

# Package ‘belg’

March 24, 2018

**Title** Boltzmann Entropy of a Landscape Gradient

**Version** 0.2.1

**Description** Calculates the Boltzmann entropy of a landscape gradient.

It uses the analytical method created by Gao, P., Zhang, H. and Li, Z., 2018  
(<doi:10.1111/tgis.12315>).

**License** MIT + file LICENSE

**Encoding** UTF-8

**LazyData** true

**ByteCompile** true

**RoxygenNote** 6.0.1.9000

**Depends** R (>= 3.3.0)

**LinkingTo** Rcpp, RcppArmadillo

**Imports** Rcpp

**Suggests** testthat, sp, raster, covr, knitr, rmarkdown, ggplot2,  
rasterVis

**URL** <https://github.com/Nowosad/belg>

**BugReports** <https://github.com/Nowosad/belg/issues>

**VignetteBuilder** knitr

**NeedsCompilation** yes

**Author** Jakub Nowosad [aut, cre] (<<https://orcid.org/0000-0002-1057-3721>>),  
Space Informatics Lab [cph]

**Maintainer** Jakub Nowosad <[nowosad.jakub@gmail.com](mailto:nowosad.jakub@gmail.com)>

**Repository** CRAN

**Date/Publication** 2018-03-24 14:13:29 UTC

## R topics documented:

belg . . . . .	2
complex_land . . . . .	2
get_boltzmann . . . . .	2
simple_land . . . . .	4

**Index****5**

---

belg	<i>belg</i>
------	-------------

---

**Description**

Description of your package

---

complex_land	<i>Complex landscape</i>
--------------	--------------------------

---

**Description**

A dataset containing artificial complex landscape

**Usage**

```
complex_land
```

**Format**

An object of class RasterLayer of dimension 3 x 8 x 1.

---

get_boltzmann	<i>Boltzmann entropy of a landscape gradient</i>
---------------	--

---

**Description**

Calculates the Boltzmann entropy of a landscape gradient

**Usage**

```
get_boltzmann(x, base = "log10", relative = FALSE)
```

```
## Default S3 method:
```

```
get_boltzmann(x, base = "log10", relative = FALSE)
```

```
## S3 method for class 'array'
```

```
get_boltzmann(x, base = "log10", relative = FALSE)
```

```
## S3 method for class 'RasterLayer'
```

```
get_boltzmann(x, base = "log10", relative = FALSE)
```

```
## S3 method for class 'RasterStack'
```

```
get_boltzmann(x, base = "log10", relative = FALSE)

## S3 method for class 'RasterBrick'
get_boltzmann(x, base = "log10", relative = FALSE)
```

### Arguments

x	RasterLayer, RasterStack, RasterBrick, matrix, or array
base	A logarithm base ("log", "log2" or "log10")
relative	TRUE/FALSE

### Details

The method for computing the Boltzmann entropy of a landscape gradient works on integer values that are either positive or equals to zero. This function automatically rounds values to the nearest integer value (rounding halfway cases away from zero) and negative values are shifted to positive values.

### Value

a numeric vector

### References

Gao, Peichao, Hong Zhang, and Zhilin Li. "A hierarchy-based solution to calculate the configurational entropy of landscape gradients." *Landscape Ecology* 32.6 (2017): 1133-1146.

Gao, Peichao, Hong Zhang, and Zhilin Li. "An efficient analytical method for computing the Boltzmann entropy of a landscape gradient." *Transactions in GIS* (2018).

### Examples

```
new_c = c(56, 86, 98, 50, 45, 56, 96, 25,
          15, 55, 85, 69, 12, 52, 25, 56,
          32, 25, 68, 98, 58, 66, 56, 58)

lg = matrix(new_c, nrow = 3, ncol = 8, byrow = TRUE)
get_boltzmann(lg, relative = FALSE, base = "log10")
get_boltzmann(lg, relative = TRUE, base = "log2")
get_boltzmann(lg, relative = TRUE, base = "log")
```

---

`simple_land`*Simple landscape*

---

**Description**

A dataset containing artificial simple landscape

**Usage**

```
simple_land
```

**Format**

An object of class RasterLayer of dimension 3 x 8 x 1.

# Index

## \*Topic **datasets**

complex\_land, 2

simple\_land, 4

belg, 2

belg-package (belg), 2

complex\_land, 2

get\_boltzmann, 2

simple\_land, 4