

News CLM-Community

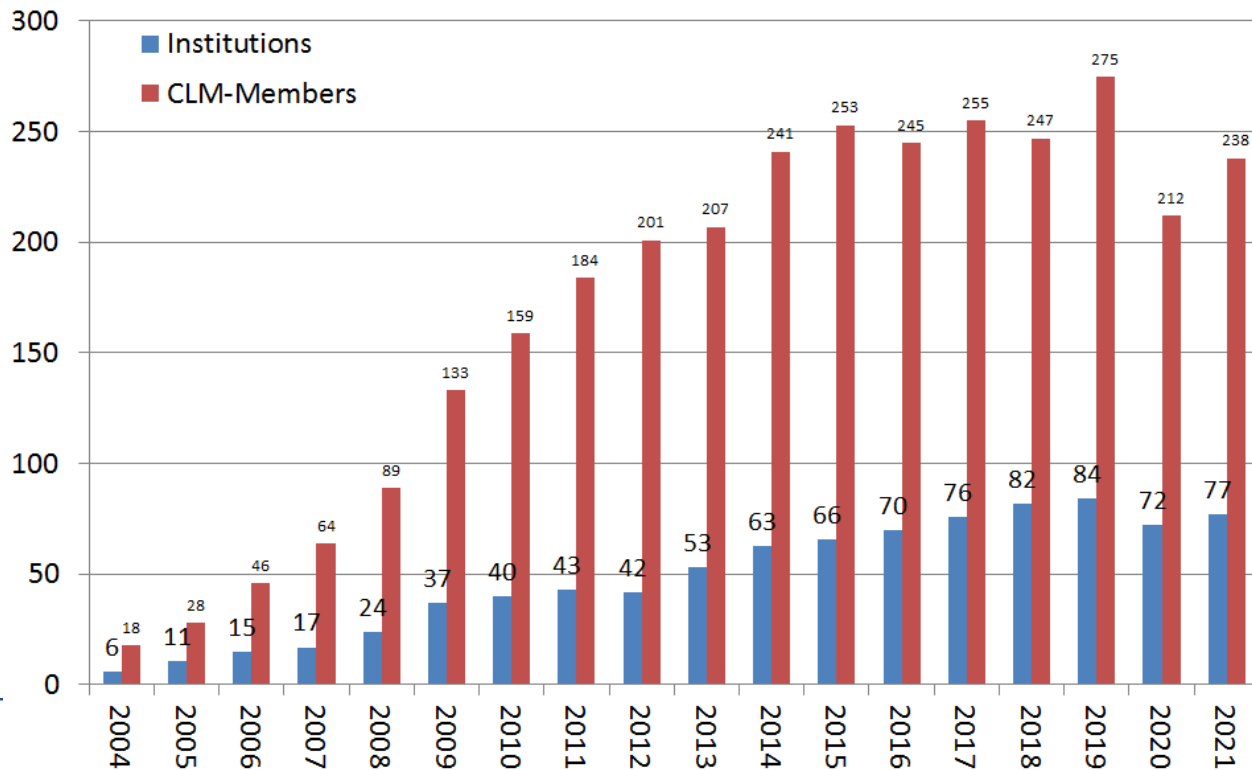
Christian Steger
COSMO General Meeting 2021
16 September 2021
Virtual Meeting

Overview

1. **Community issues**
2. New strategy document / science plan
3. ICON-CLM development
4. Contribution CORDEX – CMIP6

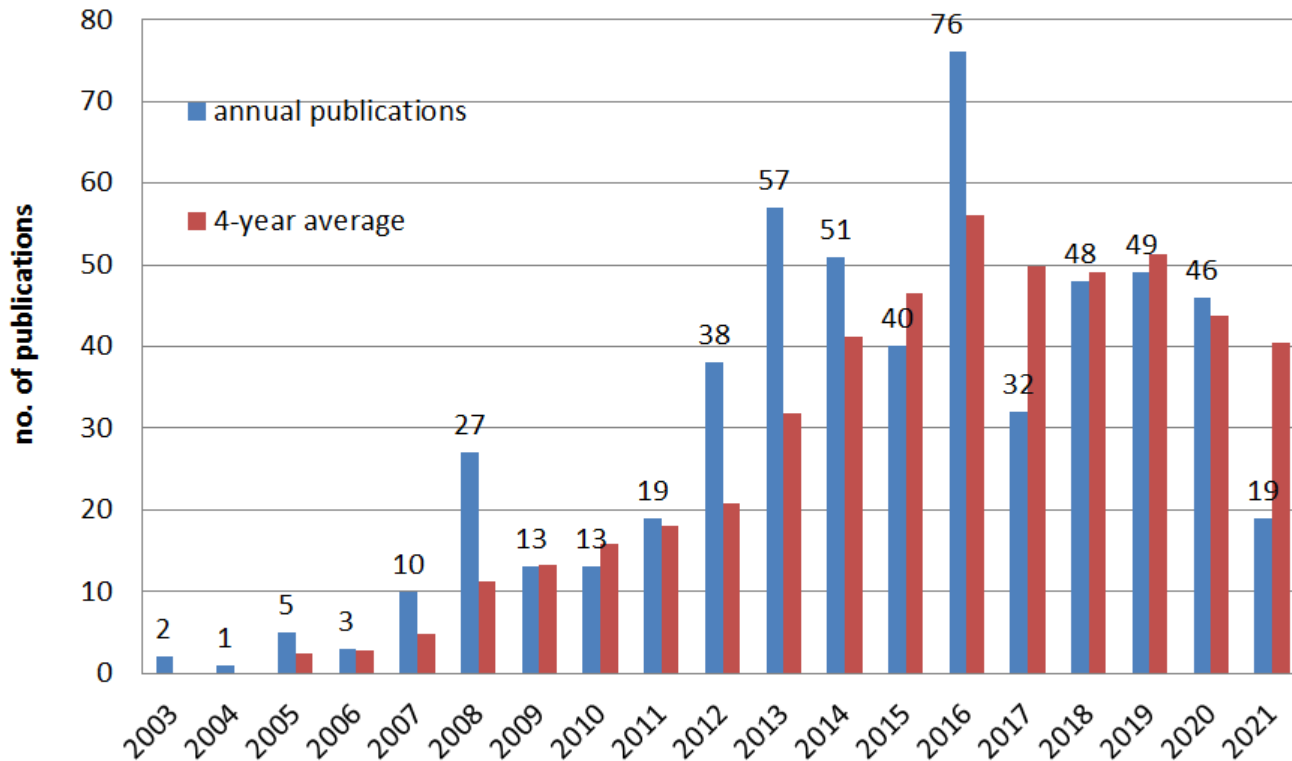


CLM-Community members and institutions





CLM-Community development of publications



New management tool

- New management tool was introduced in April 2021
- Thanks to Hereon, esp. Philipp Sommer
- Management/administration of: members, institutions, topics working and project groups
- Registration for and organization of CLM Assembly
- Link: <https://management.clm-community.eu>

Structure of working groups

- DYNNUM was closed
 - no coordinator and no active members
 - If community members will work on this topic in the future, it should be done in very close cooperation with the ICON consortium
- CCAR in sleep mode
 - No activities at the moment
 - Can be reactivated if situation changes
 - Will be closed otherwise
- PG ICON
 - will very likely be closed in the next year (purpose fulfilled)
 - Discussion about new working group (permanent) „Model development“ to coordinate and take care of ICON-CLM development/maintenance in the future

Development partnership agreement with DWD for ICON

- Agreement was signed in January 2021
- Document is now part of CLM-Community Agreement (Appendix J, <https://wiki.coast.hereon.de/clmcom/terms-conditions-98599061.html>)
- CLM-Community is the only group outside the ICON consortium beside COSMO that can contribute to the ICON development!

Meetings/Events 2022

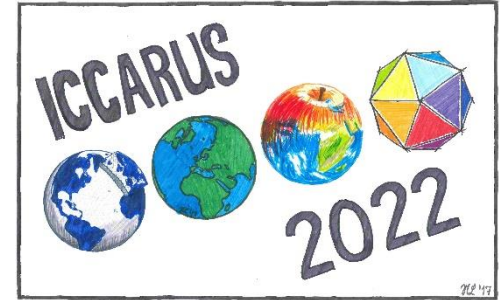
ICCARUS 2022:

07 - 11 March 2022 (virtual meeting)

ICON-LAM/ICON-CLM training course
Not scheduled yet

CLM-Community Assembly 2022

19 - 23 September (Berlin if possible)



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Structure of new strategy document

- Introduction (0.5 page)
- Demands on the CLM-Community and the community model(s) (5 pages)
- Goals of the CLM-Community (11 pages)
 - Quality assurance and support (3.5 pages)
 - Model development: improve and extend ICON-CLM to produce better simulation results (6.5 pages)
 - Application (1 page)

Goals – Quality assurance and support

- Transition from COSMO-CLM to ICON-CLM
- Identify optimal model configurations for climate simulations for Europe and other domains
- Preparation of a common evaluation framework
- Provide training course for ICON-CLM
- Provide and maintain runtime environment for community models
- Standardization of model output

Goals – Model development (ICON-CLM)

- Implementation of a generalized interface
- Improve representation and treatment of aerosols
- Improve representation of land cover and land use change
- Coupling of an ocean model
- Development of a coupled global-regional ESM
- Develop ICON-CLM towards a regional earth system model
- Implementation of flexible online diagnostics

➔ Important: All developments must go back to official ICON releases

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ICON-CLM development – What has been done so far?

- Administrative aspects (code access for community members, workflow for developments) have been clarified and development partnership agreement between DWD and CLM-Community was signed in January 2021
- SPICE (Starter Package for ICON-CLM Experiments, Version 0.9.3) the runtime environment for ICON-CLM has been released and is available for community members now (thanks Burkhardt); Information/documentation: <https://spice.clm-community.eu>
- ICON-CLM development has made progress in 2021 (thanks esp. to Klaus/Burkhardt and colleagues and Daniel for support from DWD/ICON consortium); regular task force meetings each month

ICON-CLM development – Changes from CLM-Community

- Input
 - Time dependency of SST and sea ice
 - Time dependency of greenhouse gas concentrations
- Output
 - Precipitation accumulation over output interval
 - Runoff accumulation over output interval
 - Implementation of sunshine duration
 - Implementation of melting rate
 - Additional variables for soil moisture budget
 - NetCDF time dimension of vegetation quantities
- Other
 - Variable setting of number/thickness of soil levels via namelist
 - Soil moisture budget correction

purple: on the way
to next release
ICON 2.6.4

red: only available
in CLM version up
to now



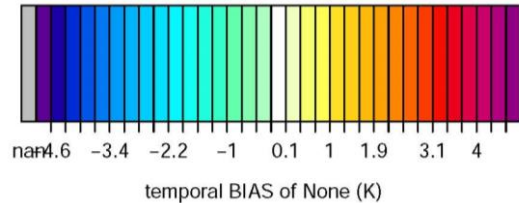
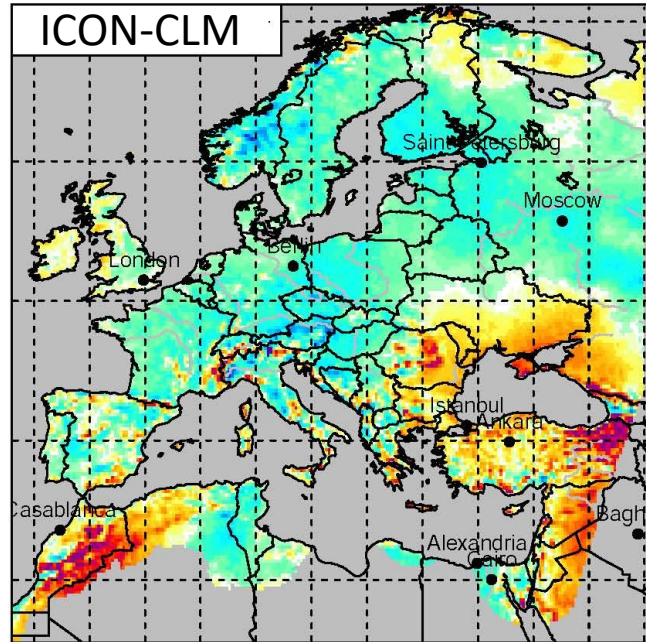
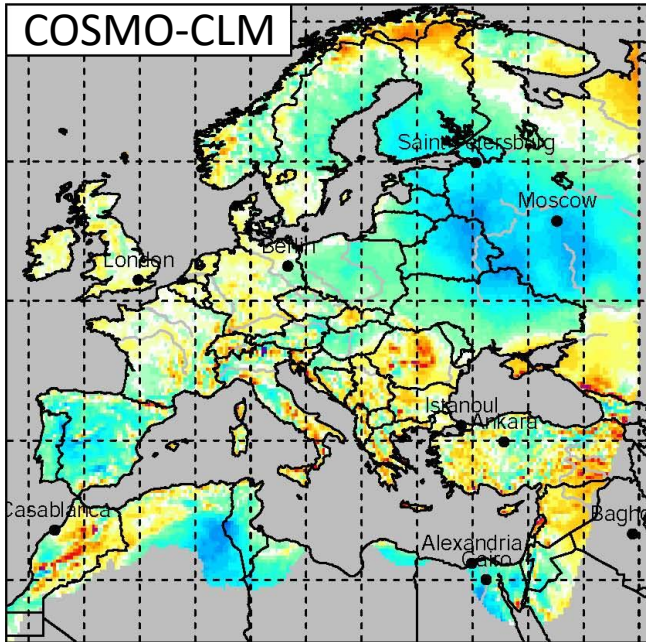
ICON-CLM development – next steps

- Remaining problem: large differences between ICON-CLM results and forcing data (ERA5/ERAInterim) in some months (up to 6 K, often in April/May)



ICON-CLM development – remaining problem

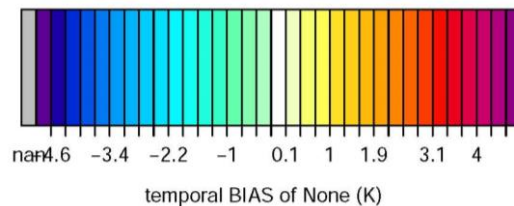
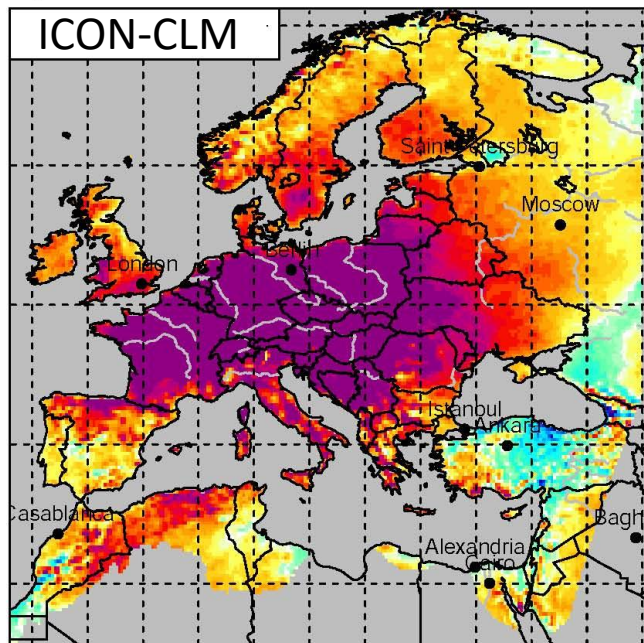
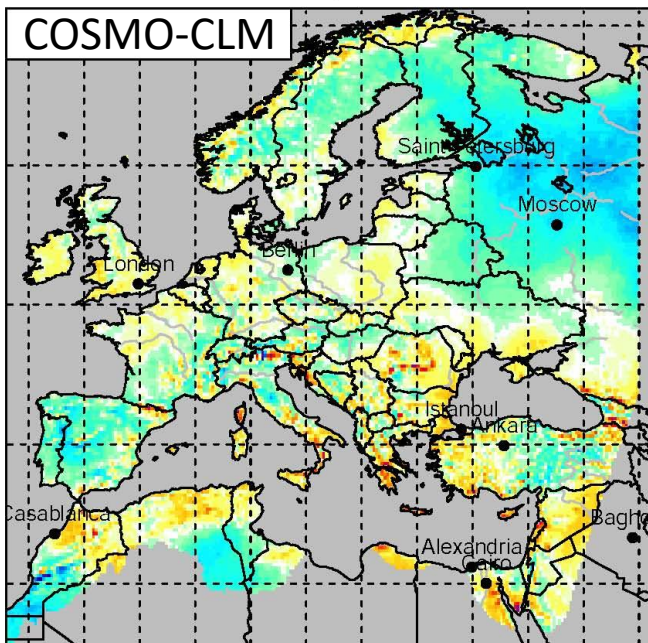
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ICON-CLM development – remaining problem

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ICON-CLM development – next steps

- Remaining problem: large differences between ICON-CLM results and forcing data (ERA5/ERAInterim) in some months (up to 6 K, often in April/May)
- The next ICON release (likely 2.6.4) that will include the remaining changes will be the first working version and used for the coordinate parameter tuning (COPAT2)
- After COPAT2, a first recommended version and setup of ICON-CLM will be provided to the CLM-Community members

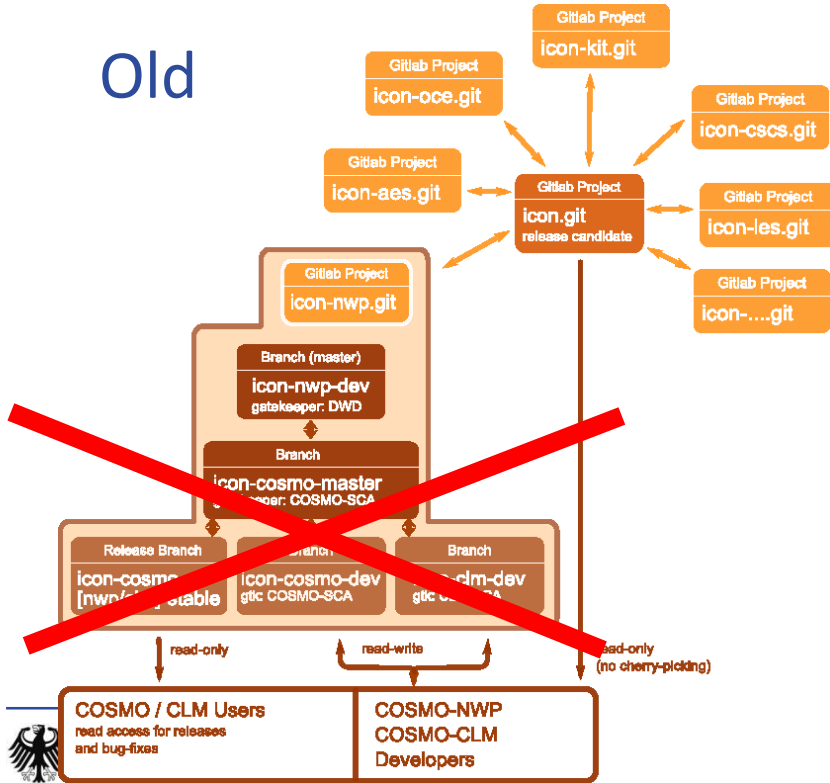
ICON-CLM development – next steps

- Most important/urgent things thereafter are:
 - more flexible initialization for GCMs (different input formats and variables (e.g. W_SO or SMIL), vertical interpolation of soil layers of GCM to ICON layers)
 - optimization of NetCDF output (CF conform variable names, attributes and time stamps/time bounds/cell methods); currently done in postprocessing)
 - Work on converter for CMIP6 GCMs (has already started and is ongoing)
 - Technical tests (compiler settings, parallelization, bit identical results, ...) on all machines on which the model should be used
 - Creating a buildbot test for ICON-CLM

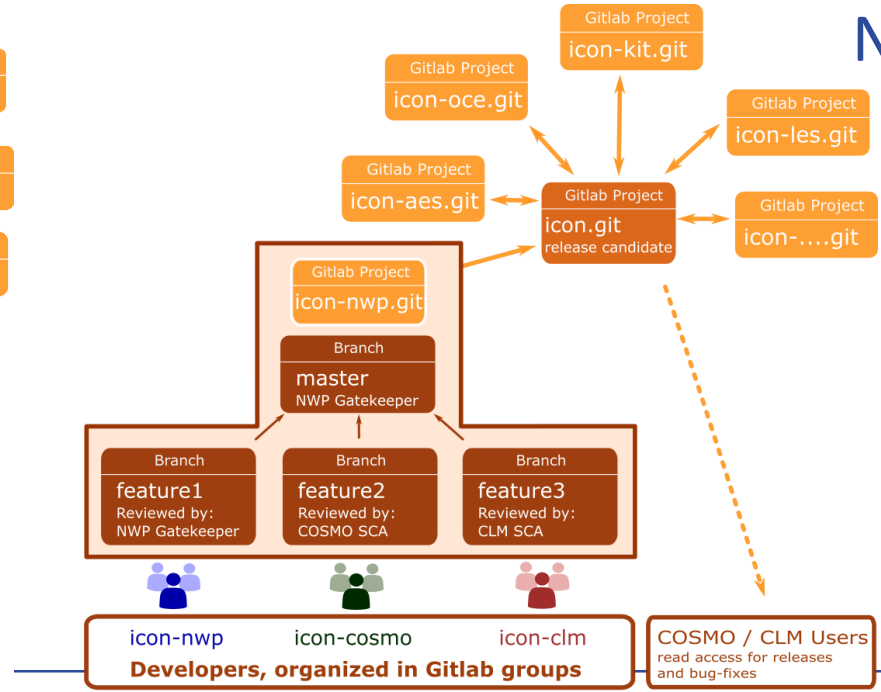


ICON-CLM development – new workflow

Old



New



National ESM Strategy Germany

- Initiative by DKK (German Climate Consortium) to coordinate the national activities in the field of Earth-System-Model development
- CLM-Community proposed ICON-CLM as possible component of a (future, unified) Earth-System-Model
- Workshop for presentation of possible components took place on 14/15 June 2021
- One presentation for ICON (incl. ICON-CLM) together with colleagues from ICON developer consortium
- Broad agreement that ICON should/will be the atmospheric component for all temporal and spatial scales (ocean, coupler etc. less clear)
- Next workshop should take place in November

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4. **Contribution CORDEX – CMIP6**

Contribution to CORDEX – CMIP6

- Global climate simulations for CMIP6 are available now in ESGF
- Downscaling of CMIP6 simulations in CORDEX framework can in theory start soon:
- Experiment protocol has been defined
- Open (decision from CORDEX/EURO-CORDEX necessary):
 - Decisions about output variables/frequencies
 - selection of GCMs for boundary conditions
 - prioritization of emission scenarios

Contribution to CORDEX – CMIP6

- Discussion about contribution of the CLM-Community to the downscaling has started:
 - Production of simulations for different GCMs and scenarios must be coordinated in the community
 - Converter for data of CMIP6 GCMs must be created; work has already started
 - Overview/Plan:
https://docs.google.com/spreadsheets/d/1ucEdjdygFBJS_WLvbNis1rywmptSZcu_tqRkWaZI1SVY/edit#gid=634702028
 - Final decision about contribution from CLM-Community (which GCMs and scenarios) will be taken when all information about scenarios and GCMs are available from CORDEX



Questions?