



CLM-Community Agreement

on the joint utilization and further development of the
CLM-Community Software

Version 5.4
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1. History

version	status	author
V1	version translated from German original	U. Riebow, P. Frater (BTU Cottbus)
V2	accepted at the CLM-Community Assembly 2006 in Langen (adjustments)	A. Will (BTU Cottbus)
V3	accepted at the CLM-Community Assembly 2010 in Berlin (adjustments)	A. Will (BTU Cottbus)
V4	accepted at the CLM-Community Assembly 2011 in Cava de Tirreni (coding standards)	A. Will (BTU Cottbus)
V4.1	accepted at the CLM-Community Assembly 2012 in Leuven (adjustments)	A. Will (BTU Cottbus)
V5	material for the CLM-Community Assembly 2014 in Frankfurt	B. Früh, J. Brauch (DWD)
V5.1	Adjustments from the CLM-CO meeting in June, 2014; accepted CLM Assembly 2014 Frankfurt	B. Früh, J. Brauch (DWD)
V5.2	minor corrections	B. Früh (DWD)
V5.3	General adjustments, adjustments for General Data Protection Regulation (GDPR), inclusion of ICON-CLM	C. Steger (DWD), B. Früh (DWD)
V5.4	Development partnership agreement between DWD and the CLM-Community with respect to the ICON software included in CLM-Community agreement as appendix. Links to CLM-Community documents updated and removed where not necessary. Minor corrections.	C. Steger (DWD)

2. Ambition of the CLM-Community

After many years of development, regional climate models (RCMs) have reached a level, which allows the simulation of regional climate patterns with high temporal and spatial resolution. With the information from the global climate model at the boundaries and the emission scenarios assumed, RCMs can give more detailed information on potential local climate change in the future compared to the global projections. However, the operation of these models, the analysis of their results, as well as the continuous improvement of their efficiency and the quantitative examination are connected with considerable and continuously increasing costs. Thus, the most efficient use and further development of regional climate models is done to the best in coordi-



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nated, joint actions of a large group of scientists like the [Climate Limited area Modelling-Community \(CLM-Community\)](#).

The models employed in the CLM-Community are the regional climate models COSMO-CLM and ICON-CLM (hereafter the CLM-Community models).

The COSMO model has its origins at DWD and it is now developed and applied by COSMO (CONsortium for Small scale MOdelling) for weather forecasting applications. COSMO-CLM is the climate mode of the COSMO model, which has been refined and extended by the CLM-Community over the last years.

The ICON modeling framework is a joint development of DWD and Max-Planck-Institute for Meteorology in Hamburg (MPI-M). ICON is operational for numerical weather prediction at DWD since 2015. In the second half of 2020, the Limited-Area-Mode of ICON (ICON-LAM) will replace the high resolution COSMO for the German domain and DWD will stop the operational use of the COSMO model. In order to have a state of the art tool for regional climate applications for the upcoming years, the CLM-Community is adapting ICON-LAM for regional climate applications. This configuration will be the Climate Limited-area Mode of ICON (ICON-CLM).

The ambitions of the CLM-Community are:

- to coordinate the work of model development and maintenance to have a scientifically and technically state-of-the-art regional climate model as CLM-Community model,
- to maximise scientific findings by regularly exchanging information and having close collaborations,
- to make substantial contributions to the international (regional) climate (modelling) research, and,
- to support external users (e.g. from the field of climate impact research) on the utilisation and interpretation of the simulation results.

The outline of the future direction of work of the CLM-Community is summarized in the CLM-Community science plan¹. The science plan sets the frame for the model developments and applications for the next years. This includes the identification and elimination of model deficits and the definition of common scientific goals. The science plan will undergo a regular update.

All CLM-Community documents can be found on the CLM-Community website¹.

3. Purpose of the Community Agreement

The signatories are obliged to implement and follow the rules and agreements specified in this document. They agree that maintaining an active community and coordinated research can only be achieved by a joint implementation of the regulations stated herein.



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The following sections regulate the handling of the community models and the cooperation of the community members. All members (*section 4.1*) of the CLM-Community have to accept the regulations stated herein.

4. Rights and Obligations

4.1 Membership

Every person affiliated at an university, research institution or state agency who wishes to use the CLM-Community software (COSMO-CLM and ICON-CLM as well as all scripts and programs for workflow control, pre- and post-processing, see *Appendix D*) for his/her own research purposes and accepts the guidelines stated herein without restrictions can become a member of the CLM-Community. To become a member of the CLM-Community, the interested person has to apply for membership using the official application form² (Appendix A). By signing the application form the person confirms, that he/she has taken note of the data protection information¹ (Appendix B). The membership comes into effect by approval of the CLM-Community coordination office (CO).

The membership is documented by a public listing (name and institution) on the CLM-Community website³. Further information about each member (e.g. E-e-mail, phone number, description of the research objectives, membership in working groups, picture (optional)) is available in the member area of the CLM-Community website³.

The membership in the CLM-Community ends when the member writes an informal notice to the hands of the CLM-Community coordination office or when the member leaves the institution for which he/she is registered. In the latter case, the member has to inform the CLM-Community coordination office. The membership has to be renewed when the work with the CLM-Community software is continued at another institution. In this case, the membership persists for the transition period.

After a member leaves the CLM-Community, the CLM-Community coordination office removes the person's name from the members list, deletes the email address from all mailing lists, deletes the phone number and disables the web access to the CLM-Community webpage. The person's name, areas of work and scientific contributions are archived for documentary reasons in the restricted member area of the CLM-Community webpage⁴.

4.2 Utilisation of the CLM-Community Software

The CLM-Community software (*Appendix D*) is made available for every member of the CLM-Community via the CLM-Community website⁵, RedC⁶ or an appropriate Git repository. The authorization to use the CLM-Community software ends with the end of the membership in the CLM-Community.



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Every community member is allowed

- to change the model code in accordance with the community rules on model development (*section 4.3*),
- to conduct simulations using the model and publish the results (*section 4.5*), and
- to pass the results obtained to third parties.

It is explicitly forbidden for community members

- to pass any part of the CLM-Community software to third parties,
- to use any part of the CLM-Community software commercially (this is subject to a special contractual arrangement between DWD, the CLM-Community coordination office and the member).

The community member should

- participate in joint user meetings, especially the annual CLM-Community Assembly,
- inform the community about publications containing results from model simulations (provide information to the CLM-Community coordination office for uploading to the CLM-Community website),
- stick to the recommendations made by the DFG “Safeguarding good scientific practice¹” (*Appendix E*), and
- inform the community quickly about problems and progress during the work via CLM-Community website (RedC⁶)

The community member has to

- explain the intended work (developments and simulations) to the CLM-Community to enable a better coordination of CLM-Community’s activities (*section 4.3*); for model developments the procedure is described in the COSMO Standards for Source Code Development (CSCD)⁷
- take measures for quality assurance, which guarantee the reproducibility of the achieved results (*section 4.4*),
- provide the achieved results to the community (*section 4.5*),
- return the CLM-Community software modifications to the community (*section 4.5*) in accordance to the guidelines (*section 4.3*), and
- pass identified errors or shortcomings in the CLM-Community software or in the results immediately to the community via RedC⁶.

A joint analysis of simulation results and an intensive exchange of experience during CLM-Community software development are explicitly desired and are supported by the CLM-Community coordination office.



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4.3 Model Development and Documentation

A major aim of the CLM-Community is to develop the CLM-Community models systematically by continuously improving individual model components and by extending the CLM-Community models with additional process modules.

All members are allowed to change the code of the CLM-Community models for test purposes, for required adaptations and extensions as well as for the general improvements of the model quality. But the procedure of model development in the community has to follow certain rules to prevent double or redundant work. These rules guide the member from the first idea to a new version of a CLM-Community model. They are explicitly described in the currently valid version of the COSMO Standards for Source Code Development⁷.

4.4 Archiving and Reproducibility

In order to guarantee the community's high quality demands to their scientific way of working, the details/configuration of relevant and especially published simulations need to be documented in a way that their reproduction is possible for a reasonable period (e.g. 10 years). Excluded from this rule are external factors, which cannot be controlled by the CLM Community (e.g. change of HPC systems).

All relevant in- and output files as well as program code used for the simulation need to be archived by the author for a reasonable period (e.g. 10 years) to enable quality assurance, reproducibility and further utilisation.

The respective data and code need to be kept beyond the end of the scientific work in accordance with the suggestions made by the DFG for safeguarding good scientific practice¹ (*Appendix E*).

4.5 Availability of model modifications and results

Model Developments and Simulation results

The source code of the recommended version (including subsequent bug fixes) has to be made available to the CLM-Community members as quickly as possible via the corresponding source code administrator and the CLM-CO. Completed developments, which are not yet part of the recommended version, are made available by the developer upon request (for ICON-CLM the terms of reference for the ICON Git repository at DWD (in preparation) have to be accepted and followed). This regulation also applies to the results achieved with the models (including the software and the driving data needed for the simulation) unless it is explicitly forbidden by stipulations from third parties (e.g. the project grantor).

Members are explicitly encouraged to pass their simulation results after finishing the evaluation (see CSCD) to all community members even if the work is not completely finished. In addition, it is highly appreciated to agree on the joint execution and analysis of climate simulations.



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Guidelines for users

When working with the results the general guidelines of scientific work (e.g. indication of author, co-authors) have to be kept as they are also specified in the suggestions made by the DFG for safeguarding good scientific practice¹ (Appendix E).

In any case, the protection of the individual idea has to be guaranteed by the community members as a scientific principle.

External usage of simulation results

Passing on simulation results to colleagues or institutions outside the CLM-Community (external users) is subject to the explicit agreement of all people involved in the production of the simulation.

4.6 Publications

Right to publish

The right to publish scientific results achieved by using the CLM-Community software belongs to the respective user of the software without limitation. Individual results can be presented at conferences at any time.

Citation of the CLM-Community models

In each publication the use of the “COSMO model in Climate Mode (COSMO-CLM)” or the “Climate Limited-area Mode of ICON (ICON-CLM)” has to be indicated and the statement “COSMO-CLM is the community model of the German regional climate research community” has to be used. It is recommended to cite basic publications and evaluation results from the CLM-Community. The current list of publications can be found on the CLM-Community webpage⁸. When presenting joint results the participating partners have to be informed.

Information about publications

The CLM-Community coordination office should be informed about publications, which are directly connected to the use of CLM-Community software. The list of publications generated serves for the exchange of information within the community and, if needed, can be used for the documentation of the community’s efficiency. This information is published on the CLM-Community website⁸.

5. Final clause

German law is exclusively applicable for all affairs of the CLM-Community. The place of jurisdiction is Offenbach am Main, Germany.

Each person who signs the application form² (see



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Appendix A) agrees to all rules stated in this document. The application form² has to be sent electronically and as hard copy to the CLM-Community coordination office. With the members' signature, he/she also complies with the further applicable documents:

- Rules of internal procedure¹ (*Appendix C*)
- Safeguarding good scientific practice¹ (*Appendix E*)
- COSMO standards for source code development (CSCD⁷) (*Appendix F*)
- Annex D of the COSMO agreement¹ (see *Appendix G*)
- CLM-Community Science Plan¹ (*Appendix H*)
- Development partnership agreement between DWD and the CLM-Community with respect to the ICON software (*Appendix J*)

Future updates of the

- CLM-Community agreement¹,
- the CLM-Community rules of internal procedure¹,
- the COSMO standards for source code development¹ and the
- CLM-Community science plan¹

come into effect after the adoption by the CLM-Community.

If changes on the

- CLM-Community agreement¹,
- the CLM-Community rules of internal procedure¹,
- the COSMO standards for source code development¹ and
- CLM-Community science plan¹

should be adopted at the CLM-Community meeting, the drafts of the revised documents must be provided to all CLM-Community members at least four weeks before the CLM-Community meeting to allow for assessment before the vote.



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Appendix A. Application Form

The application form² for admission to the CLM-Community is available from the CLM-Community website.

Appendix B. Data Protection Information

The data protection information¹ can be found on the CLM-Community webpage.

Appendix C. Rules of Internal Procedure

See CLM-Community Rules of Internal Procedure¹

Appendix D. CLM-Community Software

See CLM-Community Software¹

Appendix E. Securing good scientific practice

The community members commit themselves to keep a high scientific-ethical standard when communicating with each other and while handling their scientific results. The recommendations of the DFG commission “Safeguarding good scientific practice¹” serves as the basis for the scientific work. The DFG’s recommendations are a subject of this agreement.

Appendix F. Documentation and Programming standards

The “COSMO standards for source code development⁷” form the basis for programming and documentation of the model extensions in the CLM-Community models. They are accepted by the CLM-Community. This aims to guarantee a common source code development with COSMO.

Appendix G. Cooperation with COSMO

By means of close cooperation between the CLM-Community and the COSMO consortium, the versions of the current operational forecast model and the corresponding regional climate model are reunified regularly. This involves the willingness of COSMO to provide new model versions to the CLM-Community and to integrate CLM-Community model developments into the code package of the current operational forecast model. The details of the cooperation are described in Annex D of the COSMO agreement¹.

Appendix H. CLM-Community Science Plan

The CLM-Community prepared a science plan¹ outlining the research goals of the CLM-Community.



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Appendix I. CLM-Community Acronyms

See list of CLM-Community Acronyms¹.

Appendix J. Development partnership agreement between DWD and the CLM-Community with respect to the ICON software

See Development partnership agreement between DWD and the CLM-Community
with respect to the ICON software ¹.

¹ <https://wiki.coast.hzg.de/clmcom> → Community → Terms & conditions

² <https://wiki.coast.hzg.de/clmcom> → About us → Become a member

³ <https://wiki.coast.hzg.de/clmcom> → Community → People / → Science

⁴ <https://wiki.coast.hzg.de/clmcom> → Outcome → Publications

⁵ <https://wiki.coast.hzg.de/clmcom> → Model

⁶ <https://redc.clm-community.eu>

⁷ <http://www.cosmo-model.org> → Documentation → COSMO Coding Standards

⁸ <https://wiki.coast.hzg.de/clmcom> → Outcome → Publications