

Project: JSBACH initial and boundary data

Project acronym for link in /pool/data: JSBACH

Principal investigator (long-term responsible contact): Veronika Gayler

Applicant (if not the same as above):

Allocation period: 04/2021 – 03/2026

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Volume	500 GB
Expected Volume Change	1 TB
License allows usage on DKRZ resources	yes

Project overview

This project comprises initial, boundary and forcing data required for simulations with JSBACH in commonly used setups. This currently includes JSBACH3 and JSBACH4 initial and boundary data for ECHAM6 and MPI-ESM (Mauritsen et al. 2019) simulations, as well as climate forcing data for simulation with the standalone versions of JSBACH (Reick et al. 2021). In the near future JSBACH4 initial, boundary and forcing data will also be provided on the relevant ICON grids.

The data was generated by MPI-M and is provided under the CC-BY-4.0 license (<https://creativecommons.org/licenses/by/4.0>). Their usage is restricted accordingly.

Mauritsen, T. et al. (2019), Developments in the MPI-M Earth System Model version 1.2 (MPI-ESM1.2) and Its Response to Increasing CO₂, J. Adv. Model. Earth Syst., 11, 998-1038, doi:10.1029/2018MS001400

Reick, C. H., Gayler, V., Goll, D., Hagemann, S., Heidkamp, M., Nabel, J. E. M. S., et al. (2021). *JSBACH 3 - The land component of the MPI Earth System Model: documentation of version 3.2*. Hamburg: MPI für Meteorologie. doi:10.17617/2.3279802. <http://hdl.handle.net/21.11116/0000-0008-098B-2>

Data content

The JSBACH pool data currently comprises initial and boundary data for simulations with JSBACH in Gaussian grid resolutions T31, T63, T127 and T255 (directory 'input'). However it is planned to expand the project with JSBACH4 data on different ICON-grid resolutions.

Annual land-use maps are provided for historical and selected future scenarios in T31, T63 and T127 resolution, R2B4 and higher ICON grid resolutions will be added in the near future. In T31 and T63 annual maps of land-use transitions and harvest data following the Land-use Harmonization protocol (<http://luh.umd.edu/data.shtml>) are additionally available.

Besides, the project provides commonly used global climate forcing data for JSBACH standalone simulations. This includes forcing data from model simulations as well as based on observations. Up to now the daily or three-hourly climate forcing data is only provided in T63 resolution, there is however a need for additional forcing data on ICON grids.

Apart from the above data needed at runtime, the project includes datasets that are needed to generate jsbach initial and boundary files (directory 'prepare').

Except for scripts and some readme files, all data is provided in NetCDF format.

Range of planned scientific data usage

Access to this data is essential for all users of MPI-ESM, ECHAM6 (versions provided by MPI-M) and JSBACH3. Although these models will not be further developed, for the upcoming years many institutions associated with DKRZ will depend on the models.

JSBACH4 simulations within the ECHAM infrastructure rely on initial and boundary data from this pool data project. Besides, future ICON-ESM and ICON-A simulations with special interest in land surface processes, as well as JSBACH4 standalone simulation will need project data.

Model use requires consent to our software license agreement (https://mpimet.mpg.de/fileadmin/projekte/ICON-ESM/mpi-m_sla_201202.pdf).

Data Storage Usage Plan

The current data volume is 498 GB.

For now climate forcing data for JSBACH standalone simulations was only provided in horizontal grid resolution T63, which was the standard resolution in setups with ECHAM (currently 383 GB). We expect that the JSBACH4 standalone version, also running within the ICON framework on ICON grids will in the near future become an important tool for several projects as Q-ARCTIC or ESM2025. We thus plan to additionally provide forcing data on ICON grids in at least two resolutions. This will considerably increase the data storage. Besides, initial and boundary files on ICON grids will be added. We expect a data increase to about 1.5 TB.