

GIS in Archaeology

01 - Introduction

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18/09/24

based on [Datapolitan-Training/qgis-training](#)

You can download a [pdf of this presentation](#).

aims and objectives

aim

- Teach skills required for a complete GIS workflow
 - from data acquisition to analysis and cartographic output

objectives

- Introduction to GIS and fundamental cartography
- Practical work with archaeological (spatial) data
- Spatial analyses
- Creation of "presentable" maps with different levels of information
- Learning the basics for later autonomous work with GIS

outcomes

- You will be familiar with the foundational concepts in spatial analysis and mapmaking
- You will understand the structure and purpose of GIS
- You will be practiced in applying spatial concepts to real-world problems
- You will be able to conduct spatial analyses
- You will produce decent maps

schedule

18/09/24	Introduction
25/09/24	<i>no class</i>
02/10/24	Working with QGIS
09/10/24	Making Maps
16/10/24	Georeferencing
23/10/24	Handling Spatial Data
30/10/24	Densities
06/11/24	Interpolation
13/11/24	<i>no class</i>
20/11/24	Making nicer Maps
27/11/24	Terrain Data
04/12/24	Least Cost Path Analysis
11/12/24	Site Catchment Analysis
18/12/24	Visibility Analysis

The programme may change or shift depending on how well we progress.

organisational information

- Assessment:
 - active participation
 - homework
- You will need
 - to take part regularly
 - to make the homework
 - some frustration threshold...

If you do your homework at home, than you need a computer with QGIS:
<https://qgis.org/de/site/forusers/download.html>

All slides and additional (video) Material will be accessible via the course home page
<https://berncodalab.github.io/gia>

who are you?

Please give a short statement about

What is your name?

What is your background in archaeology/computer/GIS?

One thing you hope to get out of the course

Describe a map you've seen/created/used recently and why it was interesting to you

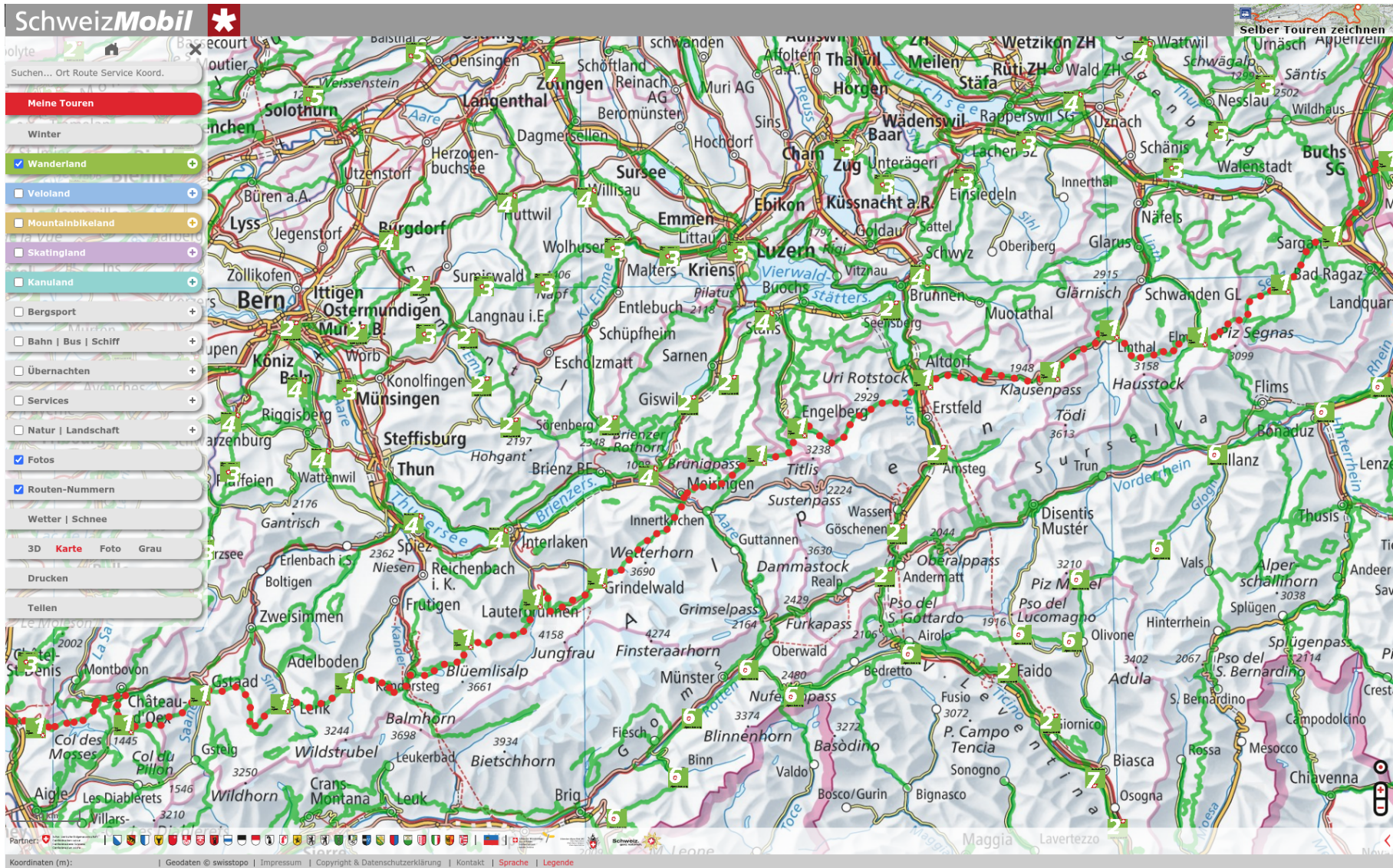
Do you have any advice how we make this a successful seminar?

Why Do We Create Maps?

Types of Maps

General Reference Maps

- Show important physical features of an area
- Include natural and man-made features
- Usually meant to help aid in the navigation or discovery of locations
- Usually fairly simple
- Can be stylized based on the intended audience (tourists vs locals)



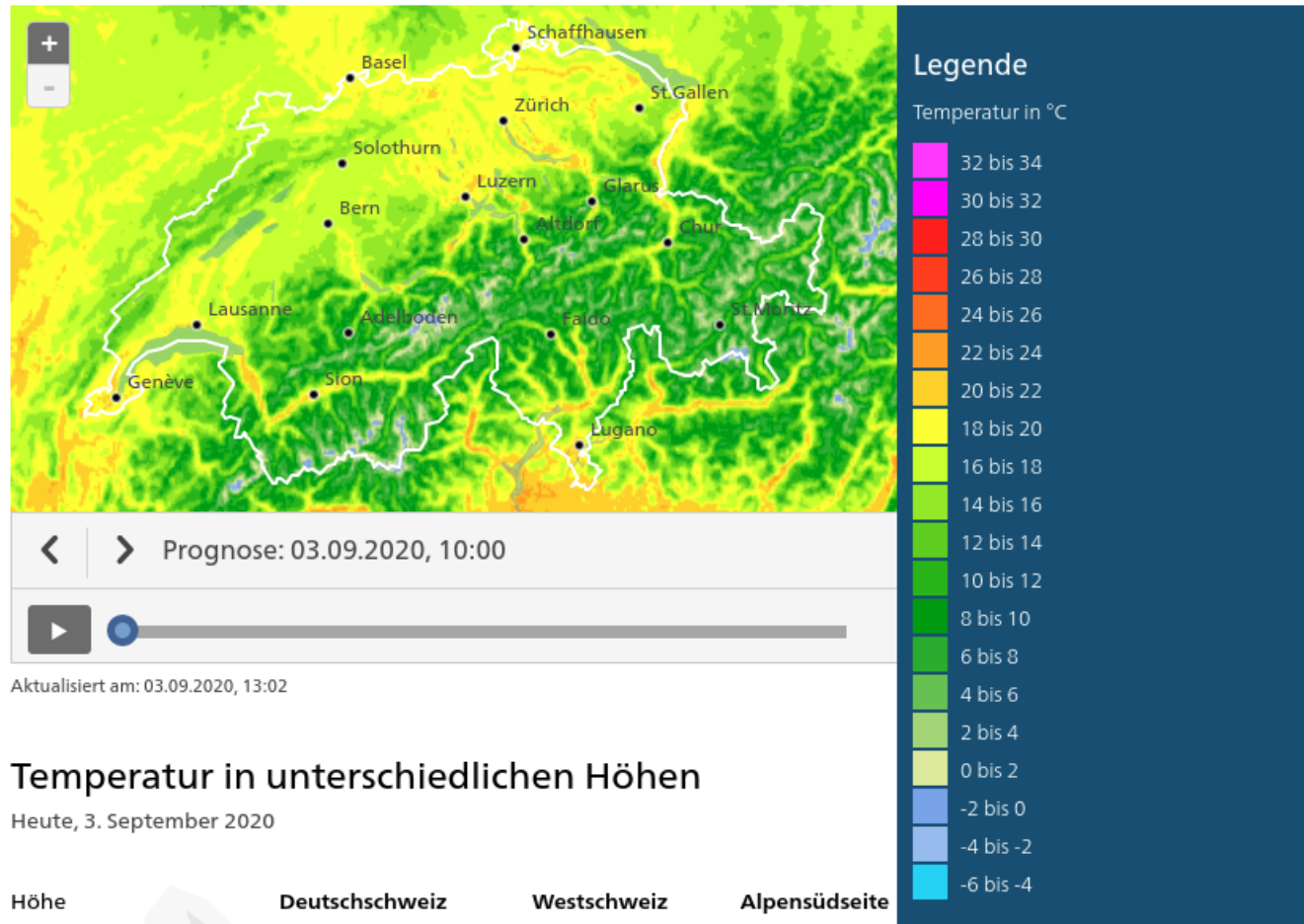
Source: <https://map.schweizmobil.ch/>

Thematic Maps

- Focuses on a specific theme or subject area
- Features on the map represent the phenomenon being mapped
- Spatial features used for reference

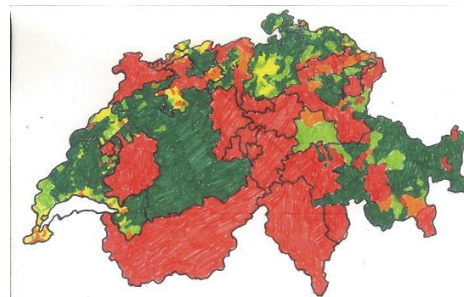
Temperatur

✕ Schliessen



Source: <https://www.meteoschweiz.admin.ch/>

Choropleth

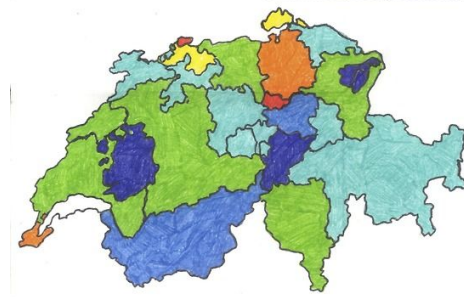
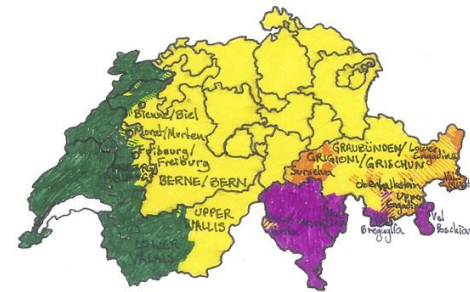


Religion

- >50% Protestant
 - >40% Protestant
 - No religion exceeds 40%
 - >40% Catholic
 - >50% Catholic
- (2000)

Language

- Majority French
 - Majority German
 - Majority Italian
 - Majority Romansch
- (2000, Swiss Federal Statistics Office)



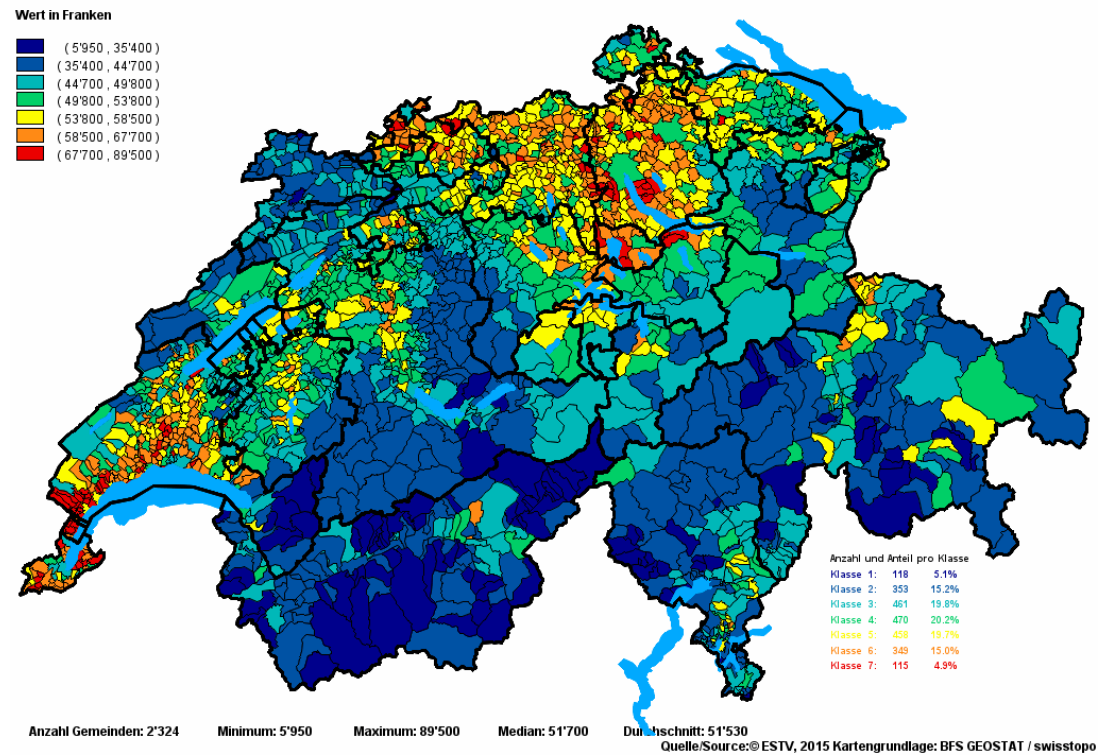
Wealth

- GDP Per Capita, Swiss Franc, 2010
- 45000 - 50000
 - 50000 - 55000
 - 56000 - 61000
 - 64000 - 67000
 - 69000 - 90000
 - 90000 - 105000
 - 125000 - 150000
- (Swiss Federal Statistics Office)

Source: Pinterest...

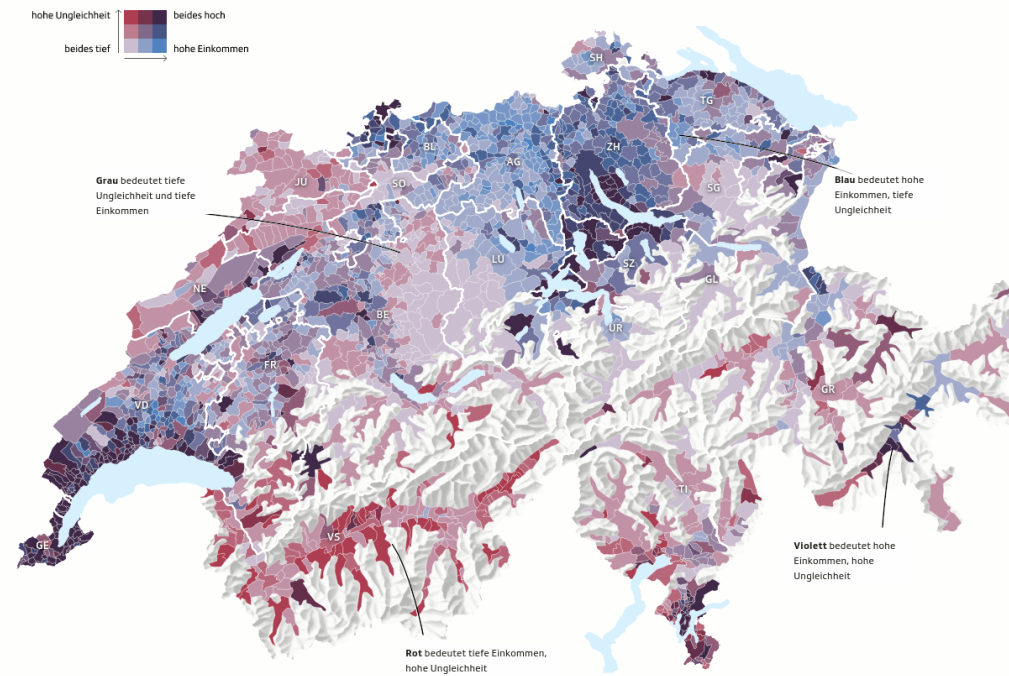
Choropleth

Medianwert der Reineinkommen 2015
Gemeindeebene, ganze Schweiz



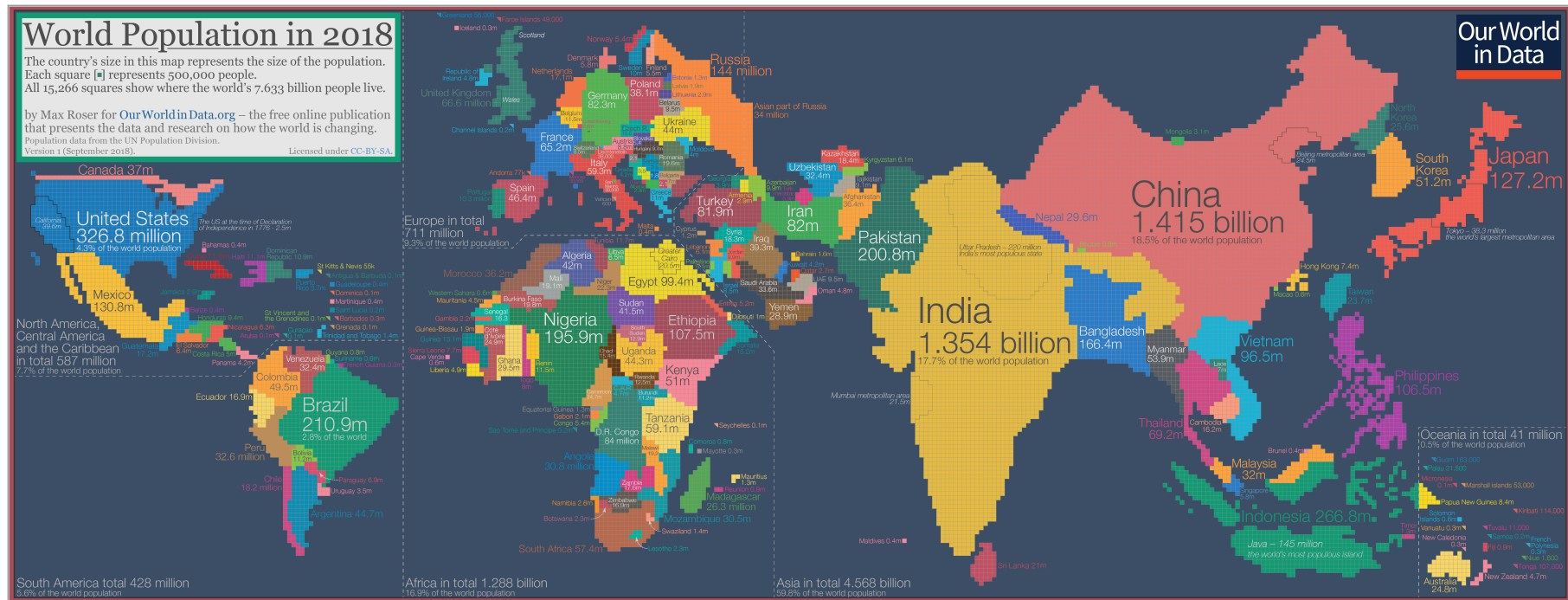
Source: <http://www.estv2.admin.ch/>

Choropleth



Source: <https://www.srf.ch/news/schweiz/interaktive-karte-so-ungleich-ist-das-einkommen-in-der-schweiz-verteilt>

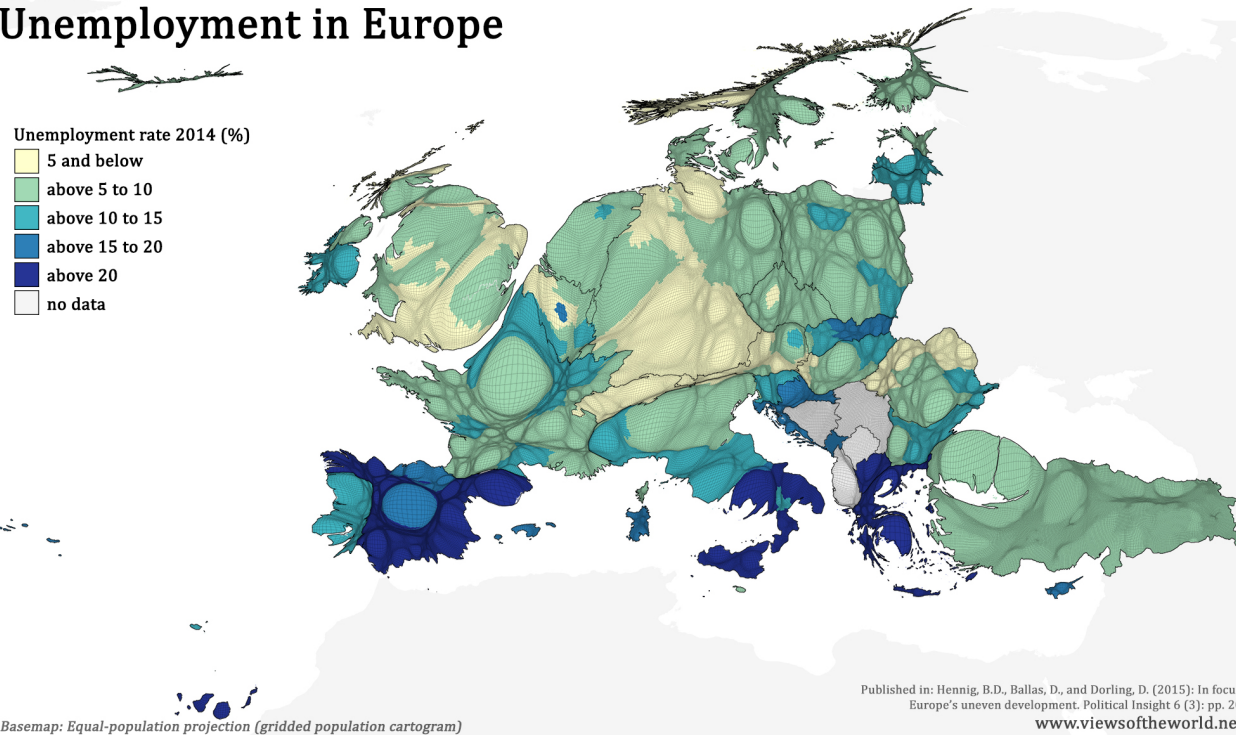
Area Cartogram – World Population



Source: <http://www.visualcapitalist.com/>

Area Cartogram – European Unemployment rate

Unemployment in Europe



Source: <http://www.viewsoftheworld.net/>

Distribution Map

298

Heiko Steuer

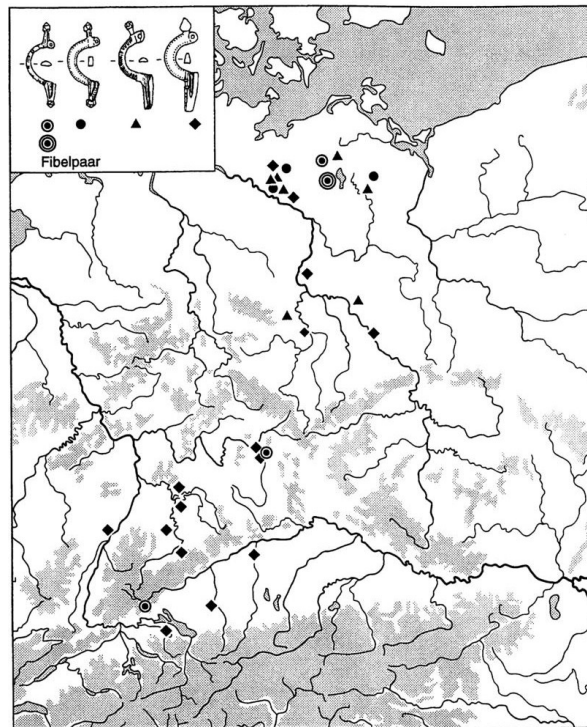
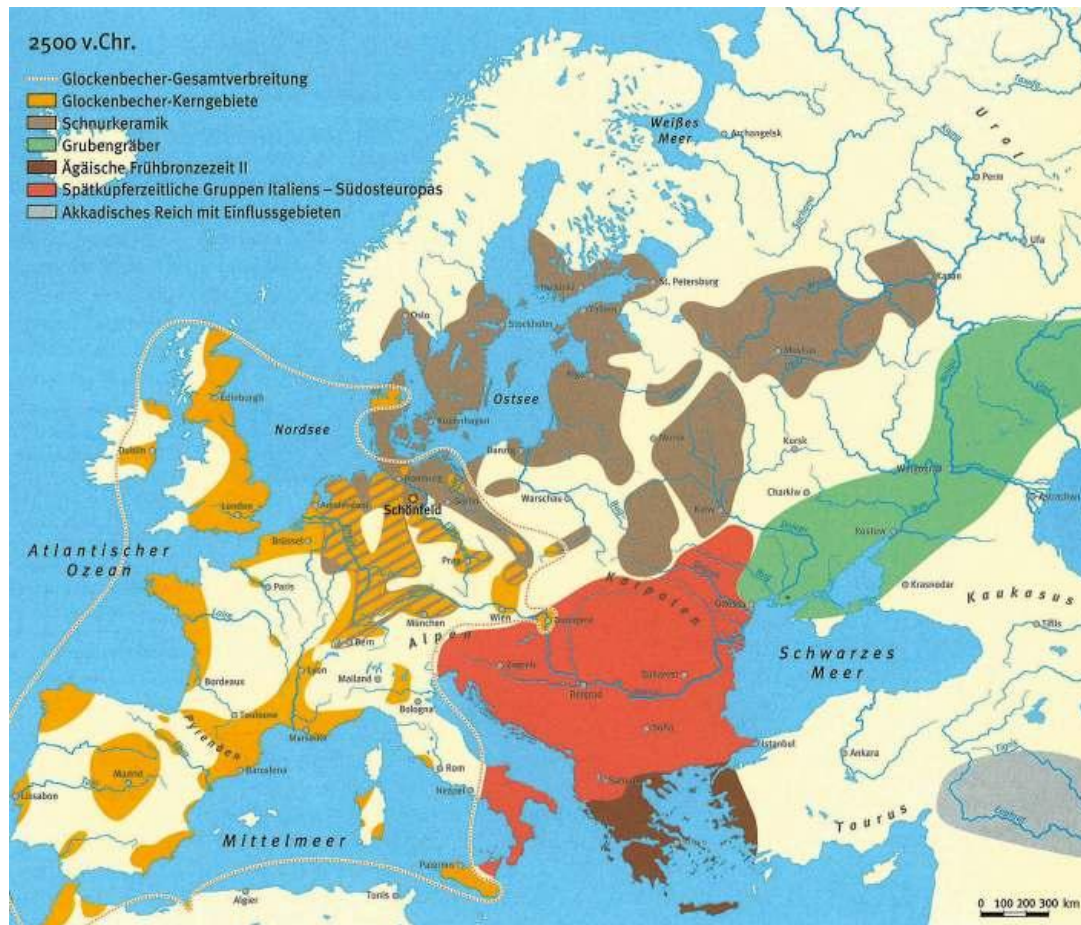


Abbildung 6. Verbreitungskarte der Bügelknopffibeln. PunktKreis: Typ Leipferdingen; Kreis: Typ Groß Nemerow; Dreieck: weitere Fibeln mit gestieltem Bügelknopf; Rhombus: Typ Leutkirch (nach Voß 1993, 174 Karte Abb. 27 mit Ergänzung).

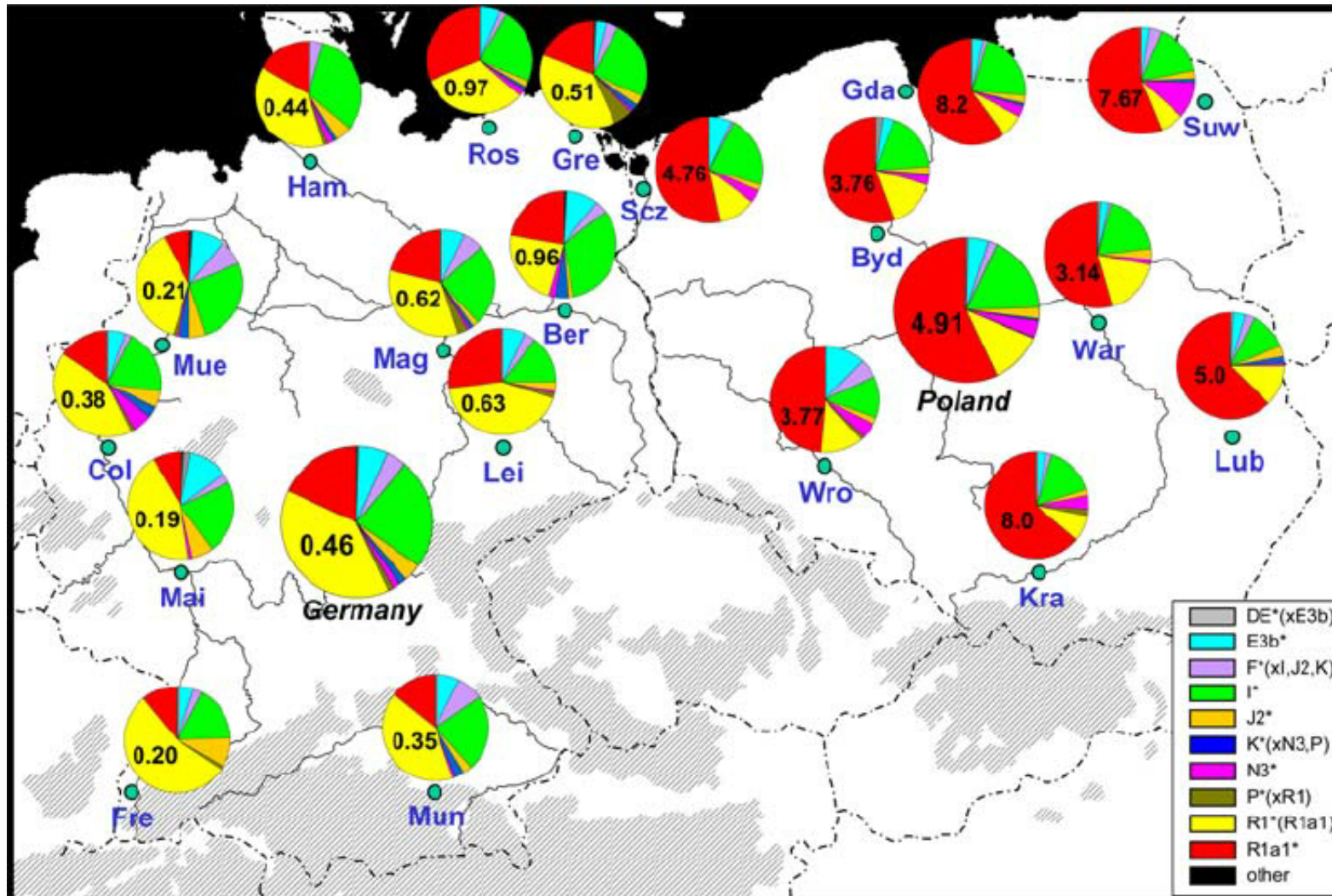
Source: Steuer 1998

"Cultural" Map



Terberger et al. 2014

"Genetic" Map

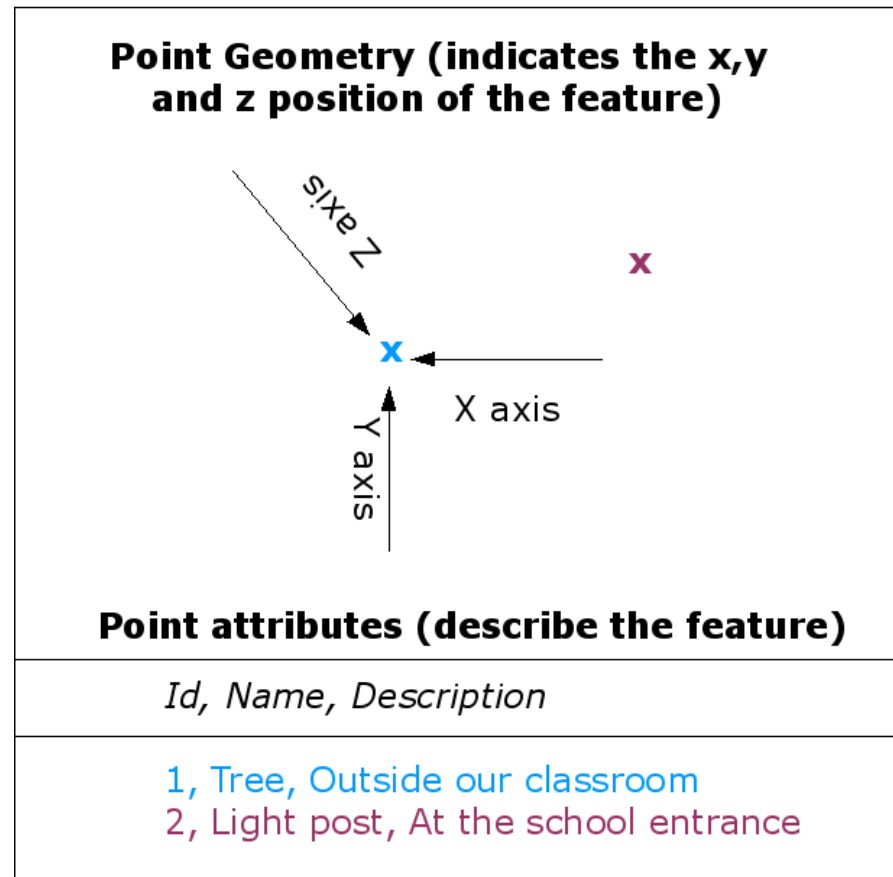


Kayser et al. 2005

Basic Map Elements

Points

Vector Point Feature

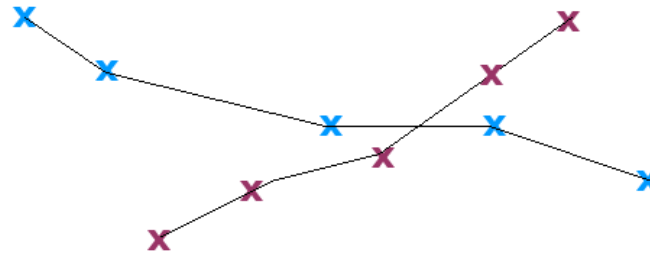


http://docs.qgis.org/2.8/en/docs/gentle_gis_introduction/vector_data.html#overview

Lines

Vector Polyline Feature

Polyline Geometry (a series of connected vertices that do not form an enclosed shape)



Polyline attributes (describe the feature)

Id, Name, Description

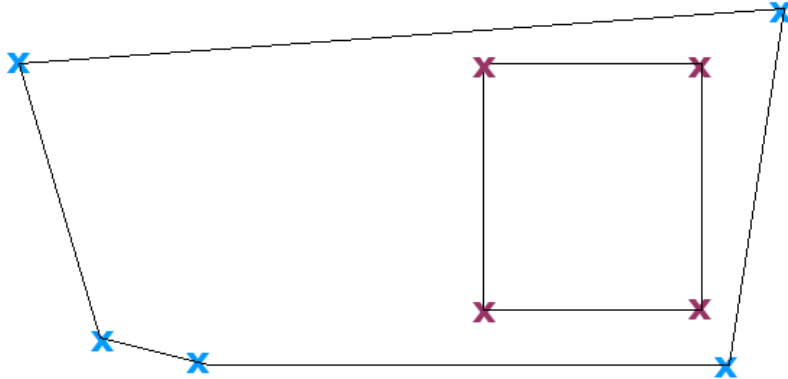
1, Footpath 1, From class to the playground
2, Footpath 2, From the school gate to the hall

http://docs.qgis.org/2.8/en/docs/gentle_gis_introduction/vector_data.html#overview

Polygons

Vector Polygon Feature

Polygon Geometry (a series of connected vertices that do form an enclosed shape)

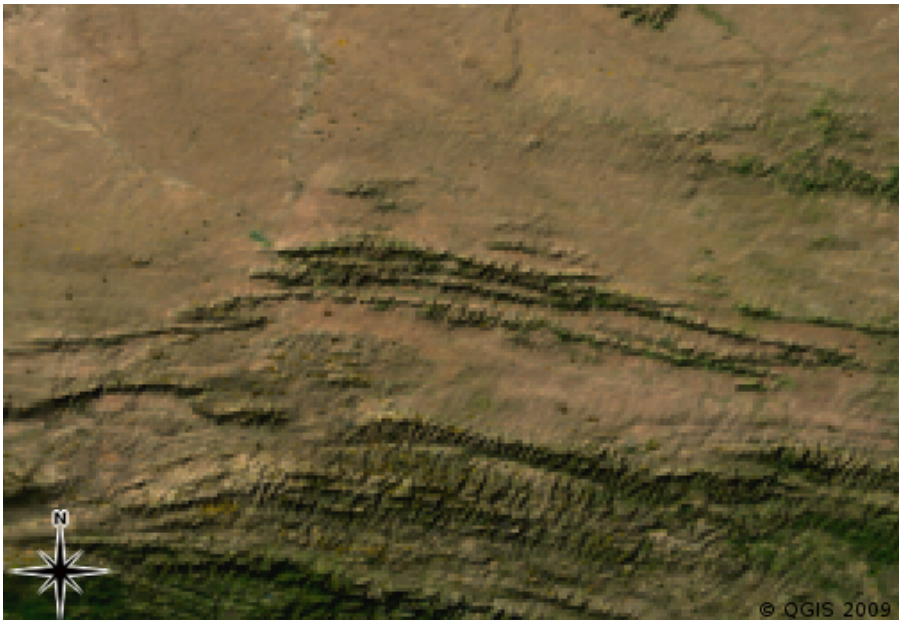


Polygon attributes (describe the feature)

<i>Id, Name, Description</i>		
1,	School Boundary,	Fenceline for the school
2,	Sports Field,	We play soccer here

http://docs.qgis.org/2.8/en/docs/gentle_gis_introduction/vector_data.html#overview

Raster

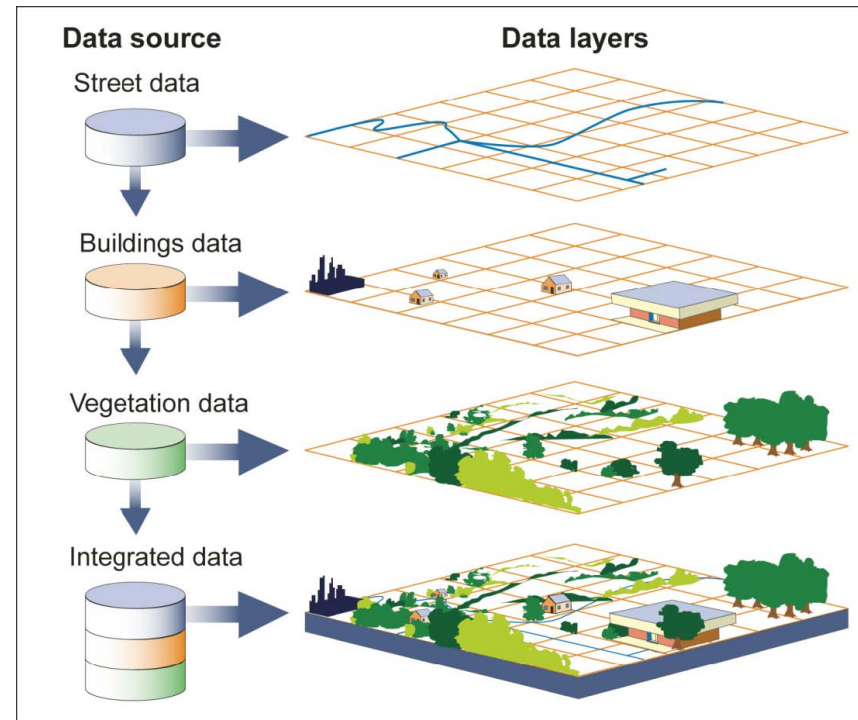


https://docs.qgis.org/3.34/en/_images/raster_types.png

How do we make maps?

Geographic Information System (GIS)

A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data. - Wikipedia



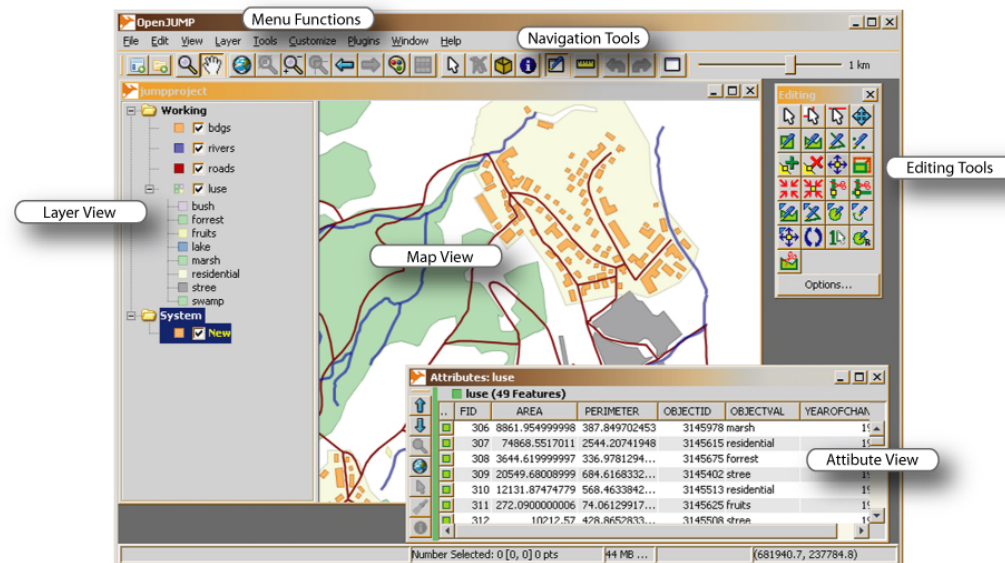
Source: GAO.

Or more simply

In a GIS, you connect **data** with **geography**. GISgeography.com

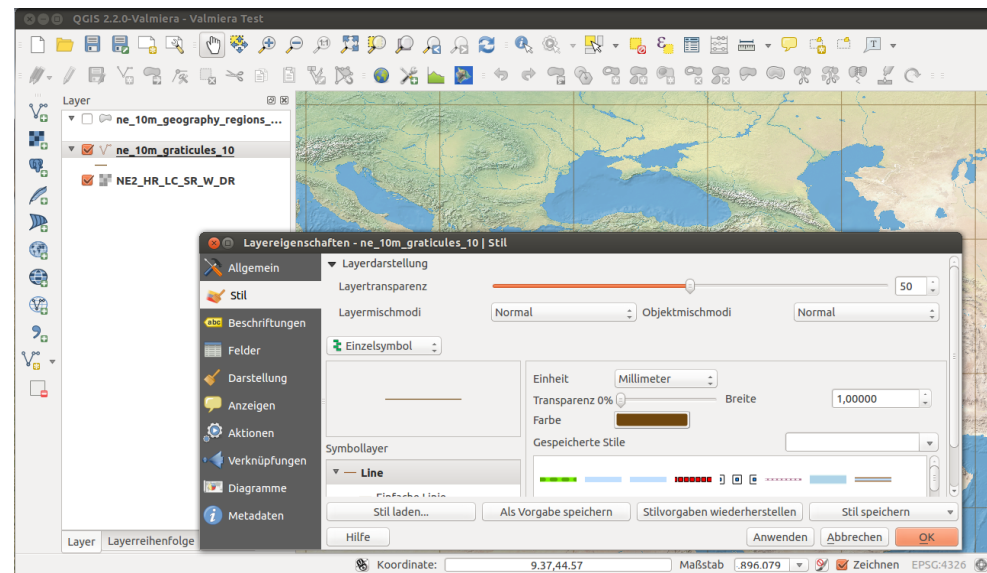
Geographic Information Systems (GIS)

- Create interactive queries (user-created searches)
- Analyze spatial information
- Edit data in maps
- Present the results of all these operations



QGIS

- a free and open source GIS software
- <https://www.qgis.org/>
- You might like to installed it... ;-)



QGIS

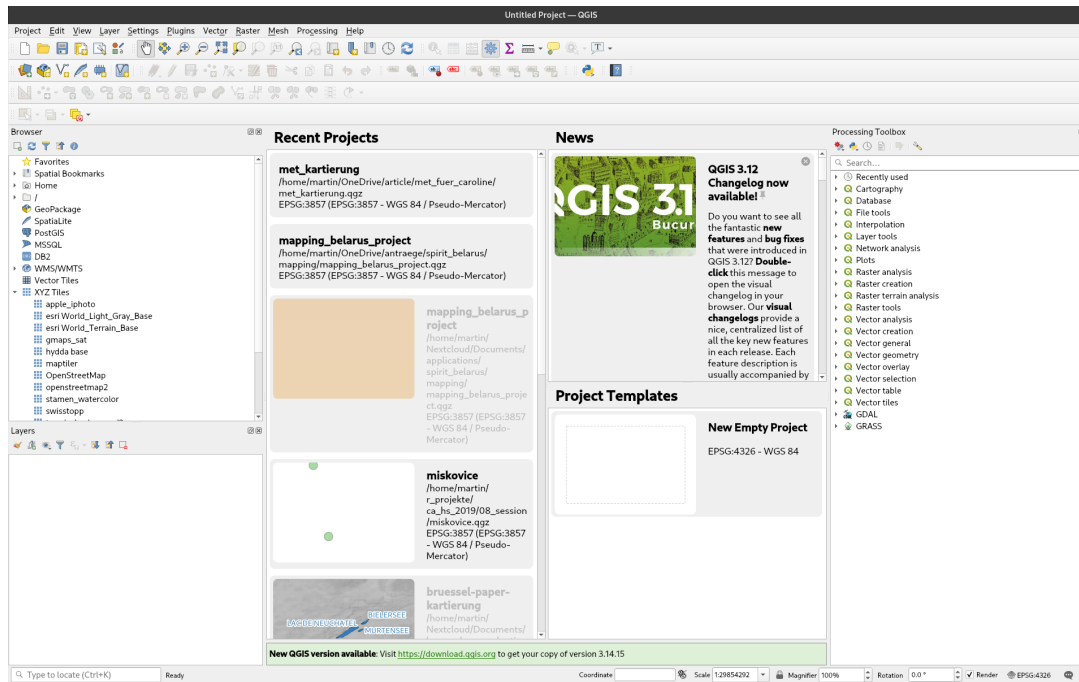
Let's Get Started

Getting Data

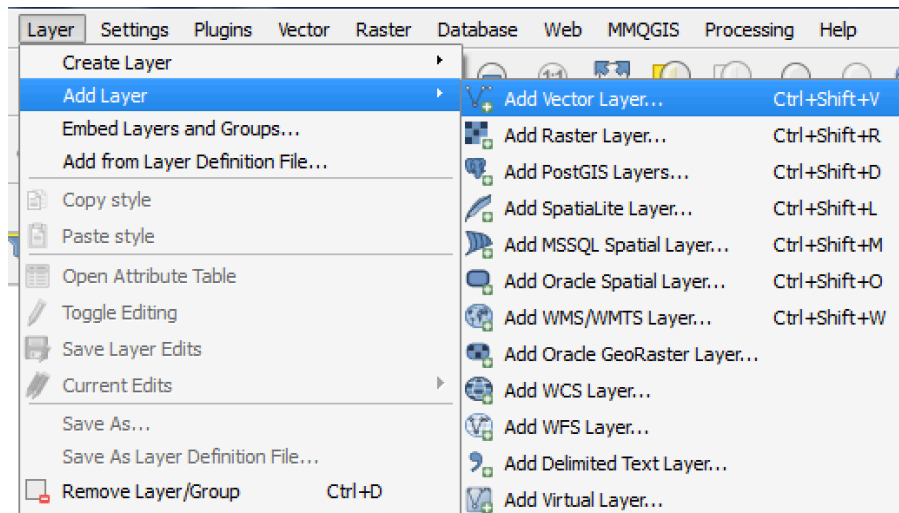
1. [Click this link](#) and download the file to your desktop
2. Unzip the file
3. [Click this link](#) and download the other file also to your desktop
4. Open QGIS

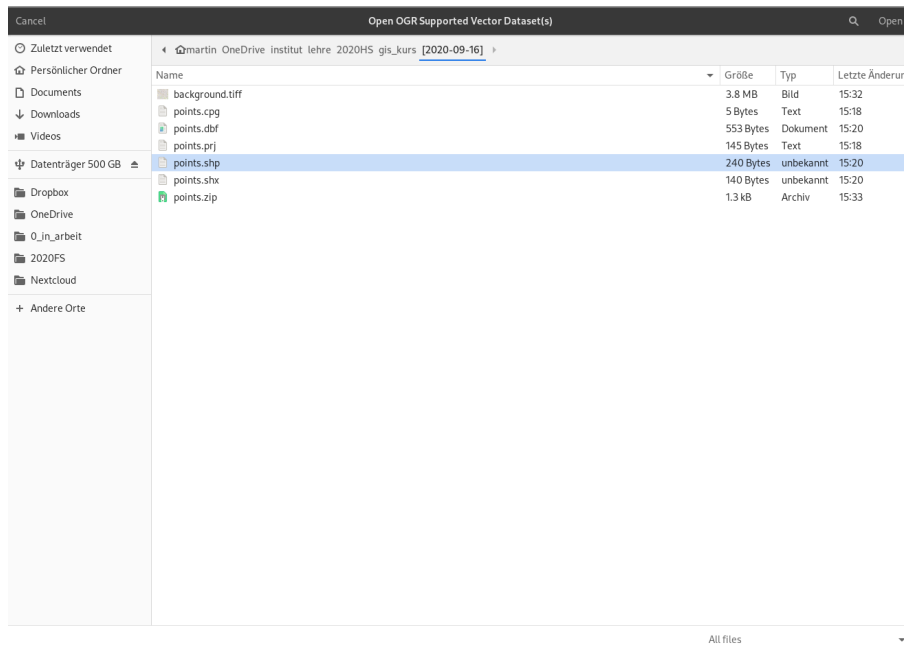
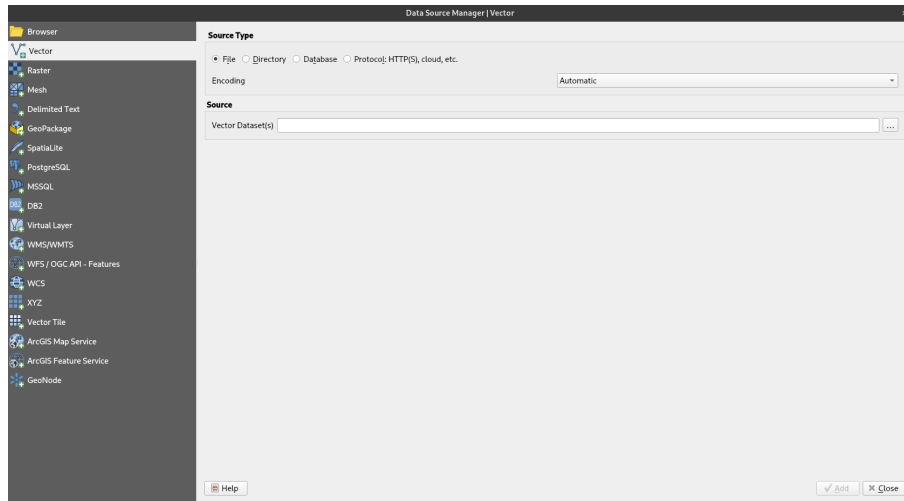


QGIS Getting Started

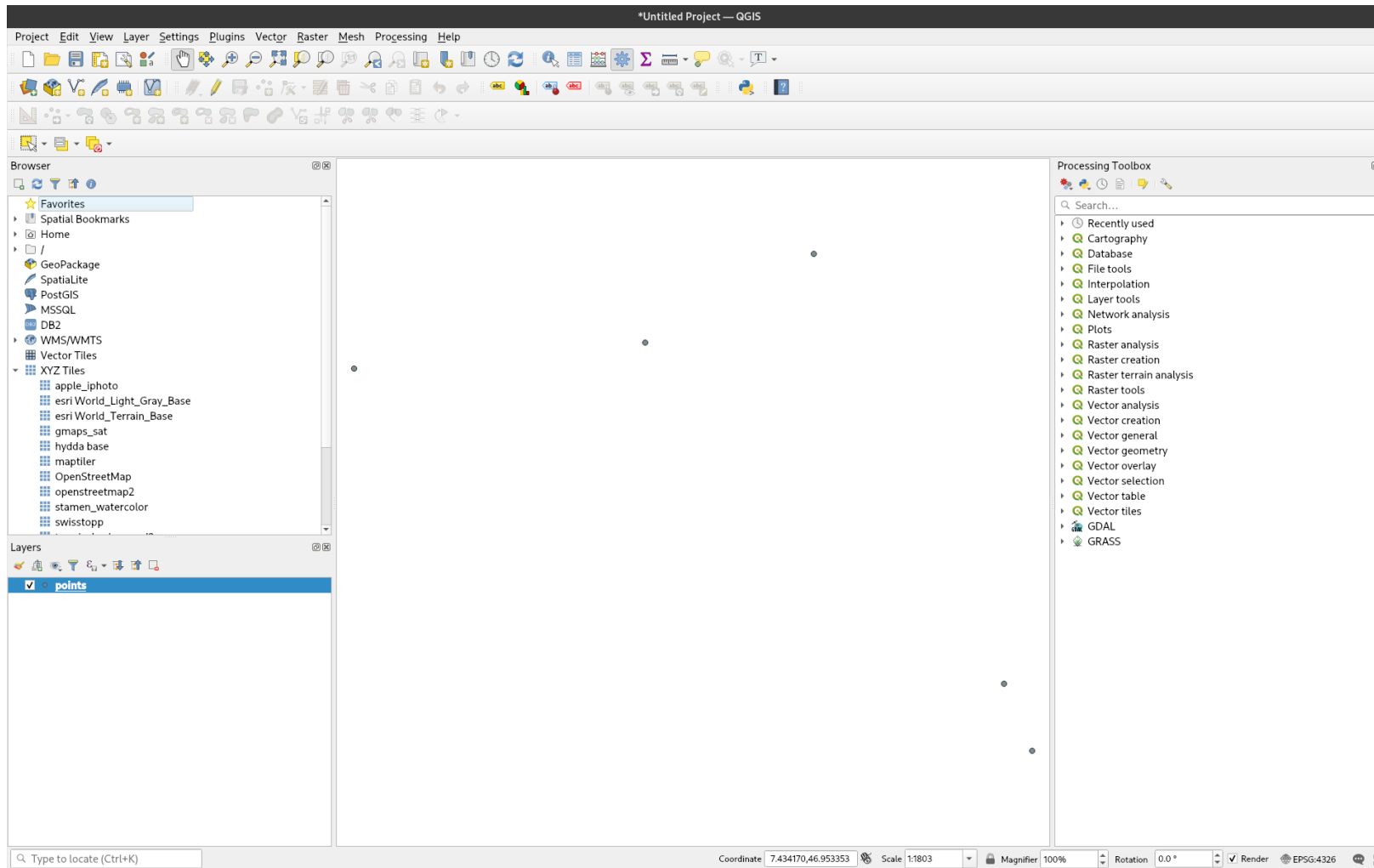


QGIS Getting Started



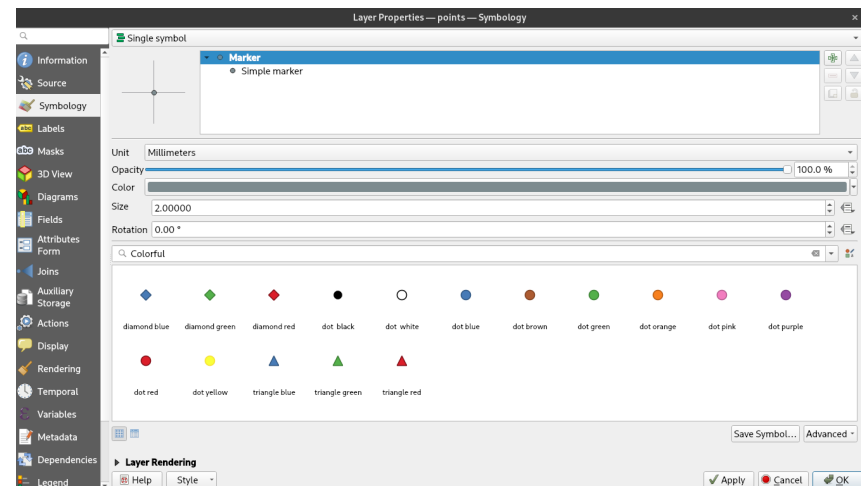
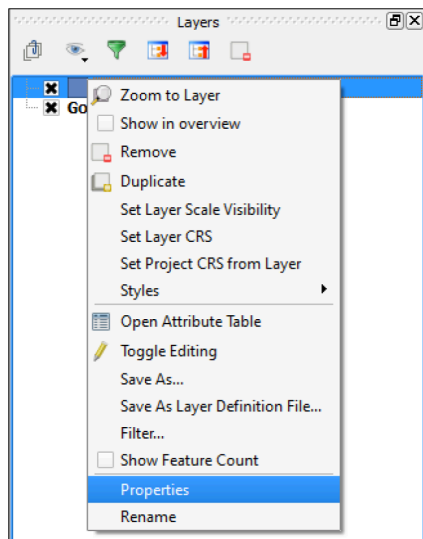


QGIS Getting Started

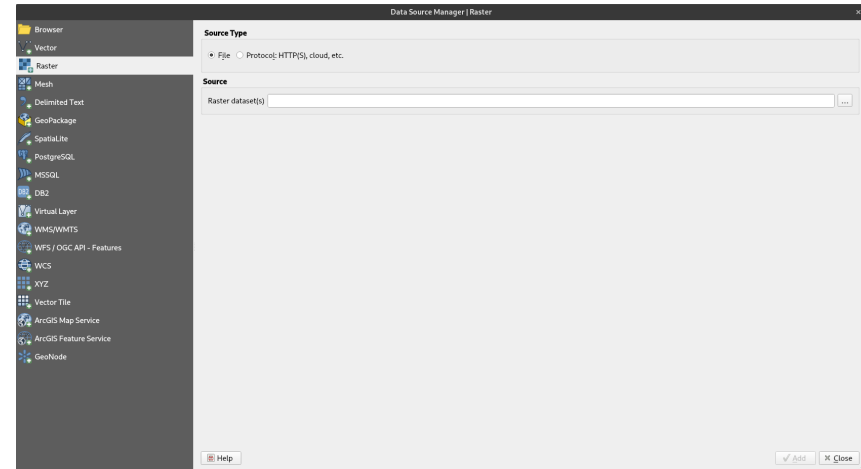
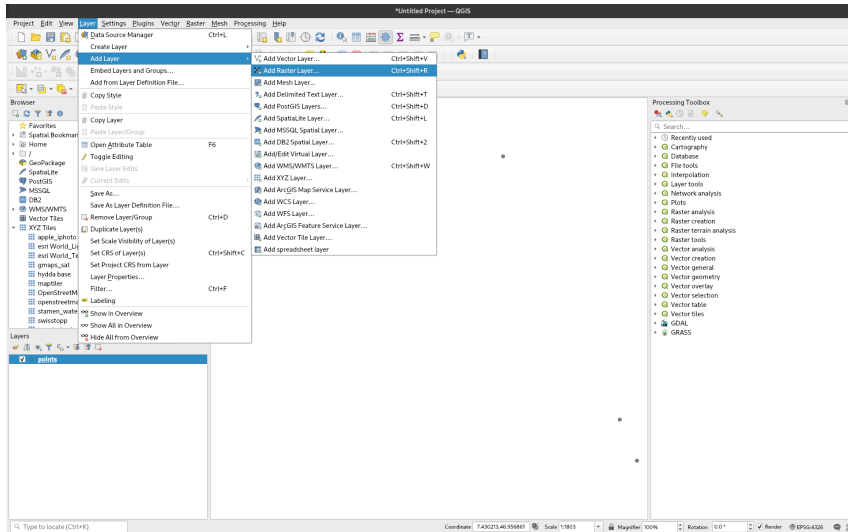


Styling Features

- Right-click the layer and select the Properties option
- Select "Symbology," and style as you like

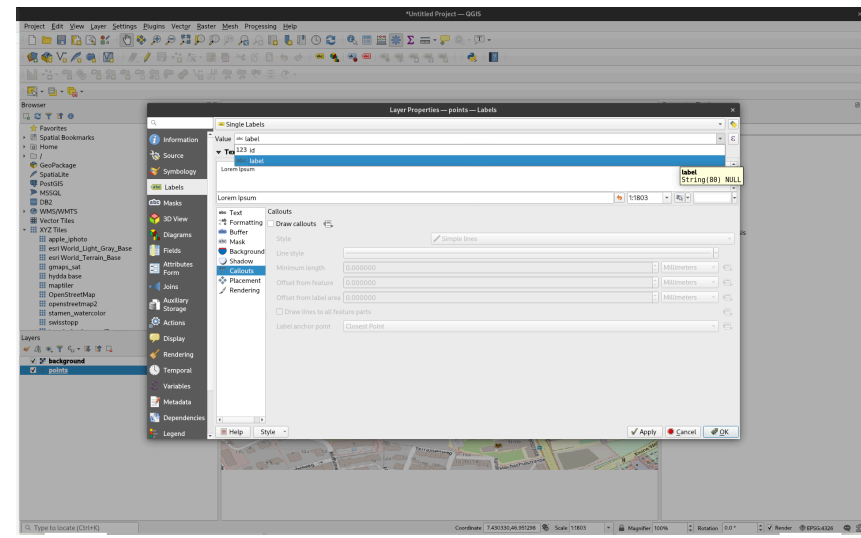
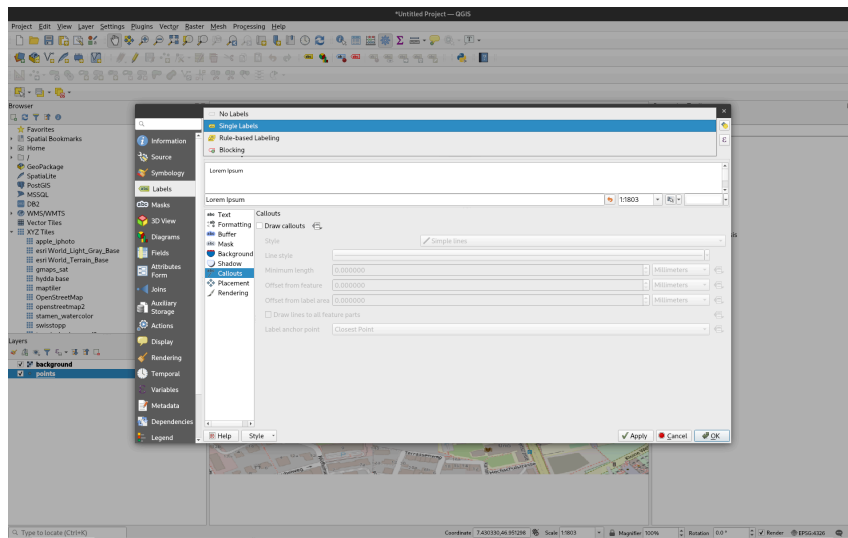


Add background



Add labels to data

- From Properties, select "Labels", "Show labels"
- Select attribute for label (this time "label")
- Style as you like



What We've Covered

- What is GIS
- Basic GIS concepts and tools
- Adding, styling, and labeling data in QGIS

Homework

- Style the polygons however you'd like
- Change the outline color or add a pattern
- Style the labels
- Change the font, the font size, or other attributes
- Send me a screenshot

Any questions?



You might find the course material (including the presentations) at

https://github.com/MartinHinz/gia_hs_2020

You can see the rendered presentations at

http://martinhinz.github.io/gia_hs_2020

You can contact me at

martin.hinz@iaw.unibe.ch

Source: <https://www.instagram.com/sadtopographies>