

Package: rdefra (via r-universe)

July 18, 2024

Title Interact with the UK AIR Pollution Database from DEFRA

Version 0.3.9.9000

URL <https://docs.ropensci.org/rdefra/>,
<https://github.com/ropensci/rdefra>

BugReports <https://github.com/ropensci/rdefra/issues>

Description This packages allows to retrieve air pollution data from the Air Information Resource (UK-AIR, [<https://uk-air.defra.gov.uk/>](https://uk-air.defra.gov.uk/)) of the Department for Environment, Food and Rural Affairs (DEFRA) in the United Kingdom. UK-AIR does not provide a public API for programmatic access to data, therefore this package scrapes the HTML pages to get relevant information. The package is described in Vitolo et al. (2016) ``rdefra: Interact with the UK AIR Pollution Database from DEFRA" [doi:10.21105/joss.00051](https://doi.org/10.21105/joss.00051)>.

Depends R (>= 3.5.0)

Imports lubridate, tibble, httr, xml2, dplyr, sf, curl

Suggests testthat, rmarkdown, knitr, ggplot2, zoo

VignetteBuilder knitr

LazyData true

Encoding UTF-8

License GPL-3

RoxygenNote 7.2.3

Roxygen list(markdown = TRUE)

Repository <https://ropensci.r-universe.dev>

RemoteUrl <https://github.com/ropensci/rdefra>

RemoteRef master

RemoteSha 10bd4b1672dcac1d64afaf3c0387d65198a243f8

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stations	<i>List of all the DEFRA air quality monitoring stations with complete coordinates</i>
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Description

This is the list of all the air quality monitoring stations ever installed in the UK and operated by DEFRA networks (as per February 2016). As the network expands, metadata for new stations will be added.

Usage

stations

Format

A data frame with 6561 observations on the following 14 variables.

UK.AIR.ID ID reference for monitoring stations

EU.Site.ID EU.Site.ID

EMEP.Site.ID EMEP.Site.ID

Site.Name Site name

Environment.Type a factor with levels Background Rural Background Suburban Background
Urban Industrial Suburban Industrial Unknown Industrial Urban Traffic Urban Unknown
Unknown

Zone Zone

Start.Date Start date

End.Date End date

Latitude Latitude (WGS 84)

Longitude Longitude (WGS 84)

Northing Northing coordinate (British National Grid)

Easting Easting coordinate (British National Grid)

Altitude.m. Altitude in metres above sea level

Networks Monitoring Networks

AURN.Pollutants.Measured Pollutant measured

Site.Description Description of the site.

SiteID Site ID, used to retrieve time series data.

Source

<https://uk-air.defra.gov.uk/>

Examples

```
stations
```

ukair_catalogue	<i>Get DEFRA UK-AIR stations metadata</i>
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Description

This function fetches the catalogue of monitoring stations from DEFRA's website.

Usage

```
ukair_catalogue(
  site_name = "",
  pollutant = 9999,
  group_id = 9999,
  closed = "true",
  country_id = 9999,
  region_id = 9999,
  location_type = 9999
)
```

Arguments

site_name	This is the name of a specific site. By default this is left blank to get info on all the available sites.
pollutant	This is a number from 1 to 10. Default is 9999, which means all the pollutants.
group_id	This is the identification number of a group of stations. Default is 9999 which means all available networks.
closed	This is "true" to include closed stations, "false" otherwise.
country_id	This is the identification number of the country, it can be a number from 1 to 6. Default is 9999, which means all the countries.
region_id	This is the identification number of the region. 1 = Aberdeen City, etc. (for the full list see https://uk-air.defra.gov.uk/). Default is 9999, which means all the local authorities.
location_type	This is the identification number of the location type. Default is 9999, which means all the location types.

Details

The argument `Pollutant` is defined based on the following convention:

- 1 = Ozone (O₃)
- 2 = Nitrogen oxides (NO_x)
- 3 = Carbon monoxide (CO)
- 4 = Sulphur dioxide (SO₂)
- 5 = Particulate Matter (PM₁₀)
- 6 = Particulate Matter (PM_{2.5})
- 7 = PAHs
- 8 = Metals in PM₁₀
- 9 = Benzene
- 10 = Black Carbon

The argument `group_id` is defined based on the following convention:

- 1 = UKEAP: Precip-Net
- 2 = Air Quality Strategy Pollutants
- 3 = Ammonia and Nitric Acid
- 4 = Automatic Urban and Rural Monitoring Network (AURN)
- 5 = Dioxins and Furans
- 6 = Black Smoke & SO₂
- 7 = Automatic Hydrocarbon Network
- 8 = Heavy Metals
- 9 = Nitrogen Dioxide Diffusion Tube
- 10 = PAH Andersen
- 11 = Particle Size Composition
- 12 = PCBs
- 13 = TOMPs
- 14 = Non-Automatic Hydrocarbon Network
- 15 = 1,3-Butadiene Diffusion Tube
- 16 = Black Carbon
- 17 = Automatic Urban and Rural Monitoring Network (AURN)
- 18 = Defra NO₂ Diffusion Tube
- 19 = PAH Digitel (solid phase)
- 20 = PAH Digitel (solid+vapour)
- 21 = PAH Deposition
- 22 = Particle size and number
- 23 = Rural Automatic Mercury network

- 24 = Urban Sulphate
- 25 = UKEAP: Rural NO2
- 26 = Automatic Urban and Rural Monitoring Network (AURN)
- 27 = UKEAP: National Ammonia Monitoring Network
- 28 = UKEAP: Acid Gases & Aerosol Network
- 29 = Particle Speciation (MARGA)
- 30 = UKEAP: Historic Aerosol measurements

The argument `country_id` is defined based on the following convention:

- 1 = England
- 2 = Wales
- 3 = Scotland
- 4 = Northern Ireland
- 5 = Republic of Ireland
- 6 = Channel Islands

Value

A dataframe listing stations and related information.

Examples

```
## Not run:  
stations <- ukair_catalogue()  
  
## End(Not run)
```

`ukair_get_coordinates` *Get Easting and Northing coordinates from DEFRA*

Description

This function takes as input the UK AIR ID and returns Easting and Northing coordinates (British National Grid, EPSG:27700).

Usage

```
ukair_get_coordinates(ids)
```

Arguments

`ids` contains the station identification code defined by DEFRA. It can be: a) an alphanumeric string, b) a vector of strings or c) a data frame. In the latter case, the column containing the codes should be named "UK.AIR.ID", all the other columns will be ignored.

Details

If the input is a data frame with some of the columns named "UK.AIR.ID", "Northing" and "Easting", the function only infills missing Northing/Easting values (if available on the relevant web-page).

Value

A data.frame containing at least five columns named "UK.AIR.ID", "Easting", "Northing", "Latitude" and "Longitude".

Examples

```
## Not run:
# Case a: alphanumeric string
ukair_get_coordinates("UKA12536")

# Case b: vector of strings
ukair_get_coordinates(c("UKA15910", "UKA15956", "UKA16663", "UKA16097"))

# Case c: data frame
ukair_get_coordinates(ukair_catalogue()[1:10,])

## End(Not run)
```

ukair_get_hourly_data *Get hourly data for DEFRA stations*

Description

This function fetches hourly data from DEFRA's air pollution monitoring stations.

Usage

```
ukair_get_hourly_data(site_id = NULL, years = NULL)
```

Arguments

site_id	This is the ID of a specific site.
years	Years for which data should be downloaded.

Details

The measurements are generally in $\mu\text{g}/\text{m}^3$ (micrograms per cubic metre). To check the units, refer to the table of attributes (see example below). Please double check the units on the DEFRA website, as they might change over time.

Value

A data.frame containing hourly pollution data.

Examples

```
## Not run:
# Get data for 1 year
output <- ukair_get_hourly_data("ABD", 2014)

# Get data for multiple years
output <- ukair_get_hourly_data("ABD", 2014:2016)

# Get units
attributes(output)$units

## End(Not run)
```

ukair_get_site_id *Get site identification numbers for DEFRA stations*

Description

Given the UK AIR ID (from [ukair_catalogue\(\)](#)), this function fetches the catalogue of monitoring stations from DEFRA's website.

Usage

```
ukair_get_site_id(id_s)
```

Arguments

`id_s` An alphanumeric string (or vector of strings) containing the UK AIR ID defined by DEFRA.

Value

A named vector containing the site `id_s`.

Examples

```
## Not run:
ukair_get_site_id("UKA00399")

## End(Not run)
```

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