

Computer Aided Archaeology

09 - GIS II

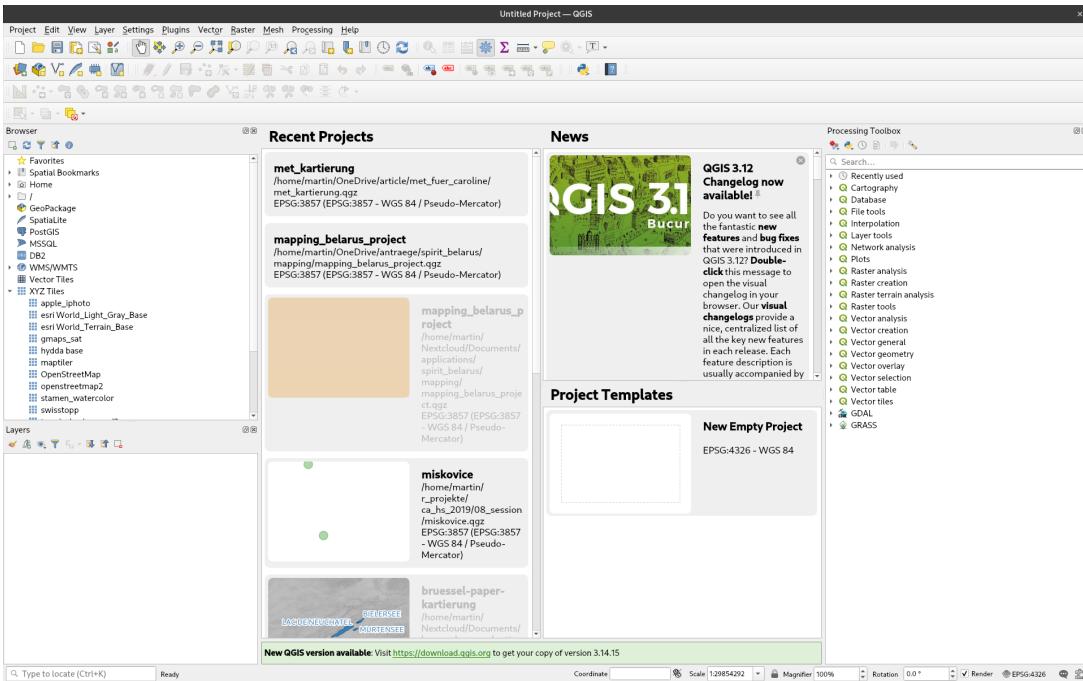
Martin Hinz

Institut für Archäologische Wissenschaften, Universität Bern

15/11/23

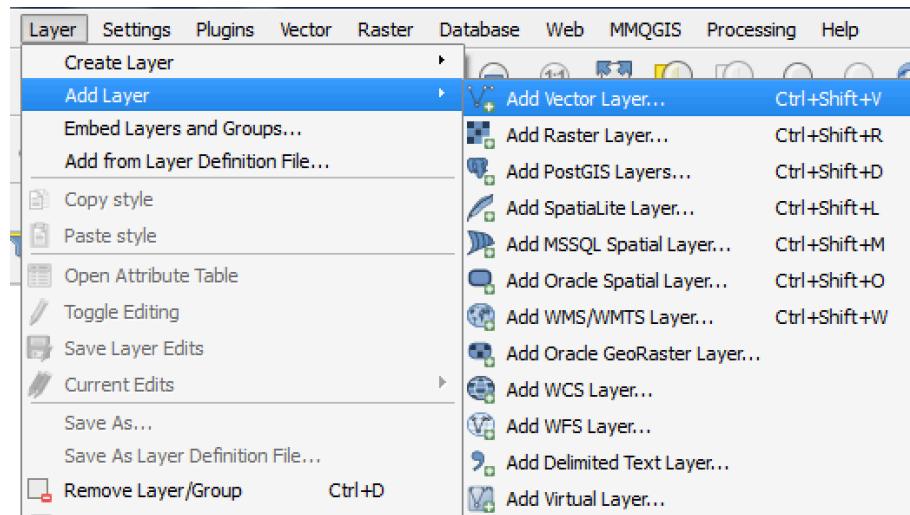
Importing Vector Data

Shape Files



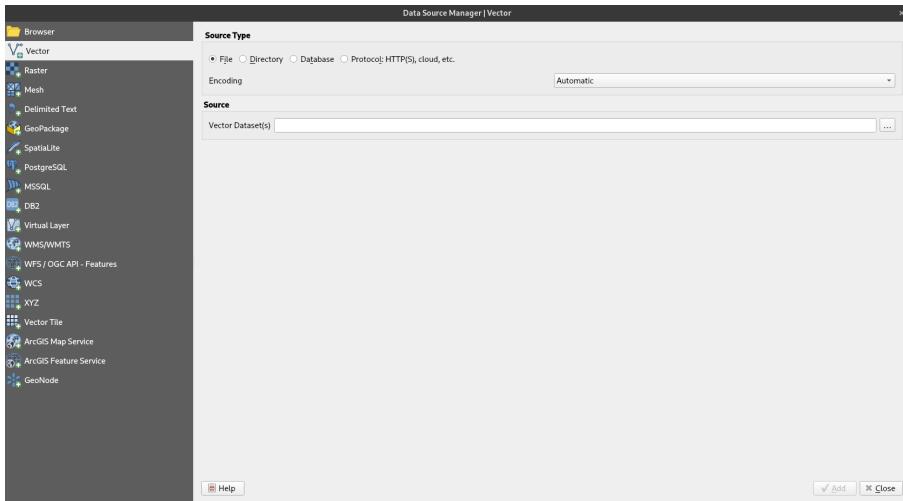
Importing Vector Data

Shape Files



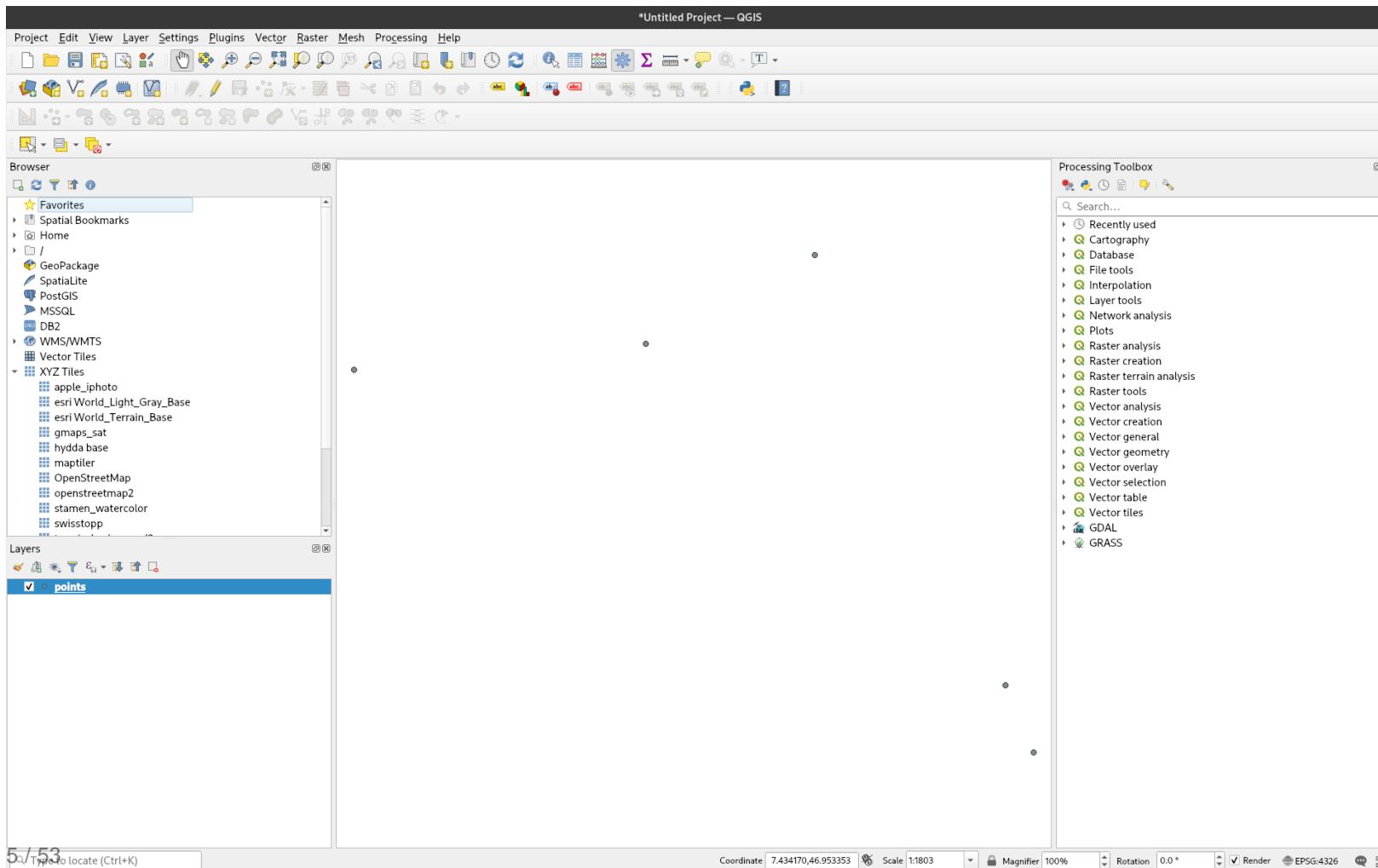
Importing Vector Data

Shape Files



Importing Vector Data

Shape Files



CSV-Files

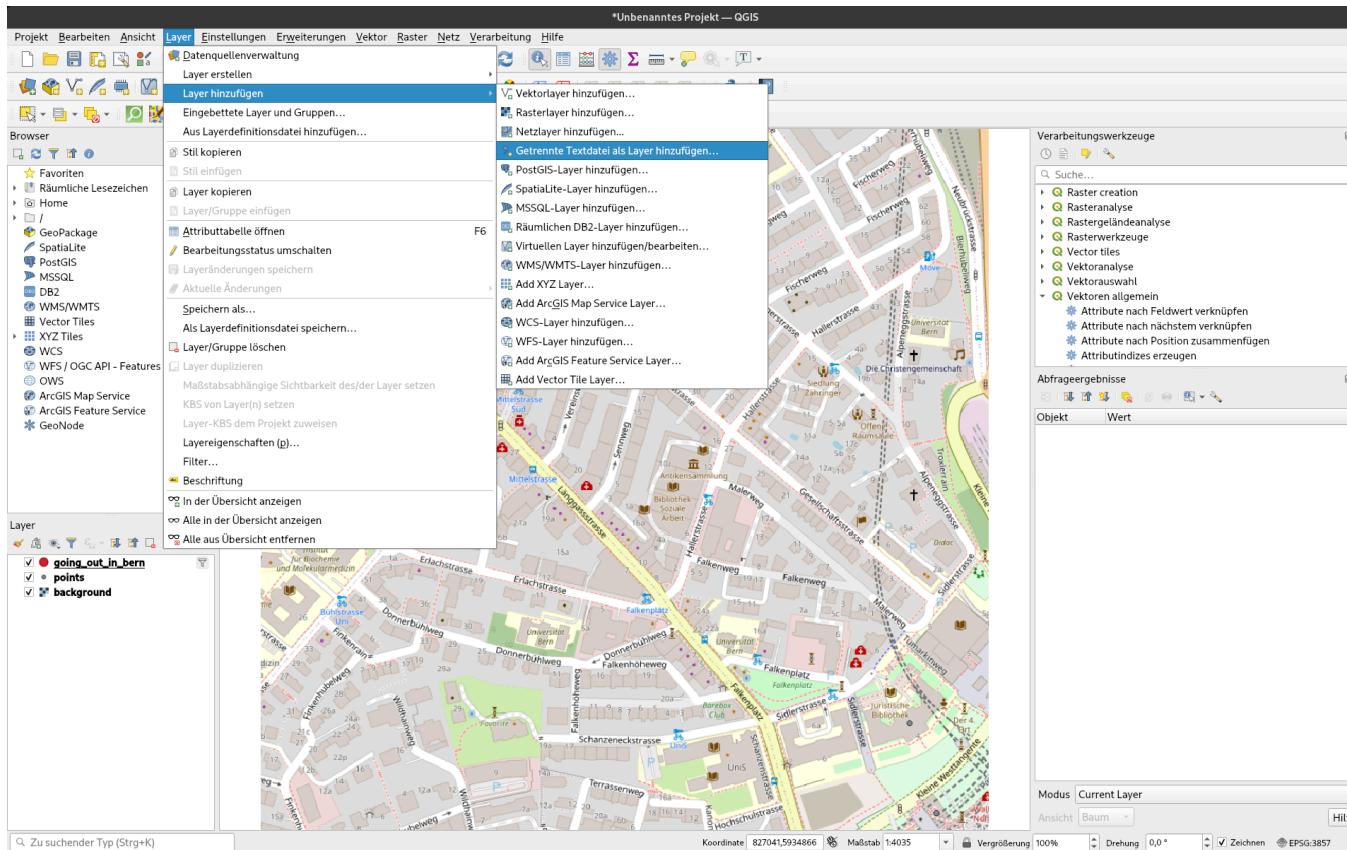
- General (textbased) spreadsheet format
- simple and robust
- human readable (kind of)

CSV-Files

- Perfect for data exchange between Spreadsheet (Excel) and GIS

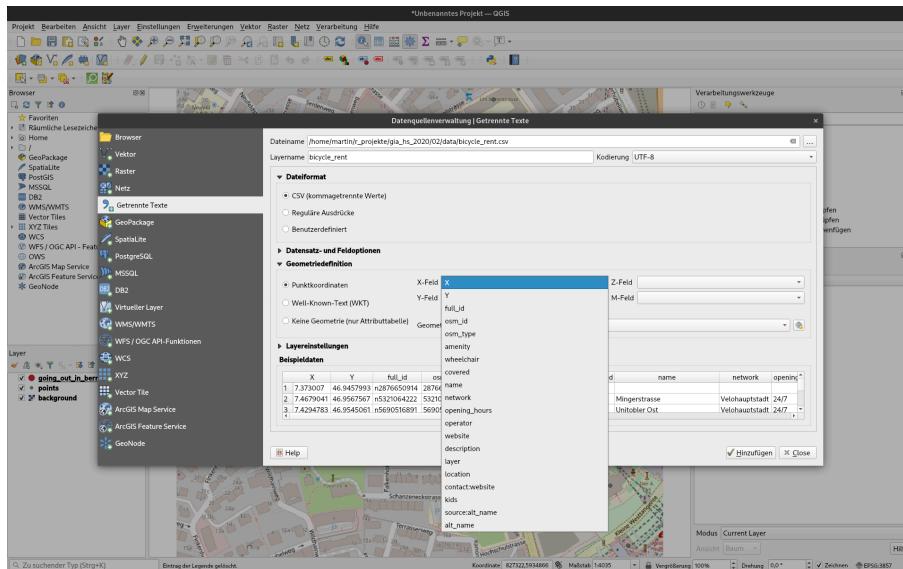
CSV Import

Load Text Layer



CSV Import

Set coordinate columns

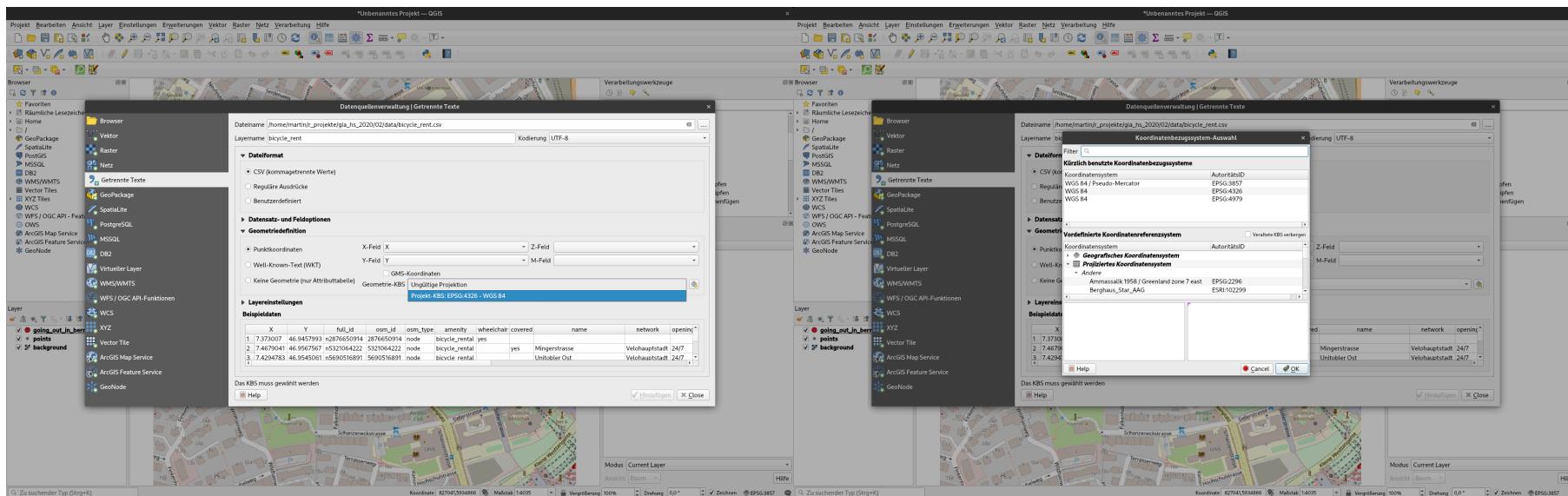


CSV Import

Set coordinate columns

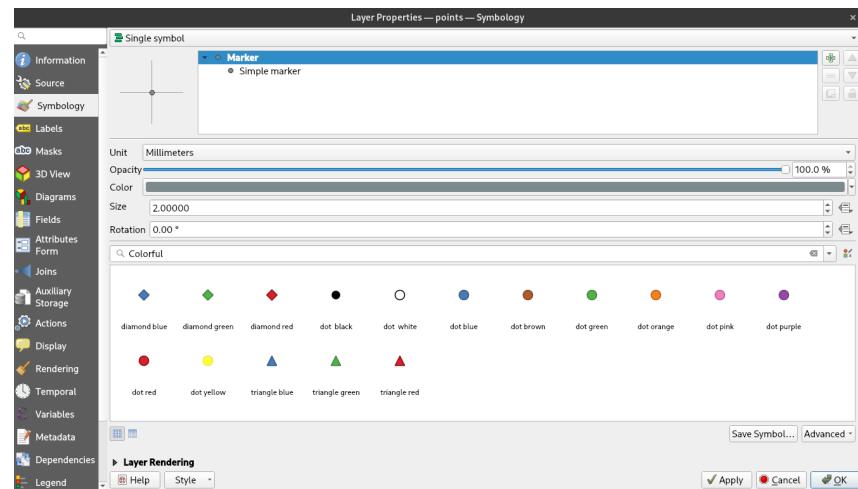
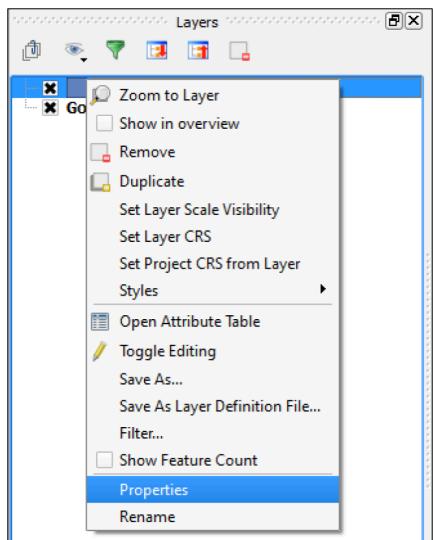
and Coordinate Reference System

You can also access more detailed Coordinate Reference settings.



Styling Features

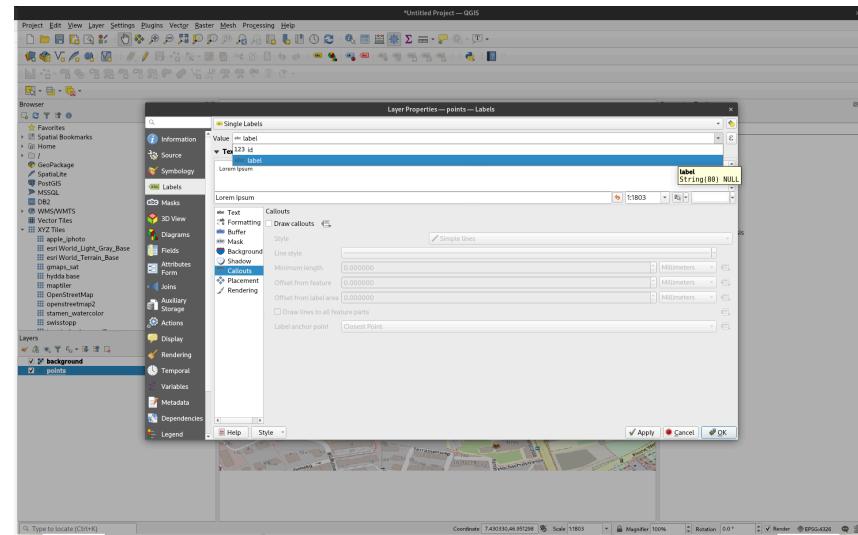
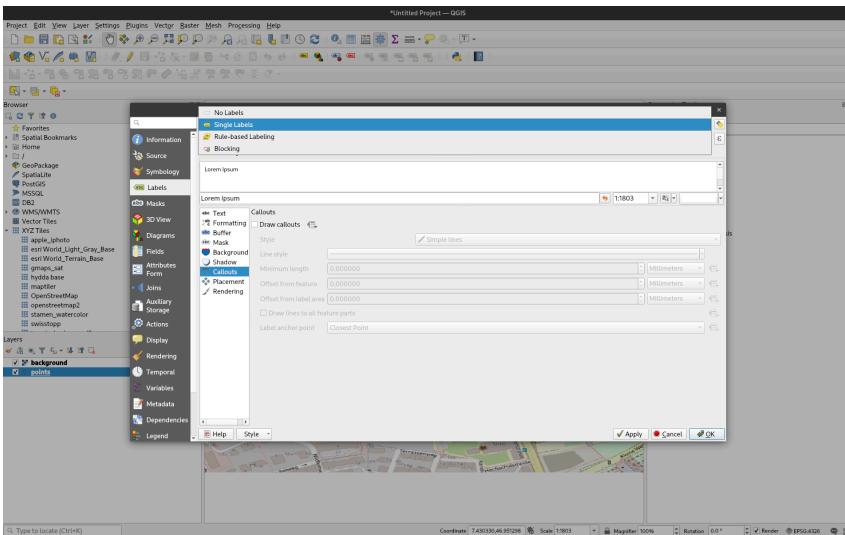
- Right-click the layer and select the Properties option
- Select "Symbology," and style as you like



For more Styling Options watch the [Video from the GIS Course](#)

Add labels to data

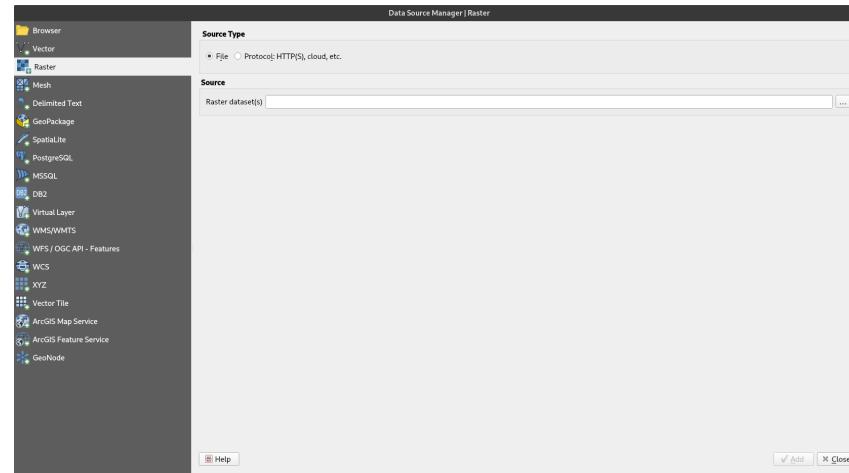
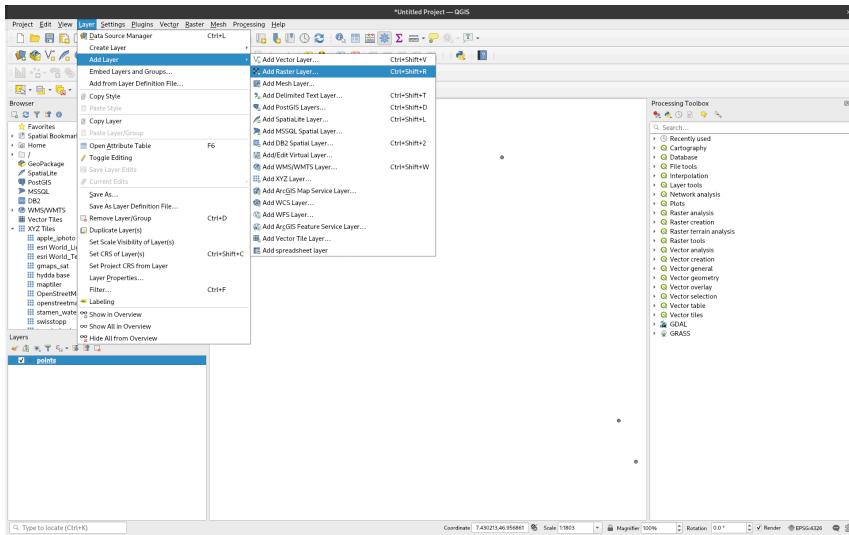
- From Properties, select "Labels", "Show labels"
- Select attribute for label (this time "label")
- Style as you like



For more Labeling Options watch the [Video from the GIS Course](#)

Importing Raster Data

GeoTiffs



Importing Raster Data

GeoTiffs

Layers

- Layers on top are drawn on top
- Just drag and drop within the Layers Panel to change order

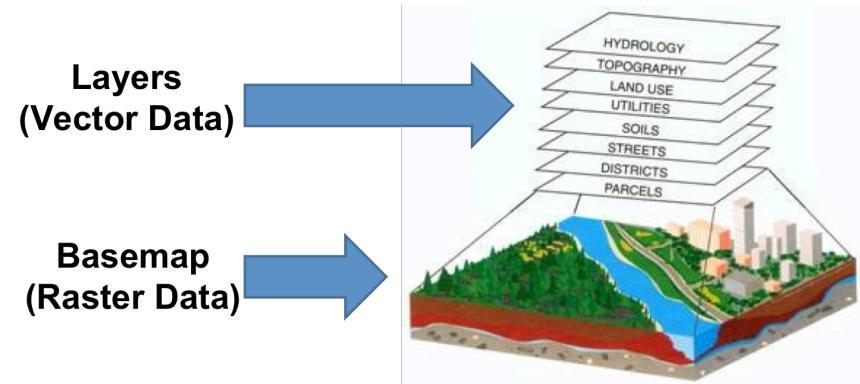


Image Source:
<http://www.geocontrolling.com/co-je-gis.htm>

Choosing a Base Map

- Think about what someone reading your map needs to see for context
- Think about how the base map interacts with the data on your map

Hierarchy

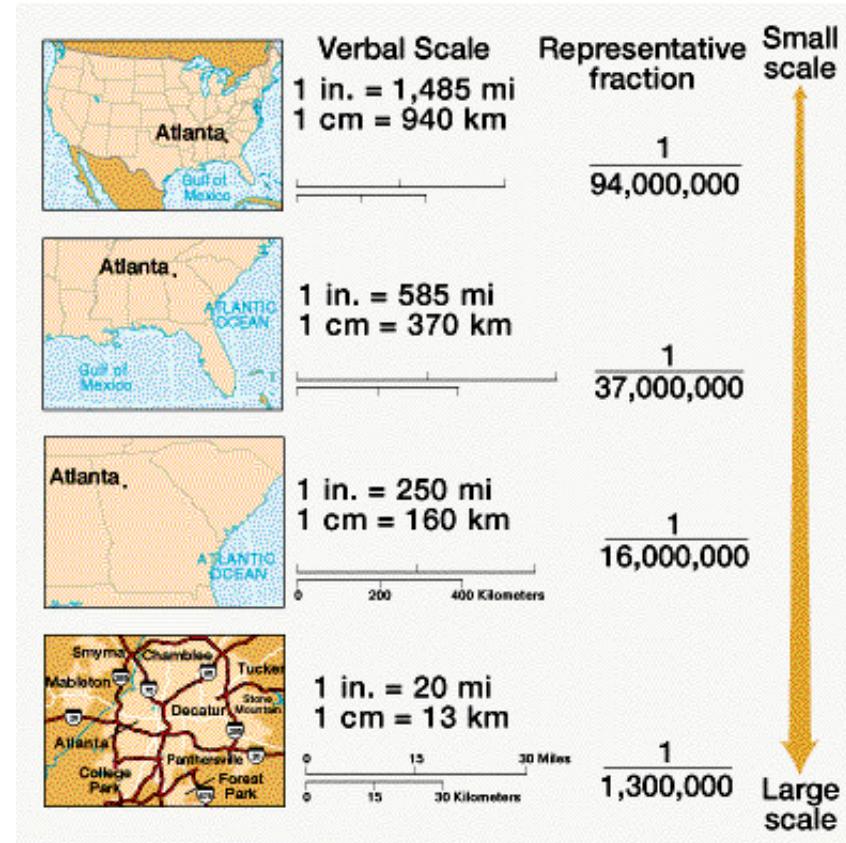
- If your data is the most important part of the map, make sure it looks more important than the base map
- Avoid base maps that strongly emphasize features that aren't relevant on your map

Colors

- Choose base maps with colors that complement the colors on your map
- The contrast between the color on your map and the color on the base map should be enough to make your layers clearly visible

Base Maps - Scale

- Base maps show different levels of detail at different scales
- Make sure the level of detail is appropriate to your map

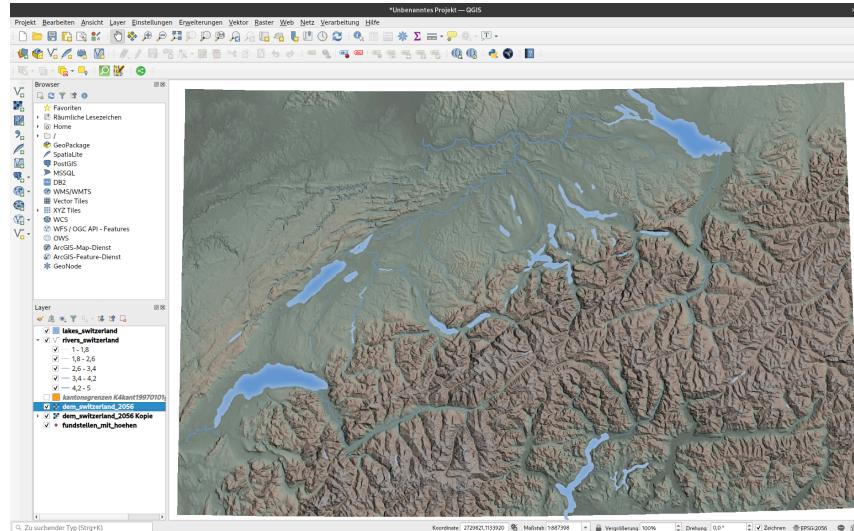


Source:

http://go.owu.edu/~jbkrygie/krygier_html/geog_222/geog_222_lo/geog_222_lo04.html

Background Maps - Options

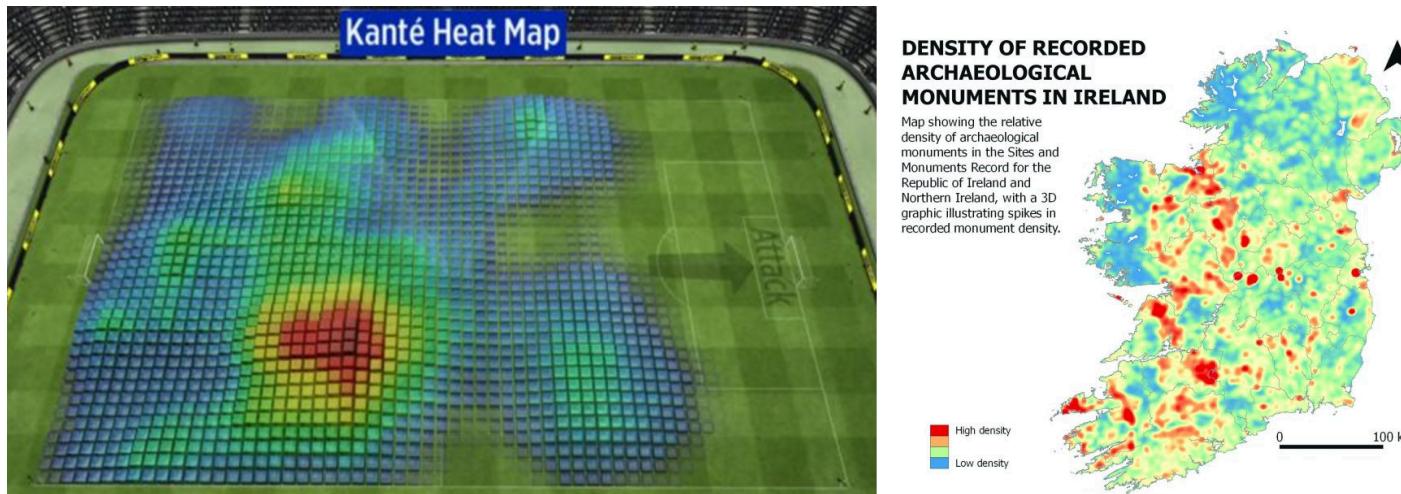
- use a scanned georeferences map
 - will look a bit awkward most of the times
- use a preproduced background map (eg. <https://www.naturalearthdata.com>)
 - useful for small scale background maps
- use a background map from a plugin (eg. the [QuickMapServices Plugin](#))
 - useful, if man made features are not a disturbing factor
- Build a background map from scratch
 - Probably the best results, but also the most complicated



A background map from scratch using elevation and waterbody information and hillshading

Visualising densities - Heatmaps

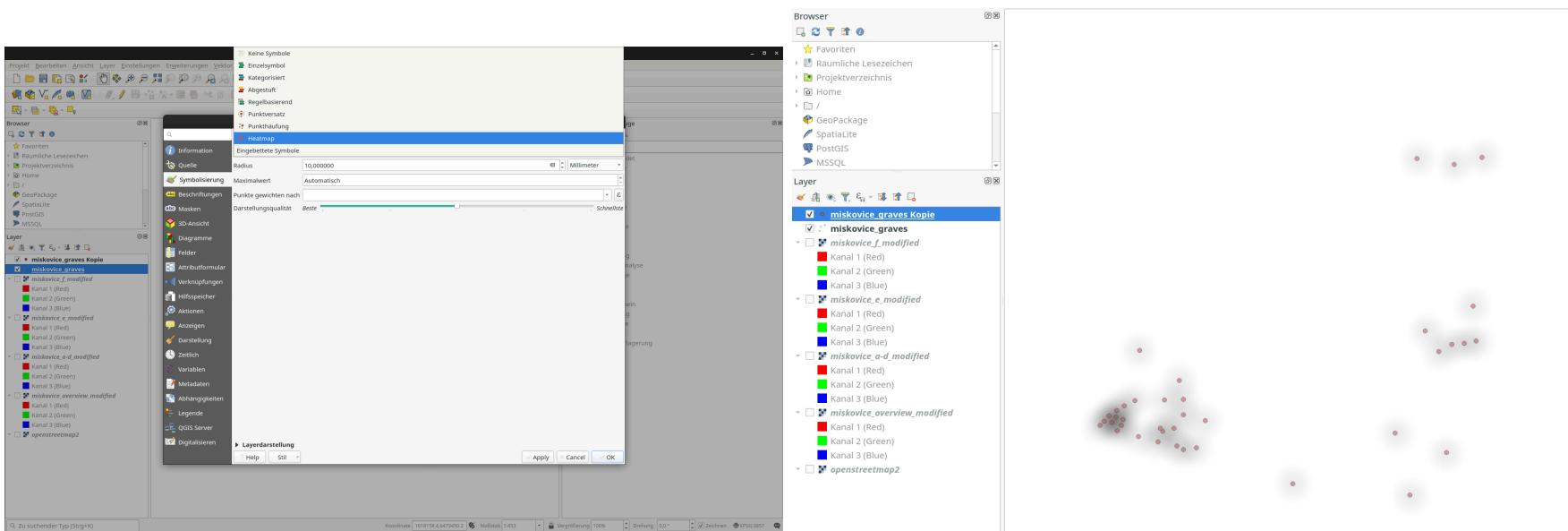
- Heatmaps are one of the best visualization tools for dense point data
- Heatmap is an interpolation technique that useful in determining density of input features
- Heatmaps are most commonly used to visualize crime data, traffic incidents etc.
- QGIS has a heatmap renderer that can be used to create an raster from a point layer.



Source: Berner Zeitung; <https://archaeologyireland.ie/>

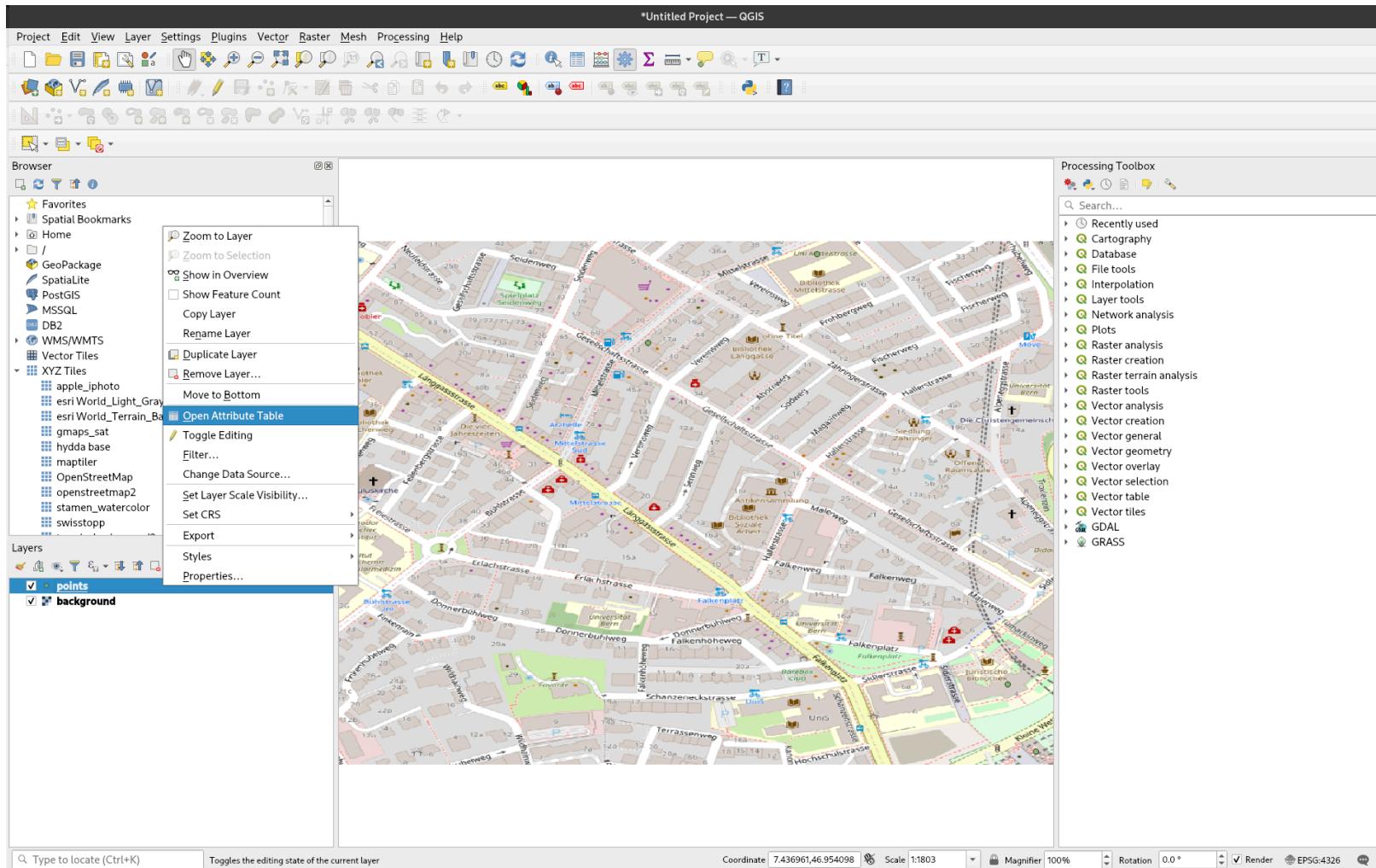
Heatmap in QGIS - Most simple solution

- right click on layer > Duplicate Layer
- right click on layer > Properties > Symbology > Heatmap
- enjoy a really simple heatmap



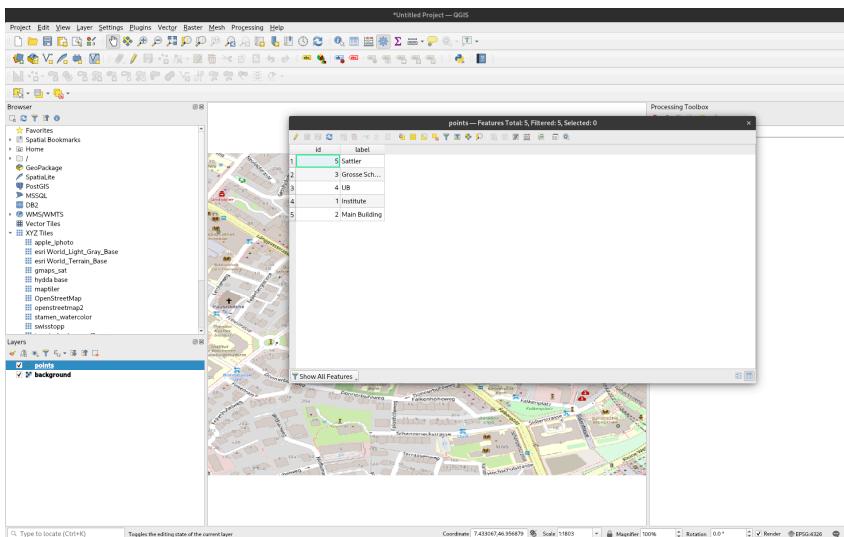
More complicated: watch the [Video from the GIS Course](#)

Attribute Table (Right click on layer)

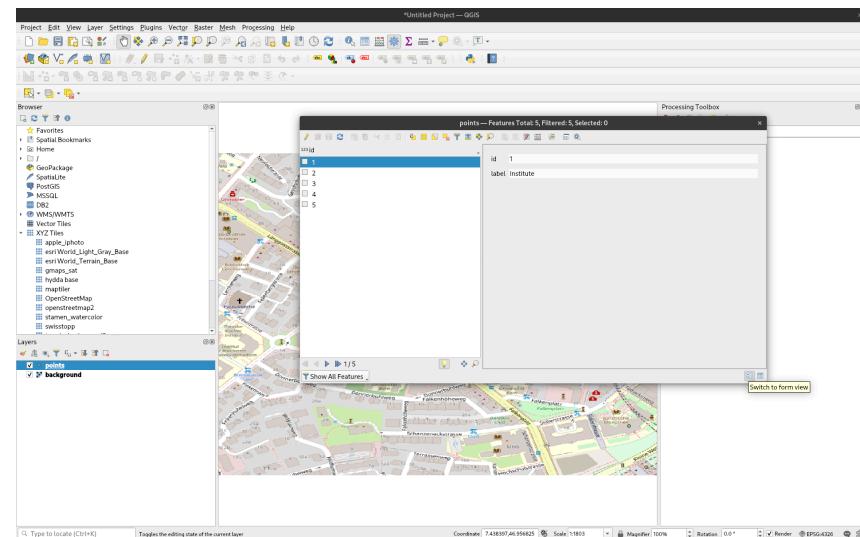


Attribute Table

Table View

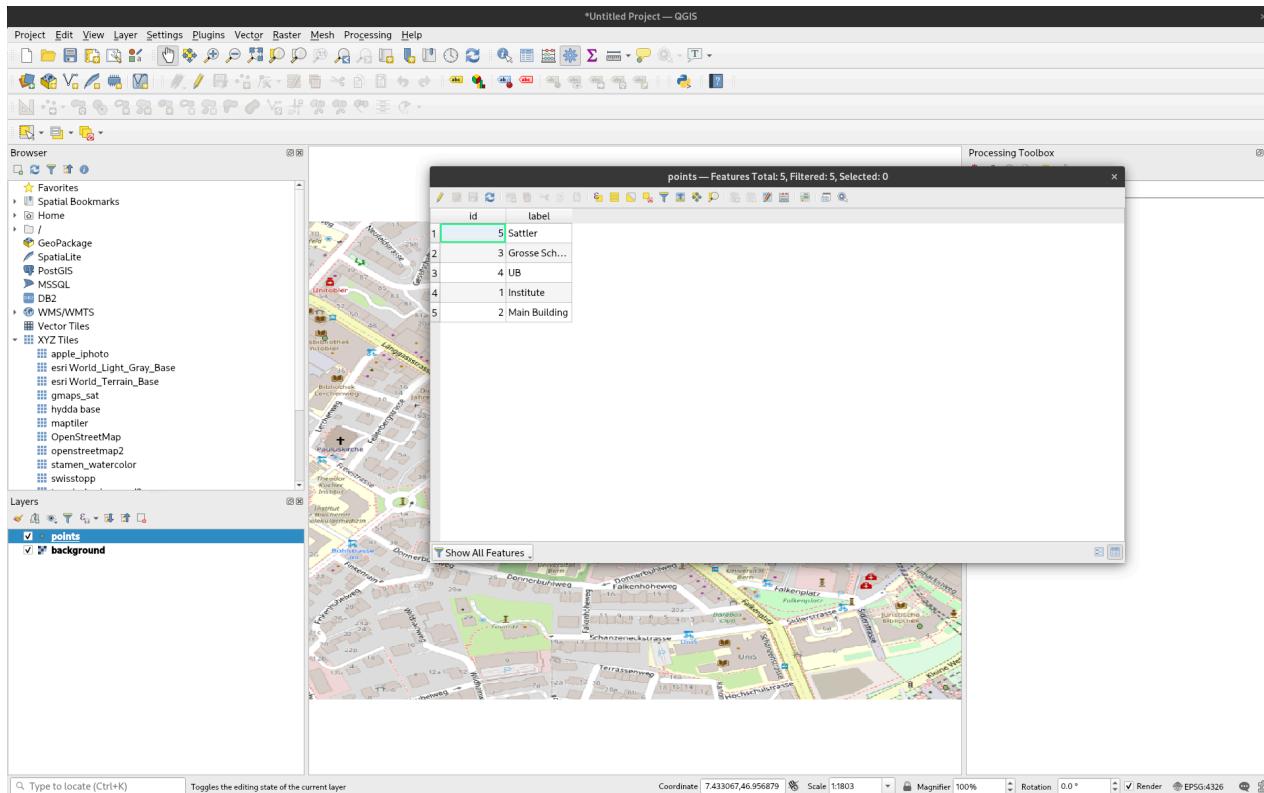


Form View



Shapefiles and Attribute Tables

- Column names can only be letters, numbers, and underscores "_"
- Column names can only be ten characters long



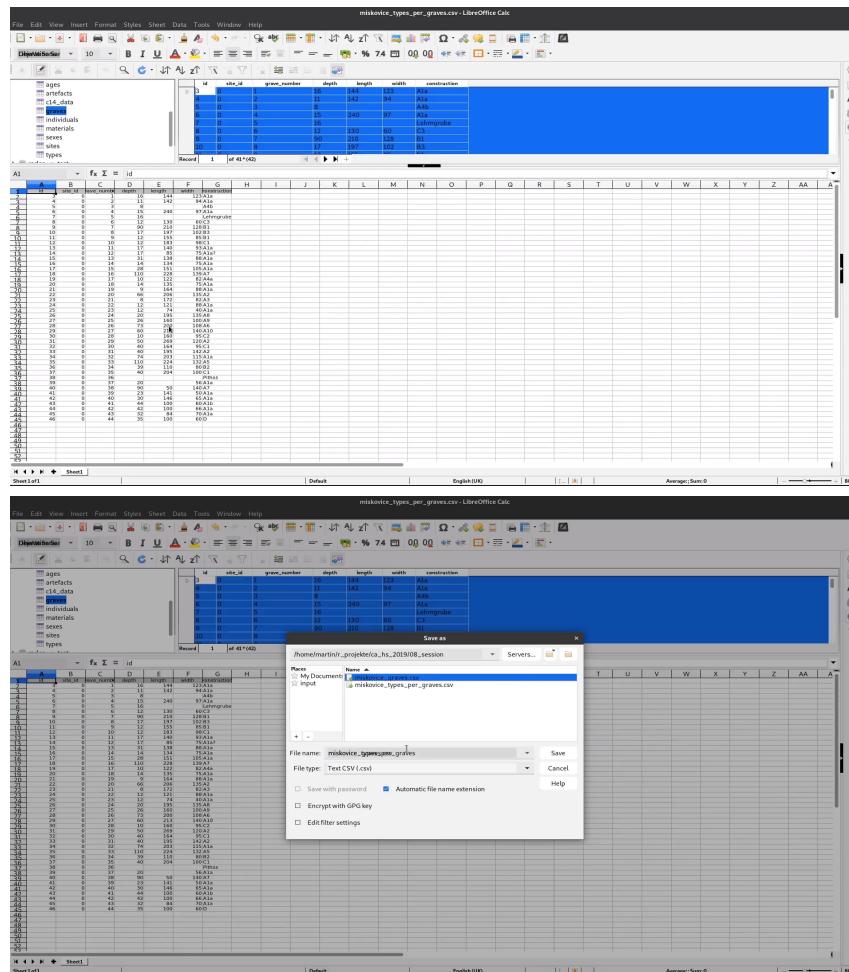
Basic Thematic Mapping

or: put data to your map

- simple: 1:1 relationship
- advanced: preparing pivot table and plotting eg. diagrams for that relationship
- a bit more complex: 1:m relationships

Simple: 1:1 relationship

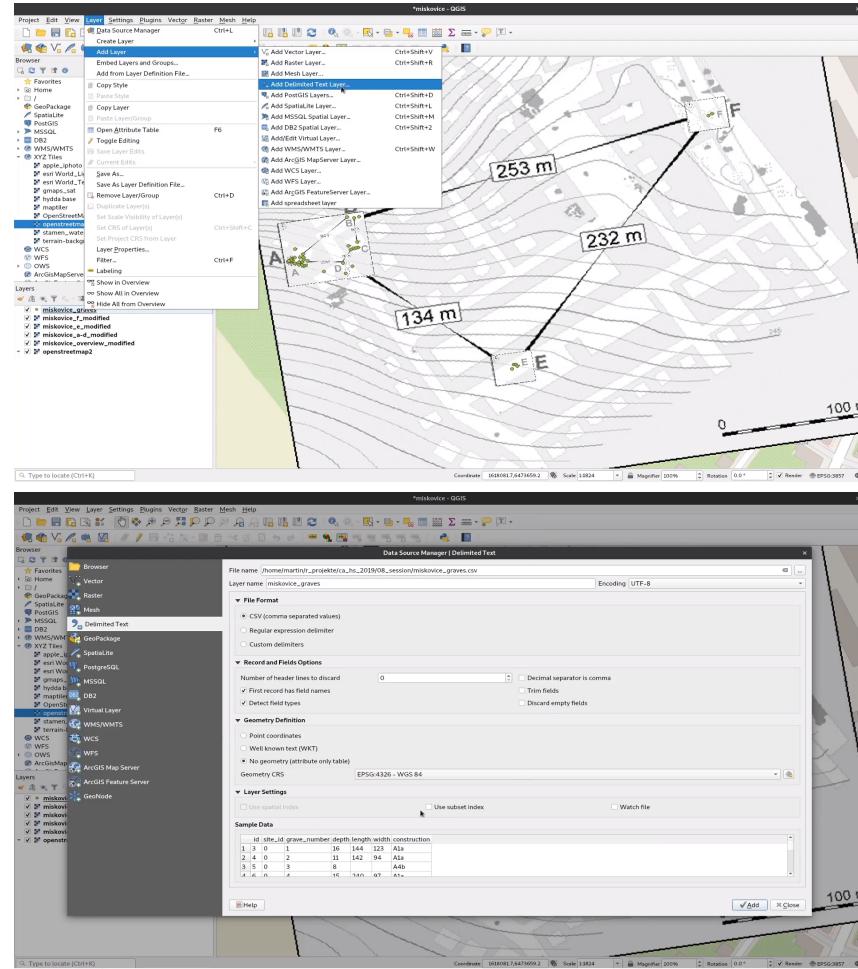
1. Save your data to a csv



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
1	id	site_id	grave_number	depth	length	width	construction																				
2	1	1	1	25	142	124	122,42																				
3	2	1	2	25	142	124	122,42																				
4	3	1	3	25	142	124	122,42																				
5	4	1	4	25	240	174	174,42																				
6	5	1	5	25	120	60	60,42																				
7	6	1	6	25	120	60	60,42																				
8	7	1	7	25	120	60	60,42																				
9	8	1	8	25	120	60	60,42																				
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74	73	1	73	25	120</td																						

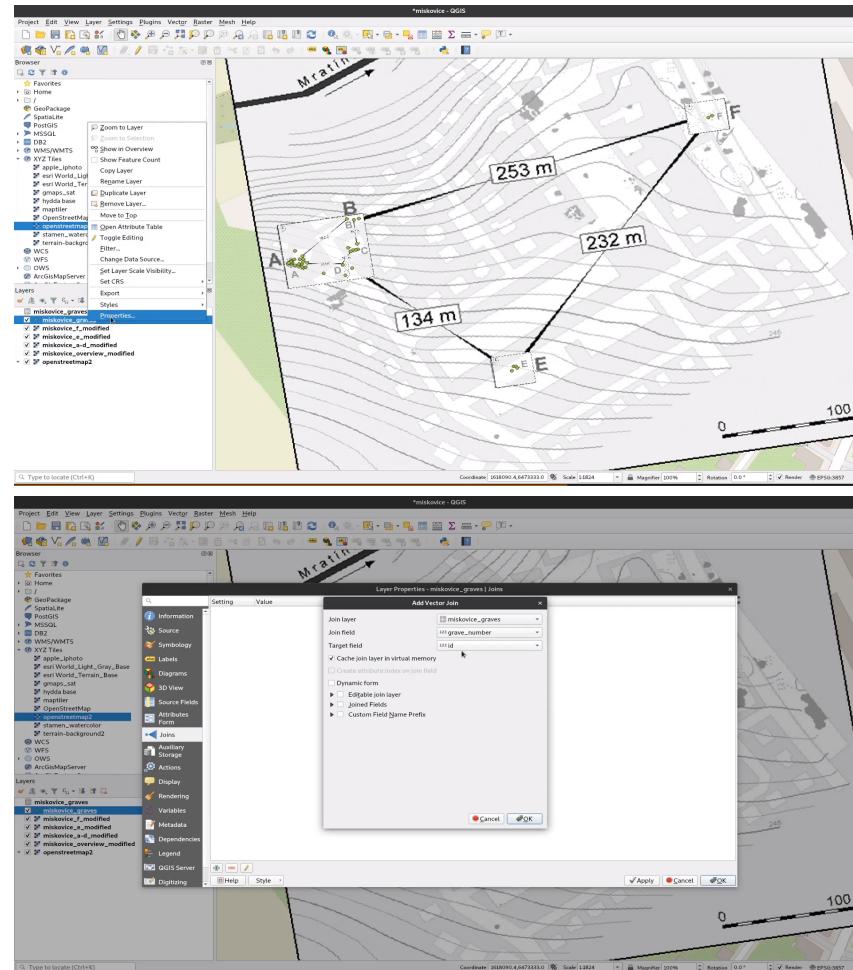
Simple: 1:1 relationship

1. Save your data to a csv
2. Add as Delimited Text Layer without coordinates



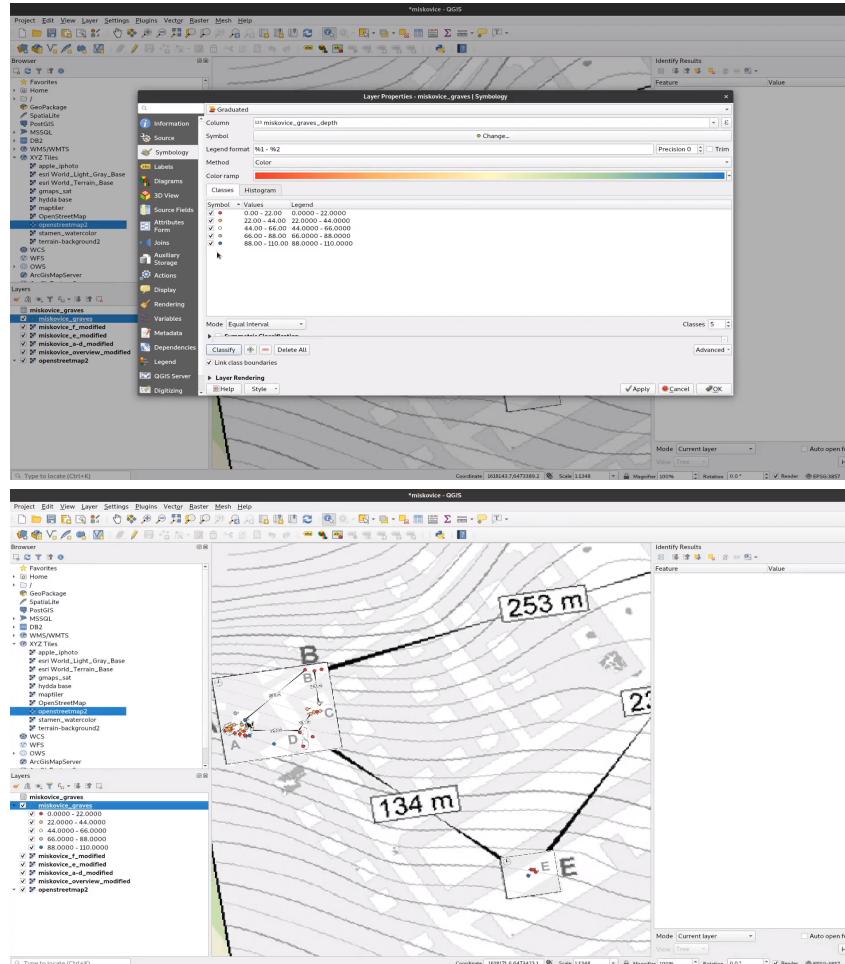
Simple: 1:1 relationship

1. Save your data to a csv
2. Add as Delimited Text Layer without coordinates
3. Join by common attribute (identifier)



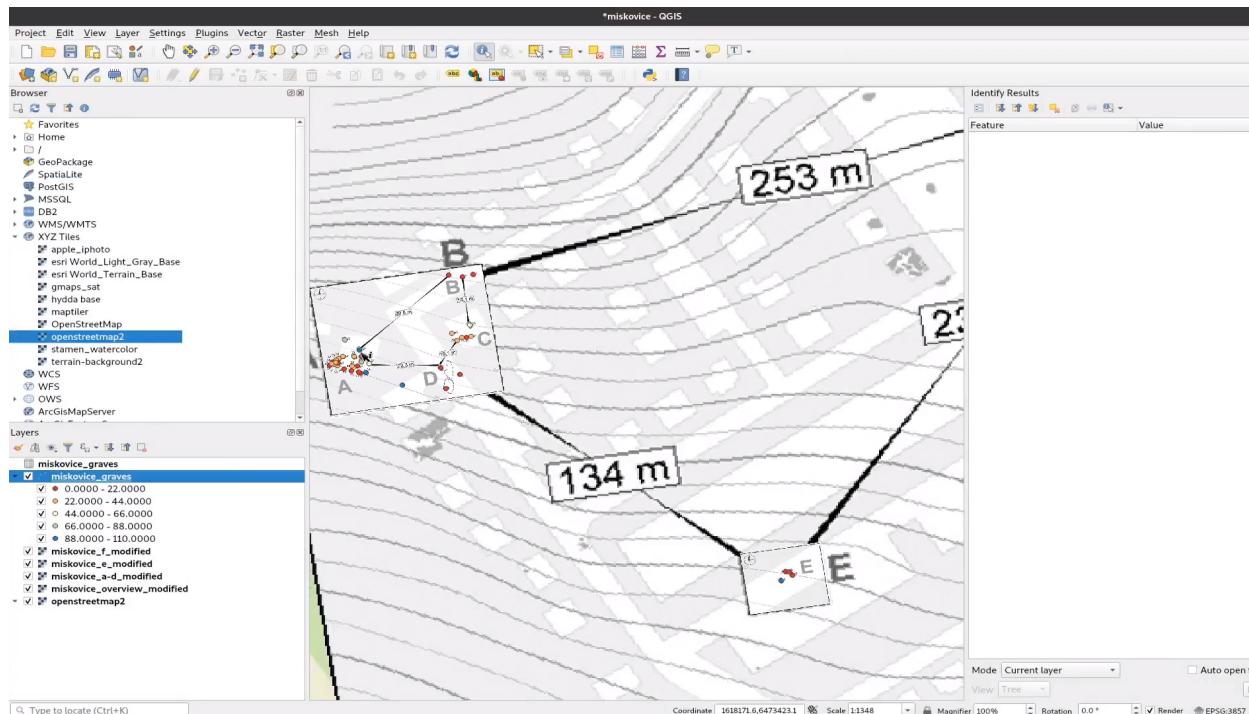
Simple: 1:1 relationship

1. Save your data to a csv
2. Add as Delimited Text Layer without coordinates
3. Join by common attribute (identifier)
4. Use new attributes in symbology



Simple: 1:1 relationship

Result



A map showing you the values of your data in space

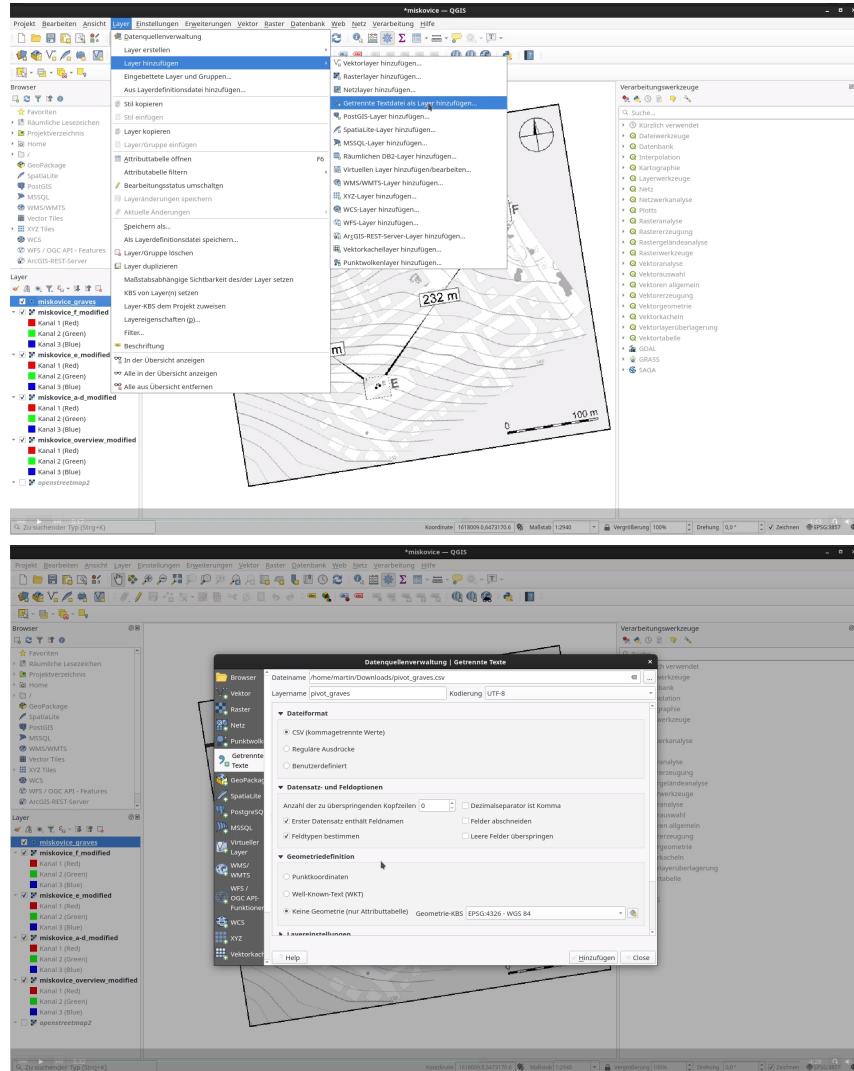
Advanced - Diagrams

1. Make a pivot table and save as csv

The screenshot shows two windows of LibreOffice Calc. The top window displays a 'Pivot Table Layout' dialog box. It lists 'Filters' (grave_number, name), 'Row Fields' (grave_number), and 'Data Fields' (Count - name). The bottom window shows a spreadsheet titled 'evidence_types_per_graves' with data for various grave numbers and their counts. An 'Export Text File' dialog box is open over the spreadsheet, with settings for 'Field Options' (Character set: Unicode (UTF-8), Field delimiter: ;, String delimiter: "), 'Save cell content as shown' (checked), 'Save cell formulas instead of calculated values' (unchecked), and 'Create all text cells' (checked). The 'OK' button is visible at the bottom of the dialog.

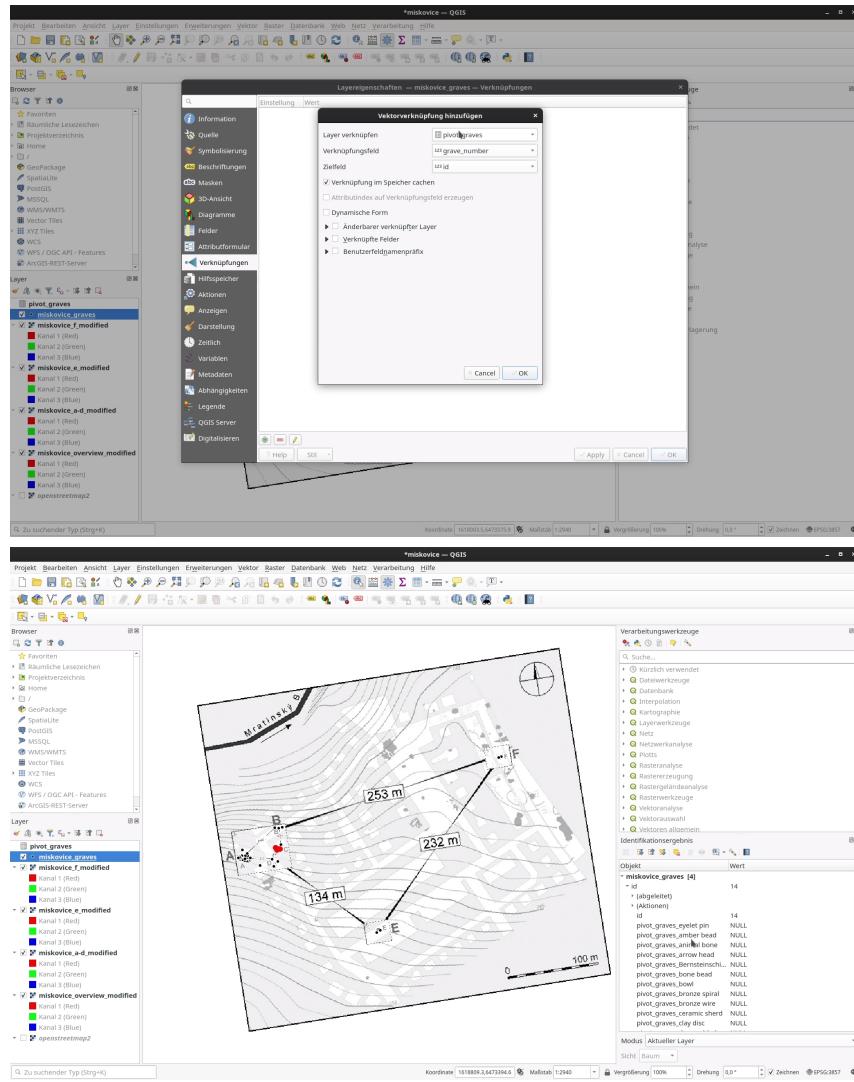
Advanced - Diagrams

1. Save your data to a csv
2. Add as Delimited Text Layer without coordinates



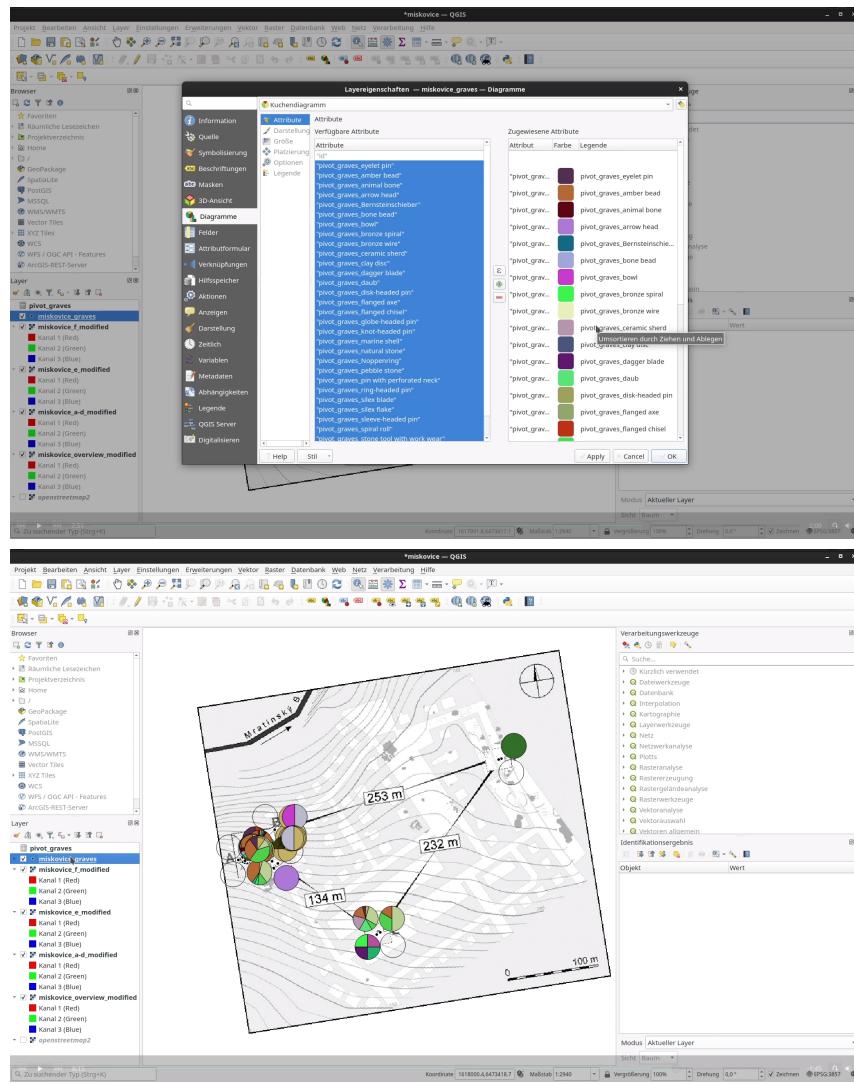
Advanced - Diagrams

1. Save your data to a csv
2. Add as Delimited Text Layer without coordinates
3. Join by common attribute (identifier)



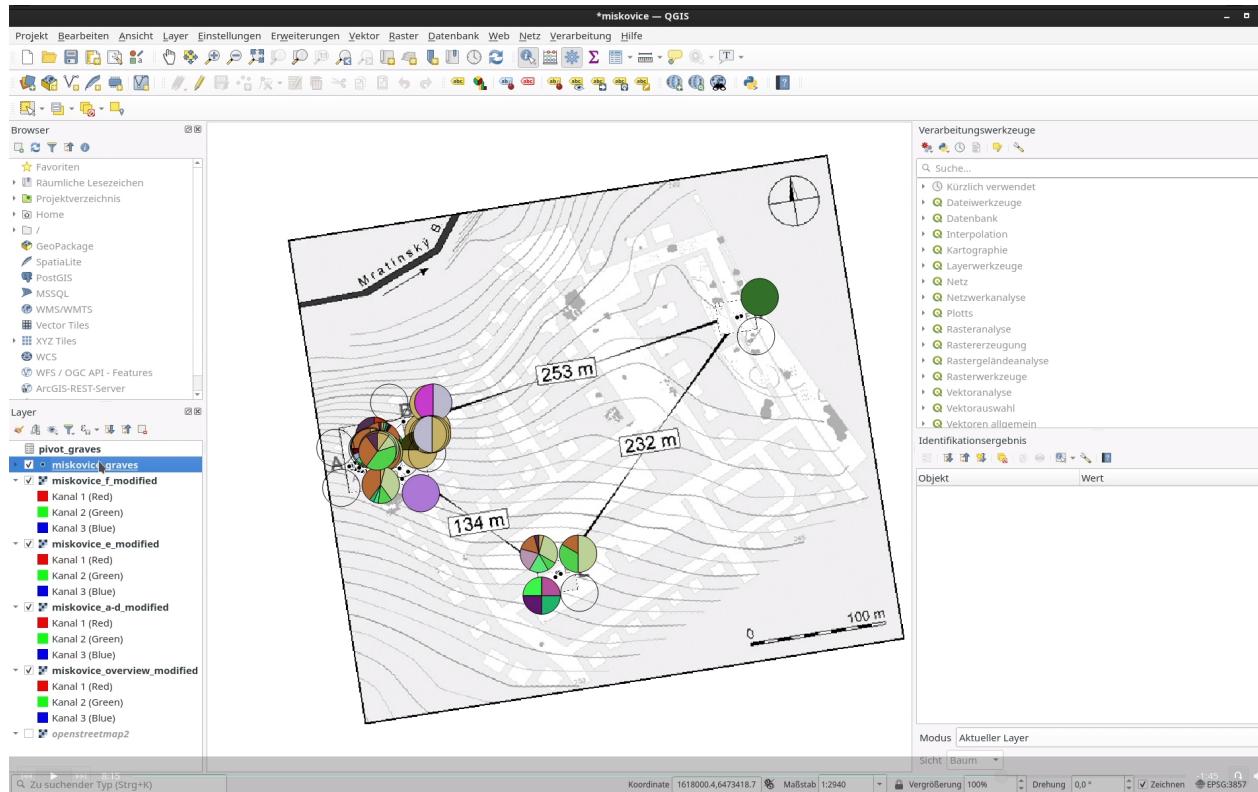
Advanced - Diagrams

1. Save your data to a csv
2. Add as Delimited Text Layer without coordinates
3. Join by common attribute (identifier)
4. Go to diagrams, select pie chart and add all columns



Advanced - Diagrams

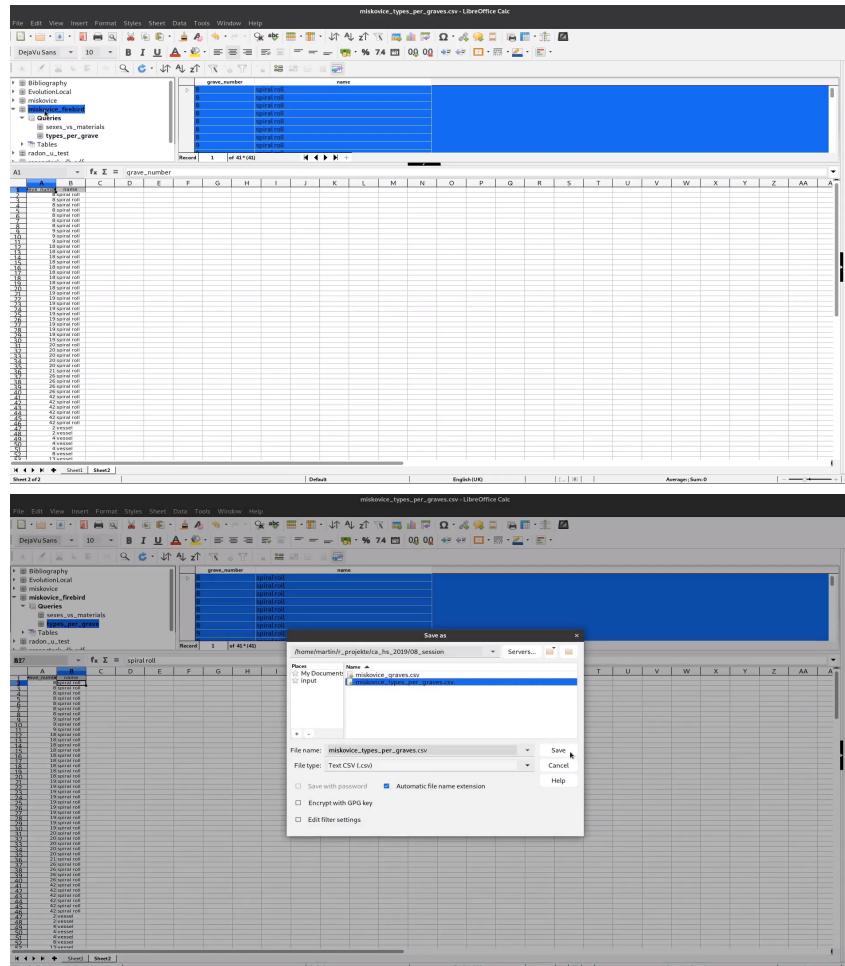
Result



A map enhanced with diagrams.

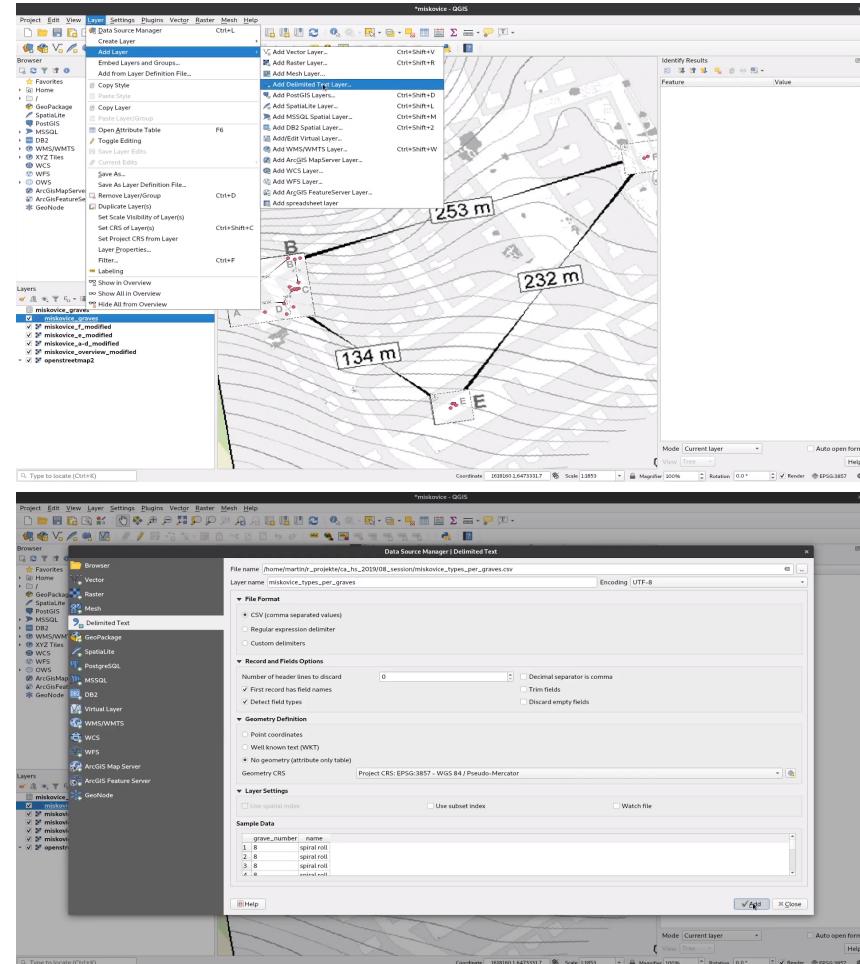
Complex: 1:m relationships

1. Get your data from the database (query) and save as csv



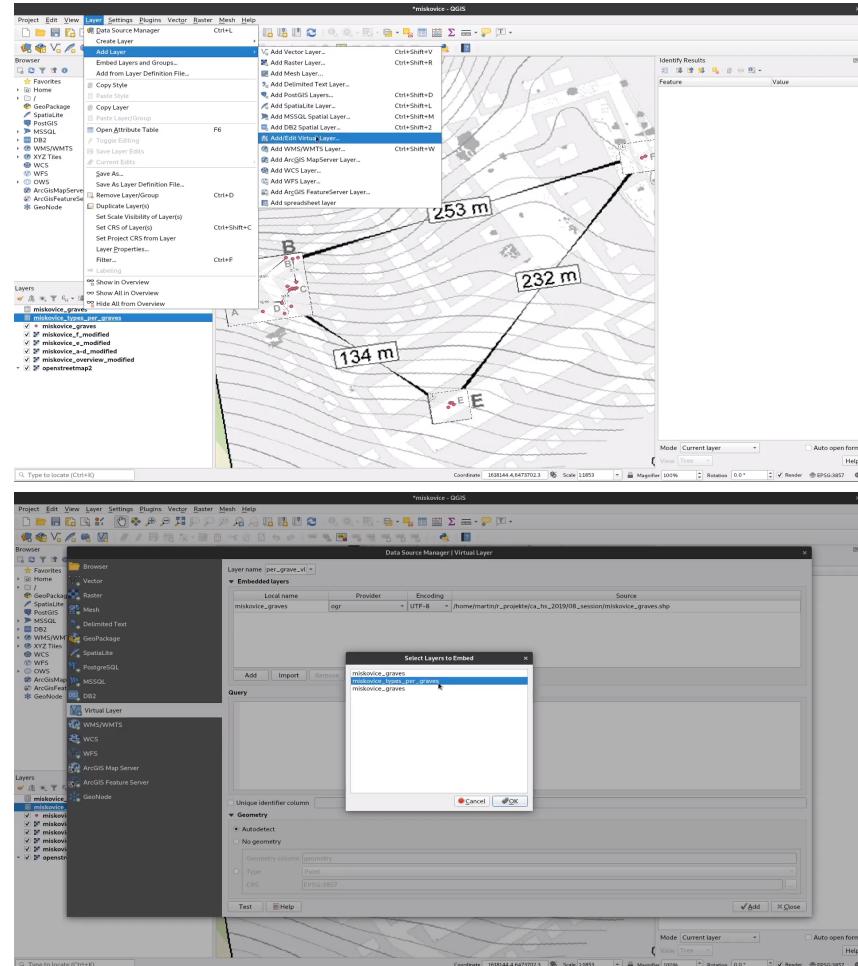
Complex: 1:m relationships

1. Get your data from the database (query) and save as csv
2. Add as Delimited Text Layer without coordinates



Complex: 1:m relationships

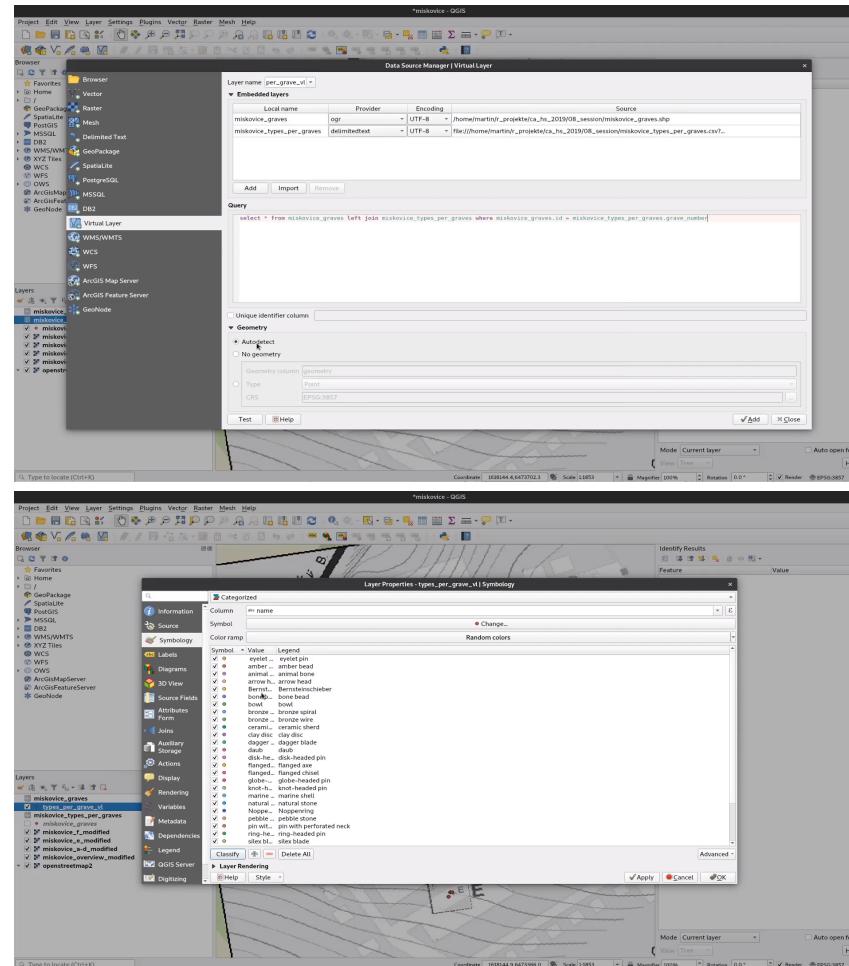
1. Get your data from the database (query) and save as csv
2. Add as Delimited Text Layer without coordinates
3. Add a virtual layer and "import" the "embedded" layers for your spatial (shp) and content informations (csv)



Complex: 1:m relationships

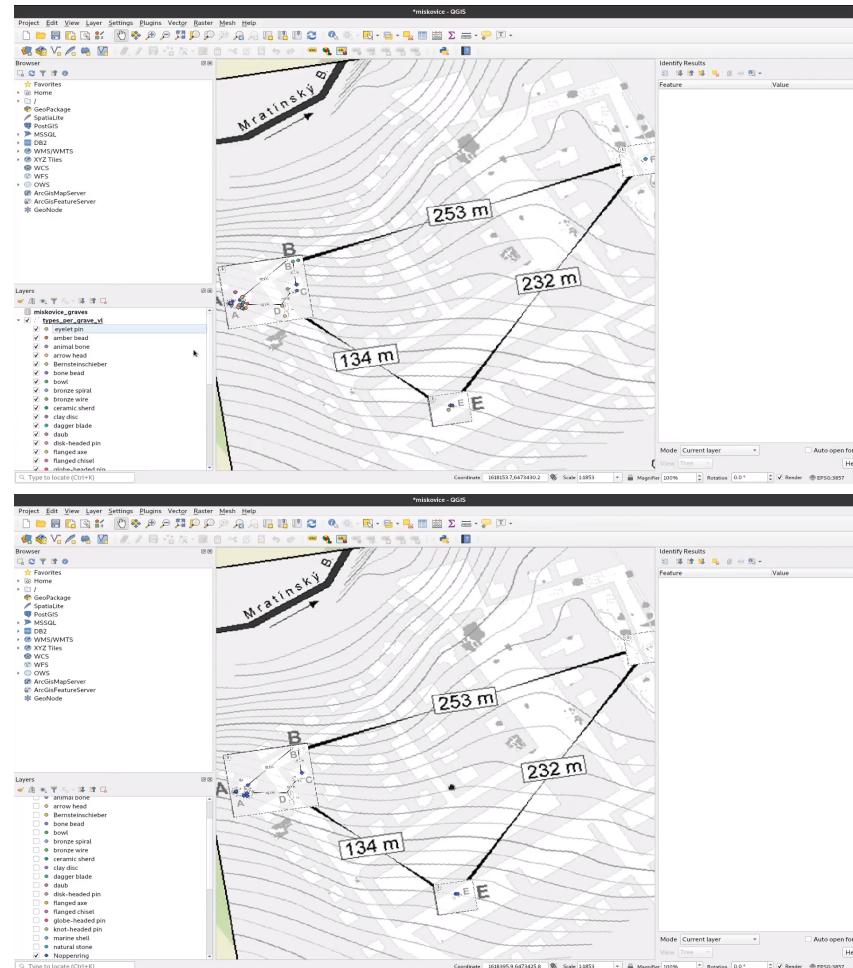
1. Get your data from the database (query) and save as csv
2. Add as Delimited Text Layer without coordinates
3. Add a virtual layer and "import" the "embedded" layers for your spatial (shp) and content informations (csv)
4. Specify your sql query and select categorized from Symbology

```
SELECT * from miskovice_graves
LEFT JOIN miskovice_types_per_grave
WHERE miskovice_graves.id =
miskovice_types_per_grave.grave_numb
```



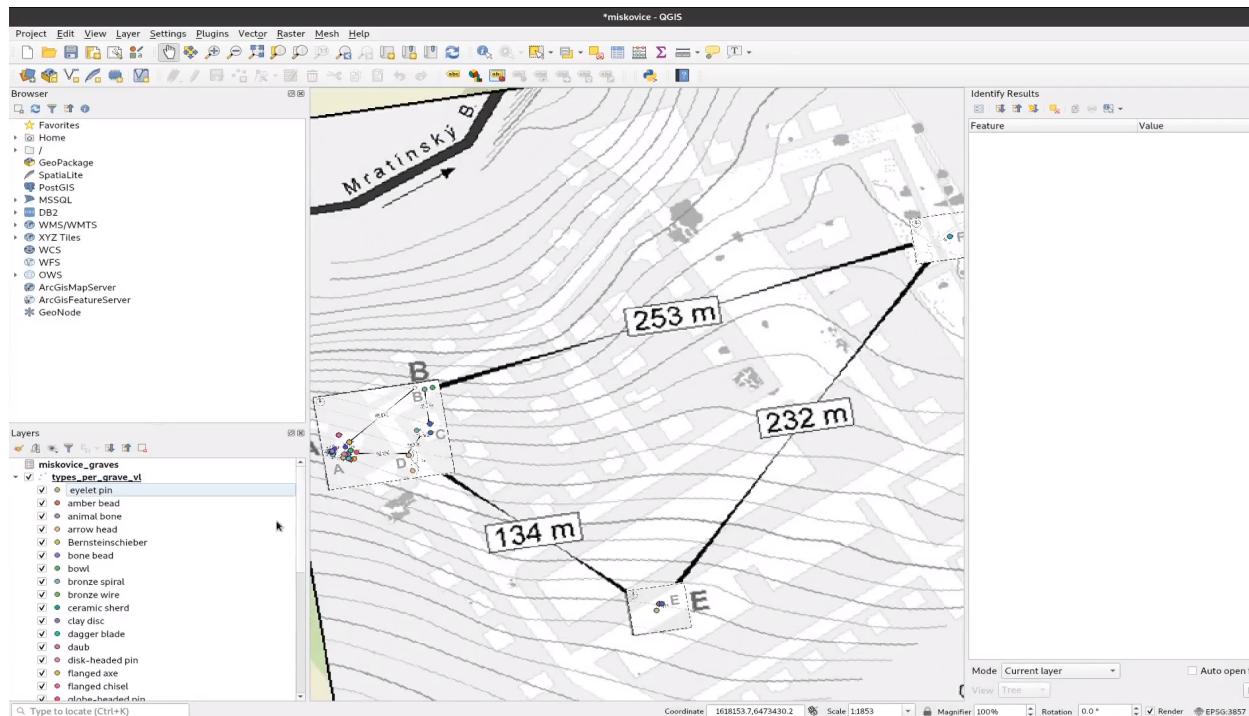
Complex: 1:m relationships

1. Get your data from the database (query) and save as csv
2. Add as Delimited Text Layer without coordinates
3. Add a virtual layer and "import" the "embedded" layers for your spatial (shp) and content informations (csv)
4. Specify your sql query and select categorized from Symbology
5. Your virtual layer now has symbols for different artefact types that you can turn on and off



Advanced - Diagrams

Result

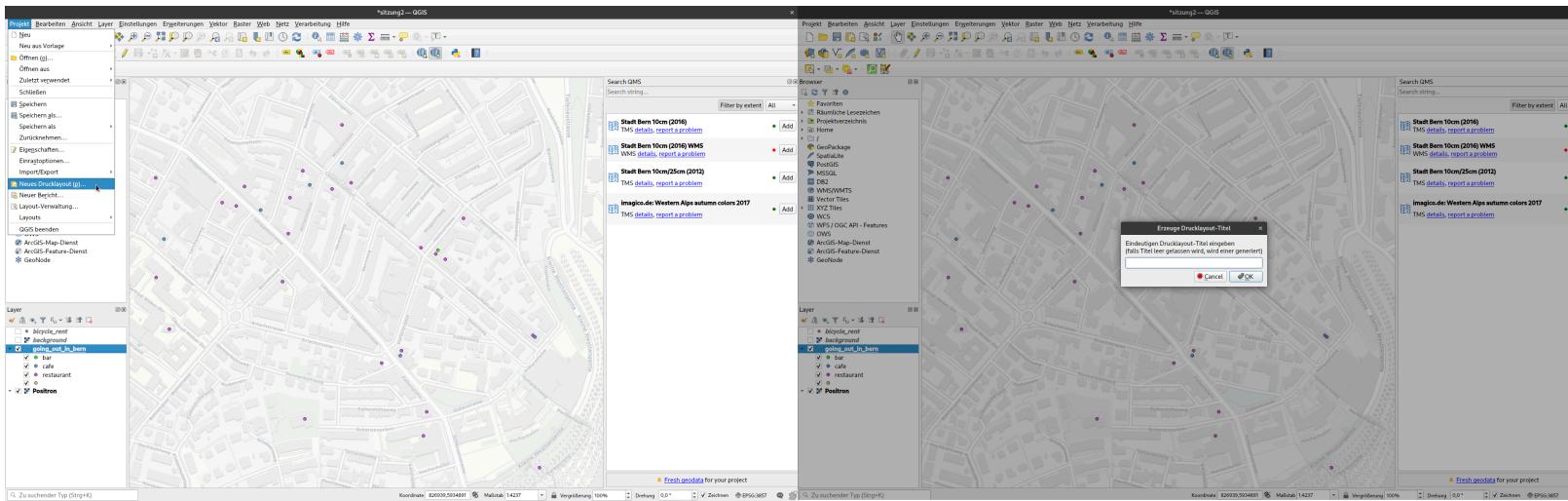


A layer where you can select which artefact type should be displayed.

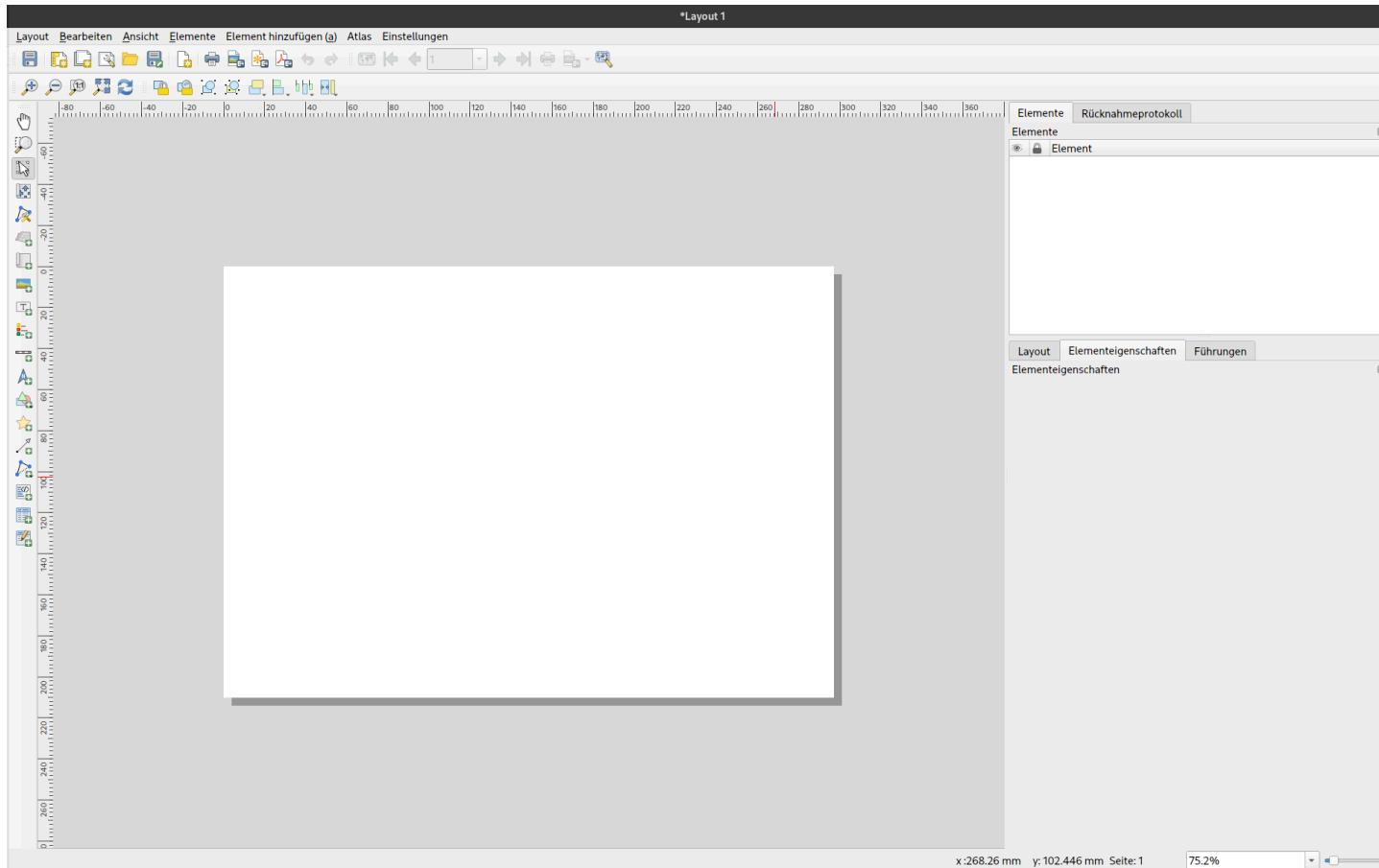
Print Composer

- How you make exportable and printable maps in QGIS
- Able to add map elements (legends, scales, text, etc)

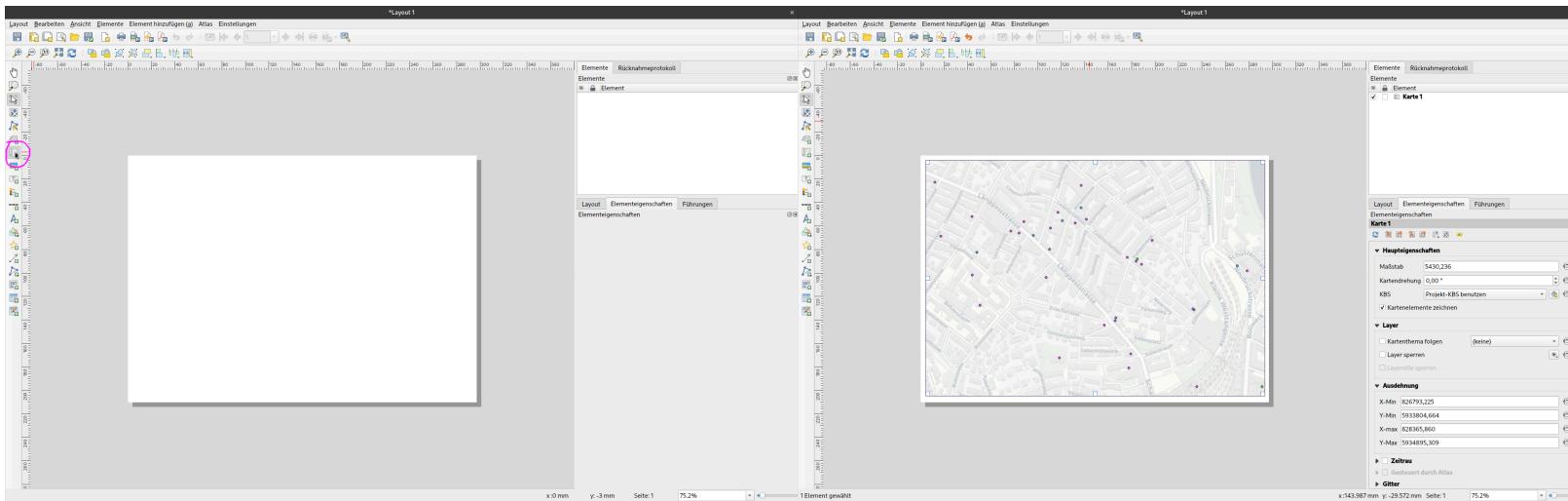
Create a new print composer



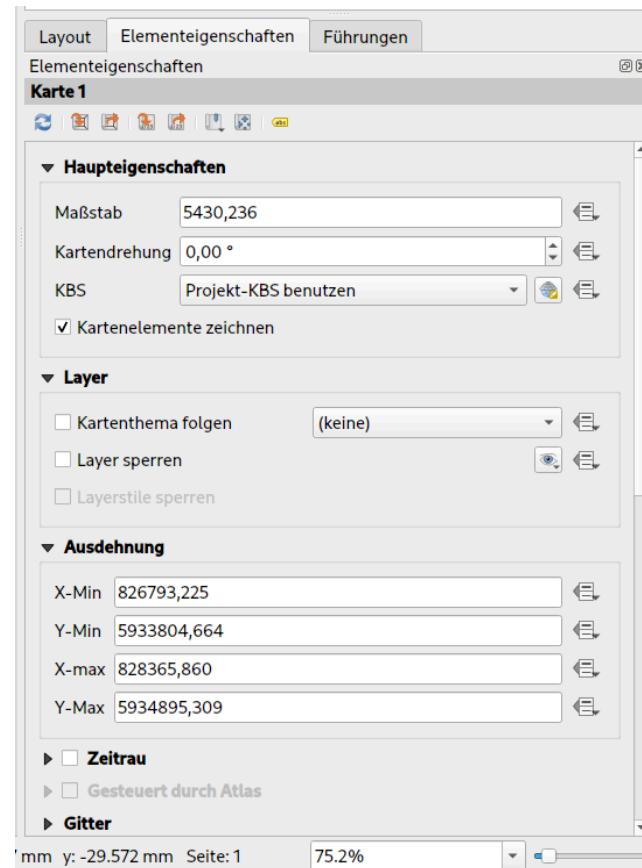
You are greeted with a blank slate



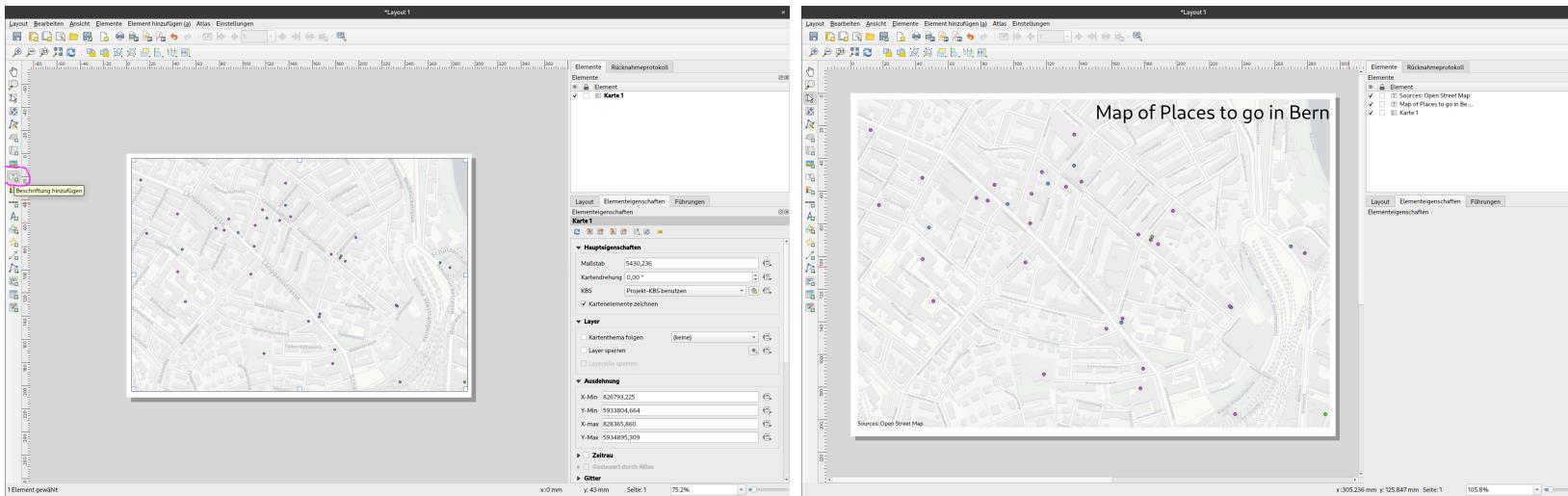
Add New Map tool will add your current map



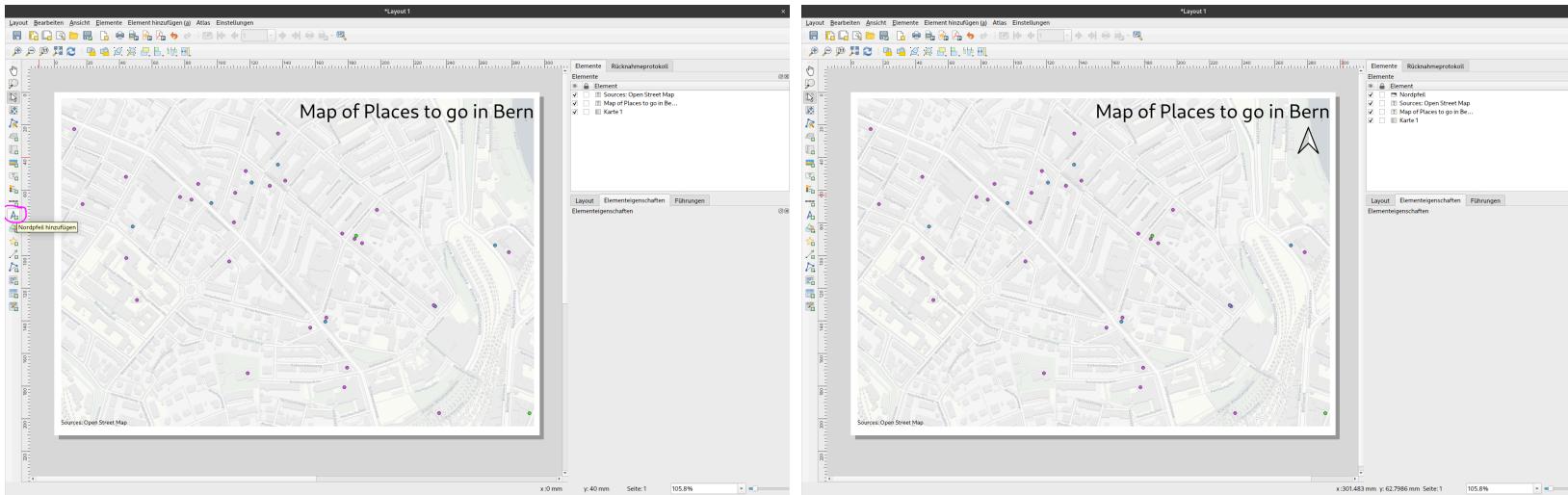
Customize item properties on the right



Don't forget a title and your sources

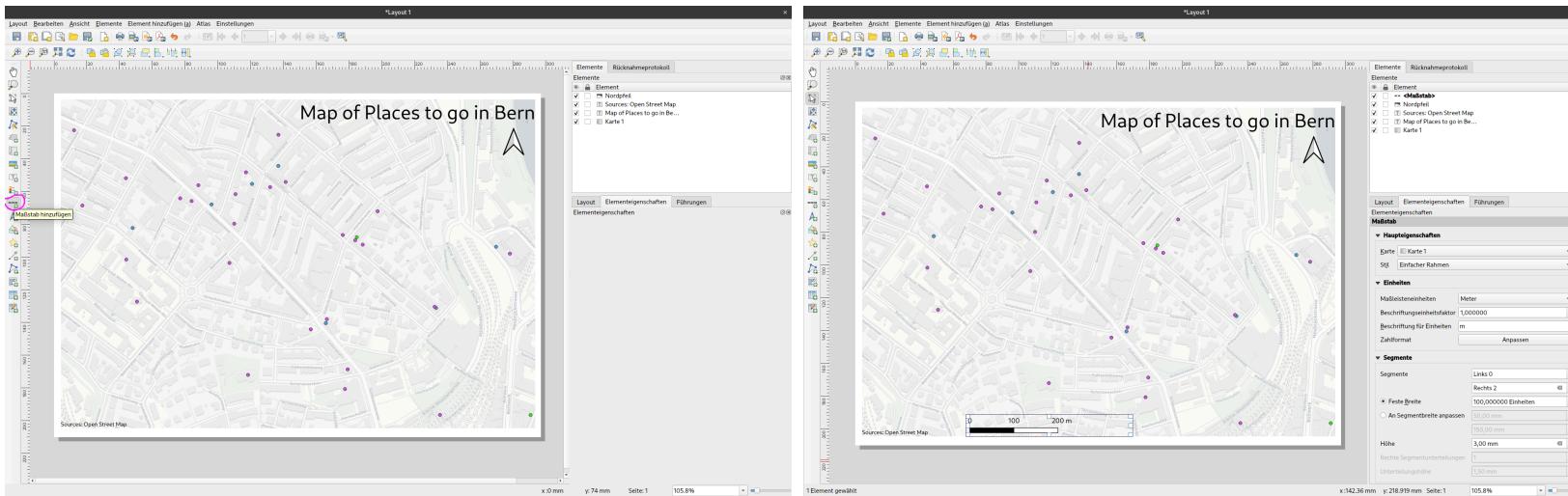


Adding North Arrow



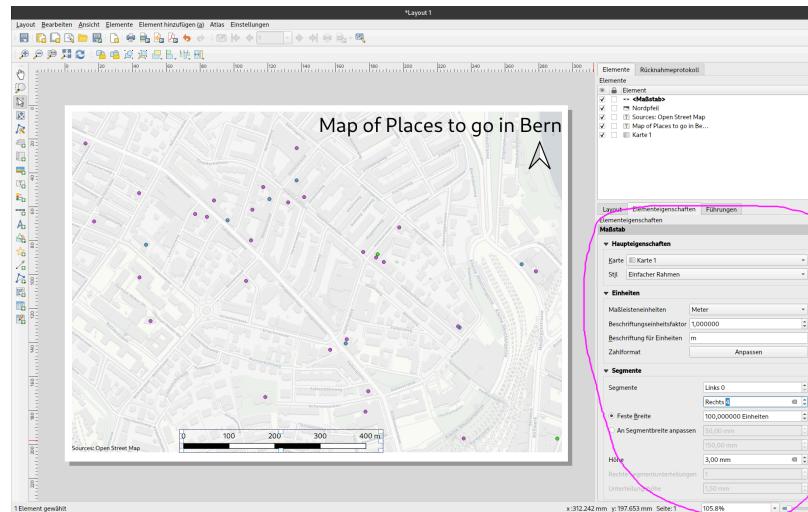
- You can select from multiple arrow types

Adding Scale bar

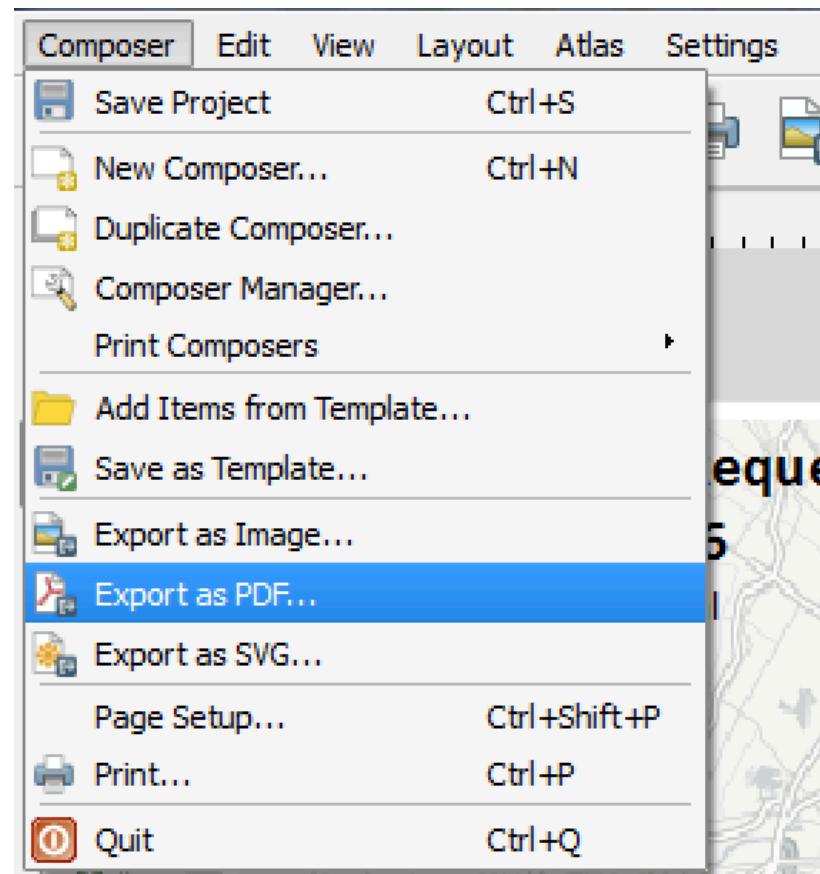


Adding Scale bar

- You can also select and customize different styles of scale bars



There are a few exporting options



Now you can share your map or print it



Exporting

right click on layer > Export > Save features as...

- shp
- csv
 - geometry ('AS_XY')

Any questions?

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

<https://berncodalab.github.io/caa>

You can contact me at

martin.hinz@iaw.unibe.ch