preWarmWorld

WarmWorld is a project proposed to the BMBF, which will hopefully start in autumn 2022. It aims to harness advances in high-performance computing and data analysis to compute and evaluate climate warming trajectories and make their inherent information content transparent to scientific communities. A central component of this climate information system will be an ICON-based earth system model capable of resolving global oceanic and atmospheric coupled circulation systems on kilometer-scales with a throughput of one simulated year per day on future exascale HPC-systems. To achieve this, a transformation of the ICON software towards an open, scalable, modularized and flexible code is needed such that independent development (both scientific and informatics) will be enabled.

To lay the technical foundation for these ambitious plans, a preparatory *preWarmWorld* project has been approved by BMBF and already started in 2021, which aims to develop a software blueprint for ICON. Based on prototype model components like the atmospheric tracer advection it will test strategies for modularisation, memory management and language interoperability to evaluate the suitability of various programming paradigms based on these prototypes.

The main HPC system for these developments will be HLRE-4, one of the main systems on which ICON experiments are being developed and performed and which provides two of the currently most widely used hardware architectures with its CPU and NVIDIA GPU partitions.