

Package ‘gwavr’

October 13, 2022

Title Get Water Attributes Visually in R

Version 0.2.0

Description Provides methods to Get Water Attributes Visually in R ('gwavr'). This allows the user to point and click on areas within the United States and get back hydrological data, e.g. flowlines, catchments, basin boundaries, comids, etc.

URL <https://github.com/joshualerickson/gwavr/>

BugReports <https://github.com/joshualerickson/gwavr/issues/>

License MIT + file LICENSE

Encoding UTF-8

RoxygenNote 7.1.2

Imports dplyr, httr, jsonlite, leaflet, leaflet.extras, magrittr, miniUI, nhdplusTools, purrr, scales, sf, shiny, shinyWidgets, tidy, units, utils, promises, elevatr, whitebox, terra

Suggests spelling, knitr, rmarkdown

Language en-US

NeedsCompilation no

Author Joshua Erickson [aut, cre]

Maintainer Joshua Erickson <joshualerickson@gmail.com>

Repository CRAN

Date/Publication 2022-03-28 21:30:02 UTC

R topics documented:

base_map	2
basinMod	2
basinModUI	3
get_Basin	3
get_basin_interactively	4
get_nhdplus_interactively	5
get_NLDI	6

get_NLDI_catchments	6
get_nldi_interactively	7
get_whitebox_basin	8
nhdplusMod	8
nhdplusModUI	9
nldi_basin_function	9

Index	10
--------------	-----------

base_map	<i>Base Map</i>
----------	-----------------

Description

A generic leaflet base map used in the shiny apps.

Usage

```
base_map()
```

Value

A leaflet map with provider layers: "Esri.WorldImagery", "CartoDB.Positron", "OpenStreetMap", "CartoDB.DarkMatter", "OpenTopoMap" "Hydrography"

basinMod	<i>Shiny Module Server for nhdplus</i>
----------	--

Description

Shiny Module Server for nhdplus

Usage

```
basinMod(input, output, session, values)
```

Arguments

input	Shiny server function input
output	Shiny server function output
session	Shiny server function session
values	A reactive Values list to pass

Value

server function for Shiny module

basinModUI	<i>Shiny Module UI for basins</i>
------------	-----------------------------------

Description

A shiny Module to.

Usage

```
basinModUI(id, ...)
```

Arguments

id	character id for the the Shiny namespace
...	other arguments to leafletOutput()

Value

UI function for Shiny module

get_Basin	<i>Get Basin Boundary NLDI</i>
-----------	--------------------------------

Description

This function uses the USGS water data API to link a point to a realized basin. This is not the same as delineating from the exact point, rather this API uses NLDI to find the closest basin downstream source point. There is a lot you can do with this API and I would recommend looking at `nhdplusTools` as that has a lot of functionality and better documentation.

Usage

```
get_Basin(point)
```

Arguments

point	A sf point object.
-------	--------------------

Value

An sf object with added `comid` and `basin`.

Note

`point` needs geometry column.

`get_basin_interactively`*Get Watershed Basin Interactively*

Description

This function allows the user delineate watershed basins interactively with a shiny app. It uses the `elevatr` package for DEM and `whitebox` package to delineate the watershed.

Usage

```
get_basin_interactively(  
  ns = "basin-ui",  
  viewer = shiny::paneViewer(),  
  title = "Delineate Basin",  
  ...  
)
```

Arguments

<code>ns</code>	string name for the Shiny namespace to use. The <code>ns</code> is unlikely to require a change.
<code>viewer</code>	function for the viewer. See Shiny viewer . NOTE: when using <code>browserViewer(browser = getOption("browser"))</code> to open the app in the default browser, the browser window will automatically close when closing the app (by pressing "done" or "cancel") in most browsers. Firefox is an exception. See Details for instructions on how to enable this behaviour in Firefox.
<code>title</code>	string to customize the title of the UI window. The default is "Delineate Basin".
<code>...</code>	other arguments to <code>leafletOutput()</code> in module.

Value

A list of sf objects that the user collected during shiny session.

Examples

```
if(interactive()){  
  nhdplus_data <- get_basin_interactively()  
}
```

get_nhdplus_interactively
Get NHDPlus Interactively

Description

This function allows the user go get NHDPlus realizations interactively with a shiny app.

Usage

```
get_nhdplus_interactively(  
  ns = "hydro-ui",  
  viewer = shiny::paneViewer(),  
  title = "NHDPlus",  
  ...  
)
```

Arguments

ns	string name for the Shiny namespace to use. The ns is unlikely to require a change.
viewer	function for the viewer. See Shiny viewer . NOTE: when using <code>browserViewer(browser = getOption("browser"))</code> to open the app in the default browser, the browser window will automatically close when closing the app (by pressing "done" or "cancel") in most browsers. Firefox is an exception. See Details for instructions on how to enable this behaviour in Firefox.
title	string to customize the title of the UI window. The default is "NHDPlus".
...	other arguments to <code>leafletOutput()</code> in module.

Value

A list of sf objects that the user collected during shiny session.

Note

The picker list has seven options right now: NHDPlus Catchments, NHDPlus Flowlines, NHDPlus Waterbodies, NHDPlus Outlet, HUC 12, HUC 8, NWIS Site.

Examples

```
if(interactive()){  
  nhdplus_data <- get_nhdplus_interactively()  
}
```

get_NLDI	<i>Get NLDI</i>
----------	-----------------

Description

This function grabs the upstream tributaries, upstream main stream and basin boundary using the NLDI API. It then combines the NLDI zonal stats to the basin boundary shape, i.e. 'TOT' is the 'total' basin zonal statistic.

Usage

```
get_NLDI(point)
```

Arguments

point	A sf point.
-------	-------------

Value

A list of UT, UM and basin boundary sf objects

get_NLDI_catchments	<i>Get NLDI Catchments</i>
---------------------	----------------------------

Description

This function grabs the 'local' zonal stats for 'all' subcatchments above a point or only for the 'local' catchment using the NLDI API. This is different than get_NLDI(), which grabs the entire basin above a point.

Usage

```
get_NLDI_catchments(point, type = "local", method = "all")
```

Arguments

point	A sf point object.
type	A character 'local' or 'all'.
method	A character 'local' or 'all'.

Value

A list of sf objects: UT and catchments.

Note

This function can be expensive when using type = 'local' and method = 'all' depending on the size of the upstream area.

`get_nldi_interactively`*Get NLDI Interactively*

Description

This function uses the NLDI API to allow the user to visually select a location (point) to get numerous hydrologic realizations.

Usage

```
get_nldi_interactively()
```

Value

A list with sf objects.

Note

The picker list has three options right now: Total Basin, All Local Catchments and Only Local Catchment. Descriptions below:

- **Total Basin:** This will return the upstream tributaries (UT), upstream main (UM), basin boundary and site data above the user point.
- **All Local Catchments:** This will return the upstream tributaries (UT) and all the local NHD-PLUSV2 catchments above the user point. In addition, each catchment will contain the zonal stats associated with 'CAT' in NLDI.
- **Only Local Catchment:** This will only return the catchment at the point and tributary. In addition, it will also include the zonal stat for that catchment.

Examples

```
if(interactive()){  
  nldi_data <- get_nldi_interactively()  
}
```

get_whitebox_basin *whitebox helpers*

Description

whitebox helpers

Usage

```
get_whitebox_basin(  
  sf_point,  
  z,  
  snap_dist,  
  smoothing = TRUE,  
  depressions = TRUE,  
  ...  
)
```

Arguments

sf_point	a sf data.frame point(s)
z	param for elevatr function get_elev_raster()
snap_dist	distance to snap to stream (in meters)
smoothing	logical
depressions	logical
...	arguments to pass to whitebox tools functions

Value

a sf polygon

nhdplusMod *Shiny Module Server for nhdplus*

Description

Shiny Module Server for nhdplus

Usage

```
nhdplusMod(input, output, session, values)
```


Arguments

input	Shiny server function input
output	Shiny server function output
session	Shiny server function session
values	A reactive Values list to pass

Value

server function for Shiny module

nhdplusModUI	<i>Shiny Module UI for nhdplus</i>
--------------	------------------------------------

Description

A shiny Module to.

Usage

```
nhdplusModUI(id, ...)
```

Arguments

id	character id for the the Shiny namespace
...	other arguments to leafletOutput()

Value

UI function for Shiny module

nldi_basin_function	<i>Calling NLDI API</i>
---------------------	-------------------------

Description

Calling NLDI API

Usage

```
nldi_basin_function(point)
```

Arguments

point	sf data.frame
-------	---------------

Value

a sf data.frame with watershed basin

Index

base_map, [2](#)
basinMod, [2](#)
basinModUI, [3](#)

get_Basin, [3](#)
get_basin_interactively, [4](#)
get_nhdplus_interactively, [5](#)
get_NLDI, [6](#)
get_NLDI_catchments, [6](#)
get_nldi_interactively, [7](#)
get_whitebox_basin, [8](#)

nhdplusMod, [8](#)
nhdplusModUI, [9](#)
nldi_basin_function, [9](#)

viewer, [4](#), [5](#)