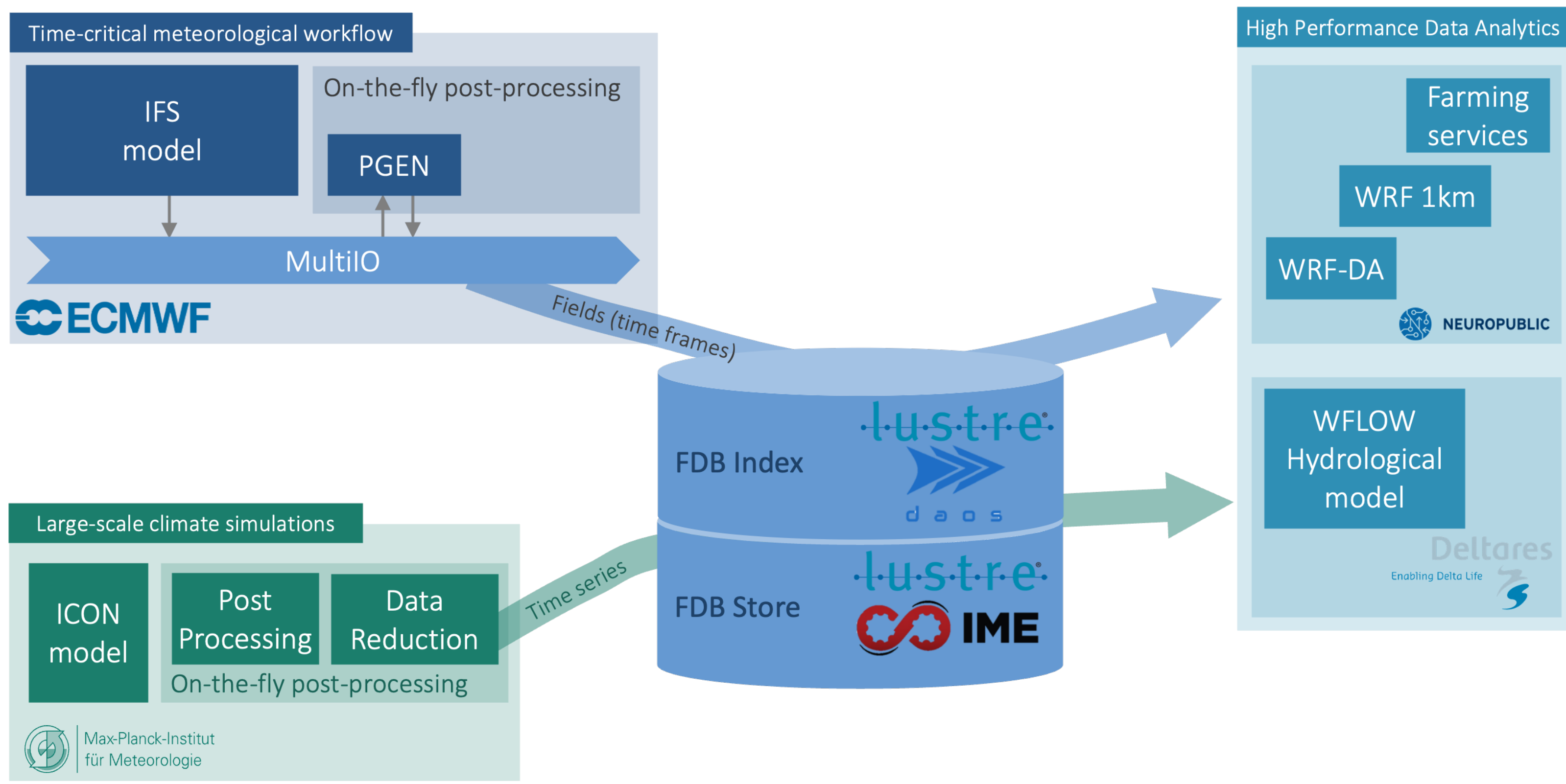


# Weather, Climate, Hydrological and Farming Low-latency Workflows on the ACROSS Platform

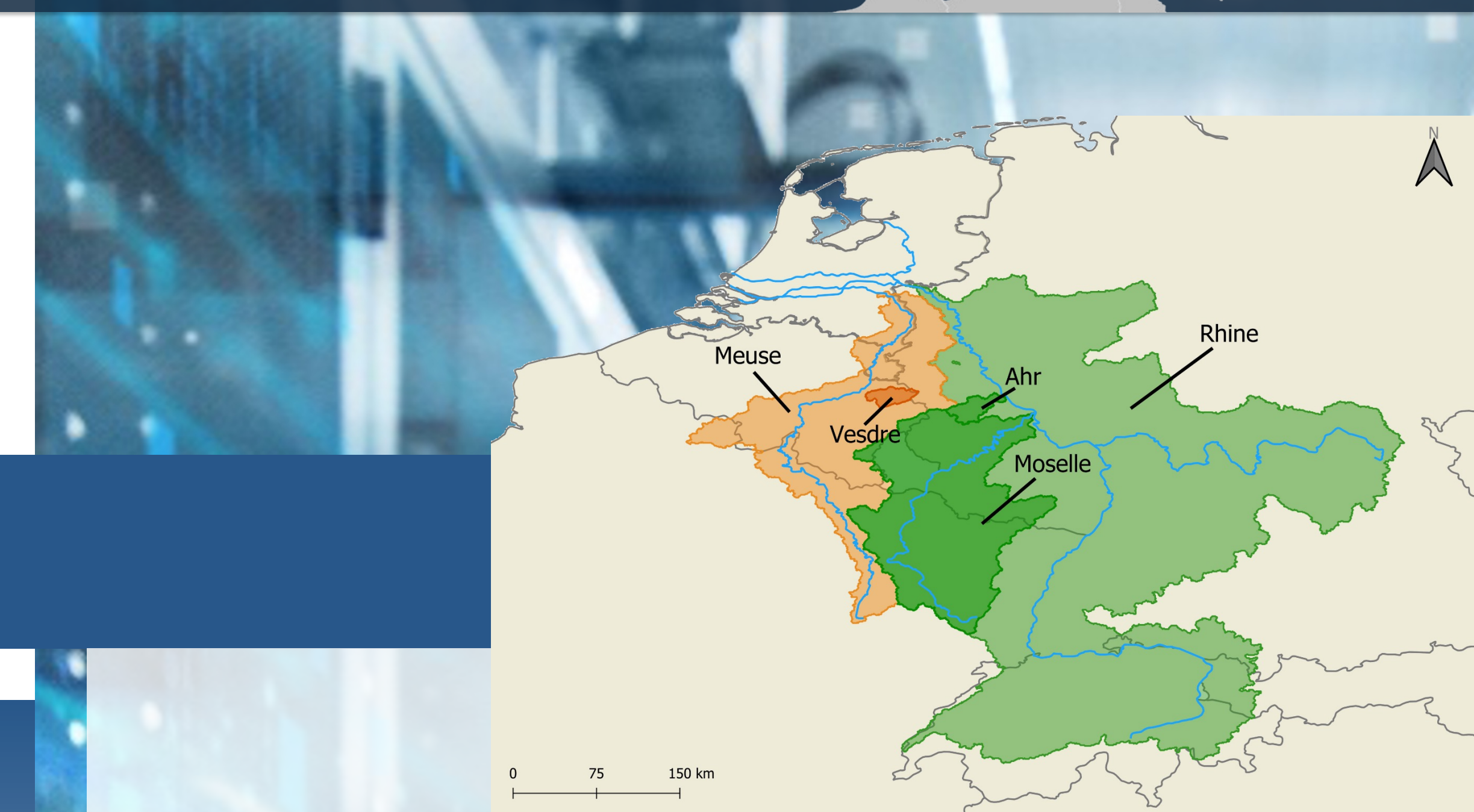


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ACROSS is a EuroHPC project (2021-2024) with €8.8M budget  
13 partners from 8 European countries

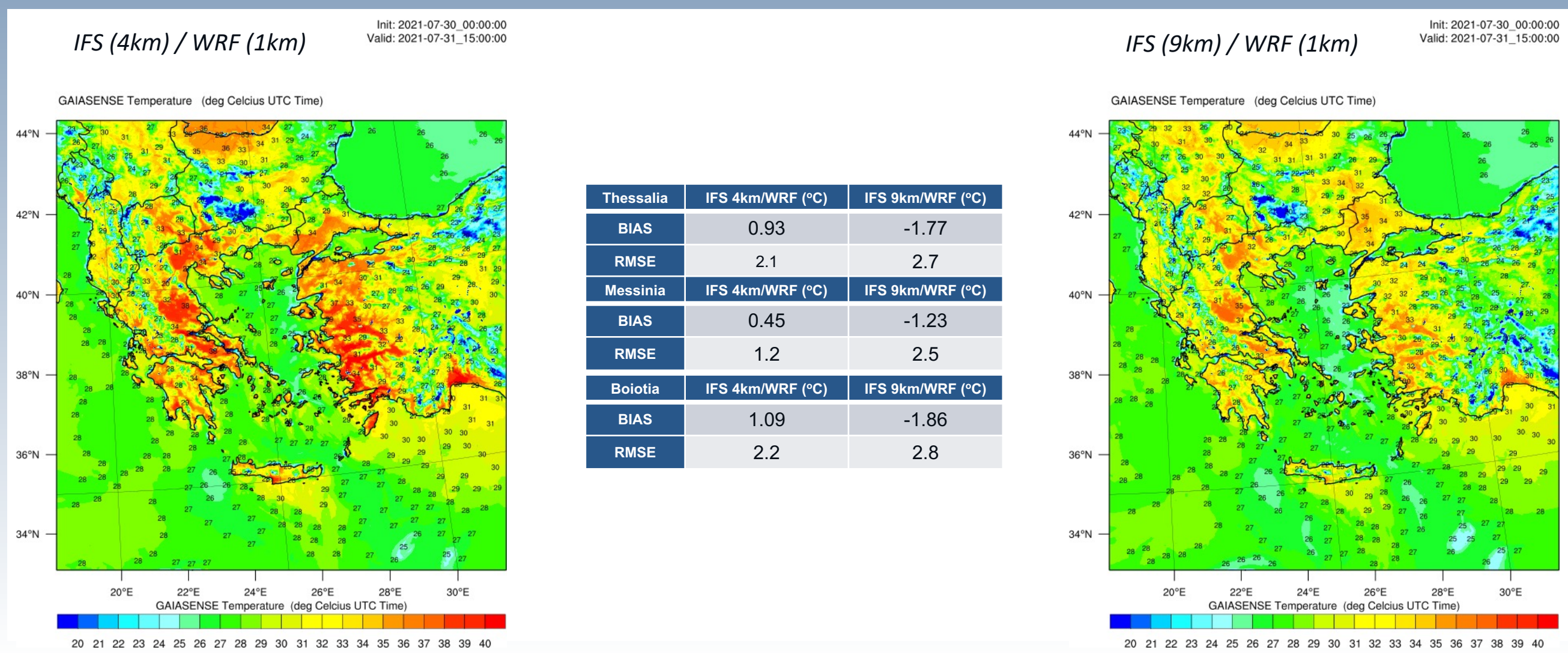
ACROSS has created a platform that facilitates the execution of diverse application workflows, encompassing large numerical simulations, machine learning, and big-data analytics, on HPC resources with optimal efficiency



ECMWF, MPI-M, Deltares, and NEUROPUBLIC have harnessed the potential of the ACROSS platform to develop large-scale low-latency workflows that surpass the current state-of-the-art capabilities.

## Meteorological Workflow and Farming advisory services

NEUROPUBLIC's farming advisory services (GAIASENSE system) are forced by 4km global-scale IFS forecasts and 1km WRF mesoscale downscaling with data assimilation using NEUROPUBLIC's weather station network. Improved accuracy (thanks to IFS 4km global-scale NWP) In-situ product generation (see multio presentation for further details) Low-latency utilization of global-scale NWP by employing stream-like post-processing of the global-scale product during the WRF-DA Data assimilation phase.

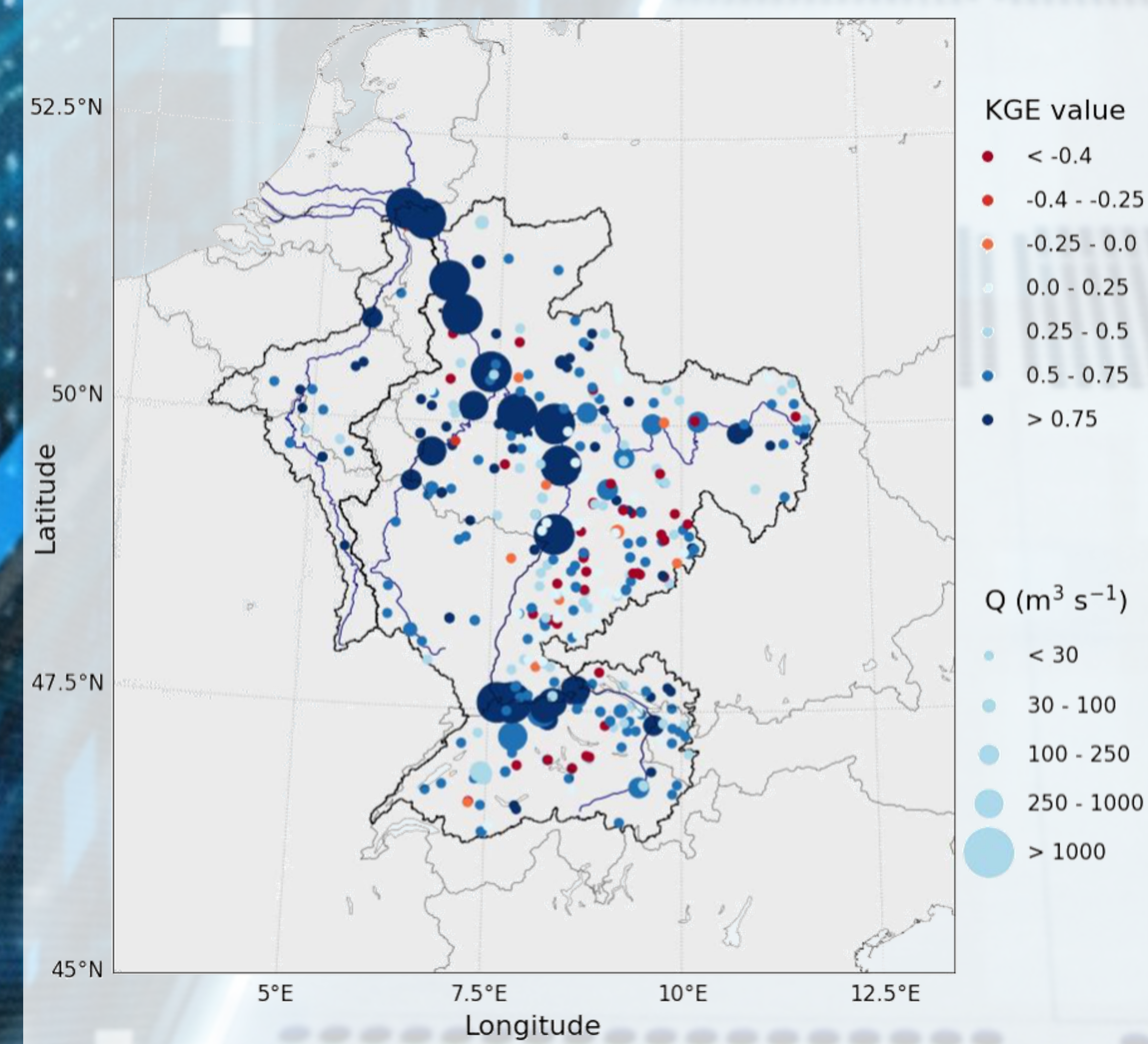


## Hydro-meteorological workflow

In the hydro-meteorological workflow, the team achieved hydrological forecasts for the Rhine and Meuse catchments at 1km spatial and hourly temporal resolution, taking only 1 to 2 minutes per issue time after obtaining the IFS forecast.

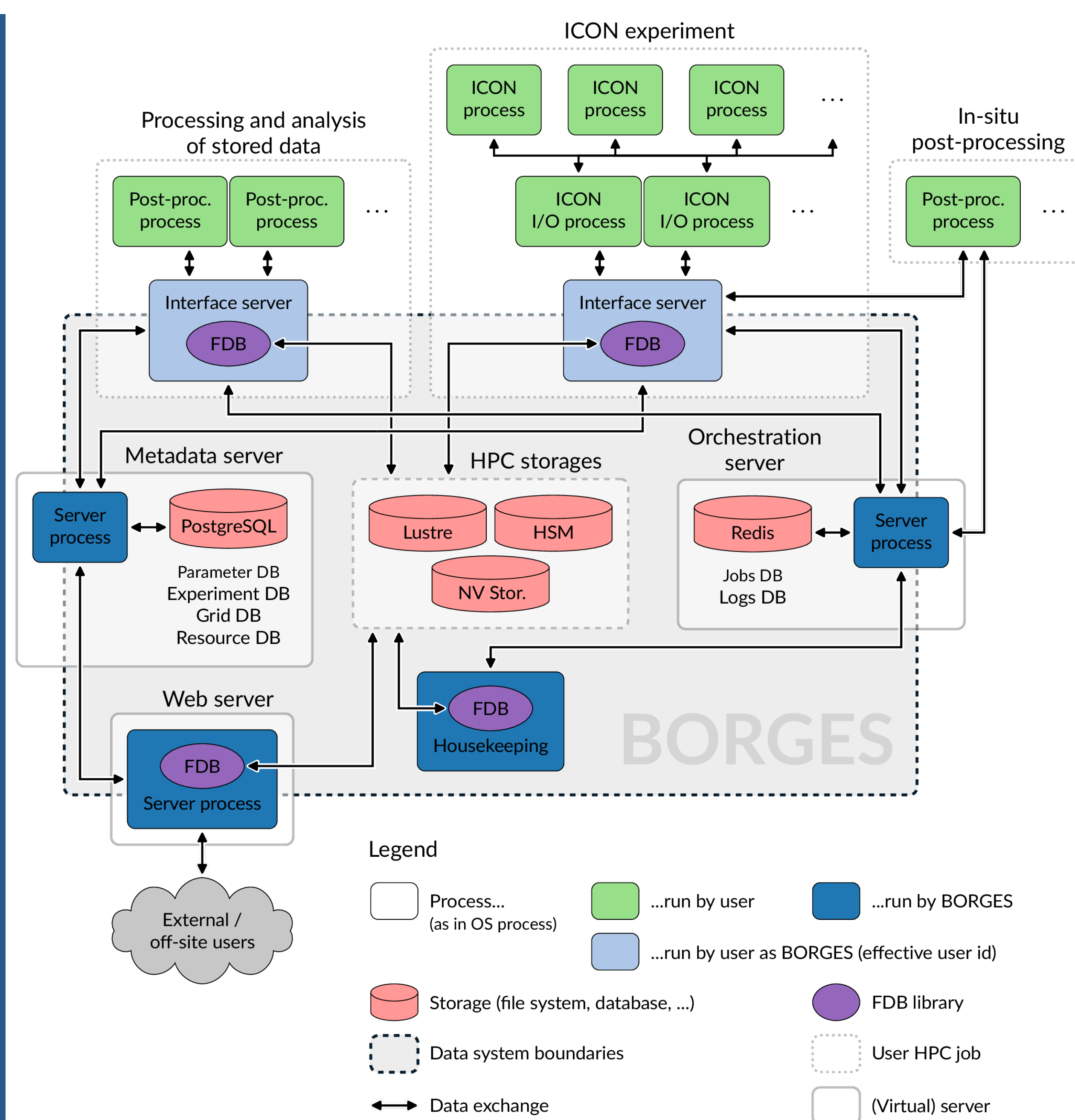
This significant advancement was made possible by employing in-situ NWP product generation, stream-like pre-processing of meteorological forcing data, and a complete re-implementation of the WFLOW hydrological model, resulting in a remarkable 11x speed improvement.

Furthermore, the approach can be scaled up to accommodate more compute nodes, allowing for the simulation of all European catchments and/or multiple ensemble members.



## Climatological simulations

MPI-M has developed a novel data management subsystem called BORGES, which adopts the FDB object store and has been integrated into the ICON model. BORGES facilitates semantic data access and seamless integration of ICON climatological simulations with WFLOW, thereby enabling hydro-climatological simulations over extensive river catchments.



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