

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

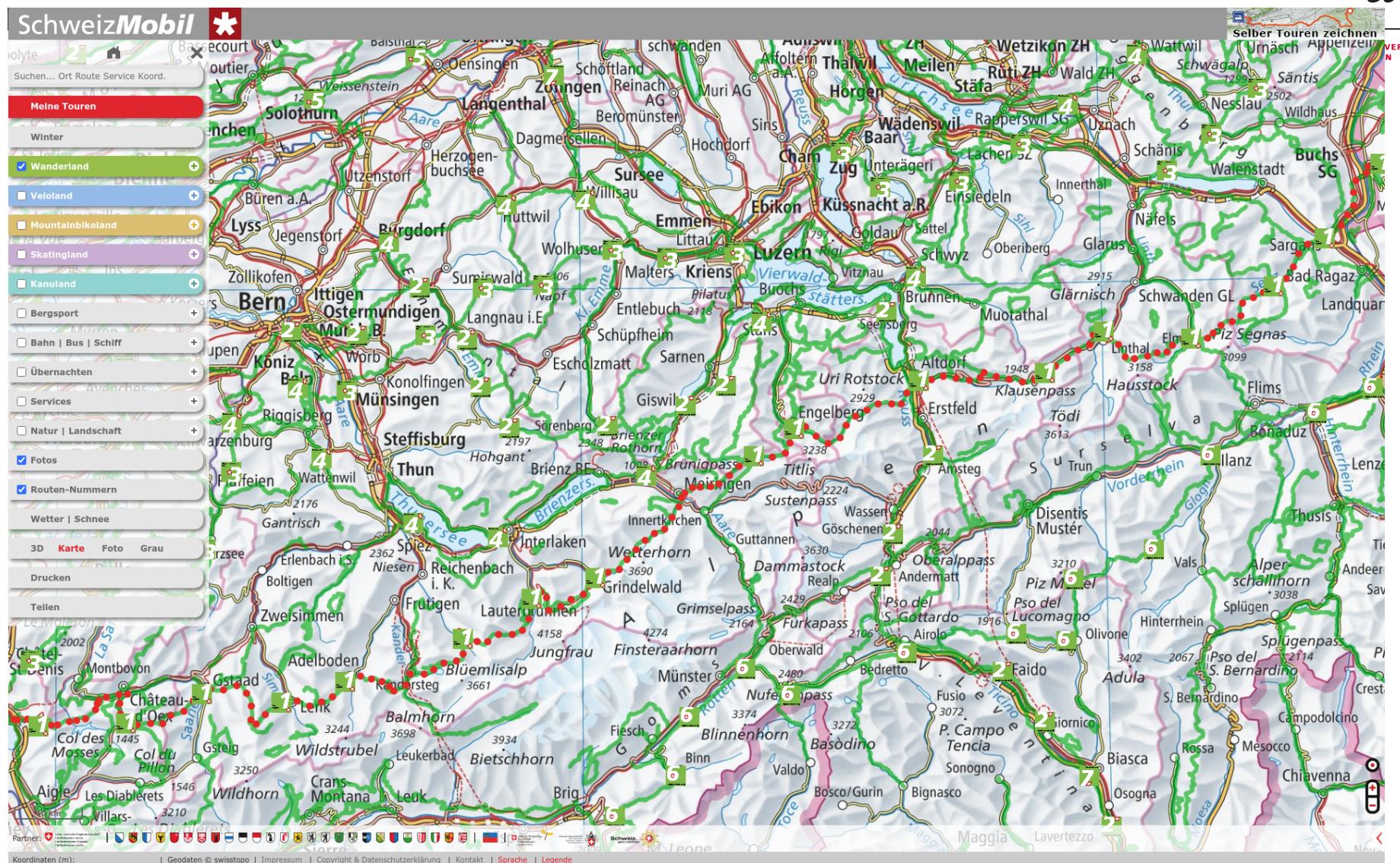
Do you have any advice how we make this a successful seminar?

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)



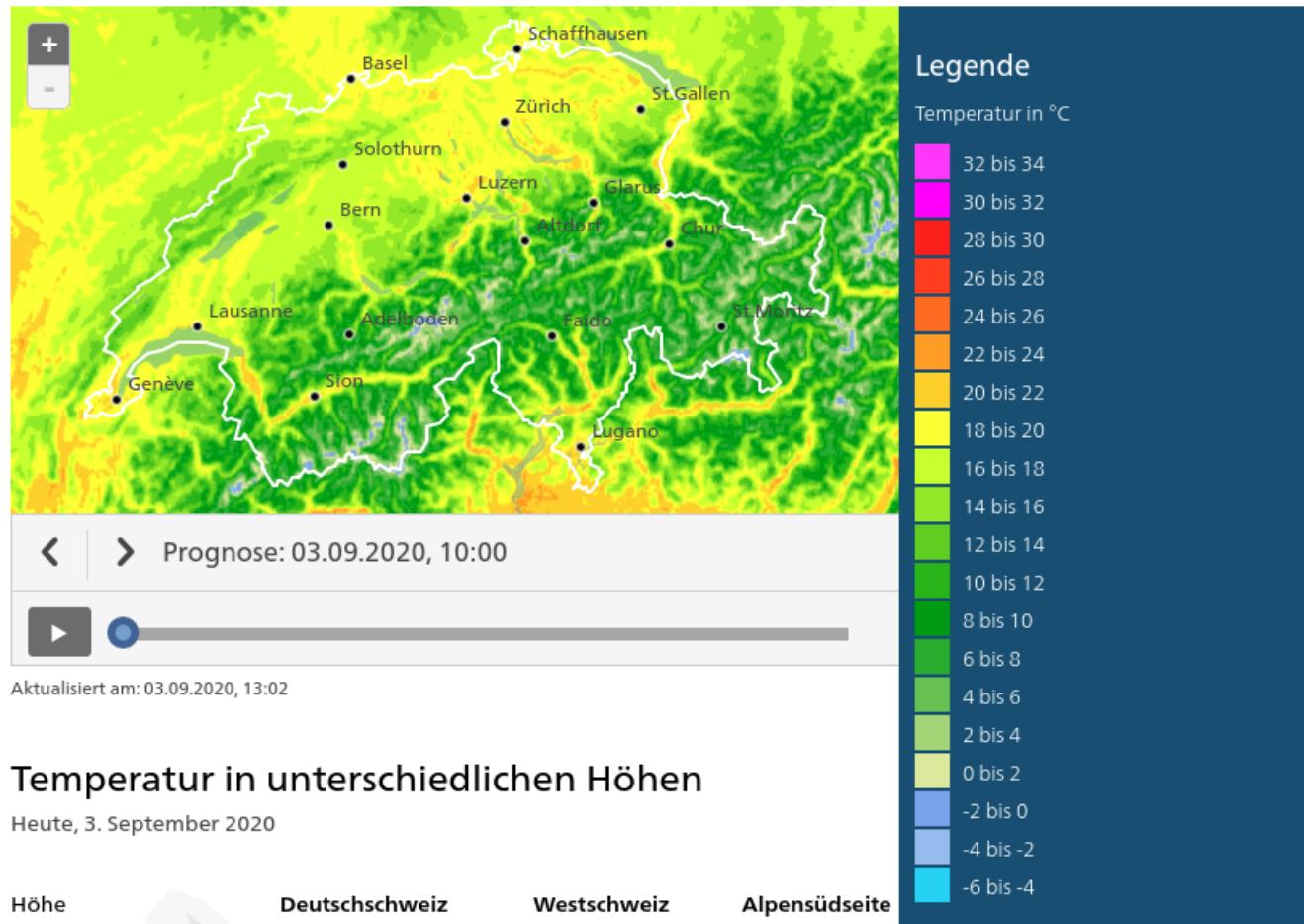
Source: <https://map.schweizmobil.ch/>

Thematic Maps

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

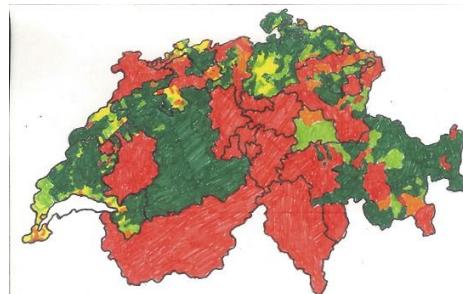
Temperatur

X Schliessen



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

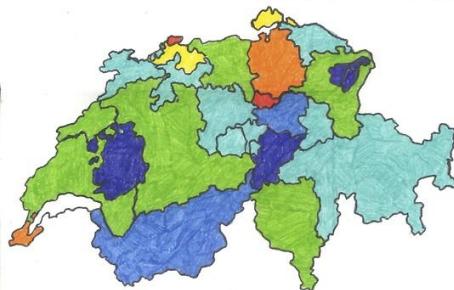
Choropleth



Language

- > 50% Protestant
- > 40% Protestant
- No religion exceeds 40%
- > 40% Catholic
- > 50% Catholic

(2000, Swiss Federal Statistics Office)

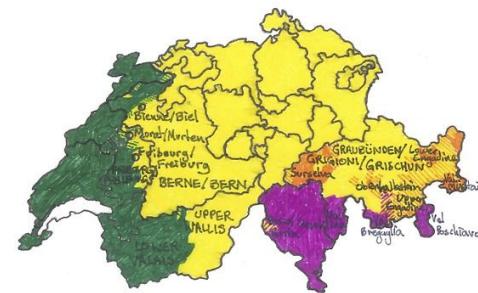


Source: Pinterest...

Religion

- > 50% Protestant
- > 40% Protestant
- No religion exceeds 40%
- > 40% Catholic
- > 50% Catholic

(2000)



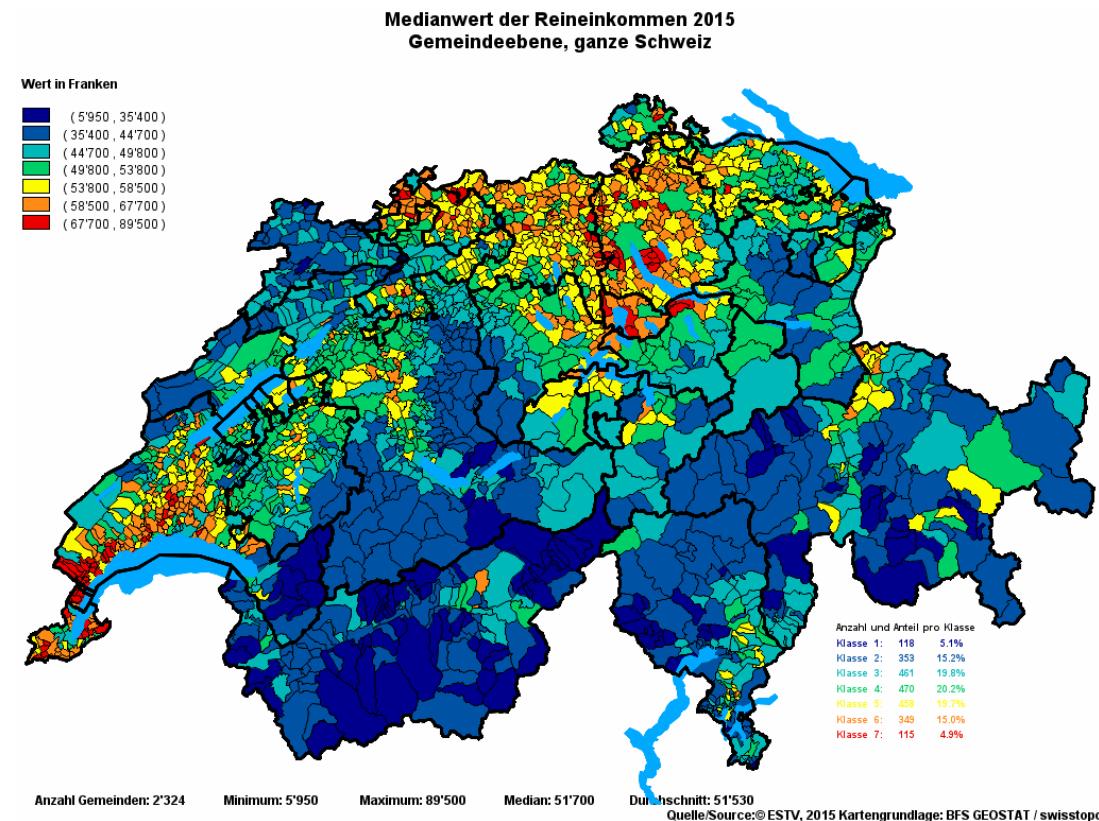
Wealth

GDP Per Capita, Swiss Franc, 2010

- 45000 - 50000
- 50000 - 55000
- 55000 - 61000
- 61000 - 67000
- 67000 - 80000
- 90000 - 105000
- 125000 - 150000

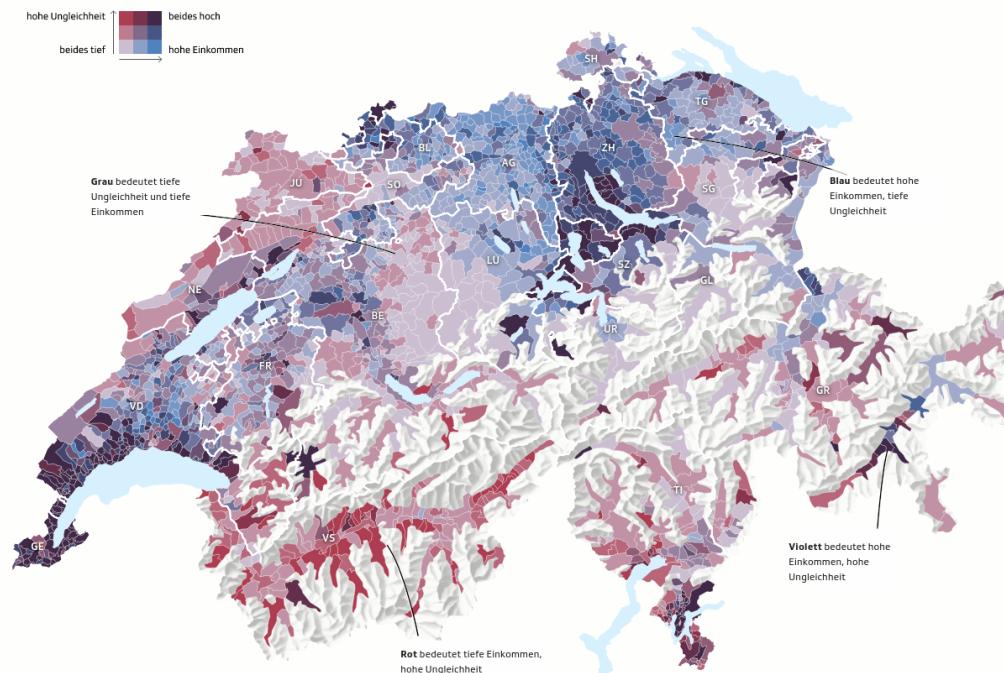
(Swiss Federal Statistics Office)

Choropleth



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

Choropleth



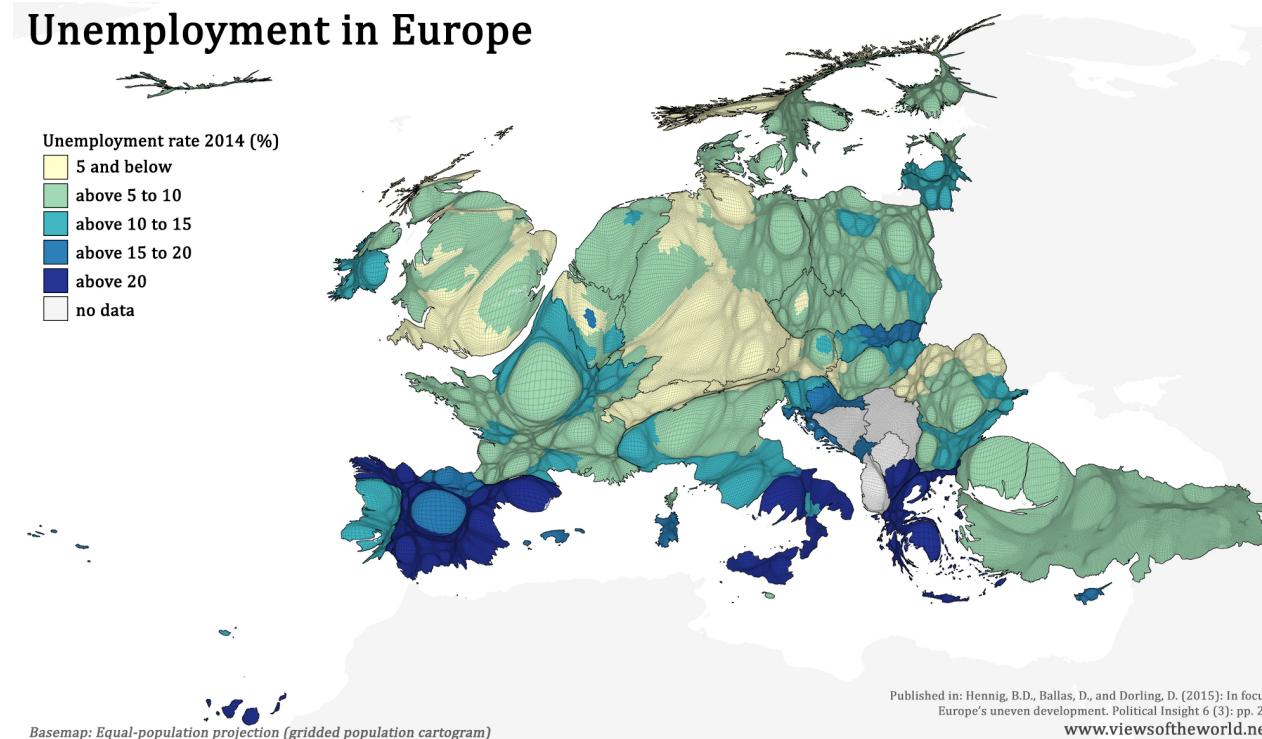
Source: <https://www.srf.ch/news/schweiz/interaktive-karte-so-ungleich-ist-das-einkommen-in-der-schweiz-verteilt>

Area Cartogram – World Population



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

Area Cartogram – European Unemployment rate



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

Distribution Map

298

Heiko Steuer

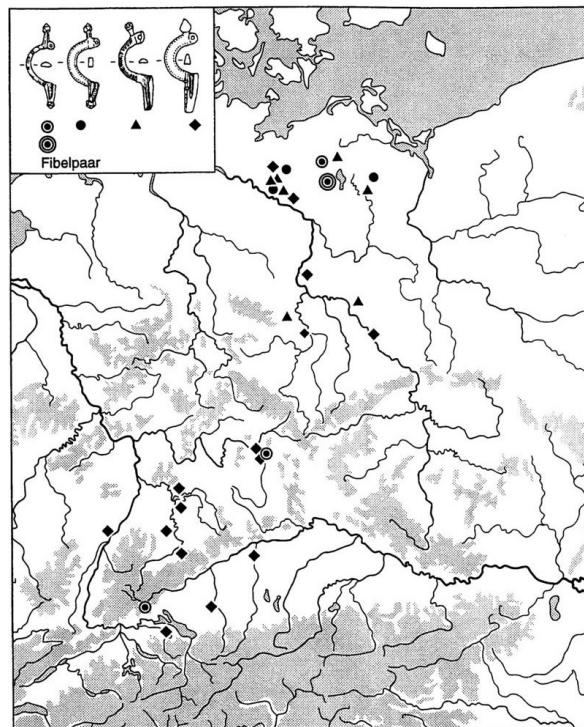


Abbildung 6. Verbreitungskarte der Bügelknopffibeln. Punktkreis: Typ Leipferdingen; Kreis: Typ Groß Nemerow; Dreieck: weitere Fibeln mit gestieltem Bügelknopf; Rhombus: Typ Leutkirch (nach Voß 1993, 174 Karte Abb. 27 mit Ergänzung).

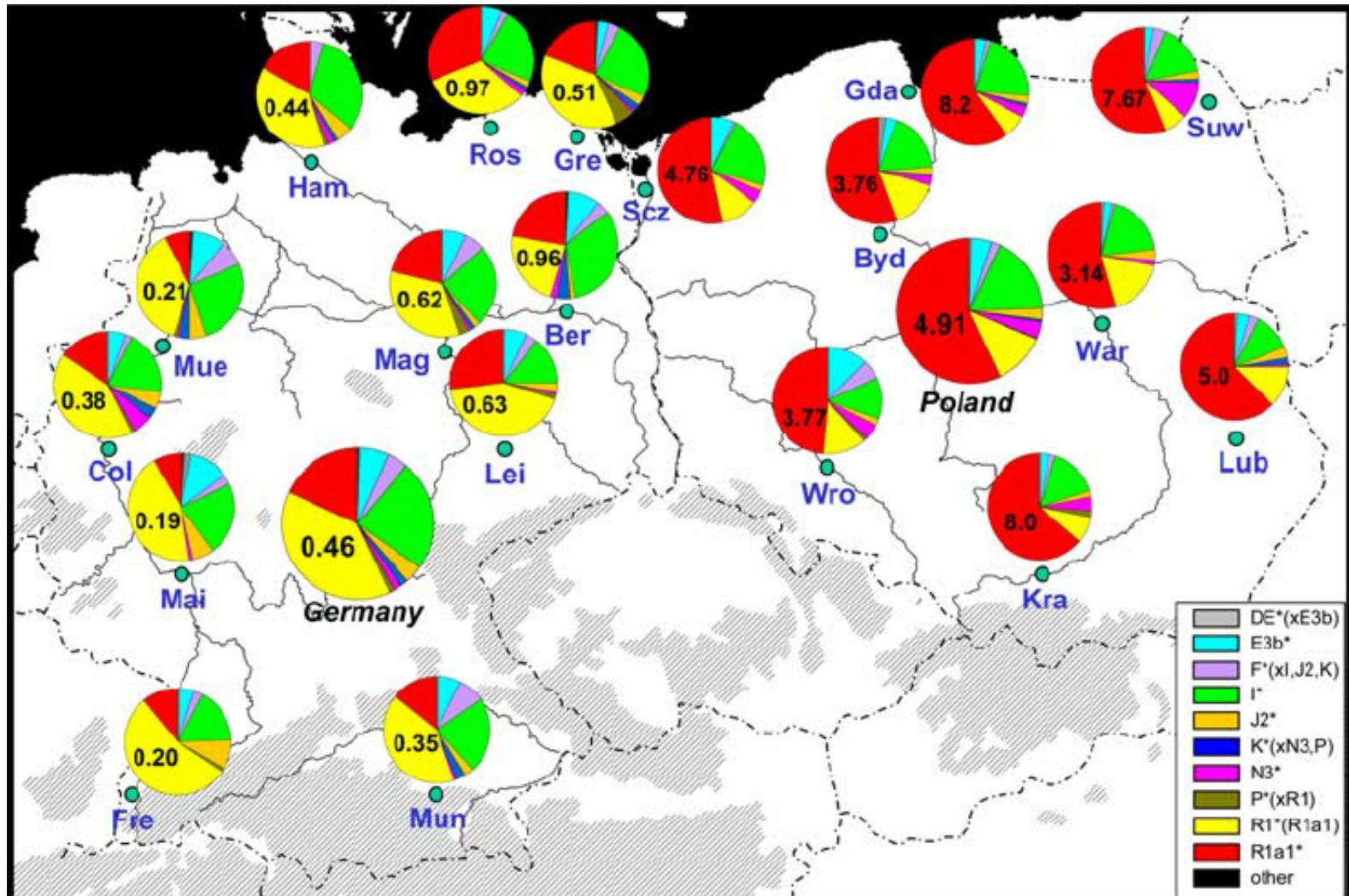
Source: Steuer 1998

"Cultural" Map



Terberger et al. 2014

"Genetic" Map

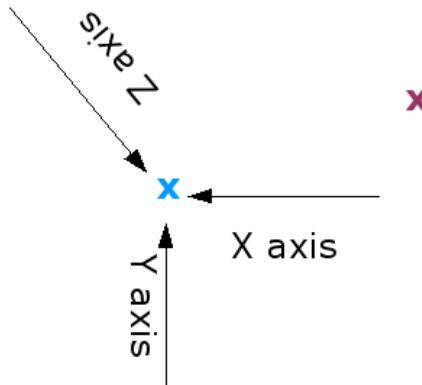


Basic Map Elements

Points

Vector Point Feature

Point Geometry (indicates the x,y and z position of the feature)



Point attributes (describe the feature)

Id, Name, Description

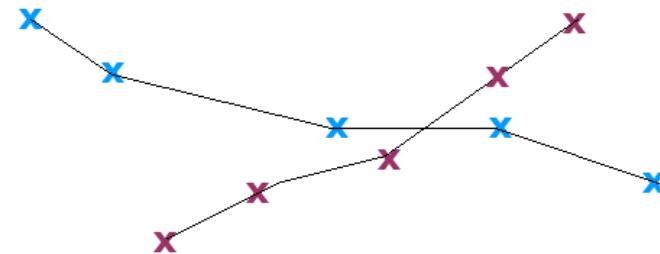
- 1, Tree, Outside our classroom
- 2, Light post, At the school entrance

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

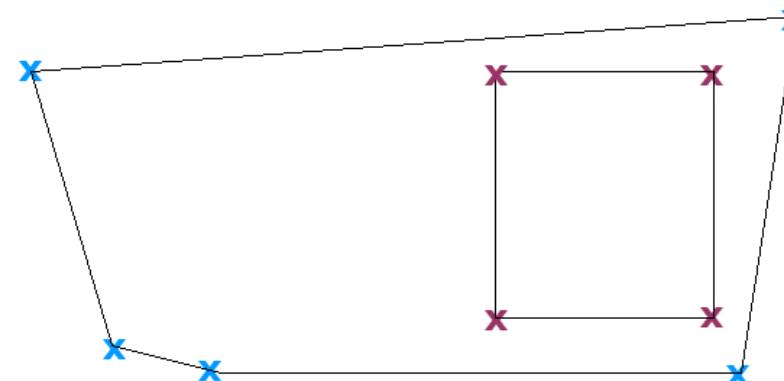
- 1, Footpath 1, From class to the playground
- 2, Footpath 2, From the school gate to the hall

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)



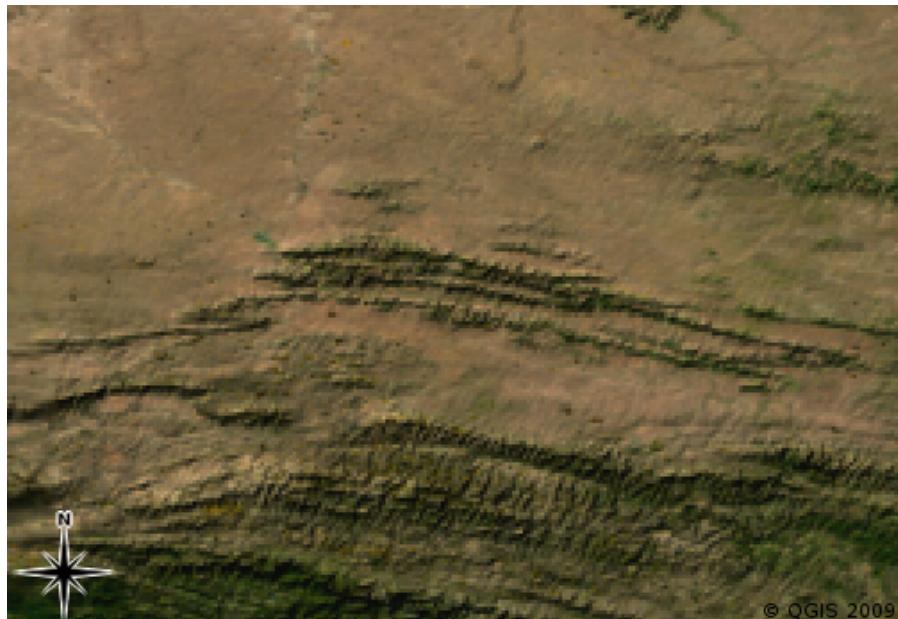
Polygon attributes (describe the feature)

Id, Name, Description

- 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

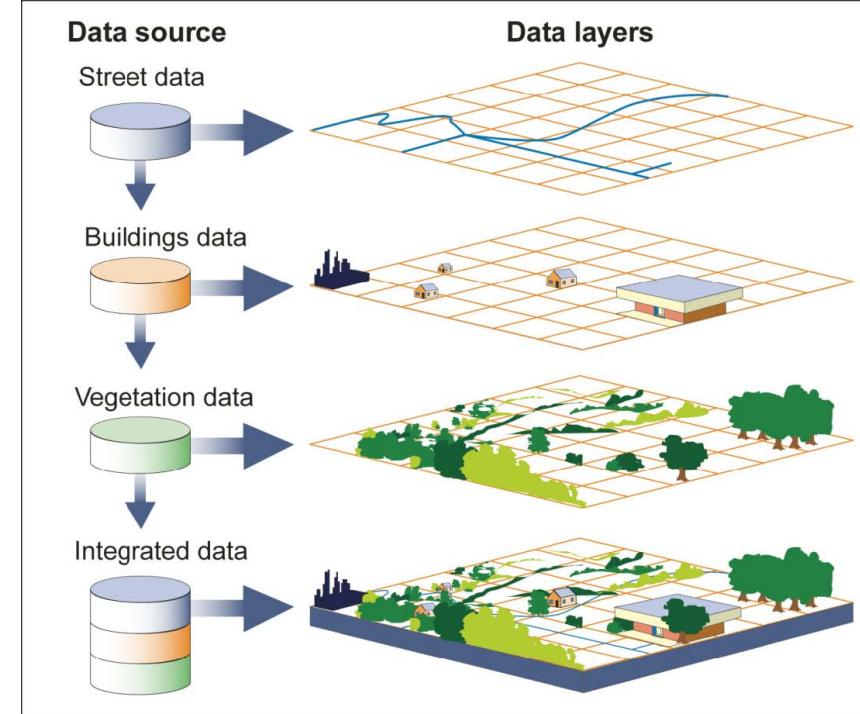


https://docs.qgis.org/3.34/en/_images/raster_types.png

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



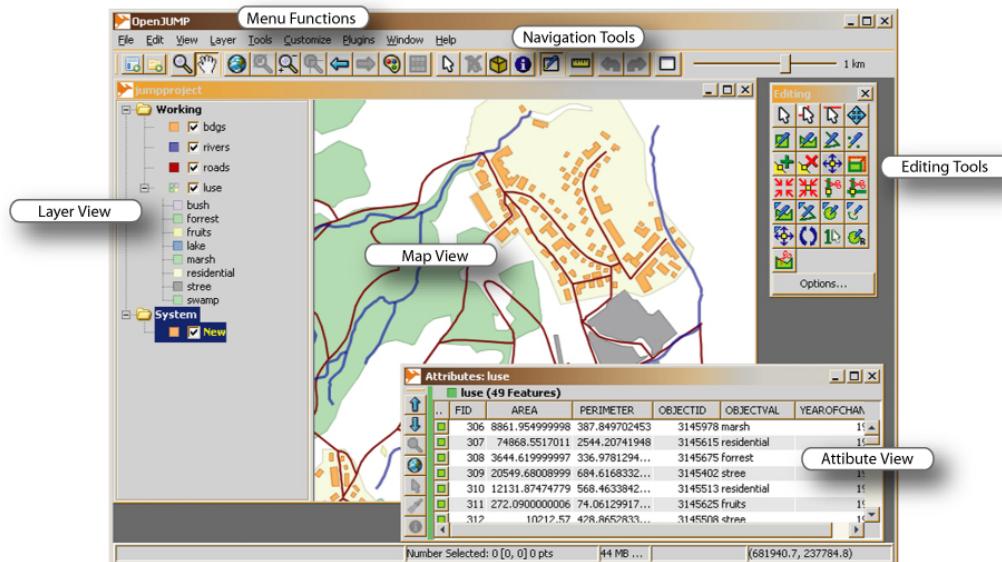
Source: GAO.

Or more simply

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

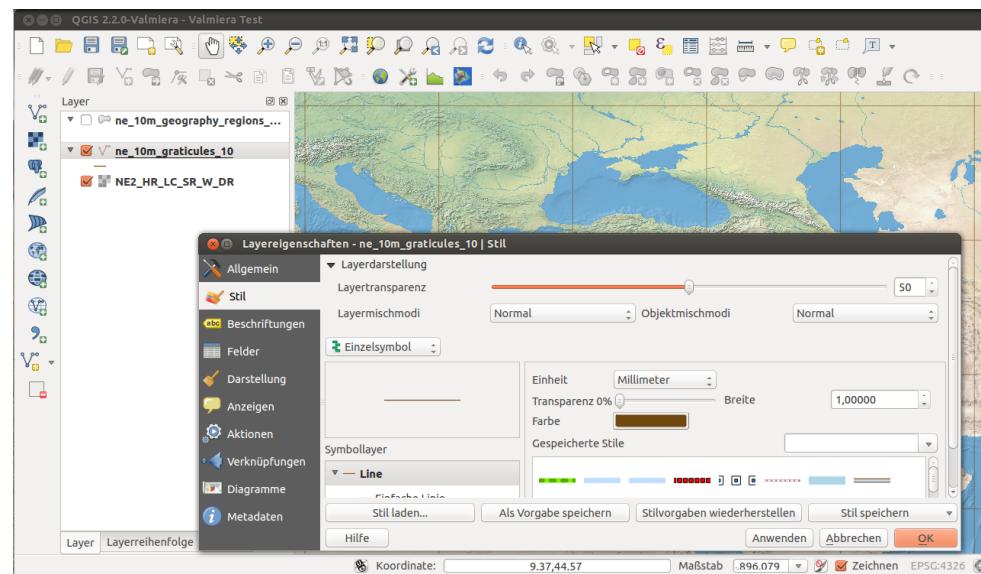
Geographic Information Systems (GIS)

- 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... ;-)



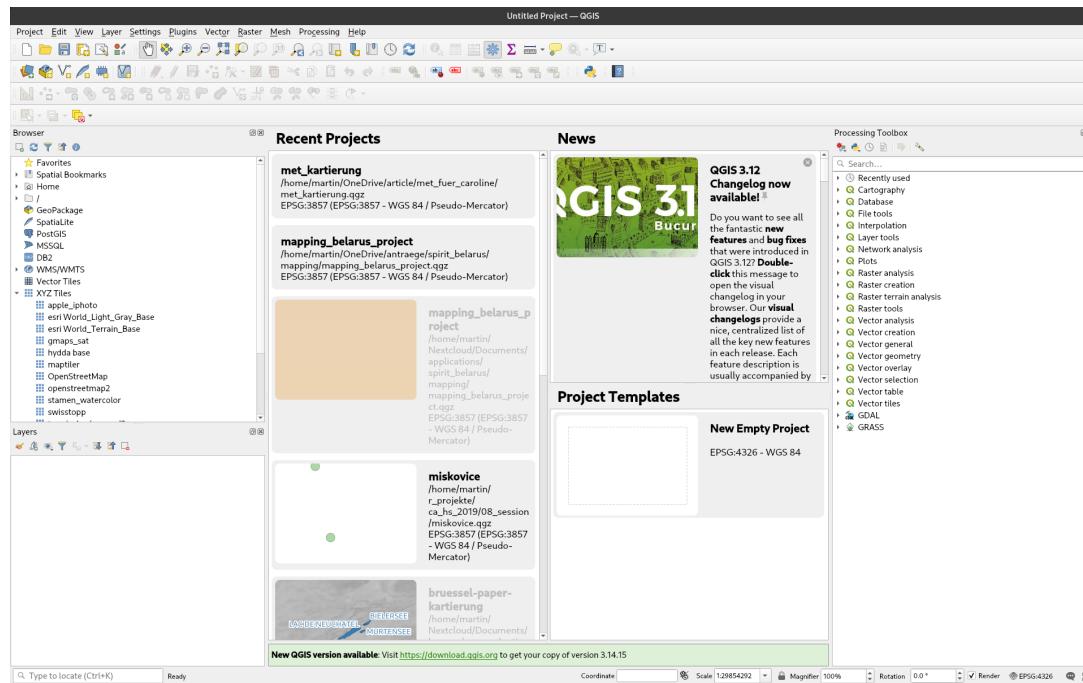
Let's Get Started

Getting Data

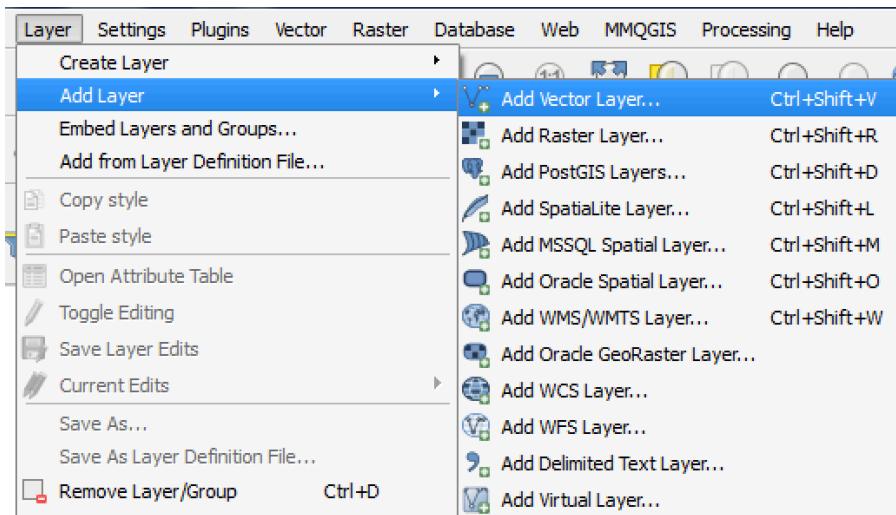
1. [Click this link](#) and download the file to your desktop
2. Unzip the file
3. [Click this link](#) and download the other file also to your desktop
4. Open QGIS

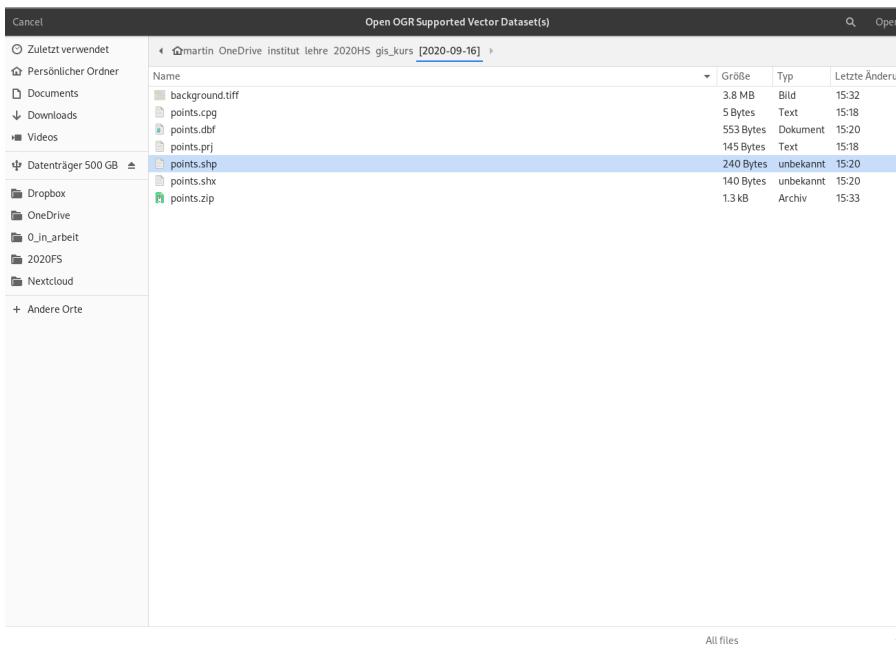
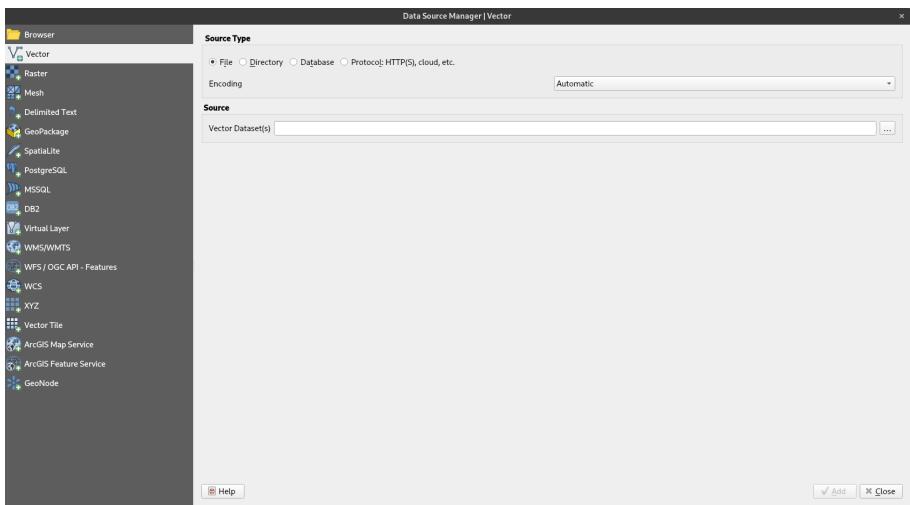


QGIS Getting Started

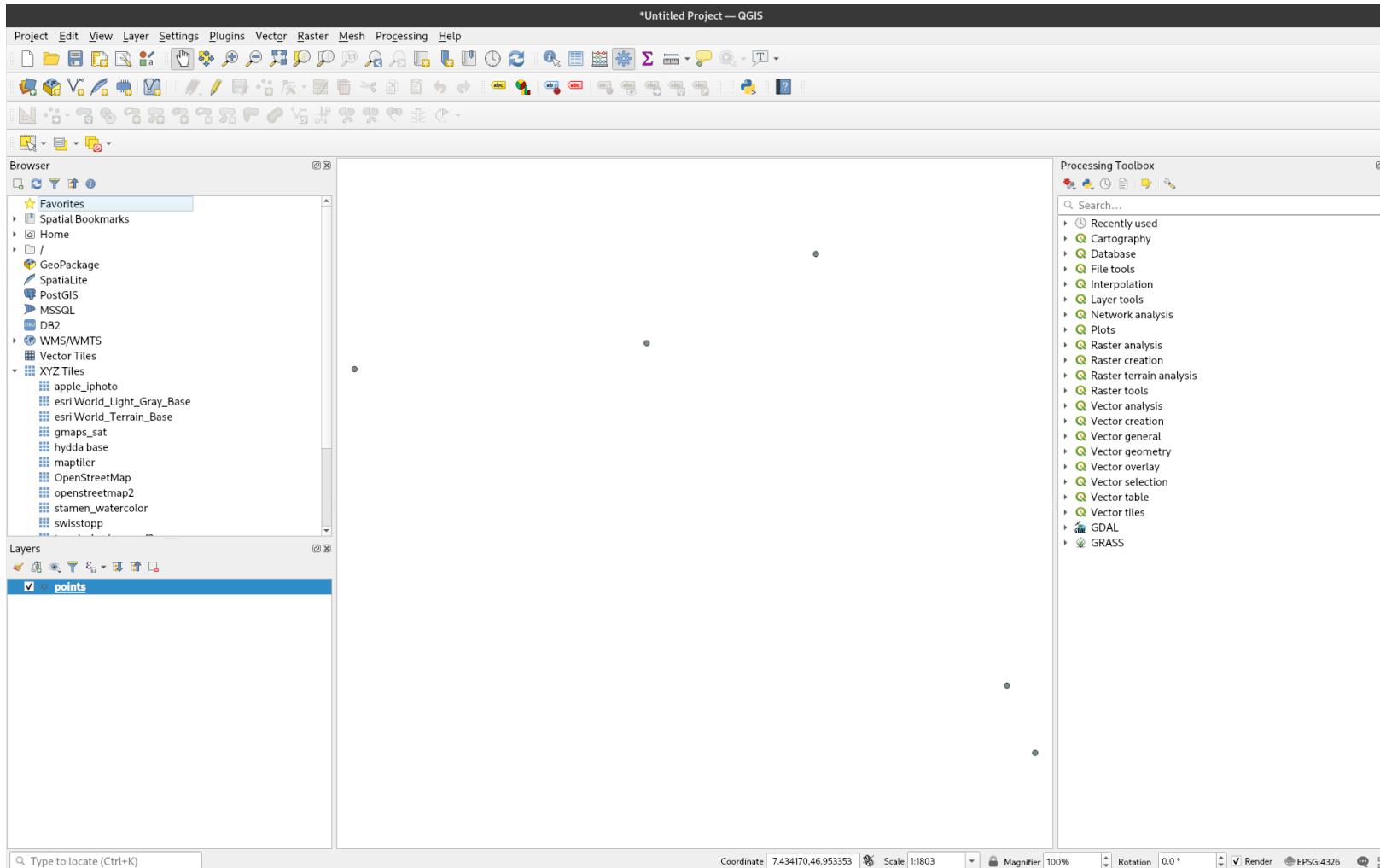


QGIS Getting Started



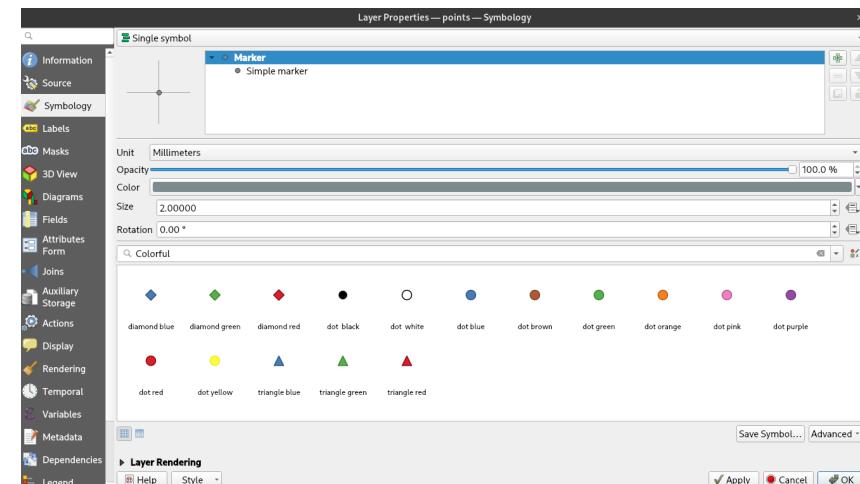
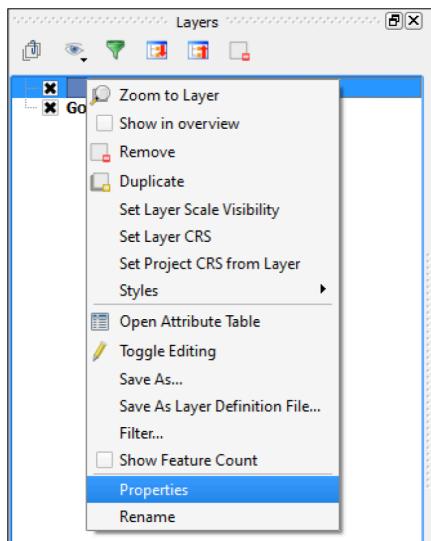


QGIS Getting Started

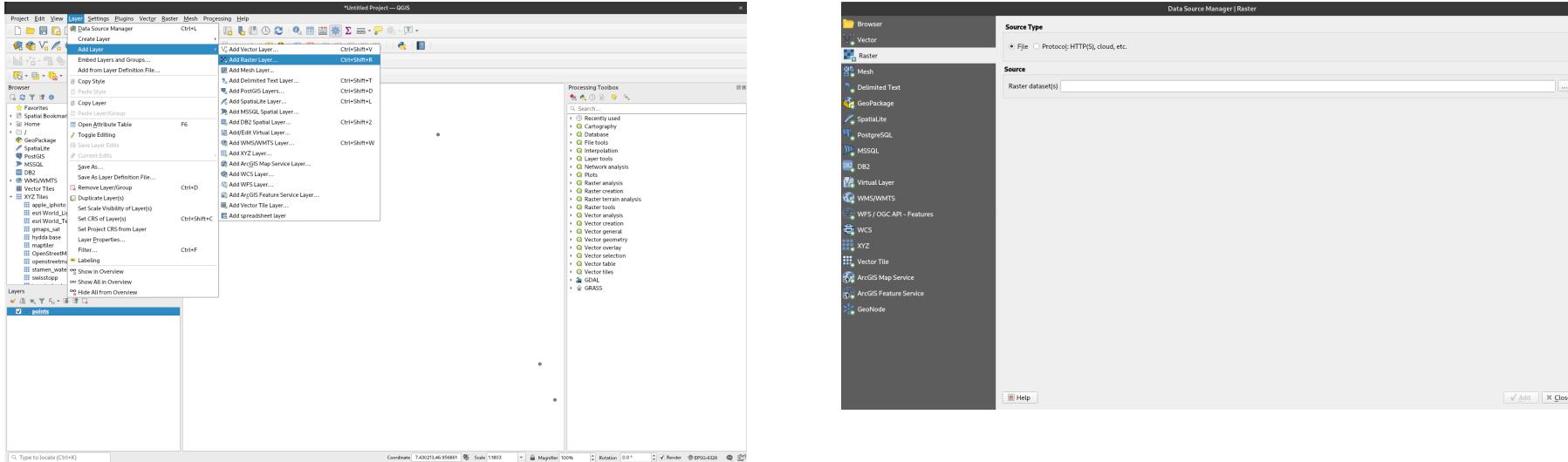


Styling Features

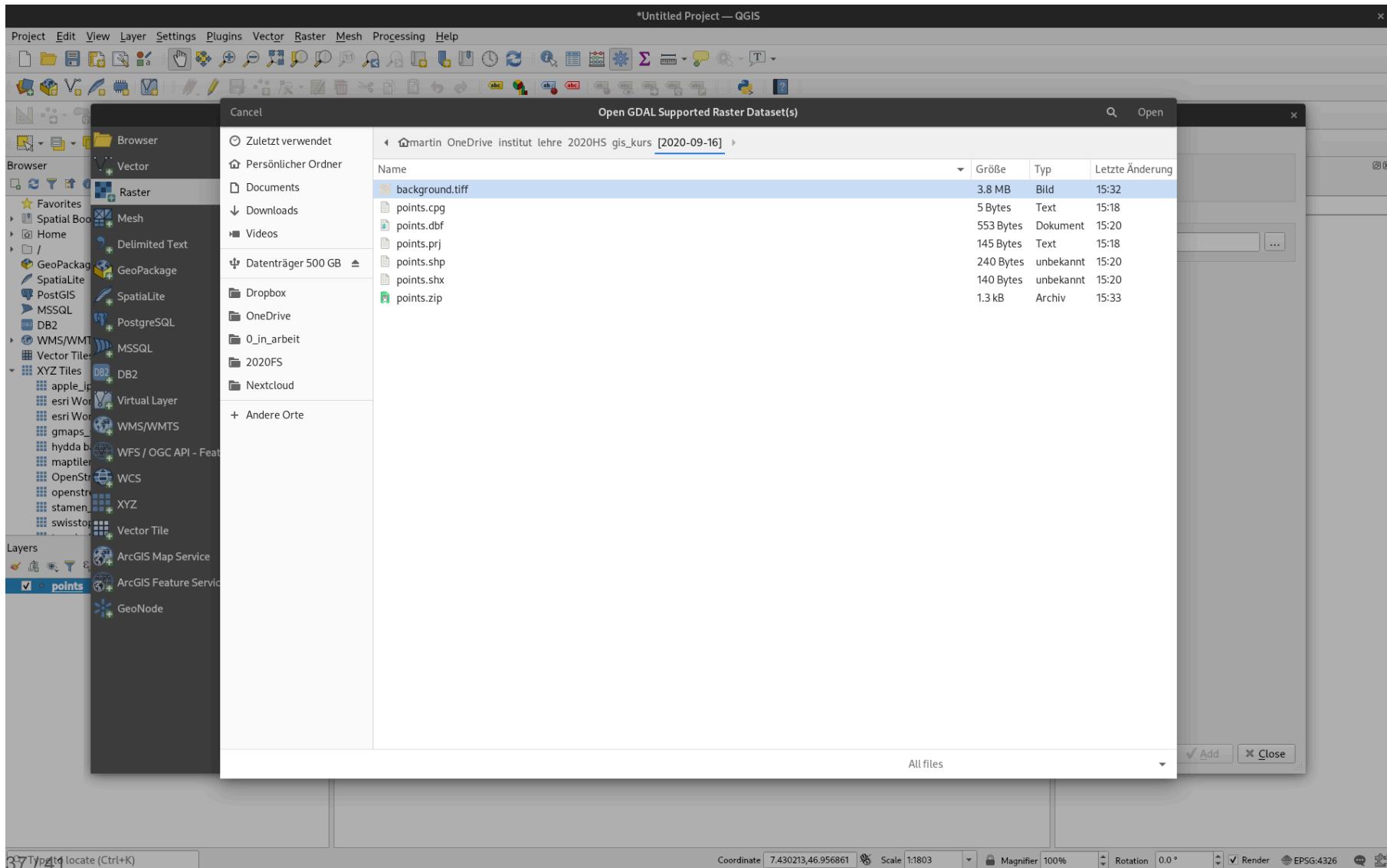
- Right-click the layer and select the Properties option
- Select "Symbology," and style as you like



Add background

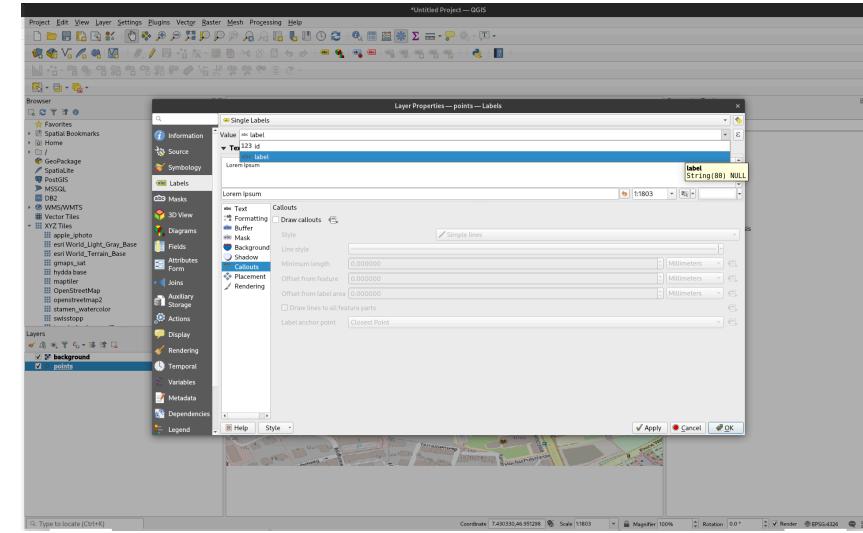
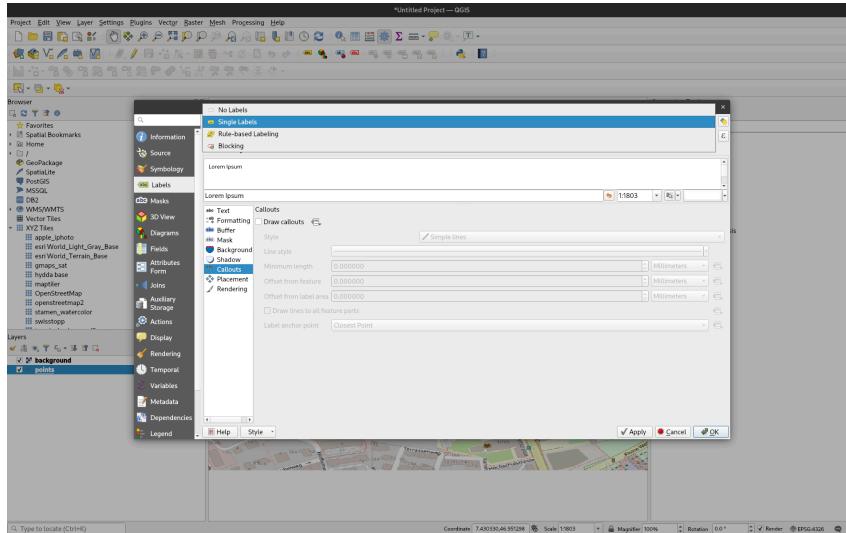


Add background



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>