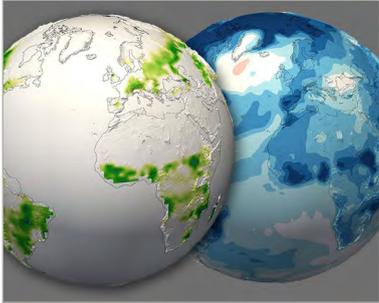




## Spotlight: Can ambitious afforestation/reforestation mitigate temperature overshoot?



Emission pathways consistent with the 1.5 degree target require carbon dioxide removal (CDR). Afforestation/reforestation (AW) is a key CDR method to remove carbon and can thus reduce global temperatures. Scientists at LMU Munich used simulations on the DKRZ supercomputer Levante to investigate how far ambitious AW can reduce warming and thus mitigate overshooting of temperature limits. The simulations of the total of 1,700 model years required about 4,600 node hours on Levante and generated about 10 Terabytes of output data. The study shows that, in line with country commitments, AW could reduce the temperature peak by 0.08°C by 2100 and the temperature in 2100 by 0.2°C. Converting 935Mha of land into forest shortens the exceedance period by 13 years, but requires careful planning as it can impact biodiversity loss, food security and social justice. The authors emphasize that AW is not a substitute for emissions reduction and should only be one part of comprehensive climate action. The visualization of this study was – among others – shown in the German Pavilion at the UN Climate Change Conference COP29 in Baku, Azerbaijan. More details and video: [www.dkrz.de/en/tree-planting-vs-temp-overshoot/](http://www.dkrz.de/en/tree-planting-vs-temp-overshoot/)

## SC24: The HPC world gathers in Atlanta!

From November 17 to 22, 2024 around 18,000 participants came together in Atlanta, USA, for the Supercomputing Conference (SC24), the world's most important event in the field of high performance computing (HPC). Under the motto „HPC creates.“, the conference offered an extensive program and numerous opportunities for exchange on current developments and innovations. During the SC24, the latest edition of the TOP500 list of the world's most powerful supercomputers was presented, which is led by three US exascale systems. The DKRZ supercomputer Levante still ranks a good 115th about three years after its installation. As part of the SC24 conference, young scientists can demonstrate their knowledge at the Student Cluster Competition (SCC). For this purpose, DKRZ co-jointly with the MPI for Meteorology prepared a tropical storm simulation using the ICON model. The participating teams had to develop strategies to optimize the performance of this simulation on a wide variety of platforms. The DKRZ was also represented in the SCC jury. Further information: [www.dkrz.de/en/sc24/](http://www.dkrz.de/en/sc24/)



## ESiWACE3 celebrates its General Assembly in Hamburg



On November 12 and 13, 2024, the DKRZ hosted the ESiWACE3 General Assembly in Hamburg, which marked the halfway point of the third funding period of this European center of excellence. The focus of the hybrid meeting with over 40 participants was on technical topics related to high-resolution modeling of weather and climate; for example such as data storage and compression, which Dr. Karsten Peters-von Gehlen presented. This work requires close collaboration with projects such as NextGEMS, EERIE, Destination Earth and WarmWorld in order to develop consolidated approaches for the data handling of high-resolution weather and climate models. On the second day, specific topics were explored in more detail. Dr. Joachim Biercamp and Niclas Schröter reported on the status and future of the „High Performance Weather and Climate“ benchmark, which includes the ICON model and is intended to complement the generic high-performance Linpack benchmark. In the final session, overviews of projects that are closely related to ESiWACE were given: Dr. Claudia Frauen summarized the project WarmWorld and Dr. Hendryk Bockelmann the project natESM. Further information: [www.dkrz.de/en/esiwace3-GA/](http://www.dkrz.de/en/esiwace3-GA/)

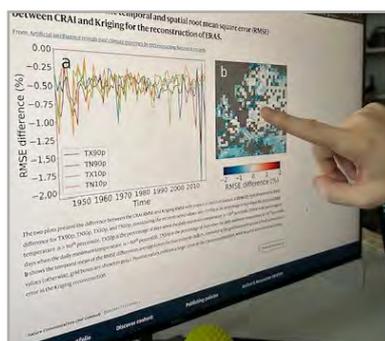
## WarmWorld: Half time for the first project phase

The General Assembly of the project WarmWorld took place at the Alfred Wegener Institute in Bremerhaven from October 14 to 16, 2024. Around 80 participants, including the DKRZ team, reviewed the progress and discussed

priorities for the application process in the second project phase. The aim of WarmWorld is to adapt the weather and climate model ICON for extremely high-resolution simulations in order to better assess the effects of a warmer world. The DKRZ is involved in two of the four modules: It coordinates the module *faster* to increase the runtime efficiency of ICON and to construct a finer-meshed model grid. Furthermore, the module *easier*, coordinated jointly with the University of Cologne, is intended to develop new methods for data analysis. Other modules are *better* to improve physics and *smarter* to integrate machine learning methods. During the meeting, plenary lectures were given on the three running modules *better*, *faster* and *easier*. For the fourth module *smarter*, the new project partners as well as an overview on the use of artificial intelligence in earth system modeling were presented. From the DKRZ team, Dr. Claudia Frauen gave an overview of the module *faster*, Dr. Georgiana Mania and Dr. Pradipta Samanta presented current ICON code developments and Dr. Nils-Arne Dreier took part in the overview presentation for the module *easier*. Further information: [www.dkrz.de/en/warmworld-GA/](http://www.dkrz.de/en/warmworld-GA/)



## DKRZ uses AI to reconstruct ocean temperatures and extreme weater



Using newly developed AI methods, the DKRZ data analysis team has made key contributions to two studies published in the renowned journals Nature and Nature Communications. A study by the University of Leipzig showed that the global oceans were less cold in the early 20th century than previously thought. The DKRZ confirmed these findings by reconstructing incomplete and heterogeneous measurement data using machine learning. The AI used for this was trained with large data sets from the Coupled Model Intercomparison Project (CMIP6) and delivered results on the Levante high-performance computer that support the main study. In another project, the DKRZ reconstructed historical climate extremes such as heat waves or cold periods in Europe and uncovered spatial and temporal trends from

1901 to 2018 that were previously not recognizable using classical statistical approaches. Here, too, the AI was trained with data from CMIP6 models to close gaps in historical observations. The new datasets enable more precise analyses of past climate extremes and contribute to improving risk management and policy development. Further information: [www.dkrz.de/en/AI-climate-extremes/](http://www.dkrz.de/en/AI-climate-extremes/) and [www.dkrz.de/en/AI-oceantemp/](http://www.dkrz.de/en/AI-oceantemp/)

## News from the User Group Committee and the WLA

Both the DKRZ User Group and the DKRZ Scientific Steering Committee (Wissenschaftlicher Lenkungsausschuss, WLA) have elected new management teams.

On June 7, 2024, the SSC elected Prof. Johannes Quaas (Leipzig University) as its new chairman and Prof. Sönke Zähle (MPI for Biogeochemistry Jena) as deputy chairman. The DKRZ thanked the previous team led by Dr. Frauke Feser and especially Prof. Uwe Ulbrich (Free University of Berlin) for their commitment since May 2018.

On November 11, 2024, the user group elected Dr. Beate Geyer (Hereon) and Dr. David Grawe (CEN, University of Hamburg) as the new spokesperson team with Dr. Sabine Brinkop (DLR) as their representative. The previous spokesperson, Dr. Bernadette Fritzsch (AWI), was recognized for her 22 years of dedicated work; she remains active and continues to represent the user group at WLA meetings. It was also decided to hold the public part of the meeting in English under the title „Open User Exchange Meeting“ in order to open up participation to a wider audience. Further information: [www.dkrz.de/en/news-wla-and-ug/](http://www.dkrz.de/en/news-wla-and-ug/)



## 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 \(all genders\) for GPU programming](#)
- [Research Software Engineer \(all genders\) for coupled climate models on HPC systems](#)
- [IT system administrator \(all genders\) focussing on network and security \(in German\)](#)
- [Human resources clerk \(all genders\) \(in German\)](#)

General information about vacancies and working conditions at DKRZ:

[www.dkrz.de/en/about-en/vacancies/](http://www.dkrz.de/en/about-en/vacancies/)

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