**Wikiprint Book**

**Title: 1. Introduction**

**Subject: lgcmg_doc - Doc/Models/ORCHIDEE**

**Version: 19**

**Date: 03/29/24 05:44:30**

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# The ORCHIDEE model

## 1. Introduction

■Visit the ORCHIDEE's official website
■Follow the actualities in developements of ORCHIDEE

The ORCHIDEE models includes 3 components: sechiba, stomate and LPJ (vegetation dynamics). Only 2 components (sechiba and stomate) are activated by default. If you are using a coupled configuration with LMDZ, you will need the sechiba component to compute the water and energy balance. You will also need the stomate component to compute the carbon balance but this component can be deactivated. You will find additional information on how to use ORCHIDEE in libIGCM-supported configurations below.

## 2. Vegetation map

If you want to update annually (VEGET_UPDATE=1Y) the vegetation map (in forced or coupled mode) you must add the following lines in COMP/orchidee.card:

```
[SmoothFiles]
List=(${R_BC}/SRF/${config_UserChoices_TagName}/PFTmap_1850to2005_AR5_LUHa.rc2/PFTmap_IPCC_${year_p1}.nc, PFTmap.nc, 12:12
```

If you do not want to update annually the vegetation map (VEGET_UPDATE=0Y) but you want to update the vegetation map with activated stomate instead, you must add the following lines in COMP/orchidee.card and specify the map year to be used:

```
[BoundaryFiles]
List=(${R_BC}/SRF/${config_UserChoices_TagName}/PFTmap_1850to2005_AR5_LUHa.rc2/PFTmap_IPCC_2005.nc, PFTmap.nc)
ListNonDel= ()
```

## 3. Options related to ORCHIDEE in configuration _v5

### 3.1. config.card

The model output frequency is configured in the config.card file.

- The WriteFrequency variable in the [SRF] section induces a change of the WRITE_STEP variable in orchidee.def. WRITE_STEP determines the output frequency for the sechiba_history.nc file. The available frequencies are: xY (x years), xM (x months), 5D(5 days), 1D (1 day), xs (x seconds). This file is mandatory. If you add HF a second sechiba_out_2.nc file will be written with the 3H frequency.
- The WriteFrequency variable in the [SBG] section induces a change of the STOMATE_HIST_DT variable in orchidee.def. STOMATE_HIST_DT determines the output frequency for the stomate_history.nc file. The stomate_history_ipcc.nc file always has daily outputs.

### 3.2. orchidee.card

In orchidee.card you can specify variables inducing a change in the model input parameter files. The default parameter values are:

- VEGET_UPDATE : default value 0Y. The VEGET_UPDATE variable in orchidee.def is set to 0Y or 1Y. Frequency of the vegetation map update.
- LAND_COVER_CHANGE : default value n. The LAND_COVER_CHANGE variable in orchidee.def is set to n or y. Takes into account (or not) land use and deforestation processes.
- NEWHYDROL : mandatory variable, no default value. The HYDROL_CWRR variable is set to NEWHYDROL. Only the case NEWHYDROL=n is evaluated in the ORCHIDEE official versions.
- sechiba_LEVEL : mandatory variable, no default value, it varies between 0 and 11. The SECHIBA_HISTLEVEL variable is set to sechiba_LEVEL. This variable determines the number of variables written in sechiba_history.nc.

### 3.3. stomate.card

- stomate_LEVEL : mandatory variable, no default value, it varies between 0 and 10. The STOMATE_HISTLEVEL variable is set to this value. This variable determines the number of variables written in stomate_history.nc.

## 4. Deactivate stomate in ORCHIDEE

You can deactivate STOMATE component included by default in all experiments with ORCHIDEE. In this case, you only run the SECHIBA component. To do so:

- in config.card: delete the line for SBG in the ListeOfComponents section
- in COMP/orchidee.card (for _v5 configurations) or in COMP/sechiba.card (for ORCHIDEE_OL configuration): add the lai2D.nc file in BoundaryFiles, ListNonDel section as follow:

```
ListNonDel= (${R_BC}/SRF/${config_UserChoices_TagName}/lai2D_03.nc, lai2D.nc)
```

- in PARAM/orchidee.def (for _v5) or PARAM/run.def (for ORCHIDEE_OL): add parameter LAI_MAP to request the reading of LAI_MAP:

```
# Read a LAI map (12 monthly values)
LAI_MAP = y
# default = n
```