

Package ‘XPolaris’

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Title Retrieving Soil Data from POLARIS

Version 1.0.2

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

RoxygenNote 7.1.1

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

Config/testthat/edition 3

Depends R (>= 2.10)

Imports curl, dplyr, ggplot2, httr, magrittr, purrr, raster, sf, tidy, utils

NeedsCompilation no

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exkansas	<i>Example locations in Kansas</i>
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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	<i>ximages</i>
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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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