

# Spatial Visualisations

## Types of maps

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Monday, October 20, 2014



# The 5 Themes of Geography

## Definition

The five governing themes of geography are Movement, Region, Human Environment Interactions, Location, and Place.

## Movement

- The movement of individuals across any given scale

## Region

- An area distinguished by a unique combination of trends or features.

## Human Environment Interaction

- The effects humans have on the environment

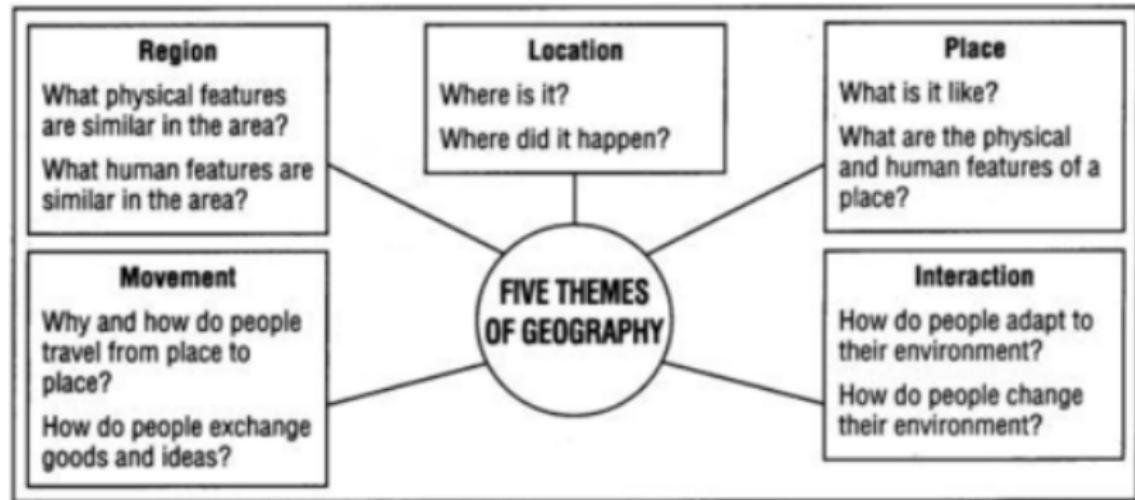
## Location

- The position of anything on Earth's surface.

## Place

- A specific point on Earth distinguished by a particular character.

# The 5 Themes of Geography



<http://apmodels.wikispaces.com/Introduction+To+Geography>

# Outline

Historic maps

Political maps

Road maps

Physical maps

Topographic maps

Thematic maps

Climate maps

## Historic maps



Source: <http://de.slideshare.net/ajturner/how-neogeography-killed-gis>

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## The Fra Mauro map



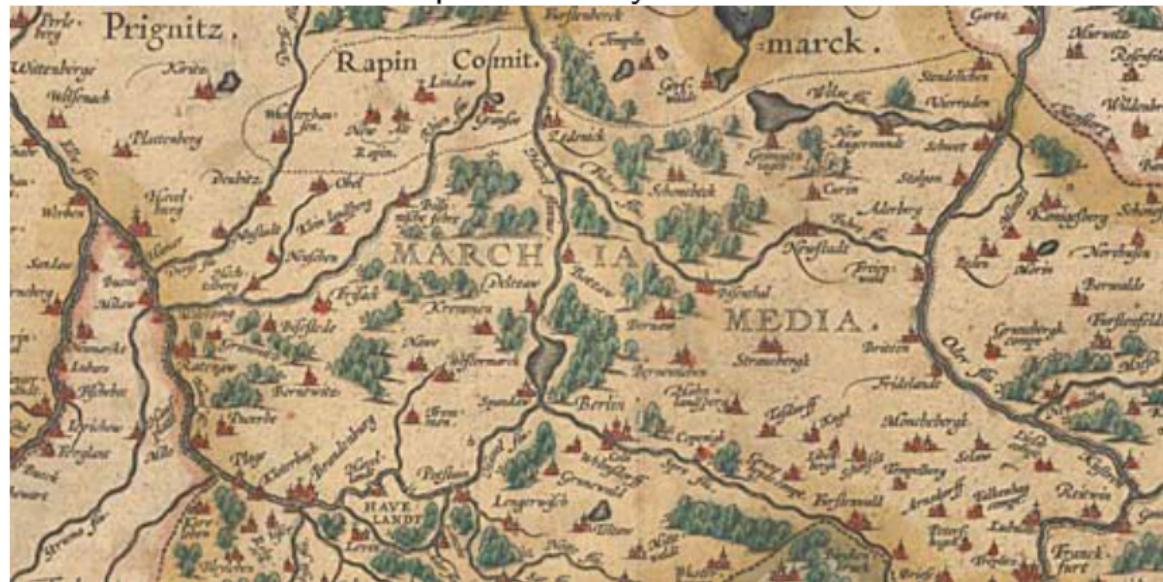
.... was made around 1450 by the Venetian monk Fra Mauro.

Source: [http://en.wikipedia.org/wiki/History\\_of\\_cartography](http://en.wikipedia.org/wiki/History_of_cartography)

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## Use of maps since long time

Map from the year 1588



# Use of maps - time perspective



Mitteueropa zu Beginn der Französischen Revolution 1789

## Cantino planisphere



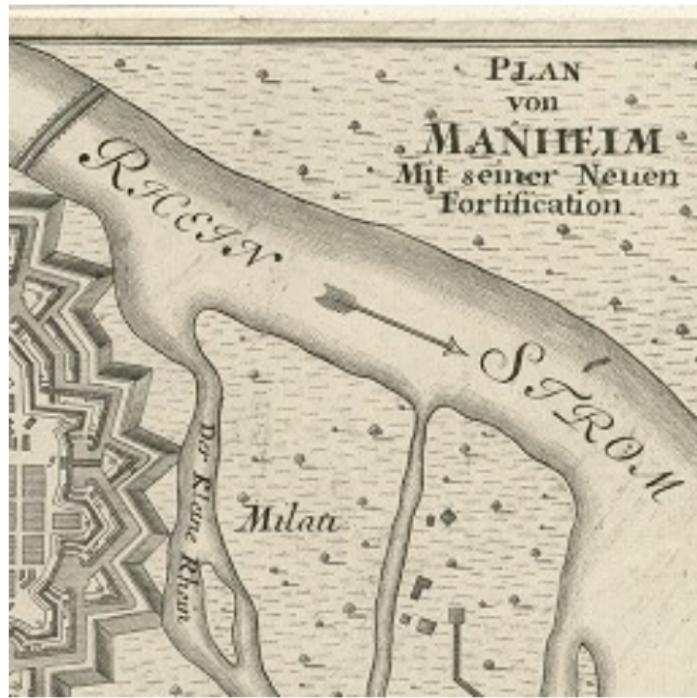
Source:

[http://en.wikipedia.org/wiki/Age\\_of\\_Discovery](http://en.wikipedia.org/wiki/Age_of_Discovery)

created 1502, earliest chart showing explorations of...

- ▶ Columbus to Central America,
- ▶ Corte-Real to Newfoundland,
- ▶ Gama to India and
- ▶ Cabral to Brazil.

## Historic map of Mannheim



<http://mapy.mzk.cz/mzk03/001/057/653/2619317972/>

[oldmapsonline.org](http://www.oldmapsonline.org/)

The screenshot shows the homepage of Old Maps Online ([www.oldmapsonline.org/](http://www.oldmapsonline.org/)). The main feature is a historical map of the Rhine-Main region of Germany, specifically from 1704-1715. The map is detailed, showing numerous towns, rivers, and geographical features. A search bar at the top allows users to search by year (1600-2010) or name. To the right, there is a sidebar with several thumbnail images of other historical maps from the collection, each with a brief description. Some of the maps shown include:

- Geographica Provinciarum Suevia Descriptio • 1704-1715 • Baden-Württemberg
- Landkartenabdrückung 1893-1905 • Bibliothek Innsbruck
- Wertstellung der Linie auf der Inseln von Bruchsal bis Ketsch • 1733-1734 • Rommels, Johann Baptista • ddc:1
- Monachium institutum oppidum ex hoc anno de rebus ecclesiasticis et politicis conditum Rheni et Niceti, Iusta recentissimum delineatum • 1730-1736 • per Matthaeum Seutter
- Germany [Town plan of], Worms • 1744 • [London] : Wal. Orme
- Monachium 1733-1740 • Scherer, Matthaeus
- Monachium 1730-1736 • per Matthaeum Seutter

<http://www.oldmapsonline.org/>

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# Political Map

## Political Map:

- ▶ A political map does not show any topographic features.
- ▶ It focuses on the state and national boundaries of a place.
- ▶ Include locations of cities - both large and small, depending on the detail of the map.

A common type of political map would be one showing the 50 U.S. states and their borders along with the United States' north and south international borders (map of the United States).

# Political maps



Source: <http://www.trumus.biz/tag/north-america-political-map-quiz>

## Political maps



Source: <http://www.worldatlas.com/atlas/infopage/politphys.htm>

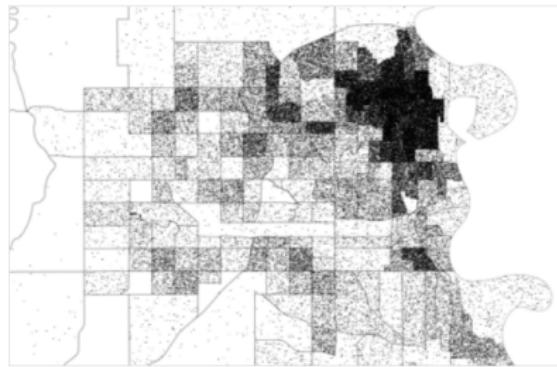
## Political maps - changing borders



[http://www.youtube.com/watch?v=uxDyJ\\_6N-6A](http://www.youtube.com/watch?v=uxDyJ_6N-6A)

## Choropleth maps

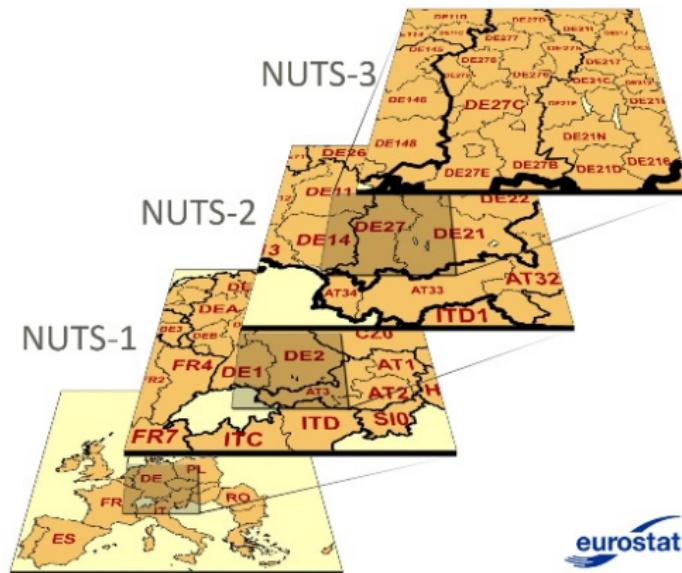
Choropleth maps are useful to show values for areas on a map, but they can be limited. In contrast, dot density maps are sometimes better for showing distributions within regions.



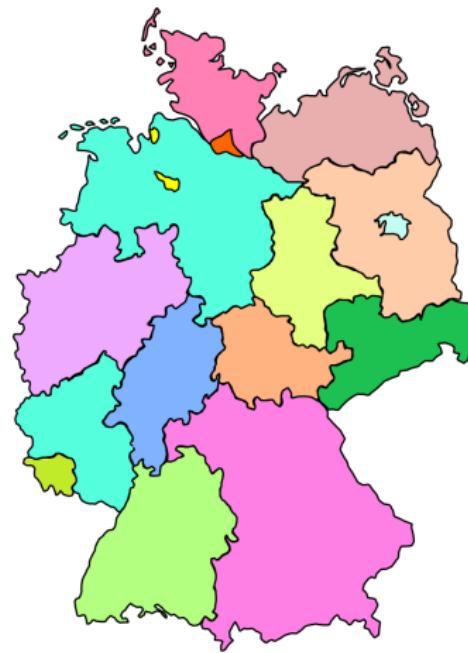
Source: <http://flowingdata.com/2014/08/28/how-to-make-dot-density-maps-in-r/>

## NUTS - level of information

The information published in the GADM database goes down to NUTS 3 level which are smaller regions and large cities.



## NUTS 1 level - Germany



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## Road Map

A road map is one of the most widely used map types. These maps show major and minor highways and roads (depending on detail) as well as things like airports, city locations and points of interest like parks, campgrounds and monuments. Major highways on a road map are generally red and larger than other roads, while minor roads are a lighter color and a narrower line.

# Road Map

A road map of San Francisco, California for example would show the major highways as a wide red line and other large roads as a lighter red with minor streets as gray



Source: [http://smart-traveler.info/map\\_of\\_san\\_francisco\\_ca\\_usa.html](http://smart-traveler.info/map_of_san_francisco_ca_usa.html)

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## Physical maps

Physical maps illustrate the physical features of an area, such as the mountains, rivers and lakes.

Colors are used to show relief differences in land elevations.

- ▶ The water is usually shown in blue.
- ▶ Green is typically used at lower elevation and
- ▶ orange or brown indicate higher elevations.

Source: <http://www.factmonster.com/world/geography/types-maps.html>

## Physical maps

This satellite image is similar to a physical map as it shows physical features and terrain clearly.



Source: <http://geography.about.com/od/understandmaps/a/map-types.htm>

## Physical map of India



Source: <http://www.freeworldmaps.net/asia/india/map.html>

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# Topographic Map

## Topographic Map:

A topographic map is similar to a physical map in that it shows different physical landscape features.

They are different however because they use contour lines instead of colors to show changes in the landscape.

Contour lines on topographic maps are normally spaced at regular intervals to show elevation changes (e.g. each line represents a 100 foot (30 m) elevation change) and when lines are close together the terrain is steep.

## Topographic Map

For example a topographic map showing the Big Island of Hawaii would have contour lines that are close together near the steep, high elevation mountains of Mauna Loa and Kilauea (map of the Big Island). By contrast, the low elevation, flat coastal areas show contour lines that are spread apart.



Source: [http://commons.wikimedia.org/wiki/File:Hawaii\\_islands\\_topographic\\_map-fr.svg](http://commons.wikimedia.org/wiki/File:Hawaii_islands_topographic_map-fr.svg)

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## Thematic Map

- ▶ focuses on a particular theme or special topic
- ▶ natural features are used as background information and as reference points to enhance the map's theme
- ▶ e.g. population change of Canada in specific locations from 1996 to 2001.
- ▶ political map with provincial and territorial borders is used to give it more of a reference

## Thematic map

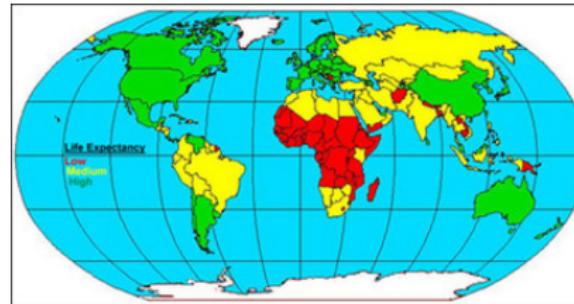
This simple thematic map divides global life expectancy into three colors -

green for high life expectancy,

yellow for medium,

and red for low life expectancy.

It is an example of a choropleth thematic map.



Source: <http://geography.about.com/od/understandmaps/a/thematicmaps.htm>

# Thematic Mapping

thematicmapping.org



The homepage features four globe thumbnails: one with yellow dots, one with orange and brown regions, one with blue and yellow regions, and one with orange and brown regions. To the right, a box contains the text "Thematic Mapping API" and "Create KML based thematic maps with a few lines of JavaScript" with a "» More details" link.

Home API Engine Techniques Playground Downloads Blog About

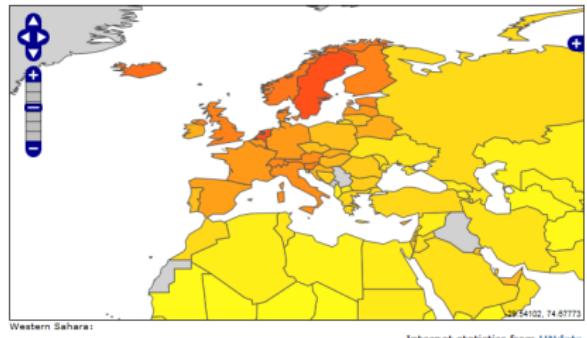
» Home > Playground > OpenLayers > Choropleth map

Google Custom Search GO!

## Thematic Mapping with OpenLayers

### Choropleth map from GeoJSON

Internet users per 100 population, 2005



0-10  
10-20  
20-30  
30-40  
40-50  
50-60  
60-70  
70-80  
80-90  
90-100  
100-110

Western Sahara: 23°54'10" E, 27°47'77" N

12°54'10" E, 74°87'77" N

Internet statistics from UNdata

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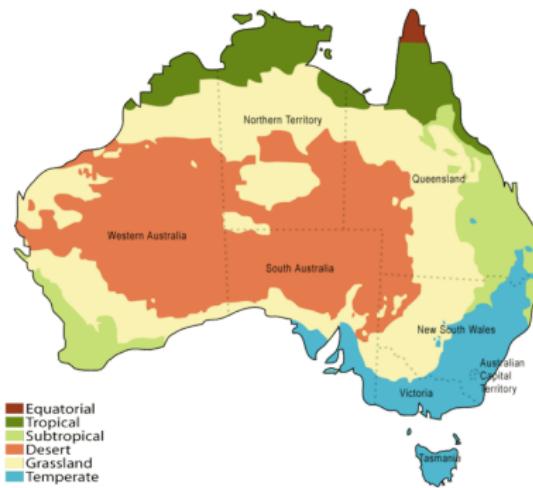
Climate maps

# Climate Map

A climate map shows information about the climate of an area. They can show things like the specific climatic zones of an area based on the temperature, the amount of snow an area receives or average number of cloudy days. These maps normally use colors to show different climatic areas.

# Climate Map

A climate map for Australia for example uses colors to show differences between the temperate area of Victoria and desert region in the center of the continent.



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## Economic or Resource Map

An economic or resource map shows the specific type of economic activity or natural resources present in an area through the use of different symbols or colors depending on what is being shown on the map.

## Economic or Resource Map

For example an economic activity map for Brazil can use colors to show different agricultural products of given areas, letters for natural resources and symbols for different industries



Source: [http://www.vmapas.com/Americas/Brazil/Map\\_Economic\\_Activity\\_Brazil\\_1977.jpg/maps-en.html?map\\_viewMap=1](http://www.vmapas.com/Americas/Brazil/Map_Economic_Activity_Brazil_1977.jpg/maps-en.html?map_viewMap=1)