Project: **169**

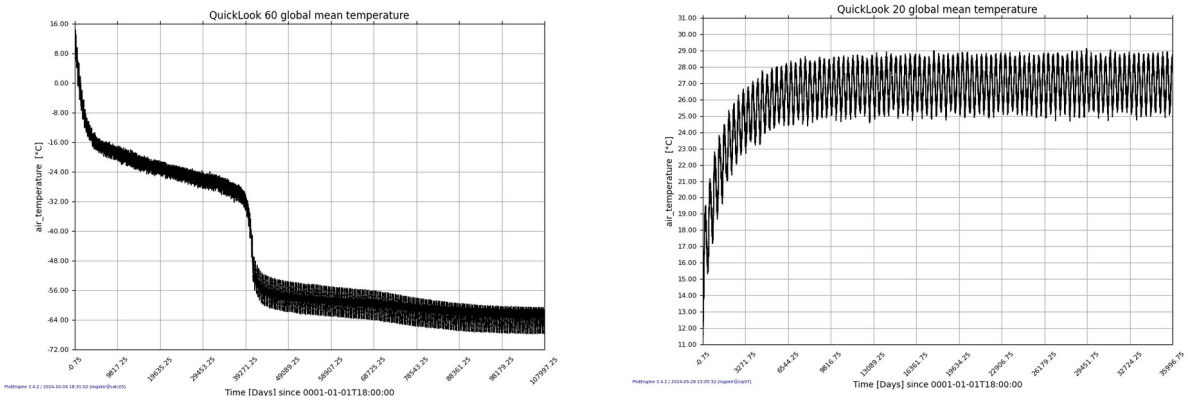
Project title: **Klimamodellierung mit dem Virtuellen Labor für Erdsystem Studien**

Principal investigator: **Ingo Kirchner**

Report period: **2023-11-01 to 2024-10-31**

The major topic for the report period was the upgrade of the software stack of the VAST system at the HPC (see also the portal site[1] for more informations about the VAST system). The ICON model (version os-2024.01) is now part of the VAST system and can be executed with the provided model run environment. Addional development work is planned for the future.

The number of simulations at HPC was smaller as planned and approx. 100 simulation years with a low resolution (R02B04, 160km) ICON (version 2.6.6) were performed. During the report period 18% of the node hours were shared with other projects and 8% was used for the VAST system. The remaining number of 1166 node hours for 2024 will be used for sensitivity studies with ICON. These experiments completes show-cases of the modelling course for master students at the institute of meteorology at Freie Universität Berlin. The scientific topic of the last year experiments was the dynamic response to ozone changes. For the next sensitivity studies extreme CO_2 changes (1ppm and 1500ppm) are in focus. The ICON simulations should demonstrate the benefit from state-of-the art model in comparison with results of the PLASIM (a more simple Earth system model), see figure above.



The figure shows the global mean of the near surface temperatur simulated with PLASIM[2]. On the left side 300 years with 1ppm CO_2 and in the right side 100 years with 1500ppm CO_2 are shown.

The second jump in the curve of the 'ice planet simulation' is caused due to the completion of the seaice coverage. In the last 200 years of the simulation the ocean has no open sea fraction anymore.

1 https://vast.klimod.de

2 https://www.mi.uni-hamburg.de/en/arbeitsgruppen/theoretische-meteorologie/modelle/plasim.html