



ESM-TOOLS

An Overview

Mitarbeitertag June 14, 2018
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ESM-Tools

**Download, compile and run (all)
your models in a standard way**

Developed and maintained @AWI

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

ESM-Tools - Overview



esm-master

Get the esm-tools; download, configure and compile your models



esm-environment

Collection of machine setting, can be used by esm-master / models to compile or esm-runscripsts to run models



esm-runscripsts

Unified and short runscripsts for your models, supporting iterative coupling, hyperthreading, beeyond, shortcuts for namelist changes



esm-usermanual

Documentation, How-to section, description of default settings

Implemented for:

FESOM 1.4 and 2.0

ECHAM 6.302 and 6.304

AWICM 1 and 2

MPIESM 1.2.00p4 and 1.2.01

PISM 1.0

PISM-MPIESM and PISM-AWICM



esm-workshop

Workshop on ESM-Tools:

June 18/19 2018,

Konferenzzimmer Kantinenturm

as well as the slides used for it (including this talk).

Suggested usage of the esm-tools





1. esm-master

Download, configure and
compile your model

esm-master

Makefile-based tool to

- download (e.g. make get-mpiesm-1.2.01)
- configure (e.g. make conf-mpiesm-1.2.01)
- compile (e.g. make comp-mpiesm-1.2.01)

Typing „make“ gives you a detailed list of available commands.

Also gives you access to

- the other esm-tools,
- the slides of the git-workshop, and
- the slides of the esm-tools workshop.

Integration with esm-environment

If esm-environment exists in esm-master folder, all compiling is performed using the machine settings from there.

Integration with esm-runscripsts

If esm-runscripsts exists in esm-master folder, esm-master will generate a prototype runscript for the model after compiling it.

Get it from: <https://gitlab.dkrz.de/esm-tools/esm-master>



2. esm-environment

All the machine-relevant
settings in one place

esm-environment

Collection of files containing the (optimal) settings for each machine, e.g. ollie.awi.de, mistral.dkrz.de, ...

- sets module files
- sets environment variables
- is by default used by esm-master to compile models
- can be used by esm-runscripsts to run simulations

Advantages:

- Share optimal settings for (new/changed) machines easily
- No contradicting settings between compilation and run

esm-environment is based on the cmake-build-system developed by Jan Hegewald for awicm.

**Get it by using esm-master (make get-esm-environment),
or from: <https://gitlab.dkrz.de/esm-tools/esm-environment>**



3. esm-runscrip

Run all your models with short, easy, and almost identical runscrip

esm-runscripts

Huge set of functions, containing the script blocks depending on

- (machine)
- operating system
- batch system
- coupled setup
- component models

as well as a layer for general functionality.

Needed user input:

- Models used
- Resolution
- Integration period

Defaults exist for:

- Physical parameters
- Slurm settings
- Model Partitioning

All defaults can be overwritten easily!

**Get it by using esm-master (make get-esm-runscripts),
or from: <https://gitlab.dkrz.de/esm-tools/esm-runscripts>**

esm-runscripsts – more than runscripsts

Optimize

Choose hardware based options like hyperthreading, becond etc. by setting simple flags, like

```
use_beeond=1
```

Organize

All data is automatically organized neatly in subfolders of the experiment folders, e.g.

```
forcing/echam
```

(also init, output, restart, log, config, scripts)

Document

All relevant data (origin of input files, parameter settings, machine settings, namelist configurations, runscripsts itself etc.) are saved to log files nicely.

```

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

module purge
module load intel.compiler/17.0.2 intel.mpi/17.0.2_ofi netcdf/4.4.0_intel
module list

export FUNCTION_PATH=/home/ollie/dbarbi/dev/easy-scripts/functions/all
export FPATH=${FUNCTION_PATH}:$FPATH

machine_name="ollie" # only ollie supported yet
setup_name="fesom_standalone" # mpiesm, pism_mpiresm, echam. mpiom, or pism
check=1

#####

INITIAL_DATE_fesom_standalone=2008-01-01 # initial exp. date
FINAL_DATE_fesom_standalone=2010-01-01 # final date of the experiment
#CURRENT_DATE_mpiresm=1851-01-01 # final date of the experiment
CURRENT_DATE_fesom_standalone=date_file # final date of the experiment

SCENARIO_fesom=REF87K

NYEAR_fesom_standalone=1 # number of years per run

MODEL_DIR_fesom_standalone=/home/ollie/dbarbi/fesom_standalone/
BIN_DIR_fesom=${MODEL_DIR_fesom_standalone}/fesom_cpl/
BASE_DIR_fesom_standalone=/work/ollie/dbarbi/FESOM/
POOL_DIR_fesom_standalone=/work/ollie/dsidoren/input/
MESH_DIR_fesom=/work/ollie/dbarbi/meshes/mesh_ref87k/

EXE_fesom=fesom.x

#WORK_DIR=${BASE_DIR_mpiresm}/work
SCRIPT_DIR=${BASE_DIR_fesom_standalone}/scripts

#####
load_all_functions
general_do_it_all $@

```

fesom-runscrip?

That's all!



MODULARITY

As first step towards building a framework for Modular Earth System Modelling, the esm-runscrip`ts` are themselves implemented in a modular way.

esm-runscripsts – main benefits

- Get to a running simulation quickly
- Combine two setups for offline coupling
- Consider only the scientific side, not the technical side
- Directly compare model runs from different models
- Have all the functionality you want (or ask us for it)



“

*No work is so much fun that you should do it
twice.*

(Someone.)



4. esm-usermanual

Documentation (really!)

esm-usermanual

Documentation of:

- All feature available in the esm-tools
- „How-to“ get started quickly
- Default settings
- Known issues

Open project – feel free to add content!

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

Also check out the wiki-page: <https://gitlab.dkrz.de/esm-tools/esm-runscripsts/wikis/home>



5. esm-workshop

Learn how to get, use and
contribute to the esm-tools

esm-workshop

Day 1: Introduction to new users

- Overview
- Accessing the projects
- „How-to“ get started quickly
- Writing a runscripts
- Hands-on session

Day 2: Invitation to contributors

- Philosophy behind the tools
- Coding standards
- Available functions
- FAQ / Missing features

The course will take place:

JUNE 18 / 19 2018, 9:30 -16:00

Konferenzzimmer Kantinenturm

Building E

Get the slides (including this presentation) from: <https://gitlab.dkrz.de/esm-tools/esm-workshop>

More to come...



esm-master



esm-environment



esm-runscripts



esm-usermanual



esm-workshop



esm-interfaces



esm-parser



esm-visualisation



esm-hgf-system

Thanks!

Any questions?

You can find us at:

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

Credits



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