

# Package ‘ecmwfr’

April 23, 2019

**Title** Interface to 'ECMWF' and 'CDS' Data Web Services

**Version** 1.2.1

**Description** Programmatic interface to the European Centre for Medium-Range Weather Forecasts dataset web services (ECMWF; <<https://www.ecmwf.int/>>) and Copernicus's Climate Data Store (CDS; <<https://cds.climate.copernicus.eu/>>). Allows for easy downloads of weather forecasts and climate reanalysis data in R.

**URL** <https://github.com/khufkens/ecmwfr>

**BugReports** <https://github.com/khufkens/ecmwfr/issues>

**Depends** R (>= 3.4)

**Imports** httr, keyring, memoise

**License** AGPL-3

**LazyData** true

**ByteCompile** true

**RoxygenNote** 6.1.1

**Suggests** rmarkdown, covr, testthat, raster, maps, ncdf4, stars, knitr, stats, rlang, rstudioapi, jsonlite

**VignetteBuilder** knitr

**NeedsCompilation** no

**Author** Koen Hufkens [aut, cre] (<<https://orcid.org/0000-0002-5070-8109/>>),  
Reto Stauffer [ctb] (<<https://orcid.org/0000-0002-3798-5507/>>),  
Elio Campitelli [ctb] (<<https://orcid.org/0000-0002-7742-9230/>>)

**Maintainer** Koen Hufkens <[koen.hufkens@gmail.com](mailto:koen.hufkens@gmail.com)>

**Repository** CRAN

**Date/Publication** 2019-04-23 11:30:02 UTC

## R topics documented:

wf_archetype . . . . .	2
wf_check_request . . . . .	3
wf_datasets . . . . .	4
wf_delete . . . . .	5
wf_get_key . . . . .	6
wf_product_info . . . . .	7
wf_request . . . . .	8
wf_services . . . . .	9
wf_set_key . . . . .	10
wf_transfer . . . . .	11
wf_user_info . . . . .	12
<b>Index</b>	<b>13</b>

---

wf_archetype	<i>Creates an archetype function</i>
--------------	--------------------------------------

---

### Description

Creates a universal MARS / CDS formatting function, in ways similar to `wf_modify_request()` but the added advantage that you could code for the use of dynamic changes in the parameters provided to the resulting custom function.

### Usage

```
wf_archetype(request, dynamic_fields)
```

### Arguments

`request` a MARS or CDS request as an R list object.  
`dynamic_fields` character vector of fields that could be changed.

### Details

Contrary to a simple replacement as in `wf_modify_request()` the generated functions are considered custom user written. Given the potential for complex formulations and formatting commands NO SUPPORT for the resulting functions can be provided. Only the generation of a valid function will be guaranteed and tested for.

### Value

a function that takes ‘dynamic\_fields’ as arguments and returns a request as an R list object.

**Examples**

```
## Not run:
# format an archetype function
ERA1 <- wf_archetype(
  request = list(stream = "oper",
                 levtype = "sfc",
                 param = "165.128/166.128/167.128",
                 dataset = "interim",
                 step = "0",
                 grid = "0.75/0.75",
                 time = "00/06/12/18",
                 date = "2014-07-01/to/2014-07-31",
                 type = "an",
                 class = "ei",
                 area = "73.5/-27/33/45",
                 format = "netcdf",
                 target = "tmp.nc"),
  dynamic_fields = c("date", "time")
)

# print output of the function with below parameters
str(ERA_interim("20100101", 3, 200))

## End(Not run)
```

---

 wf\_check\_request

*check ECMWF / CDS data requests*


---

**Description**

Check the validity of a data request, and login credentials.

**Usage**

```
wf_check_request(user, request)
```

**Arguments**

user	user (email address) used to sign up for the ECMWF data service, used to retrieve the token set by <a href="#">wf_set_key</a>
request	nested list with query parameters following the layout as specified on the ECMWF API page

**Value**

a data frame with the determined service and url service endpoint

**Author(s)**

Koen Kufkens

**See Also**

[wf\\_set\\_key](#) [wf\\_transfer](#), [wf\\_request](#)

---

wf\_datasets

*ECMWF dataset list*

---

**Description**

Returns a list of datasets

**Usage**

```
wf_datasets(user, service = "webapi", simplify = TRUE)
```

**Arguments**

user	user (email address) used to sign up for the ECMWF data service, used to retrieve the token set by <a href="#">wf_set_key</a>
service	service to use ecmwf webapi or cds (default = "webapi")
simplify	simplify the output, logical (default = TRUE)

**Value**

returns a nested list or data frame with the ECMWF datasets

**Author(s)**

Koen Kufkens

**See Also**

[wf\\_set\\_key](#) [wf\\_transfer](#) [wf\\_request](#)

**Examples**

```
## Not run:  
# set key  
wf_set_key(email = "test@mail.com", key = "123")  
  
# get a list of services  
wf_services("test@mail.com")  
  
# get a list of datasets
```

```
wf_datasets("test@mail.com")  
  
## End(Not run)
```

---

wf_delete	<i>ECMWF delete request</i>
-----------	-----------------------------

---

## Description

Deletes a staged download from the queue

## Usage

```
wf_delete(url, user, service = "webapi", verbose = TRUE)
```

## Arguments

url	url to query
user	user (email address) used to sign up for the ECMWF data service, used to retrieve the token set by <a href="#">wf_set_key</a>
service	character, one of ecmwf or cds depending on the data set to be deleted.
verbose	show feedback on processing

## Author(s)

Koen Kufkens

## See Also

[wf\\_set\\_key](#) [wf\\_transfer](#) [wf\\_request](#)

## Examples

```
## Not run:  
# set key  
wf_set_key(email = "test@mail.com", key = "123")  
  
# get key  
wf_get_key(email = "test@mail.com")  
  
## End(Not run)
```

---

wf_get_key	<i>Get secret ECMWF / CDS token</i>
------------	-------------------------------------

---

### Description

Returns you token set by [wf\\_set\\_key](#)

### Usage

```
wf_get_key(user, service = "webapi")
```

### Arguments

user	user (email address) used to sign up for the ECMWF data service
service	service associated with credentials ("webapi" or "cds")

### Value

the key set using [wf\\_set\\_key](#) saved in the keychain

### Author(s)

Koen Kufkens

### See Also

[wf\\_set\\_key](#)

### Examples

```
## Not run:  
# set key  
wf_set_key(user = "test@mail.com", key = "123")  
  
# get key  
wf_get_key(user = "test@mail.com")  
  
## End(Not run)
```

---

wf_product_info	<i>Renders product lists for a given dataset and data service</i>
-----------------	---

---

## Description

Shows and returns detailed product information about a specific data set (see [wf\\_datasets](#)).

## Usage

```
wf_product_info(dataset, user, service = "webapi", simplify = TRUE)
```

## Arguments

dataset	character, name of the data set for which the product information should be loaded.
user	string, user ID used to sign up for the CDS data service, used to retrieve the token set by <a href="#">wf_set_key</a> .
service	which service to use, one of webapi or cds
simplify	boolean, default TRUE. If TRUE the description will be returned as tidy data instead of a nested list.

## Value

Downloads a tidy data frame with product descriptions from CDS. If `simplify = FALSE` a list with product details will be returned.

## Author(s)

Reto Stauffer, Koen Hufkens

## See Also

[wf\\_datasets](#).

## Examples

```
## Not run:  
# Open description in browser  
wf_product_info(NULL, "reanalysis-era5-single-levels")  
  
# Return information  
info <- wf_product_info(NULL,  
  "reanalysis-era5-single-levels", show = FALSE)  
names(info)  
  
## End(Not run)
```

---

wf_request	<i>ECMWF data request and download</i>
------------	--

---

### Description

Stage a data request, and optionally download the data to disk. Alternatively you can only stage requests, logging the request URLs to submit download queries later on using [wf\\_transfer](#). Note that the function will do some basic checks on the request input to identify possible problems.

### Usage

```
wf_request(request, user, transfer = TRUE, path = tempdir(),
           time_out = 3600, verbose = TRUE)
```

### Arguments

request	nested list with query parameters following the layout as specified on the ECMWF API page
user	user (email address) used to sign up for the ECMWF data service, used to retrieve the token set by <a href="#">wf_set_key</a>
transfer	logical, download data TRUE or FALSE (default = TRUE)
path	path were to store the downloaded data
time_out	how long to wait on a download to start (default = 3*3600 seconds).
verbose	show feedback on processing

### Value

a download query staging url or (invisible) filename of the file on your local disc

### Author(s)

Koen Kufkens

### See Also

[wf\\_set\\_key](#) [wf\\_transfer](#)

### Examples

```
## Not run:
# set key
wf_set_key(user = "test@mail.com", key = "123")

request <- = list(stream = "oper",
                 levtype = "sfc",
                 param = "167.128",
```



```
dataset = "interim",
step = "0",
grid = "0.75/0.75",
time = "00",
date = "2014-07-01/to/2014-07-02",
type = "an",
class = "ei",
area = "50/10/51/11",
format = "netcdf",
target = "tmp.nc")

# demo query
wf_request(request = request, user = "test@mail.com")

## End(Not run)
```

---

wf\_services

*ECMWF services list*

---

## Description

Returns a list of services

## Usage

```
wf_services(user, simplify = TRUE)
```

## Arguments

user	user (email address) used to sign up for the ECMWF data service, used to retrieve the token set by <a href="#">wf_set_key</a>
simplify	simplify the output, logical (default = TRUE)

## Value

returns a nested list or data frame with the ECMWF services

## See Also

[wf\\_set\\_key](#) [wf\\_transfer](#) [wf\\_request](#)

## Examples

```
## Not run:
# set key
wf_set_key(user = "test@mail.com", key = "123")

# get a list of services
```

```
wf_services("test@mail.com")

# get a list of datasets
wf_services("test@mail.com")

## End(Not run)
```

---

wf_set_key	<i>Set secret ECMWF token</i>
------------	-------------------------------

---

## Description

Saves the token to your local keychain under a service called "ecmwfr".

## Usage

```
wf_set_key(user, key, service)
```

## Arguments

user	user (email address) used to sign up for the ECMWF data service
key	token provided by ECMWF
service	service associated with credentials ("webapi" or "cds")

## Value

It invisibly returns the user.

## Author(s)

Koen Kufkens

## See Also

[wf\\_get\\_key](#)

## Examples

```
## Not run:
# set key
wf_set_key(user = "test@mail.com", key = "123")

# get key
wf_get_key(user = "test@mail.com")

# leave user and key empty to open a browser window to the service's website
# and type the key interactively
wf_get_key()
```

```
## End(Not run)
```

---

wf\_transfer

*ECMWF data transfer function*

---

### Description

Returns the contents of the requested url as a netCDF file downloaded to disk or the current status of the requested transfer.

### Usage

```
wf_transfer(url, user, service = "webapi", path = tempdir(),  
           filename = tempfile("ecmwfr_"), verbose = TRUE)
```

### Arguments

url	url to query
user	user (email address) used to sign up for the ECMWF data service, used to retrieve the token set by <a href="#">wf_set_key</a> .
service	which service to use, one of webapi or cds
path	path were to store the downloaded data
filename	filename to use for the downloaded data
verbose	show feedback on data transfers
...	forwarded to <a href="#">wf_transfer</a>

### Value

a netCDF of data on disk as specified by a [wf\\_request](#)

### Author(s)

Koen Kufkens

### See Also

[wf\\_set\\_key](#) [wf\\_request](#)

## Examples

```
## Not run:
# set key
wf_set_key(user = "test@mail.com", key = "123")

# request data and grab url and try a transfer
r <- wf_request(request, "test@mail.com", transfer = FALSE)

# check transfer, will download if available
wf_transfer(r$url, "test@mail.com")

## End(Not run)
```

---

wf_user_info	<i>ECMWF WebAPI user info query</i>
--------------	-------------------------------------

---

## Description

Returns user info for the ECMWF WebAPI

## Usage

```
wf_user_info(user)
```

## Arguments

user	user (email address) used to sign up for the ECMWF data service, used to retrieve the token set by <a href="#">wf_set_key</a>
------	---

## Value

returns a data frame with user info

## See Also

[wf\\_set\\_key](#) [wf\\_services](#) [wf\\_datasets](#)

## Examples

```
## Not run:
# set key
wf_set_key(user = "test@mail.com", key = "123")

# get user info
wf_user_info("test@mail.com")

## End(Not run)
```

# Index

\*Topic **climate**,

- wf\_check\_request, 3
- wf\_datasets, 4
- wf\_delete, 5
- wf\_product\_info, 7
- wf\_request, 8
- wf\_services, 9
- wf\_transfer, 11
- wf\_user\_info, 12

\*Topic **data**

- wf\_check\_request, 3
- wf\_datasets, 4
- wf\_delete, 5
- wf\_product\_info, 7
- wf\_request, 8
- wf\_services, 9
- wf\_transfer, 11
- wf\_user\_info, 12

\*Topic **download**,

- wf\_check\_request, 3
- wf\_datasets, 4
- wf\_delete, 5
- wf\_product\_info, 7
- wf\_request, 8
- wf\_services, 9
- wf\_transfer, 11
- wf\_user\_info, 12

\*Topic **key**

- wf\_get\_key, 6
- wf\_set\_key, 10

\*Topic **management**

- wf\_get\_key, 6
- wf\_set\_key, 10

\*Topic **re-analysis**

- wf\_check\_request, 3
- wf\_datasets, 4
- wf\_delete, 5
- wf\_product\_info, 7
- wf\_request, 8

- wf\_services, 9
- wf\_transfer, 11
- wf\_user\_info, 12

- wf\_archetype, 2
- wf\_check\_request, 3
- wf\_datasets, 4, 7, 12
- wf\_delete, 5
- wf\_get\_key, 6, 10
- wf\_product\_info, 7
- wf\_request, 4, 5, 8, 9, 11
- wf\_services, 9, 12
- wf\_set\_key, 3–9, 10, 11, 12
- wf\_transfer, 4, 5, 8, 9, 11, 11
- wf\_user\_info, 12