

Spatial Visualisations Portfolio

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Outline



Spatial Turn
Research questions
Open Government
Neogeography
Examples Neogeography
Realisation
Conclusion

Laws of Spatial Science

Tobler's [Tobler, 1970] First Law of Geography (TFLG)

TFLG: "All things are related, but nearby things are more related than distant things"

Spatial Heterogeneity

"Second law of geography" [Goodchild, 2003].

Spatial Simpson's Paradox

Global model will always compete and may be inconsistent with local models.

Anyon (1982): social science should be empirically grounded, theoretically explanatory and socially critical.

http://www.biostatnepublic.com/author.asp?section_id=2948

<http://de.slideshare.net/rheimann04/big-social-data-the-spatial-turn-in-big-data>

Spatial turn

Explanation - spatial turn

Spatial turn is a term used to describe an intellectual movement that places emphasis on place and space in social science and the humanities.

Source: https://en.wikipedia.org/wiki/Spatial_turn

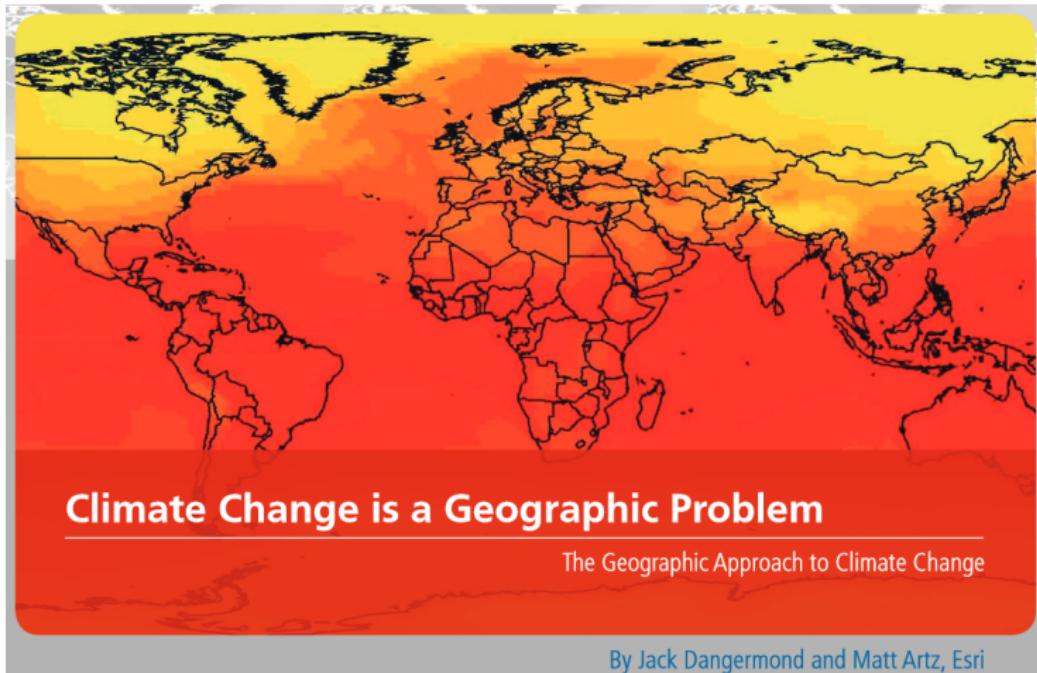
Spatial turn



- ◊ Profound and sustained transformation in study of space across the disciplines.
 - ◊ Space, place, mapping, and geographical imaginations have become commonplace topics in a variety of analytical fields in part because globalization has accentuated the significance of location.
- ⇒ Renaissance in human geography

See also:

<http://spatial.scholarslab.org/spatial-turn/>



Regional/geographical differences in the perception of...

- ▶ ... measures to promote climatic change
- ▶ ... big infrastructure projects

The research questions are not new but
Recently the picture has changed

Two reasons:

- ▶ Open Government development
More and more (semi-) administrative data is freely available
(Example for Europe: INSPIRE direction)
- ▶ Growing availability of data (Collaborative mapping,
wikification of GIS)

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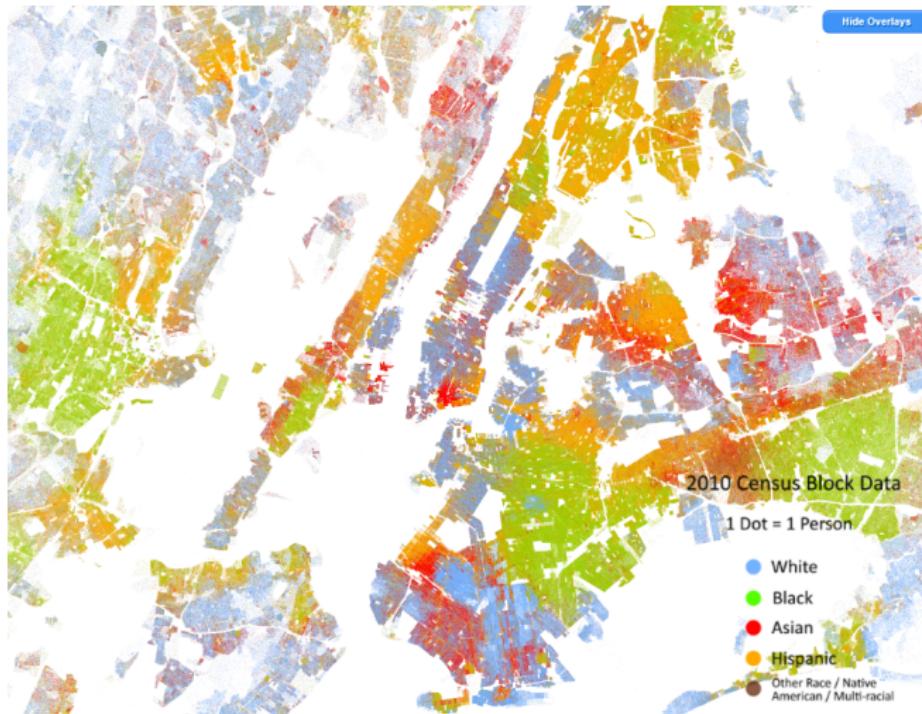
Neogeography

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One dot per Person - based on U.S. Census Data

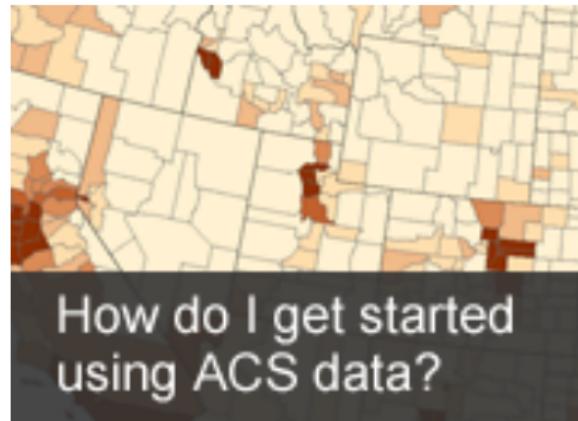


<http://demographics.coopercenter.org/DotMap/index.html>

Jan-Philipp Kolb Spatial Visualisations

American Community Survey

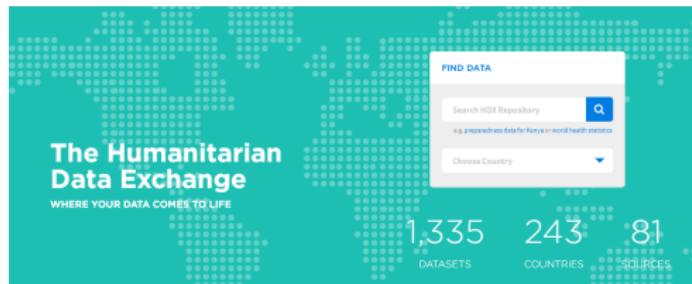
Data for the American Community Survey:



<http://www.census.gov/acs/www/>

The Humanitarian Data Exchange

data.hdx.rwlabs.org



Ebola

<https://data.hdx.rwlabs.org/dataset/rowca-ebola-cases>

London Datastore

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_datasets

Find data by location 
Map data © OpenStreetMap contributors.
Tiles by MapQuest.

Search datasets... 

591 datasets found Order by: Relevance

Monthly Mix-Adjusted Average House Prices, London Modified 2 days ago
Mix-adjusted house prices, by new/pre-owned dwellings, type of buyer and region, from February 2002 for London and UK, and average mix-adjusted prices by UK region. The data...
[XLS](#)

Index of Private Housing Rental Prices, Region Modified 2 days ago
The Index of Private Housing Rental Prices (IPHRP) is a quarterly experimental price index. It tracks the prices paid for renting property from private landlords in Great...
[XLS](#)

<http://data.london.gov.uk/dataset>

EU initiative INSPIRE



Targets:

- ▶ Make spatial information more accessible and interoperable
- ▶ support sustainable development

http://inspire.ec.europa.eu/reports/Registration_form.pdf

Results Census 2011



Download results for Census 2011¹

Community level: Population per gender, age group, marital status, nationality and religion

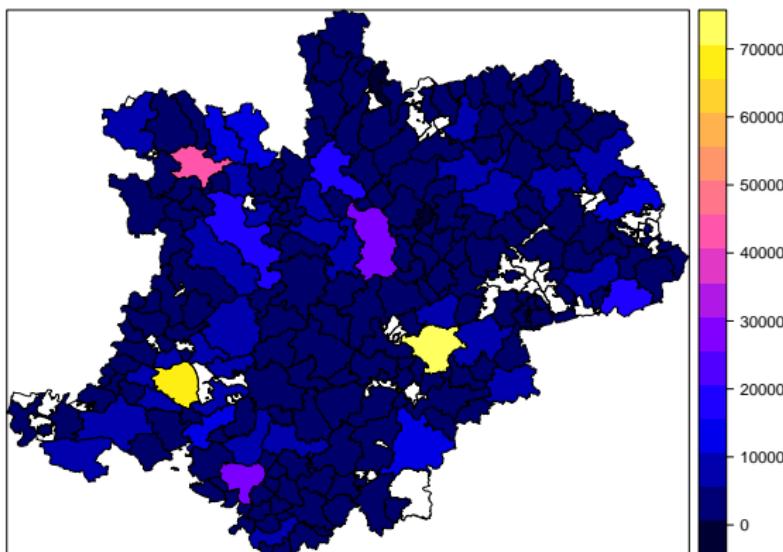
1 km² raster: Population, vacancy rate, living space and household size

100 m² raster: Population

¹ <https://www.zensus2011.de/SharedDocs/Aktuelles/Ergebnisse/DemografischeGrunddaten.html?nn=3065474>

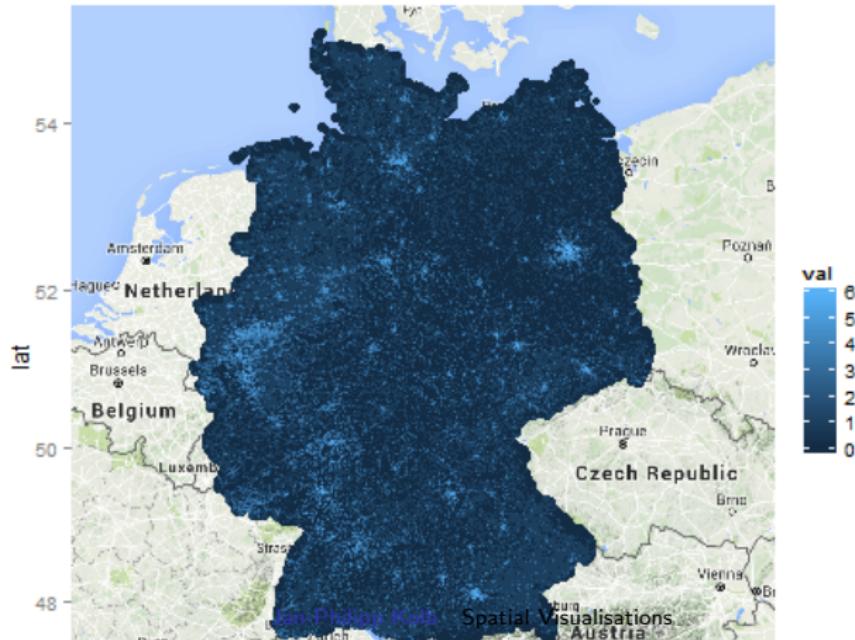
Census Results - Example

Population in Communities in Upper Franconia

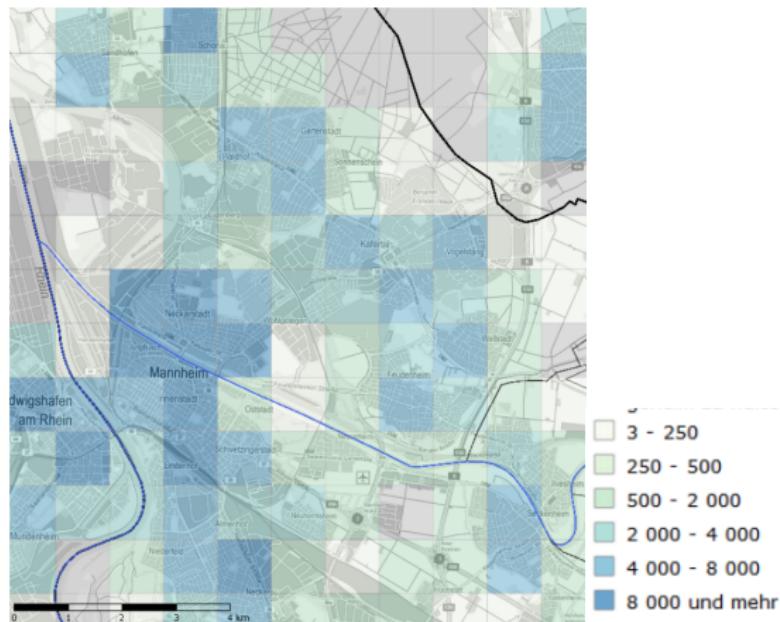


Census - raster based results

Population in Germany

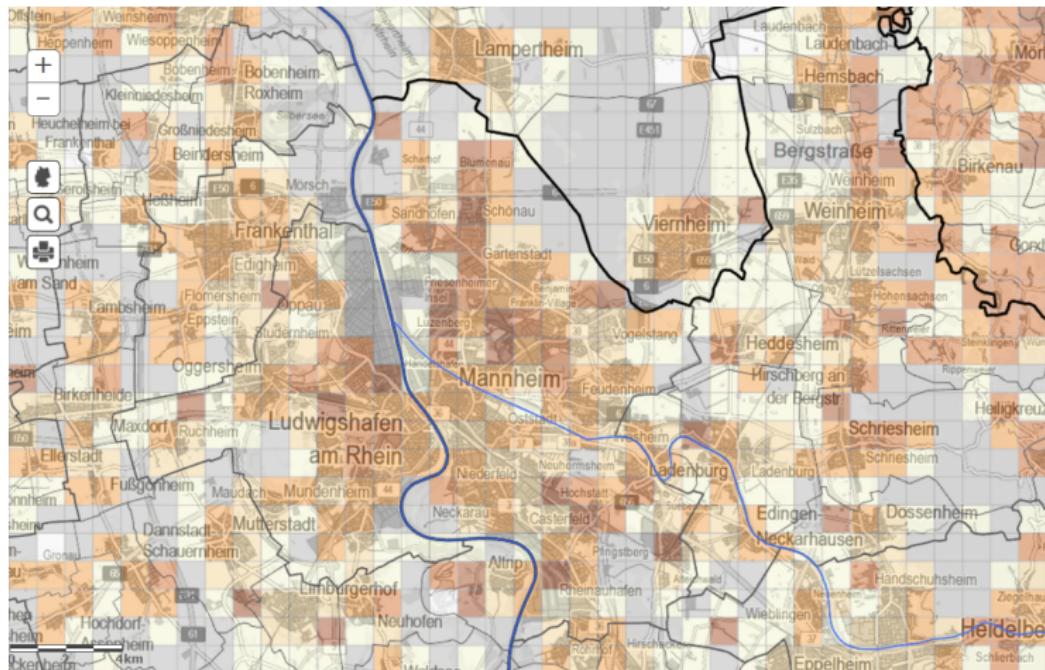


Population Mannheim

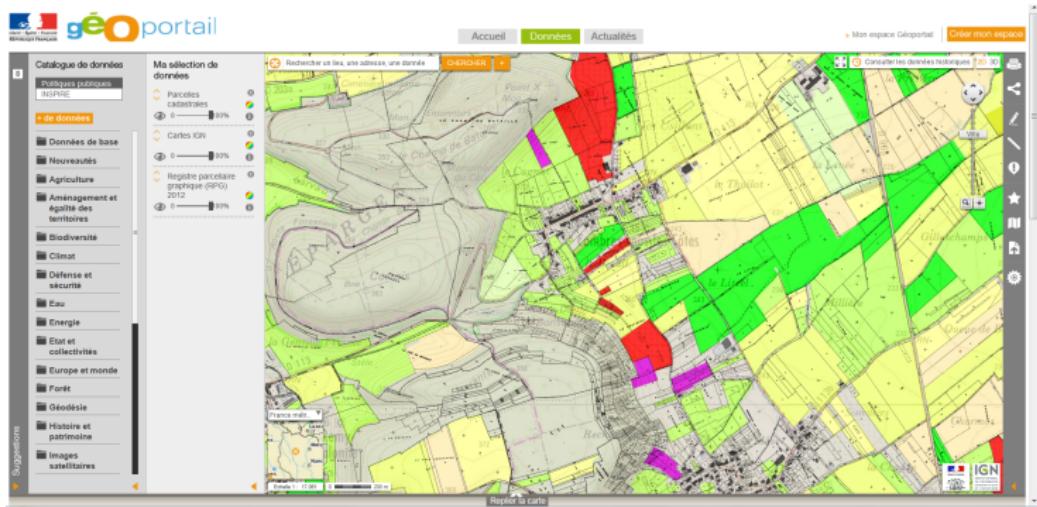


<https://atlas.zensus2011.de/>

Vacancy rate - housing



<https://atlas.zensus2011.de/>



<http://www.geoportail.gouv.fr/accueil>

Noise protection data (INSPIRE)



- ▶ European Environment Information and Observation Network
- ▶ Eionet - Central Data Repository²
- ▶ Strategic noise maps

²<http://cdr.eionet.europa.eu/de/eu/noise/df8/colvi7k8q>

Example Noise protection data

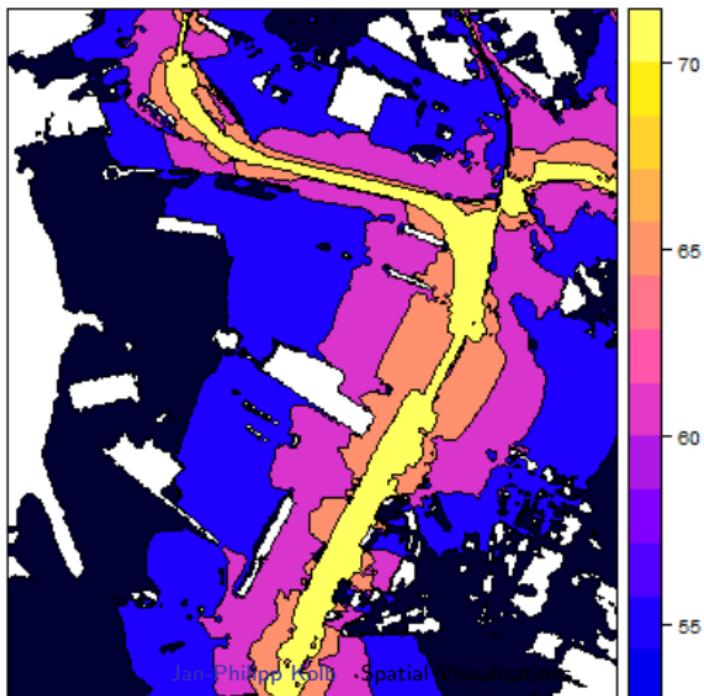
Deutsche Bahn - rail routes (Night)



Hamburg

Example Noise protection data

Deutsche Bahn - rail routes (Night)



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Buzz words

- ▶ Collaborative mapping
- ▶ Volunteered geographic information
- ▶ Wikification of GIS
- ▶ Gamification of geo
- ▶ Neogeography

Neogeography

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Short Cuts

Introduction to Neogeography

By Andrew J. Turner

Copyright © 2006 O'Reilly Media, Inc.

ISBN: 978-0-596-52995-6

Release Date: December 15, 2006

Neogeography combines the complex techniques of cartography and GIS and places them within reach of users and developers.

This Short Cut introduces you to the growing number of tools, frameworks, and resources available that make it easy to create maps and share the locations of your interests and history. Learn what existing and emerging standards such as GeoRSS, KML, and Microformats mean; how to add dynamic maps and locations to your web site; how to pinpoint the locations of your online visitors; how to create genealogical maps and Google Earth animations of your family's ancestry; or how to geotag and share your travel photographs.

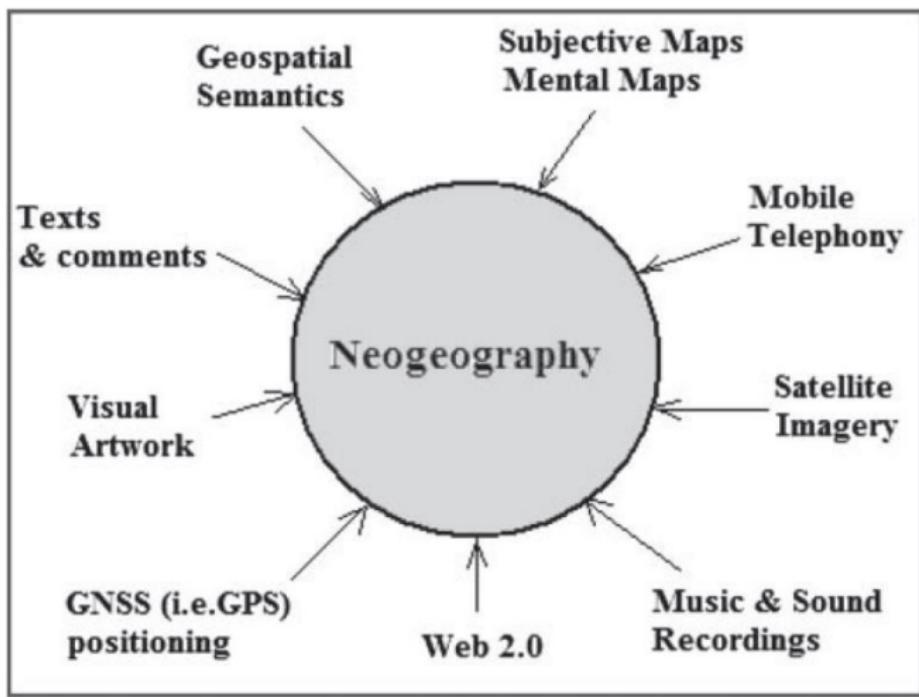
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Making Some Maps	24
Adding Location to Your Web Site.....	31
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Neogeography is about personal interaction with place

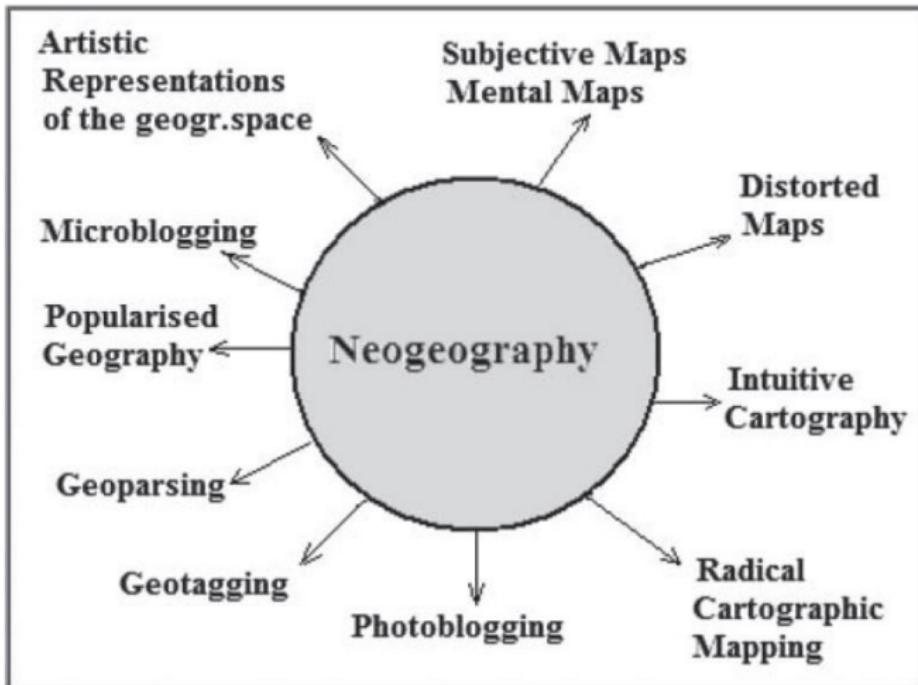


What is Neogeography?



<http://southwesterngis.blogspot.de/2012/09/neogeography-geography-and-art.html>

What is Neogeography



<http://southwesterngis.blogspot.de/2012/09/neogeography-geography-and-art.html>

Easy-to-use mapping tools

- ▶ MapQuest
- ▶ Yahoo!Maps
- ▶ gEarth
- ▶ Google Maps
- ▶ OpenStreetMap

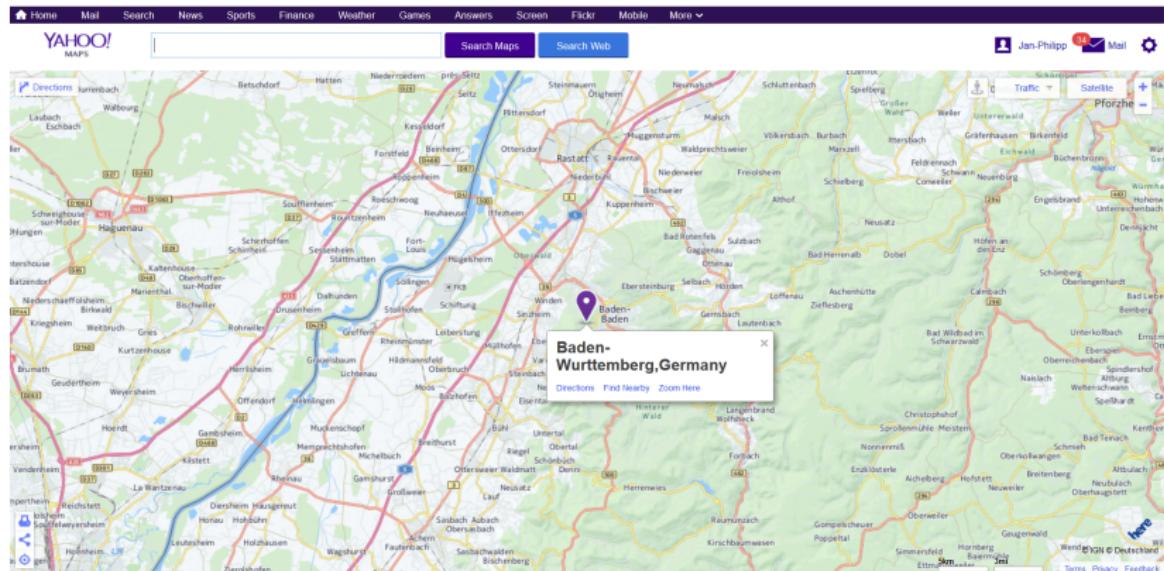
This mapping tools are good to get info about:

Current Events, Favorite places, traffic conditions, walking, hiking and bicycle tracks

Example MapQuest

The screenshot shows the MapQuest website interface. On the left, there's a sidebar with icons for 'Find Places', 'Get Directions', 'Layers', and a 'Find a hotel & save!' button. The main area has a search bar with 'Mannheim' typed in, a 'Find Places' button, and a 'Share' and 'Print' link. The map itself shows the city of Mannheim with several orange location markers indicating points of interest like restaurants and bars. Labels on the map include 'INNENSTADT', 'Katholisches Bürgerhospital', 'Elizabeth-Gymnasium', 'Mittelstraße', 'Schlossau', 'Stadtteil N.', 'Kunst', 'Kurpfalzstraße', 'Lamaygarten', 'Collini-Center', 'Collini Center', 'Friedrichstraße', 'Hebelstraße', 'B 44', 'B 38', and 'Lamay'. A legend at the top right includes icons for Layers, Daytime, Hotels, Food, Gas, Coffee, Grocery, Parking, Bars, Postal, and More.

Example Yahoo!Maps



Example gEarth



Maps with google



In February 2005 Google Maps was introduced which offered a fast-loading, tiled map display and a deep user interface.

Keyhole Markup Language (KML)

- ▶ Keyhole Markup Language (KML) is an XML notation for expressing geographic annotation and visualization within Internet-based, two-dimensional maps and three-dimensional Earth browsers.
- ▶ KML was developed for use with Google Earth, which was originally named Keyhole Earth Viewer.
- ▶ It was created by Keyhole, Inc, which was acquired by Google in 2004.
- ▶ KML became an international standard of the Open Geospatial Consortium in 2008.

http://en.wikipedia.org/wiki/Keyhole_Markup_Language

Maps with google

Wikification of GIS

Google's KML brought the Wikification of GIS

Mount, N., Harvey, G., Aplin, P., & Priestnall, G. (Eds.). (2008). Representing, modeling, and visualizing the natural environment. CRC Press.

OpenStreetMap

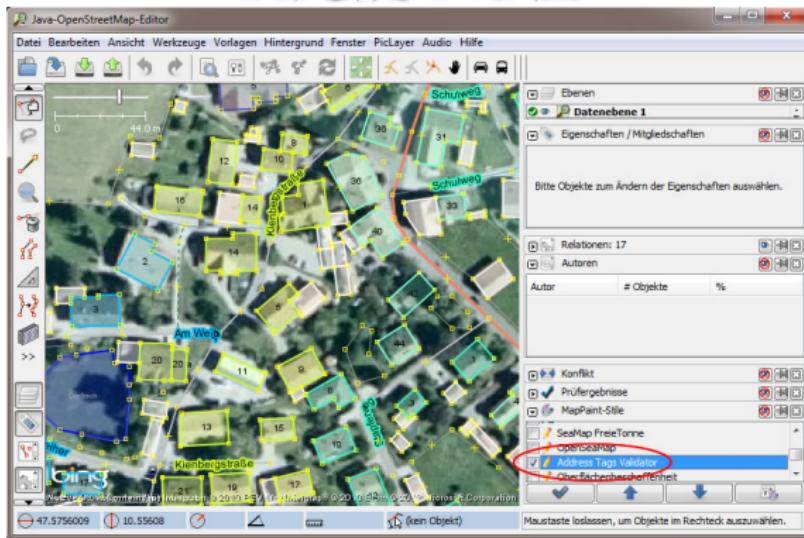
OpenStreetMap (OSM) is a collaborative project to create a free editable map of the world.

Two major driving forces:

- ▶ restrictions on use or availability of map information across much of the world and
- ▶ the advent of inexpensive portable satellite navigation devices.

<http://en.wikipedia.org/wiki/OpenStreetMap>

Example OpenStreetMap



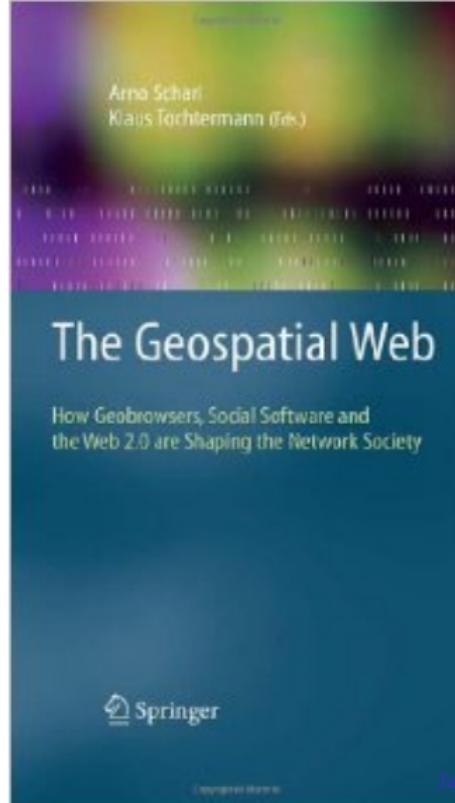
<http://www.segeln-mediterran.de/blog/wp-content/uploads/2012/11/josm014.jpg>

Wikification of GIS



- ▶ Quality and quantity of so-called Volunteered Geographic Information (VGI) is increasing

Literature - Collaborative Mapping



Persons are able to gather and add data to a central Web mapping.

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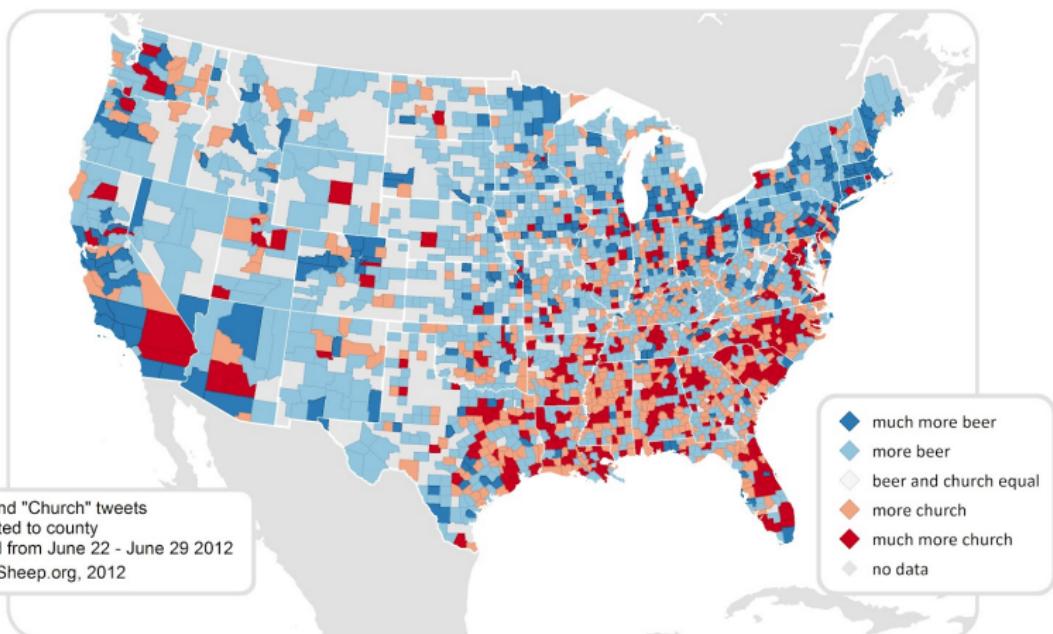
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Getting more practical

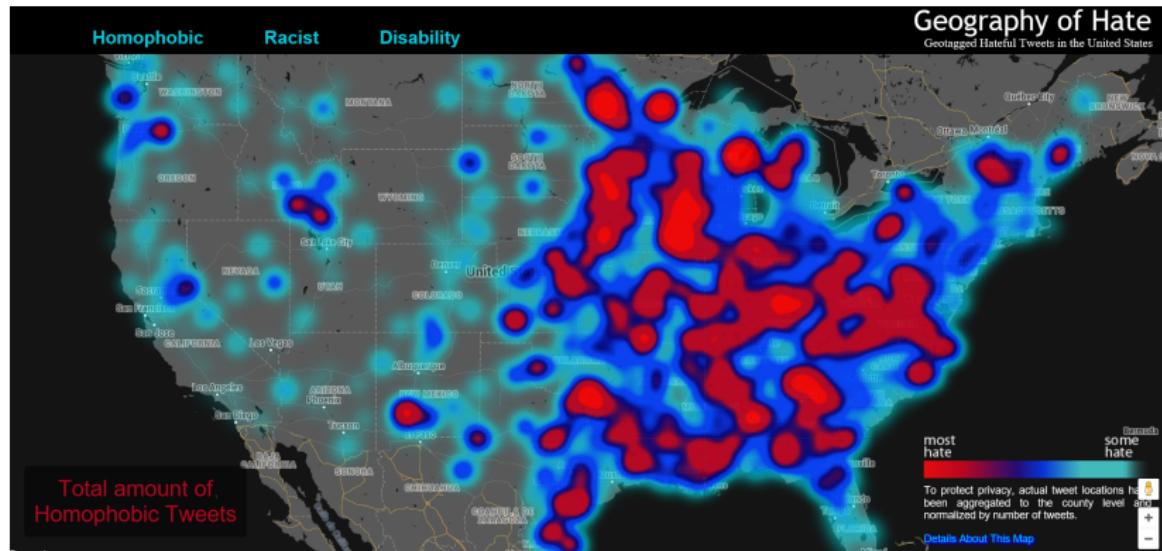
- ▶ Mapping web content
- ▶ Geotagging
- ▶ Mapping heterogeneous data which was not intended for geographic purposes

Mapping Tweets



Source: <http://www.floatingsheep.org/2012/07/church-or-beer-americans-on-twitter.html>

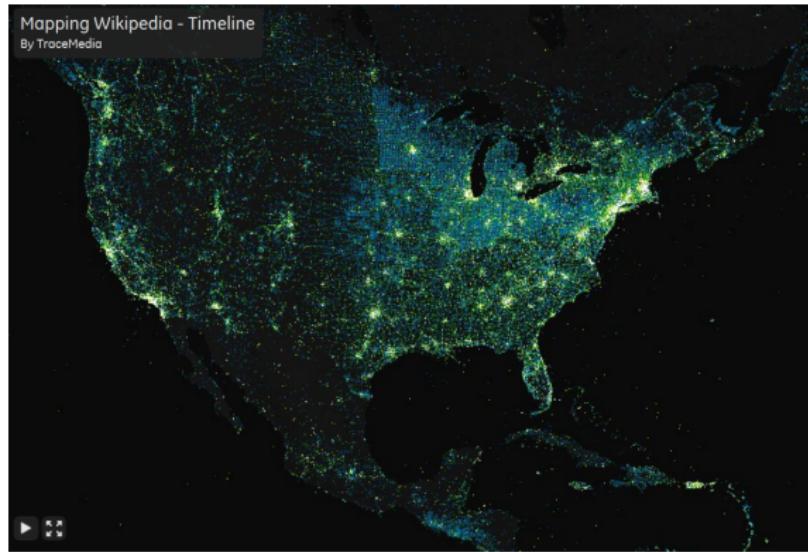
Mapping Tweets



Source: http://users.humboldt.edu/mstephens/hate/hate_map.html

Mapping Wikipedia

Mapping Wikipedia - Timeline visualises all the geo-located articles for a number of languages and maps article creation dates, showing how Wikipedia has evolved over time.



Source: <http://www.visualizing.org/visualizations/mapping-wikipedia-timeline>

Mapping Wikipedia

Mapping Wikipedia visualises all the geo-located articles for a number of languages.

This mapping highlights geo-linguistic contours and uneven geographies:

- ▶ regions that are densely populated with contested edits, and
- ▶ virtual deserts with sparse article coverage.

Mapping Wikipedia



Source: <http://www.visualizing.org/visualizations/mapping-wikipedia>

Mapping Wikipedia

Look at:

<http://tracemedia.co.uk/portfolio/mapping-wikipedia/>

for more details.

Mapping Wikipedia

TraceMedia

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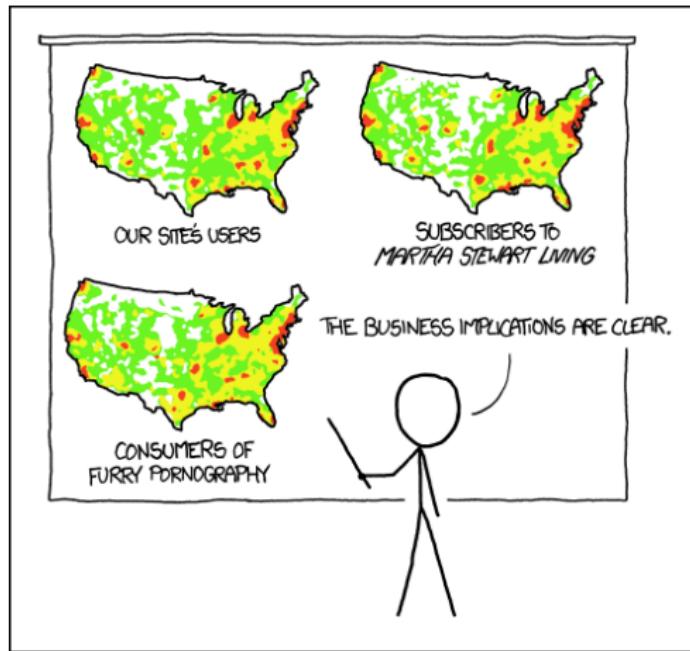


Projects

We specialise in visualisations, mapping and digital arts projects.
Our recent clients and collaborators include Oxford University, UCL, the OOI, the British Museum, and the



But...



PET PEEVE #208:
GEOGRAPHIC PROFILE MAPS WHICH ARE
BASICALLY JUST POPULATION MAPS

Flickr Map

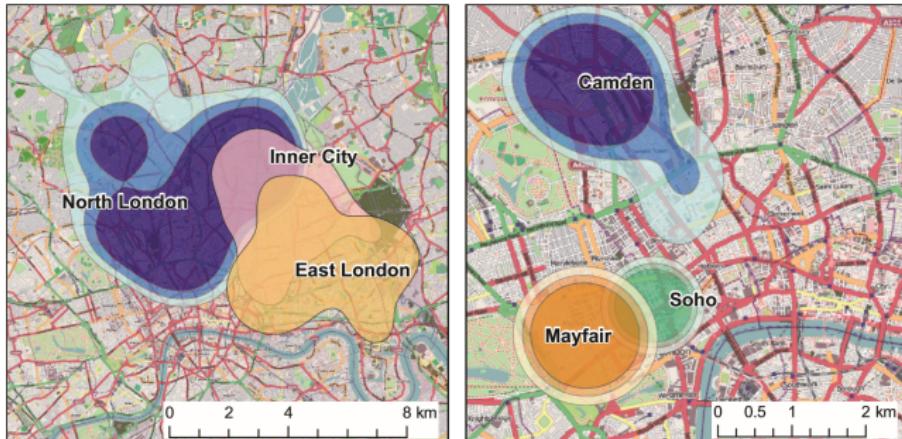
The Flickr API was used to generate temporal city level maps
The project explores the spatial structures of Flickr tags.



Source: <http://www.visualizing.org/visualizations/luminous-cities-flickr-tags>

Using Flickr tags to describe city cores

Livia Hollenstein and Ross S. Purves:
Exploring place through user-generated content



Source: <http://www.josis.org/index.php/josis/article/view/13/26>

Vernacular Geography

JAROFFACTS.COM

Vernacular geography is
the sense of place that
is revealed in ordinary
people's language.



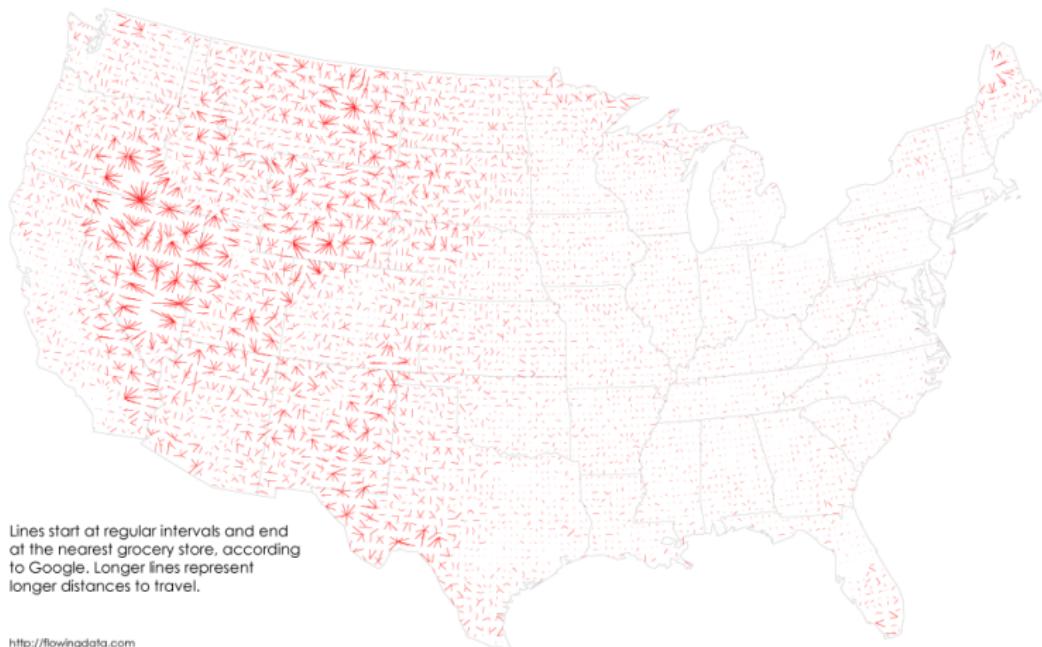
<http://www.jaroffacts.com/open.php?tag=vernacular>

Example RunKeeper - Where People Run in Paris



Source: <http://flowingdata.com/2014/02/05/where-people-run/>

In search of food deserts



Application programming interface (API)

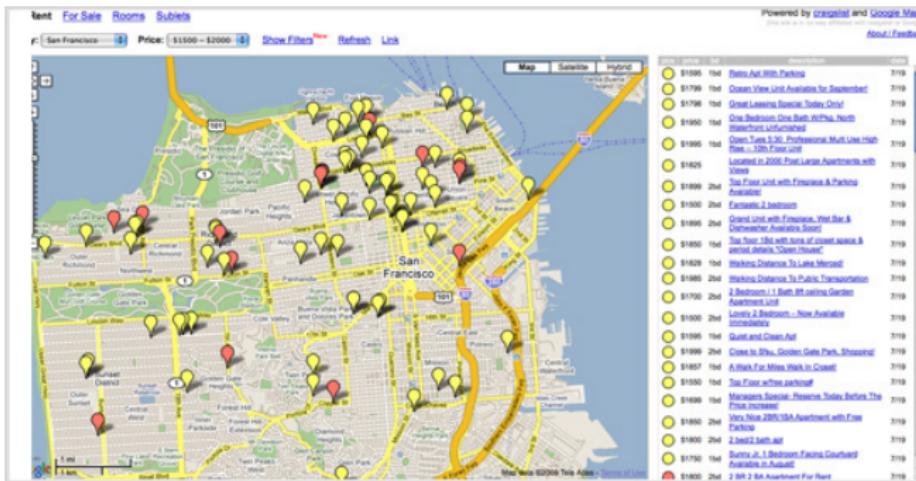
API's allow developers and users to quickly and easily show geographically based data on shareable maps.

→ **Mashups**

First examples of mapping mashups:

- ▶ Housing Maps
- ▶ ChicagoCrime.

Housing Maps



http://media.onsugar.com/files/ons1/192/1922507/29_2009/70e58c3087938704_Housing-Maps.jpg

Example OpenStreetMap Data



- ▶ The data from OpenStreetMap can be used with an API.
- ▶ R-Package `osmar` is the implementation for R
- ▶ It is also possible to use the Overpass API

Example OpenStreetMap Data

Landuse Neunkirchen am Sand



Source: OpenStreetMap

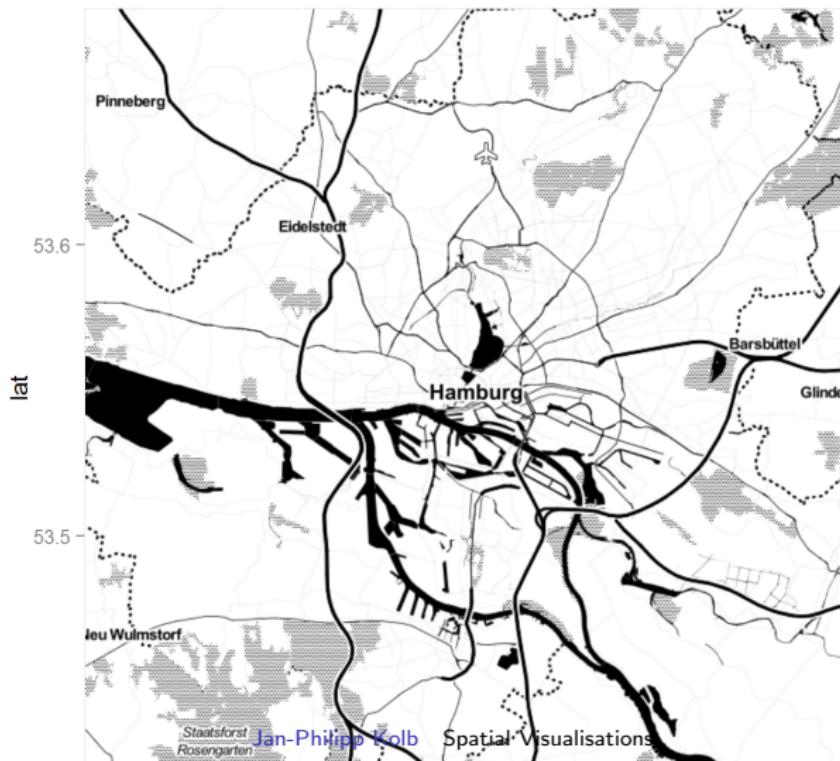
Example - Using the Overpass API

```
library(devtools)
devtools::install_github("Japhilko/GeoData/geosmdata2")
```

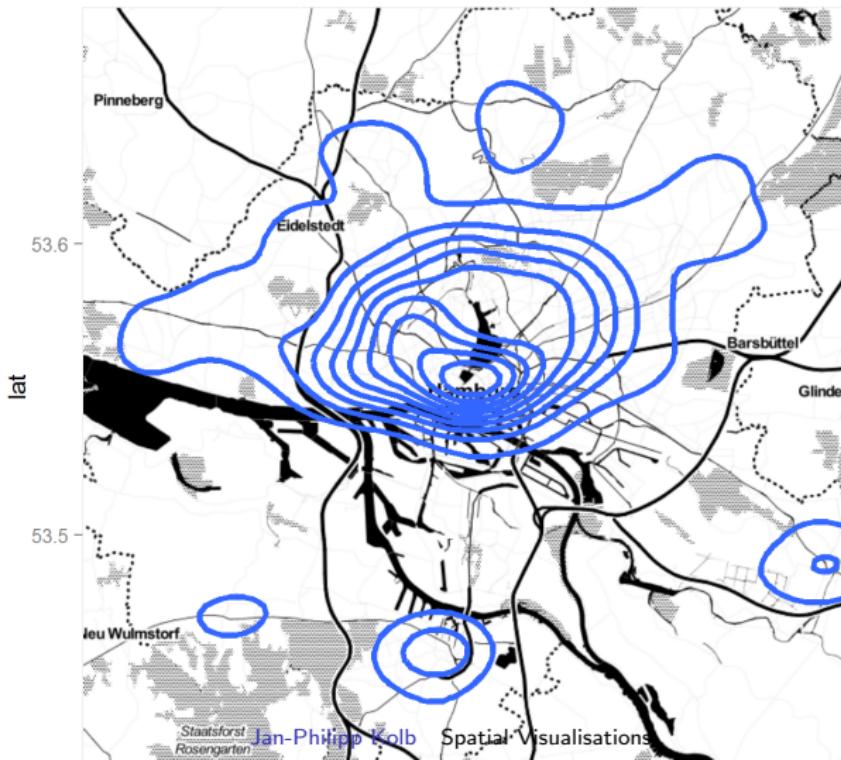
Example - Bakeries in Hamburg

```
library(geosmdata2)
place <- "Hamburg"
object <- "bakery"
xml_obj <- get_osm_nodes(object, place)
info <- extract_info_op(xml_obj, "bakery")
```

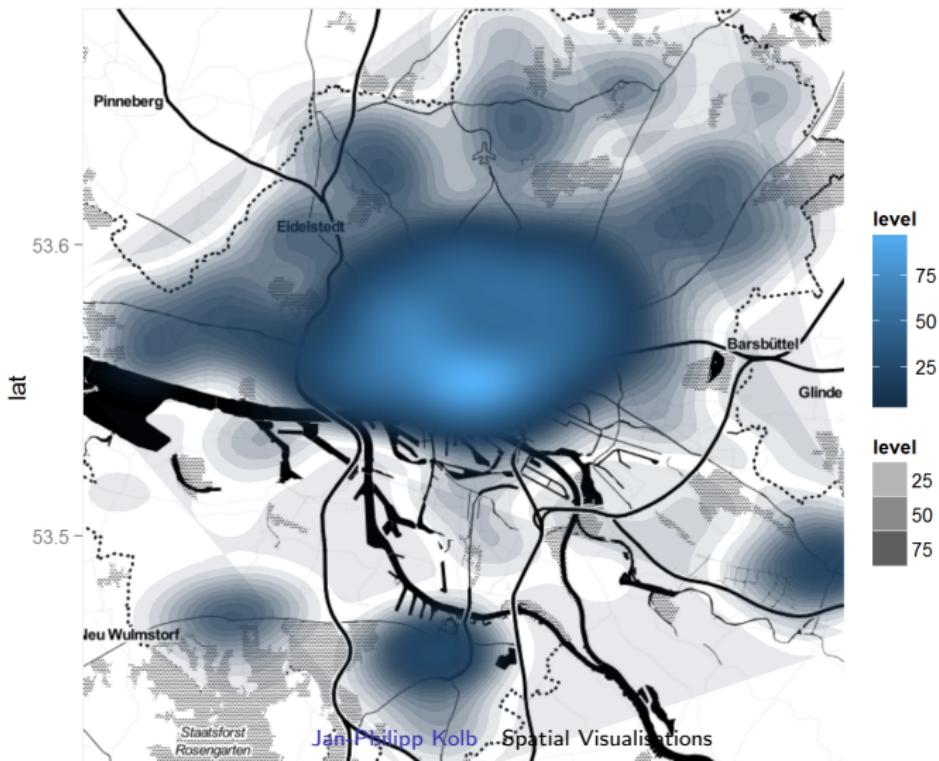
The results: bakeries in Hamburg



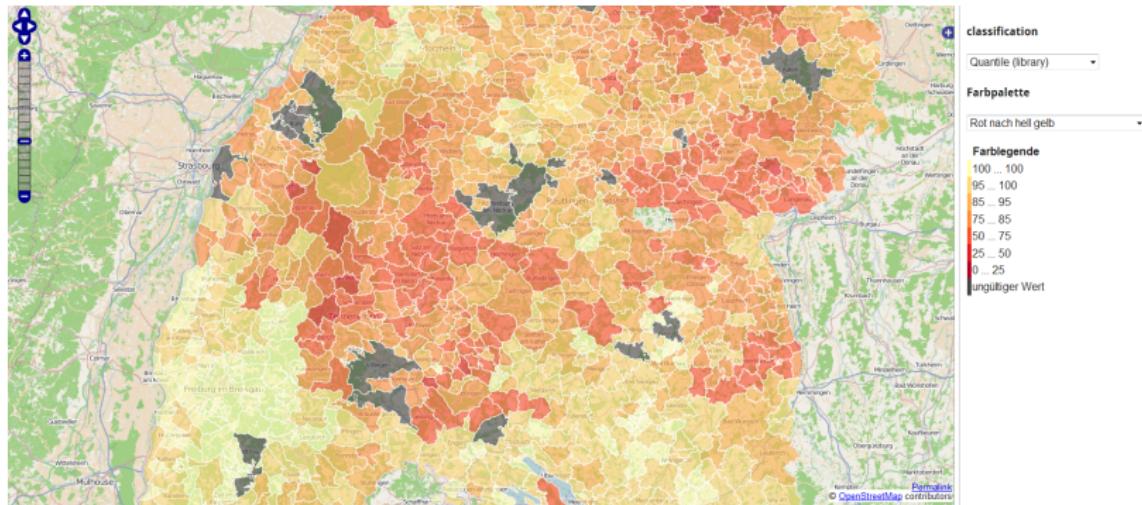
The results: bakeries in Hamburg



The results: bakeries in Hamburg



Completeness of OSM-data



http://regio-osm.de/listofstreets/kartenansicht.html?file=DE_BW

Conclusion

- ▶ Putting data in geospatial context unlocks insight
- ▶ Location teaches us more about what we are analyzing
- ▶ Adhere to statistical assumptions and avoid misspecification in our models