

# Package ‘regional’

May 9, 2026

**Title** Intra- and Inter-Regional Similarity

**Version** 0.4.4

**Description** Calculates intra-regional and inter-regional similarities based on user-provided spatial vector objects (regions) and spatial raster objects (cells with values). Implemented metrics include inhomogeneity, isolation (Haralick and Shapiro (1985) <[doi:10.1016/S0734-189X\(85\)90153-7](https://doi.org/10.1016/S0734-189X(85)90153-7)>, Jasiewicz et al. (2018) <[doi:10.1016/j.cageo.2018.06.003](https://doi.org/10.1016/j.cageo.2018.06.003)>), and distinction (Nowosad (2021) <[doi:10.1080/13658816.2021.1893324](https://doi.org/10.1080/13658816.2021.1893324)>).

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**Encoding** UTF-8

**RoxygenNote** 7.3.1

**Imports** phylentropy (>= 0.6.0), terra

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

**URL** <https://jakubnowosad.com/regional/>

**Suggests** supercells, sf, testthat (>= 3.0.0), covr, proxy, dtwclust

**Config/testthat/edition** 3

**NeedsCompilation** no

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**Repository** CRAN

**Date/Publication** 2024-05-09 14:00:03 UTC

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reg_distinction	<i>Distinction</i>
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### Description

Distinction is an average distance between the focus region and all of the other regions. This value is between 0 and 1, where large value indicates that the values in the region stands out from the other regions.

### Usage

```
reg_distinction(
  region,
  raster,
  dist_fun = "euclidean",
  sample_size = 1,
  unit = "log2",
  na.rm = FALSE,
  ...
)
```

### Arguments

region	An object of class <i>sf</i> with a POLYGON or MULTIPOLYGON geometry type
raster	An object of class <i>SpatRaster</i> ( <i>terra</i> )
dist_fun	Distance measure used. This function uses <code>philentropy::distance</code> (run <code>philentropy::getDistMethods</code> to find possible distance measures) or <code>proxy::dist</code> (run <code>names(proxy::pr_DB\$get_entries())</code> to find possible distance measures) in the background. It is also possible to use "dtw" (dynamic time warping)
sample_size	Proportion of the cells inside of each region to be used in calculations. Value between 0 and 1. It is also possible to specify an integer larger than 1, in which case the specified number of cells of each region will be used in calculations.
unit	a character string specifying the logarithm unit that should be used to compute distances that depend on log computations.
na.rm	Whether NA values should be stripped from the calculations.
...	Additional arguments for <code>philentropy::dist_one_one</code> , <code>proxy::dist</code> , or <code>dtwclust::dtw_basic</code> . When <code>dist_fun = "dtw"</code> is used, <code>ndim</code> should be set to specify how many dimension the input raster time-series has.

### Value

A vector with the distinction values

**Examples**

```
## Not run:
library(terra)
if (requireNamespace("sf", quietly = TRUE)) {
  library(sf)
  volcano = rast(system.file("raster/volcano.tif", package = "regional"))
  vr = read_sf(system.file("regions/volcano_regions.gpkg", package = "regional"))
  vr$dis = reg_distinction(vr, volcano, sample_size = 0.5)

  mean(vr$dis)

  plot(volcano)
  plot(vect(vr), add = TRUE)
  plot(volcano)
  plot(vr["dis"], add = TRUE)
}

## End(Not run)
```

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reg_inhomogeneity	<i>Inhomogeneity</i>
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**Description**

Inhomogeneity measures a degree of mutual dissimilarity between values of all cells in a region. This value is between 0 and 1, where small value indicates that values of all cells in the region represent consistent patterns so the cluster is pattern-homogeneous.

**Usage**

```
reg_inhomogeneity(
  region,
  raster,
  dist_fun = "euclidean",
  sample_size = 1,
  unit = "log2",
  na.rm = FALSE,
  ...
)
```

**Arguments**

region	An object of class <code>sf</code> with a POLYGON or MULTIPOLYGON geometry type
raster	An object of class <code>SpatRaster</code> (terra)
dist_fun	Distance measure used. This function uses <code>philentropy::distance</code> (run <code>philentropy::getDistMethods</code> to find possible distance measures) or <code>proxy::dist</code> (run <code>names(proxy::pr_DB\$get_entries())</code> to find possible distance measures) in the background. It is also possible to use "dtw" (dynamic time warping)

sample_size	Proportion of the cells inside of each region to be used in calculations. Value between 0 and 1. It is also possible to specify an integer larger than 1, in which case the specified number of cells of each region will be used in calculations.
unit	A character string specifying the logarithm unit that should be used to compute distances that depend on log computations.
na.rm	Whether NA values should be stripped from the calculations.
...	Additional arguments for <code>philentropy::dist_one_one</code> , <code>proxy::dist</code> , or <code>dtwclust::dtw_basic</code> . When <code>dist_fun = "dtw"</code> is used, <code>ndim</code> should be set to specify how many dimension the input raster time-series has.

### Value

A vector with the inhomogeneity values

### Examples

```
## Not run:
library(terra)
if (requireNamespace("sf", quietly = TRUE)) {
  library(sf)
  volcano = rast(system.file("raster/volcano.tif", package = "regional"))
  vr = read_sf(system.file("regions/volcano_regions.gpkg", package = "regional"))
  vr$inh = reg_inhomogeneity(vr, volcano, sample_size = 1)

  mean(vr$inh)

  plot(volcano)
  plot(vect(vr), add = TRUE)
  plot(volcano)
  plot(vr["inh"], add = TRUE)
}

## End(Not run)
```

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reg\_isolation

*Isolation*

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### Description

Isolation is an average distance between the focus region and all of its neighbors. This value is between 0 and 1, where large value indicates that values of the region stands out from its surroundings.

**Usage**

```
reg_isolation(
  region,
  raster,
  dist_fun = "euclidean",
  sample_size = 1,
  unit = "log2",
  na.rm = FALSE,
  ...
)
```

**Arguments**

region	An object of class <code>sf</code> with a POLYGON or MULTIPOLYGON geometry type
raster	An object of class <code>SpatRaster</code> (terra)
dist_fun	Distance measure used. This function uses <code>philentropy::distance</code> (run <code>philentropy::getDistMethods</code> to find possible distance measures) or <code>proxy::dist</code> (run <code>names(proxy::pr_DB\$get_entries())</code> to find possible distance measures) in the background. It is also possible to use "dtw" (dynamic time warping)
sample_size	Proportion of the cells inside of each region to be used in calculations. Value between 0 and 1. It is also possible to specify an integer larger than 1, in which case the specified number of cells of each region will be used in calculations.
unit	a character string specifying the logarithm unit that should be used to compute distances that depend on log computations.
na.rm	Whether NA values should be stripped from the calculations.
...	Additional arguments for <code>philentropy::dist_one_one</code> , <code>proxy::dist</code> , or <code>dtwclust::dtw_basic</code> . When <code>dist_fun = "dtw"</code> is used, <code>ndim</code> should be set to specify how many dimension the input raster time-series has.

**Value**

A vector with the isolation values

**Examples**

```
## Not run:
library(terra)
if (requireNamespace("sf", quietly = TRUE)) {
  library(sf)
  volcano = rast(system.file("raster/volcano.tif", package = "regional"))
  vr = read_sf(system.file("regions/volcano_regions.gpkg", package = "regional"))
  vr$iso = reg_isolation(vr, volcano, sample_size = 1)

  mean(vr$iso)

  plot(volcano)
  plot(vect(vr), add = TRUE)
  plot(volcano)
```

```
    plot(vr["iso"], add = TRUE)  
  }  
## End(Not run)
```

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