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The R Graph Gallery

Inspiration and Help with R Graphics

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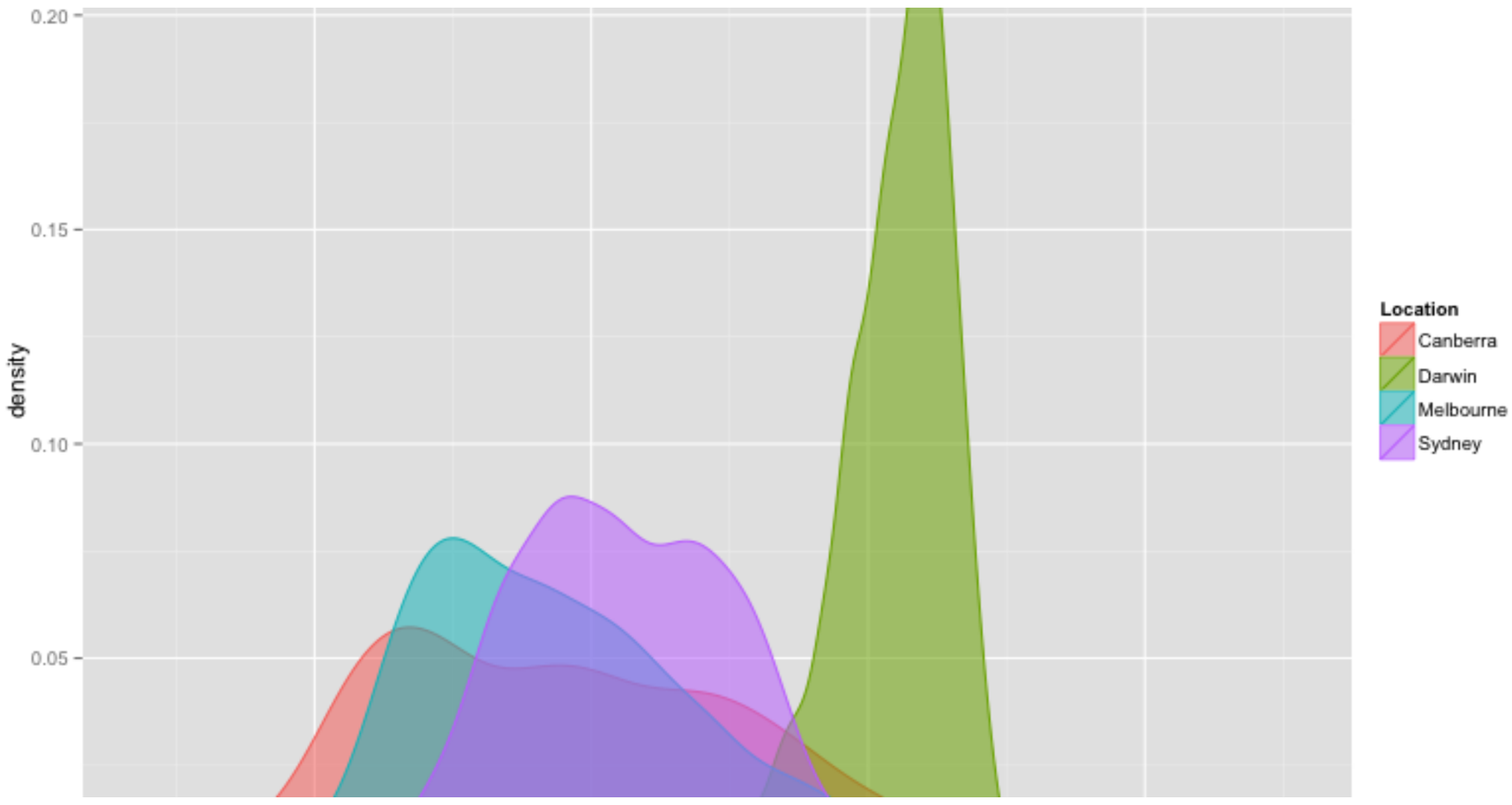
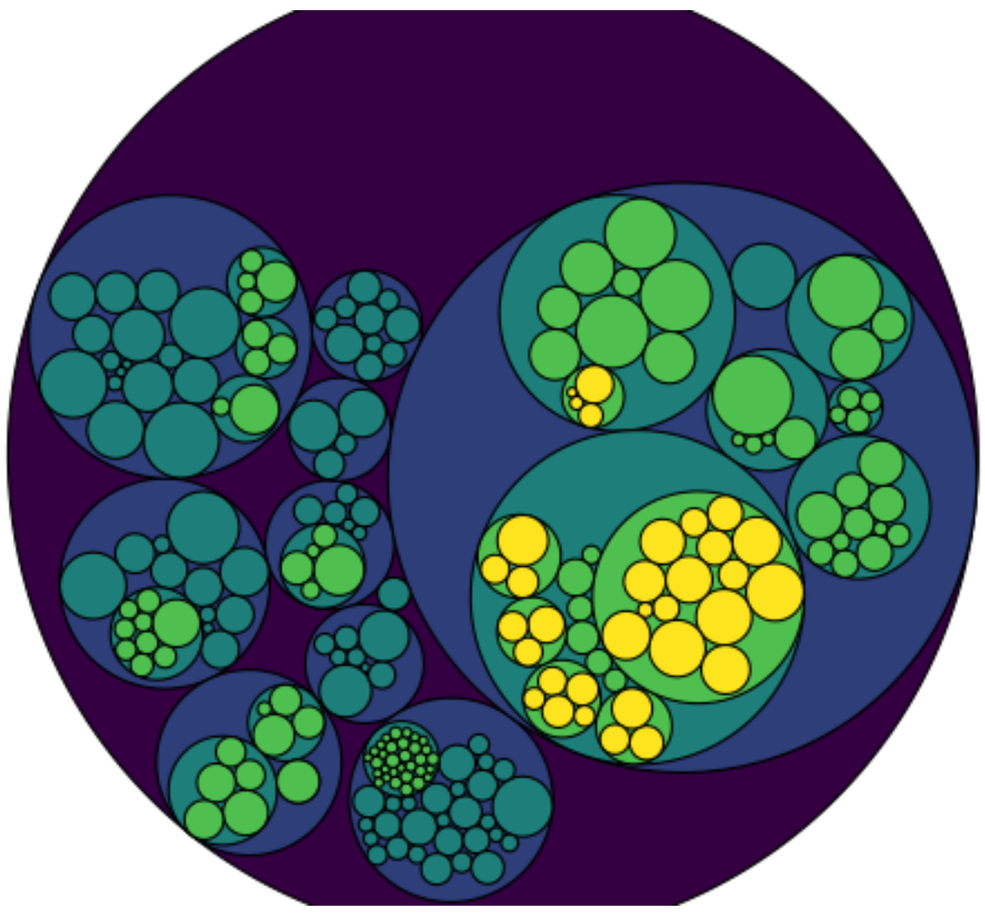
ART FROM DATA

September 2, 2015February 9, 2018 | Holtz



General Ggplot2 Tips

September 1, 2014March 13, 2018 | Holtz



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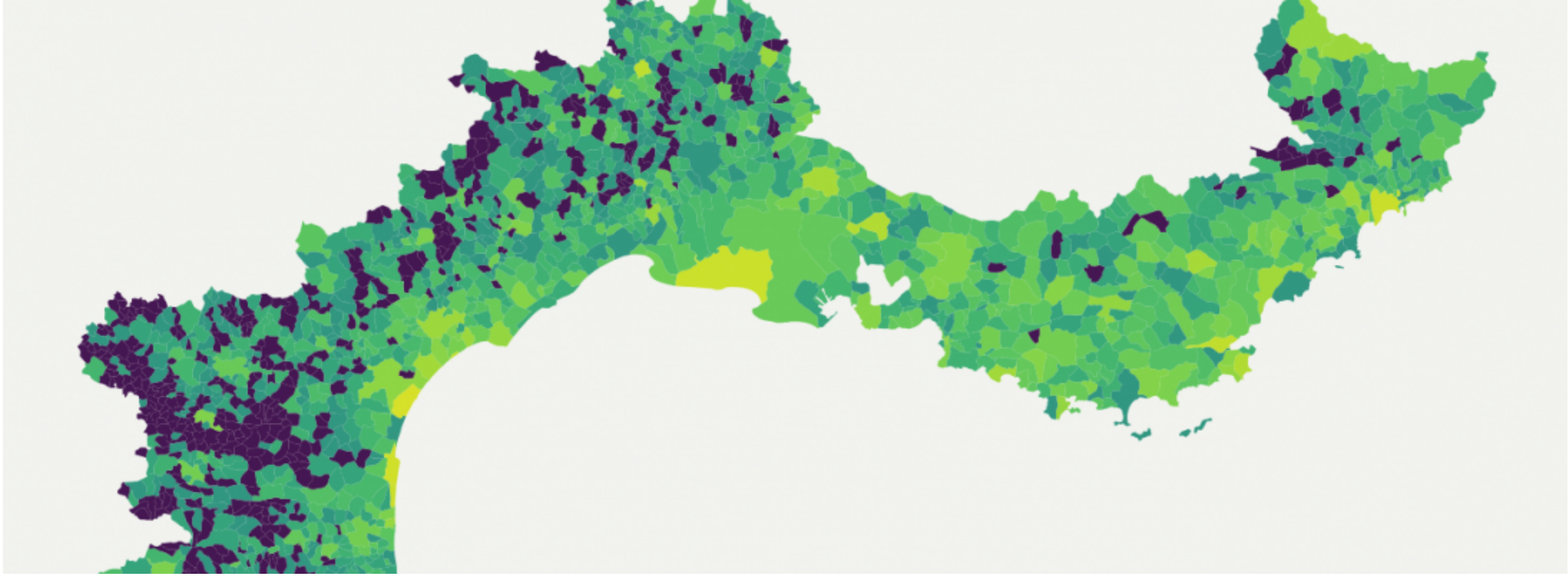
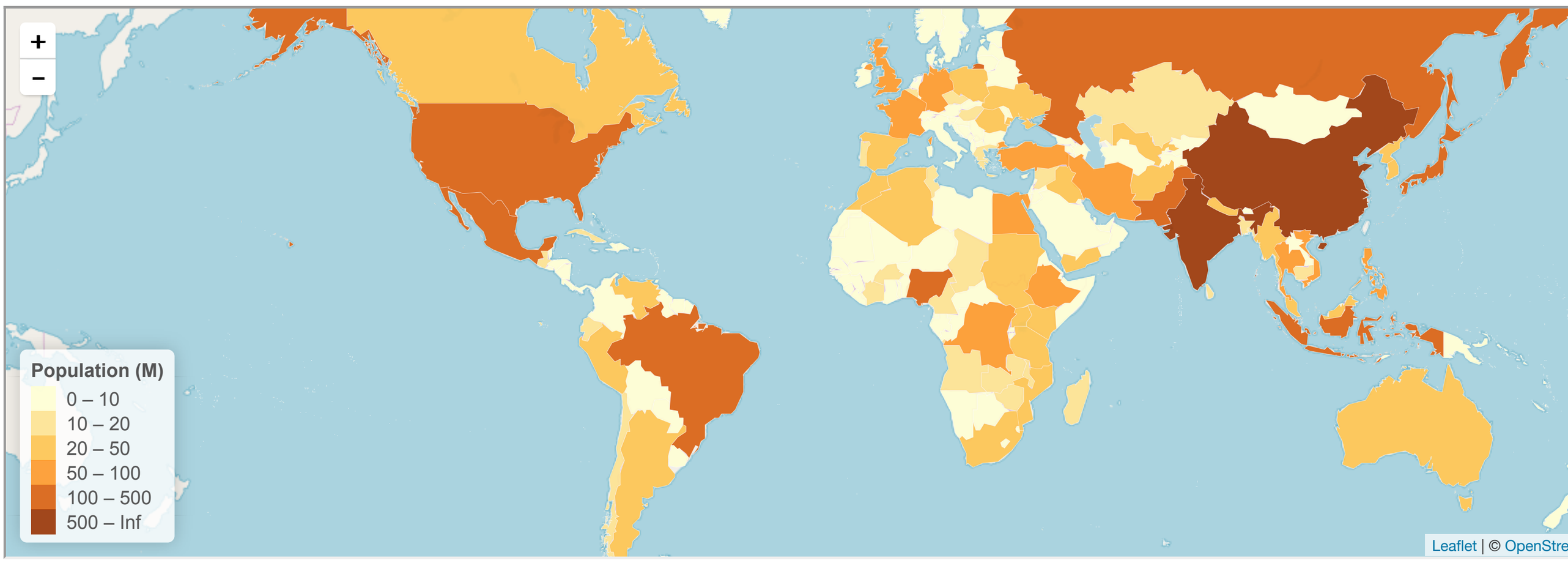
- 

Choropleth map with ggplot2

December 7, 2000April 28, 2018 | Holtz

#183 Choropleth map with leaflet



How to do a choropleth map with the leaflet library.

0 – Introduction

This page aims to describe how to realise an interactive choropleth map with the leaflet library of R. Note that you can zoom and hover country to have more information.

First we need to to load the shape file of the world map to know the border position of every country. See graph #168 to have a complete description of this step. We can summarize this step with these 4 lines of code:

```
# Download .shp file on the web:
```

```
1
2 # Download .shp file on the web:
3 download.file("http://thematicmapping.org/downloads/TM_WORLD_BORDERS_SIMPL-0.3.zip" , destfile="world_shape_file.zip")
```

```
4 system("unzip world_shape_file.zip")
5
6 # Read the file with the rgdal library in R
7 library(rgdal)
8 world_spdf=readOGR( dsn= getwd() , layer="TM_WORLD_BORDERS_SIMPL-0.3")
9
```

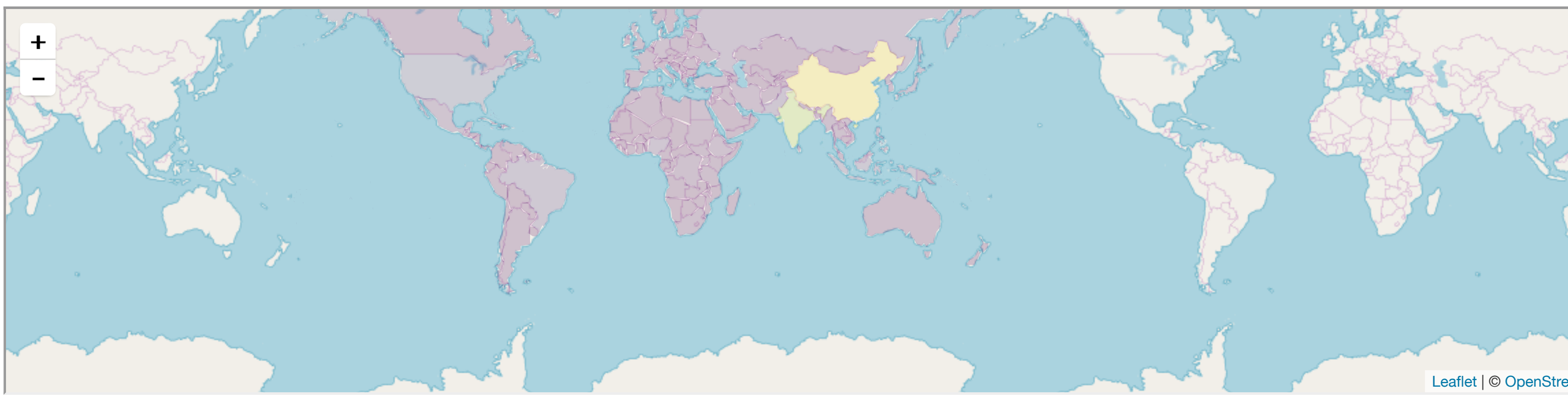
The world_spdf object contains the coordinates of the countries borders. It also contains the population size in 2005. You can see it in the *world_spdf@data* dataframe. With these 2 information we can draw a first basic choropleth map.

```
# Look at the info provided
with the geospatial object
```

```
1
2 # Look at the info provided with the geospatial object
3 head(world_spdf@data)
4 summary(world_spdf@data)
5
6 # Modify these info
7 world_spdf@data$POP2005[ which(world_spdf@data$POP2005 == 0)] = NA
8 world_spdf@data$POP2005 = as.numeric(as.character(world_spdf@data$POP2005)) / 1000000 %>% round(2)
9
```

1 – Default choropleth

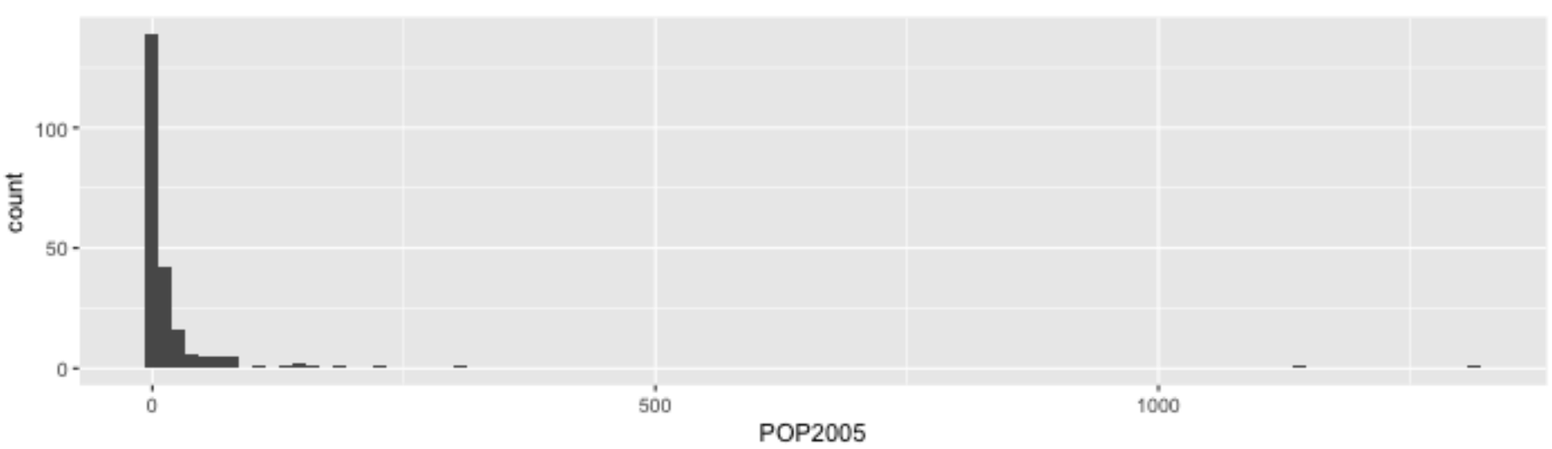
With these information we can draw a first basic choropleth map. We first need to create a color palette, and then use addPolygons() to add the shape of all country, with a color representing the number of people in the country. The result is quite disappointing! Since China and India have extremely high population, all the variation between countries is absorbed.. We need to fix that.




```
# Create a color palette for
the map:
```

```
1
2  # Create a color palette for the map:
3  mypalette = colorNumeric( palette="viridis", domain=world_spdf@data$POP2005, na.color="transparent")
4  mypalette(c(45,43))
5
6  # Basic choropleth with leaflet?
7  leaflet(world_spdf) %>%
8    addTiles()  %>%
9    setView( lat=10, lng=0 , zoom=2) %>%
10   addPolygons( fillColor = ~mypalette(POP2005), stroke=FALSE )
11
```

And here is the histogram of the population per country. It is a good practice to check this distribution when you make a choropleth. It helps to understand how your color palette should be implemented.

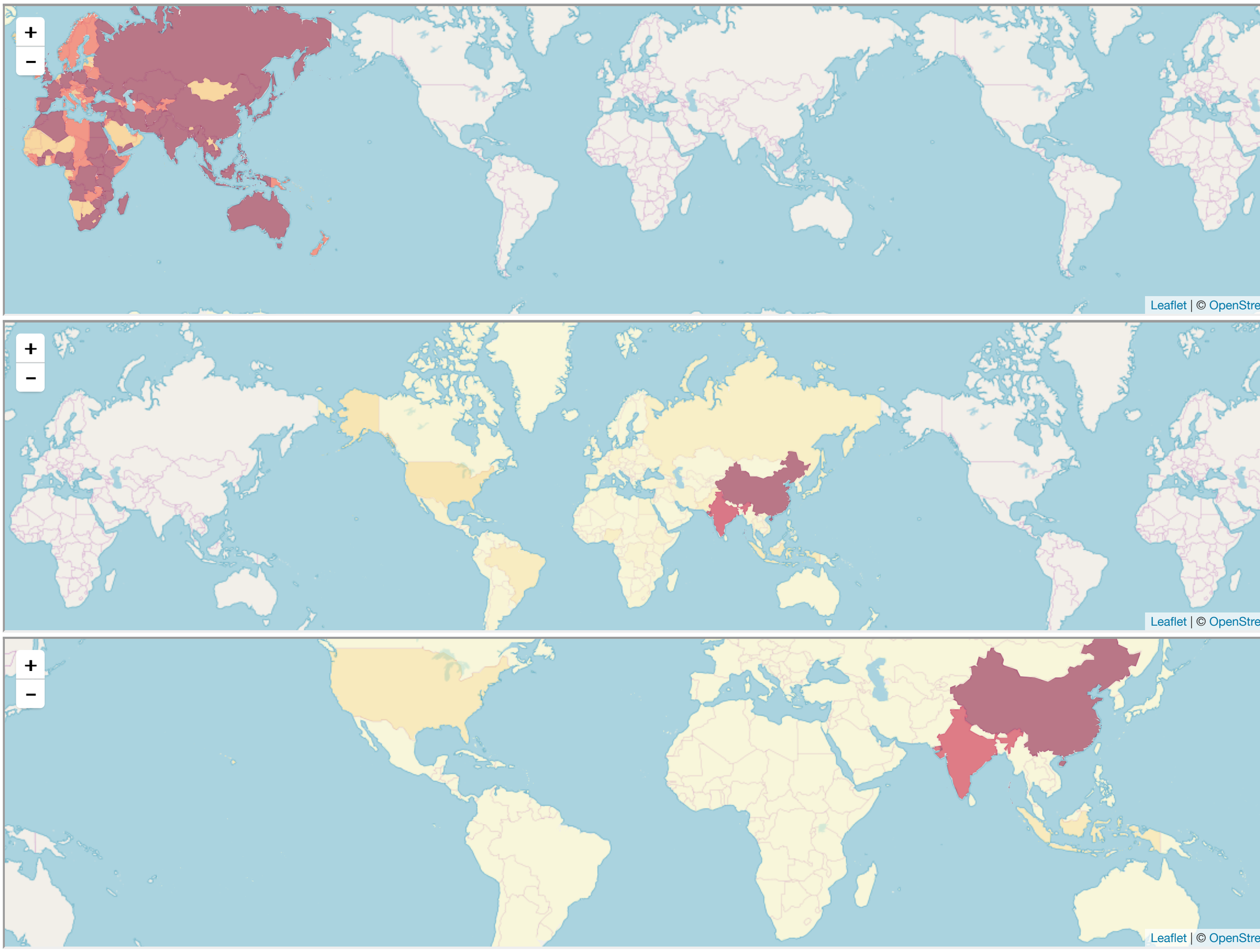


2 – Change color scale

There are several ways to pass from a numerical variable to palette of color. Leaflet offers 3 possibilities that are described below: Numerical, Bins and Quantiles.

```
 # Color by quantile
m=leaflet(world_spdf)%>%
```

```
1
2  # Color by quantile
3  m=leaflet(world_spdf)%>% addTiles()  %>% setView( lat=10, lng=0 , zoom=2) %>%
4    addPolygons( stroke = FALSE, fillOpacity = 0.5, smoothFactor = 0.5, color = ~colorQuantile("YlOrRd", POP2005)(POP2005) )
5  m
6
7  # Numeric palette
8  m=leaflet(world_spdf)%>% addTiles()  %>% setView( lat=10, lng=0 , zoom=2) %>%
9    addPolygons( stroke = FALSE, fillOpacity = 0.5, smoothFactor = 0.5, color = ~colorNumeric("YlOrRd", POP2005)(POP2005) )
10 m
11
12 # Bin
13 m=leaflet(world_spdf)%>% addTiles()  %>% setView( lat=10, lng=0 , zoom=2) %>%
14   addPolygons( stroke = FALSE, fillOpacity = 0.5, smoothFactor = 0.5, color = ~colorBin("YlOrRd", POP2005)(POP2005) )
15 m
16
```

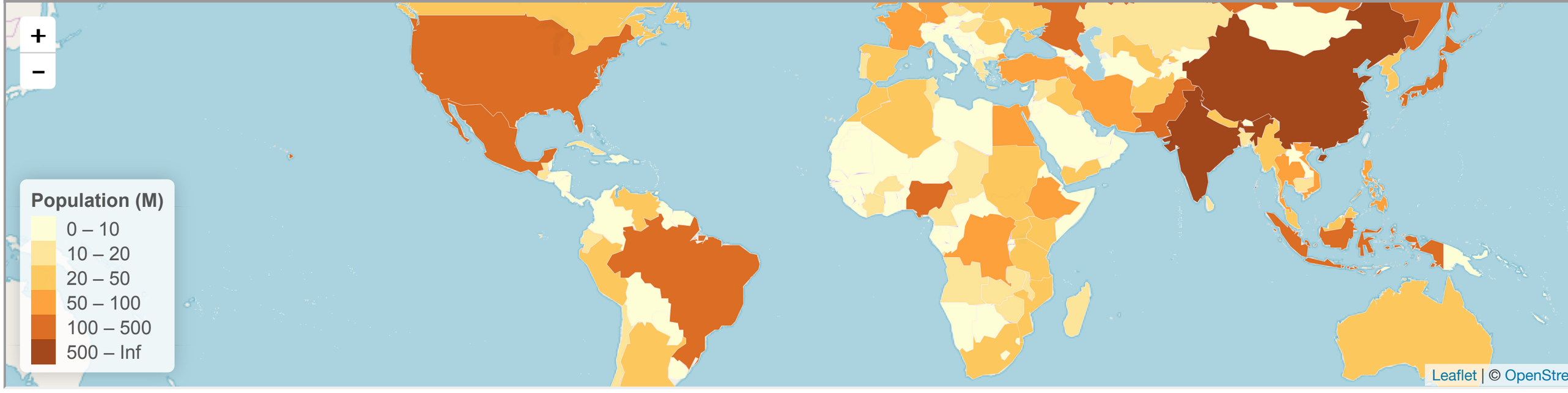


3 – Custom the choropleth map

In order to get a quality choropleth map, there are several improvements we need to apply:

- Add a legend
- Find a smart colorscale + use a nice color palette
- Add a tooltip. When you hover a specific region, a box appears with custom text. This is very handy to add additional information to your map.

And here is the result and the code:

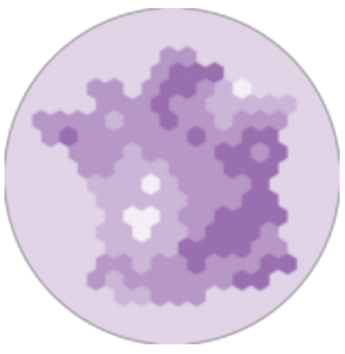



```
# Create a color palette with handmade bins.
```

```
1
2  # Create a color palette with handmade bins.
3  mybins=c(0,10,20,50,100,500,Inf)
4  mypalette = colorBin( palette="YlOrBr", domain=world_spdf@data$POP2005, na.color="transparent", bins=mybins)
5
6  # Prepar the text for the tooltip:
7  mytext=paste("Country: ", world_spdf@data$NAME,"<br/>", "Area: ", world_spdf@data$AREA, "<br/>", "Population: ", round(world_spdf@data$POP2005, 2), sep="") %>%
8    lapply(htmltools::HTML)
9
10 # Final Map
11 leaflet(world_spdf) %>%
12   addTiles()  %>%
13   setView( lat=10, lng=0 , zoom=2) %>%
14   addPolygons(
15     fillColor = ~mypalette(POP2005), stroke=TRUE, fillOpacity = 0.9, color="white", weight=0.3,
16     highlight = highlightOptions( weight = 5, color = ~colorNumeric("Blues", POP2005)(POP2005), dashArray = "", fillOpacity = 0.3, bringToFront = TRUE),
17     label = mytext,
18     labelOptions = labelOptions( style = list("font-weight" = "normal", padding = "3px 8px"), textsize = "13px", direction = "auto")
19   ) %>%
20   addLegend( pal=mypalette, values=~POP2005, opacity=0.9, title = "Population (M)", position = "bottomleft" )
21
```

Related

Background Map

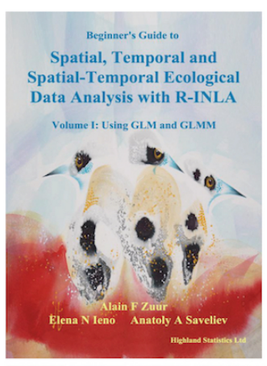


Hexbin Map

Connection

Bubble

Choropleth



Beginner's Guide to

Spatial, Temporal and Spatial-Temporal Ecological Data Analysis with R-INLA

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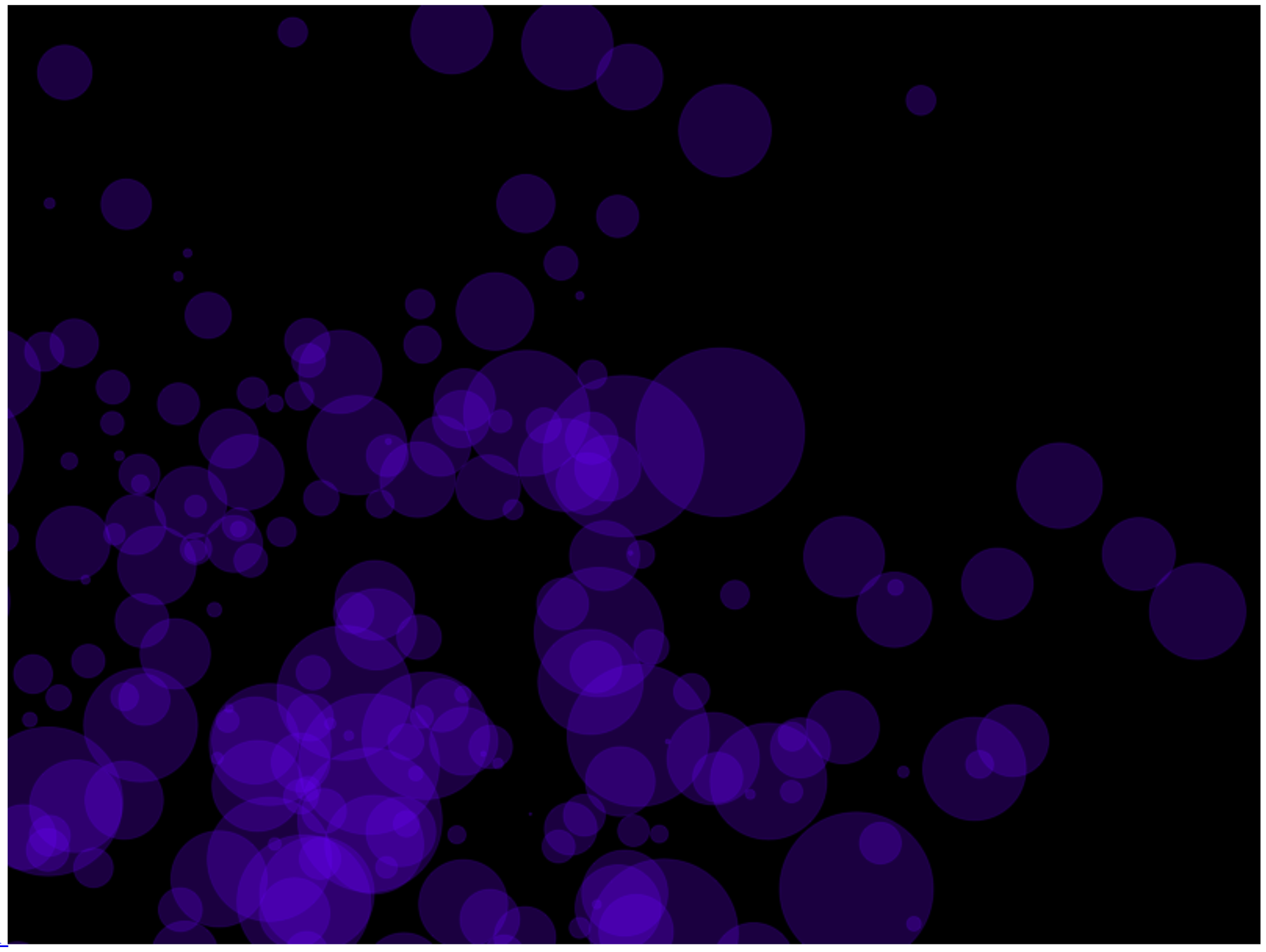
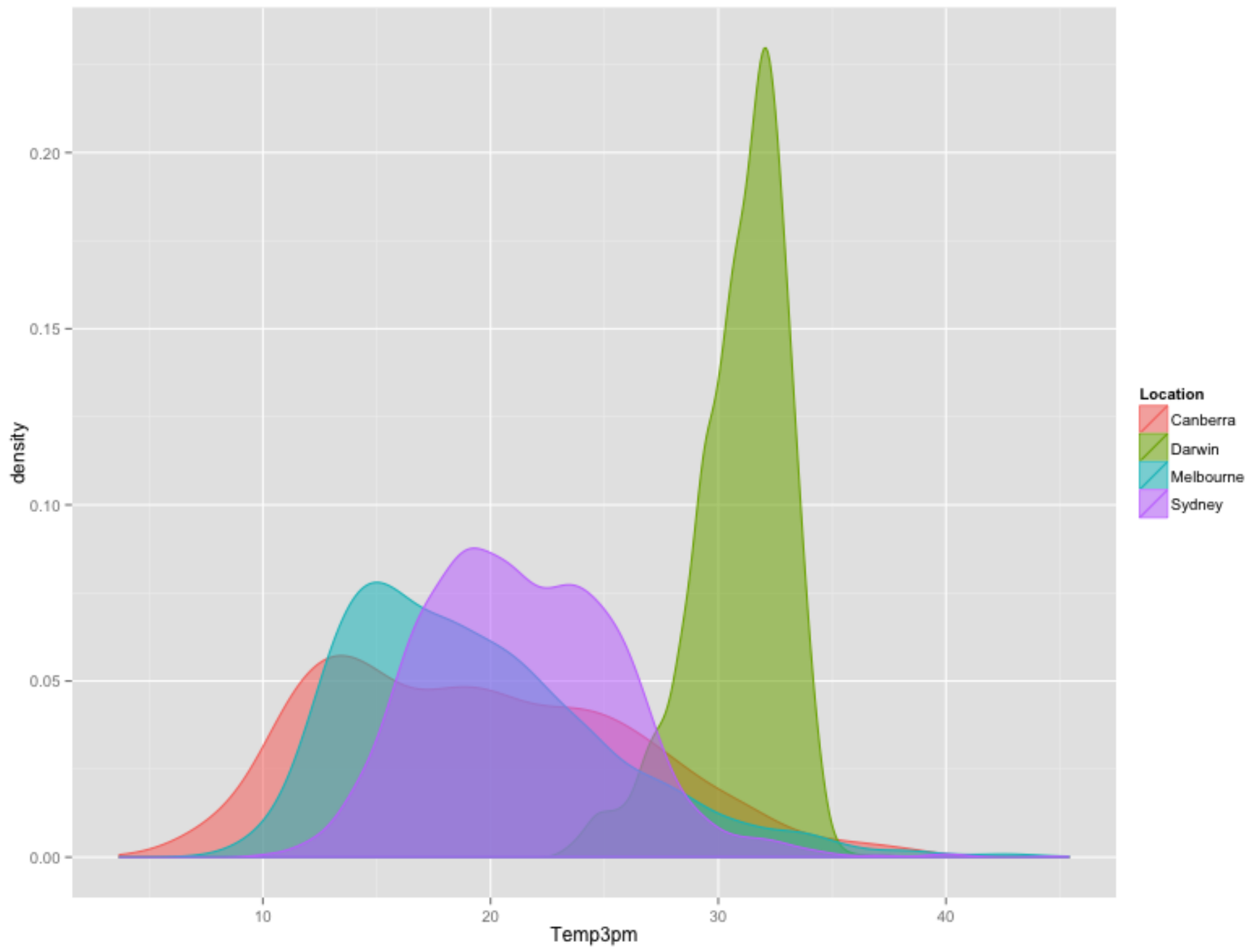


ART FROM DATA

ART FROM DATA



General Ggplot2 Tips

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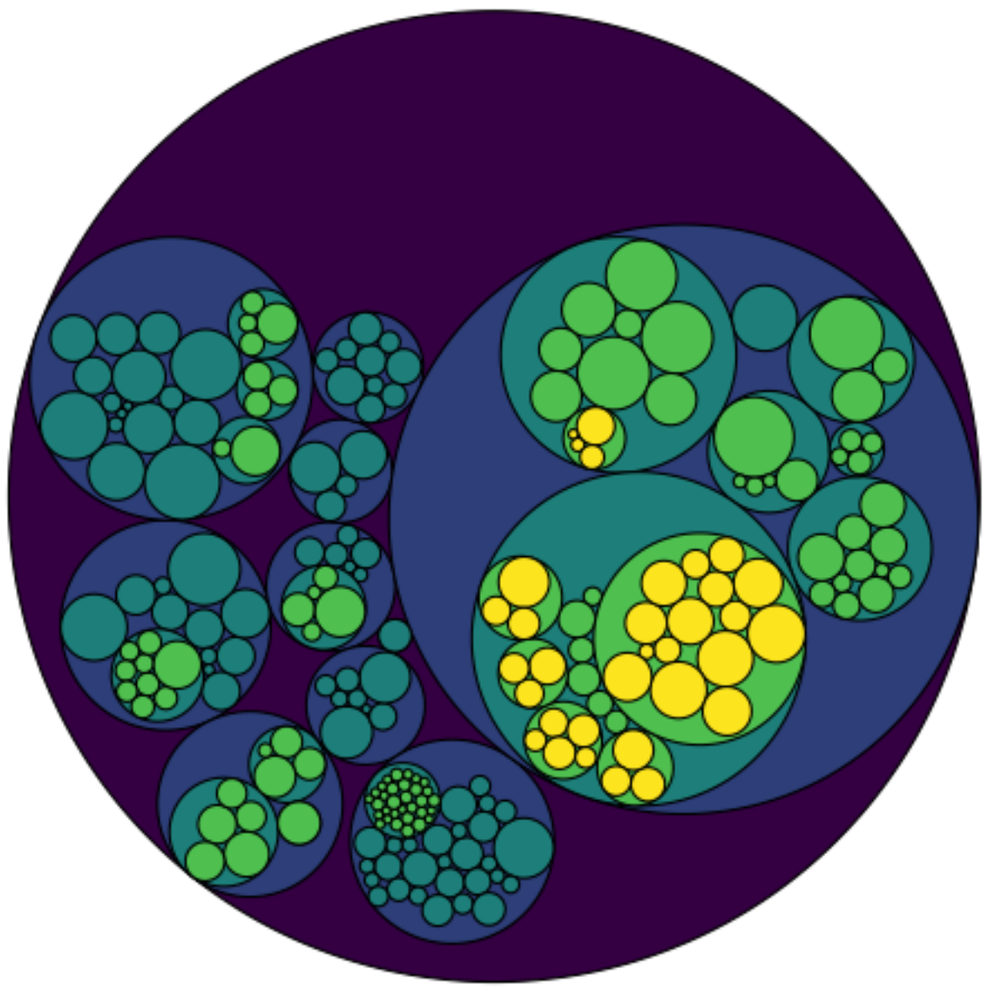
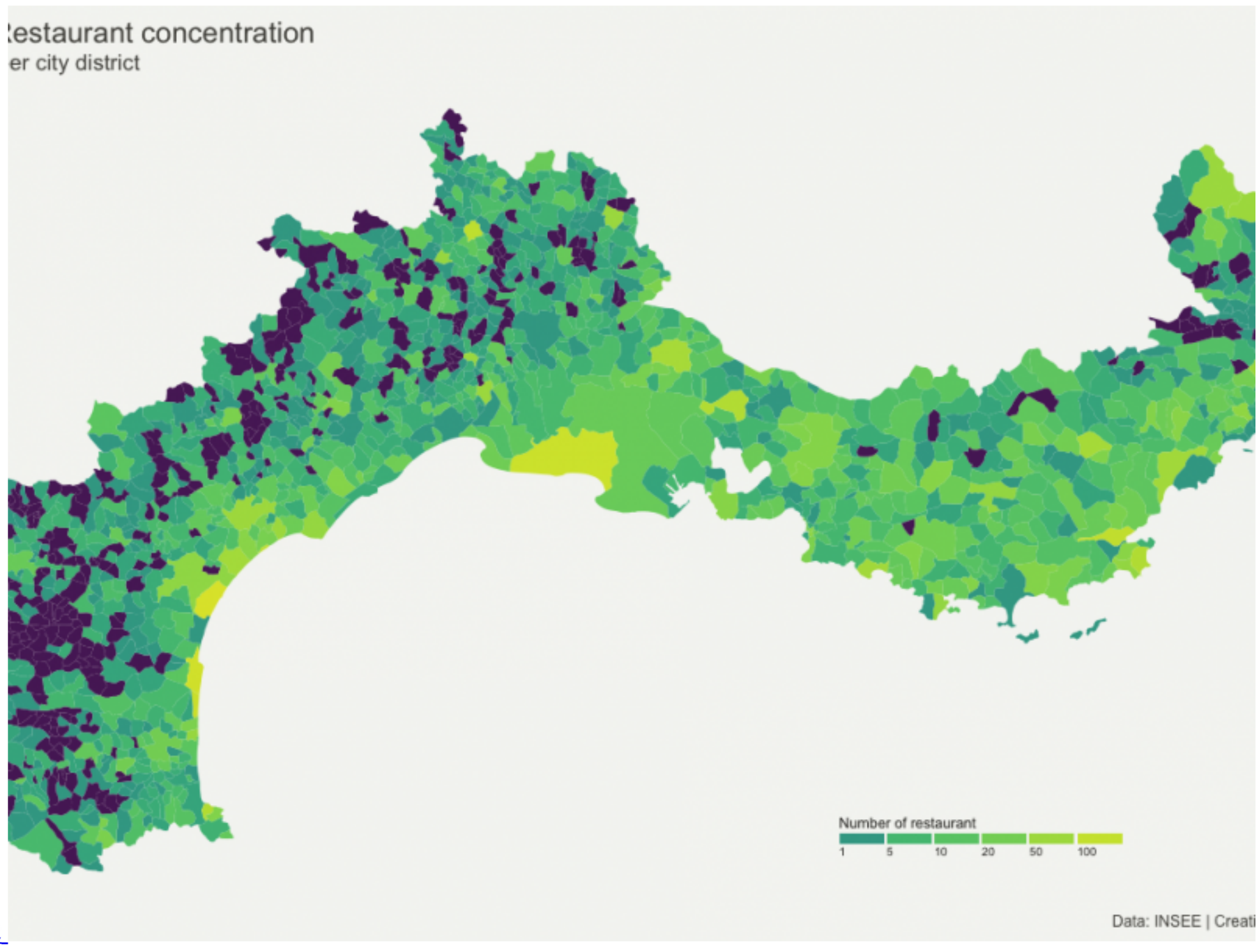


What is circle packing?

What is circle packing?



Choropleth map with ggplot2

Choropleth map with ggplot2