

## Tie-ins between R and Openstreetmap data

### UseR 2016 Stanford

Jan-Philipp Kolb  
Jan-Philipp.Kolb@gesis.org

GESIS Mannheim

29. Juni 2016

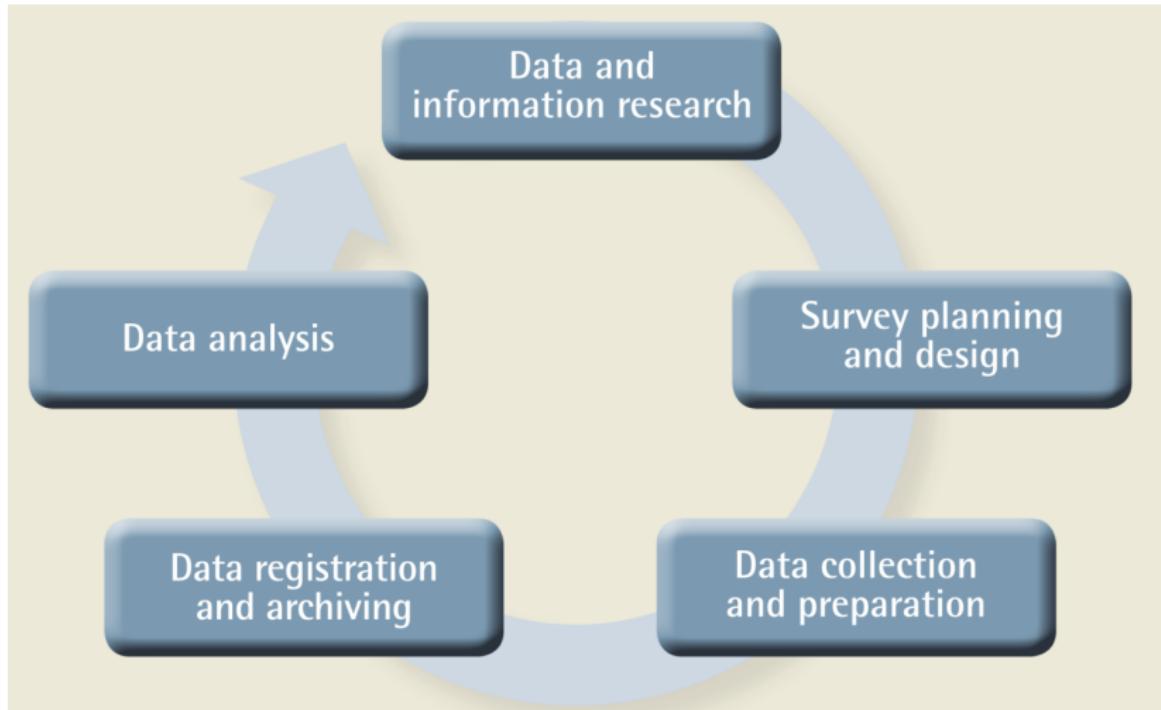


## Outline/Motivation

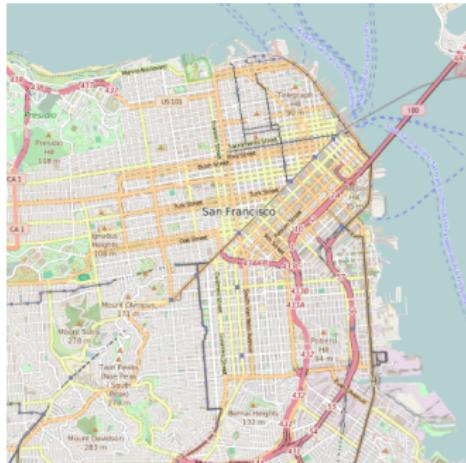


- 1 Gesis/Social Sciences
- 2 Get maps with `ggmap`
- 3 Openstreetmap
- 4 `osmar` and `sp`
- 5 Parse XML
- 6 `geosmdata` and `ggmap`
- 7 Conclusion/Outlook

## What is Gesis?



## Get maps with ggmap



**David Kahle and Hadley Wickham**

ggmap: Spatial Visualization with  
ggplot2

The R Journal (2013) 5/1 pp. 144-161

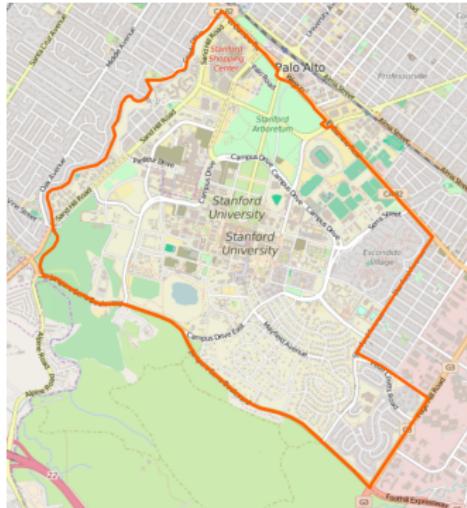
---

```
library("ggmap")
nbc <- "San Francisco"
nbc015 <- qmap(nbc, zoom=15,
                 source="osm")
```

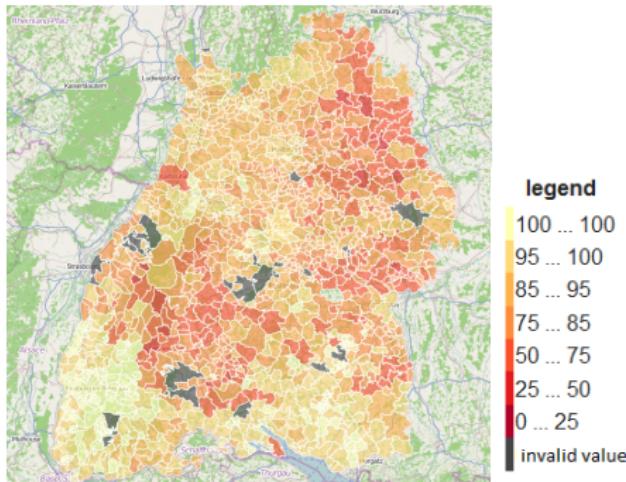
---

# Openstreetmap

- Web 2.0 mapping application - free project
- OSM aims to create a free digital map
- Volunteered Geographical Information
- Completeness of OSM-data



Source: [www.openstreetmap.org](http://www.openstreetmap.org)



Source: [http://regio-osm.de/listofstreets/kartenansicht.html?file=DE\\_BW](http://regio-osm.de/listofstreets/kartenansicht.html?file=DE_BW)

# Get the Geocode



## Google API

```
library("ggmap")
geocode("Stanford")
```

	lon	lat
1	-122.4194	37.77493



## Openstreetmap API

```
library("photon") # github package
geocode("Stanford University")
```

	lon	lat
1	-122.1702	37.42656

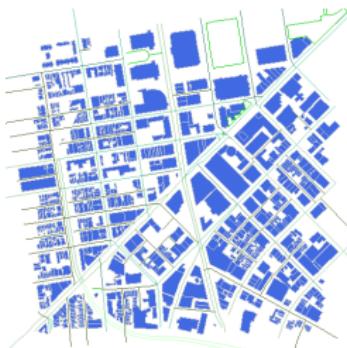
**Manuel J. A. Eugster and Thomas Schlesinger**

osmar: OpenStreetMap and R

The R Journal (2010) 5/1 pp. 144-161

**Roger S. Bivand, Edzer Pebesma, Virgilio Gomez-Rubio**  
(2013).

Applied spatial data analysis with R, Second edition. Springer, NY.  
<http://www.asdar-book.org/>

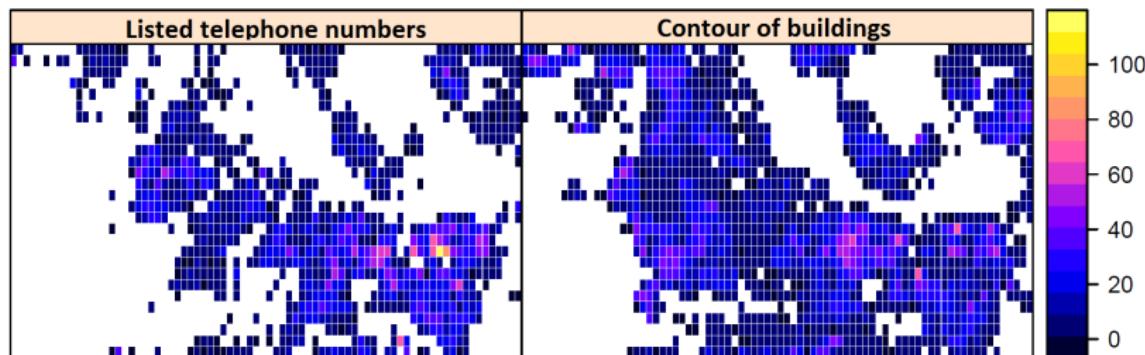


---

```
library("osmar")
nbc<- "San Francisco"
gc<- geocode(nbc)
bb<- center_bbox(gc$lon, gc$lat, 1000, 1000)
ua <- get_osm(bb, source = src)
...
bg_poly <- as_sp(bg, "polygons")
```

---

- Geocoding of addresses in telephone register
- OSM-Info on contours of buildings
- Number of telephone numbers/buidlings per grid



### Martijn Tennekes

tmap: Thematic Maps

R package version 1.4 (2016)

<https://CRAN.R-project.org/package=tmap>

---

```
src<-osmsource_api()
bb<-center_bbox(8.4,49.4,
                 1000,1000)
ua<-get_osm(bb,source=src)
MA<-getBuildingShapes(
  ua=ua,what="building")
plot(MA,col="orange")
```

---

Downtown San Francisco

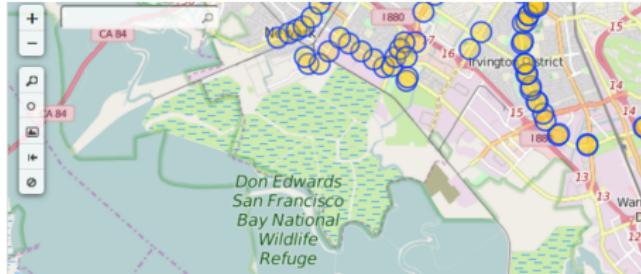


# Openstreetmap API Overpass



- Overpass API acts as a database over the web
- It has a powerful query language
- <https://overpass-turbo.eu/>

```
1  /*
2   This is an example Overpass query.
3   Try it out by pressing the Run
4   button above!
5   You can find more examples with
6   the Load tool.
7 */
8 node
9 [highway=bus_stop]
10 ({{bbox}});
11 out;
```



# The R package XML

```
3 <relation id="35820" visible="true" version="10" changeset="116473"
  <member type="way" ref="24763782" role="outer"/>
  <member type="way" ref="27520194" role="inner"/>
  <member type="way" ref="27520199" role="inner"/>
  <member type="way" ref="27520208" role="inner"/>
  <member type="way" ref="27520214" role="inner"/>
  <member type="way" ref="27520258" role="inner"/>
  <member type="way" ref="27520345" role="inner"/>
  <member type="way" ref="27520349" role="inner"/>
  <tag k="amenity" v="university"/>
  <tag k="building" v="yes"/>
  <tag k="created_by" v="Potlatch 0.10f"/>
  <tag k="name" v="Main Quad"/>
  <tag k="operator" v="Stanford University"/>
  <tag k="type" v="multipolygon"/>
</relation>
```

**Duncan Temple Lang and the CRAN Team (2016).**

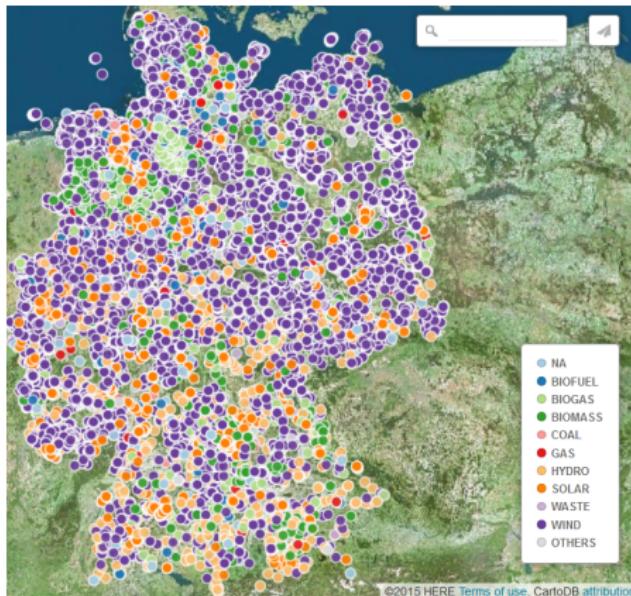
XML: Tools for Parsing and Generating XML Within R and S-Plus.

R package version 3.98-1.4.

<https://CRAN.R-project.org/package=XML>

# The geosmdata package (github)

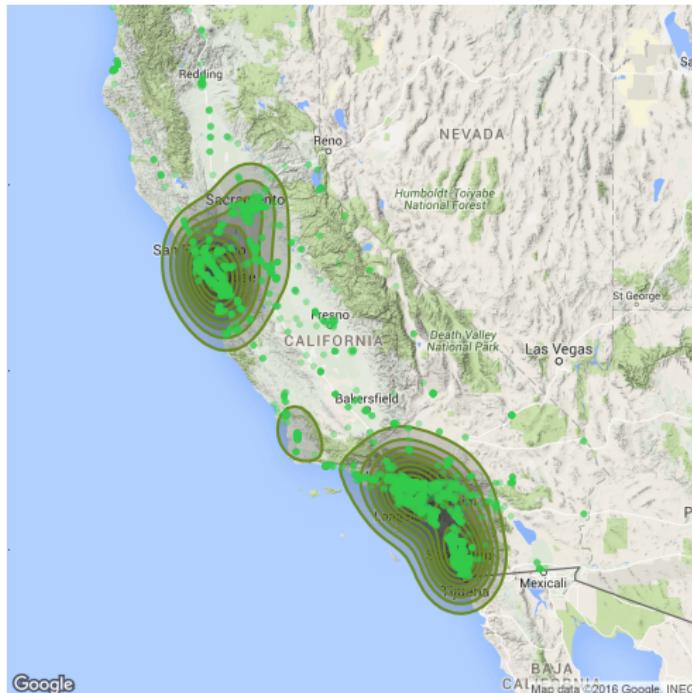
Openstreetmap: key=power; value=generator



More examples on <http://rpubs.com/Japhilko82/> or  
<https://japhilko.cartodb.com/>

## geosmdata and ggmap

Openstreetmap: key=amenity; value=fast\_food



# Conclusion/Outlook



PostgreSQL



- Online mapping services - great data treasure
- Wide variety of analysis options
- Many R-tools to manage heterogenous data (sp, raster, XML, ...)
- Interfaces with other programs/languages...
  - ...like PostgreSQL, PostGis to work with planet data
  - ...like htmlwidgets to realize interactive visualisations

Thank you for your attention!



Gesis  
Mannheim

Please contact me!

Jan-Philipp.Kolb@gesis.org

<https://github.com/Japhilko/GeoData>