

Package ‘hydrolinks’

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Type Package

Title Hydrologic Network Linking Data and Tools

Version 0.7.1

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, RSQLite, units,
stats

Suggests testthat

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| | |
|----------------|--------------------------------------|
| all_shapefiles | <i>Return path to all shapefiles</i> |
|----------------|--------------------------------------|

Description

Returns list of paths to shapefiles for use in custom processing.

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> |
|-------------|------------------------------------|

Description

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

Usage

```
cache_clear()
```

| | |
|---------------|-----------------------------|
| cache_get_dir | <i>Get local cache path</i> |
|---------------|-----------------------------|

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> |
|------------|----------------------------------|

Description

prints files stored at the current cache location and their size in megabytes.

Usage

```
cache_info()
```

Examples

```
cache_info()
```

| | |
|---------------|-----------------------------|
| cache_set_dir | <i>Set local cache path</i> |
|---------------|-----------------------------|

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/hydr links')  
  
## End(Not run)
```

| | |
|---------------|---------------------------------------|
| check_dl_file | <i>Verify and download data files</i> |
|---------------|---------------------------------------|

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> |
|--------------|--|

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, max_dist = 100, dataset = c("nhdh",  
  "nhdplusv2"))
```

Arguments

| | |
|----------|--|
| lats | Vector of point latitudes |
| lons | Vector of point longitudes |
| ids | Vector of point identifiers (string or numeric) |
| max_dist | 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"), max_dist = 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" |
| max_dist | 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)
```

| | |
|--------------------|---------------------------|
| traverse_flowlines | <i>traverse_flowlines</i> |
|--------------------|---------------------------|

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

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

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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