News CLM Community

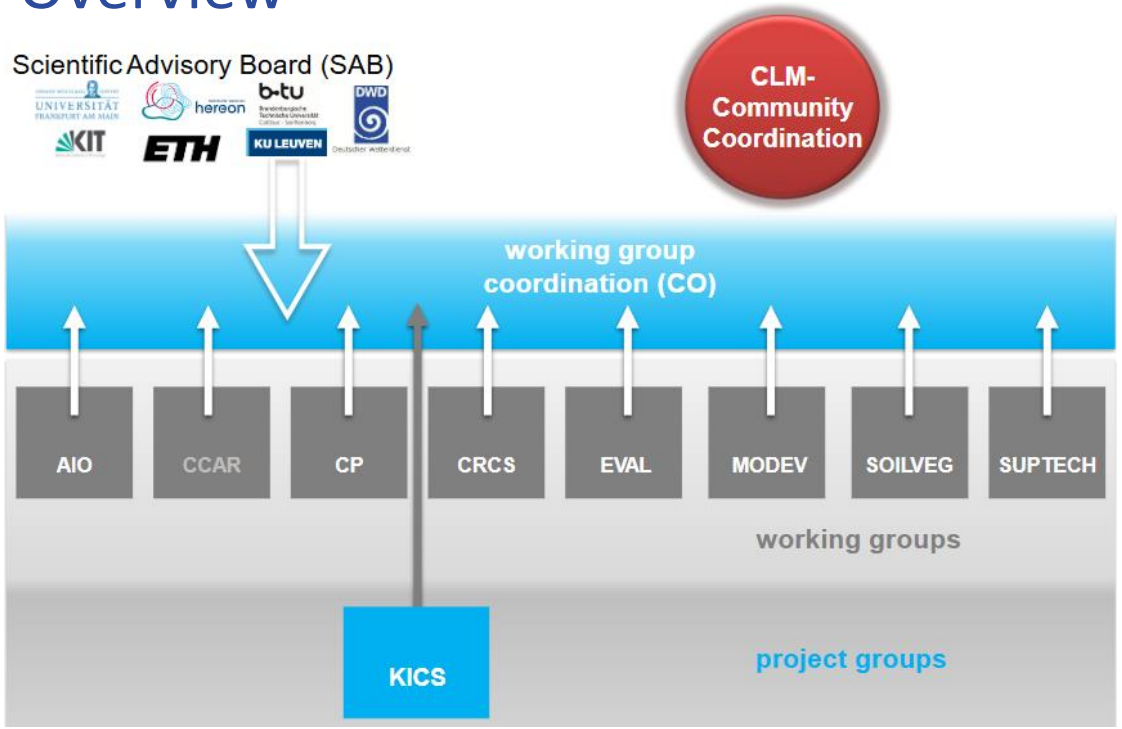
CLM SAB Meeting 2026
23 September 2026
Lüneburg, Germany

Outline

1. **Main working group activities last year**
2. ICON-CLM simulations for EURO-CORDEX
3. CLM Community numbers and meetings

CLM Community Overview

SAB Chair: Stefan Hagemann (Hereon)



WG AIO

- **Development coupled systems**
  - Upgrading RESM GCOAST-AHOIB2-1 (ICON-CLM v2026-04 + NEMO v3.6 + HD v2.5 + ECOSMO) (Ha Hagemann et al., Hereon)
  - The coupling RESM IOW-ESM2 (ICON-CLM v2026-04 + MOM6) is work in progress (Sven Karsten et al., IOW)
  - Regional coupled ICON-CLM + ICON-O-LAM configuration over the Mediterranean for climate applications, developed within the SPICE software (Angelo Campanale et al., CMCC)
  - FESOM-1.4 coupled ocean-ice model forced by CCLM (15 km res.) over the southern Weddell Sea (Günther Heinemann et al., AWI)
  - Develop the new RESM TSMP2 (ICON-CLM + eCLM + ParFlow) (Stefan Poll et al., FZJ)

WG AIO: EURO-CORDEX downscaling (ERA5 & CMIP6)

Institute	RESM	Components	ERA5, ORAS5	MPI-ESM1-2-HR	EC-Earth-Veg3	CNRM, CMCC, MIROC6, NorESM
Hereon	GCOAST-AHOIB1-1	CCLM v6.0 + NEMO v3.6 + HD v2.5 + ECOSMO	1959-2021 (cmorised → JSC)	Historical (finished) SSP370 (running)		
DWD	ROAM-NBS	ICON v2024-10 + NEMO v4.2	1979-2021 (cmorised → JSC)	Historical (finished) SSP126 (finished) SSP370 (finished)	Historical (finished) SSP126 (finished) SSP370 (finished)	
FZJ	TSMP1-140E	CCLM v5.0 + CLM 3.5 + ParFlow	1979-2021 (cmorised → JSC)	Historical (finished) SSP126 (finished) SSP370 (finished)		
IOW	IOW-ESM1	CCLM v5.0 +MOM6 + ERGOM	1979-2021 (running)	Historical (running) SSP126 (planned) SSP370 (planned)	Historical (running) SSP126 (planned) SSP370 (planned)	Historical (planned) SSP126 (planned) SSP370 (planned)

WG AIO publications

- Campanale, A., A. Bevrnja, M. Raffa, R. Potthast, P. Mercogliano, J.-P. Schulz, “Exploring the regional coupled capabilities of the ICON modelling framework: The case of medicane Ianos,” *Atmospheric Research*, Volume 338, 2026, 108975. https://doi.org/10.1016/j.atmosres.2026.108975
- Maurer, V., Düsterhöft-Wriggers, W., Beddig, R, Meyer, J., Hinrichs, C., Ho-Hagemann, H.T.M, Staneva, J., Ehlers, B.-M., and Janssen, F. (2026): Evaluation of coupled and uncoupled ocean-ice-atmosphere simulations using icon_2024.07 and NEMOv4.2.0 for the EURO-CORDEX domain. Geoscientific Model Development, 19, 543–578, https://doi.org/10.5194/gmd-19-543-2026
- Poll, S., Rigor, P., Brdar, S., Ho-Hagemann, H. T. M., Hartick, C., van Hulten, M., et al. (2025). The new TSMP2 coupled Earth system model. EGUsphere, 2025, 1–28. https://doi.org/10.5194/egusphere-2025-5468
- Teske, V., Timmermann, R., Nissen, C., Zentek, R., Semmler, T., Heinemann, G., 2025: Simulated density reorganization on the Weddell Sea continental shelf sensitive to atmospheric forcing. Ocean Sci., 21, 1205–1221. https://doi.org/10.5194/os-21-1205-2025
- Zentek, R., Heinemann, G., 2023: REDOCCA Projekt - Uni Trier - Core Data. DOKU at DKRZ. https://hdl.handle.net/21.14106/cb44f718061ed8e9cdeb574d51113b64ec781564 (The data for full Antarctic, res. 15km, 2000-2014, 2036-2050, 2086-2100)

Ensembles of Climate Projections (WG CP)

- CMIP6 Downscaling for the European Domain almost completed
  - ICON-CLM and COSMO-CLM already published in ESGF
  - Intensive analysis and publication efforts in progress
- Several (3-)Kilometre-Scale Ensemble have been created
  - UDAG – DACH Region, ICON-CLM, 3 GCMs, 2 Scenarios, transient
  - NUKLEUS – ~DACH Region, 3 RCMs, 3 GCMS, 2 GWLs
  - KIT-KLIWA – Southern Germany,4 GCMs, COSMO-CLM, transient
  - CORDEX FPS UrbRCC – Paris and Johannesburg
- Regional Decadal Hindcast Ensemble (R2B7, R2B9) with ICON-XPP for Europe

Ensembles of Climate Projections (WG CP)

- Publications WG CP - incomplete
  - Sieck, K., et al. (2026): NUKLEUS – A First Kilometre Scale Multi-model Climate Ensemble for Germany: Evaluation, EGUsphere [preprint], https://doi.org/10.5194/egusphere-2026-1024, under revision
  - Braun, C., et al. (2026): NUKLEUS – A first kilometer-scale convection-permitting multi-model climate ensemble for Germany: Characteristics of the historical simulations 1961–1990, EGUsphere [preprint], https://doi.org/10.5194/egusphere-2026-2517, under revision
  - Beier, C., et al. (2026): NUKLEUS - A First Convection Permitting Multi-model Ensemble for Germany: Assessment of future changes in temperature and precipitation extremes. Journal of Climate, in print.
  - Cusinato, E., et al. (2026): From Global to Regional Climate Models: Consistency Assessment of the Hydrological Cycle. Climate Dynamics, under revision
  - Singh et al. (2026): Dynamical and statistical downscaling of CMIP6 climate projections for Europe and Germany using ICON-CLM and EPISODES, Int. J. of Climatol., submitted
  - Pinto, J. G., et al. (2026): User-Relevant Climate Indices and Associated Uncertainties: From Transient Convection-Permitting Climate Model Projections. Int J. of Climatol. e70304. https://doi.org/10.1002/joc.70304.

WG Convection-Resolving Climate Sim. (WG CRCS), 2025/26

- WG CRCS-related scientific / technical activities
  - Coordinated Evaluation of Convection Permitting Climate simulations with ICON-CLM for Germany (CECPI-Ger) ongoing follow-up activities: 2-moment MP scheme testing, configuration testing for geographically distant / continental domains
  - Ongoing analyses of the UDAG km-scale simulations over Germany (e.g., precipitation extremes)
  - Technical developments by WGs EVAL, SUPTECH with “km-scale support”: COPAT3 pipeline, new EVA-Suite, new SPICE

WG Convection-Resolving Climate Sim. (WG CRCS), 2025/26

- Other activities (non-comprehensive)
  - Continued contribution to CORDEX FPSs doing km-scale ICON runs with WG CRCS members' participation (e.g. FPS-URB)
  - Contribution to CORDEX Task Force on CPRCM strategy report (https://zenodo.org/records/20282519) (based on this report, a paper by Sobolowski et al. for CORDEX 15th anniversary PLOS special issue under preparation)
  - WG CRCS members applied for newly to-be-established WCRP / CORDEX Task Team Convection-Permitting Regional Climate Modelling
- Born out of WG CRCS Task Group Alps discussions in mid 2025 (transferring the CECPI-Ger recommended configuration to new model domains for specific process studies):
  The WG CRCS initiated during the CLMcom GA 2025 the establishment of the time-bound **Project Group Kilometer-scale ICON Continental Simulations (PG KICS)** and devoted most of its activities to this PG ever since

WG Convection-Resolving Climate Sim. (WG CRCS), 2025/26

- Ongoing joint publication on 2024/2025 CECPI-Ger activity, mainly in collaboration with WG EVAL
  - Will et al. for JAMES on CECPI-Ger (tuning strategy, parameter sensitivities, optimized configuration and assessment)
- Km-scale (publication) activities in relation to WG CRCS, (supported) by members, non-comprehensive
  - Renewable energy: e.g., by KU Leuven: Borgers et al. (2025, https://doi.org/10.1088/1748-9326/add8a2, https://doi.org/10.1175/JAMC-D-24-0116.1; FZJ: Chen et al. (2025, https://doi.org/10.1016/j.energy.2025.139565)
  - Model domains over Africa, extreme precipitation and heat stress: e.g., by KU Leuven: Sunguti et al. (under preparation), Ramon et al. (2025, https://doi.org/10.1088/1748-9326/ae05b1)
  - New km-scale simulations: e.g., by AIT: Baier et al., HAILCHANGE project (2km ICON runs, hail events over Alps/Austria)

WG EVAL

- COPAT framework: COPAT3
- EvaSuite
  - v1.0.2 → support users
  - v2.0.0 (Nova) → new version of EvaSuite adapted for high-resolution datasets with more efficient memory consumption, new input formats (zarr + healpix) and fully automated system of tests

WG SOILVEG

- **WG Coordinator / Deputy**

  Jan-Peter Schulz (DWD, CMCC) / Mario Raffa (CMCC)

- **Key research topics: Soil hydrology**
  - Jane Roque (Uni Bonn): Decadal convection-permitting irrigation impact across the European continent
  - Morgane Lalonde (ETHZ): Lateral soil water transport
  - Gennaro Sequino (CMCC): Soil hydraulic properties based on measurements
  - Mittal Parmar (GUF): Frozen soil water for seasonal prediction

WG SOILVEG

- **Key research topics: Urban modelling**
  - Angelo Campanale (CMCC): Urban test case Bologna
  - May Bohmann (KIT): Urban climate applications with ICON-CLM at KIT
  - Kutay Dönmez (EMPA): Evaluating the role of Urban Canopy Parameters in ICON TERRA_URB
  - Nicole van Lipzig (KUL): "Roman cement" with high albedo
  - Fien Serras (KUL): Urban climate adaptations in Belgium

Topics WG SUPTECH (1)

- **User Management and gitlab**: connection between gitlab and webpage established; working groups and repositories in place and now used more actively; also some public repositories (e.g. SPICE)
- **SPICE** updated to version 2.4 (new recommended settings; technical updates, new documentation directly in gitlab, …)

Topics WG SUPTECH (1)

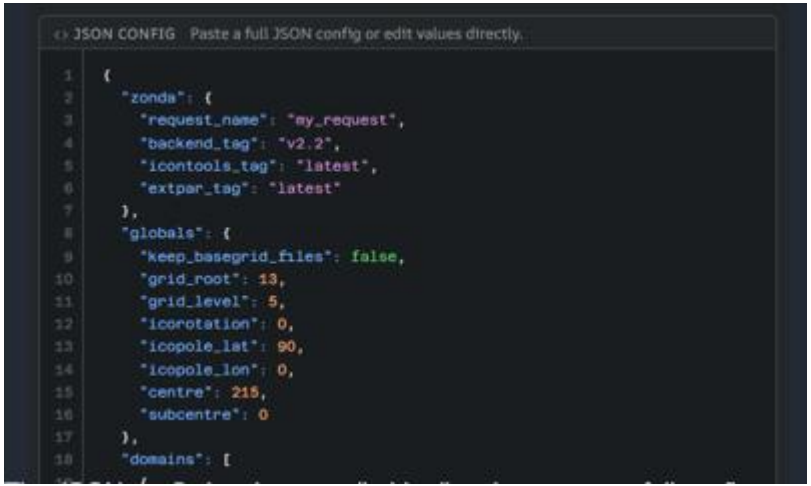
- **COPAT-Framework** for testing new model versions established
- **ICON-CLM Training course** in June with 31 participants

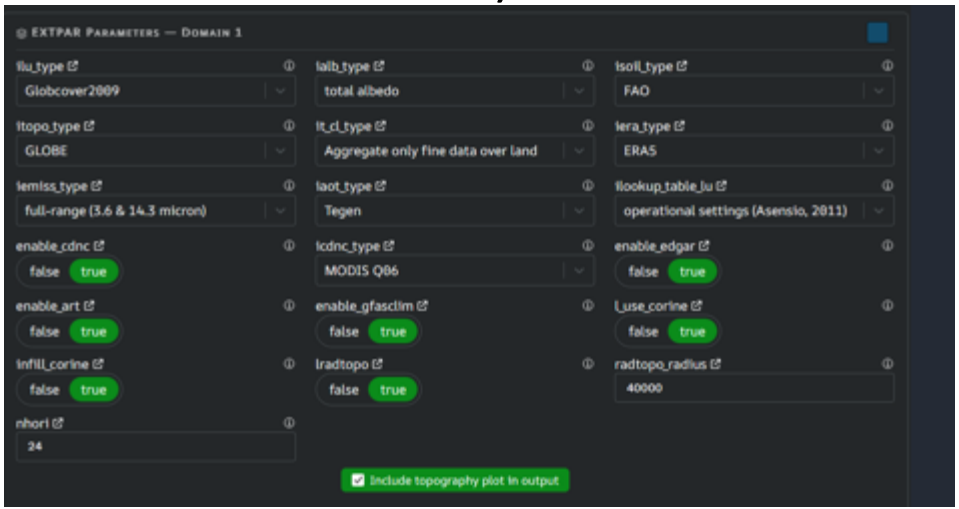




Topics WG SUPTECH (3)

- **Zonda** updated to version 2.2 (e.g., editable JSON Config and new datasets for EXTPAR)





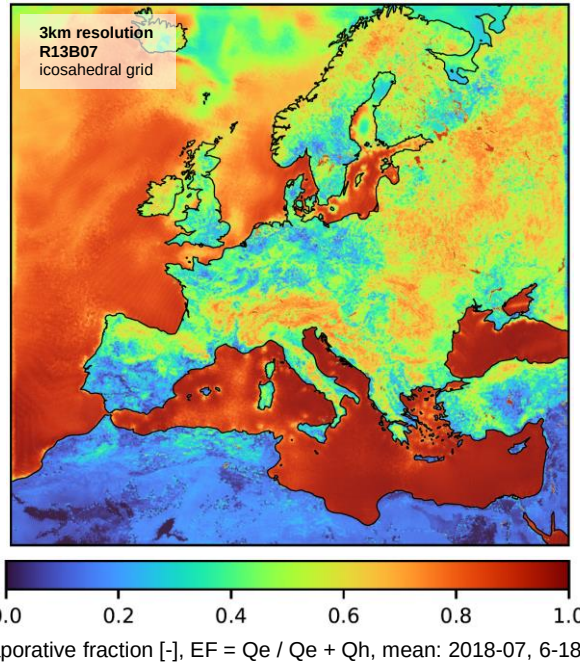
PG Kilometer-scale ICON Continental Simulations, 2025/26

- Assembly 2025: **Startup and establishment of PG KICS**
  - "The goal of the Project Group is the preparation, conduction, and analysis of km-scale continental ICON climate simulations by 2030. This encompasses all aspects of regional climate modelling. The PG thus aims at enabling the CLM-Community to perform such simulations, similar to 12 km simulations nowadays, 2025."
- GitLab-based FAIR / RAIR4RS work organisation, information management, communication, sprint-like simulation experiment development and maintenance; **monthly jour-fixe** and **intermediate meetings**
- Two primary simulation experiments ongoing / under preparation (pan-European 3km model domain)
  - "*pg-kics_cycle-2026_initial-tests*" (preparation of setup, use of multiple HPC systems, internal variability, additional sensitivity study runs), seven simulation groups / HPC systems; 1SYPD can already be reached (on CSCS Alps by ETH)
  - "*pg-kics_cycle-2026_baseline*" (production of 2026 1st 10-year evaluation baseline, **continued technical improvements** (data handling, performance, in-situ analysis, workflows, parallelism, use of heterogeneous HPC, etc.); enhanced setups and configurations; **basis for extensive community analyses and process studies through community Task Groups**
- Since May 2026, own CLMcom compute time project on JSC/JUPITER exascale HPC system for km-scale runs

PG Kilometer-scale ICON Continental Simulations, 2025/26

pg-kics_cycle-2026_initial-tests setup

- ICON release-2026.04-public
- Configuration: CEI19[3,5]c
- Grid: R12B07, EUR-12 extent
- extpar: Zonda
- One-way single nest, no nudging
- LBC / IC: ERA5
- 2001-12 spinup, 2002-01 to 12
- Workflow engine: SPICE 2.4 modified
- VL: towards CORE and Tier 1 from CORDEX
- HPC: IMWM, GUF, DWD, DKRZ, CSCS, JSC (x2)



Evaporative fraction [-], EF = Qe / Qe + Qh, mean: 2018-07, 6-18UTC

Example of preparatory ICON 3km test runs

Outline

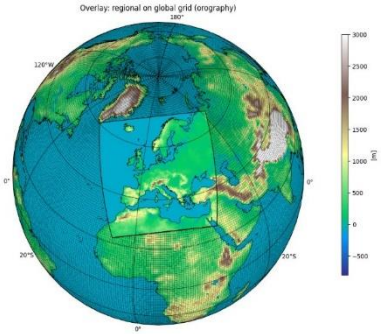
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UDAG – 12 km simulations

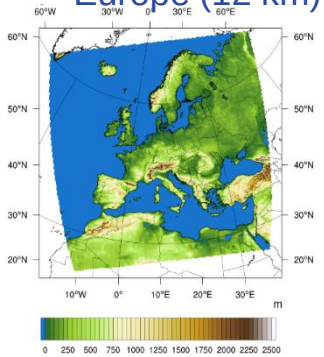
- Provide regional climate projections based on current global climate models (CMIP6)
- "Dynamical Downscalling"
  - ICON-CLM
  - 4 global models as driving models
  - Scenarios: SSP1-2.6, SSP2-4.5

    SSP3-7.0 and SSP5-8.5

Global (100 km)



Europe (12 km)



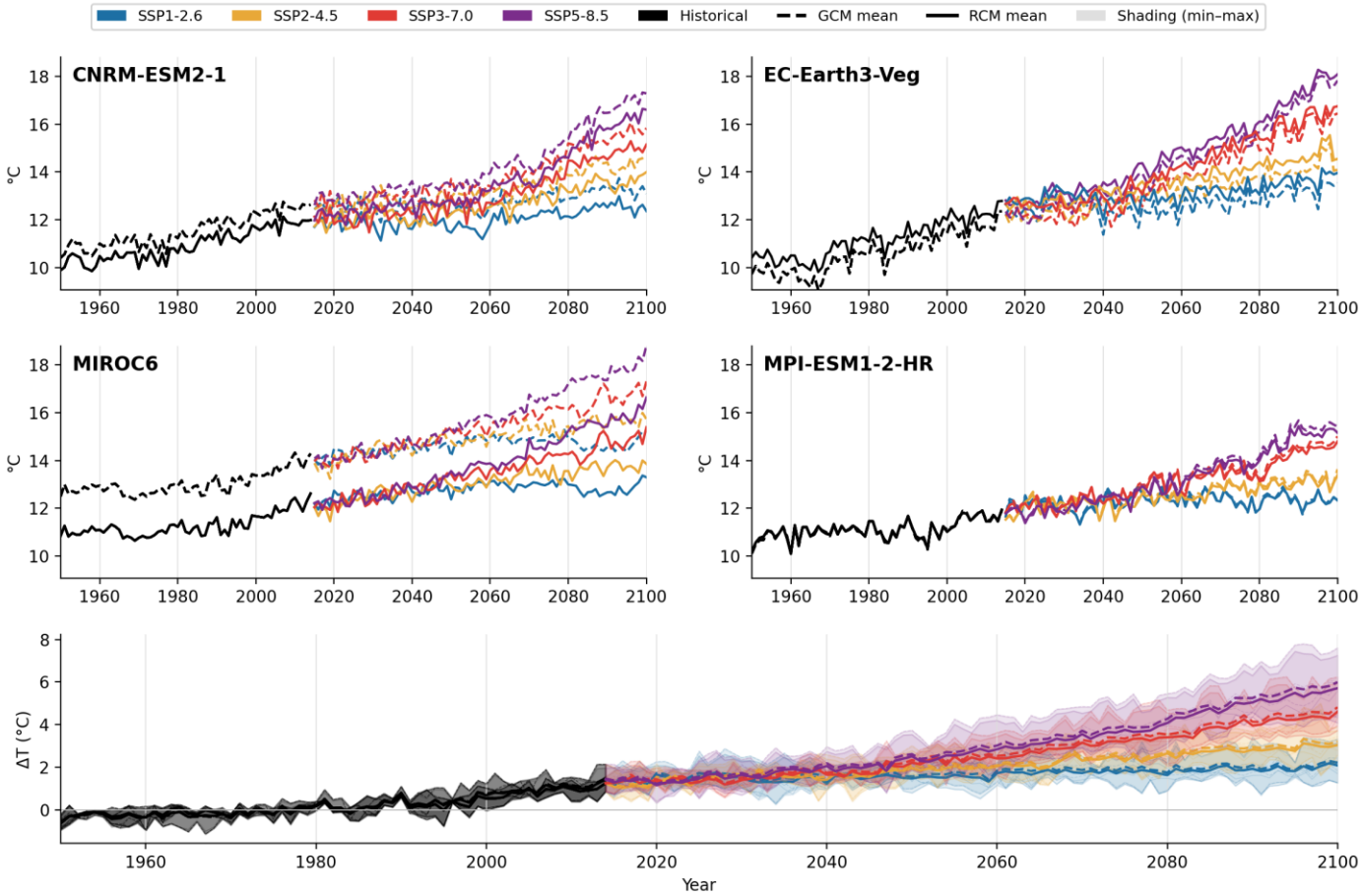
WCRP CMIP6 World Climate Research Programme

ICON

UDAG 12 km

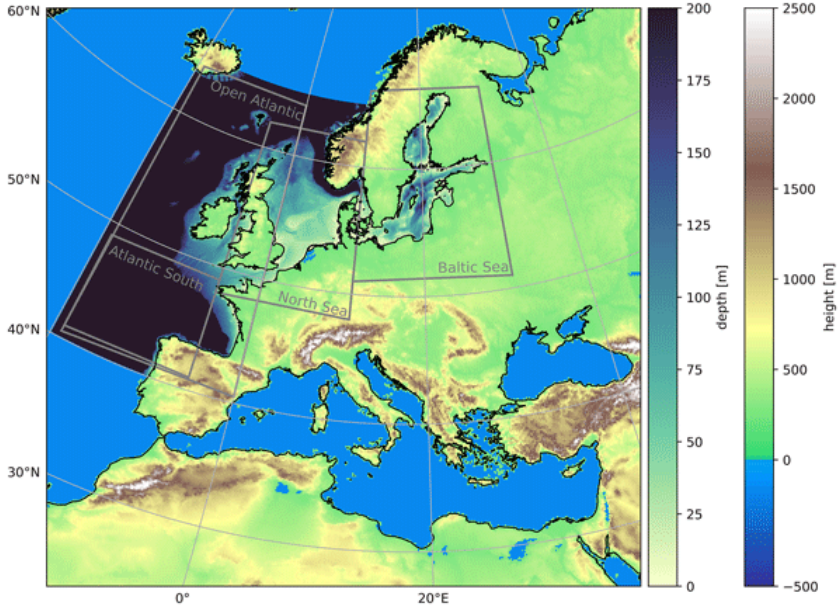
2m temperature Europe in historical and different scenarios in GCMs and RCMs

Ensemble mean



More 12 km simulations

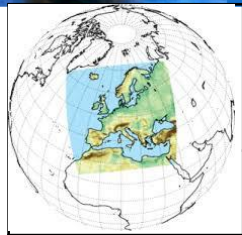
- Simulations with NorESM2-MM and CMCC-CM2-SR5 were carried out by WEGC, FZJ, ETH, IMGW
- Simulations with coupled systems (CCLM6-0-1-URB, TSMP1-140-E, CCLM5-0-9-NEMOMED12-3-6, GCOAST-AHOI1-1, GCOAST-AHOIB1-1, GCOAST-AHOI2-1, ROAM-NBS) were done by CMCC, FJZ, IOW, Hereon and DWD



Climate Limited-area Modelling Community

CMIP6 - EURO-CORDEX "balanced" matrix

Deutscher Wetterdienst
Wetter und Klima aus einer Hand
DWD

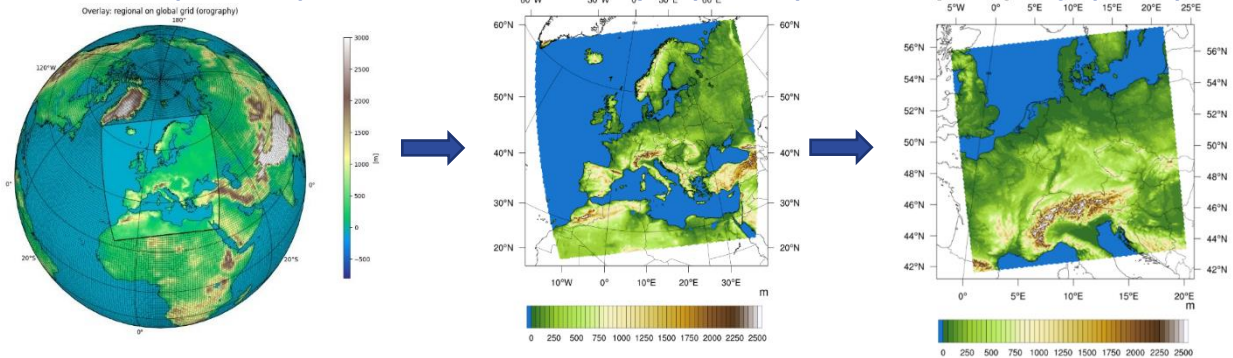


Institution	CNRM-MF	Hclimcom-SMHI	CLMcom – ICON-CLM	CLMcom – COSMO-CLM	KNMI	GERICS	CNR-ISAC, CUNI, ICTP	AUTH, BCC-UCAN, IDL-FCUL, TASK-IMWM
RCM	CNRM-ALADIN64E1	HCLIM43-ALADIN	ICON-CLM-202407-1-1	CCLM6-0-1	RACMO23E	REMO2020-2-2	RegCM5-0	WRF451Q
GCM	realization							
CMCC-CM2-SR5	r1i1p1f1	hist, ssp126, ssp370		hist, ssp126, ssp370	hist, ssp126, ssp370				hist, ssp126, ssp370
CNRM-ESM2-1	r1i1p1f1	hist, ssp126, ssp370	hist, ssp126, ssp370			hist, ssp126, ssp370		hist, ssp126, ssp370	
EC-Earth3-Veg	r1i1p1f1		hist, ssp126, ssp370	hist, ssp126, ssp370		hist, ssp126, ssp370	hist, ssp126, ssp370		
MIROC6	r1i1p1f1		hist, ssp126, ssp370	hist, ssp126, ssp370	hist, ssp126, ssp370		hist, ssp126, ssp370		
MPI-ESM1-2-HR	r1i1p1f1				hist, ssp126, ssp370		hist, ssp126, ssp370	hist, ssp126, ssp370	hist, ssp126, ssp370
NorESM2-MM	r1i1p1f1	hist, ssp126, ssp370				hist, ssp126, ssp370		hist, ssp126, ssp370	hist, ssp126, ssp370

UDAG – 3 km simulations

➔ High-resolution simulations (3 km) for „Hydrological D-A-CH Region”:
Refinement of 12 Simulations to a convection-permitting scale (3 km)

Global (100 km) → Europe (12 km) → Germany (3 km)



WCRP CMIP6
World Climate Research Programme

ICON

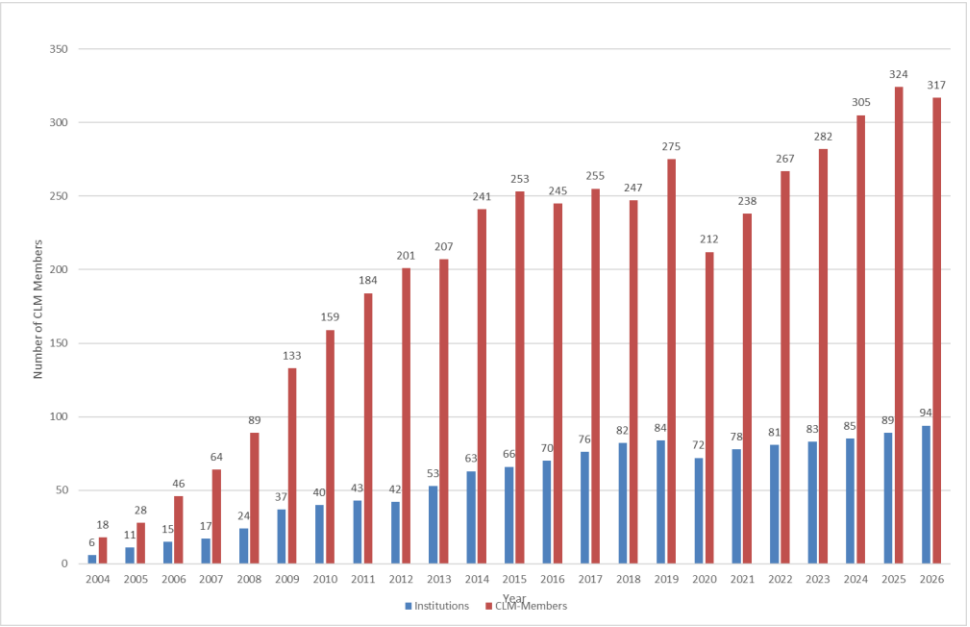
MIROC6
MPI-ESM1-2-HR
EC-Earth3-Veg

SSP1-2.6 and
SSP3-7.0

Outline

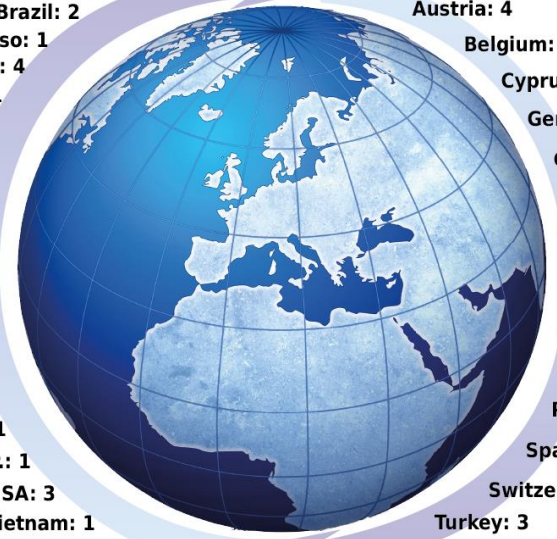
1. Main working group activities last year
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CLM Community members and institutions



CLM-Community WORLD

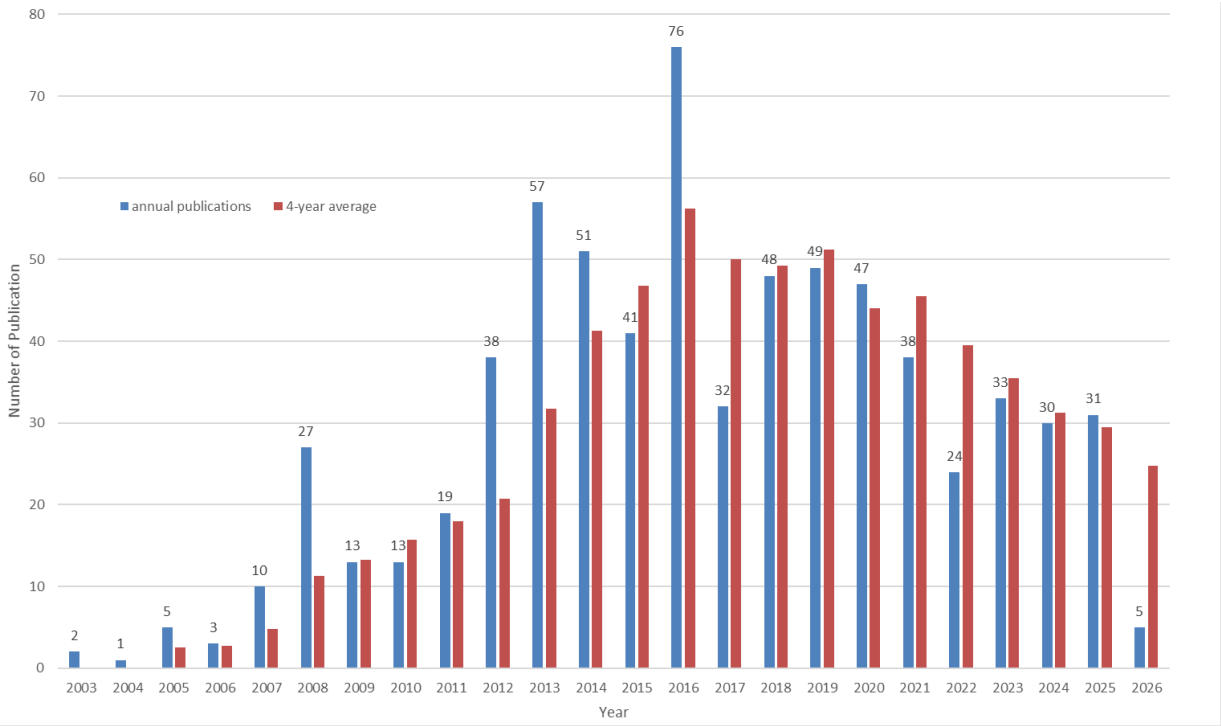
Algeria: 1
Brazil: 2
Burkina-Faso: 1
China: 4
Egypt:1
Eswatini:1
India: 3
Indonesia: 1
Iran: 1
Israel: 2
Mexico: 1
Nigeria: 3
Pakistan: 1
Russia: 1
Saudi Arabia: 1
South Korea: 1
United Arab. Emir.: 1
USA: 3
Vietnam: 1
Zimbabwe: 1



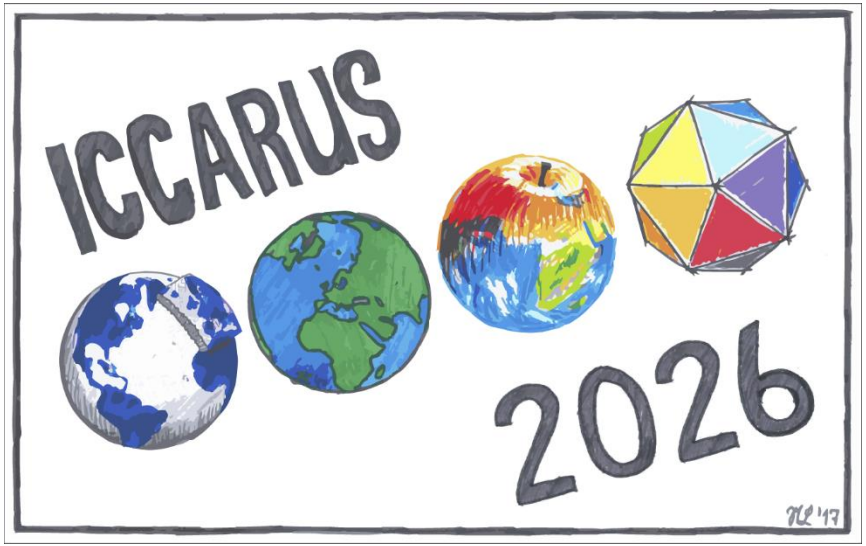
CLM-Community EUROPE

Austria: 4
Belgium: 3
Cyprus: 1
Germany: 30
Greece: 2
Ireland: 1
Italy: 4
Luxembourg: 1
Netherland: 1
Norway: 3
Poland: 2
Spain: 1
Switzerland: 4
Turkey: 3
UK: 3

CLM Community development of publications



Meetings/Events 2026 + 2027



ICON-CLM Training 2026:

23 – 25 June 2026

CLM Community Assembly 2026:

22 - 25 September 2026, Lüneburg

ICCARUS 2027:

08 - 12 March 2027, Offenbach

ICON-CLM training course 2027:

22 – 24 June 2027, Offenbach (t.b.c.)

CLM Community Assembly 2027:

20 – 24 September 2027, Caserta (t.b.c)

Questions?