

# Package ‘rbias’

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**Title** Create a bias surface

**Version** 0.1

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**Description** This packages creates bias surfaces (see Kempf et al. forthcoming) based on polygon data. It uses FuzzyLandscapes package to define fuzzy membership functions that translates the distance to the bias-causing feature into values that mirror the degree of influence (from 0 = no influence to 1 = determining influence) on objects discovered around the polygons.

**Imports** terra,  
sf,  
data.table,  
FuzzyLandscapes,  
jsonlite

**License** GPL (>= 3)

**Encoding** UTF-8

**LazyData** true

**Roxygen** list(markdown = TRUE)

**RoxygenNote** 7.2.1

**Suggests** rmarkdown,  
knitr

**VignetteBuilder** knitr

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bias_influence	<i>bias_influence</i>
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### Description

Create a raster with fuzzy values of bias influences outside a defined range of bias influence

### Usage

```
bias_influence(bias_raster, range, type)
```

### Arguments

bias_raster	raster/terra object with distance to bias-features
range	a vector indicating the range of bias influence; length depends on the chosen type
type	a string indicating the shape of the fuzzy-influence function. One of: "trapezoid", "bell", "triangle". see FuzzyLandscapes::fl_create_ras for further information

### Value

a list

### Author(s)

Daniel Knitter

### Examples

```
## Not run:
tmp1 <- bias_surface("osm_data/osm_data_dissolved.gpkg", cellsize = 500)
tmp2 <- bias_influence(tmp1,
  range = c(1e-2, 1, 1e-2, 0),
  type = "bell")
FuzzyLandscapes::plot_fs(tmp2, xrange = c(0, 3000))

## End(Not run)
```

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bias_surface	<i>bias_surface</i>
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### Description

Create a bias surface raster

### Usage

```
bias_surface(bias, targetraster = NULL, cellsize)
```

**Arguments**

<code>bias</code>	filepath to vect object (see terra package) or an sf-R object
<code>targetraster</code>	default NULL; raster to be used as template for distance raster
<code>cellsize</code>	pixel size of the raster to be created; not used when targetraster is given; CRS and extent information are taken from bias vect object

**Value**

a SpatRast from terra package

**Author(s)**

Daniel Knitter

**Examples**

```
## Not run:
tmp <- bias_surface(bias = "osm_data/osm_data_dissolved.gpkg",
                   cellsize = 500)
terra::plot(tmp)

## End(Not run)
```

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dissolve\_osmdata

*dissolve\_osmdata*


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**Description**

Dissolve osmdata into "build up" areas for predefined layers of interest

**Usage**

```
dissolve_osmdata(
  osmdata_path,
  lois = c("landuse_a", "railways", "roads"),
  crs,
  targetdir = NULL
)
```

**Arguments**

<code>osmdata_path</code>	a strings; file.path where vector data is stored
<code>lois</code>	vector of strings
<code>crs</code>	epsg code of a projected coordinate system
<code>targetdir</code>	optional; if given, store a geopackage object at the defined path

**Value**

a geopackage

**Author(s)**

Daniel Knitter

**Examples**

```
## Not run:
tmp <- dissolve_osmdata(osmdata_path = "osm_data",
                        crs = 32632)

## End(Not run)
```

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download\_data

*download\_data*

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**Description**

internal function to download osmdata from geofabrik-urls and unzips these into a defined folder

**Usage**

```
download_data(osmurl, targetpath)
```

**Arguments**

osmurl	geofabrik url
targetpath	a string. Directory where the data should be stored

**Value**

nothing

**Author(s)**

Daniel Knitter

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download\_geofabrik\_data

*download\_geofabrik\_data*

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**Description**

downloads geofabrik data for an area into a target folder

**Usage**

```
download_geofabrik_data(area, targetpath)
```

**Arguments**

area	string
targetpath	targetpath e.g. created using file.path;

**Value**

message if successful

**Author(s)**

Daniel Knitter

**Examples**

```
## Not run:  
targetpath <- "osm_data"  
area <- "Baden-Württemberg"  
download_geofabrik_data(area, targetpath)  
  
## End(Not run)
```

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<i>get_geofabrik_url</i>	<i>get_geofabrik_url</i>
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**Description**

internal function that returns geofabrik urls for defined areas

**Usage**

```
get_geofabrik_url(area)
```

**Arguments**

area	string of the area of interest to be downloaded
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**Value**

string(s) of url(s)

**Author(s)**

Daniel Knitter

**Examples**

```
## Not run:  
get_geofabrik_url("Baden-Württemberg")  
  
## End(Not run)
```

Sites vs background is a function to create frequency plots for covariate at sampling locations. Background is simulated as random sampling process.

```
sites_vs_background(  
  covariate,  
  sites,  
  nsim = 999,  
  covariate_name = names(covariate)  
)
```

covariate	a raster object
sites	points in form of an sf or sp object
nsim	number of simulations, default 999
covariate_name	name of the covariate. default: layername of raster object

a named list

Daniel Knitter, Miguel Carrero, Gerrit Günther; based upon Kyle Bocinsky (<https://benmarwick.github.io/How-To-Do-Archaeological-Science-Using-R/landscape-based-hypothesis-testing-in-r.html#reading-site-locations-from-a-table-and-cropping-to-a-study-area>)

```
## Not run:
targetdir <- file.path("data","derived_data")
base_raster_name <- file.path(targetdir, "dem.tif")
dem <- raster::raster(base_raster_name)
sites <- sf::st_read(file.path(targetdir, "shkr.gpkg"))

sites_vs_background(sites = sites,
                    covariate = dem,
                    nsim = 20)

## End(Not run)
```

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sites\_vs\_background\_plot  
*sites\_vs\_background\_plot*

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**Description**

Sites vs background plot is a function to create a predefined plot of the results (as a list) derived from the sites\_vs\_background function

**Usage**

```
sites_vs_background_plot(simulation_results)
```

**Arguments**

simulation\_results  
list derived from results of the sites\_vs\_background function

**Value**

a plot

**Author(s)**

Daniel Knitter, Miguel Carrero, Gerrit Günther; based upon Kyle Bocinsky (<https://benmarwick.github.io/How-To-Do-Archaeological-Science-Using-R/landscape-based-hypothesis-testing-in-r.html#reading-site-locations-from-a-table-and-cropping-to-a-study-area>)

**Examples**

```
## Not run:
targetdir <- file.path("data", "derived_data")
base_raster_name <- file.path(targetdir, "dem.tif")
dem <- raster::raster(base_raster_name)
sites <- sf::st_read(file.path(targetdir, "shkr.gpkg"))

simulation <- sites_vs_background(sites = sites,
                                covariate = dem,
                                nsim = 20)

sites_vs_background_plot(simulation_results)

## End(Not run)
```

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