Package 'hydrodownloadR'

September 15, 2026

Title Hydrologic Station Catalogs and Time Series from Public APIs

Version 0.1.5

Description Provides a unified, extensible interface for discovering hydrological stations and downloading hydrological daily time series (e.g., water discharge, water level, water temperature) and discrete water-quality observations from national and regional public APIs. Water-quality observations are retained at their original sampling timestamps.

Includes a provider registry, S3 generics 'stations' and 'timeseries', licensing metadata, date-range and 'complete history' modes, rate limiting and retries, optional authentication via environment variables, tidy outputs, UTF-8 to ASCII transliteration, and WGS84 coordinates. Designed for reproducible workflows and straightforward addition of new providers.

Background and use cases are described in Farber et al. (2025) <doi:10.5194/essd-17-4613-2025> and Farber et al. (2023) <doi:10.57757/IUGG23-2838>.

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URL https://hydrodownloadr.bafg.de/, https://github.com/bafg-bund/hydrodownloadR

BugReports https://github.com/bafg-bund/hydrodownloadR/issues

Depends R (>= 4.1.0)

Imports cli, dataRetrieval, DBI, dplyr, httr, httr2 (>= 1.1.0), jsonlite, lubridate, pdftools, progress, rappdirs, ratelimitr, rlang, RSQLite, sf, magrittr, tibble, cellranger, stringi, stringr

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`bafu_nawa_parameters` *Retrieve the complete BAFU NAWA Trend parameter catalogue*

Description

The catalogue includes all physicochemical parameters, nutrients, micropollutants and the few hydrological parameters stored in NAWA. The `parameter` column shows how each provider parameter is handled by `timeseries()`. All entries classified as `water_quality` are returned together when `parameter = "water_quality"` is requested.

Usage

```
bafu_nawa_parameters(x, ...)
```

Arguments

x	A `CH_BAFU_NAWA` hydro service.
...	Unused.

Value

A tibble containing the provider's parameter catalogue.

`fi_syke_runoff_meta` *SYKE runoff station metadata (area & altitude)*

Description

Catchment area and altitude for Finnish SYKE runoff stations. Area may be `NA` for a few stations; altitude may still be present. Used to compute discharge from runoff time series: `discharge_m3s = (value_lps_per_km2 * area_km2) / 1000`.

Usage

```
data(fi_syke_runoff_meta)
```

Format

A tibble with:

place_id Character. SYKE Paikka_Id.

area Numeric (km^2). May be NA.

altitude Numeric (m). May be NA.

Source

Finnish Environment Institute (SYKE).

`fr_hubeau_meta` *FR_HUBEAU precomputed station metadata*

Description

Preloaded metadata for Hub'Eau stations, built offline from the Hub'Eau referentials plus scraped site/station fiches (area, site altitude, gauge-zero altitude, vertical datum at site). Used to speed up `stations()` for the FR_HUBEAU provider.

Format

A data frame/tibble with columns:

code_site Character. Hub'Eau site code.

station_id Character. Hub'Eau station code.

area Numeric (km^2). Catchment area from site fiche; may be NA.

altitude_api Numeric (m). API referential altitude (hydrometry in mm to m; temperature in m).

altitude_site Numeric (m). Site altitude parsed from the site fiche; may be NA.

altitude_station Numeric (m). "Cote du zero d'echelle" from station fiche; may be NA.

vertical_datum_site Character. Site-level vertical datum label; may be NA.

retrieved_at POSIXct (UTC). Timestamp when the row was scraped.

Details

Built by `data-raw/fr_hubeau_meta_build.R`. The file `data/fr_hubeau_meta.rda` is shipped with the package and may be refreshed out-of-band. A build-date string is also stored in the object attribute `metadata_date`.

Source

Hub'Eau APIs and https://www.hydro.eaufrance.fr/ site/station fiches.

`hydro_service` *Create a hydro service object*

Description

Create a hydro service object

Usage

```
hydro_service(provider_id, ...)
```

Arguments

`provider_id`	ID as listed by `hydro_services()`
`...`	Reserved for future use.

Value

An object of class `"hydro_service"` (a list) containing the provider configuration used by `stations()` and `timeseries()` (e.g. provider_id, provider_name, country, base_url, and other adapter-specific settings).

hydro_services *List available providers*

Description

List available providers

Usage

```
hydro_services()
```

Value

A tibble with columns: provider_id, provider_name, country, base_url, license, license_link, access_class, reuse_class, is_open_data

jp_mlit_meta *Japan MLIT stations metadata snapshot*

Description

A processed station metadata table used internally by the JP MLIT adapter. Coordinates from the official MLIT station pages are preferred when available. Coordinates from the supplied metadata CSV are used as a fallback.

Usage

```
data(jp_mlit_meta)
```

Format

A tibble/data.frame with one row per station:

station_id MLIT station identifier (character).

station_name English station name (character).

river English river-system name (character).

lat Selected latitude in WGS84 decimal degrees (double).

lon Selected longitude in WGS84 decimal degrees (double).

area Drainage area in square kilometres, if available (double).

altitude Gauge-zero elevation in metres, if available (double).

station_name_original Original Japanese station name (character).

lat_website Latitude obtained from the official MLIT station page (double).

lon_website Longitude obtained from the official MLIT station page (double).

coordinate_source Source used for `lat` and `lon`. Either `"MLIT website"` or `"MLIT metadata CSV"` (character).

Source

Japan Ministry of Land, Infrastructure, Transport and Tourism (MLIT).

`list_countries` *List available countries*

Description

List available countries

Usage

```
list_countries()
```

Value

A character vector of country codes (e.g. ISO 3166-1 alpha-2) for which at least one provider is available.

`stations` *List stations for a provider*

Description

List stations for a provider

Usage

```
stations(x, ...)
```

Arguments

`x`	A `hydro_service` object created by `hydro_service()`.
`...`	Passed to provider-specific methods.

Value

A tibble with station metadata.

Examples

```
# Offline: enumerate providers (no network)
s <- hydro_services()
head(names(s))


# Online (opt-in): fetch stations
x <- hydro_service("SE_SMHI")
st <- stations(x)
head(st)
```

`stations.hydro_service_BR_ANA`
ANA stations (Brazil) - cache-first with optional update from inventory

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Description

Loads the cached ANA station catalogue (if present) or rebuilds it from a locally downloaded SNIRH inventory (`InventarioDD_MM_YYYY.zip` / `.mdb`) when `update = TRUE`.

Usage

```
## S3 method for class 'hydro_service_BR_ANA'
stations(x, ...)
```

Arguments

`x`	A `hydro_service` created with `hydro_service("BR_ANA")`.
`...`	Named arguments: • `zip_or_mdb`: path to `InventarioDD_MM_YYYY.zip` or `.mdb` • `dest_dir`: unzip destination (default: `"data-raw/BR_ANA"`) • `cache_dir`: cache dir for RDS (default: user cache) • `update`: `TRUE` to rebuild from provided inventory

Value

A tibble with ANA station metadata.

`timeseries` *Retrieve time series for a provider*

Description

Retrieve time series for a provider

Usage

```
timeseries(
  x,
  parameter,
  stations = NULL,
  start_date = NULL,
  end_date = NULL,
  mode = c("range", "complete"),
  ...
)
```

Arguments

`x`	A `hydro_service` object created by `hydro_service()`.
`parameter`	One of "water_discharge","water_level","water_temperature","water_velocity".
`stations`	Optional character vector of station IDs.
`start_date, end_date`	`YYYY-MM-DD` strings for `mode = "range"`.
`mode`	Either `"range"` or `"complete"` (`1900-01-01` to today).
`...`	Passed to provider-specific methods.

Value

A tibble with columns: country, provider_id, provider_name, station_id, parameter, timestamp, value, unit, quality_code, source_url.

Examples

```
# Offline: construct a service object (no network)
x <- hydro_service("SE_SMHI")


# Online (opt-in): one station for a short range
st <- head(stations(x)$station_id, 1)
ts <- timeseries(x, parameter = "water_discharge",
                 stations = st,
                 start_date = "2020-01-01", end_date = "2020-01-10")
head(ts)
```

`timeseries_parameters` *List supported parameters/units for a provider*

Description

List supported parameters/units for a provider

Usage

```
timeseries_parameters(x, ...)
```

Arguments

`x`	A `hydro_service` object.
`...`	Reserved for future use.

Value

A tibble with columns: parameter, code, unit.

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