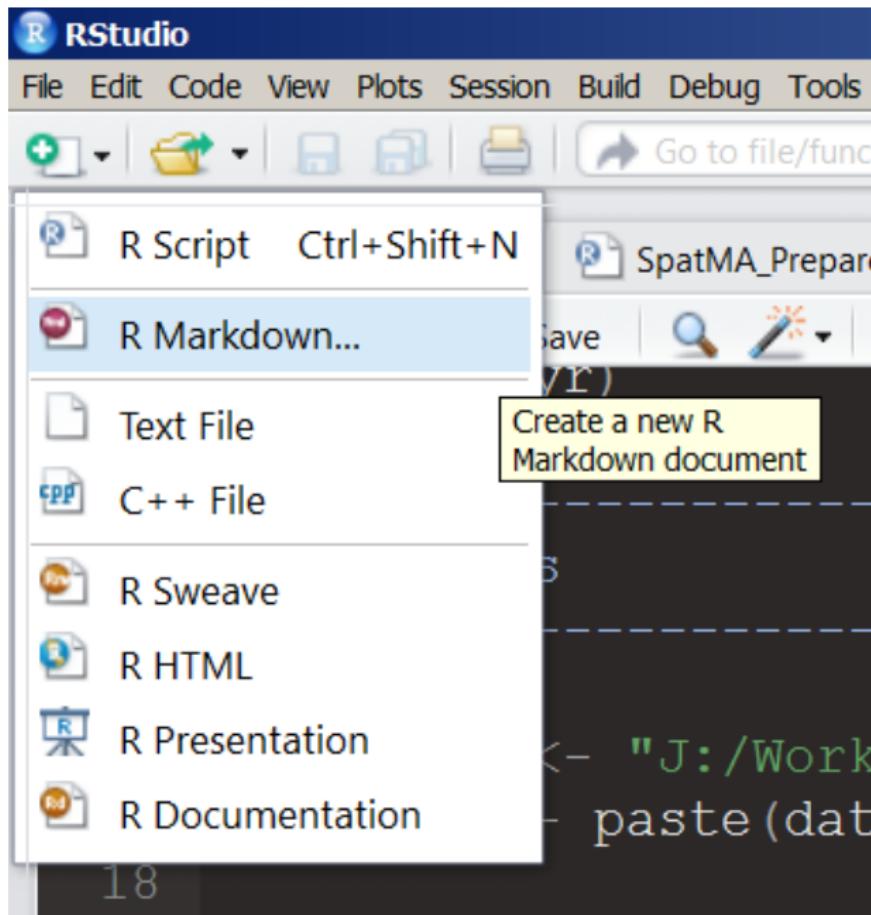


Nutzung von GeoDaten in den Sozialwissenschaften - Präsentation und Interaktive Karten

Jan-Philipp Kolb

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Präsentationen mit Rstudio I



Präsentationen mit Rstudio II

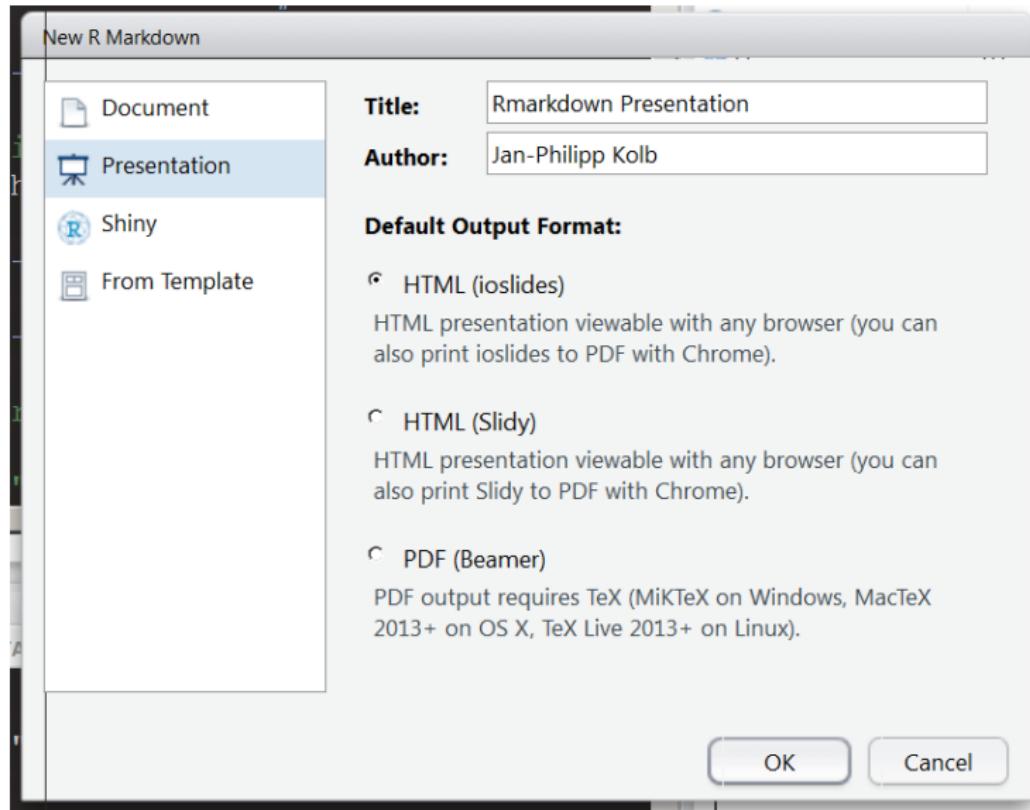


Figure 2: Rstudio und Rmarkdown

Präsentationen mit Rstudio III

The screenshot shows the RStudio IDE interface. The title bar says "RStudio". The menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Tools, and Help. The toolbar has icons for file operations like Open, Save, Print, and Go to file/function. Below the toolbar, three files are listed in tabs: "ethr.Rmd", "SpatMA_PrepCourse.R", and "CampSiteInteractive.R". The main workspace shows an R Markdown code block:

```
1 ---  
2 title: "Rmarkdown Pre  
3 author: "Jan-Philipp Kolb"  
4 date: "11. November 2015"  
5 output: ioslides_presentation  
6 ---  
7  
8 ## R Markdown  
9
```

A tooltip is displayed over the "Knit HTML" button, which says "Knit the current document (Ctrl+Shift +K)".

Fragen

- ▶ Wie kann man zwei Graphiken nebeneinander darstellen?
- ▶ Wie kann man Graphiken speichern?
- ▶ Wie bekommt man Popups in interaktive Graphiken?

Beispiel zu Campingplätzen

- ▶ Die Daten stammen von:

<http://www.openstreetmap.de/>

- ▶ Dabei wird die Overpass API genutzt:

http://wiki.openstreetmap.org/wiki/Overpass_API

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

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

Überblick über Daten zu Campingplätzen

X	name	tourism	website
1	Campingplatz Winkelbachtal	camp_site	http://www.g
2	Radler-Zeltplatz	camp_site	NA
3	Campingplatz des Naturfreundehauses	camp_site	NA
4	Campingplatz Am Aichstruter Stausee	camp_site	NA
5	NA	camp_site	NA
6	Kandern	camp_site	NA
7	Campingplatz Baiersbronn-Obertal	camp_site	NA
8	Campingplatz SchwabenmÃ¼hle	camp_site	NA

Eine Karte für Deutschland bekommen

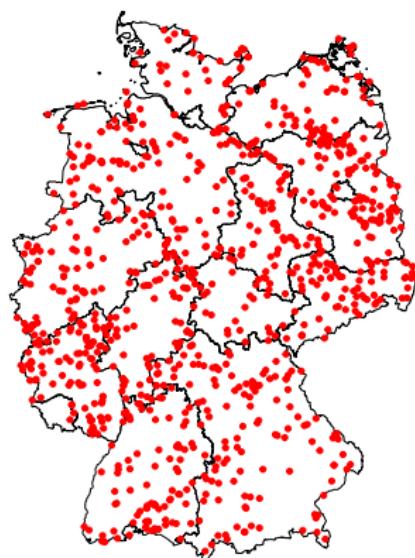
```
library(raster)
DEU1 <- getData('GADM', country='DEU', level=1)
```

```
library(maptools)
plot(DEU1)
```



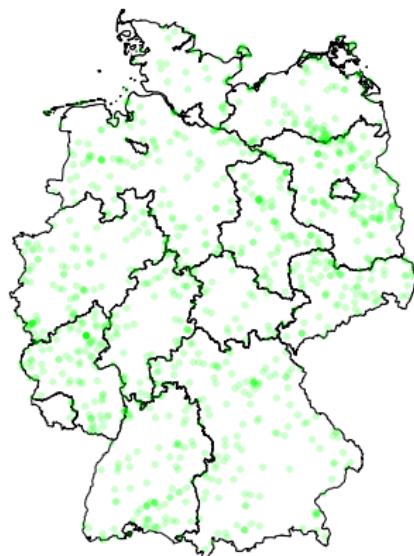
Die Campingplätze hinzufügen

```
plot(DEU1)
points(y=CampSites$lat, x=CampSites$lon,
       col="red", pch=20)
```



Die Transparenz verändern

```
plot(DEU1)
points(y=CampSites$lat, x=CampSites$lon, col=rgb(0,1,0,.2),
       pch=20)
```



Eine Google Karte für Deutschland bekommen

```
library(ggmap)
DE_Map <- qmap("Germany", zoom=6, maptype="hybrid")
DE_Map
```



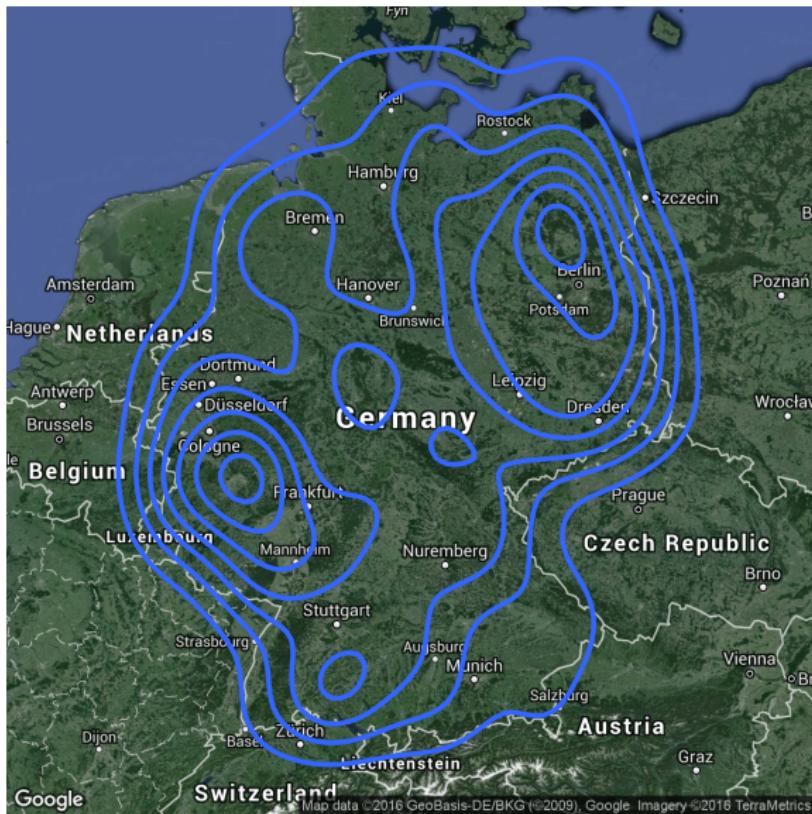
Die Punkte auf die Google Karte zeichnen

```
DE_Map + geom_point(aes(x = lon, y = lat),  
                     data = CampSites)
```



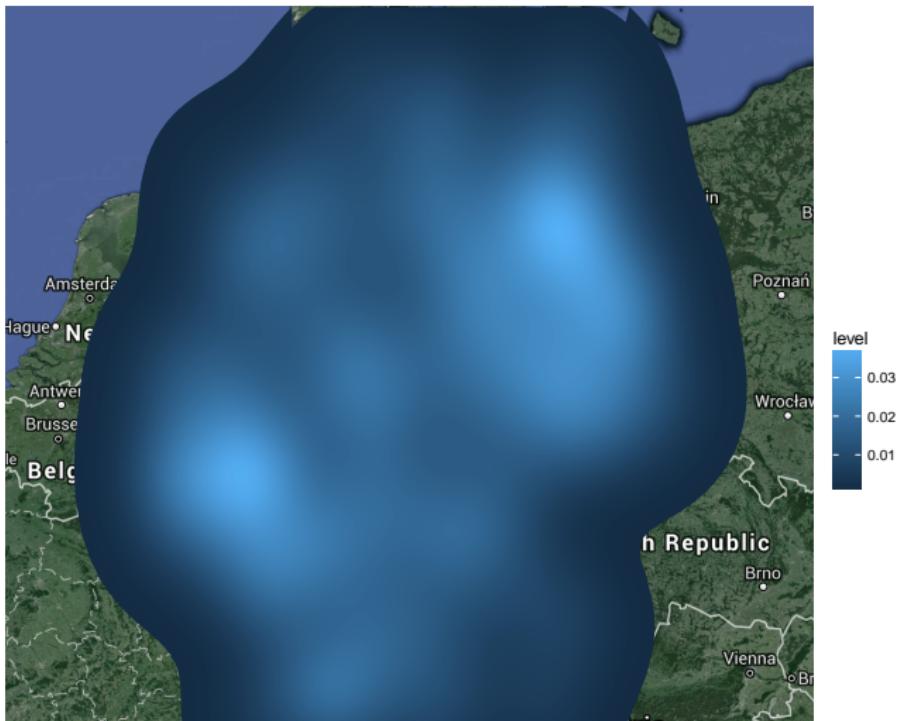
Einen Dichteplot zeichnen

```
DE_Map + geom_density2d(data = CampSites,
```



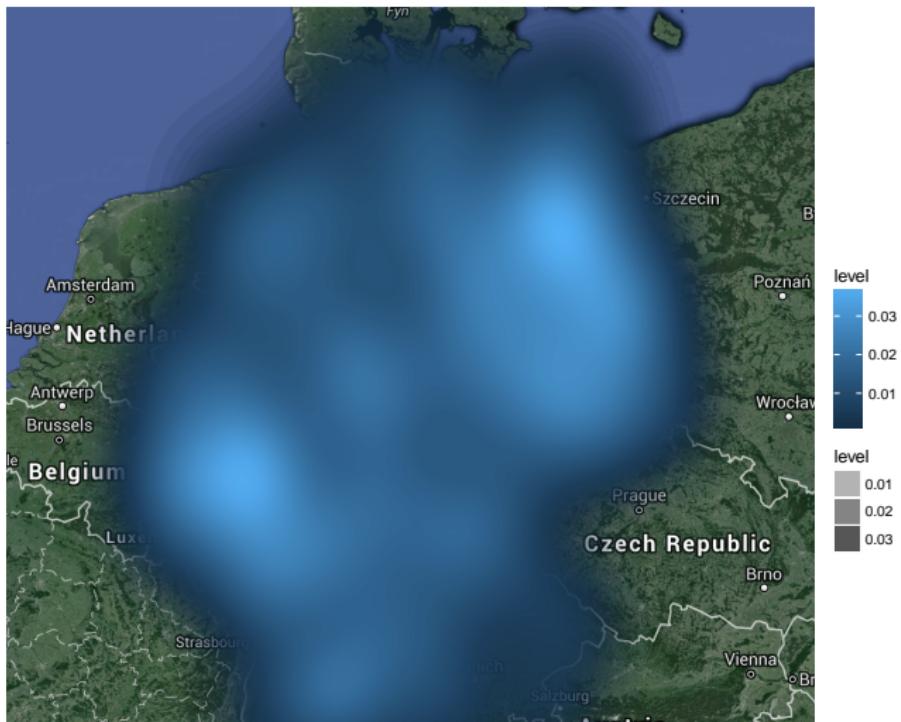
Einen anderen Dichteplot

```
DE_Map + stat_density2d(data = CampSites,  
aes(x = lon, y = lat, fill = ..level..), bins = 100,  
geom = 'polygon')
```



Einen anderen Dichteplot

```
DE_Map + stat_density2d(data=CampSites,  
                         aes(x=lon,y=lat,fill=..level..,  
                             alpha = ..level..),bins=80,geom='polygon')
```



Notwendige Pakete

magrittr - für den Pipe Operator in R:

```
library("magrittr")
```

```
##  
## Attaching package: 'magrittr'  
  
## The following object is masked from 'package:ggmap':  
##  
##     inset
```

leaflet - um interaktive Karten mit der JavaScript Bibliothek
'Leaflet' zu erzeugen

```
library("leaflet")
```

Eine interaktive Karte

```
m <- leaflet() %>%
  addTiles() %>%
  addMarkers(lng=CampSites$lon,
             lat=CampSites$lat,
             popup=CampSites$name)

m
```

Mehr Informationen hinzufügen

```
popupInfo <- paste(CampSites$name, "\n", CampSites$website)

m <- leaflet() %>%
  addTiles() %>% # Add default OpenStreetMap map tiles
  addMarkers(lng=CampSites$lon,
             lat=CampSites$lat,
             popup=popupInfo)

m
```

Das Ergebnis ist hier:

<http://rpubs.com/Japhilko82/CampSitesHL>

Die resultierende Karte

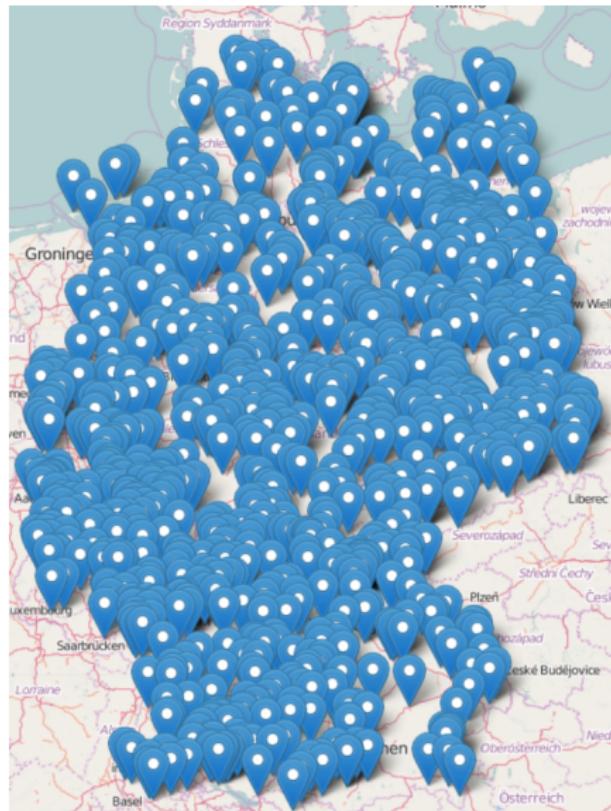
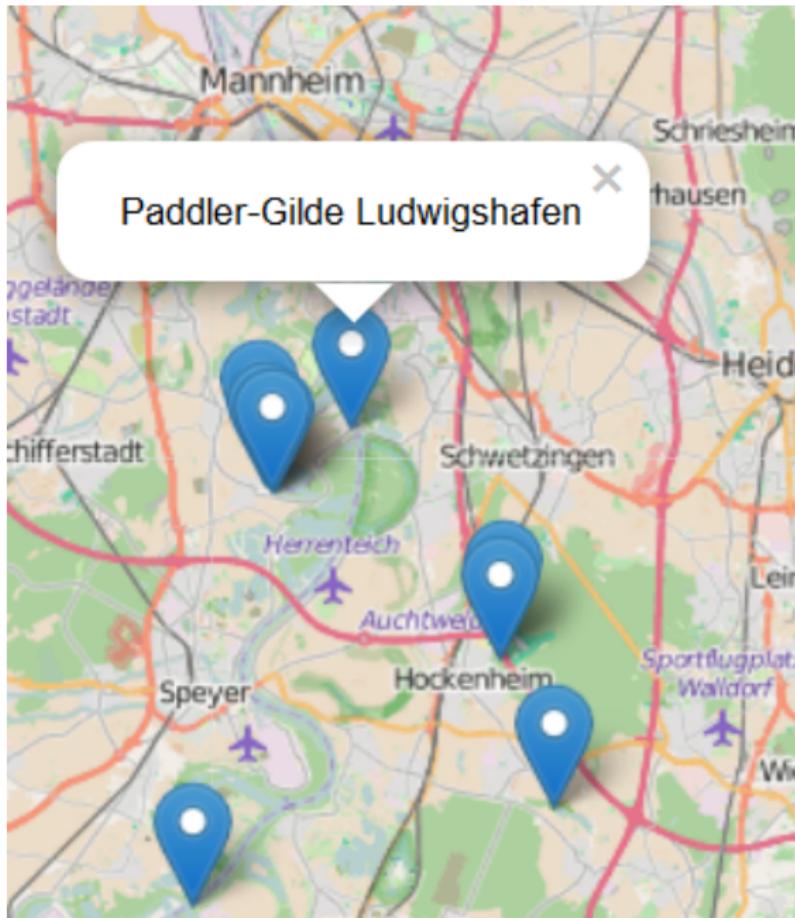


Figure 4: Campingplätze in Deutschland

Popups in einer interactiven Karte



Wie man auf Rpubs publizieren kann

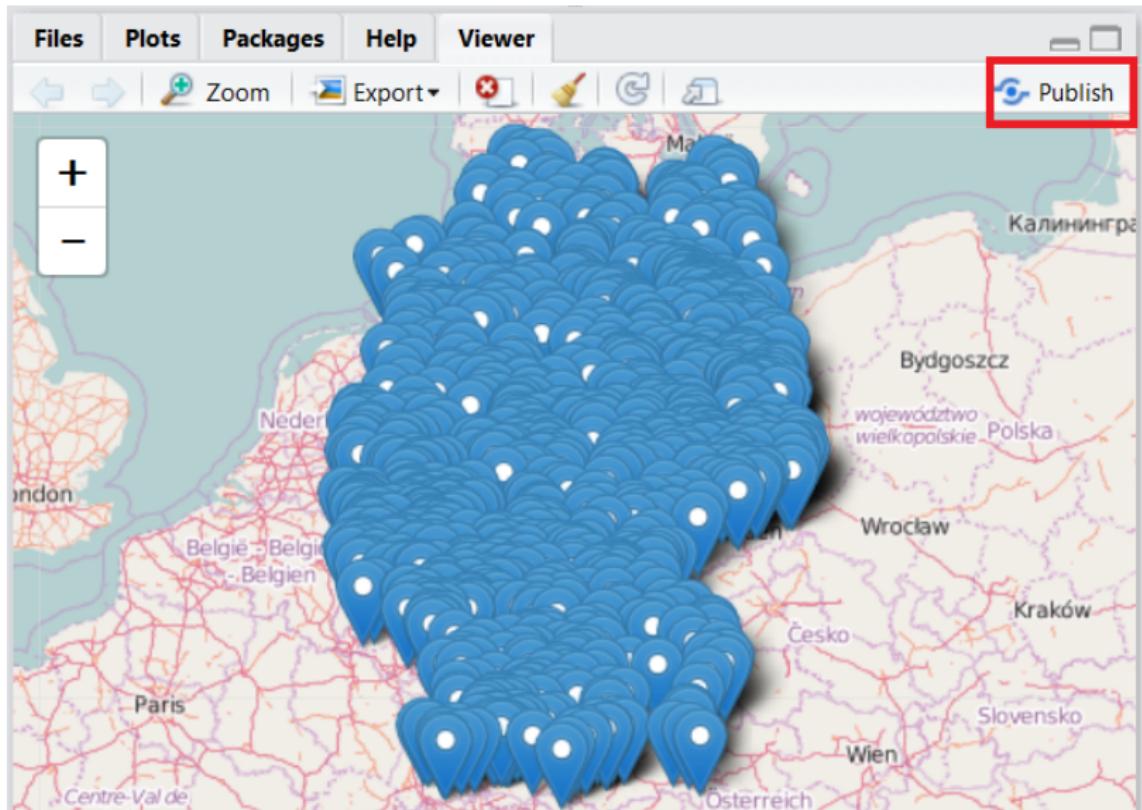


Figure 6: Publizieren auf Rpubs

Ein weiteres Beispiel - Weltkulturerbe

```
url <- "https://raw.githubusercontent.com/Japhilko/  
GeoData/master/2015/data/whcSites.csv"  
  
whcSites <- read.csv(url)
```

Eine interaktive Karte erstellen

```
m <- leaflet() %>%
  addTiles() %>% # Add default OpenStreetMap map tiles
  addMarkers(lng=whcSites$lon,
             lat=whcSites$lat,
             popup=whcSites$name_en)

m
```

Die Karte zeigen



Figure 7: Weltkulturerbestätten

Farbe hinzufügen

```
whcSites$color <- "red"  
whcSites$color[whcSites$category=="Cultural"] <- "blue"  
whcSites$color[whcSites$category=="Mixed"] <- "orange"
```

Eine Karte mit Farbe erzeugen

```
m1 <- leaflet() %>%  
  addTiles() %>%  
  addCircles(lng=whcSites$lon,  
             lat=whcSites$lat,  
             popup=whcSites$name_en,  
             color=whcSites$color)  
  
m1
```

Die Karte zeigen

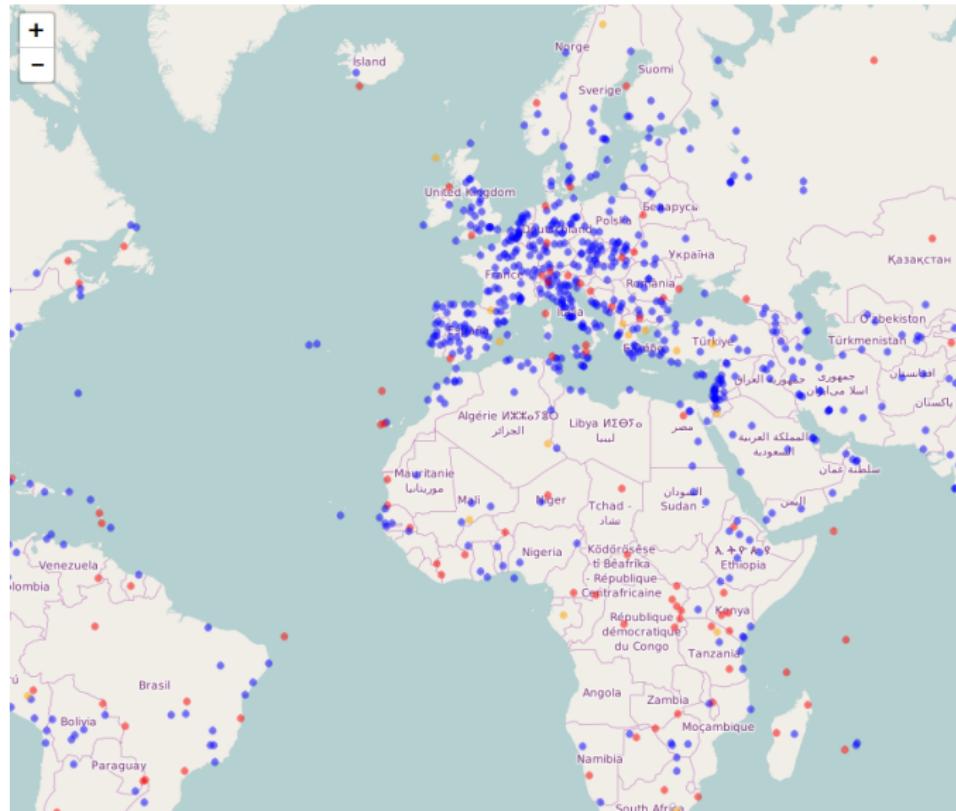


Figure 8: Karte Weltkulturerbe

Die Karte abspeichern

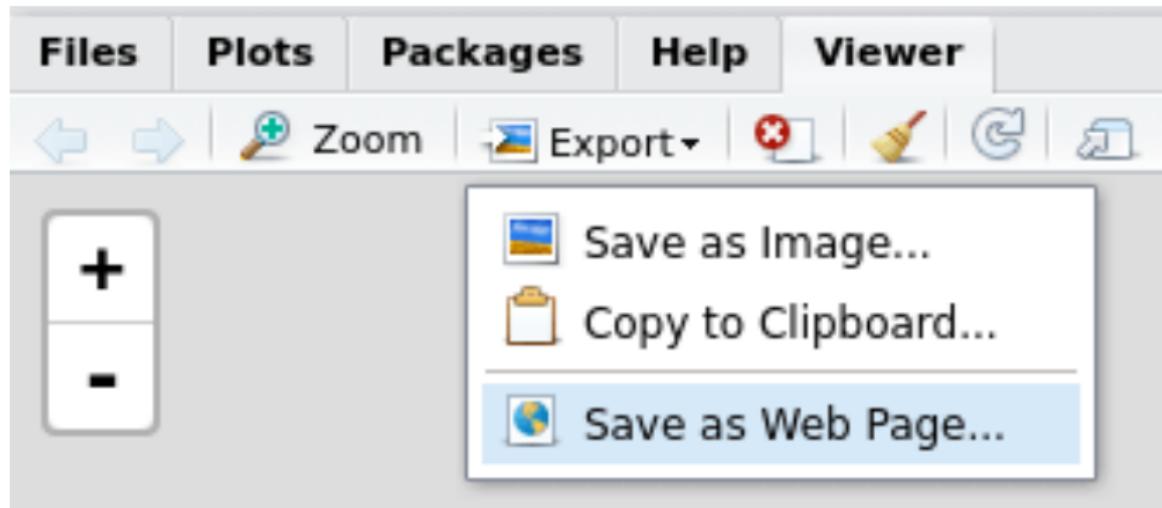


Figure 9: Als Website speichern

ggmap: Zwei Karten nebeneinander

```
url <- "https://raw.githubusercontent.com/Japhilko/  
GeoData/master/2015/data/whcSites.csv"  
UNESCO <- read.csv(url)
```

name_en

Cultural Landscape and Archaeological Remains of the Bamiyan Valley
Minaret and Archaeological Remains of Jam
Historic Centres of Berat and Gjirokastra
Butrint

Die Stätten für Deutschland

```
library(ggmap)
ind <- UNESCO$states_name_en=="Germany"
UNESCO_DE <- UNESCO[ind,]
```

Eine erste Karte zeichnen

```
library(ggplot2)  
DE_Map + geom_point(aes(x = longitude, y = latitude),  
                     data = UNESCO_DE)
```



Zwei Karten produzieren

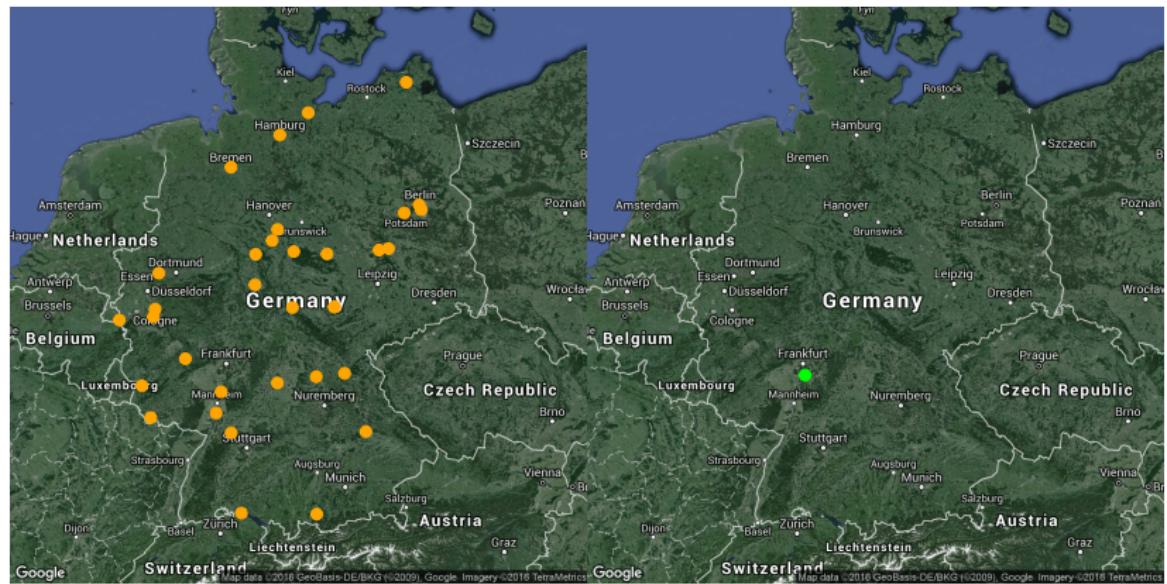
```
library(ggplot2)
DNunesco <- UNESCO_DE[UNESCO_DE$category=="Natural",]
DCunesco <- UNESCO_DE[UNESCO_DE$category=="Cultural",]

Csites <- DE_Map + geom_point(aes(x = longitude,
                                    y = latitude),
                               data = DCunesco,
                               col="orange", size= 3)

Nsites <- DE_Map + geom_point(aes(x = longitude,
                                    y = latitude),
                               data = DNunesco,
                               col="green", size= 3)
```

Zwei Graphiken nebeneinander

```
library(gridExtra)  
grid.arrange(Csites, Nsites, ncol=2)
```



Links und Quellen

- ▶ [http://www.r-bloggers.com/
the-leaflet-package-for-online-mapping-in-r/](http://www.r-bloggers.com/the-leaflet-package-for-online-mapping-in-r/)
- ▶ <https://rstudio.github.io/leaflet/>