe, xios.x, 1MPI)

...

#D-- IOS -
[IOS]
WriteFrequency=""
Restart= n
RestartDate=
RestartJobName=
RestartPath=
OldName=
```

Once the XIOS output is activated it is functioning the same way as for the other v6 configurations. Read more in chapter of ORCHIDEE for the use of XIOS output.