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ESM-Tools
Release 4
April 28, 2020

Release 4 – new stuff

- New features
- New repositories
- New models and setups
- New colleagues
- Paper submitted
- Website updated

New features

- Version checker
- Database
- Plugin manager

esm_versions

Tool that helps to

- Display the versions of the esm_tools python packages
- Upgrade some / all of them
- Available at https://github.com/esm-tools/esm_version_checker

esm_database

Tool that displays databases that are now automatically written by esm_runscripts and esm_master to help you keep track of your actions.

- sqlite
- modular
- Local files on the HPC system

esm_plugin_manager

Flow of esm_runscripts can now be defined in yaml

- modular
- Easy interface for you to define plugins

New repositories

- esm-tools repositories moved to https://github.com/esm-tools/
- Documents improved, now available in https://esm-tools.readthedocs.io

New models and setups

- FOCI (by Joakim Kjellsson and Sebastian Wahl, not merged)
- MPIOM / MPIESM (configuration files WIP)
- YAC (model coupler, implementation into esm_runscripts WIP by Nadine Wieters, part of esm-interface implementation)
- esm-interface (coupling interface, implementation into esm_runscripts WIP by Nadine Wieters)
- ECHAM 6.305, also with opt. Radiation (Kai Himstedt)

Now featured:

- 4 ocean models (FESOM 1+2, NEMO, MPIOM)
- 2.5 atmosphere models (ECHAM, OIFS (+ICON-A))
- ice sheet PISM, BGC REcoM (+ HAMOCC), GIA VILMA (in various combinations)
- 6 machines (ollie, mistral, glogin, blogin, jureca, juwels)
- 5 external partners (GEOMAR, GFZ, DLR, Uni Bonn, DKRZ)

New colleagues

- AWI Bremerhaven: Miguel Andrés-Martínez (since 1st of April)
- AWI Potsdam: another short-term position filled (starting mid-May, until end of year)

Paper submitted:

ESM-Tools Version 4.0: A modular infrastructure for stand-alone and coupled Earth System Modelling (ESM)

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Abstract.

Earth system and climate modelling involves the simulation of processes on a wide range of scales and within and across various components of the Earth system. In practice, component models are often developed independently by different research groups and then combined using a dedicated coupling software. This procedure not only leads to a strongly growing number of available versions of model components and coupled setups, but also to model- and system-dependent ways of obtaining and operating them. Therefore, implementing these Earth System Models (ESMs) can be challenging and extremely time consuming, especially for less experienced modellers, or scientists aiming to use different ESMs as in the case of inter-comparison projects.

To assist researchers and modellers by reducing avoidable complexity, we developed the ESM-Tools software, which provides a standard way for downloading, configuring, compiling, running and monitoring different models - coupled ESMs and stand-alone models alike - on a variety of High Performance Computing (HPC) systems.[1] With the ESM-Tools, the user is only required to provide a short script consisting of only the experiment specific definitions, while the software executes all the phases of a simulation in the correct order. The software, which is well documented and easy to install and use, currently supports four ocean models, three atmosphere models, two biogeochemistry models, an ice sheet model, an isostatic adjustment model, a hydrology model and a land-surface model. ESM-Tools has been entirely re-coded in a high level programming language (Python) and provides researchers with an even more user-friendly interface for Earth system modelling lately. The ESM-Tools were developed within the framework of the project Advanced Earth System Model Capacity, supported by the Helmholtz Association.

Updated Website

- Online Manual (automatically updated)
- Up-to-date videos (WIP)
- Check it out

Outlook – plans for time until release 5.0

- OPENIFS (this week!)
- MPIESM-WISO
- Get FOCI merged
- ICON-A use-cases
- Maybe NEMO standalone?
- Release esm_viz

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- Christopher Danek