SILand
R package for estimating
the spatial influence of
landscape

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Aim: Estimating the influence of the landscape

Problem:
- Observations:
  - geolocated
  - measurements (e.g. abundance of a specie)
- Landscape
  - geolocated variable (e.g. presence of field)
  - one or several
- Local variables (e.g. local treatment)

SILand, a user-friendly tool from import to results map.
Aim : Estimating the influence of the landscape

Problem:

▶ Observations:
  ▶ geolocated measurements (eg. abundance of a specie)

▶ Landscape
  ▶ geolocated variable (eg. presence of field)

▶ Local variables (eg. local treatment)

SILand, a user-friendly tool from import to results map.

*data from Ricci et al. 2009*
Model 1: Buffer model

Point observations

Landscape effects estimate:

- effect intensity
- buffer radius
Model 1: Buffer model

Point observations

Landscape effects estimate:
- effect intensity
- buffer radius

Polygonal observation
**Siland: Data Import**

Data imported directly from shapefiles

```r
library(siland)

dataCmoth = data.gis(dsn="./GIS", layer="dataCarpo", varname=c("Cmoth","trait"))

landCmoth = land.gis(dsn="./GIS", layer="landCarpo", varname="OrgConv", landname = c("conv","org"), wd=40)
```
Buffer model: Writing and Estimation

Model in a lm-like syntax

resPoint = Bsiland(\text{Cmoth} \sim \text{trait} + \text{Conv} + \text{Org},
\text{data} = \text{dataCmoth}, \text{land} = \text{landCmoth},
\text{border} = \text{F})

\text{summary(resPoint)}

## Dist.Conv  Dist.Org
## 354.78245  57.75109

##  Estimates  Std  tval  Pval  signif
## (Intercept)  4.29  2.53  1.69  0.10  .
## trait        0.11  0.20  0.54  0.59  
## Conv        -11.30  4.27 -2.65  0.01  *
## Org         19.27  4.54  4.24  0.00  ***
Buffer model: Writing and Estimation

Model in a lm-like syntax

Point data

```r
resPoint = Bsiland(Cmoth ~ trait + Conv + Org,
data = dataCmoth, land = landCmoth,
border = F)

summary(resPoint)
```

```r
## Dist.Conv  Dist.Org
## 354.78245  57.75109
```

```r
## (Intercept)   4.29  2.53 1.69 0.10 .
## trait         0.11  0.20 0.54 0.59
## Conv          -11.30 4.27 -2.65 0.01 *
## Org           19.27  4.54  4.24 0.00 ***
```

Polygon data

```r
resPol = Bsiland(Cmoth ~ trait + Conv + Org,
data = dataCmoth, land = landCmoth,
border = T)

summary(resPol)
```

```r
## Dist.Conv  Dist.Org
##  20.10367  127.44589
```

```r
## (Intercept)  2.00  2.13  0.94 0.35
## trait        0.10  0.17  0.57 0.57
## Conv         -4.63 3.44 -1.35 0.18
## Org          71.90 12.08  5.95 0.00 ***
```
Graphical output: First landscape variable effect

Point data

```r
graphPoint = plotBsiland.land(res = resPoint, var = 1, land = landCmoth, border = F)
```

![Point data graph]

Polygon data

```r
graphPol = plotBsiland.land(res = resPol, var = 1, land = landCmoth, border = T)
```

![Polygon data graph]
Graphical output: Second landscape variable effect

**Point data**

```r
graphPoint = plotBsiland.land(res=resPoint, var=2, land=landCmoth, border=F)
```

**Polygon data**

```r
graphPol = plotBsiland.land(res=resPol, var=2, land=landCmoth, border=T)
```
Model 2: Spatial Influence Function (SIF) based model
Model 2: Spatial Influence Function (SIF) based model
Estimation

\begin{verbatim}
resSIF = siland(loc.model = Cmoth ~ trait,
                land = landCmoth, data = dataCmoth, test = T)
summary(resSIF)
\end{verbatim}

## Coefficients:
## (Intercept)   trait   conv   org  
##    11.0818  -0.1145  -50.7619  86.9974  

## pvalue (L.R. Test):
## trait   conv   org  
##    5.048e-01  1.818e-03  2.079e-07  

## AIC: 331.28  AIC (no landscape): 364.79  
## (No landscape effect) p-value: 2.113485e-08

\begin{verbatim}
plotsiland(resSIF, landCmoth, dataCmoth)
\end{verbatim}
Graphical outputs:

Maps of landscape variable effects

Landscape Var 1  Landscape Var 2  Global effect
Available on

- CRAN
- https://github.com/silandpackage/siland

SILand project is still in progress.

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Thank you for your attention