ESMValTool pre-processing functions for eWaterCycle
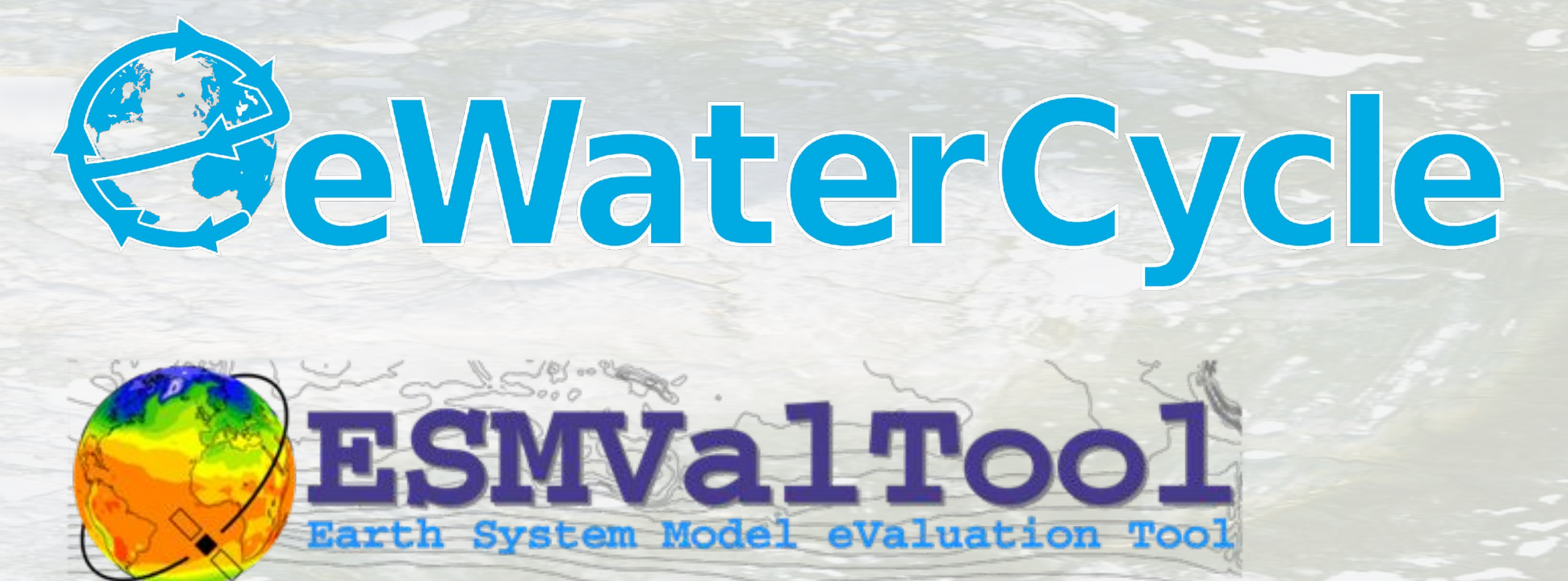
Fakhereh Alidoost[1], Jerom Aerts[2], Bouwe Andela[1], Jaro Camphuijsen[1], Nick van De Giesen[2], Gijs van Den Oord[1], Niels Drost[1], Yifat Dzigan[1], Ronald van Haren[3], Rolf Hut[2], Peter Kalverla[1], Inti Pelupessy[1], Berend Weel[1], Ben van Werkhoven[1], Stefan Verhoeven[1]

[1]Netherlands eScience Center, Amsterdam, the Netherlands [2]Delft University of Technology, Faculty of Civil Engineering and Geosciences, Delft, the Netherlands
[3]Rijkswaterstaat, Utrecht, the Netherlands
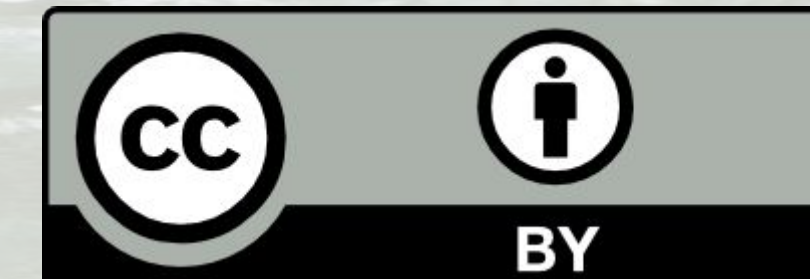
Abstract

Comparing hydrological models has always been a challenging task. Forcing (meteorological) data can be retrieved from a wide variety of sources with discrepant variable names and frequencies, and spatial and temporal resolutions. Moreover, some hydrological models make specific assumptions about the definition of the forcing variables. The pre-processing is often performed by various sets of scripts that may or may not be included with model source codes, making it hard to reproduce results.

Within the context of the eWaterCycle II project, a common pre-processing system has been created for hydrological modeling based on ESMValTool (Earth System Model Evaluation Tool).

ESMValTool is a community diagnostic and performance metrics tool developed for the evaluation of Earth system models. The ESMValTool pre-processing functions cover a broad range of operations on data before diagnostics or metrics are applied. The pre-processor performs these operations in a centralized, documented and efficient way.

The current pre-processing pipeline consists of hydrological model-specific recipes and supports ERA5 and ERA-Interim data. The pipeline starts with the downloading and CMORization (Climate Model Output Rewriter) of input data. Then a recipe is prepared to find the data and run the preprocessors. When ESMValTool runs a recipe, it will also run the diagnostic script that contains model-specific analysis to derive required forcing variables, and it will store provenance information to ensure transparency and reproducibility.

In the near future, the pipeline is extended to include Earth observation data, as these data are paramount to the data assimilation in eWaterCycle.

More Info

See more information in our website:
https://www.ewatercycle.org

See our code sources at GitHub:
http://github.com/eWaterCycle

https://github.com/ESMValGroup/ESMValTool/tree/master/esmvaltool/recipes/hydrology

Contact us at:
ewatercycle@esciencecenter.nl

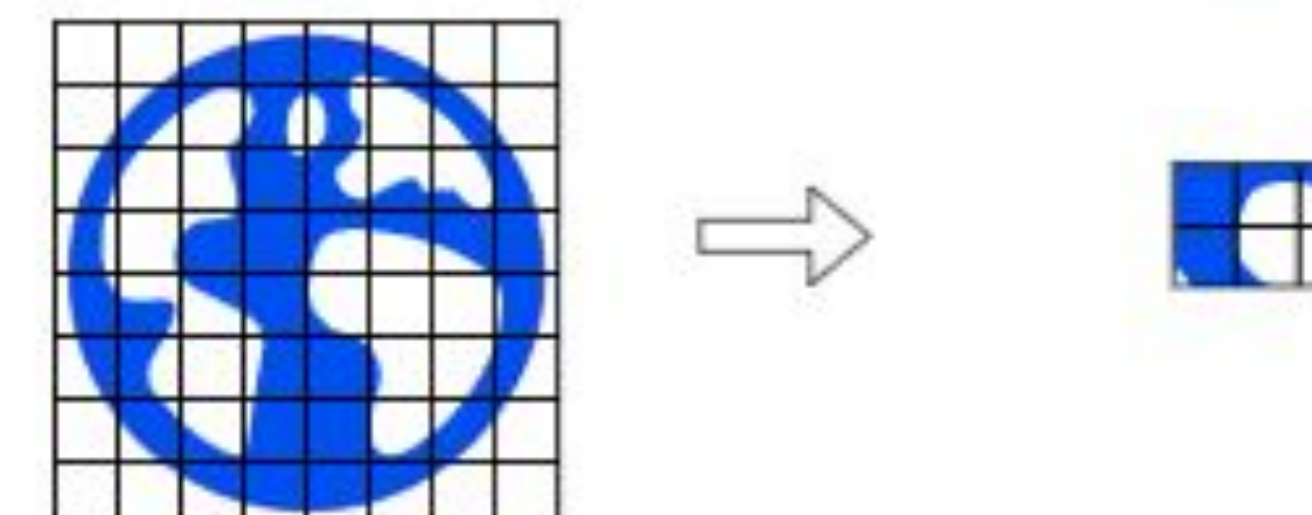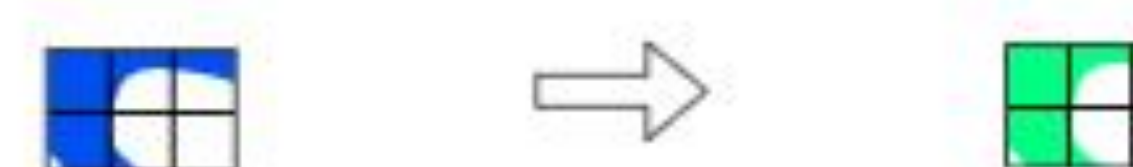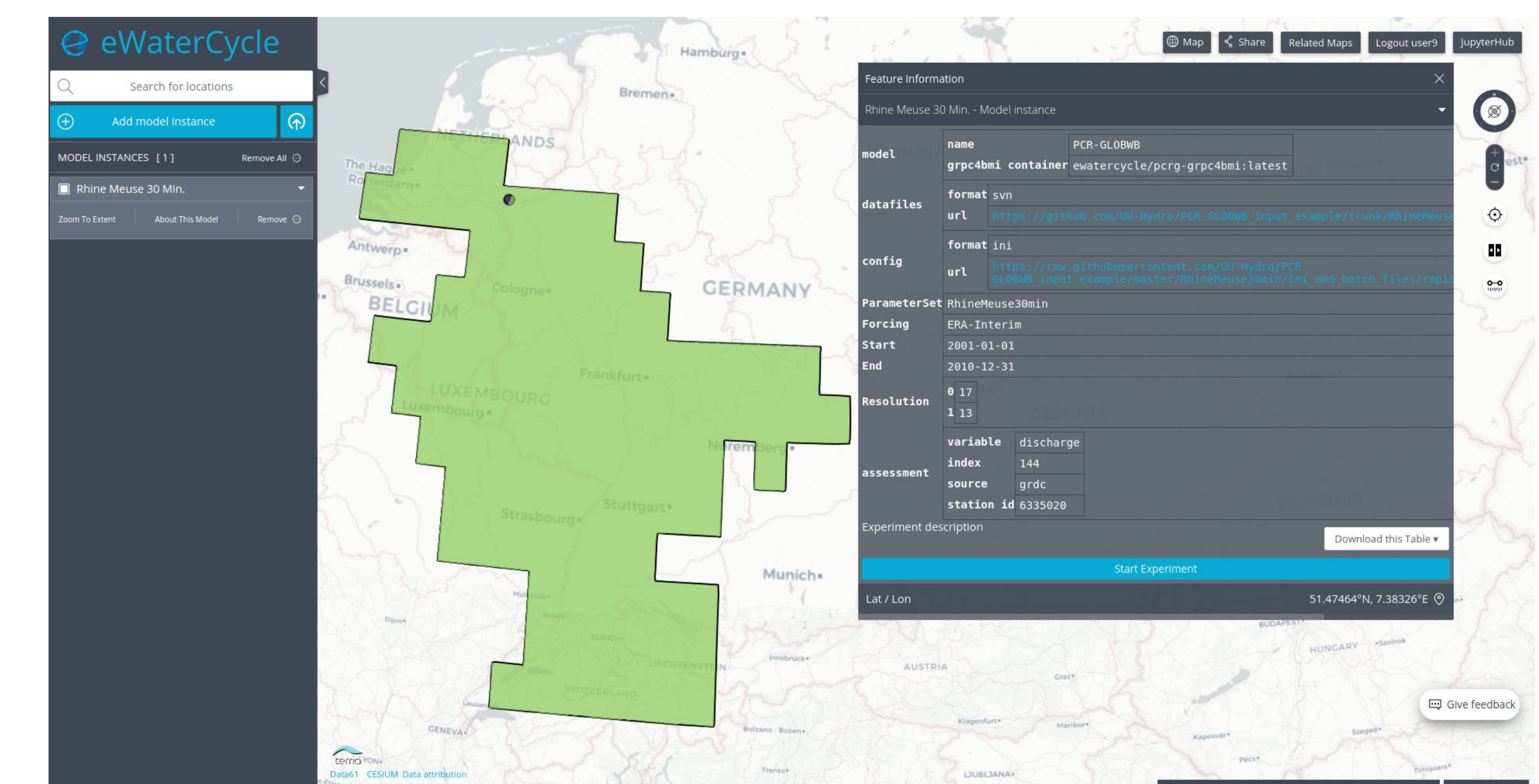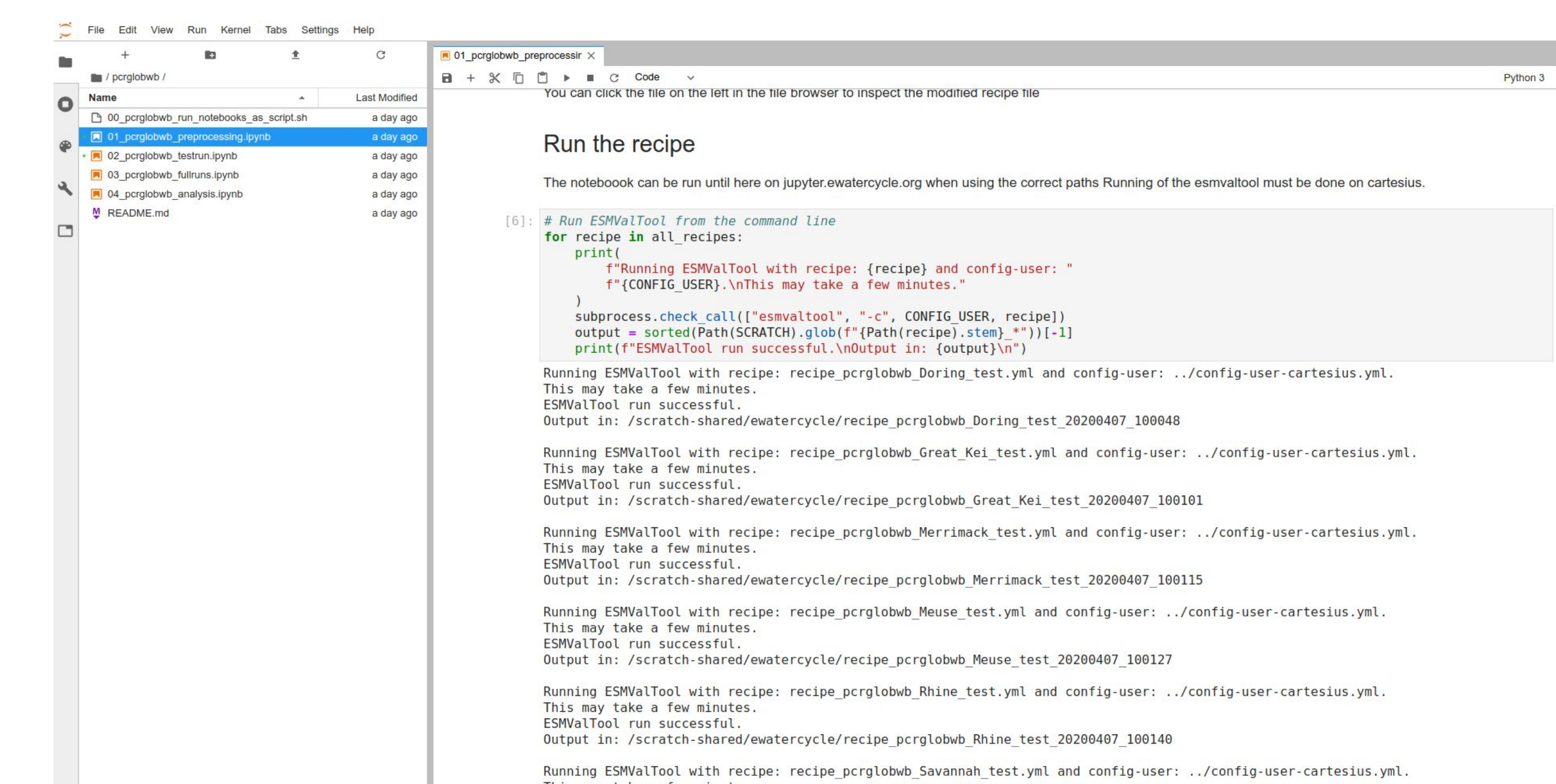## About eWaterCycle

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.

ESMVAlTool recipe runs in a Jupyter notebook.