# IBGE Data

```r
library(geobr)
```

```
## Loading required namespace: sf
```

```r
packageVersion("geobr")
```

```
## [1] '1.9.0'
```

```r
library(sf)
```

```
## Warning: package 'sf' was built under R version 4.3.3
```

```
## Linking to GEOS 3.11.2, GDAL 3.8.2, PROJ 9.3.1; sf_use_s2() is TRUE
```

```r
packageVersion("sf")
```

```
## [1] '1.0.16'
```

## Biome data

```r
biomes <- read_biomes(
  year = 2019,
  simplified = FALSE,
  showProgress = FALSE
  )
```

```
## Using year/date 2019
```

```r
st_is_valid(biomes)
```

```
## [1] FALSE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE
```

```r
st_is_valid(biomes, reason = TRUE)
```

```
## [1] "Loop 114: Edge 168413 crosses edge 168418"
## [2] "Valid Geometry"
## [3] "Valid Geometry"
## [4] "Valid Geometry"
## [5] "Valid Geometry"
## [6] "Valid Geometry"
## [7] "Valid Geometry"
```

## Intersection with municipalities

```r
mun <- read_municipality(
  code_muni = "all",
  year = 2017,
  simplified = FALSE,
```

```
    showProgress = FALSE
    )
```

## Using year/date 2017

```
st_intersects(
    mun,
    biomes,
    sparse = FALSE
    )
```

## Error in wk_handle.wk_wkb(wkb, s2_geography_writer(oriented = oriented, : Loop 114 is not valid: Edg

## We can try to make it valid.

```
valid_biomes <- st_make_valid(
  biomes
  )
```

## Is it valid now?

```
st_is_valid(valid_biomes, )
```

## [1] FALSE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE

## Not quite. Same loop, but the edge crossing changed though:

```
st_is_valid(valid_biomes, reason = TRUE)
```

```
## [1] "Loop 114: Edge 168410 crosses edge 168415"
## [2] "Valid Geometry"
## [3] "Valid Geometry"
## [4] "Valid Geometry"
## [5] "Valid Geometry"
## [6] "Valid Geometry"
## [7] "Valid Geometry"
```