

Package ‘hydrolinks’

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Type Package

Title Hydrologic Network Linking Data and Tools

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Description

Tools to link geographic data with hydrologic network, including lakes, streams and rivers.
Includes automated download of U.S. National Hydrography Network and other hydrolayers.

Imports dplyr, dbplyr, httr, tools, rappdirs, sf (>= 0.6), RSQLite,
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all_shapefiles	<i>Return path to all shapefiles</i>
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Description

Returns list of paths to all locally cached shapefiles for a specific dataset for use in custom processing. If `check_dl == TRUE`, all shapefiles for the specified dataset are downloaded to your local machine (skipping those that have been previously downloaded). This is a great way to pre-cache all shapefiles for a specific dataset. The files can be loaded into R and iterated over for custom mapping or processing of entire U.S. National or Global datasets.

Usage

```
all_shapefiles(check_dl = FALSE, dataset = c("nhdh", "hydrolakes",
      "nhdplusv2"), feature_type = c("waterbody", "flowline"))
```

Arguments

check_dl	If TRUE, checks to ensure all files for that dataset have been downloaded. This check takes some time (~30 seconds) to check all files (and much longer to download if necessary).
dataset	name of dataset to use for matching.
feature_type	name of feature layer to match. The hydrolakes dataset does not include a flowline layer.

cache_clear	<i>Remove locally cached files</i>
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Description

deletes the currently set cached directory found at [cache_get_dir](#).

Usage

```
cache_clear()
```

cache_get_dir	<i>Get local cache path</i>
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Description

Downloaded shapefiles and databases are cached locally. This location can be accessed and reset so that the best available location can be used. For example, a fast SSD or large secondary hard drive may be used.

Usage

```
cache_get_dir()
```

See Also

[cache_set_dir](#)

Examples

```
#see where cached files are being stored
```

```
print(cache_get_dir())
```

cache_info	<i>Get local file cache info</i>
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Description

Returns info on all locally cached files stored at the current cache. By default, prints a summary of cache info including total size.

Usage

```
cache_info()
```

Value

Returns a data.frame that has the columns file, type, size.MB.

Examples

```
cache_info()
```

cache_set_dir	<i>Set local cache path</i>
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Description

Set location of local data file cache. If the directory does not exist, it will be created recursively. If no custom path is set, the default user data directory for the package will be used. See [user_data_dir](#) for details.

Usage

```
cache_set_dir(path = NULL, temppath = FALSE)
```

Arguments

path	Character path to new local files path. If null, path will be reset to default user data directory location.
temppath	Boolean flag indicating if the default R temp directory should be used instead of a custom or user-workspace area. Warning: This setting will not persist between R sessions and the temp directory is cleared when R is closed. Using temp will result in frequent file downloads and extremely slow performance

See Also

[cache_get_dir](#)

Examples

```
## Not run:  
#set a different cache path  
set_cache_path('z:/big_datasets/hydrolinks')  
  
## End(Not run)
```

check_dl_file	<i>Verify and download data files</i>
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Description

Checks if local data files as defined in master file exist and match MD5 hash. Downloads data if necessary.

Usage

```
check_dl_file(master_file, fname = NULL, md5check = TRUE,  
dest = cache_get_dir())
```

Arguments

master_file	Character path to master file
fname	Character vector of specific file names to check
md5check	boolean
dest	Character path to download destination

dataset_info	<i>Return all info for requested dataset</i>
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Description

Single point

Usage

```
dataset_info(dataset, feature_type)
```

Arguments

dataset	Name of dataset
feature_type	Feature type (flowline or waterbody)

Value

List with dataset metadata elements including

bb_cache_path Path to Rdata file with bounding box cache for dataset

shapefile_name Dataset-unique name for region shapefiles

db_path Path to sqlite database for shape-by-ID lookup

file_index_path Path to the dataset's download file index and hash lookup

id_column Dataset-unique ID column name

get_shape_by_id *Link IDs to waterbody shapefiles*

Description

Get shapefiles containing waterbodies with specified IDs. If one argument is provided, no other arguments will be used to filter. Arguments are checked in order: PERMANENT_match, GNIS_ID_match, GNIS_NAME_match, REACHCODE_match.

Usage

```
get_shape_by_id(match_id, feature_type = c("flowline", "waterbody"),
  dataset = c("nhdh", "nhdplusv2", "hydrolakes"), match_column)
```

Arguments

match_id	ids of features to be matched.
feature_type	name of feature layer to match. The hydrolakes dataset does not include a flowline layer.
dataset	name of dataset to use for matching.
match_column	index containing match ids. Defaults to dataset ID column. Columns indexed by dataset:

nhdh	nhdplusv2	hydrolakes
PERMANENT_	COMID	Hylak_id
GNIS_ID	GNIS_ID	Lake_name
GNIS_NAME	GNIS_NAME	
REACHCODE	REACHCODE	

Value

simple features object containing polygons with associated IDs.

Examples

```
## Not run:

library(sf)
shp = get_shape_by_id('143249470', feature_type = 'waterbody', dataset='nhdh')
plot(st_geometry(shp), col='blue')

## End(Not run)
```

link_to_flowlines *Link geopoints to flowlines*

Description

Link geopoints to flowlines in the NHD

Usage

```
link_to_flowlines(lats, lons, ids, buffer = 100, dataset = c("nhdh",  
  "nhdplusv2"))
```

Arguments

lats	Vector of point latitudes
lons	Vector of point longitudes
ids	Vector of point identifiers (string or numeric)
buffer	numeric maximum line snapping distance in meters
dataset	Character name of dataset to link against. Can be either "nhdh" or "nhdplusv2"

Value

flowline permanent ids

Examples

```
## Not run:  
latlon = c(42.703290, -73.702855)  
  
#should link to hudson river  
link_to_flowlines(latlon[1], latlon[2], 'dummyid')  
  
## End(Not run)
```

link_to_waterbodies *Link geopoints to Waterbodies*

Description

Link geopoints to waterbodies in a geospatial dataset. Use the point-in-polygon technique with user-selectable polygon buffer size.

Usage

```
link_to_waterbodies(lats, lons, ids, dataset = c("nhdh", "hydrolakes",
  "nhdplusv2"), buffer = 0)
```

Arguments

lats	Vector of point latitudes
lons	Vector of point longitudes
ids	Vector of point identifiers (string or numeric)
dataset	Character name of dataset to link against. Can be either "nhdh", "hydrolakes", or "nhdplusv2"
buffer	Numeric width of polygon buffer in m

Value

Water body permanent IDs

Examples

```
latlon = c(43.108728, -89.418293)
## Not run:
#returns linked waterbody site information for that lat/lon
link_to_waterbodies(latlon[1], latlon[2], 'id1', dataset = 'nhdh')

## End(Not run)
```

link_waterbody_centroids

Link geopoints to Waterbodies by centroids

Description

Link geopoints to a waterbody with the closest centroid a geospatial dataset

Usage

```
link_waterbody_centroids(lats, lons, ids, dataset = c("nhdh", "nhdplusv2",
  "hydrolakes"), buffer = 25)
```

Arguments

lats	Vector of point latitudes
lons	Vector of point longitudes
ids	Vector of point identifiers (string or numeric)
dataset	Character name of dataset to link against. Can be either "nhd" or "hydrolakes"
buffer	maximum distance between points and centroids to match

Value

Water body permanent IDs

Examples

```
## Not run:
centroidpt = c(33.655277, -117.834007)

#should be item ID 126859554
link_waterbody_centroids( centroidpt[1], centroidpt[2], 'dummyid', dataset='nhdh')

## End(Not run)
```

<code>traverse_flowlines</code>	<code>traverse_flowlines</code>
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Description

traverse hydrological network

Usage

```
traverse_flowlines(max_distance, start, direction = c("out", "in"),
  dataset = c("nhdh", "nhdplusv2"), max_steps = 10000, db_path = NULL,
  ...)
```

Arguments

<code>max_distance</code>	maximum distance to traverse in km. If negative, traverse until the ocean (node 0) or <code>max_steps</code> is reached.
<code>start</code>	character node to start
<code>direction</code>	character; either "out" or "in"
<code>dataset</code>	which network dataset to traverse. May be either NHD high-res or NHD Plus v2.
<code>max_steps</code>	maximum traversal steps before terminating
<code>db_path</code>	manually specify path to flowtable database. Useful for avoiding database locks when running traversals in parallel.
<code>...</code>	options passed on to <code>check_dl_file</code>

Value

dataframe of nodes traversed, distance from the start node to each node, and the children of each node.

Examples

```
## Not run:  
traverse_flowlines(1000, "141329377", "out", "nhdh")  
# this example traverses until a cycle is found and the end of the network is reached.  
  
## End(Not run)
```

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