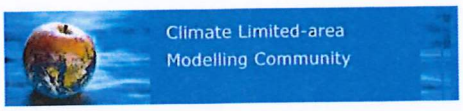

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

DWD

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

Version 1.0

1. Objective

1 This document defines the rules for the special development partnership between Deutscher Wetterdienst (DWD) and the Climate Limited-area Modelling Community (CLM-Community) with respect to the ICON software (see license agreement for description) for non-commercial research applications. The CLM-Community acts in this partnership as the key development partner of DWD for the further development of ICON in the field of regional climate modelling (incl. convection permitting resolutions). This document specifies the procedure for code contributions to the ICON software by members of the CLM-Community.

2 DWD and the CLM-Community make sure by continuous coordination that further developments due to this partnership do not change the properties of the ICON Modelling Framework except in cases the ICON developers (DWD, MPI-M, DKRZ, KIT) have agreed explicitly to these proposed and subsequently developed code changes. New developments that could potentially change or affect the properties of the ICON Modelling Framework must be communicated to the ICON developers (DWD, MPI-M, DKRZ, KIT) as soon as possible, ideally before the development starts. The term "properties" denotes in this context the overall scientific characteristics of the ICON Modelling Framework, including its run-time efficiency, as well as structural features like fundamental interfaces and data structures (not small changes and bug fixes).

3 Developers of the CLM-Community get read access to all intermediate versions, i.e. published changesets of ICON's version control system, for information purposes. However, pulling code changes from other repositories than *icon-nwp.git* into *icon-clm* development branches is not allowed in order to ensure a traceable workflow. Code changes contributed by the CLM-Community (except from bug hotfixes) enter the *icon-nwp-dev* branch via the *icon-cosmo-master* and *icon-clm-dev* branch (see Appendix 1). The ICON developers (DWD, MPI-M, DKRZ, KIT) ensure for the joint versions („Major Releases") of the ICON software the functionality of the interfaces to the modules of the CLM-Community as well as a proper documentation, which has to be provided by the CLM-Community developers for their changes.

2. Governance of the development partnership

4 ICON's organization is directed by a Steering Group (SG, composed of one representative from DWD, MPI-M, DKRZ and KIT) under the supervision of the relevant Directors / high-level managers of DWD, MPI-M, DKRZ and KIT (BD). ICON SG controls the strategic and technical development of ICON in close coordination with ICON BD. The DWD representative in the SG also duly represents the interests of the CLM-Community in the ICON SG.

5 The COSMO contact person for the CLM-Community acts as ICON representative in the bodies of the CLM-Community and is invited to participate in the CLM-Community Coordination Group (CLM-CO) and Scientific Advisory Board (CLM-SAB) meetings.

6 In the framework of the development partnership CLM-CO is responsible for planning, coordination and evaluation of all CLM-Community contributions to the development of ICON for regional climate modelling applications (incl. convection permitting scales). CLM-CO approves all CLM-Community contributions to the ICON software on the part of the CLM-Community, before they are proposed to the COSMO SCA and the ICON-NWP gatekeepers.

7 ICON SG (via COSMO contact person) and CLM-CO regularly inform each other in detail about planned changes to the ICON software, e.g. at the bi-annual ICON developer meetings and at the CLM-Community Assembly, to coordinate the further development and avoid duplication of effort.

8 DWD has the responsibility to ensure that the development partnership between DWD and the CLM-Community is in accordance with the cooperation agreement between the ICON developers (DWD, MPI-M, DKRZ, KIT) signed in 2020.

3. Workflow and rules of acceptance of CLM-Community developments

9 All contributions of the CLM-Community to the ICON software are developed according to the COSMO coding standards. These standards require a proper and transparent source code and release management supervised by the ICON-CLM gatekeepers, the COSMO contact person, CLM-CO as well as the COSMO source code administrator and the ICON-NWP gatekeepers. Further details about the procedure for a new development and some necessary criteria for a back merge of new code can be found in the ICON Gitlab at DKRZ in the project icon-doc-workflow.

10 Being a single model code developed by multiple institutions and on various computing platforms, a publicly available regression test suite plays a crucial role in the development workflow. All CLM-Community developers will be granted access to this regression test suite on request. Furthermore, new contributions to ICON by CLM-Community developers should also include additional tests to this regression test suite.

11 Appendix 1 of this document illustrates the planned ICON software repositories, access rights and workflow related to the ICON development partnership between DWD and the CLM-Community with respect to regional climate modelling applications (CLM). The ICON-CLM gatekeepers act as the gatekeepers for all code changes which should be incorporated into the *icon-clm-dev* branch by the CLM-Community developers. The code changes are handed over to the COSMO gatekeeper (gatekeeper of the *icon-cosmo-master* branch) and afterwards to the DWD gatekeepers, who control all code changes of the software repository *icon-nwp-dev* branch. CLM-Community contributions have to pass all tests of ICON's regression test framework successfully before they can be submitted to the COSMO and DWD gatekeeper. If the code changes affect the operational NWP applications, DWD checks the code changes according to DWD's quality assurance procedures in place ("Verfahrensanweisung für Änderungen der NWV-Routine": set of rules for changes of the operational NWP system) which includes a comprehensive numerical test suite including global and regional data assimilation and forecasting suites. If the code changes proposed by the CLM-Community developers pass DWD's quality assurance procedures successfully,

they are merged with the main DWD, MPI-M, DKRZ and KIT ICON software repository *icon* to generate released versions of the ICON Modelling Framework. Otherwise, the code changes are returned to the CLM-Community developers for correction and further refinement. In general, DWD decides upon the frequency of code synchronization between *icon-nwp-dev* branch and *icon* in coordination with COSMO SMC and CLM-CO. The aim is to have code synchronizations between *icon-nwp-dev* and *icon* at least twice a year.

12 As a basic rule, major code contributions to ICON should always contain the functionality to be enabled / disabled by the users, such that the ICON software retains its former structure up to bit-reproducible (bug fixes excluded) behavior. Deviating from this convention, especially in the case of technical / infrastructure changes, requires further and timely coordination of the CLM-Community developers with the ICON SG, and explicit approval by the ICON SG.

4. Intellectual property rights of the ICON software

13 The intellectual property rights of the ICON software belong to the ICON developers (DWD, MPI-M, DKRZ, KIT) and other third parties (the "IP-Rights Beneficiaries"). The CLM-Community acknowledges and agrees that all intellectual property rights of the ICON software shall fully remain with the IP-Rights Beneficiaries.

14 The ICON software is protected by the laws covering intellectual property rights, by international contracts and other national legal regulations prohibiting unauthorized copying.

15 The rights to all intangibles are retained by the ICON developers (DWD, MPI-M, DKRZ, KIT).

5. Intellectual property rights of the outcomes and further development of the ICON software

16 The intellectual property rights to the outcomes (i.e. all knowledge that could be derived from the usage of the ICON software, in particular through the scientific analysis of the products generated) and the further development of the software belong to the contributing party. The ICON developers (DWD, MPI-M, DKRZ, KIT) have the non-exclusive, free of charge and unlimited in time right to use the outcomes and further developments of the ICON software.

17 The CLM-Community has the right to use all outcomes and further developments of the ICON software free of charge for non-commercial research and teaching purposes, also within the framework of research collaboration of the CLM-Community with third parties, in all fields of application. Any direct transfer of the ICON software to third parties is not permitted unless authorized by the ICON developers (DWD, MPI-M, DKRZ, KIT), e.g. in the framework of an ICON license.

Climate Limited-area Modelling Community

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

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Director Business Area Research and Development

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Name, Date 02.11.2020
CLM-Community Coordinator

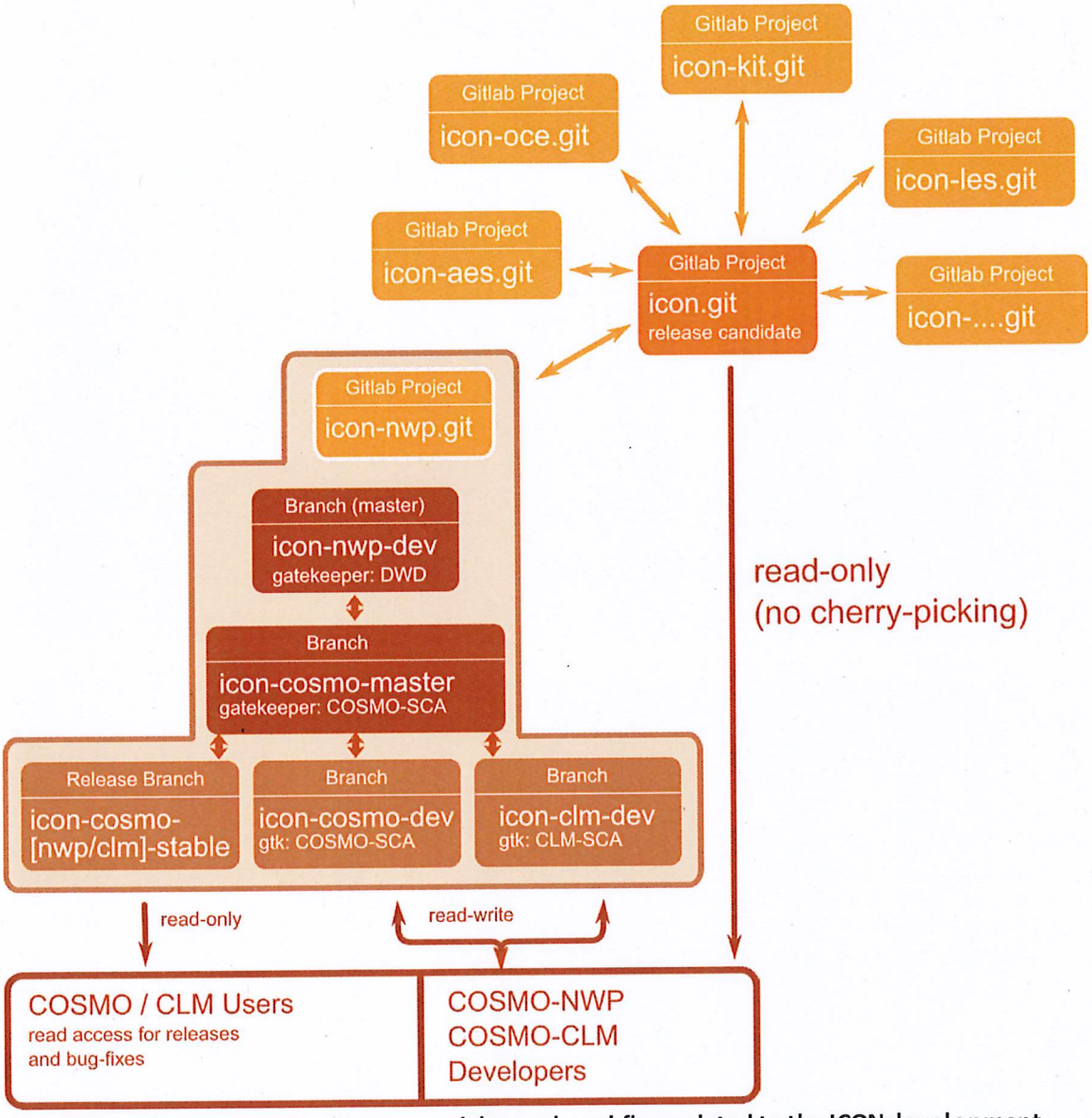
Name, Date Nicole van Lipzig 18.01.2021
Chair of the Scientific Advisory Board

Climate Limited-area Modelling Community

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

DWD

Appendix 1



ICON software repositories, access rights and workflow related to the ICON development partnership with respect to numerical weather prediction (NWP) and regional climate applications between DWD, COSMO and the CLM-Community (gtk = gatekeeper)