# It’s impolite to zoom in on global hydrological models

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## Introduction

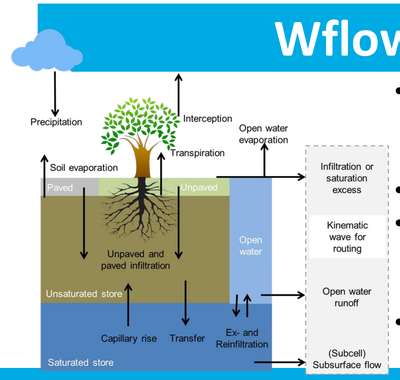
In this study, we carry out an assessment of how changes in spatial resolution affect the simulations of the Wflow SBM model for basins in the Continental United States.

This is done by comparing the model states and fluxes at three spatial resolutions, namely 3 km, 1km, and 200m. A hypothesis driven approach is used to investigate why changes in states and fluxes are taking place at different spatial resolutions and how they relate to model performance. The latter is determined by validating river streamflow.

In addition, we make use of two sets of parameters that rely on different pedo-transfer functions. Further investigating the role of parameterization in conjunction with changes in spatial resolution.

Combining all results from multiple spatial resolutions and basins we aim to answer the guiding question.

## Wflow SBM




- Physically based distributed hydrological model
- Can run with any time step.
- Spatial distribution within the hyper-resolution domain.
- Single parameter calibration.

## Guiding Question

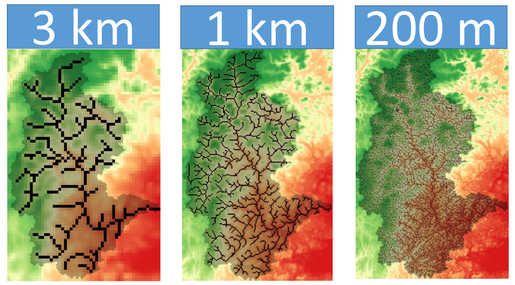
*How do catchment and climate characteristics (pre-)determine appropriate spatial modelling resolution for simulating streamflow?*

## Comparison Setup

**Input**: ERA5

**Pre-processor**: ESMValTool (Earth System Model eValuation Tool); WorldClim

**Model Runs**

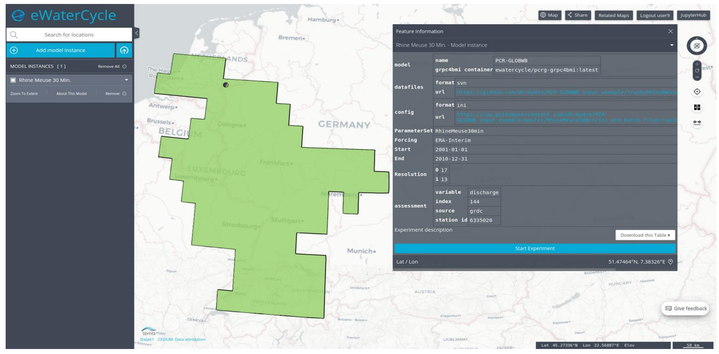



**Model Validation**: NSE(Q), NSE(log(Q), KGE(Q)

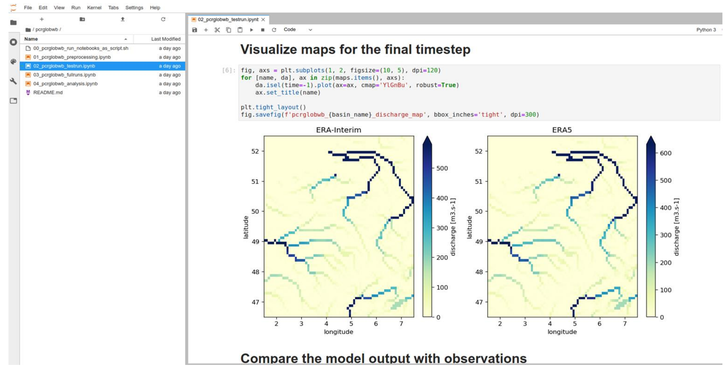
**Inter-Basin Analyses**

- Climate Indices
- Hydrological Signatures
- Land Cover Properties

## About eWaterCycle




eWaterCycle is a framework in which hydrological modelers can, for example, compare and analyze the results of models that use different sources of meteorological data. The goal of eWaterCycle is to advance the state of FAIR (Findable, Accessible, Interoperable, and Reusable) and open science in hydrological modeling.




The experiment runs in a Jupyter notebook, the model runs in a container, in any programming language, communicating through grpc4bmi, developed in our team.

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