

## ESM Tools

- Documentation and References
- How-to Guide and Examples

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# Outline

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## 1 Documentation and References

- esm-usermanual
- GitLab Wiki

## 2 How-to Guide and Examples

- Install and compile AWI-CM (CMIP6)
- Set up and run a new experiment
- Continue an experiment
- Continue an experiment from a spinup experiment



# Documentation and References

esm-usermanual

## Where can I find the esm-usermanual?

- 🦊 esm-tools project on GitLab

<https://gitlab.dkrz.de/esm-tools/esm-usermanual>

- 📄 [https://gitlab.dkrz.de/esm-tools/esm-usermanual/blob/master/esm\\_usermanual.pdf](https://gitlab.dkrz.de/esm-tools/esm-usermanual/blob/master/esm_usermanual.pdf)

## How can I contribute to the esm-usermanual?

- Read the esm-usermanual and give feedback  
([nadine.wieters@awi.de](mailto:nadine.wieters@awi.de))
- Ask questions to the esm-tools
- Make a new issue on GitLab's issue tracker
- Work on the document



# Documentation and References

esm-usermanual

## How can I work on the esm-usermanual document?

- Written with the L<sup>A</sup>T<sub>E</sub>X typesetting system (using KOMA-Script)
- Create your own branch (`mybranch`) on GitLab
- Get a local copy of your branch on your desktop computer

```
git clone -b mybranch https://gitlab.dkrz.de/esm-tools/esm-usermanual.git
```

- Do your changes and compile the document (`pdflatex`)

```
git add esm_usermanual.tex esm_usermanual.pdf  
git commit  
git push
```

- Do a merge request for your branch on GitLab

## Other file formats?



# Documentation and References

## GitLab Wiki

- Every esm-tool has a GitLab Wiki
- esm-master:  
<https://gitlab.dkrz.de/esm-tools/esm-master/wikis/home>
- esm-runscripts:  
<https://gitlab.dkrz.de/esm-tools/esm-runscripts/wikis/home>
- How Do I...?
- Add new topics, questions
- Coment, answer other questions



# Documentation and References



## GitLab Wiki

The screenshot shows a GitLab interface with the following details:

- Header:** Home - Wiki - easr-tools / easr-namscripts - GitLab - Mozilla Firefox
- Top Bar:** Home · Wiki · easr-tools · easr-namscripts · GitLab · Mozilla Firefox
- Left Sidebar:**
  - Project: easr-namscripts
  - Groups: Project
  - Issues: 0
  - Merge Requests: 0
  - CI / CD: 0
  - Wiki: **Wiki**
  - Snippets: 0
  - Settings: 0
- Page Content:**
  - Home**: Last edited by Nadine Wieters a week ago. Buttons: New page, Page history, Edit.
  - General**: Here, we gather some typical use cases that arise when setting up ESM experiments. Please have also a look at the FAQ page. You are very welcome to add new questions or answer questions from other users.
  - Where Do I...?**: Find the user manual.
  - How Do I...?**: Add, change or remove namelist entries via namscript.
  - AWI-CM**: How to use a user-defined jobscript.ncl file. How to use a user-defined unit.ncl file. Restart\_awicm\_from\_existing\_run.
  - General**: Run an initial model run (cold start). Run a simple Pre-Industrial Control simulation. Restart AWI-CM from an already existing run (spinup). Continue a model run that has been successfully completed or that unfortunately crashed. Overcome numeric instability by temporarily setting enhanced diffusion ENSTDIF. Change AWI-CM restart frequency. Change AWI-CM output schedule (output data). Set up a CDF postprocessing. Modify the postprocessing (e.g. keep daily output for selected variables, while generating monthly output for the rest of the data).
  - Paleoclimate**
- Right Sidebar:** Clone repository, Change awicm output schedule, Change awicm restart frequency, Frequently asked questions, Consumption typical models, Esm namscript change namelist entry, Esm namscript continue modulein, Esm namscript initial run, Esm namscripts user manual, General\_program\_flow, Home, how\_to, How to use a user-defined jobscript.ncl file, How to use a user-defined unit.ncl file, Restart\_awicm\_from\_existing\_run.
- Bottom:** https://gitlab.dkrz.de/easr-tools/easr-namscripts/wikis/home

# AWI-CM (CMIP6)



## Tasks to get and run AWI-CM (CMIP6)

- ① Downloading the source code → [esm-master](#)
- ② Compiling the source code → [esm-master](#), [esm-environment](#)
- ③ Set up and configure an experiment → [esm-runscripts](#)
- ④ Executing the run → [esm-runscripts](#)

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# AWI-CM (CMIP6)



## Tasks to get and run AWI-CM (CMIP6)

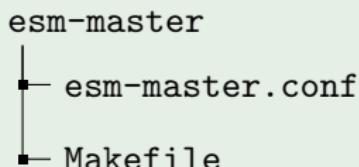
- ① Downloading the source code → [esm-master](#)
- ② Compiling the source code → [esm-master](#), [esm-environment](#)
- ③ Set up and configure an experiment → [esm-runscripts](#)
- ④ Executing the run → [esm-runscripts](#)

# AWI-CM (CMIP6)



## 0. Getting the tools

```
$ git clone https://gitlab.dkrz.de/esm-tools/esm-master.git  
...  
$ cd esm-master
```



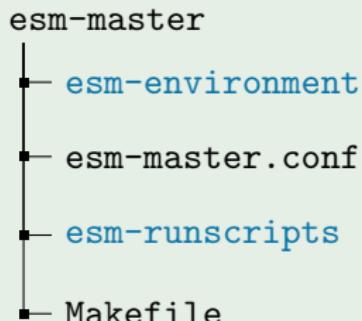
### Configure esm-master: edit esm-master.conf

- 1 SWREPO-USERNAME=<your-swrepo-username>
- 2 DKRZ-GITLAB-USERNAME=<your-dkrz-gitlab-username>

# AWI-CM (CMIP6)



```
$ make get-esm-environment  
...  
$ make get-esm-runscripts  
...
```



## 1. Downloading and 2. compiling

```
$ make get-awicm-CMIP6
```

```
...
```

```
esm-master
├── awicm-CMIP6
├── esm-environment
├── esm-master.conf
├── esm-runsctipts
└── Makefile
```

```
$ make comp-awicm-CMIP6
```

```
...
```

# AWI-CM (CMIP6)



## Set up and run a new experiment

### 3. Set up an experiment and 4. execute the run

#### Case scenario A: Initial experiment

- Copy a default runscript to your working directory (myexperiments)

```
$ mkdir ${WORK}/myexperiments  
$ cd ${WORK}/myexperiments  
$ cp ${WORK}/esm-runscripts/runscripts/awicm/awicm_initial.run .
```

- Adapt the runscript to your experiment set up
- Execute the runscript with option for experiment id

```
$ ./awicm-CMIP6.run -e awicm-cmip6-experiment
```

```
#!/usr/bin/ksh -l
set -e

...
export FUNCTION_PATH=${WORK}/esm-master/esm-runscrips/functions/all
export FPATH=${FUNCTION_PATH}:$FPATH

machine_name="ollie"
setup_name="awicm"
#check=1

compute_time="00:25:00"
#####
INITIAL_DATE_awicm=2000-01-01      # Initial exp. date
FINAL_DATE_awicm=2000-04-01        # Final date of the experiment
CURRENT_DATE_awicm=date_file       # Final date of the experiment

awicm_VERSION="1.1"
fesom_BRANCH='CMIP6'
SCENARIO_awicm=1850

RES_fesom=CORE2

runctl___dt_start___nml_entry="2000,01,01,0,0,0"
runctl___dt_start___nml_file="namelist.echam"

MODEL_DIR_awicm=${WORK}/esm-master/awicm-CMIP6/

ADJUNCT_FILES_DIR_echam=${MODEL_DIR_awicm}/echam-6.3.04p1/

BIN_DIR_echam=${MODEL_DIR_awicm}/build/echam-6.3.04p1/src/echam/
BIN_DIR_fesom=${MODEL_DIR_awicm}/build/fesom_cpl/
EXE_fesom=fesom
```

```
BASE_DIR=${WORK}/myexperiments/  
  
POOL_DIR_awicm=/work/ollie/dsidoren/input/  
POOL_DIR_echam=/work/ollie/pool/  
  
MESH_DIR_fesom=/work/ollie/pool/FESOM/meshes_default/core/  
  
mesh_def___part_format___nml_entry="REMOVE_FROM_NAMELIST"  
mesh_def___part_format___nml_file="namelist.config "  
  
NYEAR_awicm=0          # Number of years per run  
NMONTH_awicm=1         # Number of months per run  
  
LRESUME_echam=0         # Initial run  
LRESUME_fesom=0          # Initial run  
LRESUME_oasis3mct=0      # Initial run  
  
RESTART_echam=1          # Unit=month  
RESTART_fesom=1           # Unit=RESTART_UNIT_fesom  
  
RESTART_RATE_fesom=1  
RESTART_FIRST_fesom=1  
RESTART_UNIT_fesom='m'  
  
...  
  
#####  
load_all_functions  
general_do_it_all $@
```

## awicm-cmip6-experiment

```
└── bin  
└── config  
└── forcing  
└── input  
└── log  
└── mon  
└── outdata  
└── restart  
└── scripts  
└── work
```

# AWI-CM (CMIP6)



[Continue an experiment](#)

## Case scenario B: Continue an experiment (that has successfully completed or crashed)

- Continuation: Change the value FINAL\_DATE\_awicm=2000-04-01 in your runscript
- Resubmit your runscript with the same experiment id

```
$ ./awicm-CMIP6.run -e awicm-cmip6-experiment
```

- The esm-runscripts will automatically recognize that it is a restart experiment

# AWI-CM (CMIP6)



Continue an experiment from a spinup experiment

## Case scenario C: Continue an experiment from a spinup experiment

- Spinup files are of a different experiment
- Add and change the following lines to your runscript  
(awicm\_spinup.run)

```
LRESUME_echam=1
INI_RESTART_DIR_echam=/testspinupdir/restart/echam/
INI_PARENT_DATE_echam=20091231234500
INI_PARENT_EXP_ID_echam=spinup_expid

LRESUME_fesom=1
SPINUP_DIR_fesom=/testspinupdir/restart/fesom/
SPINUP_YEAR_fesom=2009

LRESUME_oasis3mct=1
INI_RESTART_DIR_oasis3mct=/testspinupdir/restart/oasis3mct/
INI_PARENT_DATE_oasis3mct=20091231

LRESUME_hdmodel=1
INI_RESTART_DIR_hdmodel=/testspinupdir/restart/hdmodel/
INI_PARENT_DATE_hdmodel=20091231
INI_PARENT_EXP_ID_hdmodel=spinup_expid

LRESUME_jsbach=1
INI_RESTART_DIR_jsbach=/testspinupdir/restart/jsbach/
INI_PARENT_DATE_jsbach=20091231
INI_PARENT_EXP_ID_jsbach=spinup_expid
```

Thank you for your attention