Tutorial (vignette) for the eurostat R package

2019-04-10

R Tools for Eurostat Open Data

This rOpenGov R package provides tools to access Eurostat database, which you can also browse on-line for the data sets and documentation. For contact information and source code, see the package website.

Installation

Release version (CRAN):

```
install.packages("eurostat")
```

Development version (Github):

```
library(devtools)
install_github("ropengov/eurostat")
```

Overall, the eurostat package includes the following functions:

Finding data

Function `get_eurostat_toc()` downloads a table of contents of eurostat datasets. The values in column 'code' should be used to download a selected dataset.

```
# Load the package
library(eurostat)
library(rvest)

# Get Eurostat data listing
toc <- get_eurostat_toc()

# Check the first items
library(knitr)
kable(head(toc))
```

title	code	type	last update of data	last table structure
Database by themes	data	folder	NA	NA
General and regional statistics	general	folder	NA	NA
European and national indicators for short-term analysis	euroind	folder	NA	NA
Business and consumer surveys (source: DG ECFIN)	ei_bcs	folder	NA	NA
Consumer surveys (source: DG ECFIN)	ei_bcs_cs	folder	NA	NA
Consumers - monthly data	ei_bsco_m	dataset	28.03.2019	28.03.2019

With `search_eurostat()` you can search the table of contents for particular patterns, e.g. all datasets related to *passenger transport*. The kable function to produces nice markdown output. Note that with the `type` argument of this function you could restrict the search to for instance datasets or tables.

```
# info about passengers
kable(head(search_eurostat("passenger transport")))
```

title	code
Volume of passenger transport relative to GDP	tran_hv_pstra
Modal split of passenger transport	tran_hv_psmod
Air passenger transport by reporting country	avia_paoc
Air passenger transport by main airports in each reporting country	avia_paoa
Air passenger transport between reporting countries	avia_paocc
Air passenger transport between main airports in each reporting country and partner reporting countries	avia_paoac

Codes for the dataset can be searched also from the Eurostat database. The Eurostat database gives codes in the Data Navigation Tree after every dataset in parenthesis.

Downloading data

The package supports two of the Eurostats download methods: the bulk download facility and the Web Services' JSON API. The bulk download facility is the fastest method to download whole datasets. It is also often the only way as the JSON API has limitation of maximum 50 sub-indicators at a time and whole datasets usually exceeds that. To download only a small section of the dataset the JSON API is faster, as it allows to make a data selection before downloading.

A user does not usually have to bother with methods, as both are used via main function `get_eurostat()`. If only the table id is given, the whole table is downloaded from the bulk download facility. If also filters are defined the JSON API is used.

Here an example of indicator 'Modal split of passenger transport'. This is the percentage share of each mode of transport in total inland transport, expressed in passenger-kilometres (pkm) based on transport by passenger cars, buses and coaches, and trains. All data should be based on movements on national territory, regardless of the nationality of the vehicle. However, the data collection is not harmonized at the EU level.

Pick and print the id of the data set to download:

```
# For the original data, see
# http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsdtr210
id <- search_eurostat("Modal split of passenger transport",
                      type = "table")$code[1]
print(id)
```

[1] "t2020_rk310"

Get the whole corresponding table. As the table is annual data, it is more convient to use a numeric time variable than use the default date format:

```
dat <- get_eurostat(id, time_format = "num")
```

Investigate the structure of the downloaded data set:

```
str(dat)
```

```
## Classes 'tbl_df', 'tbl' and 'data.frame':    2485 obs. of  5 variables:
##  $ unit   : Factor w/ 1 level "PC": 1 1 1 1 1 1 1 1 1 1 ...
##  $ vehicle: Factor w/ 3 levels "BUS_TOT","CAR",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ geo    : Factor w/ 34 levels "AT","BE","CH",..: 1 2 3 4 5 6 7 8 9 10 ...
##  $ time   : num  1990 1990 1990 1990 1990 1990 1990 1990 1990 1990 ...
```

```
##  $ values : num  11 10.6 3.7 9.1 11.3 32.4 14.9 13.5 6 24.8 ...
```

```
kable(head(dat))
```

unit	vehicle	geo	time	values
PC	BUS_TOT	AT	1990	11.0
PC	BUS_TOT	BE	1990	10.6
PC	BUS_TOT	CH	1990	3.7
PC	BUS_TOT	DE	1990	9.1
PC	BUS_TOT	DK	1990	11.3
PC	BUS_TOT	EL	1990	32.4

Or you can get only a part of the dataset by defining `filters` argument. It should be named list, where names corresponds to variable names (lower case) and values are vectors of codes corresponding desidered series (upper case). For time variable, in addition to a `time`, also a `sinceTimePeriod` and a `lastTimePeriod` can be used.

```
dat2 <- get_eurostat(id, filters = list(geo = c("EU28", "FI"), lastTimePeriod=1), time_format = "num")
kable(dat2)
```

Replacing codes with labels

By default variables are returned as Eurostat codes, but to get human-readable labels instead, use a `type = "label"` argument.

```
dat12 <- get_eurostat(id, filters = list(geo = c("EU28", "FI"),
                                         lastTimePeriod = 1),
                      type = "label", time_format = "num")
kable(head(dat12))
```

Eurostat codes in the downloaded data set can be replaced with human-readable labels from the Eurostat dictionaries with the `label_eurostat()` function.

```
datl <- label_eurostat(dat)
kable(head(datl))
```

unit	vehicle	geo	time	values
Percentage	Motor coaches, buses and trolley buses	Austria	1990	11.0
Percentage	Motor coaches, buses and trolley buses	Belgium	1990	10.6
Percentage	Motor coaches, buses and trolley buses	Switzerland	1990	3.7
Percentage	Motor coaches, buses and trolley buses	Germany (until 1990 former territory of the FRG)	1990	9.1
Percentage	Motor coaches, buses and trolley buses	Denmark	1990	11.3
Percentage	Motor coaches, buses and trolley buses	Greece	1990	32.4

The `label_eurostat()` allows conversion of individual variable vectors or variable names as well.

```
label_eurostat_vars(names(datl))
```

Vehicle information has 3 levels. You can check them now with:

```
levels(datl$vehicle)
```

Selecting and modifying data

EFTA, Eurozone, EU and EU candidate countries

To facilitate smooth visualization of standard European geographic areas, the package provides ready-made lists of the country codes used in the eurostat database for EFTA (efta_countries), Euro area (ea_countries), EU (eu_countries) and EU candidate countries (eu_candidate_countries). These can be used to select specific groups of countries for closer investigation. For conversions with other standard country coding systems, see the countrycode R package. To retrieve the country code list for EFTA, for instance, use:

```
data(efta_countries)
kable(efta_countries)
```

code	name	label
IS	Iceland	Iceland
LI	Liechtenstein	Liechtenstein
NO	Norway	Norway
CH	Switzerland	Switzerland

EU data from 2012 in all vehicles:

```
dat_eu12 <- subset(datl, geo == "European Union (current composition)" & time == 2012)
kable(dat_eu12, row.names = FALSE)
```

unit vehicle geo time values —— ——— —- —— ——-

EU data from 2000 - 2012 with vehicle types as variables:

Reshaping the data is best done with `spread()` in `tidyr`.

```
library("tidyr")
dat_eu_0012 <- subset(dat, geo == "EU28" & time %in% 2000:2012)
dat_eu_0012_wide <- spread(dat_eu_0012, vehicle, values)
kable(subset(dat_eu_0012_wide, select = -geo), row.names = FALSE)
```

unit	time	BUS_TOT	CAR	TRN
PC	2000	10.4	82.5	7.1
PC	2001	10.2	82.8	7.0
PC	2002	9.8	83.4	6.8
PC	2003	9.8	83.6	6.6
PC	2004	9.7	83.5	6.7
PC	2005	9.8	83.4	6.9
PC	2006	9.6	83.4	7.0
PC	2007	9.8	83.1	7.1
PC	2008	9.8	82.9	7.4
PC	2009	9.2	83.7	7.1
PC	2010	9.4	83.5	7.2

unit	time	BUS_TOT	CAR	TRN
PC	2011	9.4	83.2	7.4
PC	2012	9.5	82.9	7.7

Train passengers for selected EU countries in 2000 - 2012

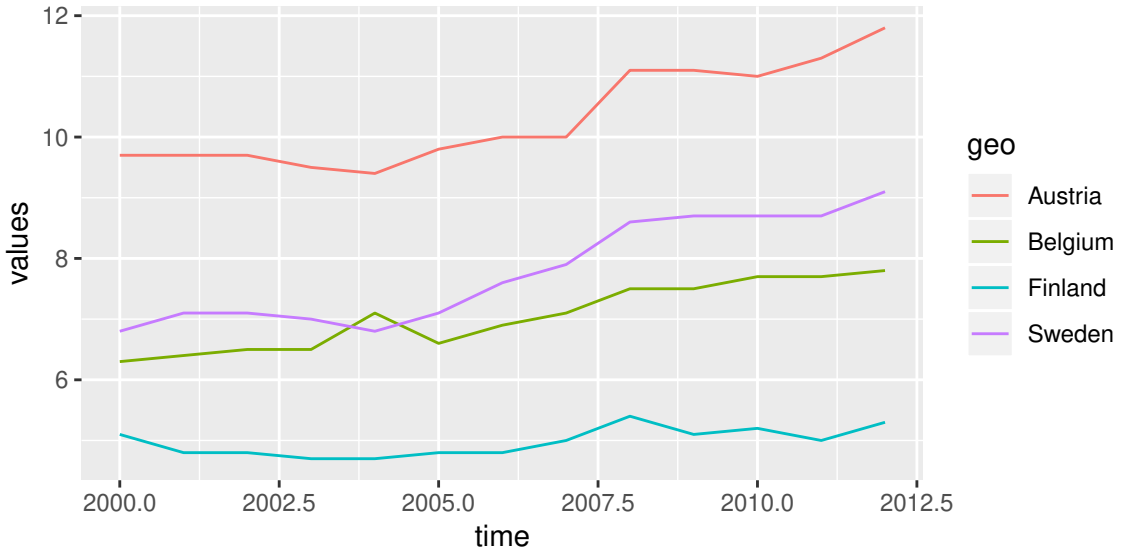
```
dat_trains <- subset(datl, geo %in% c("Austria", "Belgium", "Finland", "Sweden")
                     & time %in% 2000:2012
                     & vehicle == "Trains")

dat_trains_wide <- spread(dat_trains, geo, values)
kable(subset(dat_trains_wide, select = -vehicle), row.names = FALSE)
```

unit	time	Austria	Belgium	Finland	Sweden
Percentage	2000	9.7	6.3	5.1	6.8
Percentage	2001	9.7	6.4	4.8	7.1
Percentage	2002	9.7	6.5	4.8	7.1
Percentage	2003	9.5	6.5	4.7	7.0
Percentage	2004	9.4	7.1	4.7	6.8
Percentage	2005	9.8	6.6	4.8	7.1
Percentage	2006	10.0	6.9	4.8	7.6
Percentage	2007	10.0	7.1	5.0	7.9
Percentage	2008	11.1	7.5	5.4	8.6
Percentage	2009	11.1	7.5	5.1	8.7
Percentage	2010	11.0	7.7	5.2	8.7
Percentage	2011	11.3	7.7	5.0	8.7
Percentage	2012	11.8	7.8	5.3	9.1

Visualization

Visualizing train passenger data with `ggplot2`:

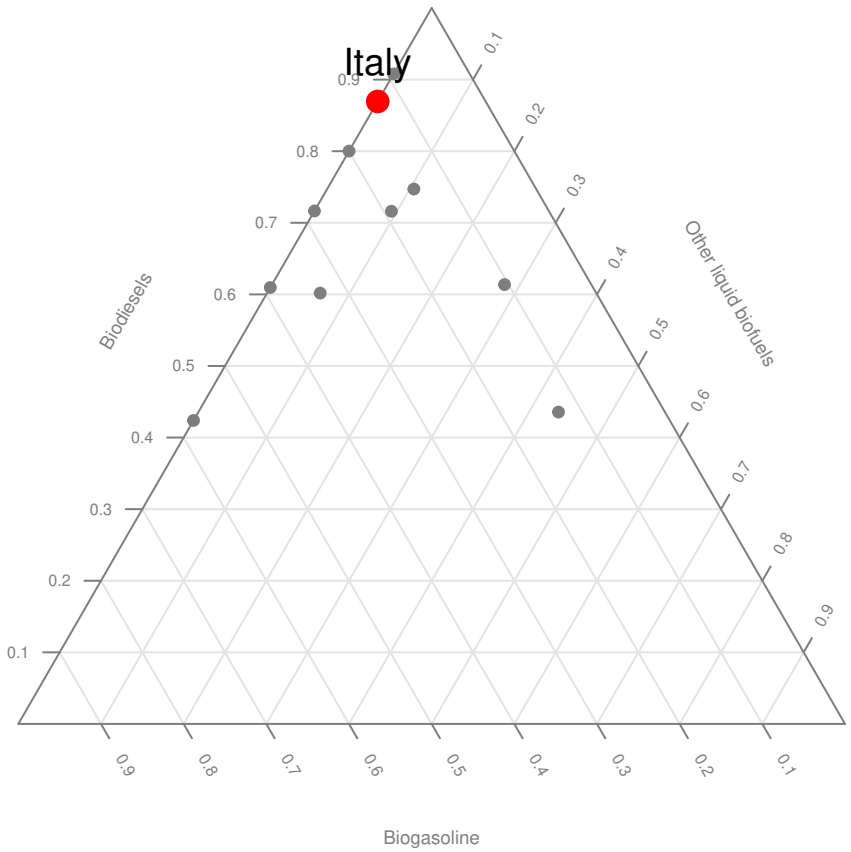
```
library(ggplot2)
p <- ggplot(dat_trains, aes(x = time, y = values, colour = geo))
p <- p + geom_line()
print(p)
```



Triangle plot

Triangle plot is handy for visualizing data sets with three variables.

```
library(tidyr)
library(plotrix)
library(eurostat)
library(dplyr)
library(tidyr)

# Some cleaning of the data is required
 energy3 <- get_eurostat("nrg_114a") %>%
 label_eurostat(dat) %>%
 filter(time == "2013-01-01") %>%
 mutate(geo = gsub(geo, pattern=" \\(.*", replacement="")) %>%
 select(product, geo, values) %>%
 group_by(product, geo) %>%
 summarise(svalue = sum(values)) %>%
 group_by(geo) %>%
 mutate(tvalue = sum(svalue),
 svalue = svalue/sum(svalue)) %>%
 filter(tvalue > 1000) %>% # only large countries
 spread(product, svalue)

# Triangle plot
 par(cex=0.75, mar=c(0,0,0,0))
 positions <- plotrix::triax.plot(as.matrix(energy3[, c(3,5,4)]),
                     show.grid = TRUE,
                     label.points= FALSE, point.labels = energy3$geo,
                     col.axis="gray50", col.grid="gray90",
                     pch = 19, cex.axis=0.8, cex.ticks=0.7, col="grey50")

 # Larger labels
 ind <- which(energy3$geo %in%  c("Norway", "Iceland","Denmark","Estonia", "Turkey", "Italy", "Finland"
 df <- data.frame(positions$xypos, geo = energy3$geo)
 points(df$x[ind], df$y[ind], cex=2, col="red", pch=19)
 text(df$x[ind], df$y[ind], df$geo[ind], adj = c(0.5,-1), cex=1.5)
```



Maps

Disposable income of private households by NUTS 2 regions at 1:60mln resolution using tmap

The mapping examples below use `tmap` package.

```
library(dplyr)
library(eurostat)
library(sf)
library(tmap)

# Download attribute data from Eurostat
sp_data <- eurostat::get_eurostat("tgs00026",
                          time_format = "raw",
                                  stringsAsFactors = FALSE) %>%
  # subset to have only a single row per geo
  dplyr::filter(time == 2010, nchar(geo) == 4) %>%
  # categorise
  dplyr::mutate(income = cut_to_classes(values, n = 5))
```

```
## Reading cache file /tmp/Rtmp3bE3NR/eurostat/tgs00026_raw_code_FF.rds
```

```
## Table  tgs00026  read from cache file:  /tmp/Rtmp3bE3NR/eurostat/tgs00026_raw_code_FF.rds
```

```
# Download geospatial data from GISCO
geodata <- get_eurostat_geospatial(output_class = "sf",
                                   resolution = "60",
```

```
                    nuts_level = 2,
                    year = 2013)
```

```
##
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##
## No encoding supplied: defaulting to UTF-8.
##
## # ---------------------------
## HEADS UP!!
##
## Function now returns the data in 'sf'-class (simple features)
## by default which is different
## from previous behaviour's 'SpatialPolygonDataFrame'.
##
## If you prefer either 'SpatialPolygonDataFrame' or
## fortified 'data_frame' (for ggplot2::geom_polygon),
## please specify it explicitly to 'output_class'-argument!
##
## # ---------------------------
##
```

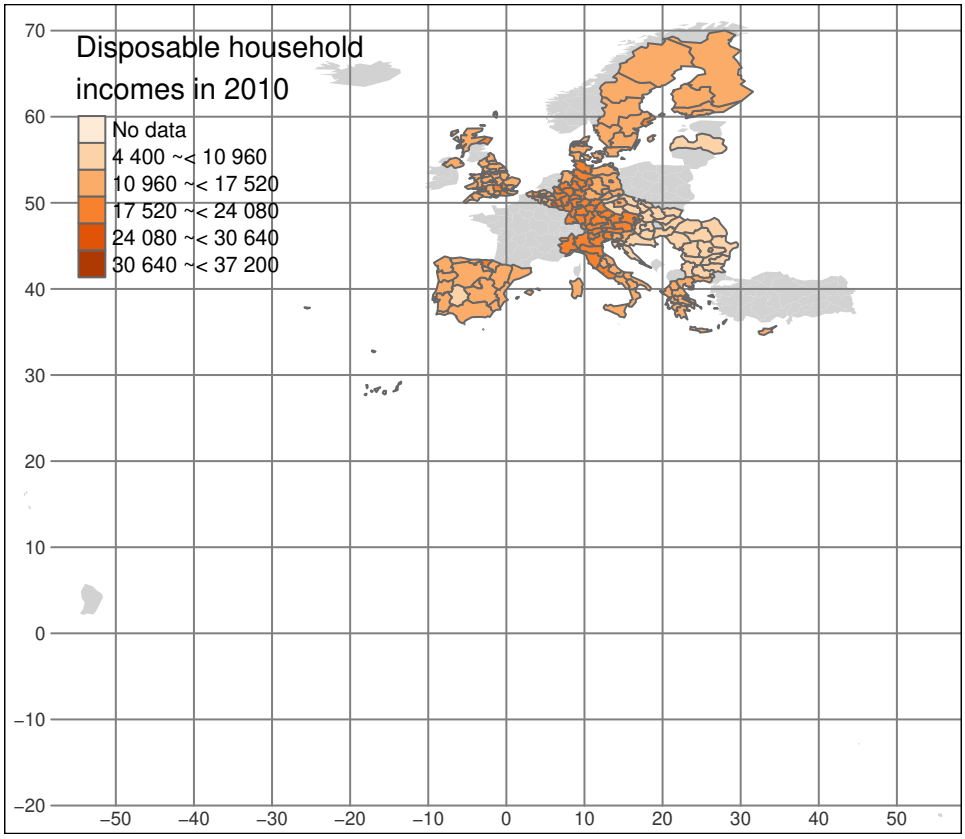
```
# merge with attribute data with geodata
map_data <- inner_join(geodata, sp_data)
```

```
## Joining, by = "geo"
```

Construct the map

```
map1 <- tmap::tm_shape(geodata) +
  tmap::tm_fill("lightgrey") +
```

```
  tmap::tm_shape(map_data) +
  tmap::tm_grid() +
  tmap::tm_polygons("income", title = "Disposable household\nincomes in 2010",
                    palette = "Oranges")
print(map1)
```



Interactive maps can be generated as well

```
# Interactive
tmap_mode("view")
map1

# Set the mode back to normal plotting
tmap_mode("plot")
print(map1)
```

Disposable income of private households by NUTS 2 regions in Poland with labels at 1:1mln resolution using tmap

```
library(eurostat)
library(dplyr)
library(sf)
library(RColorBrewer)

# Downloading and manipulating the tabular data
print("Let us focus on year 2014 and NUTS-3 level")
```

```
## [1] "Let us focus on year 2014 and NUTS-3 level"
```

```
euro_sf2 <- get_eurostat("tgs00026", time_format = "raw",
                         stringsAsFactors = FALSE,
             filter = list(time = "2014")) %>%

  # Subset to NUTS-3 level
  dplyr::filter(grepl("PL",geo)) %>%
  # label the single geo column
  mutate(label = paste0(label_eurostat(.)[["geo"]], "\n", values, "€"),
         income = cut_to_classes(values))

print("Download geospatial data from GISCO")
```

```
## [1] "Download geospatial data from GISCO"
```

```
geodata <- get_eurostat_geospatial(output_class = "sf", resolution = "60", nuts_level = 2, year = 2013)
```

```
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##
```

```
## No encoding supplied: defaulting to UTF-8.
```

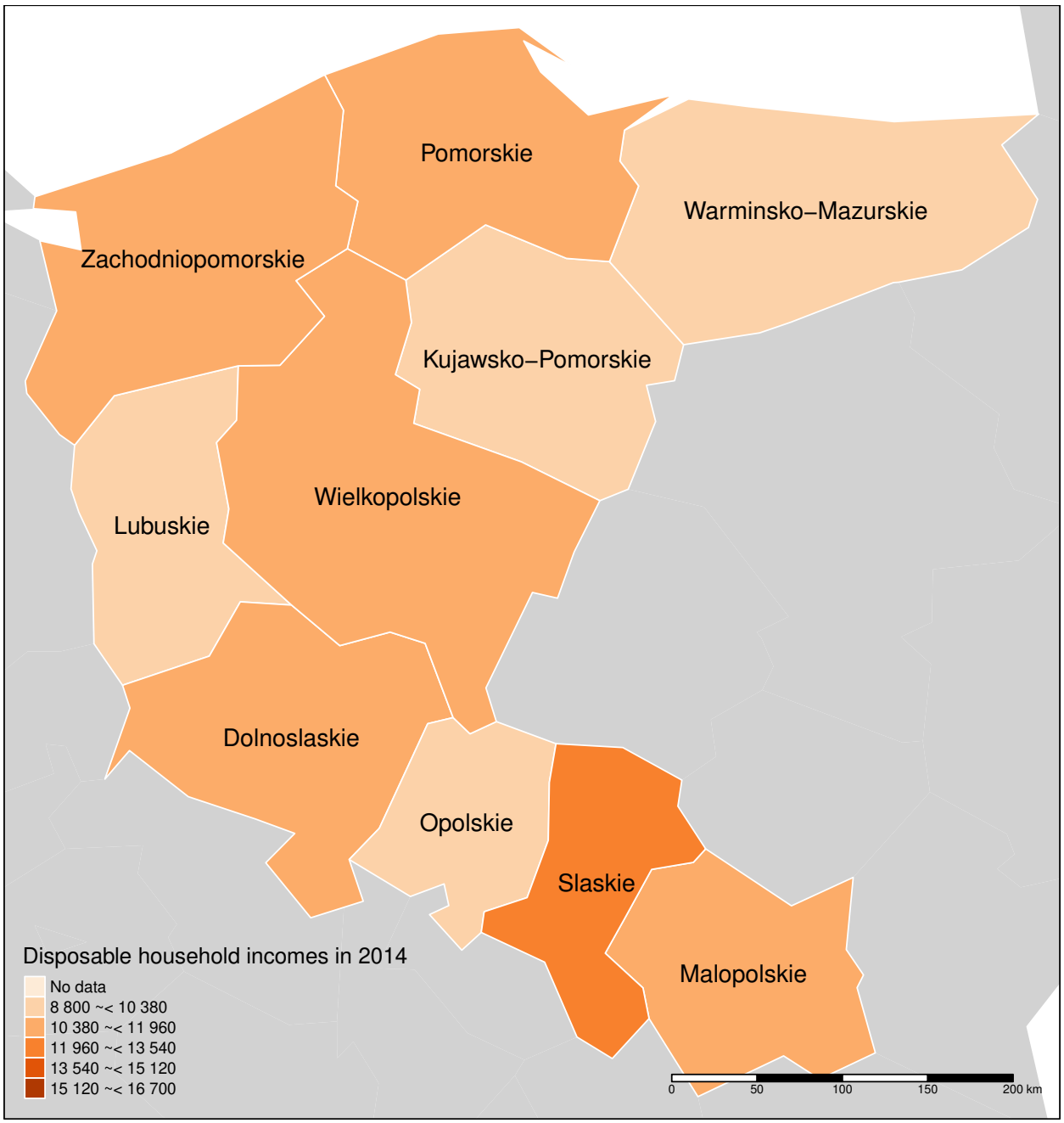
```
##
## # ---------------------------
## HEADS UP!!
##
## Function now returns the data in 'sf'-class (simple features)
## by default which is different
## from previous behaviour's 'SpatialPolygonDataFrame'.
##
## If you prefer either 'SpatialPolygonDataFrame' or
```

```
## fortified 'data_frame' (for ggplot2::geom_polygon),
## please specify it explicitly to 'output_class'-argument!
##
## # --------------------------
##
```

```
# Merge with attribute data with geodata
map_data <- inner_join(geodata, euro_sf2)
```

```
## Joining, by = "geo"
```

```
# plot map
map2 <- tm_shape(geodata) +
  tm_fill("lightgrey") +
  tm_shape(map_data, is.master = TRUE) +
  tm_polygons("income", title = "Disposable household incomes in 2014",
              palette = "Oranges", border.col = "white") +
  tm_text("NUTS_NAME", just = "center") +
  tm_scale_bar()
map2
```



Disposable income of private households by NUTS 2 regions at 1:10mln resolution using spplot

```
library(sp)
library(eurostat)
library(dplyr)
library(RColorBrewer)
dat <- get_eurostat("tgs00026", time_format = "raw", stringsAsFactors = FALSE) %>%
  # subsetting to year 2014 and NUTS-2 level
  dplyr::filter(time == 2014, nchar(geo) == 4) %>%
  # classifying the values the variable
```

```
  dplyr::mutate(cat = cut_to_classes(values))
```

```
## Reading cache file /tmp/Rtmp3bE3NR/eurostat/tgs00026_raw_code_FF.rds
```

```
## Table  tgs00026  read from cache file:  /tmp/Rtmp3bE3NR/eurostat/tgs00026_raw_code_FF.rds
```

```
# Download geospatial data from GISCO
geodata <- get_eurostat_geospatial(output_class = "spdf", resolution = "10", nuts_level = 2, year = 201
```

```
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##
```

```
## Reading cache file /tmp/Rtmp3bE3NR/eurostat/spdf1022013.RData
```

```
## SpatialPolygonDataFrame at resolution 1: 10  from year  2013  read from cache file:  /tmp/Rtmp3bE3NR/
```

```
##
## # ---------------------------
## HEADS UP!!
##
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## by default which is different
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##
## If you prefer either 'SpatialPolygonDataFrame' or
## fortified 'data_frame' (for ggplot2::geom_polygon),
## please specify it explicitly to 'output_class'-argument!
##
## # ---------------------------
##
```
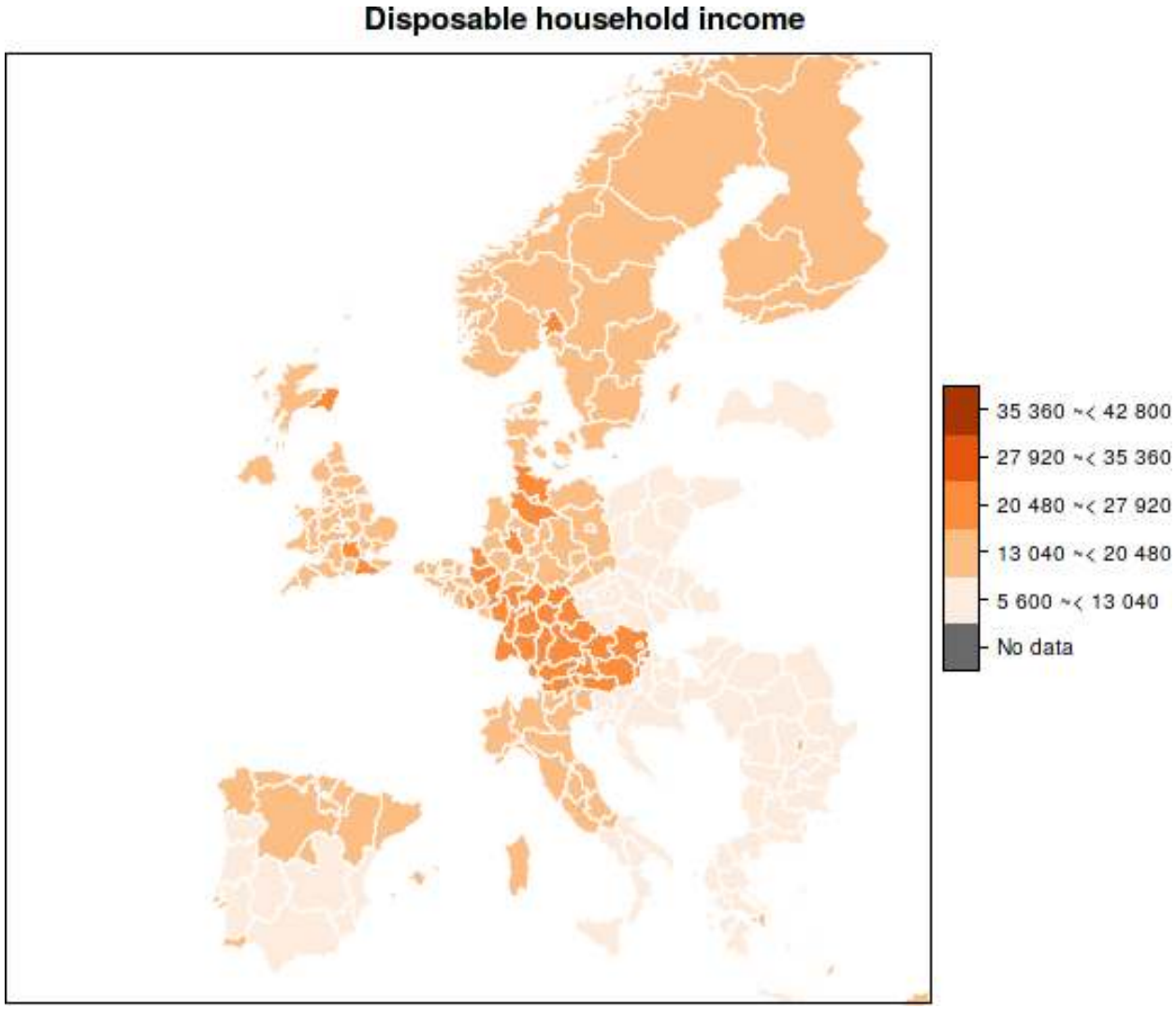

```
# merge with attribute data with geodata
geodata@data <- left_join(geodata@data, dat)
```

```
## Joining, by = "geo"
```

```
# plot map
sp::spplot(obj = geodata, "cat", main = "Disposable household income",
       xlim = c(-22,34), ylim = c(35,70),
           col.regions = c("dim grey", brewer.pal(n = 5, name = "Oranges")),
       col = "white", usePolypath = FALSE)
```



Disposable income of private households by NUTS 2 regions at 1:60mln resolution using ggplot2

Meanwhile the CRAN version of `ggplot2` is lacking support for simple features, you can plot maps with `ggplot2` by downloading geospatial data as `data.frame` with `output_class` argument set as `df`.

```
library(eurostat)
library(dplyr)
library(ggplot2)
dat <- get_eurostat("tgs00026", time_format = "raw", stringsAsFactors = FALSE) %>%
  # subsetting to year 2014 and NUTS-2 level
  dplyr::filter(time == 2014, nchar(geo) == 4) %>%
```

```r
  # classifying the values the variable
  dplyr::mutate(cat = cut_to_classes(values))
```

```
## Reading cache file /tmp/Rtmp3bE3NR/eurostat/tgs00026_raw_code_FF.rds
```

```
## Table  tgs00026  read from cache file:  /tmp/Rtmp3bE3NR/eurostat/tgs00026_raw_code_FF.rds
```

```r
# Download geospatial data from GISCO
geodata <- get_eurostat_geospatial(resolution = "60", nuts_level = "2", year = 2013)
```

```
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##
```

```
## No encoding supplied: defaulting to UTF-8.
```

```
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## If you prefer either 'SpatialPolygonDataFrame' or
## fortified 'data_frame' (for ggplot2::geom_polygon),
## please specify it explicitly to 'output_class'-argument!
##
## # ---------------------------
##
```
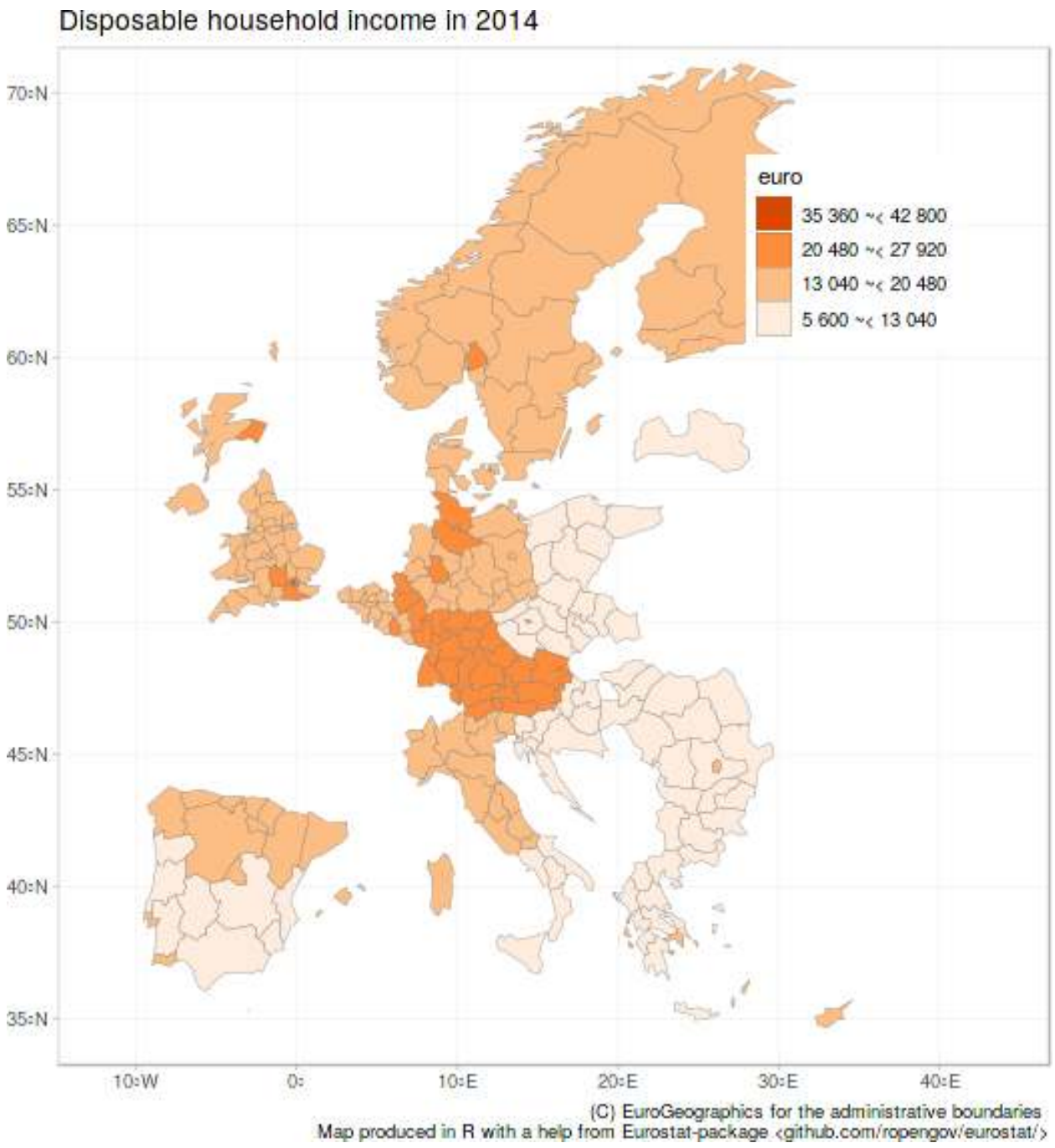

```r
# merge with attribute data with geodata
map_data <- inner_join(geodata, dat)
```

```
## Joining, by = "geo"
```

```
ggplot(data=map_data) + geom_sf(aes(fill=cat),color="dim grey", size=.1) +
    scale_fill_brewer(palette = "Oranges") +
  guides(fill = guide_legend(reverse=T, title = "euro")) +
  labs(title="Disposable household income in 2014",
       caption="(C) EuroGeographics for the administrative boundaries
                Map produced in R with a help from Eurostat-package <github.com/ropengov/eurostat/>") +
  theme_light() + theme(legend.position=c(.8,.8)) +
  coord_sf(xlim=c(-12,44), ylim=c(35,70))
```



SDMX

Eurostat data is available also in the SDMX format. The eurostat R package does not provide custom tools for this but the generic rsdmx and rjsdmx R packages can be used to access data in that format when necessary:

```
library(rsdmx)

# Data set URL
url <- "http://ec.europa.eu/eurostat/SDMX/diss-web/rest/data/cdh_e_fos/..PC.FOS1.BE/?startperiod=2005&en

# Read the data from eurostat
d <- readSDMX(url)

# Convert to data frame and show the first entries
df <- as.data.frame(d)

kable(head(df))
```

Further examples

For further examples, see the package homepage.

Citations and related work

Citing the data sources

Eurostat data: cite Eurostat.

Administrative boundaries: cite EuroGeographics

Citing the eurostat R package

For main developers and contributors, see the package homepage.

This work can be freely used, modified and distributed under the BSD-2-clause (modified FreeBSD) license:

```
citation("eurostat")
```

```
##
## Kindly cite the eurostat R package as follows:
##
##   (C) Leo Lahti, Janne Huovari, Markus Kainu, Przemyslaw Biecek.
##   Retrieval and analysis of Eurostat open data with the eurostat
##   package. R Journal 9(1):385-392, 2017. Version 3.3.5 Package
##   URL: http://ropengov.github.io/eurostat Manuscript URL:
##   https://journal.r-project.org/archive/2017/RJ-2017-019/index.html
##
## A BibTeX entry for LaTeX users is
##
##   @Misc{,
##     title = {eurostat R package},
```

```
##     author = {Leo Lahti and Janne Huovari and Markus Kainu and Przemyslaw Biecek},
##     journal = {R Journal},
##     volume = {9},
##     number = {1},
##     pages = {385-392},
##     year = {2017},
##     url = {https://journal.r-project.org/archive/2017/RJ-2017-019/index.html},
##     note = {Version 3.3.5},
##   }
```

Contact

For contact information, see the package homepage.

Version info

This tutorial was created with

```
sessionInfo()
```

```
## R version 3.5.1 (2018-07-02)
## Platform: x86_64-pc-linux-gnu (64-bit)
## Running under: Ubuntu 18.04.2 LTS
##
## Matrix products: default
## BLAS: /home/lei/bin/R-3.5.1/lib/libRblas.so
## LAPACK: /home/lei/bin/R-3.5.1/lib/libRlapack.so
##
## locale:
##  [1] LC_CTYPE=en_US.UTF-8       LC_NUMERIC=C
##  [3] LC_TIME=en_US.UTF-8        LC_COLLATE=en_US.UTF-8
##  [5] LC_MONETARY=en_US.UTF-8    LC_MESSAGES=en_US.UTF-8
##  [7] LC_PAPER=en_US.UTF-8       LC_NAME=C
##  [9] LC_ADDRESS=C               LC_TELEPHONE=C
## [11] LC_MEASUREMENT=en_US.UTF-8 LC_IDENTIFICATION=C
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## other attached packages:
##  [1] sp_1.3-1           RColorBrewer_1.1-2 tmap_2.2
##  [4] sf_0.7-3           dplyr_0.8.0.1      plotrix_3.7-4
##  [7] ggplot2_3.1.0      tidyr_0.8.2        rvest_0.3.2
## [10] xml2_1.2.0         rmarkdown_1.11     pkgdown_1.3.0
## [13] knitr_1.21         eurostat_3.3.5     usethis_1.4.0
## [16] devtools_2.0.1
##
## loaded via a namespace (and not attached):
##  [1] colorspace_1.4-0   class_7.3-15       leaflet_2.0.2
##  [4] rgdal_1.3-9        rprojroot_1.3-2    satellite_1.0.1
##  [7] base64enc_0.1-3    fs_1.2.6           dichromat_2.0-0
## [10] rstudioapi_0.9.0   roxygen2_6.1.1     remotes_2.0.2
## [13] lubridate_1.7.4    RefManageR_1.2.12  codetools_0.2-16
```

```
## [16] pkgload_1.0.2      jsonlite_1.6       tmaptools_2.0-1
## [19] Cairo_1.5-9        broom_0.5.1        png_0.1-7
## [22] rgeos_0.4-2        shiny_1.3.0        readr_1.3.1
## [25] compiler_3.5.1     httr_1.4.0         backports_1.1.3
## [28] mapview_2.6.3      assertthat_0.2.0   lazyeval_0.2.1
## [31] cli_1.0.1          later_0.8.0        htmltools_0.3.6
## [34] prettyunits_1.0.2  tools_3.5.1        gtable_0.2.0
## [37] glue_1.3.0         Rcpp_1.0.0         raster_2.8-19
## [40] countrycode_1.1.0  nlme_3.1-137       crosstalk_1.0.0
## [43] lwgeom_0.1-5       xfun_0.5           stringr_1.4.0
## [46] ps_1.3.0           testthat_2.0.1     mime_0.6
## [49] XML_3.98-1.18      MASS_7.3-51.1      scales_1.0.0
## [52] hms_0.4.2          promises_1.0.1     yaml_2.2.0
## [55] curl_3.3           memoise_1.1.0      stringi_1.3.1
## [58] highr_0.7          desc_1.2.0         e1071_1.7-0.1
## [61] pkgbuild_1.0.2     bibtex_0.4.2       rlang_0.3.1
## [64] pkgconfig_2.0.2    commonmark_1.7     evaluate_0.13
## [67] lattice_0.20-38    purrr_0.3.0        htmlwidgets_1.3
## [70] labeling_0.3       processx_3.2.1     tidyselect_0.2.5
## [73] plyr_1.8.4         magrittr_1.5       R6_2.4.0
## [76] generics_0.0.2     DBI_1.0.0          pillar_1.3.1
## [79] withr_2.1.2        units_0.6-2        tibble_2.0.1
## [82] crayon_1.3.4       KernSmooth_2.23-15 grid_3.5.1
## [85] callr_3.1.1        digest_0.6.18      classInt_0.3-1
## [88] webshot_0.5.1      xtable_1.8-3       httpuv_1.5.1
## [91] stats4_3.5.1       munsell_0.5.0      viridisLite_0.3.0
## [94] sessioninfo_1.1.1
```