

Package ‘geotopbricks’

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Title An R Plug-in for the Distributed Hydrological Model GEOtop

Type Package

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Description It analyzes raster maps and other information as input/output files from the Hydrological Distributed Model GEOtop. It contains functions and methods to import maps and other keywords from geotop.inpts file. Some examples with simulation cases of GEOtop 2.0 are presented in the package. Any information about the GEOtop Distributed Hydrological Model source code is available on <https://github.com/geotopmodel> or <https://github.com/se27xx/GEOtop>. Technical details about the model are available in Endrizzi et al, 2014 (<http://www.geosci-model-dev.net/7/2831/2014/gmd-7-2831-2014.html>).

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Imports rgdal

Suggests soilwater

URL <https://github.com/ecor/geotopbricks>,<http://code.google.com/p/geotop/>,<https://github.com/se27xx/GEOtop>,<http://www.geosci-model-dev.net/7/2831/2014/gmd-7-2831-2014.html>

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argsParser *Parser of an argument string*

Description

This command parses ...DESCRIPTION TO DO !!!

Usage

argsParser(option, args, sep = " ", novalue_response = NULL)

Arguments

option	character strings containing options (or flag) whose values
args	String containing all the arguments of an R script
sep	separator character. Default is " ". If it is of length 2, the first is separator among different options, the second is between option name and its value.
novalue_response	value used in case the option is missing. Default is NULL.

Examples

```
args <- "--value 6 --fruit apple"

option <- "--fruit"

value <- argsParser(option=option,args=args)

option2 <- "--jobs"

value2 <- argsParser(option=option2,args=args)
value22 <- argsParser(option=option2,args=args,novalue_response="./")
args_b <- "value=6 , fruit=apple"

value <- argsParser(option=option,args=args_b,sep=c(",","="))
```

bondone

Bondone Dataset

Description

It contains hourly meteorological data observed at MeteoTrentino T0327 station located at Monte Bondone-Viotte (Trentino, Easter Alps, Italy) from August 2004 to December 2012.

The `zoo` object 'meteo' contains:

`Iprec` Hourly Precipitation Depth expressed in millimeters

`AirT` Air Temperature expressed in Celsius Degree

`RH` Relative Humidity in PerCent

`WinDir` Wind Direction expressed in Degrees North Clockwise

`WinSp` Wind Direction expressed in meters per second

`Swg1ob` Short-Wave Radiation expressed in Watts per square meters

The corresponding time axis vector for each observation can be printed by typing `index(meteo)`.

Usage

```
data(bondone)
```

Format

Data frame , 'zoo' object

Details

This data set stores all meteorological information useful for a GEOtop www.geotop.org simulation. The user can easily use the package with his/her own data after replacing the values of such variables.

Source

Original data are provided by Provincia Autonoma di Trento (<http://www.meteotrentino.it/>). This dataset is intended for research purposes only, being distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY.

brick

brick

Description

Added implemetation for 'brick' S4 method
@title brick

Usage

```
## S4 method for signature 'zoo'
brick(x, layer = 1, timerange = NULL, time = NULL,
      rows = 1:nrow(x), crs = NULL, use.read.raster.from.url = TRUE)

## S4 method for signature 'GeotopRasterBrick'
brick(x)
```

Arguments

x	a 'zoo' object returned by function pointer.to.maps.xyz.time or pointer.to.maps.xy.time or a GeotopRasterBrick-class object
layer	layer at which raster maps are imported. If is NULL, maps ara no-zlayer distributed and zoo must be returend by pointer.to.maps.xy.time
timerange	two-elements vector containing the time range at which geotop maps are imported
time	vector of time instants at which geotop maps are imported

rows	rows of zoo correspondig to the geotop maps that are imported. By default all rows of zoo are considered. It is calculated by time or timerange if they are not set as NULL.
crs	coordinate system see RasterBrick-class
use.read.raster.from.url	logical value. Default is TRUE. If TRUE the RasterLayer are read with read.raster.from.url , instead of raster (otherwise). It is recomended in case the files whose paths are contained in x are remote and are 'http' addresses. In this cases the stand-alone method raster(x) does not always work and use.read.raster.from.url is necessary.

Value

a [RasterBrick-class](#) containing the geopop maps indicated by x, which is already in a [GeotopRasterBrick-class](#) object or a 'zoo' object returned by function [pointer.to.maps.xyz.time](#) or [pointer.to.maps.xy.time](#).

See Also

[getvalues.brick.at.depth](#), [vertical.aggregate.brick.within.depth](#)

Examples

```
# TON TOSS
# See the examples in the functions listed in the 'SeeAlso' section
```

```
brick.decimal.formatter
```

Imports a brick of raster ascii maps into a 'brick' object

Description

Imports a brick of raster ascii maps into a 'brick' object

Usage

```
brick.decimal.formatter(file = NULL, file_prefix, formatter = "%04d",
  file_extension = ".asc", nlayers = 10, use.read.raster.from.url = FALSE,
  crs = NULL, start.from.zero = FALSE)
```

Arguments

file	fileneme of the 'brick' files containing the decimal formatter. It is NULL by default, otherwise it replaces file_suffix, formatter and file_extension.
file_prefix	character string suffix name of the 'brick' files.
formatter	string value. Default is "%04d" .
file_extension	string value. Default is ".asc"

nlayers number of layers
use.read.raster.from.url logical value. Default is FALSE. (this is recommended in this function). If TRUE the RasterLayer are read with `read.raster.from.url`, instead of `raster` (otherwise). It is recommended in case the files whose paths are contained in `x` are remote and are 'http' addresses. In this cases the stand-alone method `raster(x)` does not always work and `use.read.raster.from.url` is necessary.
crs coordinate system see `RasterBrick-class,brick`, Default is NULL.
start.from.zero logical value. Default is FALSE. If TRUE the formatter starts from 0000, otherwise it starts from 0001.

Value

the output is returned as a `RasterBrick-class` object

Examples

```

library(geotopbricks)
library(raster)
file <- system.file("doc/examples/snowthickness", package="geotopbricks")
file <- paste(file, "SnowThickness0000L%04d.asc", sep="/")
# nlayers=15
nlayers <- 6 ## Only 6 layers are read to minimize the elapsed time of the example!!
b <- brick.decimal.formatter(file=file, nlayers=nlayers)
nlayers(b)
names(b)
  
```

brickFromOutputSoil3DTensor
brickFromOutputSoil3DTensor

Description

Extracts a brick or a raster layer from a output 3D Tensor or 2D map respectively

Usage

```

brickFromOutputSoil3DTensor(x, when, layers = "SoilLayerThicknesses",
  one.layer = FALSE, suffix = "L%04dN%04d.asc",
  time_formatter = "N%04d", suffix_one.layer = "N%04d.asc",
  wpath = NULL, tz = "A", start_date_key = "InitDateDDMMYYYYhhmm",
  end_date_key = "EndDateDDMMYYYYhhmm", timestep = "OutputSoilMaps",
  use.read.raster.from.url = FALSE, crs = NULL, projfile = "geotop.proj",
  start.from.zero = FALSE, secondary.suffix = NULL,
  only.map.filename = FALSE, ...)
  
```

```

rasterFromOutput2DMap(x, when, ...)
  
```

Arguments

x	string. GEOTop keyword related to the 3D or 2D variable to be imported in R.
when	POSIXct-class for date and time on which the variable x is requested.
layers	number of soil layer or geotop keyword for soil layer (e.g. SoilLayerThicknesses or SoilFile). Default is SoilLayerThicknesses .
one.layer	logical value. If TRUE a RasterLayer-class object is imported, otherwise a RasterBrick-class object is returned. Default for brickFromOutputSoil3DTensor is FALSE
suffix	character string containing the decimal formatter used by GEOTop in the output file names. Default is "L%04dN%04.asc". A simple user is recommended not to modify the value of this argument and use the default value.
time_formatter, suffix_one.layer	character string (suffix_one.layer is used for 2Dxy map) containing the decimal formatter used by GEOTop in the output file names to indicate time instant. Default is "N%04.asc". A simple user is recommended not to modify the value of this argument and use the default value.
wpath, tz, use.read.raster.from.url	see get.geotop.inpts.keyword.value
start_date_key, end_date_key	initial and final dates and times of the GEOTop simulation or alternatively the respective keywords of *.inpts file (Default)
timestep	time step expressed in seconds every which the raster file has been created. It can be a string corresponding to the geotop keyword in the inpts file. Default value is "OutputSoilMaps".
crs, start.from.zero	see brick.decimal.formatter . If crs is not NULL (Default) , projfile is ignored.
projfile	name of the *.proj file containing CRS information. See get.geotop.inpts.keyword.value . Default is "geotop.proj". If is NULL or NA or this file does not exist, it is not searched and read.. In case use.read.raster.from.url is TRUE and no NULL or NA values are assigned, the *.proj file is searched.
secondary.suffix	String secondary suffix which can be added at the end of the Map file name (optional). Default is NULL and no secondary suffix is added.
only.map.filename	logical value. If it is TRUE, only map file names are returned and maps are not imported. Default is FALSE.
...	additional arguments for get.geotop.inpts.keyword.value or brickFromOutputSoil3DTensor

Details

These functions [brickFromOutputSoil3DTensor](#) and [rasterFromOutput2DMap](#) return 3D or 2D [Raster-class](#) objects respectively. [rasterFromOutput2DMap](#) is a wrapper function of [brickFromOutputSoil3DTensor](#) with the option `one.layer==TRUE`. The functions work with the following output keywords:

"SoilTempTensorFile",

"SoilAveragedTempTensorFile",
"SoilLiqContentTensorFile",
"SoilAveragedLiqContentTensorFile",
"SoilIceContentTensorFile",
"SoilAveragedIceContentTensorFile",
"SoilLiqWaterPressTensorFile",
"SoilTotWaterPressTensorFile" for [brickFromOutputSoil3DTensor](#);
"FirstSoilLayerTempMapFile",
"FirstSoilLayerAveragedTempMapFile",
"FirstSoilLayerLiqContentMapFile",
"FirstSoilLayerIceContentMapFile",
"LandSurfaceWaterDepthMapFile",
"ChannelSurfaceWaterDepthMapFile",
"NetRadiationMapFile",
"InLongwaveRadiationMapFile",
"NetLongwaveRadiationMapFile",
"NetShortwaveRadiationMapFile",
"InShortwaveRadiationMapFile",
"DirectInShortwaveRadiationMapFile",
"ShadowFractionTimeMapFile",
"SurfaceHeatFluxMapFile",
"SurfaceSensibleHeatFluxMapFile",
"SurfaceLatentHeatFluxMapFile",
"SurfaceTempMapFile",
"PrecipitationMapFile",
"CanopyInterceptedWaterMapFile",
"SnowDepthMapFile",
"GlacierDepthMapFile",
"SnowMeltedMapFile",
"SnowSublMapFile",
"GlacierMeltedMapFile",
"GlacierSublimatedMapFile",
"AirTempMapFile",
"WindSpeedMapFile",
"WindDirMapFile",
"RelHumMapFile",
"SWEMapFile",


```
"GlacierWaterEqMapFile"  
"SnowDurationMapFile",  
"ThawedSoilDepthMapFile",  
"ThawedSoilDepthFromAboveMapFile",  
"WaterTableDepthMapFile",  
"WaterTableDepthFromAboveMapFile",  
"NetPrecipitationMapFile",  
"EvapotranspirationFromSoilMapFile" for rasterFromOutput2DMap.
```

Author(s)

Emanuele Cordano

See Also

[get.geotop.inpts.keyword.value,brick.decimal.formatter](#)

Examples

```
library(geotopbricks)  
# The data containing in the link are only for educational use  
wpath <- "http://www.rendena100.eu/public/geotopbricks/simulations/idroclim_test1"  
x <- "SoilLiqContentTensorFile"  
tz <- "Etc/GMT+1"  
when <- as.POSIXct("2002-03-22",tz=tz)  
  
# Not Run because it elapses too long time!!!  
# Please Uncomment the following lines to run by yourself!!!  
# b <- brickFromOutputSoil3DTensor(x,when=when,wpath=wpath,tz=tz,use.read.raster.from.url=TRUE)  
  
# a 2D map:  
x_e <- "SnowDepthMapFile"  
# Not Run: uncomment the following line  
# m <- rasterFromOutput2DMap(x_e,when=when,wpath=wpath,timestep="OutputSnowMaps",  
# tz=tz,use.read.raster.from.url=TRUE)  
## NOTE: set use.read.raster.from.url=FALSE (default)  
# if the "wpath" directory is in the local file system.  
# Not Run: uncomment the following line  
# plot(m)
```

`color.bar`*Graphic Representation of a Color bar, function written by John Colby*

Description

Graphic Representation of a Color bar, function written by John Colby

Usage

```
color.bar(lut, min, max = -min, nticks = 11, ticks = seq(min, max, len =
  nticks), title = "", width = 1.75, height = 5, ncolmax = 100,
  digits = 4, pdf = NULL)
```

Arguments

<code>lut</code>	see reference http://stackoverflow.com/questions/9314658/colorbar-from-custom-colorramp
<code>min</code>	see reference http://stackoverflow.com/questions/9314658/colorbar-from-custom-colorramp
<code>max</code>	see reference http://stackoverflow.com/questions/9314658/colorbar-from-custom-colorramp
<code>nticks</code>	see reference http://stackoverflow.com/questions/9314658/colorbar-from-custom-colorramp
<code>ticks</code>	see reference http://stackoverflow.com/questions/9314658/colorbar-from-custom-colorramp
<code>title</code>	see reference http://stackoverflow.com/questions/9314658/colorbar-from-custom-colorramp
<code>width, height</code>	width and height of the device
<code>ncolmax</code>	maximum number of colors. Default is 100.
<code>digits</code>	specified number of significant digits
<code>pdf</code>	character value for pdf output file. Default is NULL and no pdf file is created.

Note

This function is taken from <http://stackoverflow.com/questions/9314658/colorbar-from-custom-colorramp>
Please visit the URL for major details and give your feedback if possible.

Author(s)

John Colby <http://stackoverflow.com/users/412342/john-colby>

References

<http://stackoverflow.com/questions/9314658/colorbar-from-custom-colorramp>

Examples

```
color.bar(colorRampPalette(c("light green", "yellow", "orange", "red"))(100), -1)
```

color.bar.raster	<i>Graphic Representation of a Color legend of a Raster or Geotopbrick-Raster object as a Color bar, inspired by the function written by John Colby</i>
------------------	---

Description

Graphic Representation of a Color legend of a Raster or GeotopbrickRaster object as a Color bar, inspired by the function written by John Colby

Usage

```
color.bar.raster(x, col, min = NA, max = NA, ...)
```

Arguments

x	a Raster or GeotopRasterBrick object
col	the color palette used
max, min	maximum and minimum value (used if you need to crop the scale legend within a cartein interval)
...	arguments to be passed to color.bar

See Also

[color.bar](#), [setMinMax](#)

Examples

```
library(geotopbricks)

## Simulation working path

file <- system.file("rendena100/SnowDepthMapFile-2014-MA-mean-winter-2013-2014.asc",
  package="geotopbricks")
snow <- raster(file)

min <- 0 # snow depth expressed in millimeters
max <- 2500 # snow depth expressed in millimeters

colors <- terrain.colors(1000)

color.bar.raster(x=snow,col=colors,digits=2)
color.bar.raster(x=snow,col=colors,min=min,max=max,digits=2)
```

```
create.geotop.inpts.keyword
```

Creates an 'geotop.inpts' files the keyword and their values of a date.frame like the one returned by [declared.geotop.inpts.keywords](#)

Description

Creates an 'geotop.inpts' files the keyword and their values of a date.frame like the one returned by [declared.geotop.inpts.keywords](#)

Usage

```
create.geotop.inpts.keyword(df, file = "geotop.inpts.copy", wpath = NULL,
  comment.lines = "default", header = "default", ...)
```

Arguments

<code>df</code>	data frame returned by declared.geotop.inpts.keywords
<code>file</code>	connection or file name where to write 'df'
<code>wpath</code>	complete path to file (optional). Default is NULL.
<code>comment.lines</code>	string or vector of strings to add as comments for each keyword. If it is NULL the comment lines are omitted.
<code>header</code>	string or vector of strings to add as a header. If it is NULL the header is omitted.
<code>...</code>	further arguments for writeLines

Details

In case `comment.lines` and `header` are set equal to "default", they are suitably modified within the function code. See the example output.

See Also

[writeLines](#), [declared.geotop.inpts.keywords](#)

Examples

```
library(geotopbricks)

#Simulation working path
wpath <- 'http://www.rendena100.eu/public/geotopbricks/simulations/panola13_run2xC_test3'
df <- declared.geotop.inpts.keywords(wpath=wpath)
create.geotop.inpts.keyword(df=df)
```

```
create.geotop.meteo.files
```

Creates geotop meteo files from (a list of) 'zoo' objects

Description

Creates geotop meteo files from (a list of) 'zoo' objects

Usage

```
create.geotop.meteo.files(x, format = "%d/%m/%Y %H:%M",
  file_prefix = "meteo", file_extension = ".txt", formatter = "%04d",
  na = "-9999", col.names = TRUE, row.names = FALSE,
  date_field = "Date", sep = ", ", level = NULL, quote = FALSE, ...)
```

Arguments

x	'zoo' object or a list of 'zoo' object representing the meteorological station
format	string format representing the date, see as.POSIXlt . Default is "%d/%m/%Y %H:%M" (which is the same format used in <code>geotop.inpts</code> keyword <code>InitDateDDMMYYYYhhmm</code>)
file_prefix	string containing file prefix (full path). It correspos to the value of in <code>geotop.inpts</code> keyword <code>MeteoFile</code>)
file_extension	string containing the extensions of final files. Default is <code>c(".txt")</code>
formatter	string value. It is the decimal formatter contained in the file name and used in case the tabular data are referred at several points. Default is "%04d" . See sprintf .
na	NA value indicator. Default is "-9999". See write.table .
col.names	logical parameter. Default is TRUE. See write.table .
row.names	logical parameter. Default is FALSE. See write.table .
date_field	string value. Default is "Date", otherwise defined by the value of <code>HeaderDateDDMMYYYYhhmmMeteo</code> <code>geotop</code> keyword.
sep	string value. Default is ", ". See write.table .
level	integer argument. See get.geotop.inpts.keyword.value for major details. Default is NULL and is ignored.
quote	logical parameter. Default is TRUE. See write.table .
...	further argurments for write.table

See Also

[write.table.get.geotop.inpts.keyword.value](#)

Examples

```
library(geotopbricks)
data(bondone)
## Not Run - Uncomment te following line to run the example
## create.geotop.meteo.files(x=meteo)
```

```
declared.geotop.inpts.keywords
```

Collects all keywords contained in the 'geotop.inpts' configuration files and their values in a data frame object.

Description

Collects all keywords contained in the 'geotop.inpts' configuration files and their values in a data frame object.

Usage

```
declared.geotop.inpts.keywords(wpath, inpts.file = "geotop.inpts",
  comment = "!", exceptions = "Date", warn = FALSE,
  no.comment = c("!>", "!>>"), ...)
```

Arguments

wpath	working directory containing GEOtop files
inpts.file	name of the GEOtop configuration file. Default is "geotop.inpts"
comment	comment indicator charcater. Default is "!"
exceptions	string vector. If keywords contain an element of this vector, the blank spaces in Value " " will not be removed.
warn	logical argument of readLines . Default is FALSE.
no.comment	string indicatos read as comment ones by GEOtop but they do not indicate comments by "geotopbricks" package.
...	further arguments of readLines

Value

a data frame with two columns: Keyword and Value

See Also

[get.geotop.inpts.keyword.value](#)

geotopbrick *geotopbrick*

Description

geotopbrick method bla bla bla

Usage

```
geotopbrick(x = NULL, ...)

## Default S3 method:
geotopbrick(x, ...)

## S3 method for class 'zoo'
geotopbrick(x, layer = NULL, time = NULL, crs = NULL,
            timerange = NULL, ...)

## S3 method for class 'RasterLayer'
geotopbrick(x, layer = NULL, time = NULL,
            ascpath = zoo(NULL), ...)

## S3 method for class 'RasterBrick'
geotopbrick(x, layer = NULL, time = NULL,
            ascpath = zoo(NULL), ...)

## S3 method for class 'GeotopRasterBrick'
geotopbrick(x, layer = NULL, time = NULL,
            crs = NULL, timerange = NULL, ascpath = NULL, ...)
```

Arguments

x	a 'zoo' object returned by function pointer.to.maps.xyz.time or pointer.to.maps.xy.time or a GeotopRasterBrick-class object
...	further arguments.
layer	layer at which raster maps are imported. If is NULL, maps are no-layer distributed and zoo must be returned by pointer.to.maps.xy.time
time	vector of time instants at which geotop maps are imported
crs	coordinate system see RasterBrick-class
timerange	two-elements vector containing the time range at which geotop maps are imported
ascpath	NULL object or a "zoo" S3 object containing the names of ascii maps provided by GEOTop

Value

a [GeotopRasterBrick-class](#)

GeotopRasterBrick-class

GeotopRasterBrick-class

Description

A GeotopRasterBrick: an object to manage raster maps provided by GEOtop!!

Details

ascpath: A "zoo" S3 object containing the names of ascii maps provided by GEOtop

index: A "POSIXt" S3 object containing time or dates on which raster layers of brick are referred

layer: character. Name of the vertical layer at which raster map are referred

brick: A "RasterBrick-class" S4 object containing the Raster-Layer maps imported from GEOtop output files

#' @note A GeotopRasterBrick object can be created by `new("GeotopRasterBrick", ...)`

Author(s)

Emanuele Cordano

See Also

[Raster-class](#)

Examples

```
showClass("GeotopRasterBrick")
```

```
get.geotop.inpts.keyword.value
```

Importing a GEOTop Keyword and its Value into R

Description

It returns the values of a keyword of "geotop.inpts" file or data frame with the suitable format.

Usage

```
get.geotop.inpts.keyword.value(keyword, inpts.frame = NULL,
  vector_sep = NULL, col_sep = ",", numeric = FALSE,
  format = "%d/%m/%Y %H:%M", date = FALSE, tz = "Etc/GMT-1",
  raster = FALSE, file_extension = ".asc", add_wpath = FALSE,
  wpath = NULL, use.read.raster.from.url = TRUE, data.frame = FALSE,
  formatter = "%04d", level = 1, date_field = "Date", isNA = -9999,
  matlab.syntax = TRUE, projfile = "geotop.proj", start_date = NULL,
  end_date = NULL, ContinuousRecovery = 0,
  ContinuousRecoveryFormatter = "_crec%04d", zlayer.formatter = NULL,
  z_unit = c("centimeters", "millimeters"), geotop_z_unit = "millimeters",
  add_suffix_dir = NULL, ...)
```

Arguments

keyword	keyword name
inpts.frame	data frame returned by declared.geotop.inpts.keywords or NULL. Default is NULL.
vector_sep	character value for the separator character if Keyword Value must be returned as a vector, otherwise it is NULL. Default is NULL, but if numeric or date are FALSE, vector_sep is set ", " by default.
col_sep	character value for the separator character of columns. It is used if Keyword Value is returned as a data frame or zoo object or list of these objects. Default is NULL, but is set ", ".
numeric	logical value. If TRUE the Value has numeric type, otherwise it is a string or string vector. Default is FALSE.
format	string format representing the date, see as.POSIXlt , used if date is TRUE. Default is "%d/%m/%Y %H:%M" (which is the format used in geotop.inpts keyword InitDateDDMMYYYYhhmm)
date	logical value. If TRUE the Value is returned as POSIXlt date, otherwise it is a string or string vector. Default is FALSE.
tz	format string representing the time zone, see as.POSIXlt , used if date is TRUE. Default is "Etc/GMT-1" (until the previous version it was "A") which means UTC +1.
raster	logical value. Default is FALSE. If TRUE function returns directly the raster map as Raster-class object built with raster method.

<code>file_extension</code>	Extension to be added to the keyword if keyword is a file name. Default is ".asc"
<code>add_wpath</code>	logical value. Default is FALSE. If TRUE, the wpath string is attached to the keyword string value. It is automatically set TRUE if raster is TRUE.
<code>wpath</code>	working directory containing GEOTop files (included the inpts file). It is mandatory if raster is TRUE. See declared.geotop.inpts.keywords .
<code>use.read.raster.from.url</code>	logical value. Default is TRUE. If TRUE the RasterLayer are read with read.raster.from.url , instead of raster (otherwise). It is recommended in case the files whose paths are contained in x are remote and are 'http' addresses. In this cases the stand-alone method <code>raster(x)</code> does not always work and <code>use.read.raster.from.url</code> is necessary.
<code>data.frame</code>	logical value. It is an option for tabular data. If TRUE function returns directly a data frame or a list of data frames as data.frame or zoo objects imported from the keyword-related files using read.table function. In this case the argument wpath (see declared.geotop.inpts.keywords) is mandatory. Default is FALSE.
<code>formatter</code>	string value. It is the decimal formatter contained in the file name and used in case the tabular data are referred at several points. Default is "%04d". It is used in case <code>data.frame</code> is TRUE.
<code>level</code>	integer values. Numbers incating all the identification numbers of the files containing the requested data frames. Default is 1, correspondig to the decimal formatter "0001". See examples.
<code>date_field</code>	string value. Default is "Date", otherwise defined by the value of HeaderDateDDMMYYYYhmmMeteo geotop keyword. It is used only if the argument <code>data.frame</code> is TRUE. If it is NULL or NA the function return a list of generic data.frame object(s), otherwise <code>link{zoo}</code> object(s). See the arguments <code>tz</code> and <code>format</code> for Date formatting.
<code>isNA</code>	numeric value indicating NA in geotop ascii files. Default is -9999.00
<code>matlab.syntax</code>	logical value. Default is FALSE. If TRUE a vector is written in a string according to *.m file syntax. Warning: this syntax is not read by GEOTop.
<code>projfile</code>	filename of the GEOTop projection file. Default is <code>geotop.proj</code> .
<code>start_date, end_date</code>	null objects or dates in POSIXlt format between which the variables are returned. It is enabled in case that <code>date_field</code> is not NULL or NA and <code>data.frame</code> is TRUE. Default is NULL.
<code>ContinuousRecovery</code>	integer value. Default is 0. It is used for tabular output data and is the number of times GEOTop simulation broke during its running and was re-launched with 'Contiuous Recovery' option.
<code>ContinuousRecoveryFormatter</code>	character string. Default is '_crec%04d'. It is used only for tabular output data and if <code>ContinuousRecovery</code> is equal or greater than 1.
<code>zlayer.formatter</code>	decimal formatter. It is used if <code>data.frame==TRUE</code> and the columns refers to different soil depths. Default is NULL.

z_unit	z coordinate measurement unit. GEOTop values expressed in millimeters which are converted to centimeters by default. Default is c("centimeters", "millimeters"). Otherwise can be the ratio between the unit and one meter. It is used if zlayer.formatter=="z%04d" or similar.
geotop_z_unit	z coordinate measurement unit used by GEOTop. Default is millimeters. It is used if zlayer.formatter=="z%04d" or similar.
add_suffix_dir	character string. Add a suffix at the directory reported in the keyword value
...	further arguments of declared.geotop.inpts.keywords

Value

the keyword value

Note

If inpts.frame is NULL, inpts.frame will be obtained by calling the function [declared.geotop.inpts.keywords](#) with ... arguments.

Examples

```
library(geotopbricks)

#Simulation working path
wpath <- 'http://www.rendena100.eu/public/geotopbricks/simulations/panola13_run2xC_test3'
prefix <- get.geotop.inpts.keyword.value("SoilLiqWaterPressTensorFile", wpath=wpath)

slope <- get.geotop.inpts.keyword.value("SlopeMapFile", raster=TRUE, wpath=wpath)
bedrock_depth <- get.geotop.inpts.keyword.value("BedrockDepthMapFile", raster=TRUE, wpath=wpath)

layers <- get.geotop.inpts.keyword.value("SoilLayerThicknesses", numeric=TRUE, wpath=wpath)
names(layers) <- paste("L", 1:length(layers), sep="")

##### set van genuchten parameters to estimate water volume
theta_sat <- get.geotop.inpts.keyword.value("ThetaSat", numeric=TRUE, wpath=wpath)
theta_res <- get.geotop.inpts.keyword.value("ThetaRes", numeric=TRUE, wpath=wpath)
alphaVG <- get.geotop.inpts.keyword.value("AlphaVanGenuchten",
numeric=TRUE, wpath=wpath) # expressed in mm^-1

nVG <- get.geotop.inpts.keyword.value("NVanGenuchten", numeric=TRUE, wpath=wpath)

##### end set van genuchten parameters to estimate water volume

##### set meteo data

start <- get.geotop.inpts.keyword.value("InitDateDDMMYYYYhhmm", date=TRUE, wpath=wpath, tz="A")
end <- get.geotop.inpts.keyword.value("EndDateDDMMYYYYhhmm", date=TRUE, wpath=wpath, tz="A")

nmeteo <- get.geotop.inpts.keyword.value("NumberOfMeteoStations", numeric=TRUE, wpath=wpath)
```

```

level <- 1:nmeteo

# Uncomment the following lines to run the R code:

## set meteo data

## Not run:
# meteo <- get.geotop.inpts.keyword.value("MeteoFile",wpath=wpath,data.frame=TRUE,
#     level=level,start_date=start,end_date=end)

## End(Not run)

##### end set meteo data

## IMPORTING AN OUTPUT SOIL MOISTURE PROFILE:

wpath <- 'http://www.rendena100.eu/public/geotopbricks/simulations/Muntatschini_pnt_1_225_B2_004'

## Not run:
# SMC <- get.geotop.inpts.keyword.value("SoilLiqContentProfileFile",
#     wpath=wpath,data.frame=TRUE,date_field="Date12.DDMMYYYYhhmm.",
#     formatter="%04d")
#
# SMCz <- get.geotop.inpts.keyword.value("SoilLiqContentProfileFile",
#     wpath=wpath,data.frame=TRUE,date_field="Date12.DDMMYYYYhhmm.",
#     formatter="%04d",zlayer_formatter="z%04d")

## End(Not run)

```

```
get.geotop.recovery.state
```

This function saves all spatially distributed information contained in the recovery folder into a comprehensive list object.

Description

This function saves all spatially distributed information contained in the recovery folder into a comprehensive list object.

Usage

```
get.geotop.recovery.state(recFolder, xx = "0000", formatter = "L%04d",
    extension = ".asc", nsoillayers = 10, layersFromDir = FALSE, ...)
```

Arguments

recFolder	directory when recovery maps are set. In GEOtop it is ...
xx	character String. Default is "0000"
formatter	string character for the the decimal formatter to be used. Default is "L%04d".
extension	file extension used for ascii recovery map files. It must contains '.' as the first character. Default is ".asc".
nsoillayers	number of soil layers used in the GEOtop simulation.
layersFromDir	logical value. If is TRUE the number of soil/snow (vertical) layers used in the GEOtop simulation is automatically calculated and cannot be assigned through nsoillayers.
...	further arguments

Value

a list object containing all recovery raster maps.

Note

This function has been used with the built 1.225-9 of GEOtop .

Author(s)

Emanuele Cordano

See Also

[brick.decimal.formatter](#),
[raster,set.geotop.recovery.state](#),
[write.vectorized.geotop.recovery,read.vectorized.geotop.recovery](#)

Examples

```
library(geotopbricks)
example_Rscript <- system.file('template/example.geotop.recovery.state.R',package="geotopbricks")
example_Rscript

# Not Run because it elapses too long time!!!
# Please Uncomment the following line to run by yourself!!!
# source(example_Rscript)
```

getProjection	<i>It reads the CRS metadata utilized in a GEOtop Simulation</i>
---------------	--

Description

It reads the CRS metadata utilized in a GEOtop Simulation

Usage

```
getProjection(x, cond = TRUE, ...)
```

Arguments

x	name and full path of the file containing CRS information
cond	logical value. If FALSE the function returns NA. Default is TRUE.
...	further arguments

Value

A string corresponding the projection and CRS if the argument cond is TRUE.

Examples

```
library(geotopbricks)
wpath <- "http://www.rendena100.eu/public/geotopbricks/simulations/idroclim_test1"
x <- paste(wpath,"geotop.proj",sep="/")

crs <- getProjection(x)
```

getvalues.brick.at.depth	<i>Interpolates the values of a 'brick' at a certain depth and returns the map of brick values at the "depth" level</i>
--------------------------	---

Description

Interpolates the values of a 'brick' at a certain depth and returns the map of brick values at the "depth" level

Usage

```
getvalues.brick.at.depth(x, depth, layers, i0 = NULL, verify = FALSE, ...)
```

Arguments

x	a 'RasterBrick' or a three-dimensional array
depth	depth map, generally a 'RasterLayer' object
layers	vector of layer thickness
i0	a 'Raster' containing the number of soil layer just over the bedrock. Default is NULL and is then calculated.
verify	logical. Default is FALSE. If it is TRUE, it verifies that function is working correctly.
...	further argument

Value

a list of 'Raster' maps:

i0 a 'Raster' containing the number of soil layer just over the bedrock

val_z0 a 'Raster' containing the values of x at the i0-th layer

val_z1 a 'Raster' containing the values of x at the (i0+1)-th layer

z0 a 'Raster' containing the depth of the center of the i0-th layer

z1 a 'Raster' containing the depth of the center of the (i0+1)-th layer

Note

x and depth or i0 must cover the same spatial region.

See Also

[codevertical.aggregate.brick.within.depth](#)

Examples

```
library(geotopbricks)
# The examples is the following R script contained in a 'inst' directory of the package source
f <- system.file("doc/examples/example.getvalues.brick.at.depth.R", package="geotopbricks")
# source(f) # Uncomment this line to run the example.
# You can copy the example file using file.copy(from=f,to=...,...) See file.copy documentation
```

 KML

KML

Description

KML method for a GeotopRasterBrick object

Usage

```
## S4 method for signature 'GeotopRasterBrick'
KML(x, filename,
     crs = as.character("+proj=longlat +ellps=WGS84 +datum=WGS84 +no_defs"), ...)
```

Arguments

x	the GeotopRasterBrick object
filename	mane of the KML file to produce
crs	character string containg the LatLon reference system. Default is "+proj=longlat +ellps=WGS84 +datum=WGS84 +no_defs" (see http://spatialreference.org/ref/epsg/4326/).
...	further argument for S4 method KLM for Raster object.

Note

A coordinate transformation is made with [projectRaster](#).

Examples

```
library(geotopbricks)
# The examples is the following R script contained in a 'inst' directory of the package source
f <- system.file("doc/examples/example.KML.GeotopRasterBrick.R",package="geotopbricks")
# source(f) # Uncomment this line to run the example.
# You can copy the example file using file.copy(from=f,to=.....) See file.copy documentation
```

 listFromOutputSoil3DTensor

Extracts a list of files pointing to an output 3D Tensor or 2D map respectively

Description

Extracts a list of files pointing to an output 3D Tensor or 2D map respectively

Usage

```
listFromOutputSoil3DTensor(x, when, layers = "SoilLayerThicknesses",
    one.layer = FALSE, suffix = "L%04dN%04d.asc", wpath = NULL,
    tz = "A", start_date_key = "InitDateDDMMYYYYhhmm",
    end_date_key = "EndDateDDMMYYYYhhmm", timestep = "OutputSoilMaps",
    use.read.raster.from.url = FALSE, crs = NULL, projfile = "geotop.proj",
    start.from.zero = FALSE, secondary.suffix = NULL, ...)
```

Arguments

x	string. GEOtop keyword related to the 3D or 2D variable to be imported in R.
when	POSIXlt-class for date and time on which the variable x is requested.
layers	number of soil layer or geotop keyword for soil layer (e.g. SoilLayerThicknesses or SoilFile). Default is SoilLayerThicknesses.
one.layer	logical value. If TRUE a RasterLayer-class object is imported, otherwise a RasterBrick-class object is returned. Default for brickFromOutputSoil3DTensor is FALSE
suffix	character string containing the decimal formatter used by GEOtop in the output file names. Default is "L%04dN%04d.asc". A simple user is recommended not to modify the value of this argument and use the default value.
wpath, tz, use.read.raster.from.url	see get.geotop.inpts.keyword.value
start_date_key, end_date_key	initial and final dates and times of the GEOtop simulation or alternatively the respective keywords of *.inpts file (Default)
timestep	time step expressed in seconds every which the raster file has been created. It can be a string corresponding to the geotop keyword in the inpts file. Default value is "OutputSoilMaps".
crs, start.from.zero	see brick.decimal.formatter . If crs is not NULL (Default), projfile is ignored.
projfile	name of the *.proj file containing CRS information. See get.geotop.inpts.keyword.value . Default is "geotop.proj". If is NULL or NA or this file does not exist, it is not searched and read.. In case use.read.raster.from.url is TRUE and no NULL or NA values are assigned, the *.proj file is searched.
secondary.suffix	String secondary suffix which can be added at the end of the Map file name (optional). Default is NULL and no secondary suffix is added.
...	additional arguments for get.geotop.inpts.keyword.value or brickFromOutputSoil3DTensor

Details

This function is experimental and documentation partially exhaustive. These functions [brickFromOutputSoil3DTensor](#) and [rasterFromOutput2DMap](#) return 3D or 2D [Raster-class](#) objects respectively. [rasterFromOutput2DMap](#) is a wrapper function of [brickFromOutputSoil3DTensor](#) with the option `one.layer==TRUE`. The functions work with the following output keywords:

"SoilTempTensorFile",
"SoilAveragedTempTensorFile",
"SoilLiqContentTensorFile",
"SoilAveragedLiqContentTensorFile",
"SoilIceContentTensorFile",
"SoilAveragedIceContentTensorFile",
"SoilLiqWaterPressTensorFile",
"SoilTotWaterPressTensorFile" for [brickFromOutputSoil3DTensor](#);
"FirstSoilLayerTempMapFile",
"FirstSoilLayerAveragedTempMapFile",
"FirstSoilLayerLiqContentMapFile",
"FirstSoilLayerIceContentMapFile",
"LandSurfaceWaterDepthMapFile",
"ChannelSurfaceWaterDepthMapFile",
"NetRadiationMapFile",
"InLongwaveRadiationMapFile",
"NetLongwaveRadiationMapFile",
"NetShortwaveRadiationMapFile",
"InShortwaveRadiationMapFile",
"DirectInShortwaveRadiationMapFile",
"ShadowFractionTimeMapFile",
"SurfaceHeatFluxMapFile",
"SurfaceSensibleHeatFluxMapFile",
"SurfaceLatentHeatFluxMapFile",
"SurfaceTempMapFile",
"PrecipitationMapFile",
"CanopyInterceptedWaterMapFile",
"SnowDepthMapFile",
"GlacierDepthMapFile",
"SnowMeltedMapFile",
"SnowSublMapFile",
"GlacierMeltedMapFile",
"GlacierSublimatedMapFile",
"AirTempMapFile",
"WindSpeedMapFile",
"WindDirMapFile",
"RelHumMapFile",

```

"SWEMapFile",
"GlacierWaterEqMapFile"
"SnowDurationMapFile",
"ThawedSoilDepthMapFile",
"ThawedSoilDepthFromAboveMapFile",
"WaterTableDepthMapFile",
"WaterTableDepthFromAboveMapFile",
"NetPrecipitationMapFile",
"EvapotranspirationFromSoilMapFile" for rasterFromOutput2DMap.

```

Author(s)

Emanuele Cordano

See Also

[get.geotop.inpts.keyword.value](#), [brick.decimal.formatter](#), [brickFromOutputSoil3DTensor](#)

Examples

```

tz <- "Etc/GMT+1"
start <- as.POSIXct("2002-03-22", tz=tz)
end <- as.POSIXct("2002-03-25", tz=tz)
day <- 3600*24
when <- seq(from=start, to=end, by=day)
#' # The data containing in the link are only for educational use
wpath <- "http://www.rendena100.eu/public/geotopbricks/simulations/idroclim_test1"
x <- "SoilLiqContentTensorFile"
when <- as.POSIXct("2002-03-22 UTC", tz="A")

# Not Run because it elapses too long time!!!
# Please Uncomment the following lines to run by yourself!!!

# wpath <- '/Users/ecor/attivita/2013/fem-idroclima/Trentino_500_dstr_GE0top_1_225_9_002'

#kpsi <- "SoilLiqWaterPressTensorFile" ## soil water pressure head

out <- listFromOutputSoil3DTensor(x, when=when, wpath=wpath, tz=tz, use.read.raster.from.url=FALSE)

```

max_value

max_value

Description

Gets the maximum (scalar) values of a [GeotopRasterBrick](#) object

Usage

max_value(x)

Arguments

x a [GeotopRasterBrick](#) object
... further arguments

Value

the maximum (scalar) values of a [GeotopRasterBrick](#) object

min_value

min_value

Description

Gets the minimum (scalar) values of a [GeotopRasterBrick](#) object

Usage

min_value(x)

Arguments

x a [GeotopRasterBrick](#) object
... further arguments

Value

the minimum (scalar) values of a [GeotopRasterBrick](#) object

 Ops

Ops

Description

Ops method for a GeotopRasterBrick object

Usage

```
## S4 method for signature 'GeotopRasterBrick,GeotopRasterBrick'
Ops(e1, e2)
```

```
## S4 method for signature 'GeotopRasterBrick,numeric'
Ops(e1, e2)
```

```
## S4 method for signature 'numeric,GeotopRasterBrick'
Ops(e1, e2)
```

Arguments

e1, e2 the [GeotopRasterBrick](#) or numeric objects

Note

If e1 or e2 time index is not taken into account.

 plot

plot

Description

plot method for a GeotopRasterBrick object

Usage

```
## S4 method for signature 'GeotopRasterBrick,ANY'
plot(x, y = NULL, ...)
```

Arguments

x the [GeotopRasterBrick](#) object

y further argument

... further argument for S4 method plot for Raster object.

See Also[KML](#)**Examples**

```
library(geotopbricks)
# The examples is the following R script contained in a 'inst' directory of the package source
f <- system.file("doc/examples/example.plot.GeotopRasterBrick.R",package="geotopbricks")
# source(f) # Uncomment this line to run the example.
# You can copy the example file using file.copy(from=f,to=....,..) See file.copy documentation
```

```
pointer.to.maps.xyz.time
      pointer.to.maps.xyz.time
```

Description

'pointer.to.maps.xyz.time' function

Usage

```
pointer.to.maps.xyz.time(wpath, map.prefix = "thetaliq",
  suffix = "L%04dN%04d.asc", zoo.index = NULL, ntime, nlayers)
```

Arguments

wpath	complete working path to *.asc maps are saved
map.prefix	string prefix name map before
suffix	z-time or time suffix plus file extention character string. Default for GEOtop application is "L%04dN%04d.asc" for xy+z+time maps or "N%04d.asc" for xy+time maps.
zoo.index	time or date index. Default is NULL , otherwise function returns a zoo object with zoo.index as index.
ntime	number of time instant. If zoo.index is not NULL, it is calculated from zoo.index length.
nlayers	number of vertical layers.

Value

A `dota.frame` or `zoo` object containing the paths to maps for each time and z layer.

Author(s)

Emanuele Cordano

`read.ascii.vectorized.brick`

Read a text file containing values and metadata of a z-layer brick referred to a time instant (e.g. date). The file is formatted like an ascii format like 'geotop.inpts' file.

Description

Read a text file containing values and metadata of a z-layer brick referred to a time instant (e.g. date). The file is formatted like an ascii format like 'geotop.inpts' file.

Usage

```
read.ascii.vectorized.brick(file = NULL, comment = "!", crs = "",
  NAflag = -9999, matlab.syntax = FALSE, ...)
```

Arguments

<code>file</code>	file name to write
<code>comment</code>	character. Comment indicator. Default is "!".
<code>crs</code>	Character or object of class CRS. PROJ4 type description of a Coordinate Reference System (map projection) (optional). See brick or raster .
<code>NAflag</code>	numeric. Default is -9999, see writeRasterxGEOtop .
<code>matlab.syntax</code>	logical value. Default is FALSE. If TRUE the file syntax is like the one of a *.m Matlab script file.
<code>...</code>	further arguments inserted as attribute

Value

the [RasterBrick-class](#) object

See Also

[write.ascii.vectorized.brick](#)

Examples

```
# see the examples of read.ascii.vectorized.brick
```

`read.raster.from.url` *It imports a 'RasterLayer' object in Escri-Ascii format from a URL 'http://...<FILENAME>.asc'*

Description

It imports a 'RasterLayer' object in Escri-Ascii format from a URL 'http://...<FILENAME>.asc'

Usage

```
read.raster.from.url(x, header_nrow = 6, ...)
```

Arguments

<code>x</code>	the charcater string containing the URL address
<code>header_nrow</code>	Number of header in the ASCII grid format. Deaefault is 6. See http://en.wikipedia.org/wiki/Esri_grid
<code>...</code>	additional arguments

Value

a 'RasterLayer' object

Note

This function reads a local or remote text files formatted as http://en.wikipedia.org/wiki/Esri_grid and creates a 'RasterLayer' object.

See Also

[raster,readLines](#)

`read.vectorized.geotop.recovery`
Reads a text file like the one generated by [write.vectorized.geotop.recovery](#)

Description

#. containing values and matedata of a z-layer brick referred to a time instant (e.g. date). The file is formatted like an ascii format like 'geotop.inpts' file.

Usage

```
read.vectorized.geotop.recovery(file = file, comment = "!",
  matlab.syntax = TRUE, xx = "0000", formatter = "L%04d",
  extension = ".asc", NAflag = -9999, crs = "", ...)
```

Arguments

file	file name to write
comment	character. Comment indicator. Default is "!".
matlab.syntax	logical value. Default is TRUE. If TRUE the file syntax is like the one of a *.m Matlab script file.
formatter, extension, xx	see get.geotop.recovery.state .
NAflag	numeric. Default is -9999, see writeRasterxGEOTop .
crs	Character or object of class CRS. PROJ4 type description of a Coordinate Reference System (map projection) (optional). See brick or raster .
...	further arguments inserted as attribute

Value

a [list](#) object like [get.geotop.recovery.state](#)

See Also

[write.vectorized.geotop.recovery](#)

Examples

```
# see the examples of read.ascii.vectorized.brick
```

replace.keyword	<i>It replaces some keyword values of geotop.inpts file with the ones of another *.inpts value</i>
-----------------	--

Description

It replaces some keyword values of geotop.inpts file with the ones of another *.inpts value

Usage

```
replace.keyword(x, y = "geotop.inpts", file.output = NULL,
  write.file.output = TRUE, wpath = NULL, ...)
```

Arguments

x	filename of the *.inpts with the "new" keyword value
y	filename of the *.inpts with the "old" keyword value. Default is "geotop.inpts".
file.output	filename where to write the comprehensive new geotop.inpts file. If it is NULL (default), the filename is assigned by y.
write.file.output	logical value. If it is TRUE, the output of the function is written in the file file.output.
wpath	working path to the GEOTop simulation folder containing the x and y files.
...	further arguments

Details

This function replaces some keyword values of y with the ones indicated in x. It is useful to replace the meteorological station metadata, for instance, when the meteorological station of a study case is modified. The function returns the new geotop.inpts file as a vector of character strings. If write.file.output==TRUE, the output is written in an external file, e.g. "geotop.inpts" newly (this option is suggested).

Author(s)

Emanuele Cordano

Examples

```
library(geotopbricks)
wpath <- system.file('template/meteo_ex', package="geotopbricks")
x <- "meteo.inpts"
z1 <- replace.keyword(x, wpath=wpath, write.file.output=FALSE)
```

```
set.geotop.recovery.state
```

This function re-writes the recovery ascii raster maps in a given folder

Description

This function re-writes the recovery ascii raster maps in a given folder

Usage

```
set.geotop.recovery.state(rec, newRecFolder, ...)
```

Arguments

rec	a list object returned by get.geotop.recovery.state
newRecFolder	directory where to write all recovery raster asccii maps
...	further arguments

Author(s)

Emanuele Cordano

See Also

[get.geotop.recovery.state](#), [writeRasterxGEOtop](#)

Examples

```
# See the examples of the 'get.geotop.recovery.state' function
```

```
vertical.aggregate.brick.within.depth
```

Aggregates with a mean or an addition on the vertical profile the values of a 'brick' within a certain depth and returns the vertical aggregated map

Description

Aggregates with a mean or an addition on the vertical profile the values of a 'brick' within a certain depth and returns the vertical aggregated map

Usage

```
vertical.aggregate.brick.within.depth(x, depth = NULL, layers = NULL,
  i0 = NULL, verify = FALSE, FUN = identity, divide.by.depth = FALSE,
  ...)
```

Arguments

x	a 'RasterBrick' or a three-dimensional array
depth	depth map, generally a 'RasterLayer' object
layers	vector of layer thickness
i0	a 'Raster' containing the number of soil laver just over the bedrock. Default is NULL and is then calculated.
verify	logical. Default is FALSE. If it is TRUE, it verifies that function is working correctly.
FUN	function used for aggregation. If missing, identity is the default value.

```

divide.by.depth          logical. If TRUE the function returns the 'mean' value, otherwise a a cumulate
                        value. Default is FALSE.
...                      further argument for FUN

```

Value

a list of 'Raster' maps:
i0 a 'Raster' containing the number of soil laver just over the bedrock
z0 a 'Raster' containing the depth of the center of the *i0*-th layer
result a 'Raster' containing the aggregated map

Note

x and *depth* or *i0* must cover the same spatial region.

See Also

[getvalues.brick.at.depth,brick](#)

Examples

```

library(geotopbricks)
# The examples is the following R script contained
# in a 'inst' directory of the package source
f <- system.file("doc/examples/example.vertical.aggregate.brick.within.depth.R",
package="geotopbricks")
# source(f) # Uncomment this line to run the example.
# You can copy the example file using file.copy(from=f,to=...,...) See file.copy documentation

```

```
write.ascii.vectorized.brick
```

Writes a z-layer brick referred to a time instant (e.g. date) in an ascii format like 'geotop.inpts' file.

Description

Writes a z-layer brick referred to a time instant (e.g. date) in an ascii format like 'geotop.inpts' file.

Usage

```
write.ascii.vectorized.brick(b, file = NULL, header = NULL,
  overwrite = TRUE, NAflag = -9999, matlab.syntax = FALSE, ...)
```

Arguments

b	a RasterBrick-class or GeotopRasterBrick-class object
file	file name to write
header	character string vector for header text lines. If missing, a default header is written. #Default is c("! header").
overwrite	logical. Default is TRUE, see writeRaster .
NAflag	numeric. Default is -9999, see writeRasterxGEOtop .
matlab.syntax	logical value. Default is FALSE. If TRUE the file syntax is like the one of a *.m Matlab script file.
...	further arguments inserted as attribute

Value

the string vector possibly written in file.

Note

Add Quote if necessary. This function is NOT maintained and will be DEPRECATED.

See Also

[read.ascii.vectorized.brick](#)

Examples

```
## Not Run
## library(geotopbricks)
## library(raster)
## file <- system.file("doc/examples/snowthickness",package="geotopbricks")
## file <- paste(file,"SnowThickness0000L%04d.asc",sep="/")
## b <- brick.decimal.formatter(file=file,nlayers=15)
## nlayers(b)
## names(b)
## file <- "snow.txt"
## btext <- write.ascii.vectorized.brick(b,Date="1/1/2009",file="snow.txt")
## The printed object
## str(btext)
## bb <- read.ascii.vectorized.brick(file = file)
## bf <- abs(as.matrix(bb[[1]]-b[[1]]))<.Machine$double.eps^0.5
```

`write.geotop.table` *Writes an R object (data.frame or zoo) into a CSV file readable by GEOtop.*

Description

Writes an R object (data.frame or zoo) into a CSV file readable by GEOtop.

Usage

```
write.geotop.table(x, file, wpath = NULL, tz = "Etc/GMT-1",
  date_field = "Date12.DDMYYYYYhhmm.", file_end = "", sep = ",",
  format = "%d/%m/%Y %H:%M", na = "-9999", ...)
```

Arguments

<code>x</code>	R object (data.frame or zoo) to be exported and written.
<code>file</code>	filename
<code>wpath</code>	working path to the GEOtop simlation. If <code>wpath</code> is not NULL , filename will be put in <code>wpath</code> .
<code>tz</code>	time zone. Default is "Etc/GMT-1". See get.geotop.inpts.keyword.value fur further details.
<code>date_field</code>	string used for date-time field. Deafult is "Date12.DDMYYYYYhhmm.". See get.geotop.inpts.keyword.value fur further details.
<code>file_end</code>	suffix of the file name (file) (optional). Default is "".
<code>sep</code>	separator character. Default is ",". See write.table fur further details.
<code>format</code>	date time format. Default is "%d/%m/%Y %H:%M". See get.geotop.inpts.keyword.value fur further details.
<code>na</code>	string for unassigned values. Defaults is "-9999". See write.table fur further details.
<code>...</code>	further arguments for write.table .

`write.vectorized.geotop.recovery`

*It writes a list object returned by [get.geotop.recovery.state](#) as a string vector or in a text file, following *.inpts or Matlab-like syntax.*

Description

It writes a list object returned by [get.geotop.recovery.state](#) as a string vector or in a text file, following *.inpts or Matlab-like syntax.

Usage

```
write.vectorized.geotop.recovery(rec, file = NULL, header = NULL,
  overwrite = TRUE, NAflag = -9999, matlab.syntax = TRUE, ...)
```

Arguments

rec	a list object returned by get.geotop.recovery.state
file	ascii text file name where to write the string vector
header	character string vector for header text lines. If missing, a default header is written. Default is c("! header") or the one assigned by <code>matlab.syntax</code> .
overwrite	logical. Default is TRUE, see writeRaster .
NAflag	numeric. Default is -9999, see writeRasterxGEOtop .
matlab.syntax	logical value. Default is TRUE. If TRUE the file syntax is like the one of a *.m Matlab script file.
...	further arguments inserted as attribute

Value

a string vector containing the rec variables.

Note

Add Quote if necessary

See Also

[get.geotop.recovery.state](#), [set.geotop.recovery.state](#), [write.vectorized.variable.in.string](#)

Examples

```
# See the examples of the 'get.geotop.recovery.state' function
```

```
write.vectorized.variable.in.string
```

*Writes one or more variables (scalars, vectors or Rasters) in a string each, following *.inpts or Matlab-like syntax.*

Description

Writes one or more variables (scalars, vectors or Rasters) in a string each, following *.inpts or Matlab-like syntax.

Usage

```
write.vectorized.variable.in.string(l, NAflag = -9999,
  matlab.syntax = FALSE, ...)
```

Arguments

<code>l</code>	a codelist object contained the variables (scalars, vectors or Rasters) which will be written in a string each.
<code>NAflag</code>	numeric. Default is -9999, see writeRasterxGEOtop .
<code>matlab.syntax</code>	logical value. Default is FALSE. If TRUE the file syntax is like the one of a *.m Matlab script file.
<code>...</code>	further arguments

Value

the string vector <NAME_VARIABLE>==<VALUES_VARIABLE>.

Note

Add Quote if necessary

See Also

[read.ascii.vectorized.brick](#)

Examples

```
a <- 1:5
l <- list(v=a,a=a)
out <- write.vectorized.variable.in.string(l,matlab.syntax=TRUE)
out
```

<code>writeRasterxGEOtop</code>	<i>This function uses writeRaster to create .asc maps which can be read by GEOtop</i>
---------------------------------	---

Description

This function uses [writeRaster](#) to create .asc maps which can be read by GEOtop

Usage

```
writeRasterxGEOtop(x, filename = NULL, overwrite = TRUE, NAflag = -9999,
  use.decimal.formatter = FALSE, start.from.zero = FALSE, keyword, wpath,
  suffix.ext = ".asc", ...)
```


Arguments

x	a Raster object, see writeRaster . It can be also a RasterBrick-class object.
filename	see writeRaster . It is a vector of string or one string containing a decimal formatter (see brick.decimal.formatter) in case x is a RasterBrick-class object.
overwrite	logical. Default is TRUE, see writeRaster .
NAflag	numeric. Default is -9999, see writeRaster .
use.decimal.formatter	logical value. Default is FALSE. If it is TRUE or x is a RasterBrick-class object with <code>nlayers(x) != length(filename)</code> , filename is considered as one string containing a decimal formatter (e.g. "%04d", see brick.decimal.formatter). Otherwise, if filename is considered as a vector string.
start.from.zero	logical value. Default is FALSE. If TRUE the formatter starts from 0000, otherwise it starts from 0001.
keyword	geotop keyword to be used to extract the raster file name from <code>geotop.inpts</code> file. This is enabled if filename is equal to NULL.
wpath	simulation folder containing <code>geotop.inpts</code> file.
suffix.ext	character string to be added to the keyword value, e.g. possible suffix and extension of the raster file name. Default is ".asc".
...	further arguments of get.geotop.inpts.keyword.value or writeRaster

Note

It makes use of [system](#) functions. It uses *.asc format for raster files. In case the file name filename is missing and then NULL, it must be imported by the simulation `geotop.inpts` file.

Examples

```
library(geotopbricks)

## Simulation working path

file <- system.file("rendena100/SnowDepthMapFile-2014-MA-mean-winter-2013-2014.asc",
package="geotopbricks")
snow <- raster(file)

snowfile <- "./temporary/snow.asc"

dir.create("./temporary")
writeRasterxGEOtop(x=snow, file=snowfile)
```

zoo-class	<i>A GeotopRasterBrick: an object to manage raster maps provided by GEOtop!!</i>
-----------	--

Description

A GeotopRasterBrick: an object to manage raster maps provided by GEOtop!!

Examples

```
showClass("zoo")
```

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