Using R in Hydrology
EGU Short Course 2021

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Agenda

- Intro
- Data Retrieval – Louise Slater 10:05-10:15
- Extremes Modelling – Ilaria Prosdocimi 10:15-10:25
- Hydrological Modelling – Guillaume Thirel 10:25-10:35
- Hydrological Forecasting – Katie Smith 10:35-10:45
- Google Earth Engine – Abdou Khouakhi 10:45-10:55
- Q&A* – 10:55-11:00

[*] Questions typed into the chat window will be answered by the convenors or the presenter once they have finished presenting.

Young Hydrologic Society

Today's short course has be co-organised by the YHS.

Do consider joining the group!

https://younghs.com/

twitter @YoungHydrology

Accessing the materials

Materials from today's course will be available on Github.

https://github.com/hydrosoc/rhydro_vEGU21

Past years' materials are on there as well.

Previous sessions have covered:

- Good coding practice
- Using R as GIS
- Time-series visualisation
- Extreme value stats
- Hydrological modelling
- Trend Analysis
- Using APIs
- Processing, modelling and visualising hydrological data
- Extracting netCDF climate data
- Parallel Programming and HPCs
- Automating tasks
- Shiny Apps

Using R in Hydrology Paper

We have published a paper in HESS, take a look!

https://hess.copernicus.org/articles/23/2939/2019/

Hydrol. Earth Syst. Sci., 23, 2939–2963, 2019
https://doi.org/10.5194/hess-23-2939-2019

Hydrology and Earth System Sciences
Open Access
EGU

Using R in hydrology: a review of recent developments and future directions

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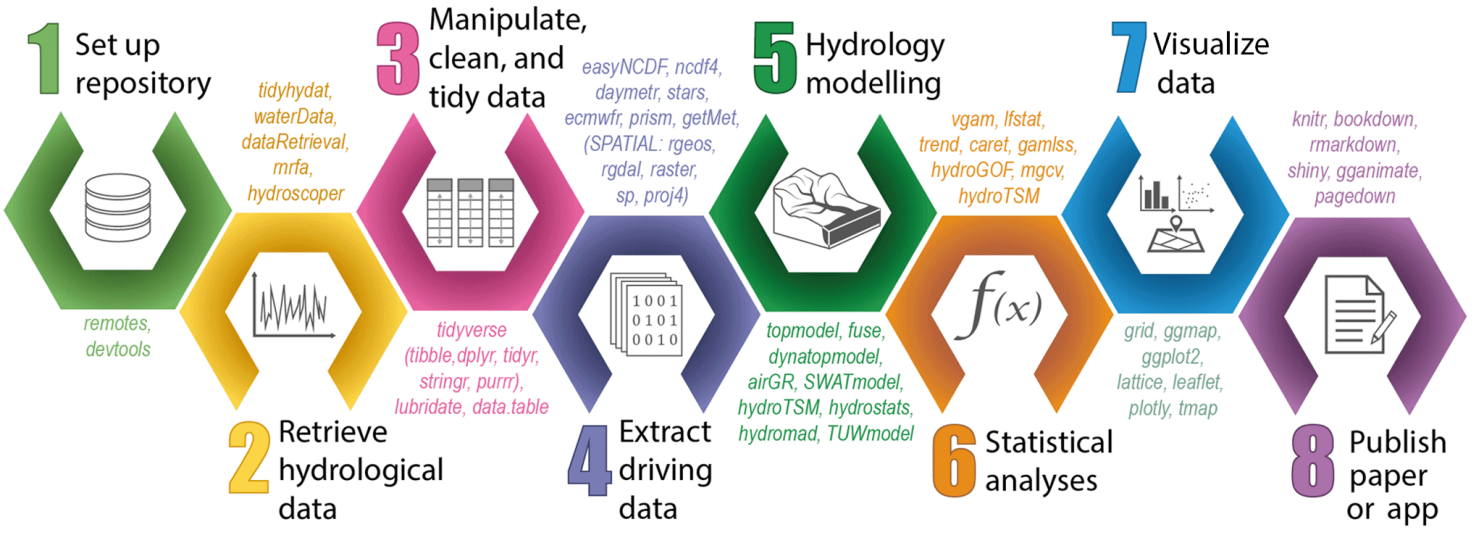
Using R in Hydrology Paper



Task View

There is also a CRAN Task View for Hydrology, detailing all the R packages relevant to hydrology.

https://cran.r-project.org/web/views/Hydrology.html

CRAN Task View: Hydrological Data and Modeling

Maintainer: Sam Zipper, Sam Albers, Ilaria Prosdocimi
Contact: samuelczipper at gmail.com
Version: 2021-04-08
URL: https://CRAN.R-project.org/view=Hydrology

This Task View contains information about packages broadly relevant to *hydrology* , defined as the movement, distribution and quality of water and water resources over a broad spatial scale of landscapes. Packages are broadly grouped according to their function; however, many have functionality that spans multiple categories. We also highlight other, existing resources that have related functions - for example, statistical analysis or spatial data processing. See also Riccardo Rigon's excellent list of hydrology-related R tools and resources.

If you have any comments or suggestions for additions or improvements for this Task View, go to GitHub and submit an issue , or make some changes and submit a pull request . If you can't contribute on GitHub, send Sam Zipper an email . If you have an issue with one of the packages discussed below, please contact the maintainer of that package.

Data Retrieval

Hydrological data sources (surface water/groundwater quantity and quality)

- AWAPer: AWAPer allows efficient extraction of daily catchment average precipitation, Tmin, Tmax, vapour pressure, solar radiation and then estimation of areal potential evaporation (Morton's) for anywhere in Australia. Spatial measures are also derived (eg spatial daily variance). For technical details see Peterson et al. (2019).
- dataRetrieval: Collection of functions to help retrieve U.S. Geological Survey (USGS) and U.S. Environmental Protection Agency (EPA) water quality and hydrology data from web services.
- dbhydroR: Client for programmatic access to the South Florida Water Management District's DBHYDRO database , with functions for accessing hydrologic and water quality data.
- echor: An R interface to United States Environmental Protection Agency (EPA) Environmental Compliance History Online ('ECHO') . Provides functions to locate facilities with discharge permits and download discharge records.
- FedData: Functions to Automate Downloading Geospatial Data Available from Several Federated Data Sources.
- hddtools: Hydrological Data Discovery Tools. Facilitates discovery and handling of hydrological data, access to catalogues and databases.
- hydroscoper: R interface to the Greek National Data Bank for Hydrological and Meteorological Information . It covers Hydroscope's data sources and provides functions to transliterate, translate and download them into tidy dataframes (tibbles).
- kiwisR: Wrapper for retrieving data from KISTERS WISKI databases via the KiWIS API.

Data Retrieval

Extremes Modelling

Hydrological Modelling

Hydrological Forecasting

Google Earth Engine

Q&A