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High performance computing (HPC) based hydrological modelling framework to support complex model-coupling and uncertainty studies

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We have recently initiated a framework of HPC based hydrological modelling system that intends to couple hydrological model and numerical weather prediction on a unified platform. The framework is intended to achieve 1) seamlessly coupling of the hydrological models with the climate/numerical weather models that are supported by the same HPC platform; 2) supporting large-scale hydrological modelling in greater details; 3) conducting joint ensemble runs of coupled modelling systems so as to account for the modelling uncertainty; 4) supporting multi-model ensembles to identify potential extreme storms with certain climate projections; 5) the ability of processing large volume of data (terabyte level). At current stage, we are focusing on the design and implementation of a versatile interface between the two backend NWPs (Unified Model from UK Met Office & WRF from NCAR) to a number of preferred hydrological models. The expected outcome will serve well the research community and practitioners in terms of providing an easy-access modelling platform as well as providing benchmarking datasets from tailor-made experiments.

Keywords: Coupled models, Hydrological modelling, High Performance Computing, Unified Model, WRF, Multi-model ensembles