Package 'rbgm'

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Type Package

Title Tools for 'Box Geometry Model' (BGM) Files and Topology for the Atlantis Ecosystem Model

Version 0.0.4

Depends R (>= 3.2.2), raster, sp

Imports dplyr, geosphere, tibble (>= 1.1)

Suggests bgmfiles, covr, graticule, knitr, rgdal, rmarkdown, roxygen2, scales, testthat

Description Facilities for working with Atlantis box-geometry model (BGM) files. Atlantis is a deterministic, biogeochemical, whole-of-ecosystem model. Functions are provided to read from BGM files directly, preserving their internal topology, as well as helper functions to generate 'Spatial' objects. This functionality aims to simplify the creation and modification of box and geometry as well as the ability to integrate with other data sources.

NeedsCompilation no

ByteCompile yes

License GPL-3

RoxygenNote 5.0.1

URL https://github.com/AustralianAntarcticDivision/rbgm/, http://atlantis.cmar.csiro.au/

BugReports https://github.com/AustralianAntarcticDivision/rbgm/issues/

VignetteBuilder knitr

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R topics documented:

`rbgm-package` *Utilities for BGM files for Atlantis*

Description

Tools for handling network data for Atlantis from box-geometry model (BGM) files

rbgm features

- read .bgm files and faithfully store all information so it can be round-tripped
- conversion from .bgm forms to Spatial classes (lines and polygons)
- (not yet implemented: write to .bgm)

I. Import

`bgmfile`	read directly from a .bgm file

II. Conversion

`boxSpatial`	convert boxes to a `SpatialPolygonsDataFrame`
`faceSpatial`	convert faces to a `SpatialLinesDataFrame`
`boundarySpatial`	convert boundary to a single-row `SpatialPolygonsDataFrame`
`nodeSpatial`	obtain all vertices as points
`pointSpatial`	obtain all instances of vertices as points

III. Miscellaneous

`build_dz`	Build Atlantis dz Values

bgmfile *Read BGM*

Description

Read geometry and full topology from BGM files.

Usage

```
bgmfile(x, ...)
```

Arguments

x	path to a bgm file
...	ignored for now

Details

BGM is a file format used for the 'Box Geometry Model' in the Atlantis Ecosystem Model. This function reads everything from the .bgm file and returns it as linked tables.

See Also

See helper functions to convert the bgm tables to 'Spatial' objects, boxSpatial, faceSpatial, nodeSpatial, boundarySpatial, pointSpatial

Examples

```
library(bgmfiles)
bfile <- sample(bgmfiles(), 1L)
bgm <- bgmfile(bfile)
library(tibble)
bgm
```

boxSpatial *Convert to Spatial*

Description

Take the output of bgmfile and return a Spatial object.

Usage

```
boxSpatial(bgm)

boundarySpatial(bgm)

faceSpatial(bgm)
```

Arguments

bgm	output of a BGM file, as returned by bgmfile

Value

Spatial* object

- boxSpatial SpatialPolygonsDataFrame
- faceSpatial SpatialLinesDataFrame
- boundarySpatial SpatialPolygonsDataFrame

Examples

```
fname <- bgmfiles::bgmfiles(pattern = "antarctica_28")
bgm <- bgmfile(fname)
spdf <- boxSpatial(bgm)
sldf <- faceSpatial(bgm)

plot(boxSpatial(bgm), col = grey(seq(0, 1, length = nrow(bgm$boxes))))
plot(faceSpatial(bgm), col = rainbow(nrow(bgm$faces)), lwd = 2,  add = TRUE)
```

build_dz *Build Atlantis dz Values*

Description

Build dz layer values for Atlantis from a bottom value, up through successive intervals. Each value is the positive offset required to rise to the top of the current interval.

Usage

```
build_dz(z, zlayers = c(-Inf, -2000, -1000, -750, -400, -300, -200, -100, -50,
  -20, 0))
```

Arguments

z	lowermost value
zlayers	intervals of layer values

Details

Offset values are returned to move from z against the intervals in zlayers. The intervals are assumed to be sorted and increasing in value from -Infinity. Once the maximum layer is reached the result is padded by that top value.

Value

numeric vector of offset values

Examples

```
## sanity tests
build_dz(-5000)
build_dz(-1500)
##build_dz(300)  ## error
build_dz(0)    ## ok
## data
dd <- c(-4396.49, -2100.84, -4448.81, -411.96, -2703.56, -5232.96,
       -4176.25, -2862.37, -3795.6, -1024.64, -897.93, -1695.82, -4949.76,
    -5264.24, -2886.81)
## all values in a matrix for checking
## [zlayers, dd]
dzvals <- sapply(dd, build_dz)
## process into text
f1 <- function(x) sprintf("somelabel,%i,%s", x, paste(build_dz(dd[x]), collapse = ","))
tex1 <- sapply(seq(length(dd)),  f1)
## for example
f2 <- function(x) {
sprintf("morelabel,%i,%s", x, paste(as.integer(build_dz(dd[x])), collapse = ","))
}
tex2 <- sapply(seq(length(dd)),  f2)
```

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nodeSpatial *Vertices as Spatial points.*

Description

Obtain all vertices as a SpatialPointsDataFrame.

Usage

```
nodeSpatial(bgm)

pointSpatial(bgm)
```

Arguments

bgm	BGM object from bgmfile

Details

Nodes are the unique coordinates (or vertices), points are the instances of those coordinates that exist in the model. pointSpatial returns all instances of the vertices with information about which boxes they belong to. nodeSpatial returns all vertices.

Value

SpatialPointsDataFrame

Examples

```
fname <- bgmfiles::bgmfiles(pattern = "antarctica_28")
bgm <- bgmfile(fname)
spnode <- nodeSpatial(bgm)
names(spnode)
nrow(spnode)  ## only unique vertices
nrow(bgm$vertices)

sppoints <- pointSpatial(bgm)
names(sppoints)
nrow(sppoints)
```

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