

Quick high
quality maps
with R

Jan-Philipp
Kolb

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Jan-Philipp Kolb

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Preliminaries

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- Usually I have big differences in knowledge and abilities of the participants - please tell, if it is too fast or slow.
- I have lots of hands-on coding **exercises** - later you can only learn on your own
- We have many **examples** - try them
- If there are questions - always ask
- R is more fun together - strong proponent of collaborative work!

Adjustments for online course

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- Quick
- One slide - one example -
- Easy to use

Getting help on packages

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```
# provides details regarding contents of a package
help(package = "osmplotr")
# list vignettes available for a specific package
vignette(package="osmplotr")
# view specific vignette
vignette("data-maps")
```

The World dataset

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Natural Earth

- Dataset contains information from **Natural Earth**

```
library(tmap)  
data(World)
```



Natural Earth

Free vector and raster map data at
1:10m, 1:50m, and 1:110m scales

 Search[Home](#)[Features](#)[Downloads](#)[Blog](#)[Forums](#)[Corrections](#)[About](#)

Natural Earth is a public domain map dataset available at 1:10m, 1:50m, and 1:110 million scales. Featuring tightly integrated vector and raster data, with Natural Earth you can make a variety of visually pleasing, well-crafted maps with cartography or GIS software.

The `qtm` command from the `tmap` package

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Fast thematic map

- With `qtm` you can create a fast thematic map
- Example from the **Vignette** for the `tmap` package

```
library(tmap)  
data(World)  
qtm(World)
```



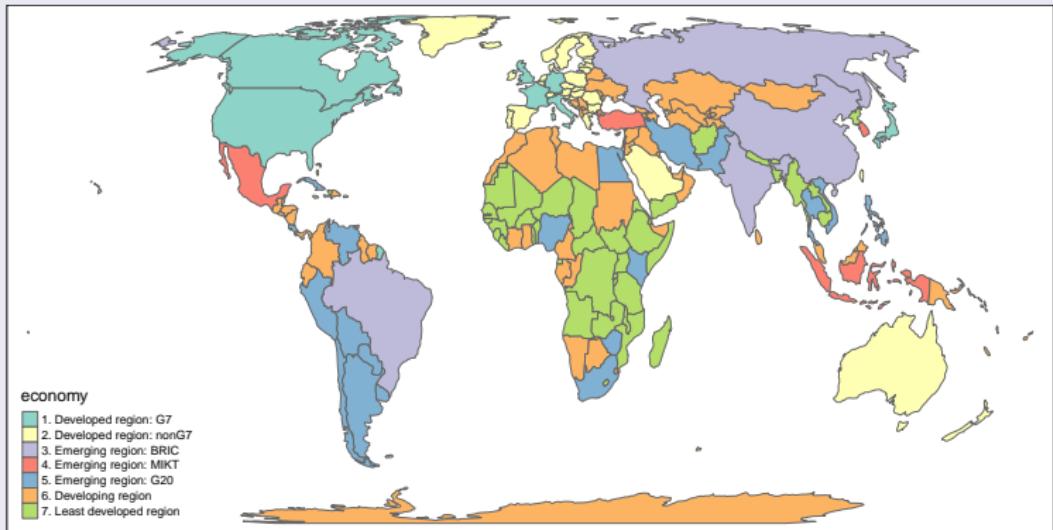
To get more color in the map

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Economic development status

```
qtm(World, fill="economy")
```



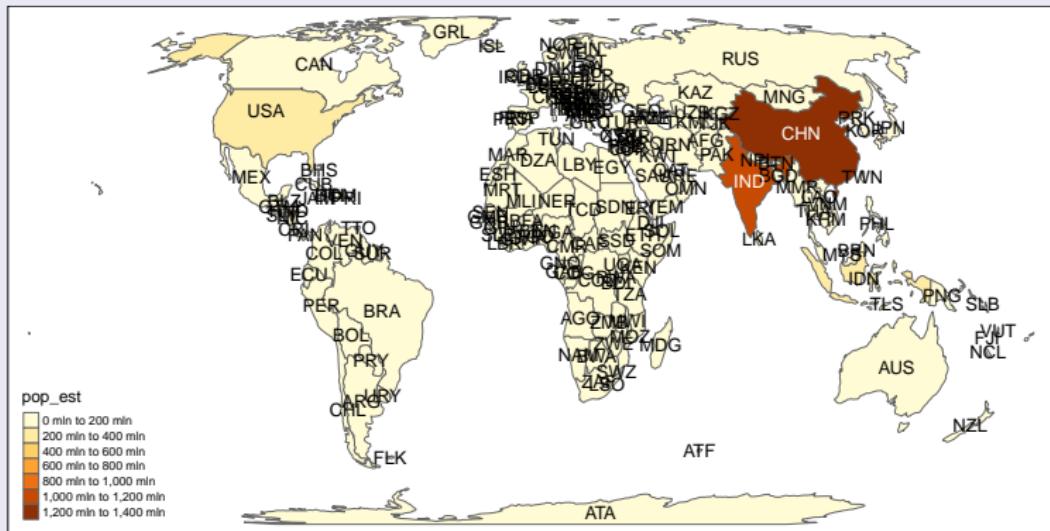
A map with text

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Population

```
qtm(World, fill="pop_est", text="iso_a3")
```



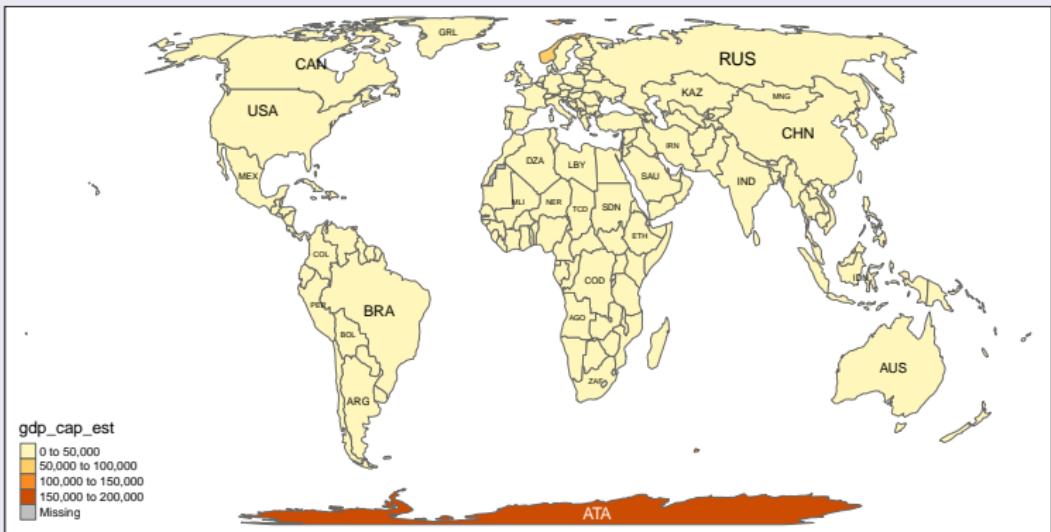
This Scheme is better:

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GDP per capita

```
qtm(World, fill="gdp_cap_est", text="iso_a3",  
text.size="AREA")
```



Topics of the World dataset

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Available variables in the data set

- ISO classification
- country name
- Area, population, population density,
- Gross Domestic Product
- Gross domestic product at purchasing power parities
- Economy, income group

Variables of the World Dataset

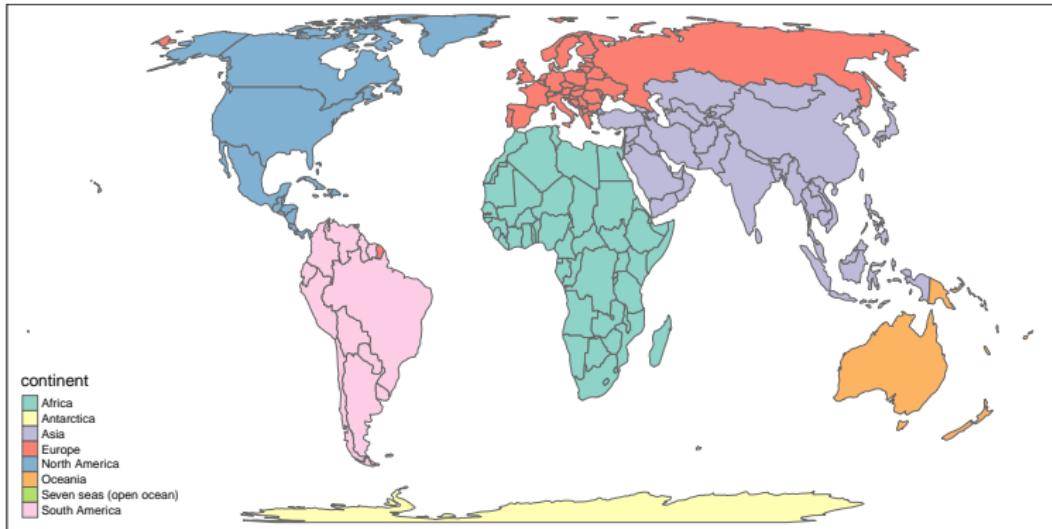
	economy	income_grp	gdp_cap_est	life_exp	well_being	footprint	inequality	HPI
1	7. Least developed region	5. Low income	784.1549	59.668	3.8	0.79	0.4265574	20.22535
2	7. Least developed region	3. Upper middle income	8617.6635	NA	NA	NA	NA	NA
3	6. Developing region	4. Lower middle income	5992.6588	77.347	5.5	2.21	0.1651337	36.76687
4	6. Developing region	2. High income: nonOECD	38407.9078	NA	NA	NA	NA	NA
	geometry							
1	MULTIPOLYGON (((5310471 451...							
2	MULTIPOLYGON (((1531585 -77...							
3	MULTIPOLYGON (((1729835 521...							
4	MULTIPOLYGON (((4675864 313...							

The variable continent

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```
qtm(World, fill="continent")
```

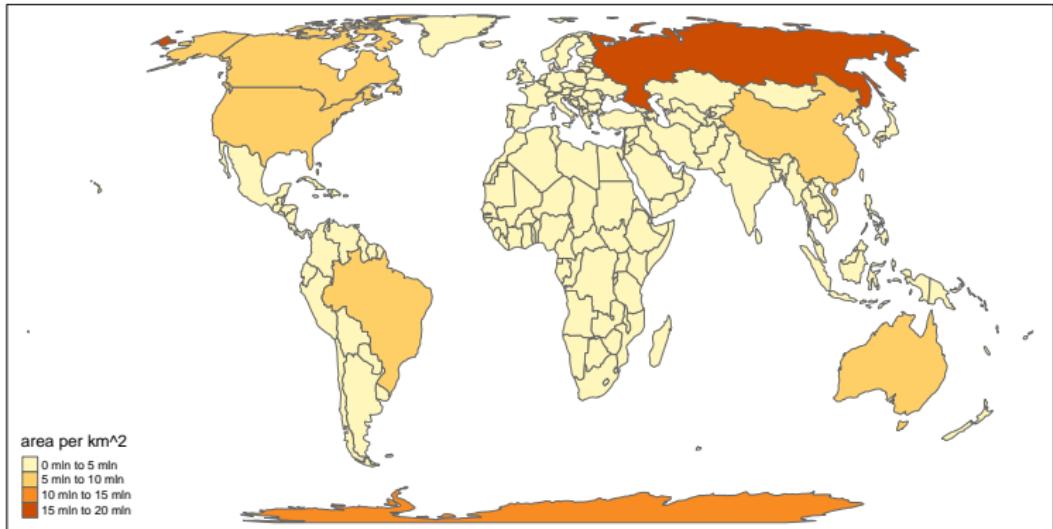


The variable area

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```
qtm(World, fill="area") # Russia is huge
```

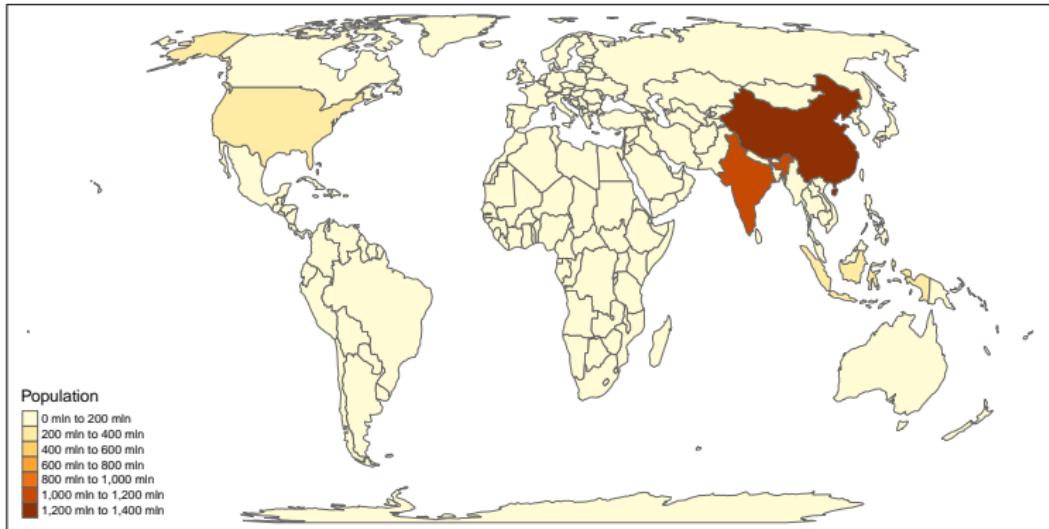


Population

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```
qtm(World, fill="pop_est",fill.title="Population")
```



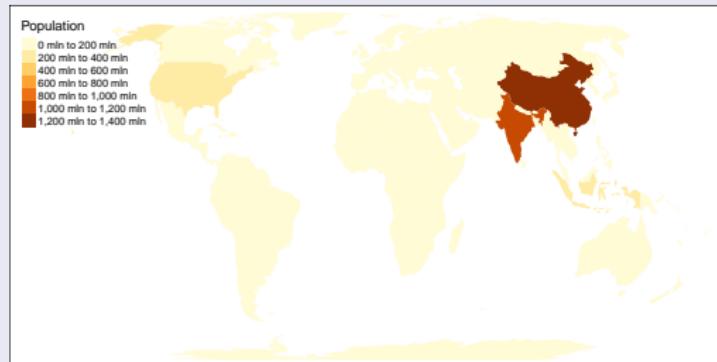
Two maps

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Population and level of development

```
tm_shape(World) + tm_fill(c("pop_est", "economy"),  
                           title=c("Population", "Economy"))
```



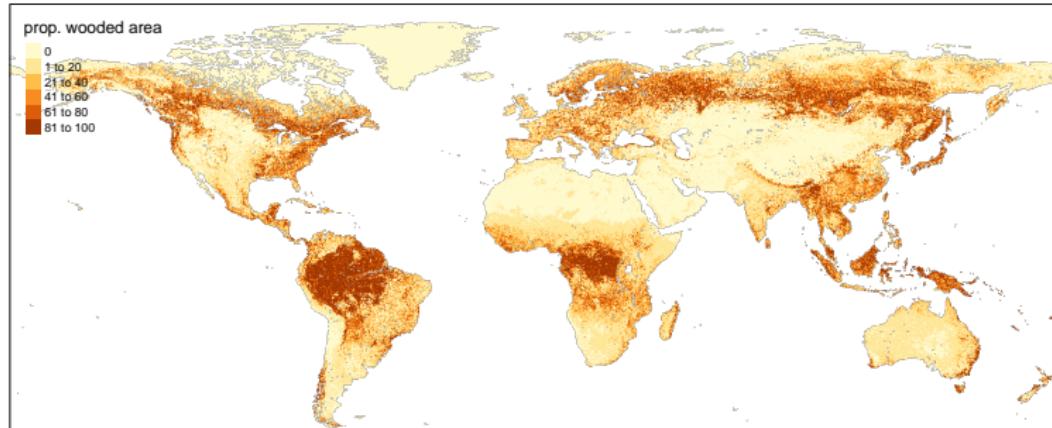
Netherlands - Population in the provinces

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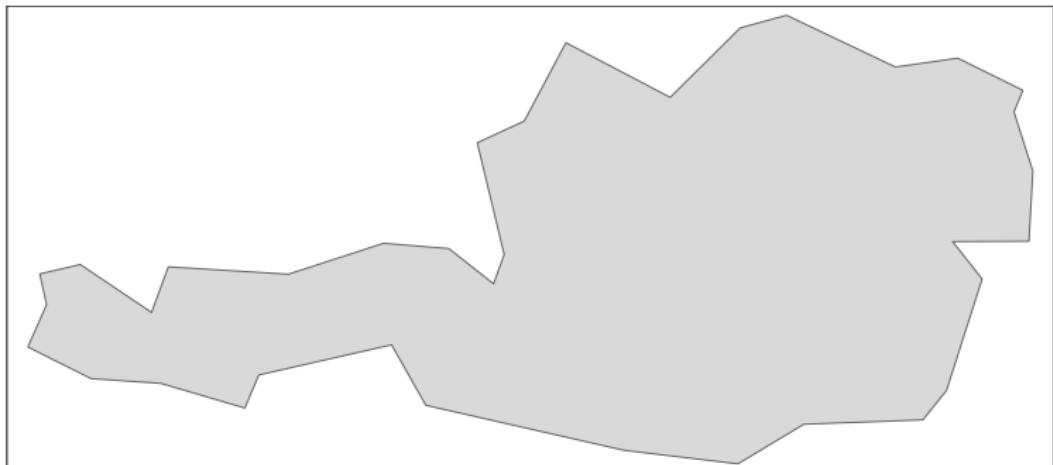
```
data(land)
data(World)

tm_shape(land, relative=FALSE) +
  tm_raster("trees", title="prop. wooded area")
```



Visualize only one country

```
tm_shape(World[World$name=="Austria", ]) +  
  tm_polygons()
```



The raster package

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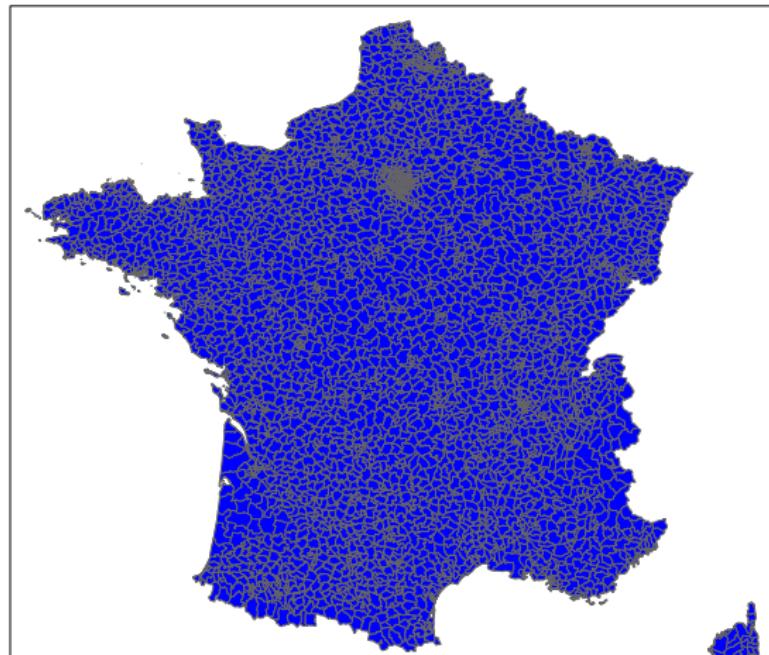
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GADM data

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```
FRA4 <- raster:::getData('GADM', country='FRA', level=4)  
  
qtm(FRA4, fill="blue")
```

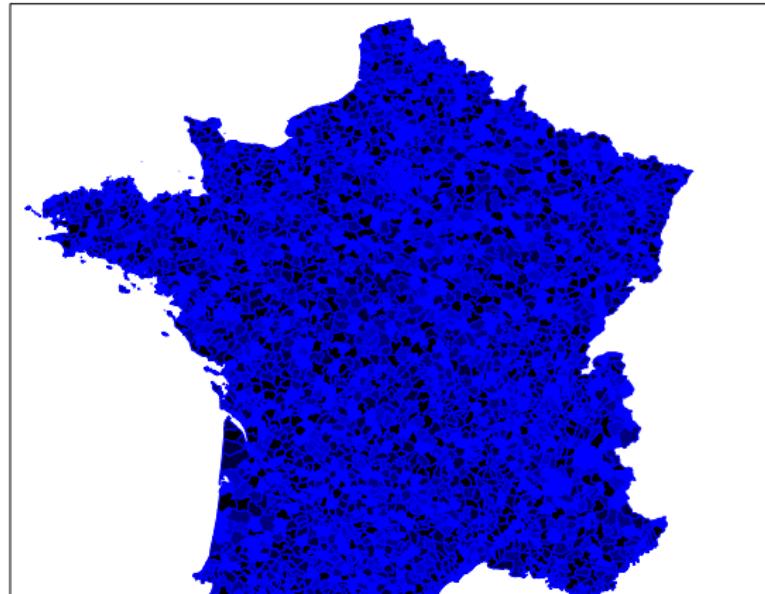


Create colour gradation

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```
FRA4$fantasy_val <- runif(nrow(FRA4))  
qtm(FRA4, "fantasy_val",  
    fill.palette = rgb(0,0,seq(0,1,.1),0),  
    borders = "blue")
```



tmaptools - Thematic Map Tools

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```
library(tmaptools)
```

Author: Martijn Tennekes

```
citation("tmaptools")
```

Description

Set of tools for reading and processing spatial data. The aim is to supply the workflow to create thematic maps. This package also facilitates 'tmap', the package for visualizing thematic maps.

Geocoordinates

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```
(gc_z <- geocode_OSM("Zürich"))

## $query
## [1] "Zürich"
##
## $coords
##           x           y
## 8.541042 47.374449
##
## $bbox
##       xmin       ymin       xmax       ymax
## 8.448006 47.320220 8.625441 47.434666
```

A package to get Openstreetmap data

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Author: Mark Padgham

```
library(osmplotr)
```

```
citation("osmplotr")
```

The collage includes:

- A GitHub profile for "jan philipp" with a bio: "Meintest du: komplott".
- A screenshot of a map titled "Creating continuous coloured maps with osmplotr" from musardius.be.
- A screenshot of the GitHub repository "ropensci/osmplotr" showing a plot of OpenStreetMap data.
- A logo for "Bespoke Images of OpenStreetMap Data" featuring a blue hexagon with the R logo.
- A dark-themed map titled "osmplotr" from docs.ropensci.org.
- A screenshot of a tweet by Oxpjerry, Maria Averick, with a link to "Making awesome maps with osmplotr".
- A screenshot of the CRAN mirror "cran/osmplotr" on GitHub.
- A screenshot of the METACRAN page for "osmplotr".
- A screenshot of a map titled "Data Maps - OpenSci: osmplotr" from docs.ropensci.org.
- A screenshot of a Twitter post with the osmplotr hashtag.
- A screenshot of a map titled "Bespoke Images of OpenStreetMap Data - osmplotr" from docs.ropensci.org.
- A screenshot of a map titled "Create custom maps from openstreetmap - RECh" from gisfridat.netlify.app.

Buildings within a bounding box

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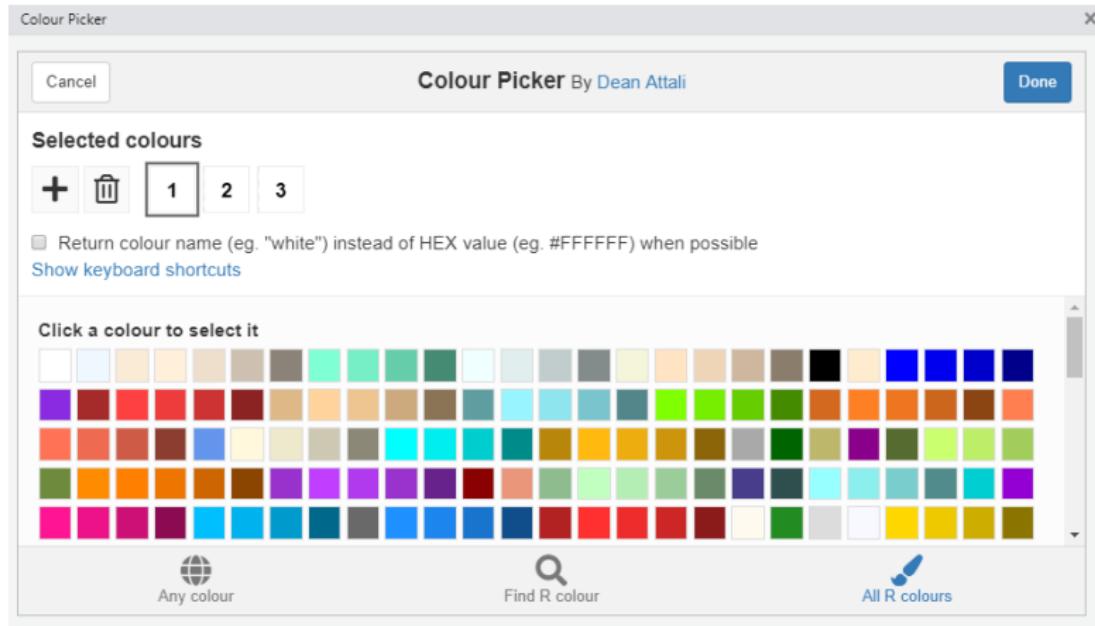
```
bbox <- get_bbox (c(8.4539 , 49.4805 ,  
                    8.4774 , 49.4943 ))  
dat_M <- extract_osm_objects (key = 'building',  
                                bbox = bbox)  
  
qtm(dat_M,fill=c("purple"),borders="black")
```



Colour picker

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The package osmdata

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```
install.packages("osmdata")
```

```
library(osmdata)
```

Get a bounding box for a city

```
bbox <- getbb("Berlin")
```

Streets of Berlin

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OSM Map Feature key=highway value=primary

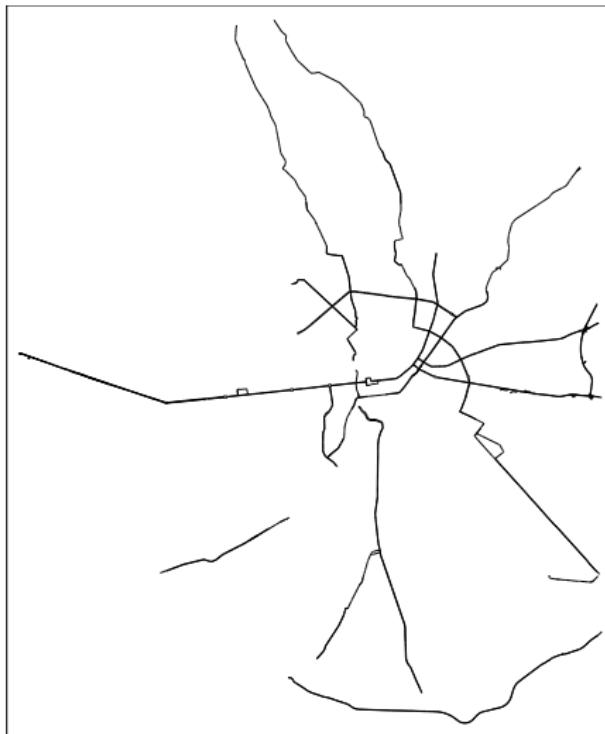
highway	primary	<input checked="" type="checkbox"/>	The next most important roads in a country's system.. (Often link larger towns.)	 
----------------	---------	-------------------------------------	--	--

Get data with package osmdata

```
dat <- extract_osm_objects(key = 'highway',  
                           value = "primary",  
                           bbox = bbox)
```

A quick map for the primary streets in Berlin

`qtm(dat)`



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```
dat_s <- extract_osm_objects(key = 'highway',
                               value = "secondary",
                               bbox = bbox)

map <- osm_basemap(bbox = bbox, bg = "#F5F5DC")
map <- add_osm_objects(map, dat, col = "#00008B")
map <- add_osm_objects(map, dat_s, col = "purple")
print_osm_map(map)
```

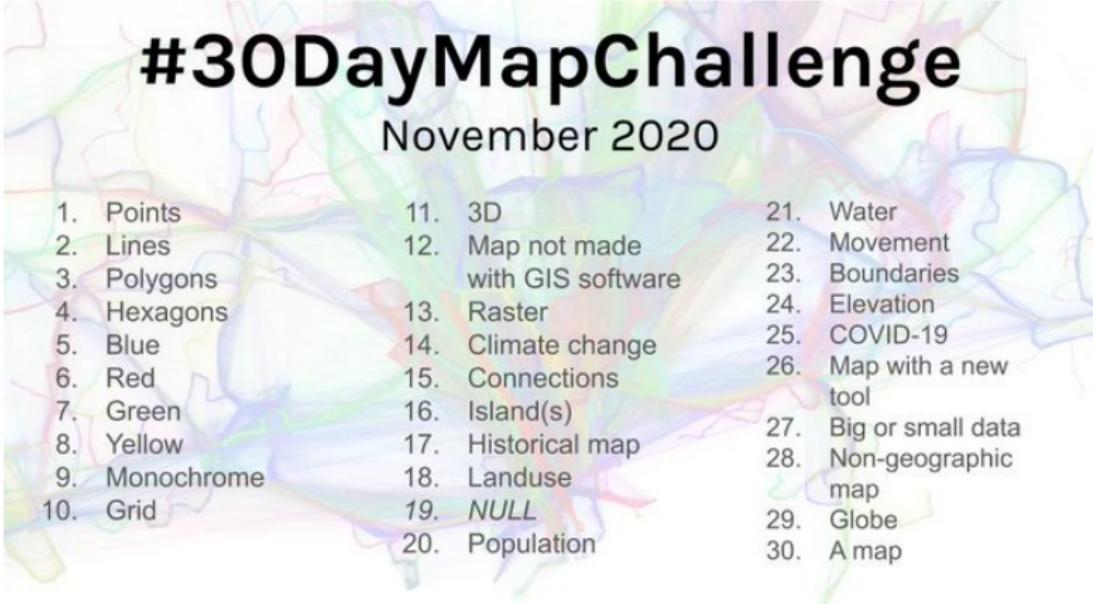
30daymapchallenge

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#30DayMapChallenge

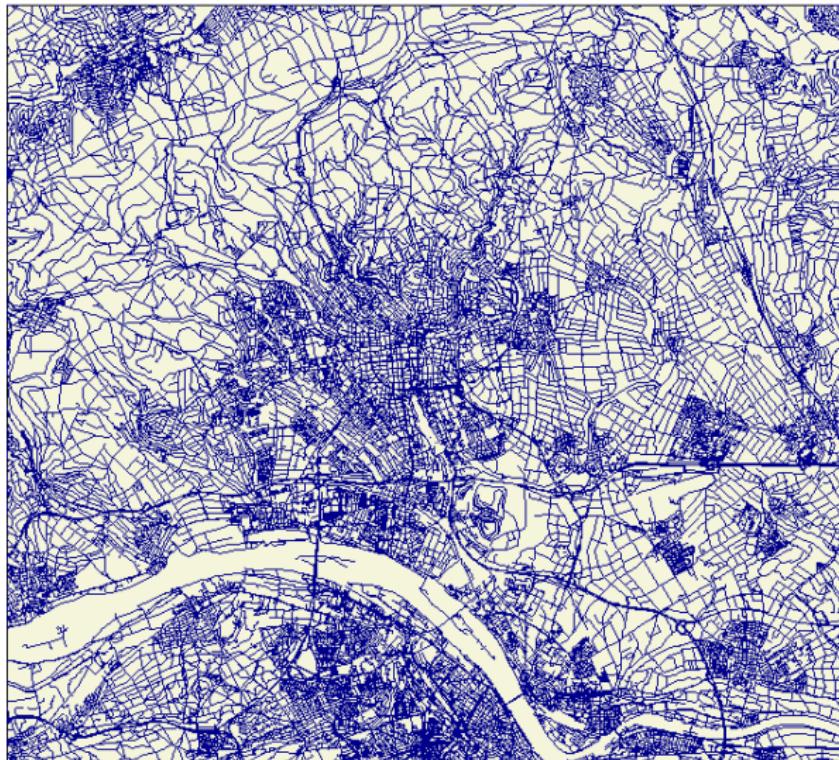
November 2020

- 
1. Points
 2. Lines
 3. Polygons
 4. Hexagons
 5. Blue
 6. Red
 7. Green
 8. Yellow
 9. Monochrome
 10. Grid
 11. 3D
 12. Map not made with GIS software
 13. Raster
 14. Climate change
 15. Connections
 16. Island(s)
 17. Historical map
 18. Landuse
 19. *NULL*
 20. Population
 21. Water
 22. Movement
 23. Boundaries
 24. Elevation
 25. COVID-19
 26. Map with a new tool
 27. Big or small data
 28. Non-geographic map
 29. Globe
 30. A map

Day 9 monochrome

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Load example data

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Data source Eurostat

- Data about unemployment in Europe

```
url <- "https://raw.githubusercontent.com/Japhilko/  
GeoData/master/2015/data/Unemployment07a13.csv"
```

```
Unemp <- read.csv(url)
```

Excursus: the command `match`

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Create two example vectors

```
vec_a <- c("A", 2, 6, 1, "C")
vec_b <- c(1, "C", 2)
```

Bringing the two vectors together

- With the function `match` you can see which element of the first vector matches the second vector.

```
match(vec_a, vec_b)
## [1] NA 3 NA 1 2
```

Use the package tmap with your data

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```
library("tmap")
```

Match the data

```
iso_a2<- substr(World$iso_a3,1,2)
ind <- match(iso_a2,Unemp$GEO)
World$Val2007M12 <- Unemp$Val2007M12[ind]
World$Val2013M01 <- Unemp$Val2013M01[ind]
```

Plot a map

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```
qtm(World,c("Val2007M12","Val2013M01"))
```

