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## Enabling km-scale coupled climate simulations with ICON on GPUs

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The Icosahedral Nonhydrostatic (ICON) weather and climate model is a modelling framework for numerical weather prediction and climate simulations. ICON is implemented mostly in Fortran 2008 with the GPU version based mainly on OpenACC. ICON is used on a large variety of hardware, ranging from classical CPU cluster to vector architecture and different GPU systems.

An ICON model configuration developed for km-scale climate simulations is used as a scientific prototype for the digital twin of the Earth for climate adaptation with in the Destination Earth program of the European Commission. Here we focus on our effort to run these coupled ICON configurations at km-scale on LUMI, a HPE Cray EX system with a GPU partition based on AMD MI250x's.

We present the model configuration, performance results and scalability of the simulation system on Lumi and compare it with results on other GPU and CPU based systems.