

# Package ‘hydroscoper’

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**Type** Package

**Title** Interface to the Greek National Data Bank for  
Hydrometeorological Information

**Version** 1.0.0

**Maintainer** Konstantinos Vantas <kon.vantas@gmail.com>

**Description** R interface to the Greek National Data Bank for Hydrological and  
Meteorological Information <<http://www.hydroscope.gr/>>. It covers  
Hydroscope's data sources and provides functions to transliterate,  
translate and download them into tidy dataframes (tibbles).

**URL** <https://github.com/ropensci/hydroscoper>,  
<https://ropensci.github.io/hydroscoper/>

**BugReports** <https://github.com/ropensci/hydroscoper/issues>

**Depends** R (>= 3.4.0)

**License** MIT + file LICENSE

**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 6.0.1

**Imports** stringi (>= 1.1.7), stringr (>= 1.3), tibble (>= 1.4.2), pingr  
(>= 1.1.2), readr (>= 1.1.1), jsonlite (>= 1.5), plyr (>= 1.8.4)

**Suggests** ggplot2 (>= 2.2.1), knitr (>= 1.20), rmarkdown (>= 1.9),  
testthat (>= 2.0.0)

**VignetteBuilder** knitr

**NeedsCompilation** no

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Tim Trice [rev] (Tim Trice reviewed the package for rOpenSci, see  
<https://github.com/ropensci/onboarding/issues/185>)

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get_data	<i>Get time series values in a tibble</i>
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### Description

get\_data returns a tibble from a Hydroscope's time-series text file.

### Usage

```
get_data(subdomain = c("kyy", "ypaat", "emy", "deh"), time_id)
```

### Arguments

subdomain	One of the subdomains of hydroscope.gr
time_id	A time series ID

### Value

If subdomain is one of:

- kyy, Ministry of Environment and Energy
- ypaat, Ministry of Rural Development and Food
- deh, Greek Public Power Corporation
- emy, National Meteorological Service

and time\_id exists in that subdomain, returns a tibble with the time series values. Otherwise returns an error message.

The dataframe columns are:

**date** The time series Dates (POSIXct)

**value** The time series values (numeric)

**comment** Comments about the values (character)

**Note**

Data are not available freely in the sub-domains: "deh" (Greek Public Power Corporation) and "emy" (National Meteorological Service).

**Author(s)**

Konstantinos Vantas, <kon.vantas@gmail.com>

**References**

Stations' data are retrieved from the Hydroscope's <http://www.hydroscope.gr/> databases:

- Ministry of Environment, Energy and Climate Change.
- Ministry of Rural Development and Food.

Tibble, <http://tibble.tidyverse.org/>

**Examples**

```
## Not run:
# get time series 912 from the Greek Ministry of Environment and Energy
time_series <- get_data("kyy", 912)

## End(Not run)
```

---

get\_tables

*Get tibbles from Hydroscope*

---

**Description**

A family of functions that return a tibble from a specific database from Hydroscope using the Enhydriis API. `get_database` returns a named list of tibbles using all the family's functions.

**Usage**

```
get_stations(subdomain = c("kyy", "ypaat", "emy", "deh"), translit = TRUE)

get_timeseries(subdomain = c("kyy", "ypaat", "emy", "deh"), translit = TRUE)

get_instruments(subdomain = c("kyy", "ypaat", "emy", "deh"),
  translit = TRUE)

get_water_basins(subdomain = c("kyy", "ypaat", "emy", "deh"),
  translit = TRUE)

get_water_divisions(subdomain = c("kyy", "ypaat", "emy", "deh"),
  translit = TRUE)
```

```
get_political_divisions(subdomain = c("kyy", "ypaat", "emy", "deh"),
  translit = TRUE)

get_variables(subdomain = c("kyy", "ypaat", "emy", "deh"), translit = TRUE)

get_units_of_measurement(subdomain = c("kyy", "ypaat", "emy", "deh"),
  translit = TRUE)

get_time_steps(subdomain = c("kyy", "ypaat", "emy", "deh"), translit = TRUE)

get_owners(subdomain = c("kyy", "ypaat", "emy", "deh"), translit = TRUE)

get_instruments_type(subdomain = c("kyy", "ypaat", "emy", "deh"),
  translit = TRUE)

get_station_type(subdomain = c("kyy", "ypaat", "emy", "deh"),
  translit = TRUE)

get_database(subdomain = c("kyy", "ypaat", "emy", "deh"), translit = TRUE)
```

### Arguments

subdomain	One of the subdomains of Hydroscope in the vector c("kyy", "ypaat", "emy", "deh").
translit	Automatically transliterate Greek to Latin.

### Value

If subdomain is one of:

- kyy, Ministry of Environment and Energy.
- ypaat, Ministry of Rural Development and Food.
- deh, Greek Public Power Corporation.
- emy, National Meteorological Service.

returns a tibble or a named list with tibbles from the corresponding database. Otherwise returns an error message.

### Note

Objects' IDs are not unique among the different Hydroscope databases. For example, time series' IDs from <http://kyy.hydroscope.gr> have same values with time series' from <http://ypaat.hydroscope.gr>.

The coordinates of the stations are based on the European Terrestrial Reference System 1989 (ETRS89).

### Author(s)

Konstantinos Vantas, <[kon.vantas@gmail.com](mailto:kon.vantas@gmail.com)>

## References

The data are retrieved from the Hydroscope's <http://www.hydroscope.gr/> databases:

- Ministry of Environment, Energy and Climate Change.
- Ministry of Rural Development and Food.
- National Meteorological Service.
- Greek Public Power Corporation.

European Terrestrial Reference System 1989 (ETRS), <http://bit.ly/2kJwFuf>

Greek Water Divisions, <http://bit.ly/2kk0t0m>, <http://bit.ly/2ltQC80>

Greek Water Basins, <http://bit.ly/2Dvzo1W>

Tibble, <http://tibble.tidyverse.org/>

## Examples

```
## Not run:

# data will be downloaded from Ministry of Environment and Energy (kyy):
subdomain <- "kyy"

# stations
kyy_stations <- get_stations(subdomain)

# time series
kyy_ts <- get_timeseries(subdomain)

# instruments
kyy_inst <- get_instruments(subdomain)

# water basins
kyy_wbas <- get_water_basins(subdomain)

# water divisions
kyy_wdiv <- get_water_divisions(subdomain)

# political divisions
kyy_pol <- get_political_divisions(subdomain)

# variables
kyy_vars <- get_variables(subdomain)

# units of measurement
kyy_units <- get_units_of_measurement(subdomain)

# time steps
kyy_time_steps <- get_time_steps(subdomain)

# owners
kyy_owners <- get_owners(subdomain)
```

```
# instruments type
kyy_instr_type <- get_instruments_type(subdomain)

# stations' type
kyy_st_type <- get_station_type(subdomain)

# use all the get_ functions above to create a named list with tibbles
kyy_db <- get_database(subdomain)

## End(Not run)
```

---

greece\_borders

*Greek borders*

---

### Description

The borders of Greece are taken from Geodata.gov.gr. The variables are created using the function `tidy` from the `broom` package. This data frame was created for use with the `geom_polygon` from `ggplot2` package.

### Usage

```
greece_borders
```

### Format

A tibble with 18,474 rows and 8 variables:

**long** Longitude in decimal degrees, ETRS89

**lat** Latitude in decimal degrees, ETRS89

**order** order, integer

**hole** hole, boolean

**piece** piece, integer

**group** group, numeric

### Source

<http://geodata.gov.gr/>

## Description

hydroscoper provides an R interface to the Greek National Data Bank for Hydrological and Meteorological Information <http://www.hydroscope.gr/>.

hydroscoper covers Hydroscope's data sources using the [Enhydris API](#) and provides functions to:

1. Transform the available tables and data sets into [tibbles](#).
2. Transliterate the Greek Unicode names to Latin.
3. Translate various Greek terms to English.

## Enhydris API

The Enhydris database is implemented in PostgreSQL. Details about the database can be found [here](#) and about the Web-service API [here](#).

## Data Sources

The data are retrieved from the Hydroscope's databases:

- Ministry of Environment, Energy and Climate Change.
- Ministry of Rural Development and Food.
- National Meteorological Service.
- Greek Public Power Corporation.

## Author(s)

**Maintainer:** Konstantinos Vantas <[kon.vantas@gmail.com](mailto:kon.vantas@gmail.com)> (0000-0001-6387-8791)

Other contributors:

- Sharla Gelfand (Sharla Gelfand reviewed the package for rOpenSci, see <https://github.com/ropensci/onboarding/issues/1> [contributor, NA])
- Tim Trice (Tim Trice reviewed the package for rOpenSci, see <https://github.com/ropensci/onboarding/issues/185>) [NA])

## See Also

Useful links:

- <https://github.com/ropensci/hydroscoper>
- <https://ropensci.github.io/hydroscoper/>
- Report bugs at <https://github.com/ropensci/hydroscoper/issues>

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hydroscoper\_defunct *Defunct functions in hydroscoper*

---

### Description

These functions are no longer available in **hydroscoper**.

### Usage

```
get_coords(...)
```

### Arguments

... Defunct function's parameters

### Details

Defunct functions:

- [get\\_coords](#): This function is defunct. Please use [hydro\\_coords](#) to convert Hydroscope's points raw format to a tidy data frame.

---

hydro\_coords *Convert coordinates from Hydroscope's points to a tibble*

---

### Description

hydro\_coords returns a tibble with the stations' longitude and latitude using as input the variable point from get\_stations function.

### Usage

```
hydro_coords(x)
```

### Arguments

x a string vector with the points retrieved from Hydroscope

### Value

a tibble with the longitude and latitude values.

### Author(s)

Konstantinos Vantas, <kon.vantas@gmail.com>

**Examples**

```
## Not run:
# get stations from the Greek Ministry of Environment and Energy
kyy_stations <-get_stations("kyy")

# create a tibble with stations' coords
coords <- hydro_coords(kyy_stations$point)

## End(Not run)
```

---

hydro_translate	<i>Translate Greek names and terms to English</i>
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---

**Description**

hydro\_translate translates various Hydroscope's names and terms to English.

**Usage**

```
hydro_translate(x, value = c("owner", "variable", "timestep", "division"))
```

**Arguments**

x	a string vector
value	One of the predefined values in c("owner", "variable", "timestep", "division")

**Value**

If value is one of:

- owner, organizations' names.
- variable, hydrometeorological term.
- timestep, timestep term.
- division, Water Division.

returns a character vector with translations of various hydrometeorological terms or organizations' names from Greek (with latin characters) to English.

The organizations' names in owner are:

<b>Code</b>	<b>Name</b>
min_envir_energy	Ministry of Environment and Energy
min_agricult	Ministry of Rural Development and Food
natio_meteo_service	National Meteorological Service
natio_observ_athens	National Observatory of Athens
public_power_corp	Public Power Corporation
natio_argic_resear	National Agricultural Research Foundation
greek_perfectures	Greek Prefectures

crete_eng_faculty	Technical University of Crete
crete_natural_museum	Natural History Museum of Crete

The Greek Water Divisions codes in division are:

<b>Code</b>	<b>Name</b>
GR01	Dytike Peloponnesos
GR02	Boreia Peloponnesos
GR03	Anatolike Peloponnesos
GR04	Dytike Sterea Ellada
GR05	Epeiros
GR06	Attike
GR07	Anatolike Sterea Ellada
GR08	Thessalia
GR09	Dytike Makedonia
GR10	Kentrike Makedonia
GR11	Anatolike Makedonia
GR12	Thrake
GR13	Krete
GR14	Nesoi Aigaiou

#### Note

The dictionary used for the Greek to English translation is:

<b>Transliterated term</b>	<b>English term</b>
agnosto	unknown
anemos	wind
dieuthynse	direction
parelthon	past
tachyteta	speed
mese	average
brochoptose	precipitation
diarkeia	duration
exatmise	evaporation
exatmisodiapnoe	evapotranspiration
thermokrasia	temperature
edaphous	ground
bathos	depth
elachiste	min
megiste	max
piese	pressure
semeiake	point
chioni	snow
ypsometro	elevation
stathme	level
plemmyra	flood

paroche	flow
broche	precipitation
katastase	condition
ektimemene	estimation
athroistiko	cumulative
stereo	sediment
ygrasia	humidity
ygro	wet
apolyte	absolute
schetike	relative
asbestio	calcium
wetu	precipitation
chionobrochometro	snow_rain_gauge
xero	dry
ydrometrese	flow_gauge
thalasses	sea
semeio_drosou	dew_point
oratoteta	visibility
steria	land
thalassa	sea
barometro	barometer
tase_ydratmon	vapour_pressure
psychrometro	psychrometer
isodynamo_ypsos	water_equivalent
agogimoteta	conductance
aktinobolia	radiation
anthraka	carbon
dioxeidio	dioxide
ypoloipo	residual
argilio	aluminum
argilos	clay
arseniko	arsenic
pyritiou	silicon
aira	air
nephokalypse	cloud_cover
nephose	clouds
axiosemeiota	remarkably
nephe	clouds
kairos	weather
diafora	difference
atmosfairiki	atmospheric
stathera	constant
parousa	present
parelthousa	past
kalymeno	cover
el.	min
meg.	max
skleroteta	hardness

```
eliophaneia      sunshine
eisroe_se_tamieuterer inflow_reservoir
```

## References

Greek Water Divisions, <http://bit.ly/2kk0t0m>, <http://bit.ly/2ltQC80>

## Examples

```
## Not run:

# get data from the Ministry of Environment and Energy
kyy_owners <- get_owners("kyy")
kyy_vars <- get_variables("kyy")
owners_names <- hydro_translate(kyy_owners$name, "owner")
vars <- hydro_translate(kyy_vars$descr, "variable")

## End(Not run)
```

---

stations

*stations*

---

## Description

Stations' data from the Greek National Data Bank for Hydrological and Meteorological Information. This dataset is a comprehensive look-up table with geographical and ownership information of the available stations in all Hydroscope's databases.

## Usage

```
stations
```

## Format

A tibble with 2,322 rows and 9 variables:

**station\_id** The station's ID from the domain's database

**name** The station's name

**water\_basin** The station's Water Basin

**water\_division** The station's Water Division

**owner** The station's owner

**longitude** The station's longitude in decimal degrees, ETRS89

**latitude** The station's latitude in decimal degrees, ETRS89

**altitude** The station's altitude, meters above sea level

**subdomain** The corresponding Hydroscope's database

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timeseries	<i>timeseries</i>
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**Description**

Time series' data from the Greek National Data Bank for Hydrological and Meteorological Information. This dataset is a comprehensive look-up table of all of the available measurements for a given station in a given Hydroscope's database, with units of measurement and times of those measurements.

**Usage**

```
timeseries
```

**Format**

A tibble with 10,804 rows and 9 variables:

**time\_id** The time series ID

**station\_id** The corresponding station's ID

**variable** The time series variable type

**timestep** The timestep of time series

**units** The units of the time series

**start\_date** The starting date of time series values

**end\_date** The ending date of time series values

**subdomain** The corresponding Hydroscope's database

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