Package 'spCEH'

January 11, 2024

Title Spatial utility functions and data

Version 0.4.1

Description Generically useful utility functions and data used at CEH Edinburgh for spatial work.

Depends R (>= 3.2.0),
terra,
sf

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LazyData true

Suggests testthat,
knitr, rmarkdown,
covr

VignetteBuilder knitr, rmarkdown

Imports terra,
sf

RoxygenNote 7.2.3

BugReports https://github.com/NERC-CEH/spCEH/issues

R topics documented:

`spCEH-package` *Spatial functions and data from CEH.*

Description

spCEH provides spatial utility functions and data.

Author(s)

Maintainer: Peter Levy <plevy@ceh.ac.uk> (ORCID) [copyright holder]

See Also

Useful links:

- Report bugs at https://github.com/NERC-CEH/spCEH/issues

`crs_Ire` *CRS object for the TM75 Irish Grid projection.*

Description

A Coordinate Reference System object for the Transverse Mercator projection used by the Ordnance Survey in Ireland (TM75 / EPSG:29903)

Usage

```
crs_Ire
```

Format

A terra CRS object

Source

https://spatialreference.org/

crs_lonlat *CRS object for null projection (longitude-latitude).*

Description

A Coordinate Reference System object for the WGS84 lon-lat coordinate system / EPSG:4326

Usage

```
crs_lonlat
```

Format

A terra CRS object

Source

https://spatialreference.org/

crs_OSGB *CRS object for the OSGB projection.*

Description

A Coordinate Reference System object for the Transverse Mercator projection used by the Ordnance Survey in Great Britain (OSGB / EPSG:27700)

Usage

```
crs_OSGB
```

Format

A terra CRS object

Source

https://spatialreference.org/

`getData` *Function to load data distributed with the spCEH package. Data are retrived from tif files stored in extdata. getData masks the equivalent function in raster package, so use raster::getData or spCEH::getData to be explicit. For small-medium sized files, this function is not necessary; the four rasters below can be saved as .rda files. However, this will be needed for anything larger than 100 MB.*

Description

Function to load data distributed with the spCEH package. Data are retrived from tif files stored in extdata. getData masks the equivalent function in raster package, so use raster::getData or spCEH::getData to be explicit. For small-medium sized files, this function is not necessary; the four rasters below can be saved as .rda files. However, this will be needed for anything larger than 100 MB.

Usage

```
getData(name_var = c("alt", "Csoil", "lcm", "twi"), res = 1000)
```

Arguments

`name_var`	A variable name, one of "alt", "Csoil", "lcm", "twi".
`res`	Resolution of the raster grid produced. Defaults to 1000 m. Higher values produce coarser grids by aggregation (e.g. 5000 gives a 5-km grid).

Value

A SpatRasterLayer containing the named variable at the specified resolution.

`getRasterTemplate` *Alternatively-named function to initialise an empty SpatRaster for the UK or a sub-region, with original name for back-compatability*

Description

Alternatively-named function to initialise an empty SpatRaster for the UK or a sub-region, with original name for back-compatability

Usage

```
getRasterTemplate(domain = "UK", res = 100, proj = NULL)
```

Arguments

`domain`	Domain of the output raster: "UK", "Scotland" etc.
`res`	Resolution of the output raster in metres (for OSGB) or decimal degrees (WGS84). For the 'UK_NAME' domain, the res is pre-specified.
`proj`	CRS (coordinate reference system) of the output raster: "OSGB" or "WGS84".

Value

An empty SpatRaster (from the terra package) object covering the domain.

Examples

```
r <- getRasterTemplate(domain = "UK", res = 10000, proj = 'OSGB')
```

`getSpatRasterTemplate` *Function to initialise an empty SpatRaster for the UK or a sub-region*

Description

Function to initialise an empty SpatRaster for the UK or a sub-region

Usage

```
getSpatRasterTemplate(domain = "UK", res = 100, proj = NULL)
```

Arguments

`domain`	Domain of the output raster: "UK", "Scotland" etc.
`res`	Resolution of the output raster in metres (for OSGB) or decimal degrees (WGS84). For the 'UK_NAME' domain, the res is pre-specified.
`proj`	CRS (coordinate reference system) of the output raster: "OSGB" or "WGS84".

Value

An empty SpatRaster (from the terra package) object covering the domain.

Examples

```
r <- getSpatRasterTemplate(domain = "UK", res = 10000, proj = 'OSGB')
r <- getSpatRasterTemplate(domain = "Scotland", res = 10000, proj = 'OSGB')
r <- getSpatRasterTemplate(domain = "NT_10km", res = 100, proj = 'OSGB')
r <- getSpatRasterTemplate(domain = "UK", res = 10000, proj = 'OSGB')
r <- getSpatRasterTemplate(domain = "UK", res = 0.1, proj = 'WGS84')
r <- getSpatRasterTemplate(domain = "UK_NAME", proj = 'WGS84')
r <- getSpatRasterTemplate(domain = "UK_NAME", proj = 'WGS84')
```

get_r_alt *Function to export UK altitude*

Description

A raster layer of altitude in the UK

Usage

```
get_r_alt()
```

Format

A SpatRaster (Raster) object from the terra package. Units: metres above mean sea level. CRS: EPSG 27700 (British National Grid)

Source

https://SRTMspaceshuttleterrainmissionIthink/

Examples

```
r_alt <- get_r_alt()
```

get_r_Csoil *Function to export UK soil carbon*

Description

A raster layer of soil carbon in the UK

Usage

```
get_r_Csoil()
```

Format

A SpatRaster object from the terra package. Units: kg C / m2. CRS: EPSG 27700 (British National Grid)

Source

https://Bradleyetal2005/

Examples

```
r_Csoil <- get_r_Csoil()
```

get_r_lcm *Function to export UK Land Cover Map classes*

Description

A raster layer of UK Land Cover Map classes.

Usage

```
get_r_lcm()
```

Format

A SpatRaster object from the terra package. Units: integers representing land cover classes. CRS: EPSG 27700 (British National Grid)

Source

https://EIDC/

Examples

```
r_lcm <- get_r_lcm()
```

get_r_twi *Function to export UK Topographic Wetness Index*

Description

A raster layer of Topographic Wetness Index in the UK.

Usage

```
get_r_twi()
```

Format

A SpatRaster object from the terra package. Units: dimensionless ratio. CRS: EPSG 27700 (British National Grid)

Source

https://DerivedfromOSDEMdatabyPL/

Examples

```
r_twi <- get_r_twi()
```

maskByCountry — *Function to mask out cells outwith polygons defining a country within the UK*

Description

Function to mask out cells outwith polygons defining a country within the UK

Usage

```
maskByCountry(r, countryName)
```

Arguments

r	A RasterLayer.
countryName	The name of a country within the UK ("Scotland", "Northern Ireland", "England" or "Wales").

Value

A RasterLayer masked to the named country.

Examples

```
r <- getSpatRasterTemplate(domain = "UK", res = 10000, proj = 'OSGB')
r[] <- 1
r_masked <- maskByCountry(r, c("England", "Wales"))
plot(r_masked)
```

projIre — *CRS object for the TM75 Irish Grid projection.*

Description

A Coordinate Reference System object for the Transverse Mercator projection used by the Ordnance Survey in Ireland (TM75 / EPSG:29903)

Usage

```
projIre
```

Format

A text string

Source

https://spatialreference.org/

projlonlat *CRS object for null projection (longitude-latitude).*

Description

A Coordinate Reference System object for the WGS84 lon-lat coordinate system / EPSG:4326

Usage

```
projlonlat
```

Format

A text string

Source

https://spatialreference.org/

projOSGB *CRS object for the OSGB projection.*

Description

A Coordinate Reference System object for the Transverse Mercator projection used by the Ordnance Survey in Great Britain (OSGB / EPSG:27700)

Usage

```
projOSGB
```

Format

A text string

Source

https://spatialreference.org/

sfdf_uk *UK coastline*

Description

A SimpleFeaturesDataFrame of the UK coastline and borders

Usage

```
sfdf_uk
```

Format

A SimpleFeaturesDataFrame object from the sf package

Source

https://spatialreference.org/

spgdf_uk *UK coastline*

Description

A SpatialPolygonsDataFrame of the UK coastline and borders

Usage

```
spgdf_uk
```

Format

A SimpleFeaturesDataFrame object from the sf package - included for backwards compatability.

Source

https://spatialreference.org/

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