

## **GlobalReservoirModel V1.0 A new global reservoir modeling database for water quality management**

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The building of dams continues worldwide. Existing global databases provide information of dam and reservoir attributes, climate conditions, discharge, etc. However, there is a lack of user-friendly databases that generate input files for reservoir water quality models. Here, we introduce a new 2D global reservoir model-usable database called GRM V1.0, which integrates data from the following existing global databases: Global Reservoir and Dam database (GRanD), Reservoir Storage-Area-Depth dataset (ReGeom), WaterGAP V2.2D, GloFAS, FutureStreams, and ERA5 reanalysis databases. For reservoirs included in the database, GRM V1.0 generates simplified reservoir bathymetries based on the variable, user-defined number of depth segments. It further provides long-term water discharge (from 1901 to 2019), water temperature (from 1979 to 2005), and daily meteorological data (from 1959 to 2019) in model usable output files. The meteorological data include air temperature, wind speed and direction, and cloud cover. The GRM V1.0 output files can be directly implemented in the CE-QUAL-W2 water quality model through the GRM V1.0 intelligent multi-threading module. As such, GRM V1.0 overcomes the usual gap between existing global reservoir datasets and water quality modelling research. To illustrate the user-specific capabilities of GRM V1.0 we present results from simulated dissolved oxygen (DO) distributions and thermal stratification for several representative reservoirs. This sets the stage for using GRM V1.0 in applications looking at the potential responses of reservoirs to climate change.