

GIS orodja

Praktična predstavitev uporabe orodij za delo s prostorskimi podatki

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Ljubljana in online, Centralna tehniška knjižnica Univerze v Ljubljani,
Usposabljanje podatkovnih strokovnjakov, 18. – 21. 11. 2024





Vsebina predavanja

- Predstavitev prostorskih podatkov in (osnovnega) dela s prostorskimi podatki s pomočjo odprtokodnih orodji.



Prostorski podatki

- Osnovna delitev
 - Vektorski
 - Rastrski



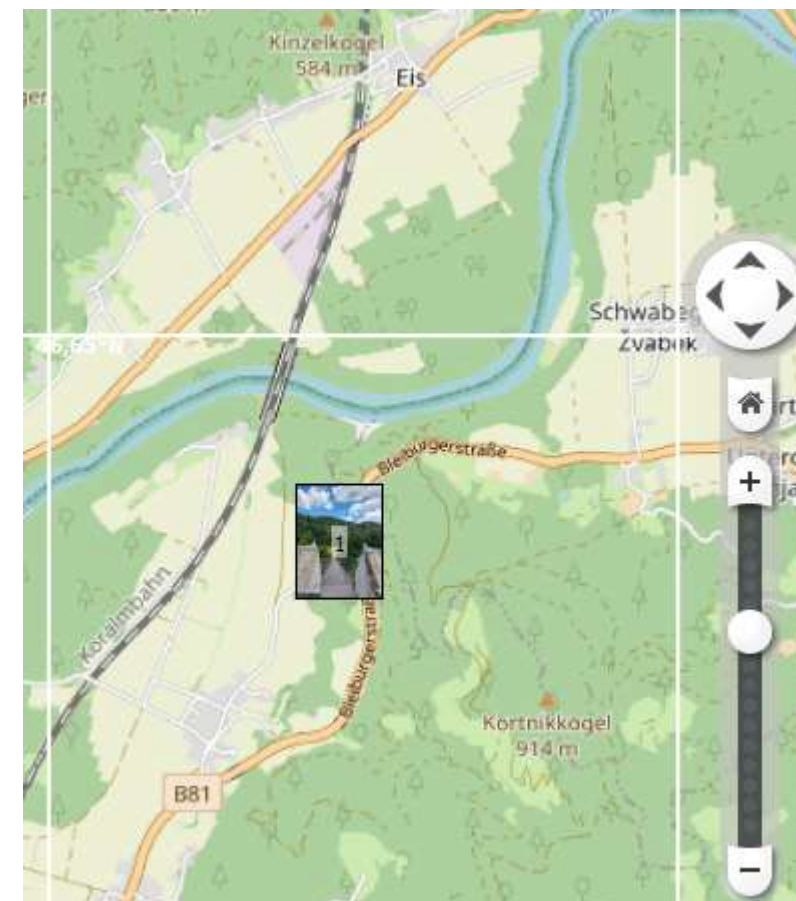


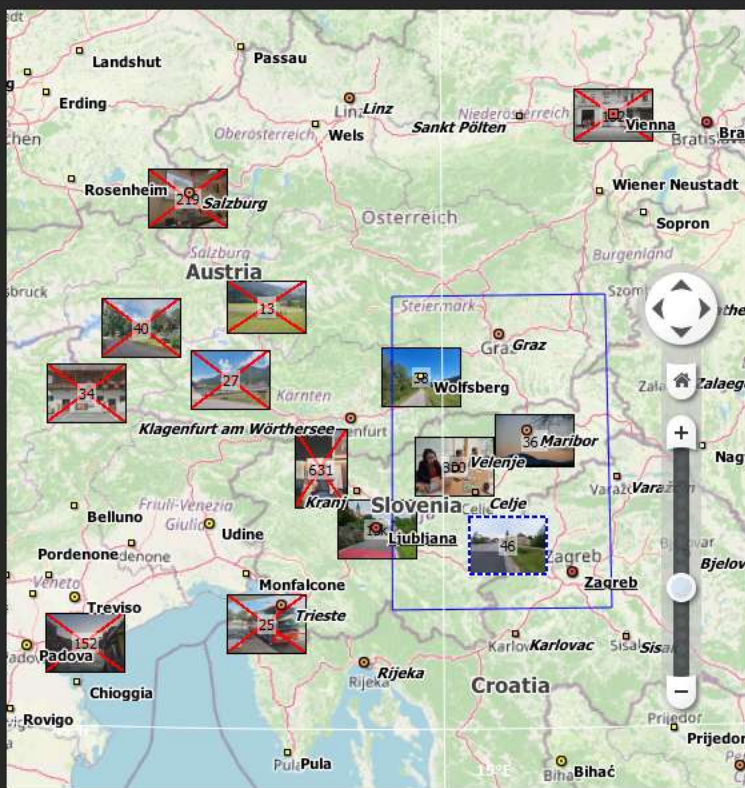
Kaj vse so prostorski podatki?

- Ali je fotografija prostorski podatek?



Focal length in 35mm film	23
GPS Altitude	499/1
GPS Altitude Reference	Above sea level
GPS Latitude	46,38.3248560N
GPS Longitude	14,49.3874080E
GPS Map Datum	WGS-84
GPS Version ID	2.0.0.0





Search by area:

Show Non-Geolocated Items

Searches

Current Map Search

Search...



20220820-20220812_183801.jpg

12.08.2022 18:38

Albums/UIRS_fototeka/projekti/19034-OpenSpaceAlps/UIRS - stock photos

Album Date: 19 apr. 2007 - 6 Items



20161230-DSC_3782.jpg

30.12.2016 11:32
19034-OpenSpaceAlps lake

JPG

20180819-DSC9618-Pano.jpg

19.08.2018 11:02
19034-OpenSpaceAlps Slovenija družina

JPG

20190812-DSC_2508.jpg

12.08.2019 19:42
19034-OpenSpaceAlps

JPG

korošica 002.jpg

17.09.2011 09:08
19034-OpenSpaceAlps korošica

JPG

korošica 011.jpg

17.09.2011 10:08
19034-OpenSpaceAlps korošica

JPG

korošica 079.jpg

vrsaj
18.09.2011 11:35
19034-OpenSpaceAlps korošica

Description Tags Information

Template:

Rights

Names:
Simon Koblar

Position:

Credit:

Simon Koblar, CC BY

Copyright:

Simon Koblar, CC BY

Usages:

Source:

Simon Koblar

Instructions:

pred uporabo kontaktiraj avtorja/before use
contact author

Location

City:

Sublocation:

State/Province:

Country:

Contact

Address:

Birthdate:

Apply

Apply to all versions

More

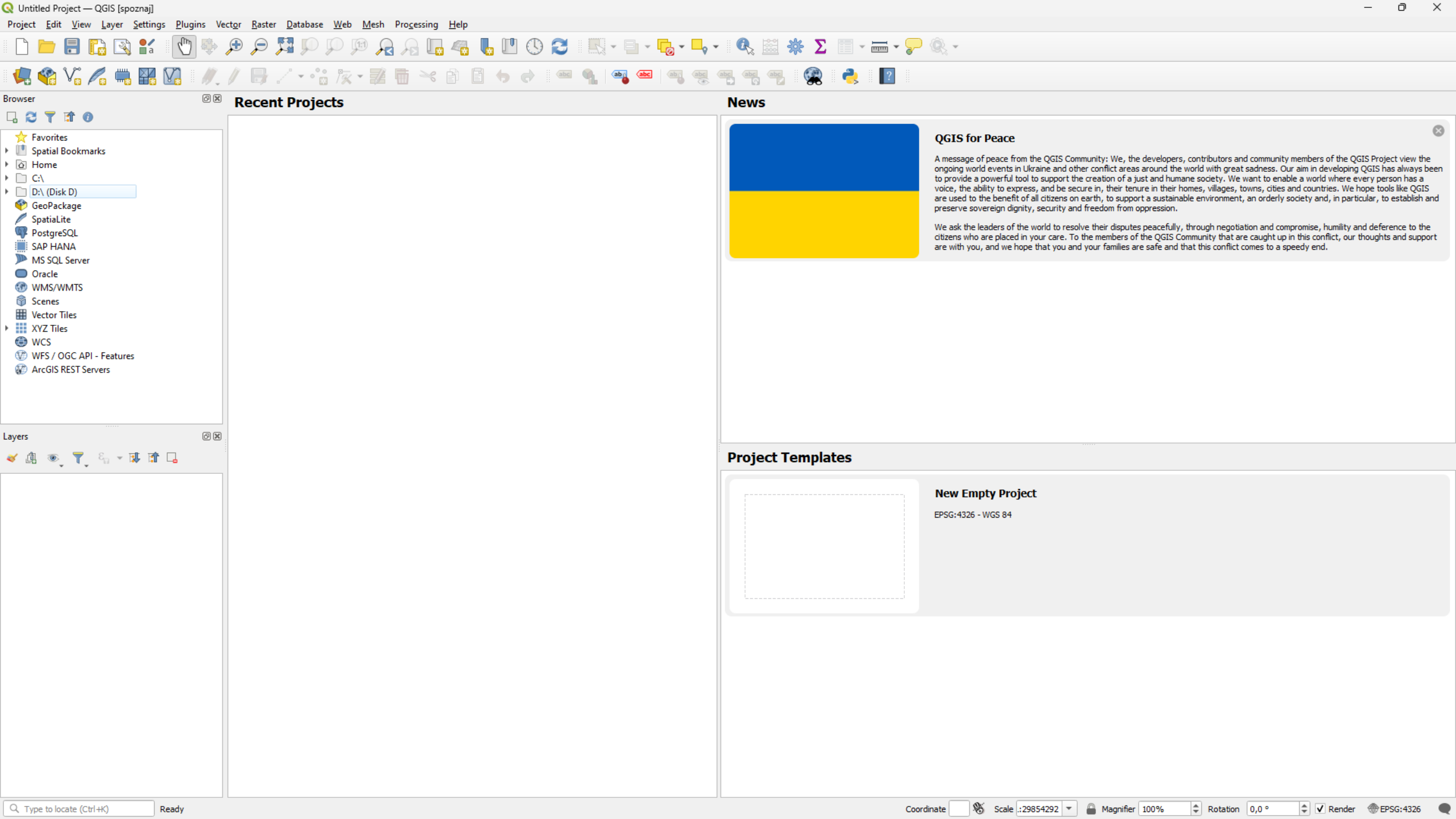


Predstavitev orodja QGIS



QGIS

- GIS – geografski informacijski sistem
- Prosto programje - GNU GPLv2+
- Zelo napreden program tudi za zahtevne raziskave in delovne procese
- Windows, Mac, Linux
- Program na voljo tu: <https://qgis.org/>



Browser Recent Projects News

★ Favorites

- Spatial Bookmarks
- Home
- C:\
- D:\ (Disk D)
- GeoPackage
- Spatialite
- PostgreSQL
- SAP HANA
- MS SQL Server
- Oracle
- WMS/WMTS
- Scenes
- Vector Tiles
- XYZ Tiles
- WCS
- WFS / OGC API - Features
- ArcGIS REST Servers

Layers

☞ ☒

QGIS for Peace

A message of peace from the QGIS Community: We, the developers, contributors and community members of the QGIS Project view the ongoing world events in Ukraine and other conflict areas around the world with great sadness. Our aim in developing QGIS has always been to provide a powerful tool to support the creation of a just and humane society. We want to enable a world where every person has a voice, the ability to express, and be secure in, their tenure in their homes, villages, towns, cities and countries. We hope tools like QGIS are used to the benefit of all citizens on earth, to support a sustainable environment, an orderly society and, in particular, to establish and preserve sovereign dignity, security and freedom from oppression.

We ask the leaders of the world to resolve their disputes peacefully, through negotiation and compromise, humility and deference to the citizens who are placed in your care. To the members of the QGIS Community that are caught up in this conflict, our thoughts and support are with you, and we hope that you and your families are safe and that this conflict comes to a speedy end.

Project Templates

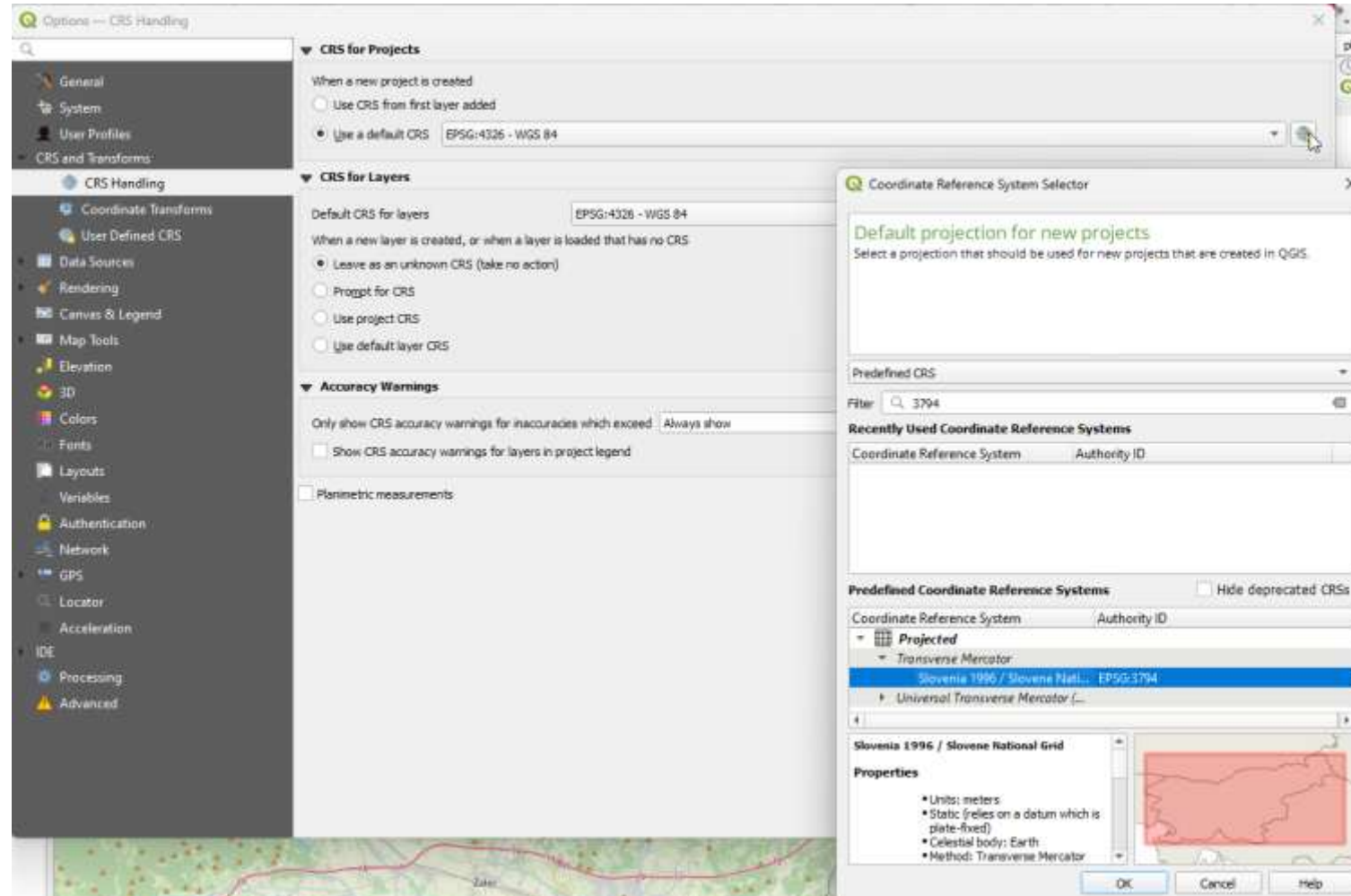
New Empty Project

EPSG:4326 - WGS 84

Coordinate Scale 1:29854292 Magnifier 100% Rotation 0,0 ° ☒ Render EPSG:4326

Nastavitev koordinatnega sistema

Settings ->
Options



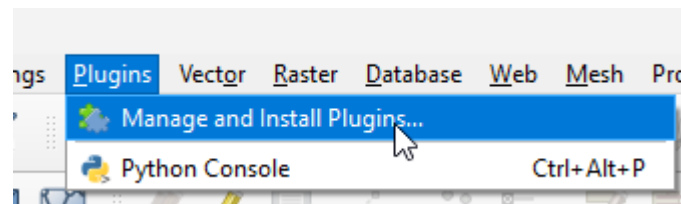
Koordinatni sistem

- Najpomembnejši koordinatni sistemi – EPSG kode:
 - **3794** – Slovenia 1996: Slovenski koordinatni sistem (E in N razdalja v metrih od izhodišča – npr. 530.000; 120.000)
 - **3912** – MGI 1901 - Star Slovenski koordinatni sistem
 - **4326** – WGS84 – GNSS naprave – (v stopinjah) → 45,50°; 15,45°
 - **3035** – ETRS89-extended - Evropski koordinatni sistem





Vtičniki



Plugins | All (1364)

All

Installed

Not installed

Install from ZIP

Settings

quick

Adjust Style

Attribute Searcher

EasyCustomLabeling

Field find/replace

FS3

Get Them Filtered

HouseNumbering3

Layer Tree Toggle Labels Widget

MapTiler

Monitask

One Click Raster Stacking

Planet_Explorer

Quick Attribution

Quick GeoJSON

Quick Layer

Quick Shape Update

Quick STEP GEOBIA

Quick_search

QuickCopy

QuickDEM4JP

Quickly save default QML

QuickMapServices

QuickMultiAttributeEdit3

QuickOSM

QuickPrint

QuickRectangleCreator

QuickWebView

QuickWKT

Random Point on Lines...

Red Layer

SHP Buddy

Species Explorer

UAV Mapping Path Generator (f

Vertical Photo Placer

QuickMapServices

Easy to add basemaps and geoservices

Easy to use list of services and search for finding datasets and basemaps. Please contribute new services via <https://qms.nextgis.com>. Developed by NextGIS. Any feedback is welcome at <https://nextgis.com/contact>

★★★★★ 1606 rating vote(s), 6974315 downloads

Tags

[wfs](#), [wms](#), [openstreetmap](#), [osm](#), [service](#), [tms](#), [geojson](#), [internet](#), [qms](#), [basemap](#)

More info

[homepage](#) [bug tracker](#) [code repository](#)

Author

NextGIS

Available version (stable)

0.19.35 updated at 15.11.2024 15:45

Upgrade All

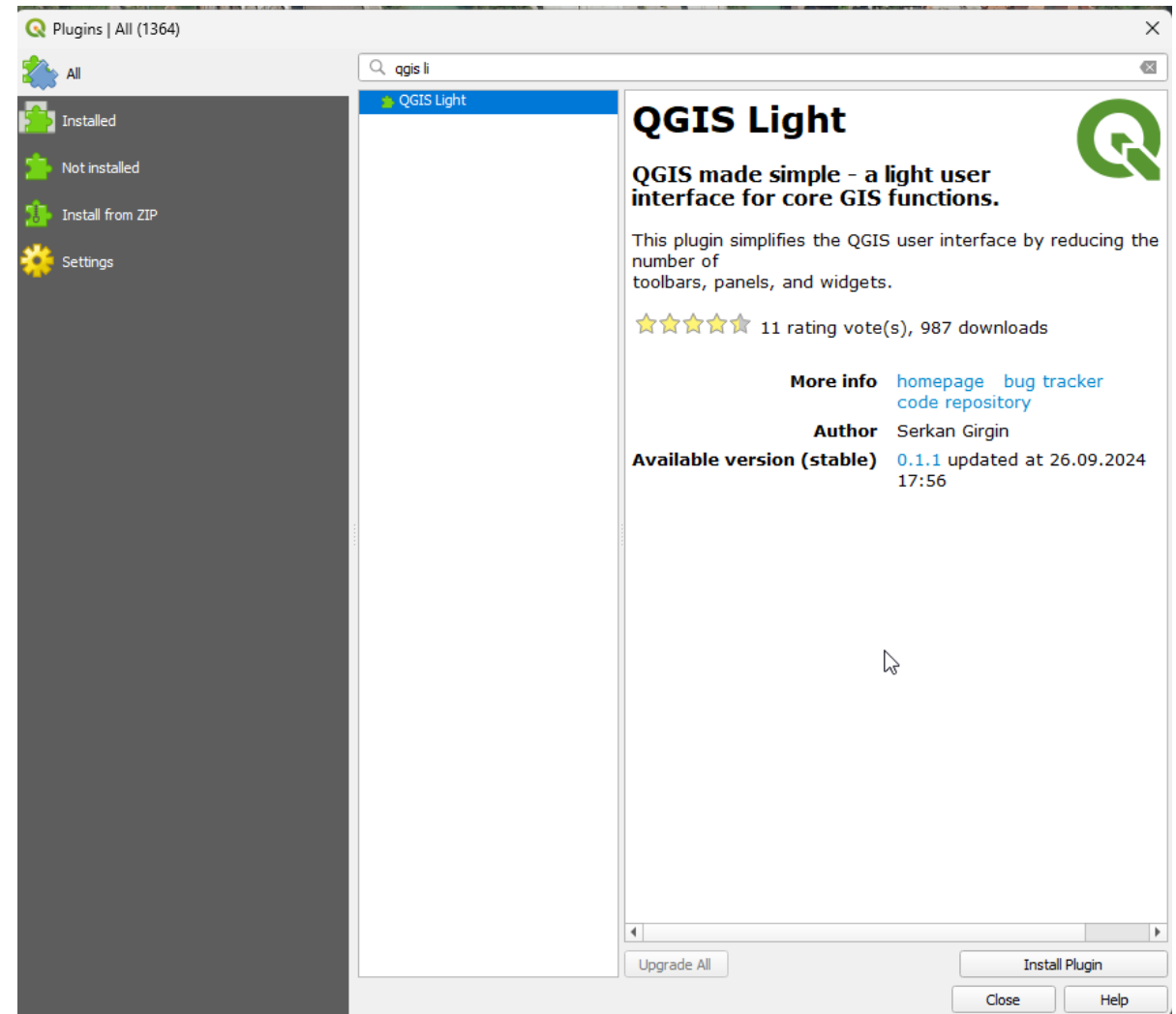
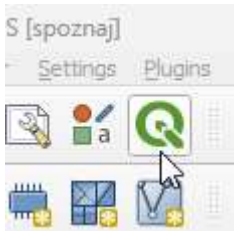
Install Plugin

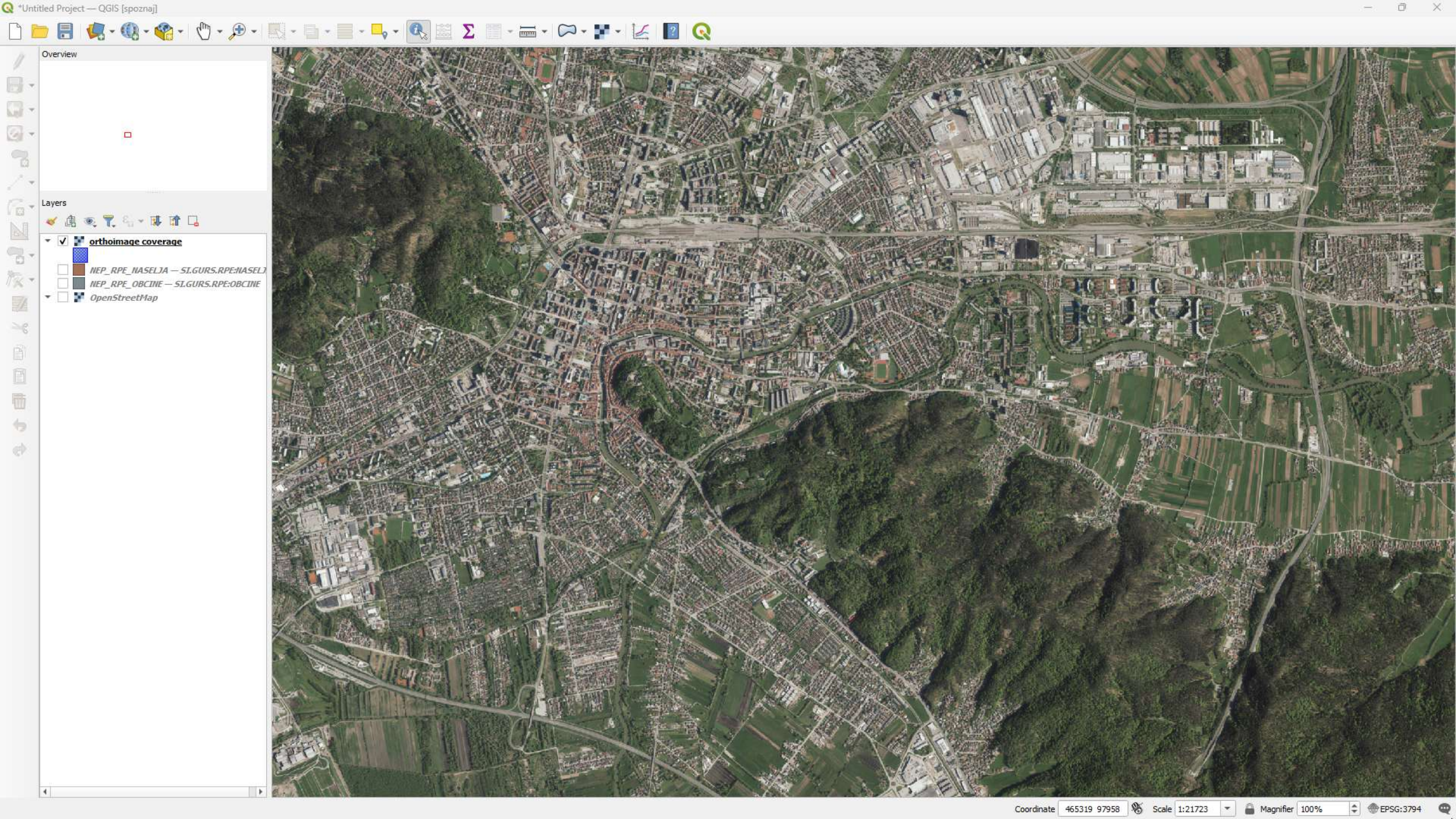
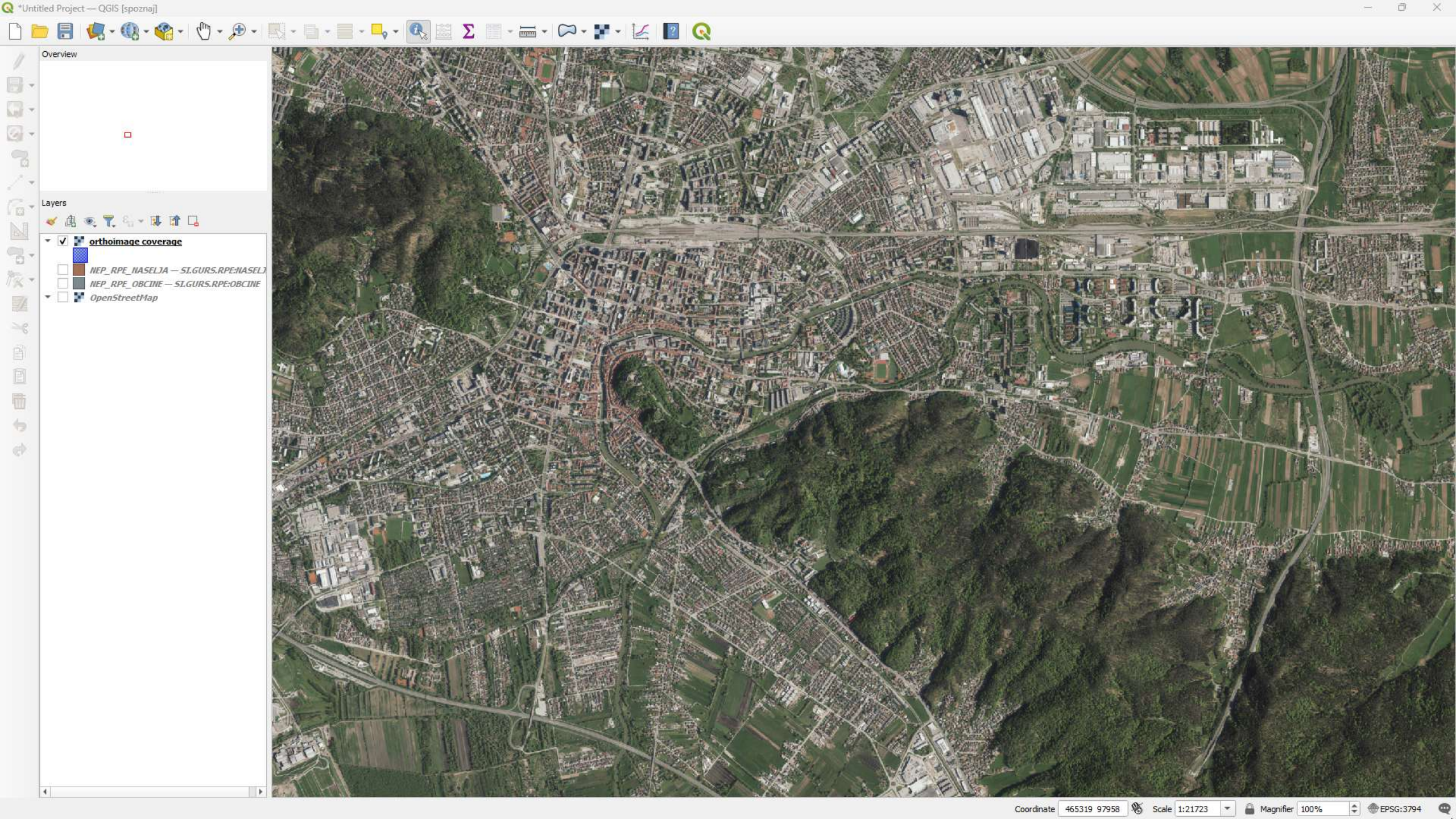
Close

Help

Vtičniki

- QGIS light – poenostavljen uporabniški vmesnik





Kartografske podlage

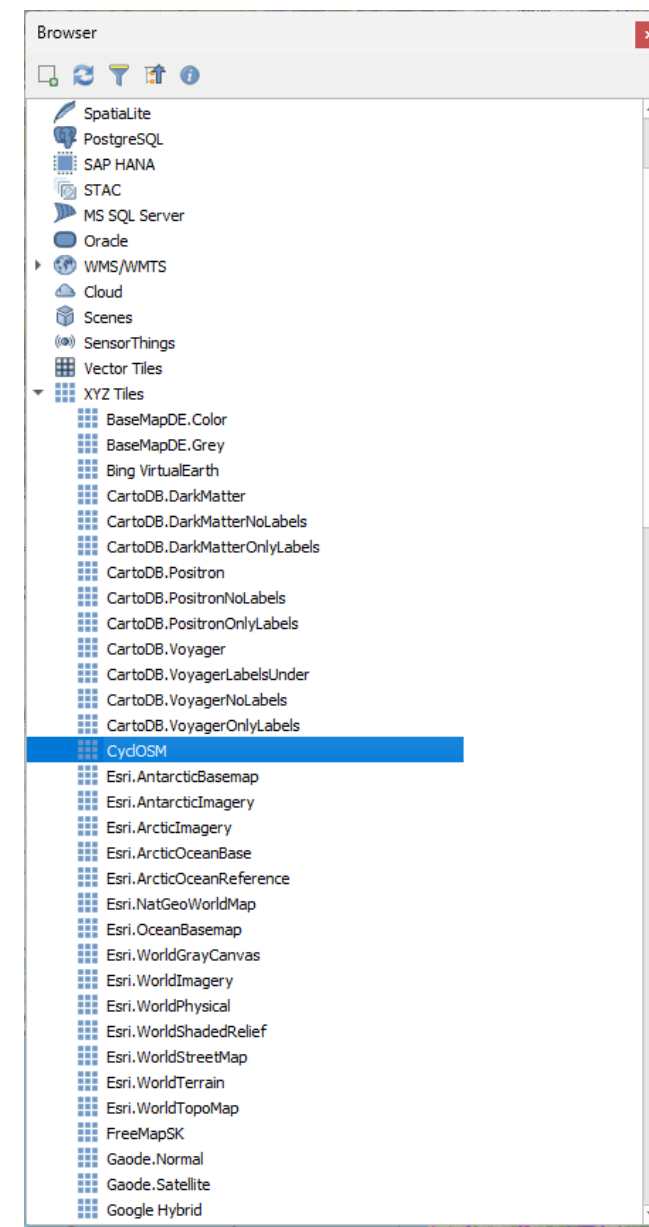
- <https://github.com/opengeos/qgis-basemaps>
- (ne deluje na verziji 3.34.x)

The image shows two windows from a QGIS installation. On the left is the 'Python Console' with the following text:

```
1 # Python Console
2 # Use iface to access QGIS API interface or type '?' for more info
3 # Security warning: typing commands from an untrusted source can harm your computer
4
```

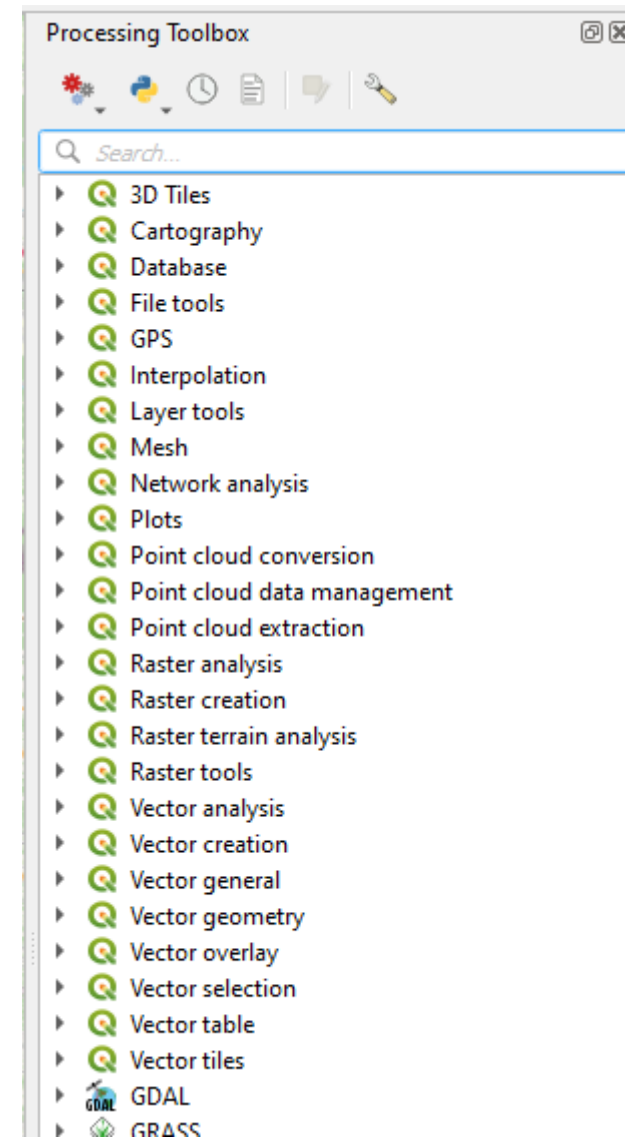
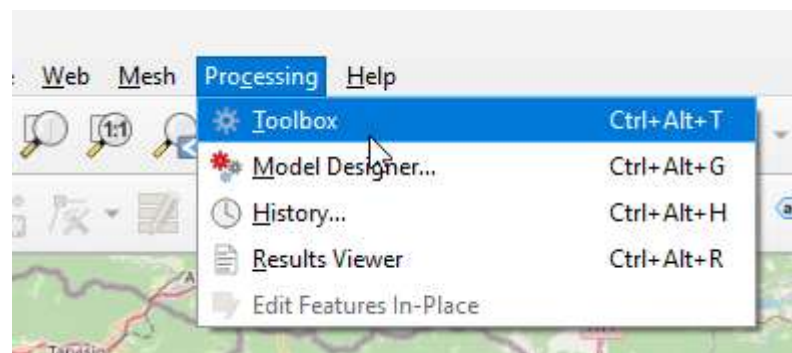
On the right is a script editor window titled 'basemaps.py' with the following code:

```
1 # This script is inspired by Elias Karlsson at https://bit.ly/4eDBu10. Credit to
2 # I expanded the script to include more XYZ basemaps from xyzservices and a lot of
3
4
5 from qgis.PyQt.QtCore import QSettings
6 from qgis.utils import iface
7 print('Adding basemaps to QGIS now. Please wait...')
8
9
10 sources = []
11 sources.append(['connections-xyz', 'Bing VirtualEarth', '', '', 'Microsoft', 'https://
12 sources.append(['connections-xyz', 'OpenStreetMap', '', '', 'OpenStreetMap', 'ht
13 sources.append(['connections-xyz', 'Google Maps', '', '', 'Google', 'https://mtl
14 sources.append(['connections-xyz', 'Google Satellite', '', '', 'Google', 'https://
```

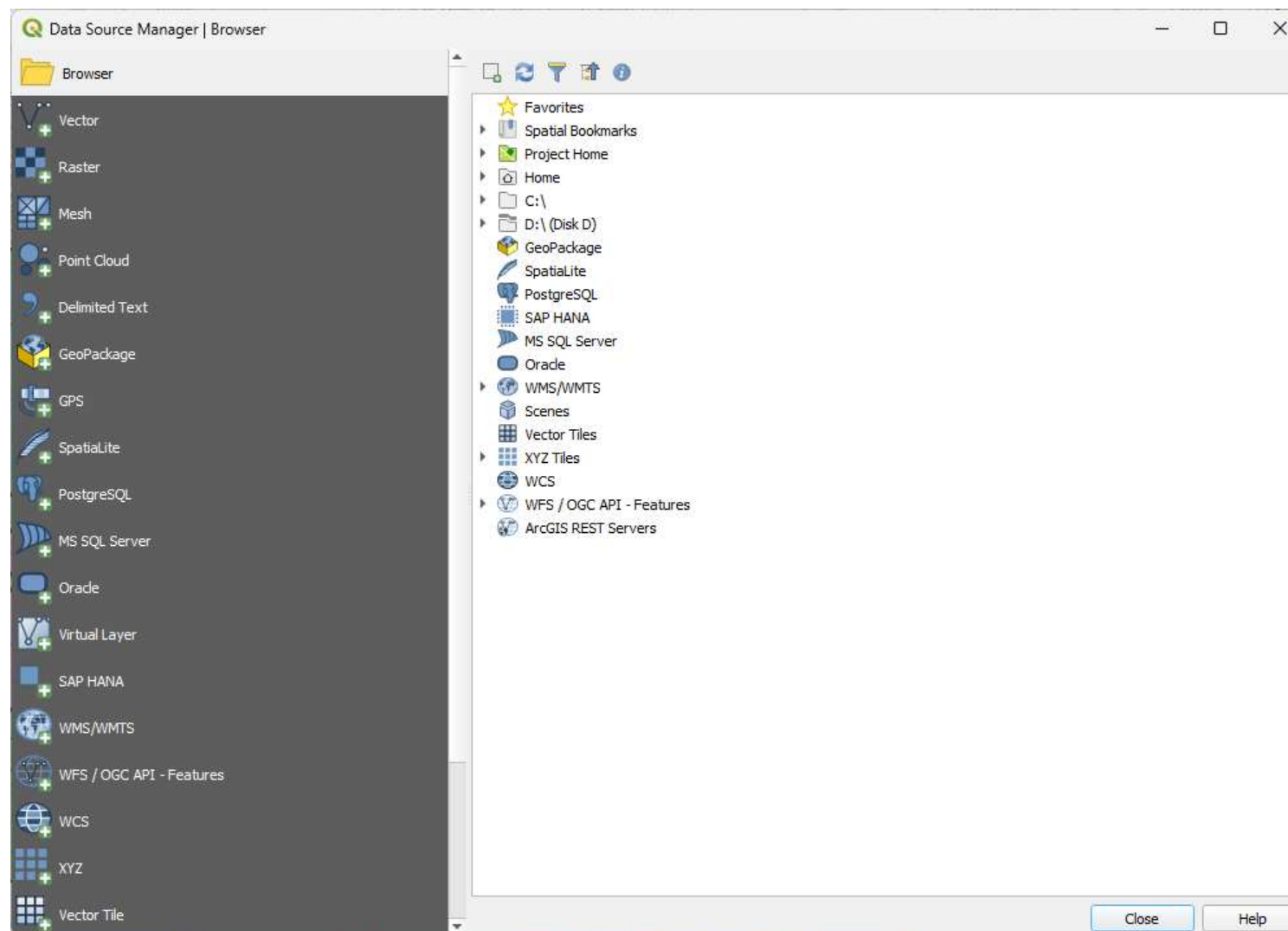
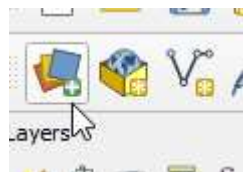




Orodja

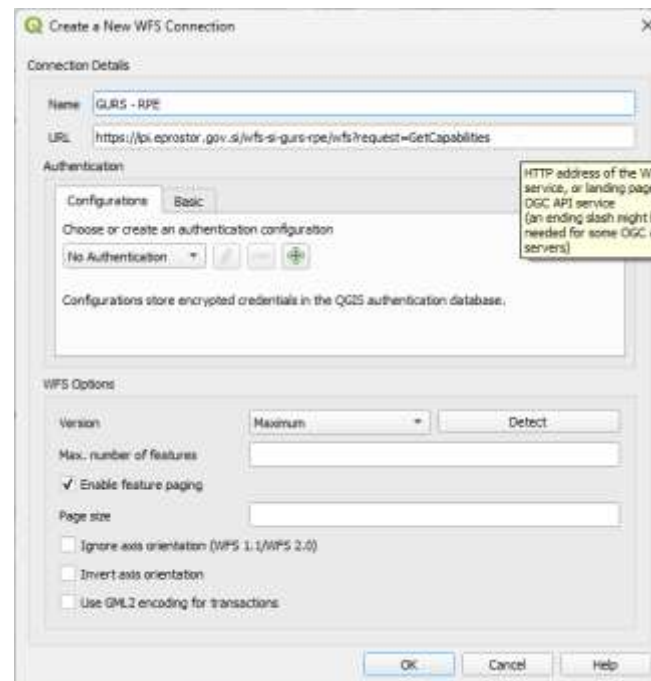
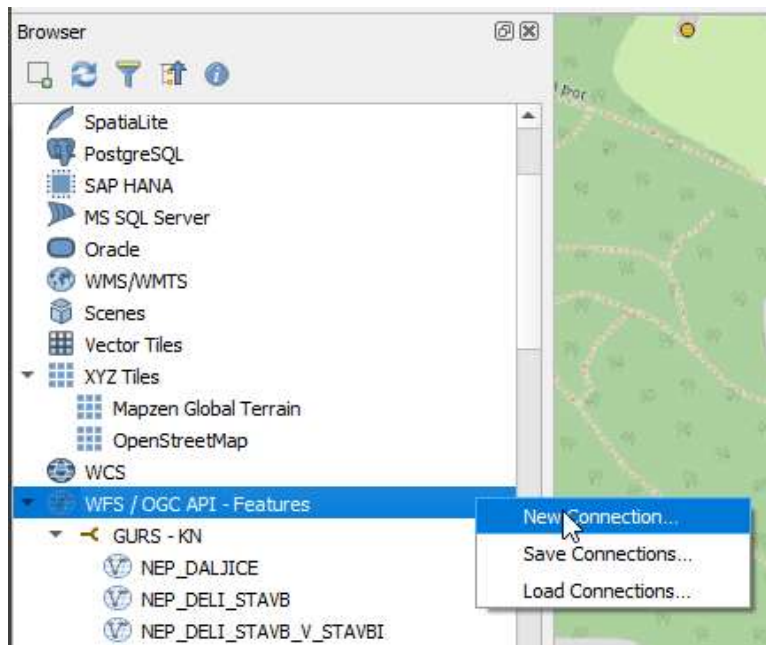


Dodajanje podatkov



Dodajanje spletnih servisov

- GURS – na [spletni strani](#) so povezave do spletnih servisov WFS
- Prostorske enote: <https://ipi.eprostor.gov.si/wfs-si-gurs-rpe/wfs?request=GetCapabilities>



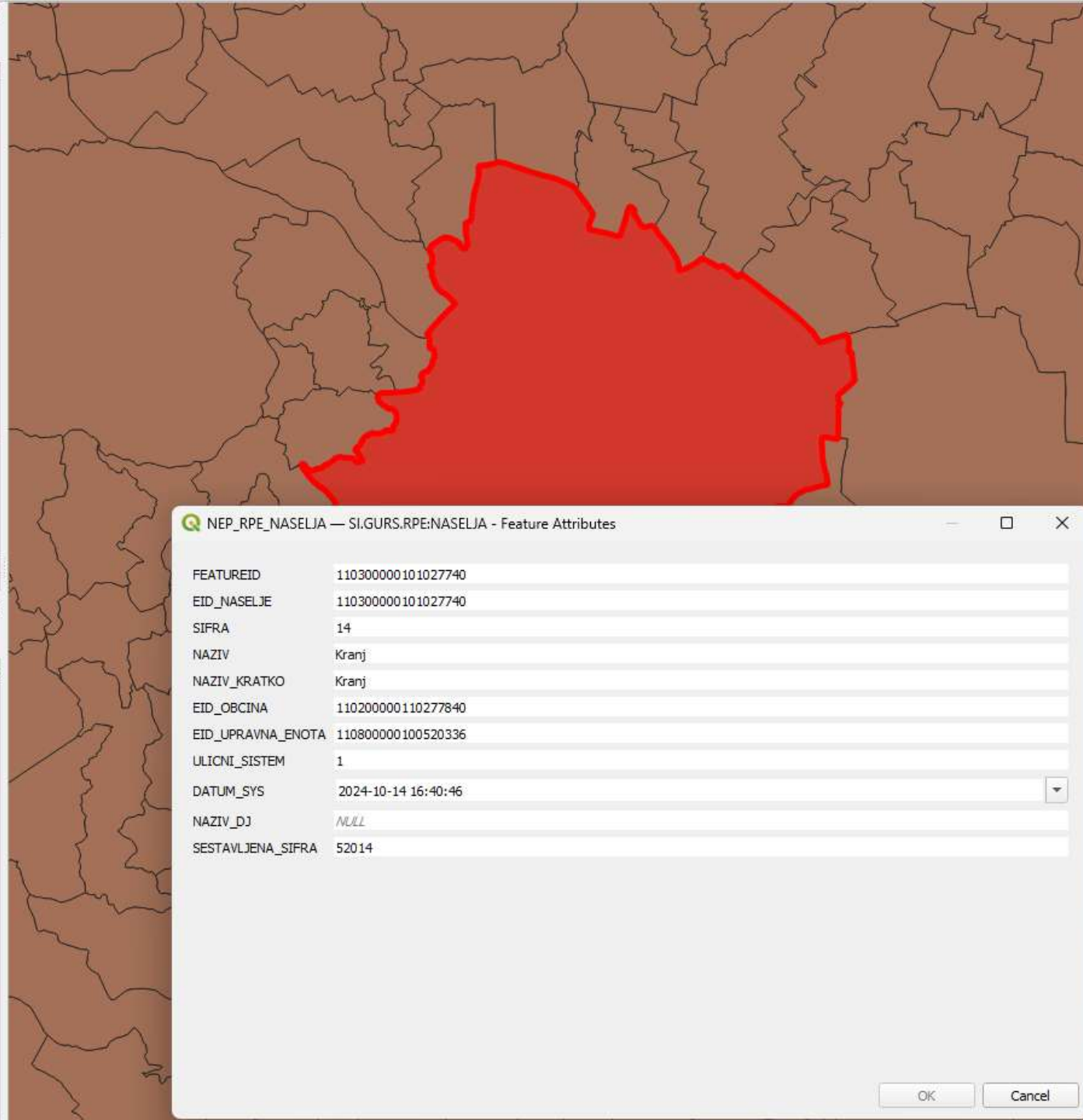
browser

WFS / OGC API - Features

- GURS - KN
- GURS - RPE
 - NEP_RPE_CETRNE_SKUPNOSTI
 - NEP_RPE_DZ_VOLISCA
 - NEP_RPE_KOHEZIJSKE_REGIJE
 - NEP_RPE_KRAJEVNE_SKUPNOSTI
 - NEP_RPE_LOKALNA_VOLISCA
 - NEP_RPE_LOKALNE_VOLILNE_ENOTE
 - NEP_RPE_NASELJA
 - NEP_RPE_OBCINE
 - NEP_RPE_POSTNI_OKOLISI
 - NEP_RPE_SOLSKI_OKOLISI
 - NEP_RPE_STATISTICNE_REGIJE
 - NEP_RPE_ULICE
 - NEP_RPE_UPRAVNE_ENOTE
 - NEP_RPE_VASKE_SKUPNOSTI
 - NEP_RPE_VOLILNE_ENOTE_DZ
 - NEP_RPE_VOLILNI_OKRAJI
 - VW_NEP_RPE_CETRNE_SKUPNOSTI_H
 - VW_NEP_RPE_DZ_VOLISCA_H
 - VW_NEP_RPE_KOHEZIJSKE_REGIJE_H
 - VW_NEP_RPE_KRAJEVNE_SKUPNOSTI_H

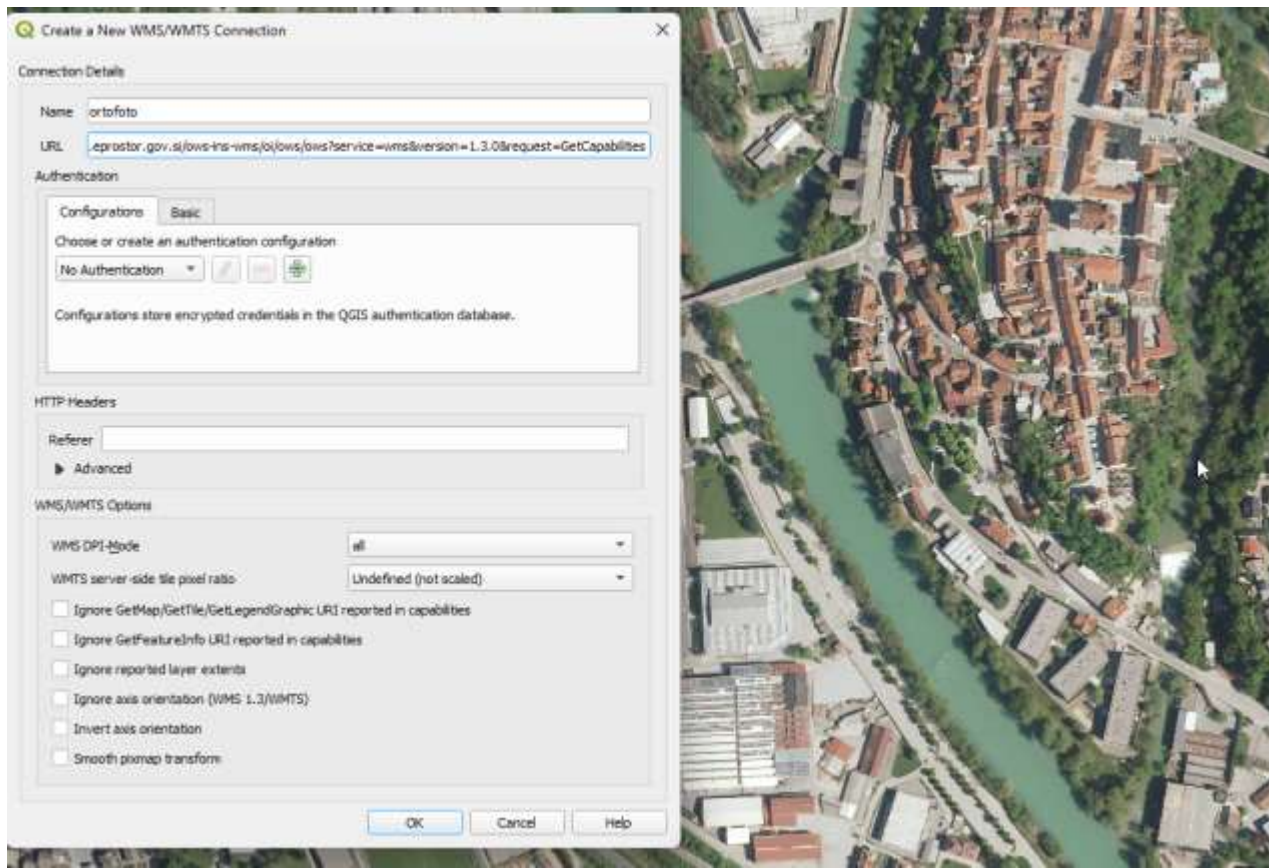
Layers

- ☒ NEP_RPE_NASELJA — SI.GURS.RPE:NASELJA
- ☒ NEP_RPE_OBCINE — SI.GURS.RPE:OBCINE
- ☒ OpenStreetMap



Dodajanje spletnih servisov

- Ortofoto WMS: <https://storitve.eprstor.gov.si/ows-ins-wms/oi/ows/ows?service=wms&version=1.3.0&request=GetCapabilities>



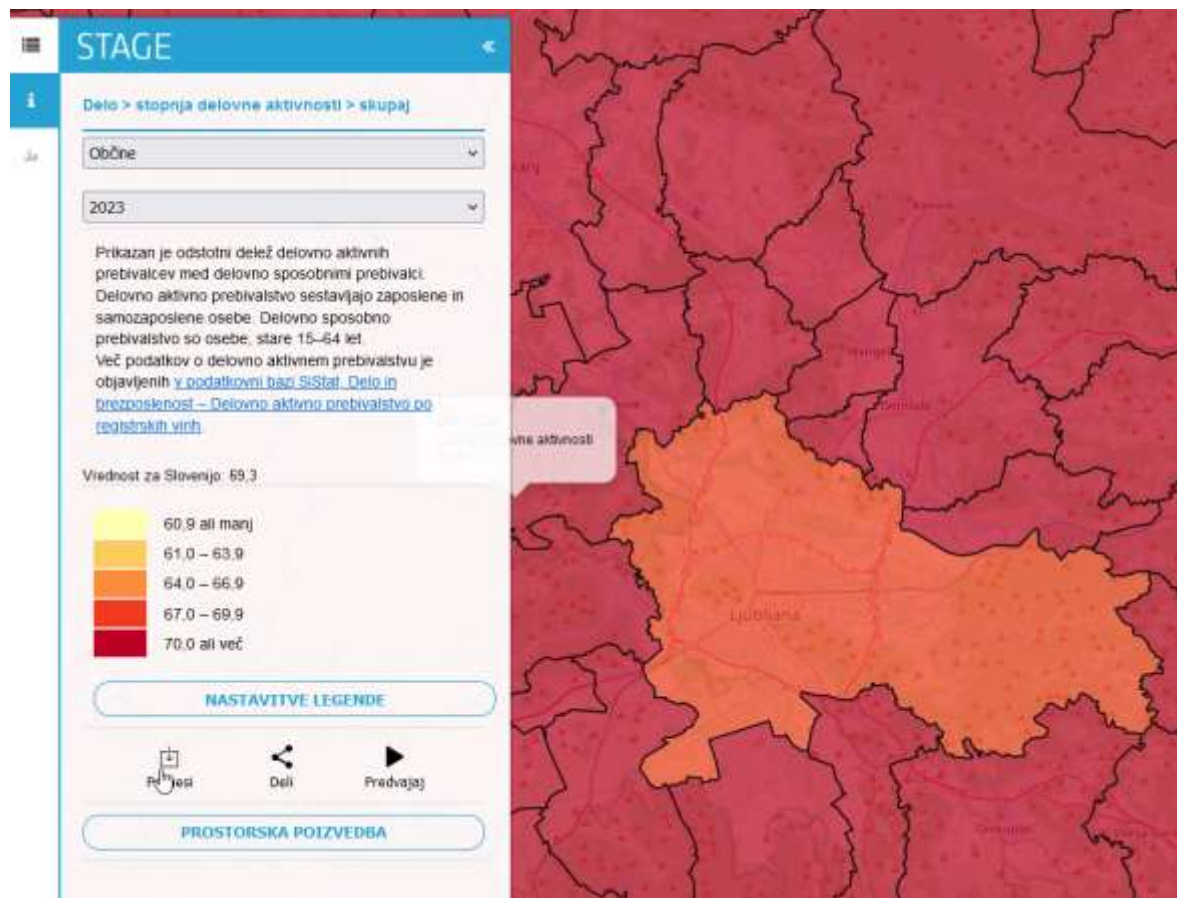


Viri prostorskih podatkov

- Geodetska uprava: <https://ipi.eprostor.gov.si/jgp/data>
- SURS stage: <https://gis.stat.si/>
- MKGP: <https://rkg.gov.si/vstop/>
- OPSI: <https://podatki.gov.si/>
- ...



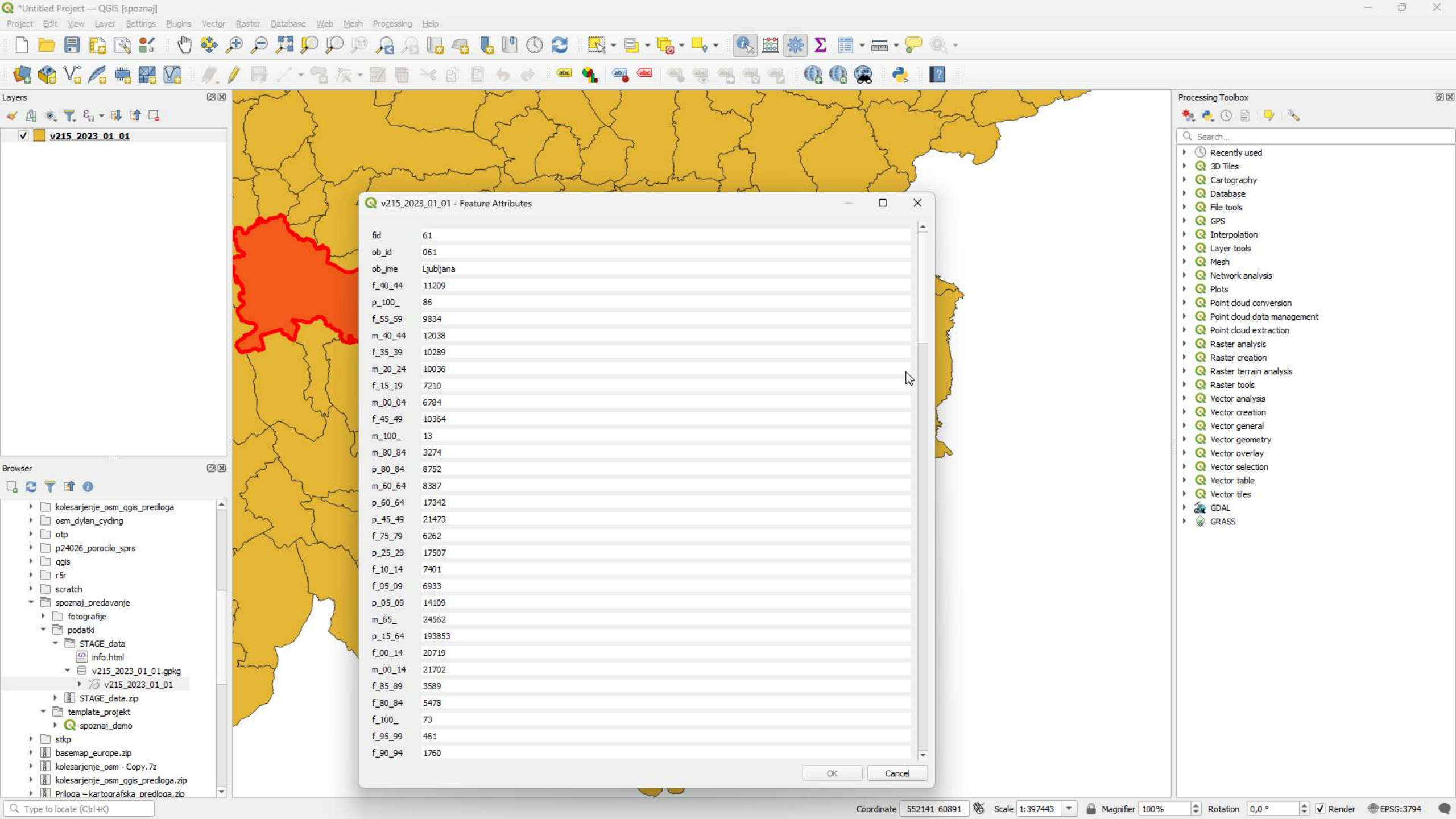
SURS - stage



STAGE

Prenesi; Delo > stopnja delovne aktivnosti > skupaj

- NAZAJ
- PRENESI SHP
- PRENESI SHP (VSE SPREMENLJIVKE)
- PRENESI GEOPACKAGE
- PRENESI GEOPACKAGE (VSE SPREMENLJIVKE)**
- PRENESI CSV TABELO
- PRENESI CSV TABELO (VSE SPREMENLJIVKE)
- PRENESI XLSX
- PRENESI XLSX (VSE SPREMENLJIVKE)
- PRENESI KARTO KOT SLIKO



v215_2023_01_01 - Feature Attributes	
fid	61
ob_id	061
ob_ime	Ljubljana
f_40_44	11209
p_100_	86
f_55_59	9834
m_40_44	12038
f_35_39	10289
m_20_24	10036
f_15_19	7210
m_00_04	6784
f_45_49	10364
m_100_	13
m_80_84	3274
p_80_84	8752
m_60_64	8387
p_60_64	17342
p_45_49	21473
f_75_79	6262
p_25_29	17507
f_10_14	7401
f_05_09	6933
p_05_09	14109
m_65_	24562
p_15_64	193853
f_00_14	20719
m_00_14	21702
f_85_89	3589
f_80_84	5478
f_100_	73
f_95_99	461
f_90_94	1760

Slabost STAGE portala

Podatki so
zapisani kot
besedilo!

Layer Properties - v215_2023_01_01 - Fields

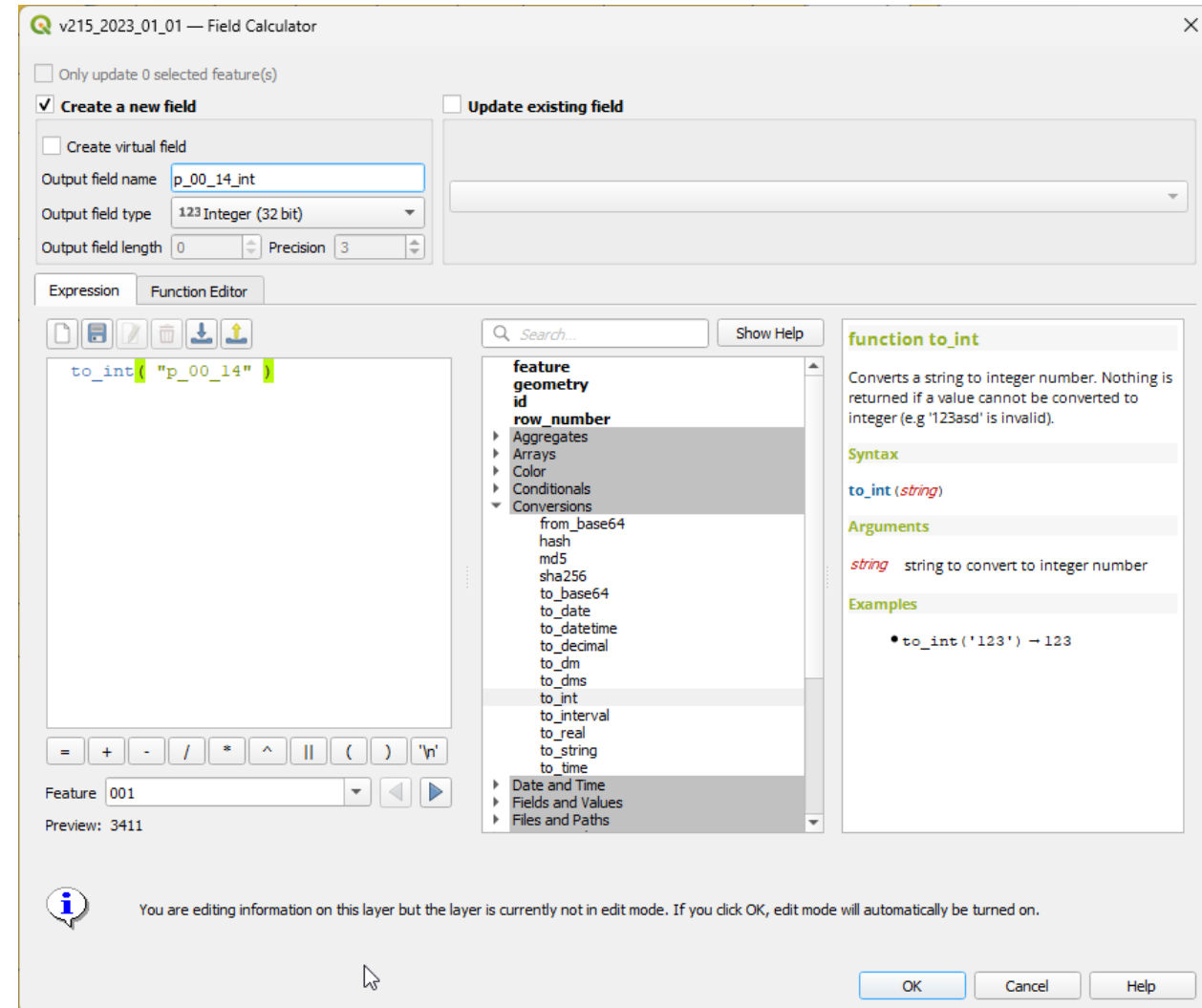
Id	Name	Alias	Type	Type name	Length	Precision	Comment	Configuration
121 0	fid		Integer (64 bit)	Integer64	0	0		
alias 1	ob_id		Text (string)	String	0	0		
alias 2	ob_ime		Text (string)	String	0	0		
alias 3	f_40_44		Text (string)	String	0	0		
alias 4	p_100_		Text (string)	String	0	0		
alias 5	f_55_59		Text (string)	String	0	0		
alias 6	m_40_44		Text (string)	String	0	0		
alias 7	f_35_39		Text (string)	String	0	0		
alias 8	m_20_24		Text (string)	String	0	0		
alias 9	f_15_19		Text (string)	String	0	0		
alias 10	m_00_04		Text (string)	String	0	0		
alias 11	f_45_49		Text (string)	String	0	0		
alias 12	m_100_		Text (string)	String	0	0		
alias 13	m_80_84		Text (string)	String	0	0		
alias 14	p_80_84		Text (string)	String	0	0		
alias 15	m_60_64		Text (string)	String	0	0		
alias 16	p_60_64		Text (string)	String	0	0		
alias 17	p_45_49		Text (string)	String	0	0		
alias 18	f_75_79		Text (string)	String	0	0		
alias 19	p_25_29		Text (string)	String	0	0		
alias 20	f_50_54		Text (string)	String	0	0		
alias 21	f_05_09		Text (string)	String	0	0		

Style

OK Cancel Apply Help

Izračun novih vrednosti

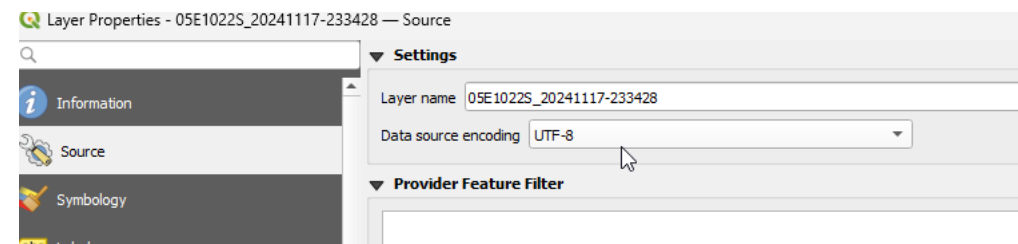
- Ogromno funkcij
- Za različne podatkovne tipe!
- Lahko posodobimo tudi obstoječe vrednosti





SURS - SiStat

- Večina podatkov vezanih na prostorske enote (naselje, občina, regija)
- Ni enoličnega identifikatorja – le ime (ki ni vedno skladno z uradnim imenom v registru prostorskih enot!)



05E1022S_20241117-233428 — Features Total

	Prebivalstvo Spol - !	OBČINE
1	19891	Ajdovščina
2	3325	Ankaran/Ancarano
3	3580	Apače
4	8071	Beltinci

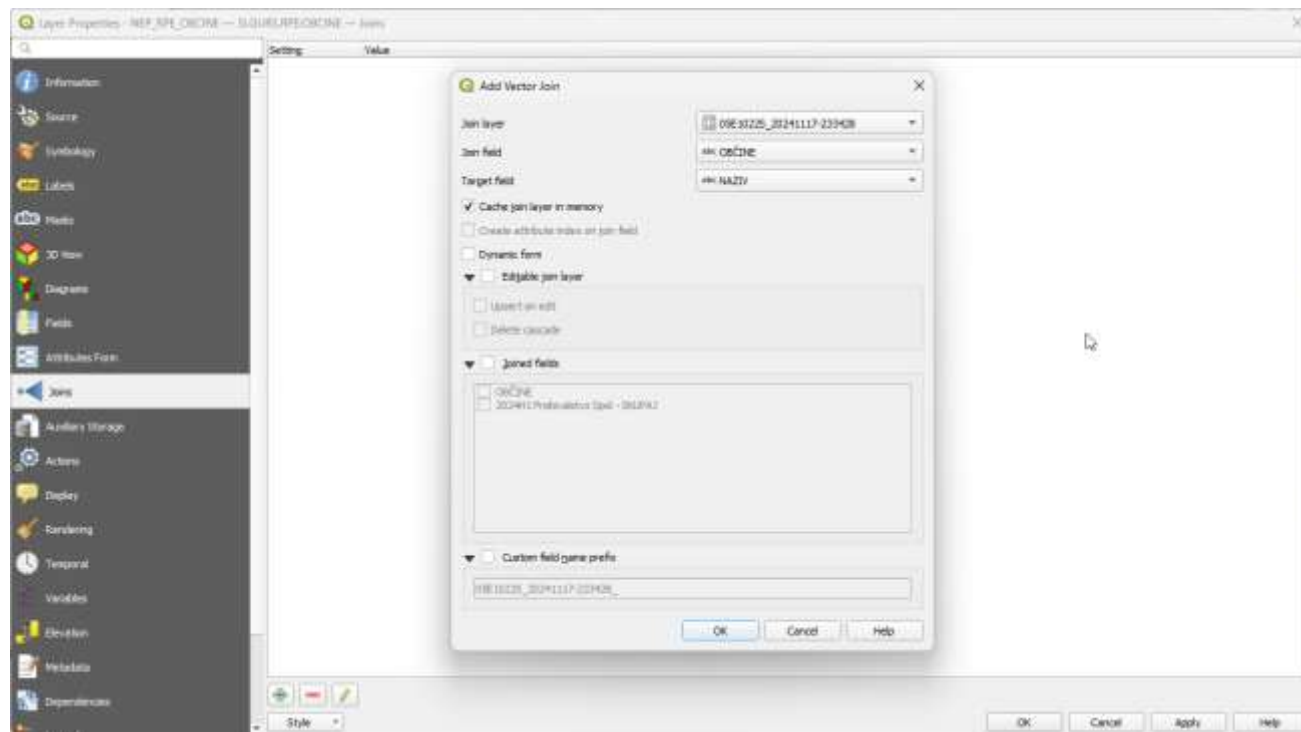
05E1022S_20241117-233428

	Prebivalstvo Spol - !	OBČINE
1	19891	Ajdovščina
2	3325	Ankaran/Ancarano
3	3580	Apače
4	8071	Beltinci
5	2728	Benedikt
6	1348	Bistrica ob Sotli

v215_2023_01_01 — Features Total: 212, Filtered...

	fid	ob_id	ob_ime	f_
1	1	001	Ajdovščina	670
2	212	213	Ankaran	131
3	194	195	Apače	132
4	2	002	Beltinci	278
5	147	148	Benedikt	103
6	148	149	Bistrica ob Sotli	49

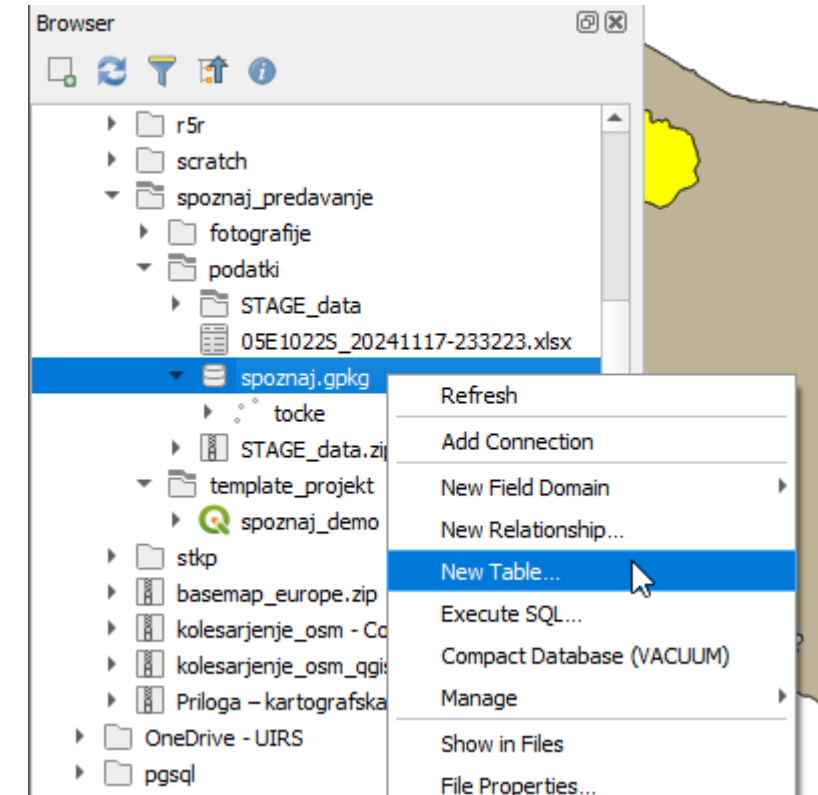
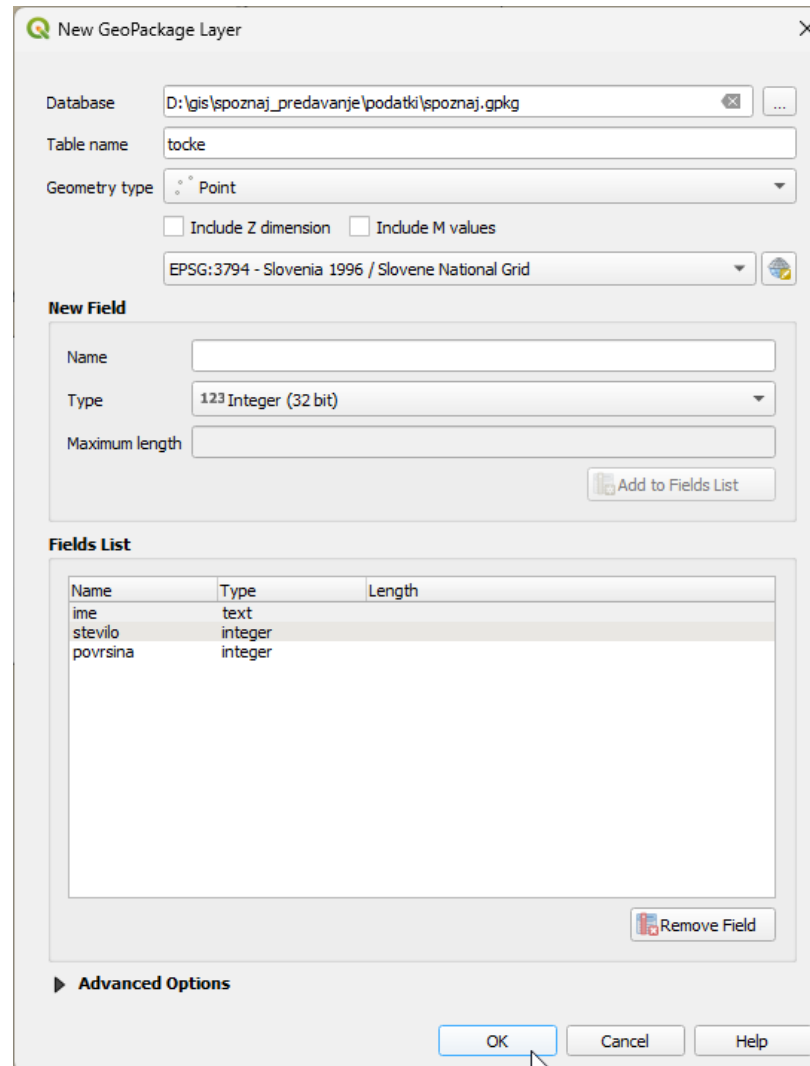
Združevanje slojev



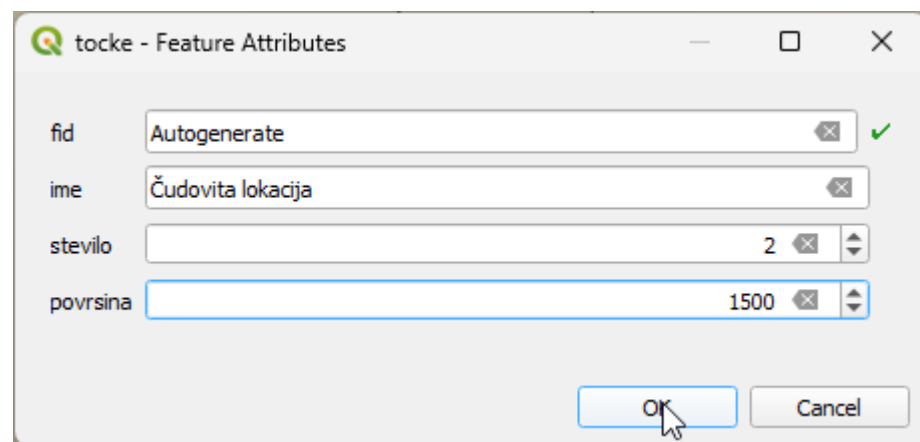
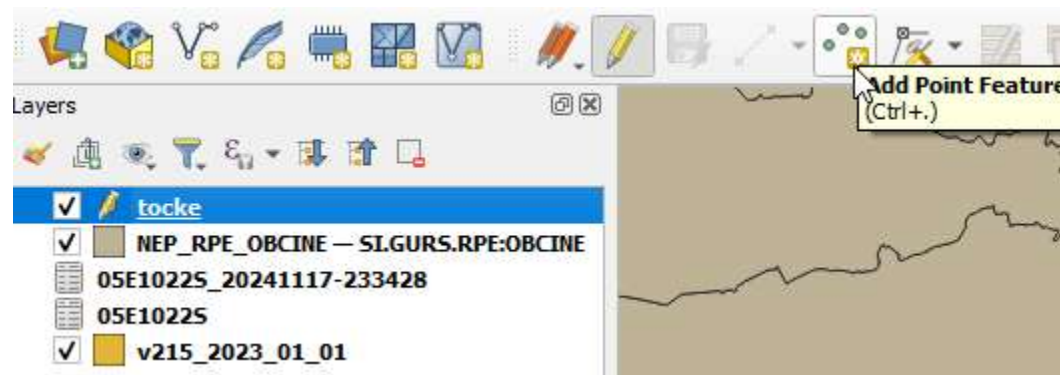
QGIS NEP_RPE_OBCINE — SI.GURS.RPE:OBCINE — Features Total: 212, Filtered: 212, Selected: 1

	FEATUREID	EID_OBCINA	SIFRA	NAZIV	4AKA_MESTNE_OBC	DATUM_SYS	NAZIV_DJ	05E1022S_20241117-233428_2024H1Prebivalstvo Spol - SKUPAJ
1	1102000001102...	1102000001102...	1	Ajdovščina	0	03.07.2024 17:3...	NULL	19891
2	1102000002406...	1102000002406...	213	Ankaran	0	13.09.2024 13:0...	NULL	NULL
3	1102000002143...	1102000002143...	195	Apače	0	29.02.2024 19:12:19 (UTC)	NULL	3580
4	1102000001102...	1102000001102...	2	Beltinci	0	22.03.2024 12:24:33 (UTC)	NULL	8071

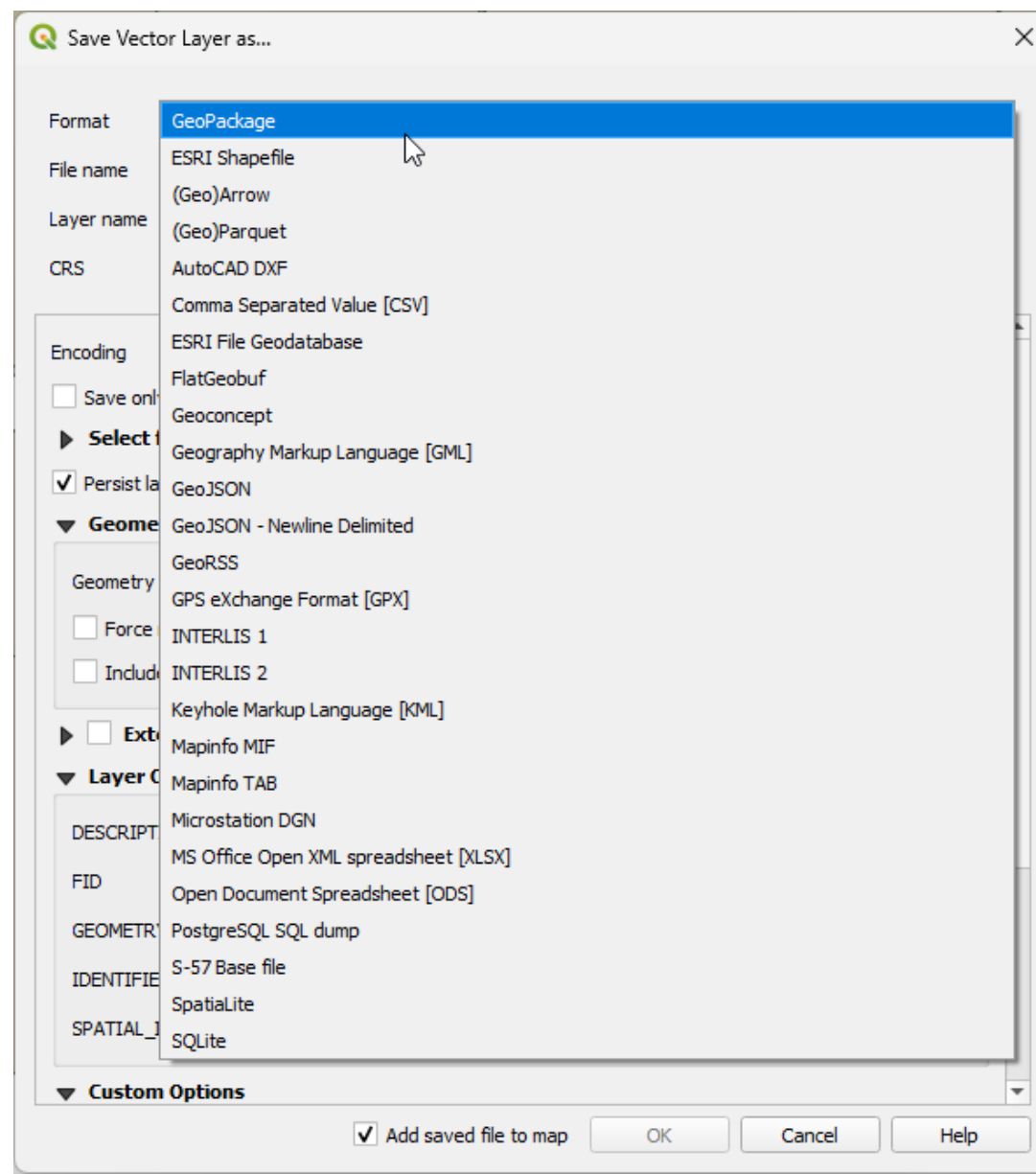
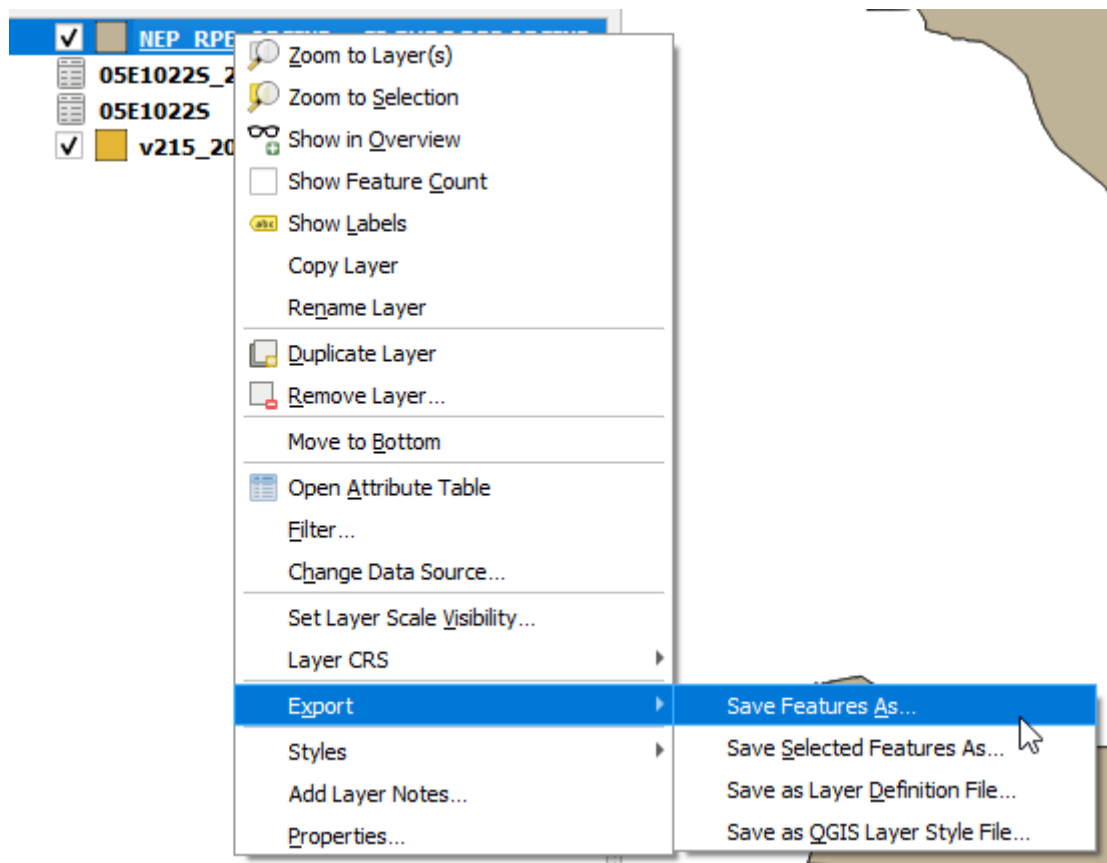
Ustvarjanje novih slojev



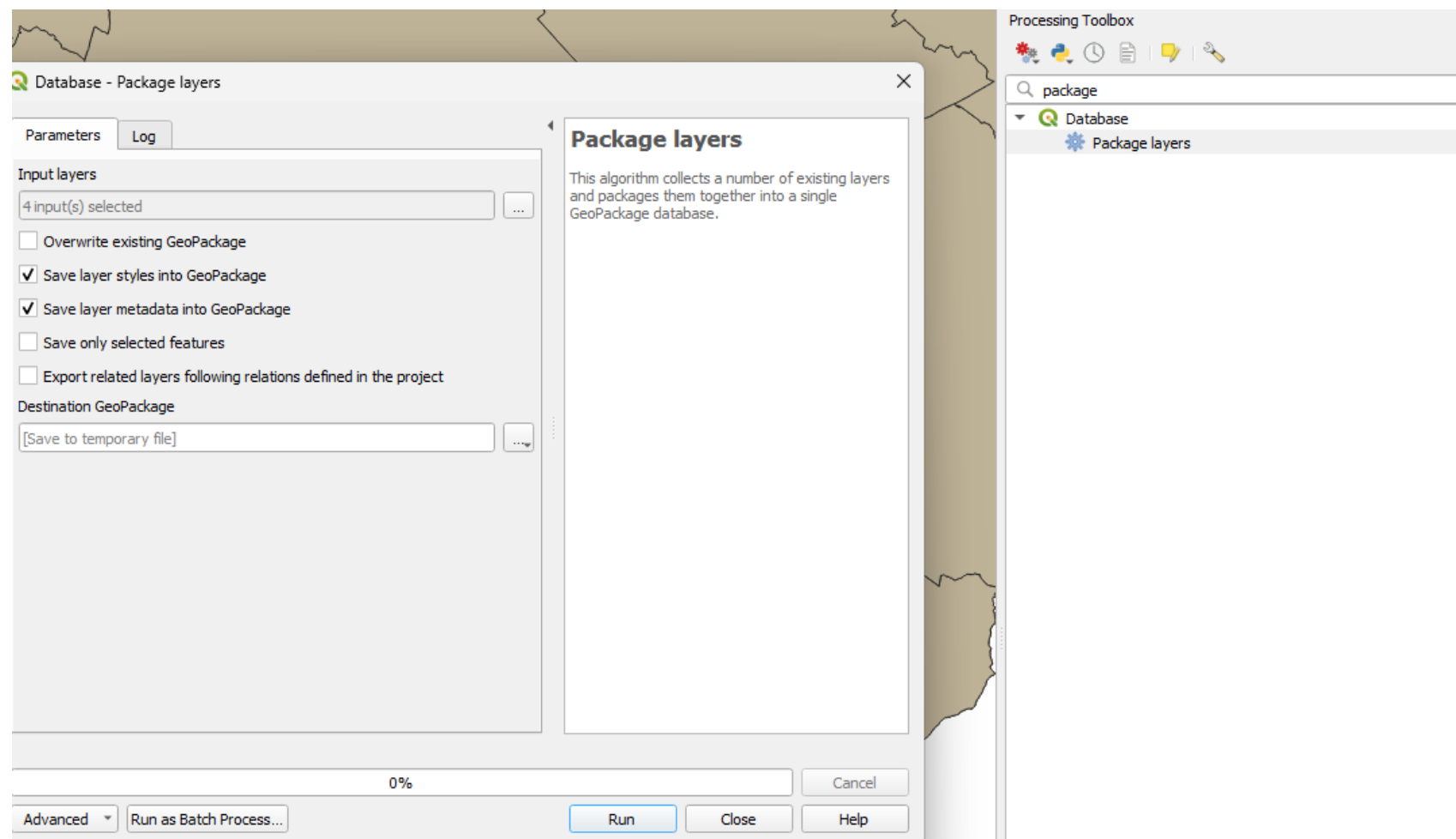
Urejanje slojev



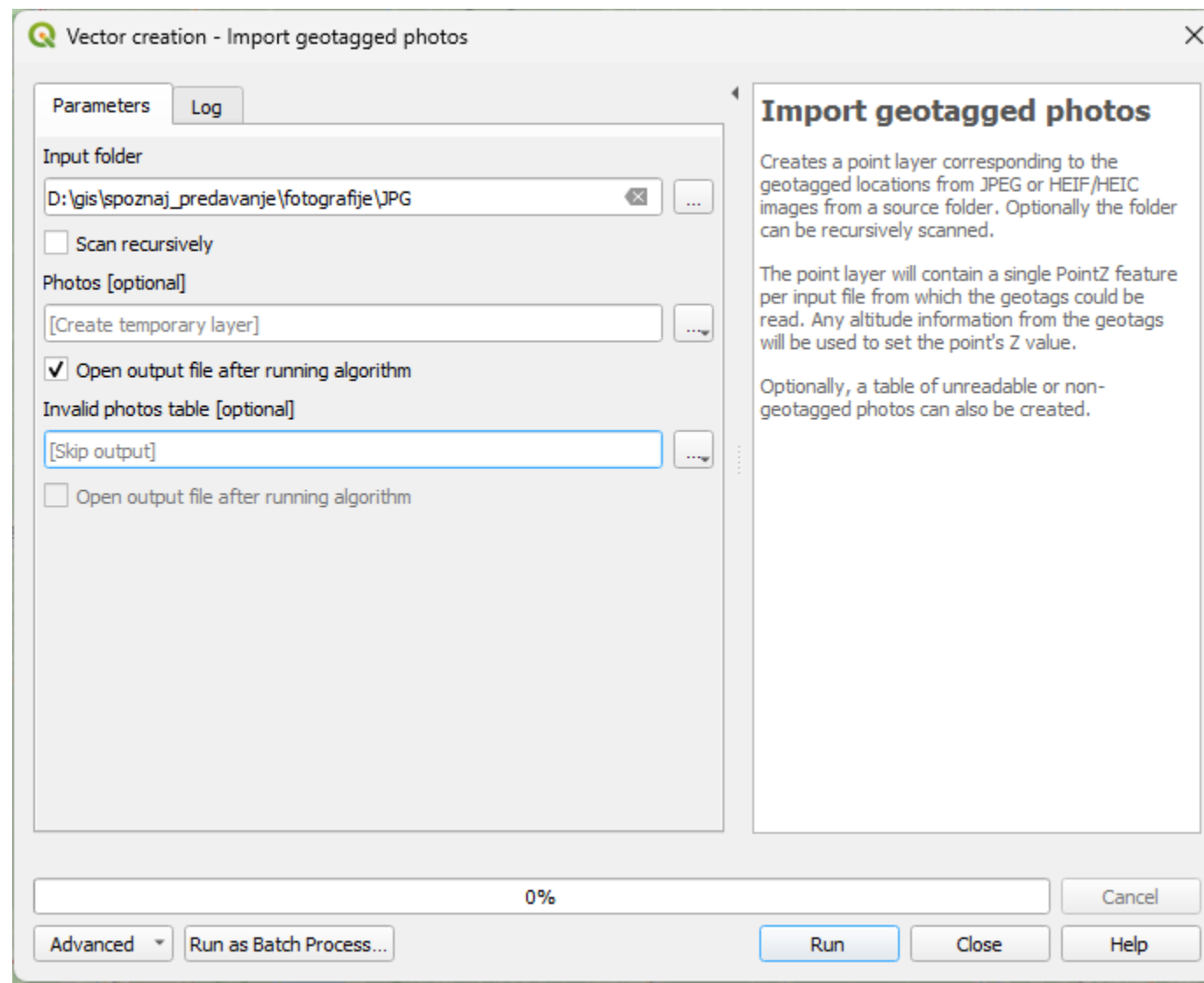
Izvažanje slojev



Izvažanje slojev



Izdelava točkovnega sloja iz geolociranih fotografij



The screenshot shows the 'Vector creation - Import geotagged photos' dialog box. It has two tabs: 'Parameters' and 'Log'. The 'Parameters' tab is active and contains the following settings:

- Input folder:** D:\gis\spoznaj_predavanje\ fotografije \JPG
- ☐ Scan recursively
- Photos [optional]:** [Create temporary layer]
- ☒ Open output file after running algorithm
- Invalid photos table [optional]:** [Skip output]
- ☐ Open output file after running algorithm

The right side of the dialog contains a text area with the following text:

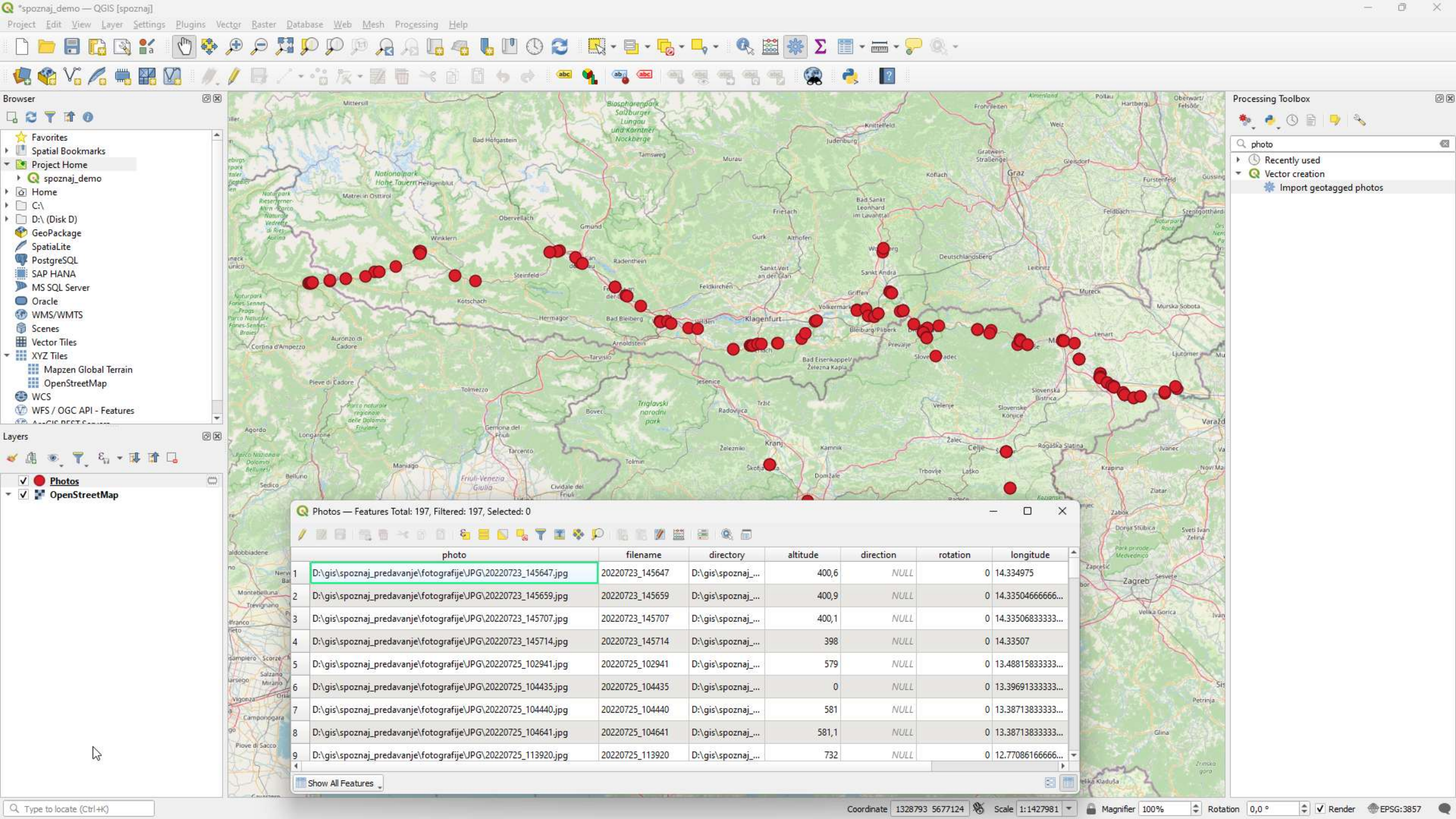
Import geotagged photos

Creates a point layer corresponding to the geotagged locations from JPEG or HEIF/HEIC images from a source folder. Optionally the folder can be recursively scanned.

The point layer will contain a single PointZ feature per input file from which the geotags could be read. Any altitude information from the geotags will be used to set the point's Z value.

Optionally, a table of unreadable or non-geotagged photos can also be created.

At the bottom, there is a progress bar showing 0%, and buttons for 'Advanced', 'Run as Batch Process...', 'Run', 'Close', 'Cancel', and 'Help'.



Photos — Features Total: 197, Filtered: 197, Selected: 0

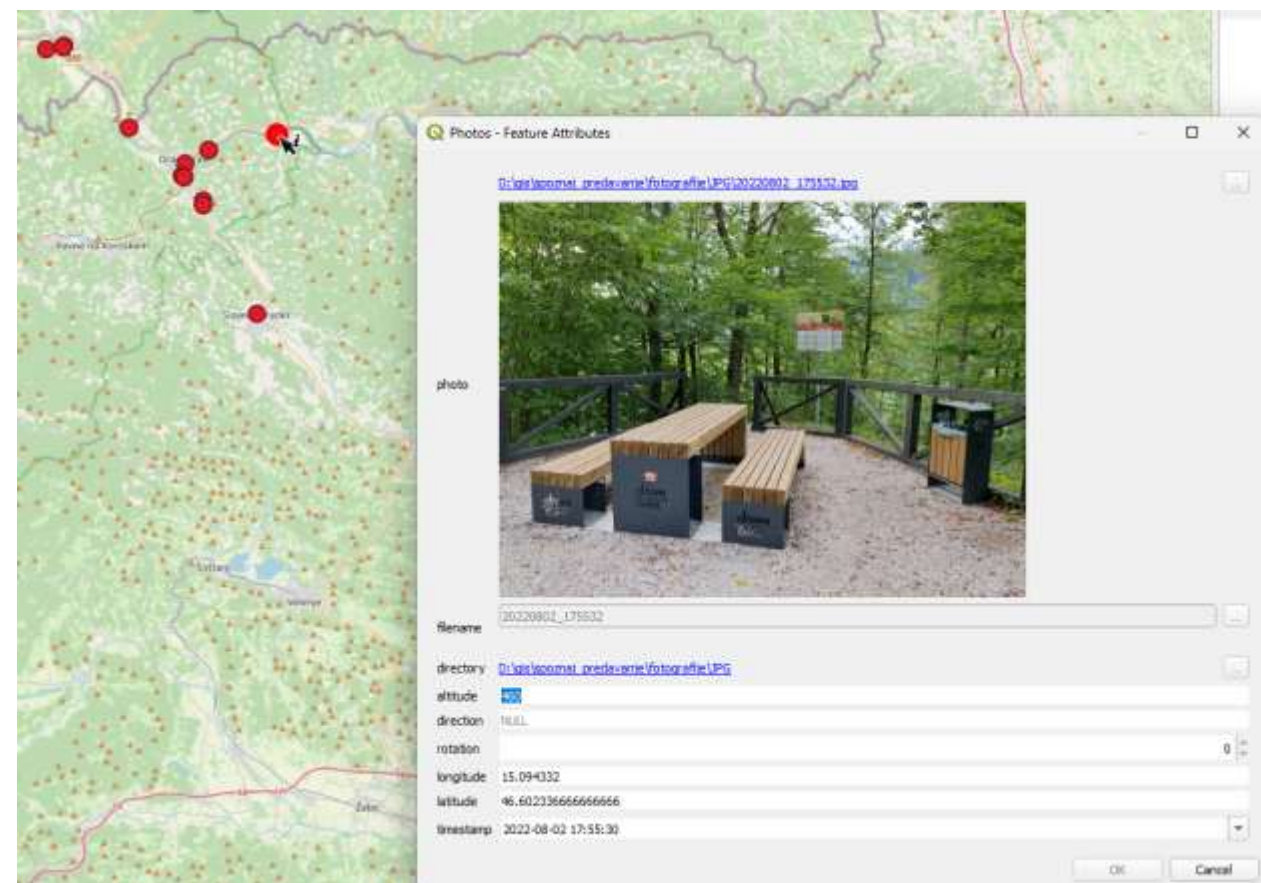
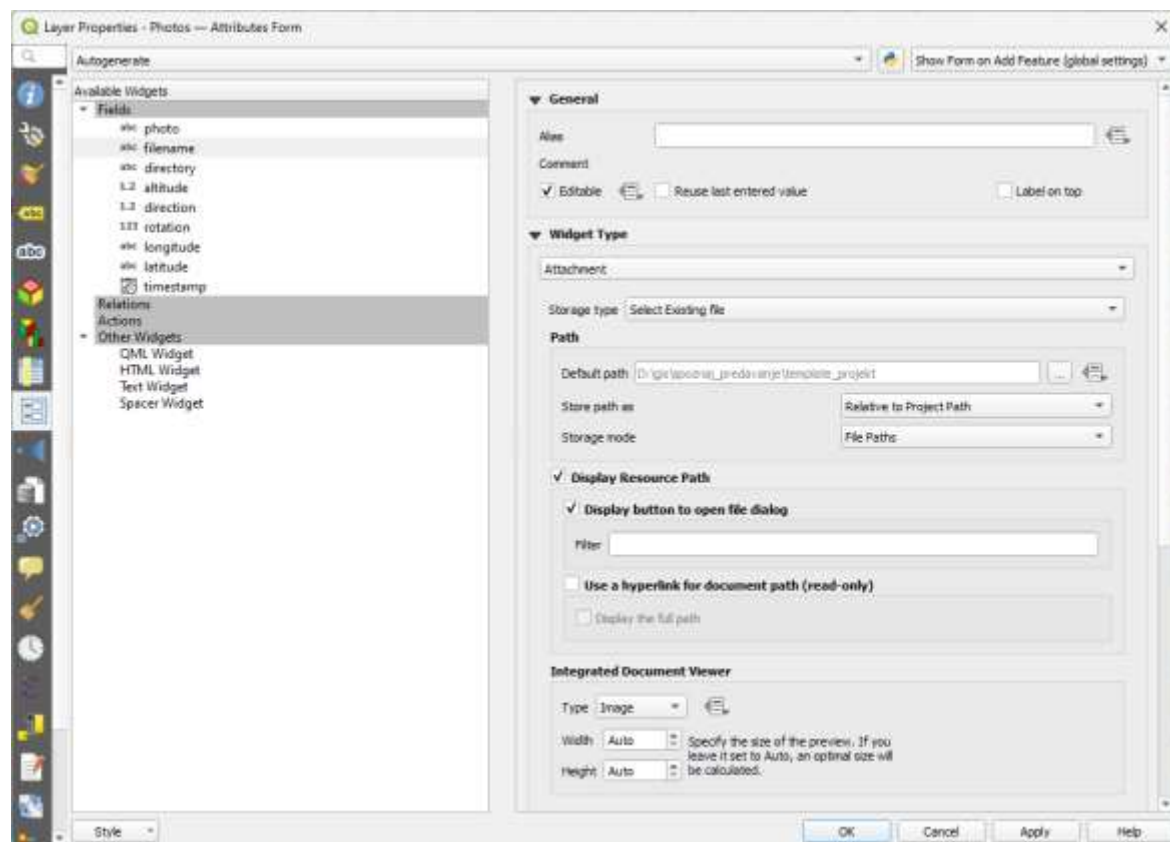
	photo	filename	directory	altitude	direction	rotation	longitude
1	D:\gis\spoznaj_predavanje\fotografije\JPG\20220723_145647.jpg	20220723_145647	D:\gis\spoznaj_...	400,6	NULL	0	14.334975
2	D:\gis\spoznaj_predavanje\fotografije\JPG\20220723_145659.jpg	20220723_145659	D:\gis\spoznaj_...	400,9	NULL	0	14.33504666666...
3	D:\gis\spoznaj_predavanje\fotografije\JPG\20220723_145707.jpg	20220723_145707	D:\gis\spoznaj_...	400,1	NULL	0	14.33506833333...
4	D:\gis\spoznaj_predavanje\fotografije\JPG\20220723_145714.jpg	20220723_145714	D:\gis\spoznaj_...	398	NULL	0	14.33507
5	D:\gis\spoznaj_predavanje\fotografije\JPG\20220725_102941.jpg	20220725_102941	D:\gis\spoznaj_...	579	NULL	0	13.48815833333...
6	D:\gis\spoznaj_predavanje\fotografije\JPG\20220725_104435.jpg	20220725_104435	D:\gis\spoznaj_...	0	NULL	0	13.39691333333...
7	D:\gis\spoznaj_predavanje\fotografije\JPG\20220725_104440.jpg	20220725_104440	D:\gis\spoznaj_...	581	NULL	0	13.38713833333...
8	D:\gis\spoznaj_predavanje\fotografije\JPG\20220725_104641.jpg	20220725_104641	D:\gis\spoznaj_...	581,1	NULL	0	13.38713833333...
9	D:\gis\spoznaj_predavanje\fotografije\JPG\20220725_113920.jpg	20220725_113920	D:\gis\spoznaj_...	732	NULL	0	12.77086166666...

Show All Features

Nastavimo obrazec za pregled podatkov

Obrazec za prikaz podatkov

Prikaz fotografije poleg atributnih vrednosti

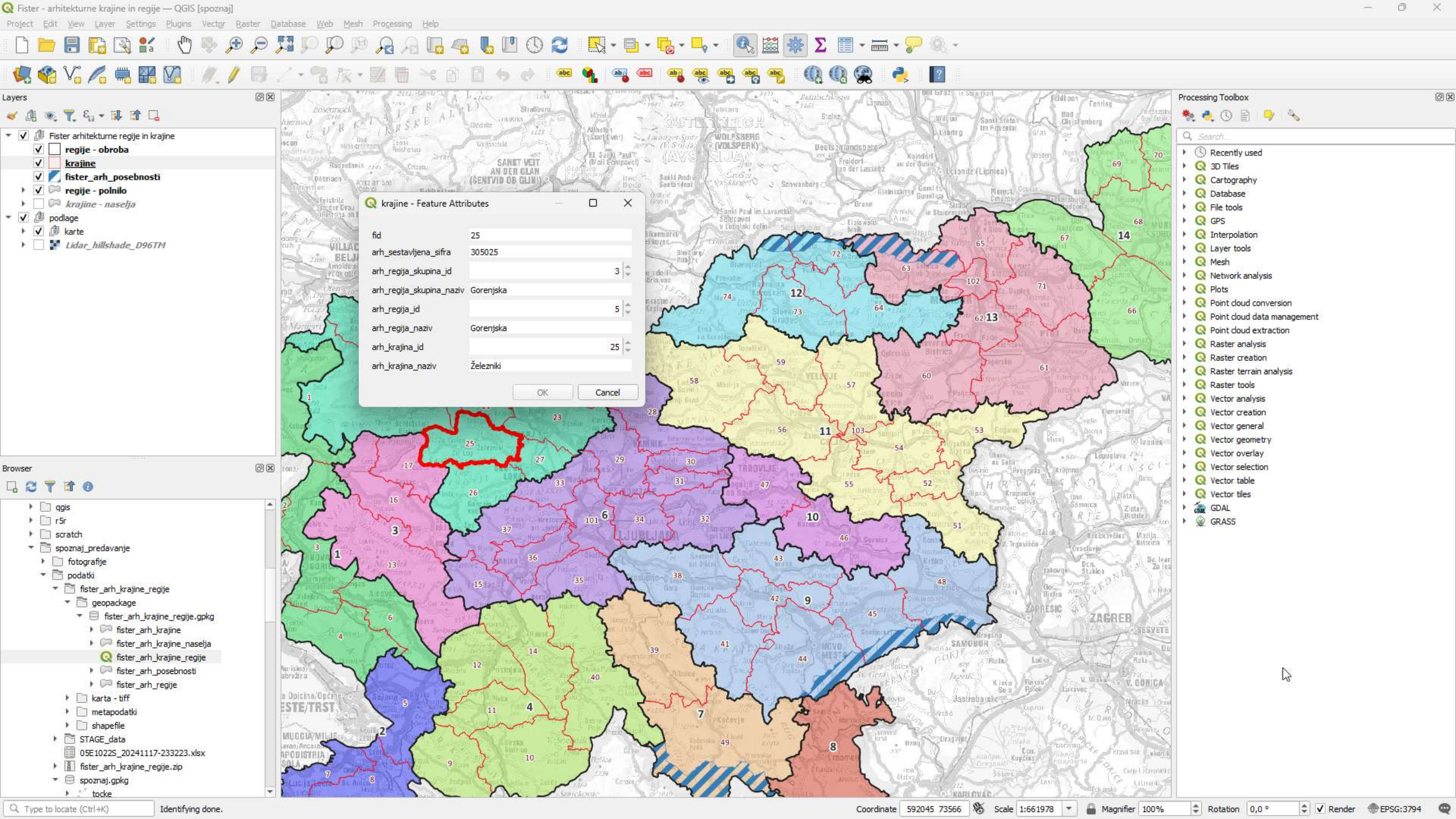


Primer pripravljenih raziskovalnih podaktov

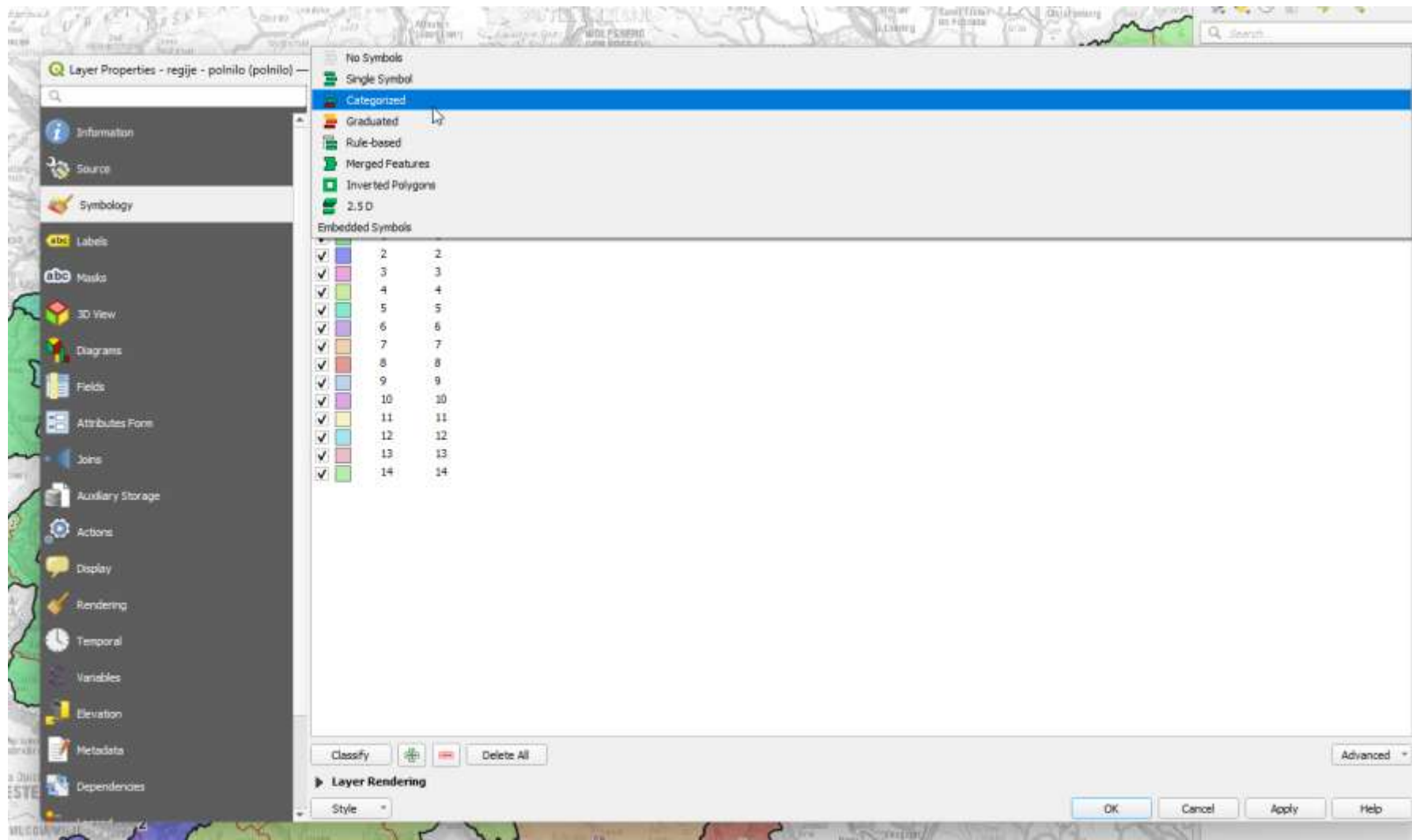
<https://zenodo.org/records/10701772>

↑ Name	Ext	Size	Date	Attr
↑ ..		<DIR>	18.11.2024 00:09:13	d-----
geopackage		<DIR>	28.09.2023 13:00:58	d-----
karta - tiff		<DIR>	28.09.2023 12:26:49	d-----
metapodatki		<DIR>	28.09.2023 13:00:46	d-----
shapefile		<DIR>	28.09.2023 12:58:55	d-----

- - ▼ fister_arh_krajine_regije
 - ▼ geopackage
 - ▼ fister_arh_krajine_regije.gpkg
 - ▶ fister_arh_krajine
 - ▶ fister_arh_krajine_naselja
 - ▶ fister_arh_krajine_regije
 - ▶ fister_arh_posebnosti
 - ▶ fister_arh_regije



Klasifikacija podatkov



Podatki OpenStreetMap - kolesarjenje

Podatkovna baza – vnos
podatkov v OSM



UIRS – reklasifikacija osnovnih
podatkov in izvoz v Geopackage

Dnevno se prenese podatke iz strani Geofabrik -> uvoz v
PostgreSQL bazo -> reklasifikacija za potrebe kolesarjenja->
izvoz v Geopackage

Prenos podatkov in posodabljanje produktov
- časovni zamik od nekaj dni do enega
meseca

Prenos geopackage datoteke s podatki
– zjutraj so vidni podatki od prejšnjega
dneva

Končni uporabniki – kolesarji preko obstoječih storitev



STRAVA



Vnos popravkov direktno v OSM

Načrtovalci infrastrukture – vektorski podatki v QGIS-u



Izdelava lastnih kart iz
vektorskih podatkov.

Odkrite napake v podatkih

Odkrite napake v podatkih



UIRS predloga

Predloga in podatki so na voljo na povezavi:

OSM kolesarjenje UIRS

https://uirs-my.sharepoint.com/:f:/g/personal/simonk_uirs_si/EgFRY_A817NDtp-DwOJzmrABR13Trdat7Jy8aZ2f8wUGlg



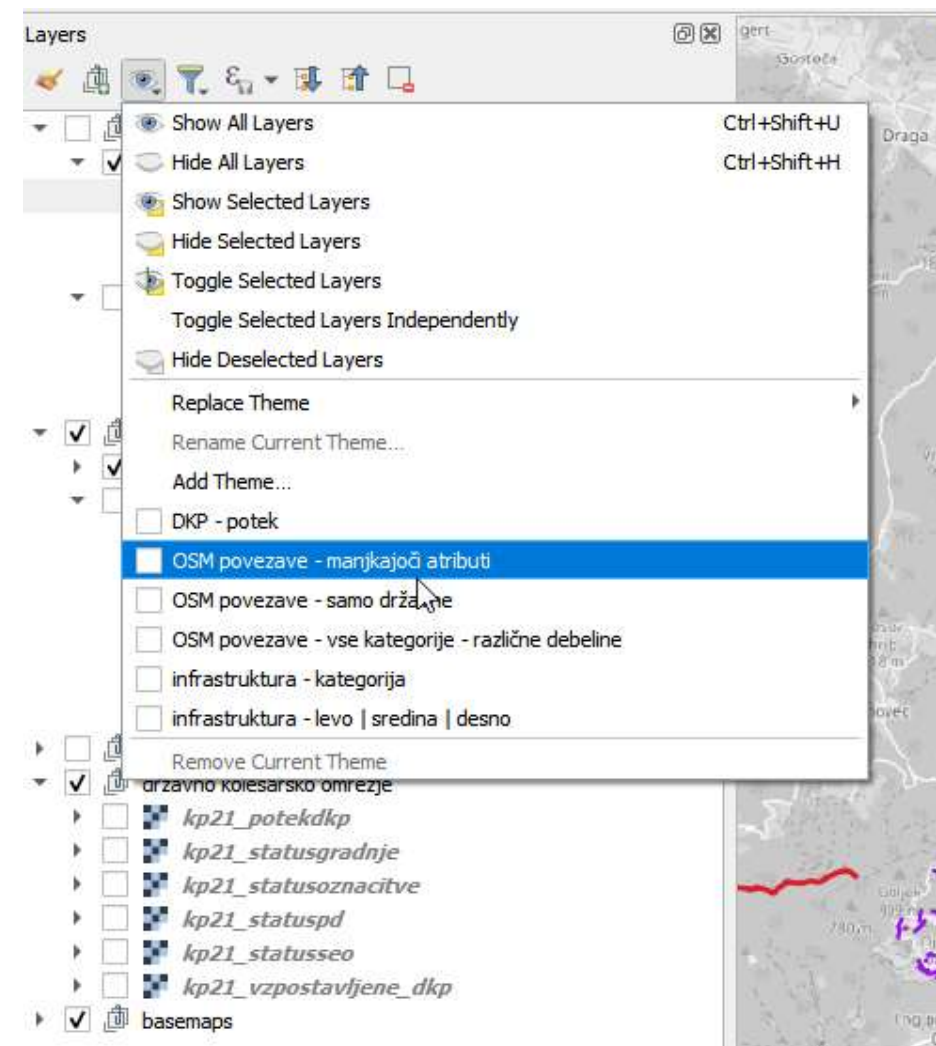
1. Prenesite datoteko kolesarjenje_osm_qgis_predloga.zip – podatki za 11. 4. 2024
2. Ekstrahirajte v poljubno mapo

Osveževanje podatkov

1. Iz mape „dnevni osveženi podatki“ prenesite datoteko „slovenia-latest-cycling-YYYY-MM-DD.zip – izberite poljuben datum – na voljo bo do 9 dnevni različit.
2. Ekstrahirajte slovenia-latest-cycling-YYYY-MM-DD.zip, ter prekopirajte datoteko slovenia-latest-cycling.gpkg v mapo „\kolesarjenje_osm_qgis_predloga\data“ – zamenjajte obstoječo datoteko

OpenStreetMap - kolesarjenje - predloga UIRS.qgz

- V dokumentu je že nekaj pred nastavljenih tem
- Pripravljene so tudi statistike na prostorske enote – občine in regije





Terensko delo

- <https://qfield.org/>
- <https://merginmaps.com/>





Nasveti

- Shranjujte v geopackage
- Poleg podatkov pripravite tudi stile in jih shranite poleg podatkov
- Preverite koordinatne sisteme – po potrebi pretvorite!



Uporabne povezave

- GIS orodje: QGIS:
 - Prenos orodja: <https://qgis.org/>
 - Uporabniški priročnik: https://docs.qgis.org/3.34/en/docs/user_manual/index.html
 - Tečaji: https://docs.qgis.org/3.34/en/docs/training_manual/index.html
- Video tečaji:
 - <https://www.youtube.com/@qgishome>
 - <https://www.youtube.com/@HansvanderKwast>
 - <https://www.youtube.com/@KartozaGeo>
 - <https://www.youtube.com/@KlasKarlsson>
 - <https://www.youtube.com/@MattForrest>



Uporabne povezave

- **Open Source Geospatial Slovenija**
 - 2024: <https://www.youtube.com/watch?v=2N41a9O6Fog>
 - 2023: <https://www.youtube.com/watch?v=h4cmV4GT-60>
- LifeNarcIS – vtičnik in izobraževanja
 - <https://narcis.gov.si/ords/r/narcis/narcis/novicka?p2030 novicka=1096>



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Slovenija / *Slovenia*

Hvala za pozornost

Simon Koblar



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SLOVENIAN FORESTRY INSTITUTE

