Package 'XPolaris'

June 15, 2021

Title Retrieving Soil Data from POLARIS

Version 1.0.1

Description The POLARIS database <http://hydrology.cee.duke.edu/POLARIS/> is a 30-meter probabilistic soil series map of the contiguous United States (US). It represents an optimization of the Soil Survey Geographic database. This R package facilitates the access to large amounts of soil data within the US, currently stored online as raster images (TIFF).

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URL https://github.com/lhmrosso/XPolaris

BugReports https://github.com/lhmrosso/XPolaris/issues

Encoding UTF-8

LazyData true

Roxygen list(markdown = TRUE)

RoxygenNote 7.1.1

Suggests covr,
knitr,
mapproj,
maps,
methods,
rgdal,
rmarkdown,
testthat (>= 3.0.0)

Config/testthat/edition 3

Depends R (>= 2.10)

Imports dplyr,
ggplot2,
magrittr,
purrr,
raster,
sf,
tidyr,
utils

R topics documented:

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`exkansas` *Example locations in Kansas*

Description

This locations example was created to help users setup their own location data. The locations Scandia and Belleville are close in space, to illustrate that only a minimum number of images will be downloaded to get the soil information (proximal locations may fall in the same raster).

Usage

```
exkansas
```

Format

This `data.frame` has 3 rows and the following 3 columns:

ID Unique identifier of a given location.

lat Latitude coordinate, in decimal degrees.

long Longitude coordinate, in decimal degrees.

`ximages` *ximages*

Description

Downloading images from the POLARIS database.

Usage

```
ximages(locations, variables, statistics, layersdepths, localPath = tempdir())
```

Arguments

`locations`	A `data.frame` object with locations data.
`variables`	A `vector` with soil variable codes. There are 13 variables in the POLARIS database: `ph` (soil water pH), `om` (organic matter), `clay`, `sand`, `silt`, `bd` (bulk density), `hb` (bubbling pressure), `n` (pore size distribution), `alpha` (scale parameter inversely proportional to mean pore diameter), `ksat` (saturated hydraulic conductivity), `lambda` (pore size distribution index), `theta_r` (residual soil water content), and `theta_s` (saturated soil water content).

statistics	A vector with the distribution summary options. There are five options of summary statistics: mean, mode, median (p50), five (p5) and 95 (p95) percentiles.
layersdepths	A vector with the soil depth codes. There are six options of soil depth layers: 0_5, 5_15, 15_30, 30_60, 60_100, and 100_200 cm.
localPath	Path to store the images. Default: tempdir()

Details

For details on units check package repository.

Value

This function simply downloads the images from the POLARIS database, according to the user request. Images are saved under a new directory, called POLARISOut, within the localPath.

See Also

xplot,xsoil

Examples

```
## Not run:
df_test <- exkansas
df_ximages <- ximages(locations = df_test,
                      variables = c('clay'),
                      statistics = c('mean'),
                      layersdepths = c('0_5'))

## End(Not run)
```

---

xplot *xplot*

Description

Identifies images containing the locations.

Usage

```
xplot(locations, localPath = tempdir())
```

Arguments

locations	A data.frame object with locations data.
localPath	Path to store the images. Default: tempdir()

Details

This function is useful for checking if locations were correctly informed, but its output is not required by ximages or xsoil. If a given location falls in the border of an image (round coordinates), the function will make sure a minimum number of images is downloaded.

Value

It returns a ggplot object and exports a .jpeg image with the locations map. Images will be saved under a new directory, called POLARISOut. The directory will be created within the localPath and used to store the raster images from the POLARIS database.

See Also

ximages,xsoil

Examples

```
## Not run:
df_test <- exkansas
xplot(locations = df_test)

## End(Not run)
```

---

xsoil *xsoil*

Description

Extracting soil data from downloaded images.

Usage

```
xsoil(ximages_output, localPath = tempdir())
```

Arguments

ximages_output	A data.frame output from ximages function.
localPath	Path to store the images. Default: tempdir()

Details

This function must be executed after downloading the images, because it depends on the output from the ximages function.

Value

It returns a data.frame object and exports a .csv file with the soil data. The .csv file will be save under a new directory (POLARISOut) in the user's machine.

See Also

xplot,ximages

Examples

```
## Not run:
df_test <- exkansas
df_ximages <- ximages(locations = df_test,
                      variables = c('clay'),
                      statistics = c('mean'),
                      layersdepths = c('0_5'))
df_xsoil <- xsoil(ximages_output = df_ximages)

## End(Not run)
```

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