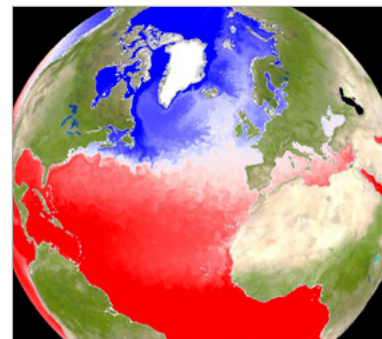




Spotlight: Taming the Petabytes – Making km-scale climate data usable

Within the EU-funded EERIE project, DKRZ has pioneered a data infrastructure for handling the challenges associated with the extremely large datasets generated by high-resolution Earth system models (ESMs). Modern ESMs with kilometer resolution can directly represent oceanic and atmospheric eddies, as well as other small-scale structures. This allows them to provide significantly more precise climate information, for example, on regional extremes and ocean-atmosphere interactions. EERIE was the first project to successfully simulate the Earth system over an entire century using an ocean component with eddy resolution. Given the enormous volume of data generated, the DKRZ is employing innovative strategies such as virtual datasets, a cloud storage emulator, and a flexible catalog system to facilitate the storage, access, and analysis of this kilometer-scale data for research and society. Further information: www.dkrz.de/en/EERIE/



Gordon Bell award for groundbreaking ICON simulation



A team led by the Max Planck Institute for Meteorology (MPI-M) and DKRZ has been awarded the prestigious Gordon Bell Prize for climate modeling. The prize recognizes a newly developed ICON configuration that, for the first time, simulated the Earth system with a horizontal resolution of 1.25 kilometers – including the atmosphere, ocean, land, and the full carbon cycle. This was made possible by precisely tuning the model components to the heterogeneous architecture of NVIDIA Grace CPUs and Hopper GPUs, as well as by novel data-centric optimization methods. The simulation achieved a throughput of 145.7 simulated days per day and were computed on two of Europe's largest supercomputers – Alps in Switzerland and JUPITER in Germany – with exceptional efficiency. The team thus accomplished

a task long considered impossible. Experts from the Jülich Supercomputing Center, ETH Zurich, the Swiss National Supercomputing Centre, the University of Hamburg, and NVIDIA also contributed to the project. The results open up new possibilities for investigating interactions within the Earth system and are considered a scientific and technological milestone. The project had already received the HPCwire Readers' Choice Award. The team accepted the Gordon Bell Prize, worth \$10,000, at the Supercomputing Conference SC25. Further information: www.dkrz.de/en/gordon-bell-preis2025/

New GPU extension of Levante achieved top position on the Green500 list

The new GPU extension of the Levante supercomputer is among the three most energy-efficient HPC systems worldwide. On the Green500 list from November 2025, it ranks third, achieving 69.426 GigaFLOPS per watt. The system is based on Eviden's BullSequana XH-3000 technology and is used for energy-efficient climate simulations by the MPI-M. In the current TOP500 list, the new GPU extension is ranked 227th as a standalone system. After just over three and a half years of operation, the DKRZ supercomputer Levante is listed on rank 164th. Although the Green500 list is based on the HPL benchmark, it has also a particularly high priority for the DKRZ and the climate research community that key models, such as the climate and weather model ICON, run as energy-efficiently as possible on the DKRZ systems. Therefore, the DKRZ is working intensively on reducing energy consumption as part of the GreenHPC initiative. Further information: www.dkrz.de/en/green500/



Faster Module Meeting: 3 years of progress and the road ahead

From 1-3 December, 2025, the annual meeting of the Faster module of the WarmWorld project took place in Offenbach, hosted by the German Weather Service (DWD) and DKRZ. Representatives from the three WarmWorld modules – Faster, Better, and Easier – as well as the partner projects EXCLAIM and OpenICON, reviewed three years of collaborative work on a future-proof, community-friendly framework for Earth system modeling. The Faster team

presented current technical advances, discussed interoperability and code porting, and defined the roadmap for the coming years. The DKRZ reported on its contributions, including improvements in performance engineering, software infrastructure, and support for high-resolution model workflows. Since the module's launch in 2022, the ICON model has been systematically refactored and prepared for Exascale systems – a success recently recognized with the Gordon Bell Prize for Climate Modeling, to which the DKRZ made a crucial contribution. Further information: www.dkrz.de/en/faster-module-meeting2025



Enhancing Climate Prediction with AI: DKRZ at UPCLIV workshop



At the "Open Workshop on Understanding and Predicting Annual to Multi-Decadal Climate Variations (UPCLIV)", researchers from the Horizon Europe projects ASPECT, EXPECT, and I4C, as well as the WCRP projects DCPD and EPESC, met in Bologna from 18–20 November, 2025, to discuss how climate fluctuations and extreme events can be better understood and predicted for the next 1–30 years. New methods, models, and AI tools were presented. The DKRZ demonstrated how deep learning tools improve the quality of observational data and support climate prediction: Christopher Kadow showcased AI-based improvements to seasonal to annual forecasts for the North Atlantic-Europe region, while Étienne Plésiat presented deep learning approaches for filling in missing values in key datasets. The workshop also strengthened networking and cooperation among the participating projects. Further information: www.dkrz.de/en/upcliv/

Strong DKRZ presence at ICON All-Hands Meeting

Members of the German Climate Computing Center (DKRZ) made a strong impact at the ICON All-Hands Meeting 2025, held in the last week of October in Zurich. The various presentations highlighted DKRZ's central role in further developing the performance, portability, and development workflows of the ICON climate model. A central focus was rewriting ICON in C++/Kokkos within the WarmWorld project. This redevelopment prepares the model for future high-performance computing. Furthermore, the MPI communication interface will be optimized and a single-precision implementation introduced to increase computational efficiency. New, simplified output options were also presented. Other topics included tests for continuous integration, innovative approaches to gatekeeping processes of the ICON sourcecode, and open development strategies. DKRZ thus reaffirmed its commitment to enabling next-generation climate modelling and fostering open, efficient development within the ICON community. Further information: www.dkrz.de/en/icon-all-hands-meeting2025/



STAC and Zarr: Climate Data Standards in the Exascale Era



In October 2025, the DKRZ introduced the perspective of climate modeling to the "STAC Community Sprint" and "Zarr Adopter Summit" at the ESA in Rome for the further development of modern data standards in Earth system research. Exascale climate simulations on kilometer-scale supercomputers generate several Petabytes of data per experiment. Given the rapidly growing volume of data, Earth system models such as ICON are increasingly relying on cloud-native formats like Zarr for storing model outputs and STAC catalogs for FAIR distribution of the datasets. The goal is to make the storage, discoverability, and use of large climate datasets more efficient and interoperable. During the meetings, the DKRZ team actively participated in developing corresponding specifications – particularly from the perspective of Earth system modeling.

Further information: www.dkrz.de/en/stac-zarr-summit2025/

On our own account: Open job offers at DKRZ

Do you want to join the DKRZ team – we are looking forward to your application:

- [Research Software Engineer for AI & Earth system modelling](#)
- [Employee for third-party funding/accounting on a part-time basis \(only in German\)](#)

General information about vacancies and working conditions at DKRZ:

www.dkrz.de/en/about-en/vacancies/

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