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Using European Open Science Cloud infrastructure for rapid simulations of large-scale global reservoirs

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Water reservoirs play an important role in relation to water security, flood risk, agriculture production, hydropower, hydropower potential, and environmental flows. However, long-term daily information on reservoir volume, inflow and outflow dynamics are not publicly available. To enable deriving long-term reservoir dynamics for many reservoirs across the globe using a distributed hydrological model, large amounts of computer power are needed. Therefore, these types of simulations are generally performed on super computers. Nowadays, public cloud computing infrastructure offers interesting alternative and allows one to quickly access hundreds to thousands of computer nodes. The current work presents an example of making use of the EOSC by simulating the dynamics of 3236 headwater reservoirs on a Kubernetes Cluster. Within the cloud, distributed model forcing and hydrological parameters at a 1-km grid resolution can be derived using HydroMT, which subsequently are used by wflow_sbm to perform long-term hydrological simulation over the period 1970-2020. To enable operation in the cloud, usage is made of the Argo workflow engine, that is effective able to schedule the sequential execution of the HydroMT and wflow_sbm containers. We will present the executed modeling setup within the public cloud as well as present some of the results derived in this manner by comparing observations with in situ and satellite observations.

Any relevant links

Topic

EOSC Compute Platform

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