

The NEMO model

Table of Content

The NEMO model	1
1. opa9.card	2
1.1. Model time step	2
1.2. Model version	2
1.3. Simulations	2
1.4. Atmospheric forcings	2
1.5. Initial states and boundary conditions	3
2. pisces.card	3
2.1. Initial states and boundary conditions	3

A few specificities of the forced NEMO configurations associated with their use with libGCM are detailed in this section.

Further information on these configurations (description, setup, documentation) is available on the official NEMO website: <http://www.nemo-ocean.eu>

To access this information you must create an account in the NEMO users' base.

1. opa9.card

1.1. Model time step

The time step used for the NEMO configurations is defined in the **User Choices** section.

```
OPA_NDT_DAY=15      ! number of time step per year
```

This variable corresponds to the number of time step per day. The time step (in second) is automatically computed and added in the namelist file (it corresponds to the `rn_rdt` parameter).

1.2. Model version

The choice of forcings used for the simulations depends on the model version. The available forcings correspond to NEMO versions v3_2, v3_3, v3_4.

```
OPA_version=v3_3
```

1.3. Simulations

Two kinds of simulations with forced NEMO can be performed:

- a climatological simulation - `Interannual_Run=n`
- an interannual simulation - `Interannual_Run=y`

```
#-- if you run interannual is "y", if not (=climatology) is "n"
Interannual_Run=n
```

1.4. Atmospheric forcings

For forced ocean simulations, you need the atmospheric forcings for the :

- wind stress - zonal and meridional
- air temperature
- solar and non solar fluxes (shortwave and longwave)
- relative humidity
- precipitations (solid: snow and liquid: rain)

To specify in the **Interannual** section

```
[Interannual]
#=====
#-- Surface Boundary Condition original files name ( get by the job ) same as the ones in namelist
#=====
#-- NOTE: MANDATORY STRUCTURE OF FILE NAMES GET BY THE JOB :
#-- "basename_yyyy.nc"          ( for interannual data )
#-- "basename.nc"              ( for climatological data )
#-- MANDATORY: NAMES USED IN List_jobsbc VARIABLE MUST BE ONLY THE BASENAME
# example for interannual, bulk core, forcing CORE2:
List_jobsbc=(u_10.15JUNE2009_orca2, v_10.15JUNE2009_orca2, ncar_rad.15JUNE2009_orca2, t_10.15JUNE2009_orca2, q_10.15JUNE2009_orca2)
# example for interannual, bulk core, forcing DRAKKAR:
#List_jobsbc=(radlw_DFS4-ORCA2, radsw_DFS4-ORCA2, q2_DFS4-ORCA2, t2_DFS4-ORCA2, u10_DFS4-ORCA2, v10_DFS4-ORCA2, snow_DFS4-ORCA2)
```

1.5. Initial states and boundary conditions

The initial states and the boundary conditions are listed in the **Boundary Files** section

All those files are described on the official NEMO website: http://www.nemo-ocean.eu/Using-NEMO/Configurations/ORCA2_LIM, section

Configuration Inputs

```
[BoundaryFiles]
List=  ()
ListNonDel= (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/ahmcoef, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/bathy_level.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/bathy_meter.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/coordinates.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/data_1m_potential_temperature_nomask.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/data_1m_salinity_nomask.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/geothermal_heating.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/runoff_core_monthly.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/sss_data.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/sst_data.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/subbasins.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/chlorophyll.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/K1rowdrg.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/M2rowdrg.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/mask_itf.nc, .)
```

2. pisces.card

2.1. Initial states and boundary conditions

- The initial states of a few passive tracers come from monthly (NO3, PO4, O2, Si) and annual (DIC, Alkalinity) climatologies or from simulation outputs (Iron, DOC). The other PISCES tracers are initialized by constant values in the model.
- the files containing the external nutrient uptake are also listed below:
 - dust.orca.nc : annual climatology of the nutrient uptake by dust
 - bathy.orca.nc : annual climatology of iron uptake by sediments
 - river.orca.nc : annual climatology of nutrient uptake by rivers
 - ndeposition.orca.nc : annual climatology of nitrogen deposit

```
[BoundaryFiles]
List=  ()
ListNonDel= (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/data_1m_DIC_nomask.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/data_1m_Alkalini_nomask.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/data_1m_O2_nomask.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/data_1m_NO3_nomask.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/data_1m_PO4_nomask.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/data_1m_Si_nomask.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/data_1m_DOC_nomask.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/data_1m_Fer_nomask.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/kRGB61.txt, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/dust.orca.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/bathy.orca.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/river.orca.nc, .), \
              (${R_BC}/OCE/${config_UserChoices_TagName}/${opa9_UserChoices_OPA_version}/ndeposition.orca.nc, .)
```