## TerraDT: A digital twin of the Earth

The project TerraDT started on January 1, 2025. It aims to develop a high-resolution digital twin (DT) of the Earth system for components that are missing in the previous DT models: such as the cryosphere, vegetation and atmospheric aerosols. Coordinated by the Finnish IT Center for Science (CSC), the project, funded by the EU with 15 million euros, brings together 18 European institutions, amang them DKRZ. As part of the EU initiative *Destination Earth (DestinE)*, TerraDT aims to enable climate simulations with 10 km resolution, which are run on the EuroHPC supercomputers LUMI in Finland and Mare Nostrum 5 in Spain. The DKRZ is involved in two aspects of TerraDT: It supports scientists in model optimization and leads the work packages on the coupling and interfaces between the various Earth system components. The DT is intended not only to advance scientific climate research, but also to support decision-making at the local level, for example in the planning of shipping routes, coastal protection or the design of urban green spaces. Further information: www.dkrz.de/en/new_project_terradt/

More storage for climate model data: DKRZ takes up operation of new tape library

In February 2025, the DKRZ, together with Spectra, successfully completed the set-up and integration of a third Spectra Logic Tfinity magnetic tape library into DKRZ's archive system. The new library, supplied by the company Cristie Data, complements the systems already installed in 2023 and gradually replaces older Oracle Storagetek libraries. It offers space for an additional 9,600 tapes and provides additional 14 LTO-8 drives, each with a bandwidth of 360 Megabytes/s. This means additional 115 Petabytes of storage space will be available to DKRZ users for their climate model results. The DKRZ archive currently comprises 210 Petabytes and grows by 25 Peta-bytes annually. With an energy consumption of 1,400 Watts, the new library is highly energy efficient. Further information: www.dkrz.de/en/spectra3/
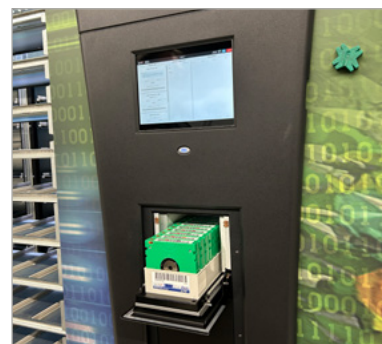
natESM Community Workshop 2025

The fifth natESM community workshop took place in Berlin on February 18 and 19, 2025. Over the course of two days, scientists and developers discussed the continued development of the natESM system and ways to strengthen collaboration within the community. Topics discussed included the integration of new modeling approaches and machine learning as well as the future of aerosol and chemical modeling. The optimization of technical interfaces and the long-term sustainibility of natESM were also discussed. In addition to keynotes, interactive sessions provided space for strategic discussions, including the future structure of the sprint process and strategic approaches for expanding the use of natESM. The exchange underscored the importance of close cooperations between research and software development in building a sustainable, adaptable, and high-performance Earth system modeling frame-work for Germany. Further information: www.dkrz.de/en/natESM-WS2025/

Kick off for EU Projects EOSC EDEN and FIDELIS

From February 4 to 6, 2025, 30 European and international organizations, including the DKRZ, met in Helsinki for a kick-off meeting for the two EU projects EOSC EDEN and FIDELIS. Both projects aim to improve digital data archiving and curation in Europe and create a networked infrastructure. EOSC EDEN is developing a framework for identifying and reassessing data worthy of archiving, testing its applicability in various scientific fields and providing tools for automating archiving. As an expert in climate data, the DKRZ is contributing to the development of a support kit on long-term archiving. FIDELIS focuses on the trustworthiness of digital repositories in the context of the European Open Science Cloud (EOSC). The DKRZ supports FIDELIS with its expertise as the operator of a CoreTrustSeal-certified repository and digital long-term archive and represents the climate data community in the

project. Both projects complement each other by jointly identifying user requirements and driving the development of a European infrastructure for digital archiving and curation. They are coordinated by the Finnish IT Center for Science (CSC) and will run until the end of 2027. Further information: www.dkrz.de/en/kickoff_eosc-eden_fidelis/
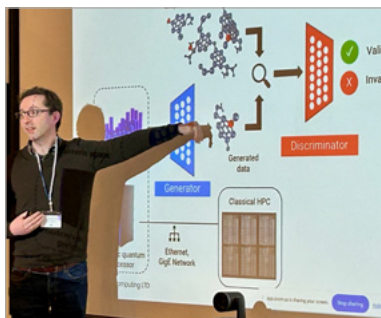
Quantum Computing Meets Climate Modeling

On February 6-7, 2025, DKRZ hosted a workshop titled „Quantum Computing in Computational Climatology." This event was organized in collaboration with industry leaders ParTec AG and ORCA Computing. Experts from quantum computing (QC), HPC and climate modeling discussed possible advantages and the use of QC for climate research. Since the performance of conventional HPC systems is only increasing slowly despite significant financial investments, QC could play an important role in the future. The aim of the workshop was to present the current status quo in all three subject areas to each other. The participants exchanged ideas about initial use cases, algorithmic advances and possible collaborations. Together with its users, the DKRZ is planning a cooperation with the Hamburg Initiative on QC. Further information: www.dkrz.de/en/q3cs/

3rd ICG-EMOWorkshop: Marine Ecosystem Modeling of the North Sea

The 3rd ICG-EMO workshop of the OSPAR Commission took place at the DKRZ from February 11 to 13, 2025. The Intersessional Correspondence Group on Ecological Modelling (ICG-EMO) is a working group of the Commission using simulations of marine ecosystem models for management measures. The meeting brought together experts in marine ecosystem modelling and environmental authorities from several European countries to develop measures to comply with the legally binding thresholds for nitrogen, phosphorus and chlorophyll in the North Sea. The research group Scientific Computing at DKRZ is in charge of coordination and modelling and is participating in the ICG-EMO with two models that are run on Levante. The results will go into the further work of the ICG-EMO to develop long-term protection strategies for the North Sea and the North East Atlantic. Further information: www.dkrz.de/en/3ICG-EMO/

2nd EERIE General Assembly

From January 14 to 16, 2025, 60 participants, am them from DKRZ, came together at ETH Zurich for the 2nd General Assembly of the EU project „Eddy Rich Earth System Models (EERIE)". The focus was on progress in high-resolution climate modeling and the first analysis of the simulations created in the project. DKRZ co-jointly with Met Office is responsible for data management of the EERIE model results. Simulations for the years 1950-2050 are currently being run at DKRZ' HPC system Levante using the two German Earth System Models (ESM) ICON-ESM-ER and IFS-FESOM2-SR. The project thus provides the first long-term and at the same time global and high-resolution (5-10 km) ESM simulation results. Hands-on sessions gave participants access to EERIE data and the Levante HPC system. In addition to presentations on improved ocean dynamics models, strategies to optimize data management and reduce storage requirements were discussed. Further information: www.dkrz.en/en/2-eerie-ga/

Registration open: hpc4climate Summer School 2025

The projects WarmWorld and ESiWACE3 are organizing the hpc4climate summer school from July 28 to August 7, 2025 for master's students and early doctoral studentsin computer science, data science, technomathematics, applied mathematics, as well as for students of meteorology and climate science with programming skills. Further information and registration until April 30, 2025: www.dkrz.de/en/hpc4climate2025/

On our own account: Open job offers at DKRZ

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

- Computer Scientist / Research Software Engineer (all genders) for a LLM based Climate Data Analysis Framework
- IT system administrator (all genders) focussing on netzwork and security (in German)

General information about vacancies and working conditions at DKRZ: www.dkrz.de/en/about-en/vacancies/