Basic Vector Operations

ISTANBULTECHNICALUNIVERSITY

Sp. Anly. and Alg. in GIS
Week 1

Res. Assist. Ömer AKIN

Introduction & Aim of the Study

- *A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data.*
- *Geoprocessing is any GIS operation used to manipulate data.*

Aim of the Study:

- *Find roads and hotels that will be affected by a possible flood event for the European side of Istanbul.*

Input Data:

- *POI (Vector-Point/Geojson)*
- *Roads (Vector-Polyline/Geojson)*
- *Water Bodies (Vector-Polygon/Geojson)*
- *European Side of Istanbul (Vector-Polygon/Geojson)*

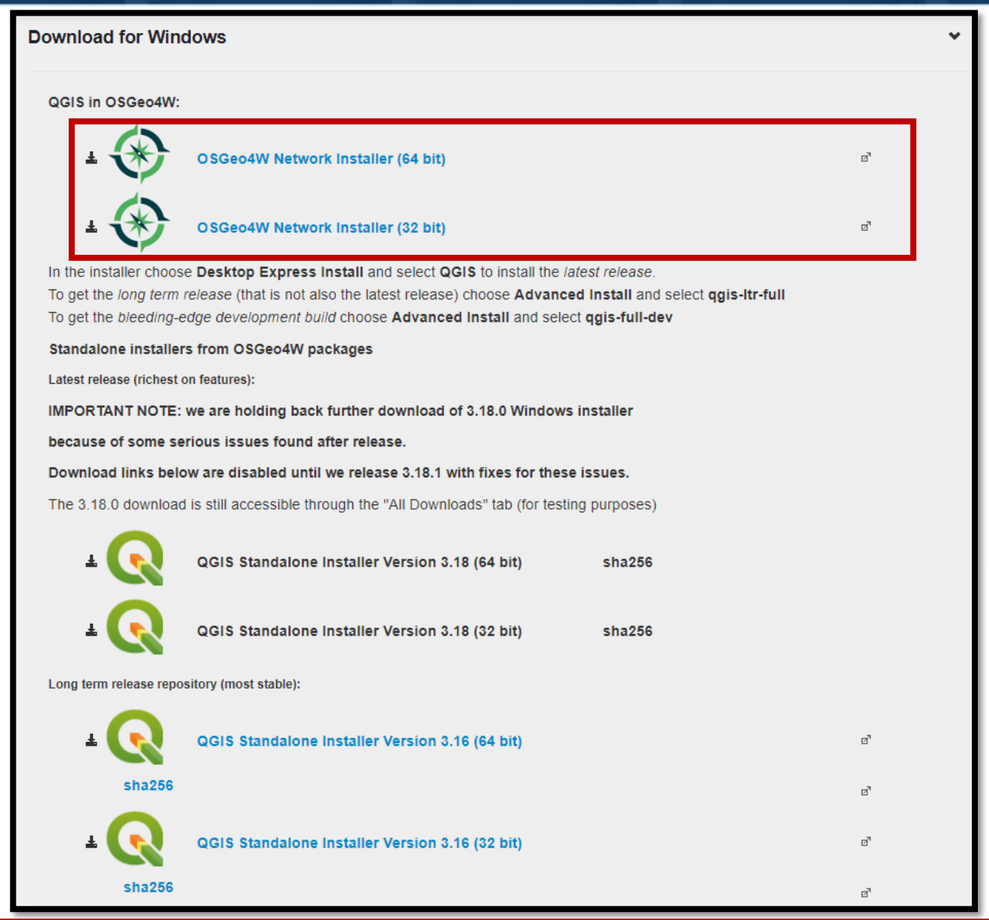
Introduction to Quantum GIS (QGIS)

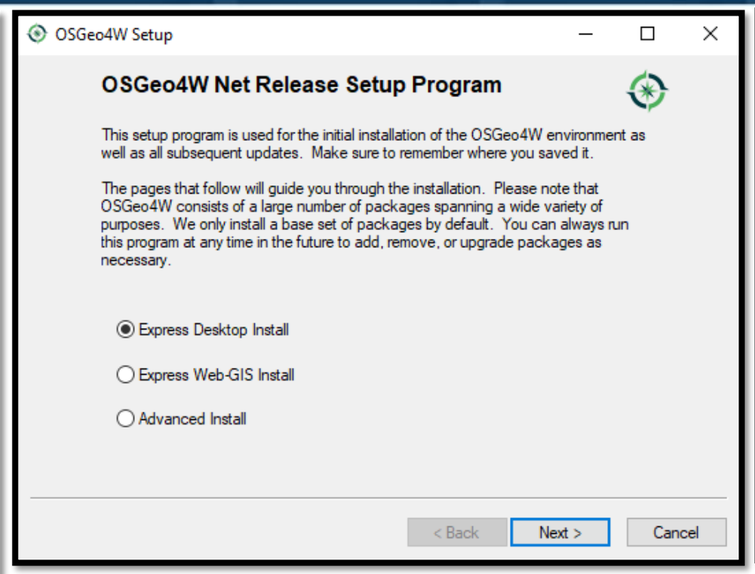
- QGIS is a volunteer-led development project licensed under the GNU General Public License then was incubated with the Open Source Geospatial Foundation (OSGeo) in 2007.

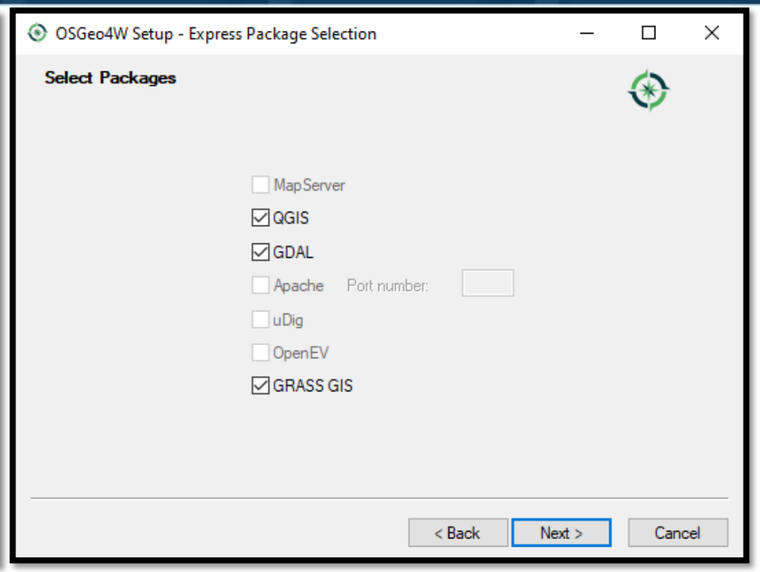
- It has many open source desktop GIS tools within (GRASS & SAGA) and it also has a plug-in architecture. It is written in C++ but offers a rich Python scripting environment. It also includes drivers for connecting to PostGIS data as well as various other GIS data sources.

Installing/Updating Quantum GIS (QGIS)

Installation

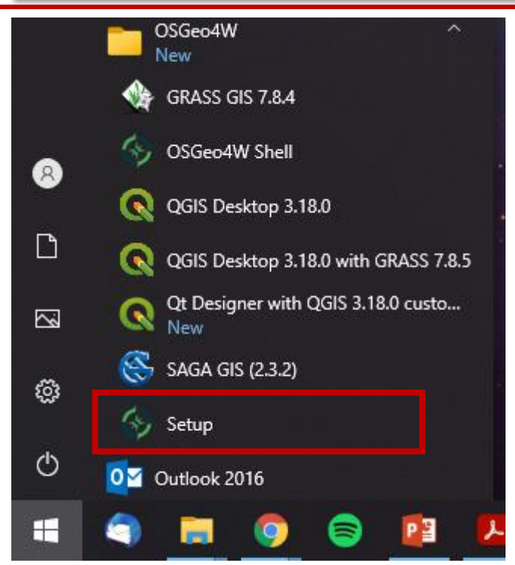


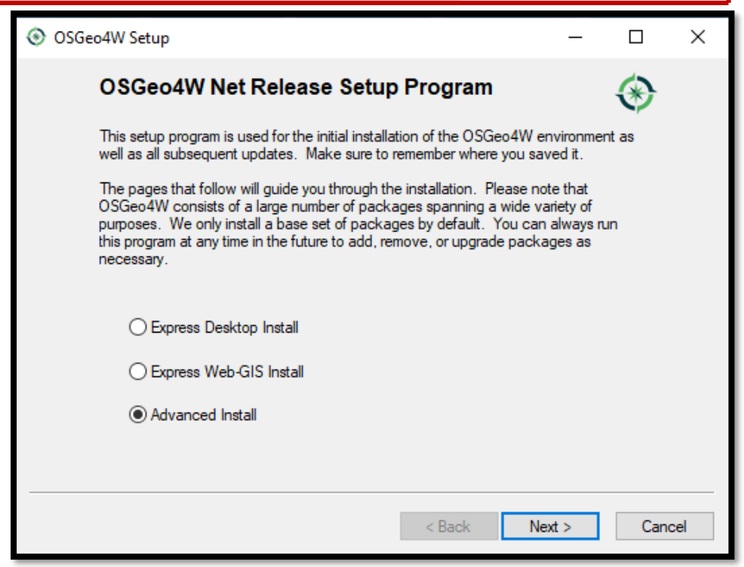


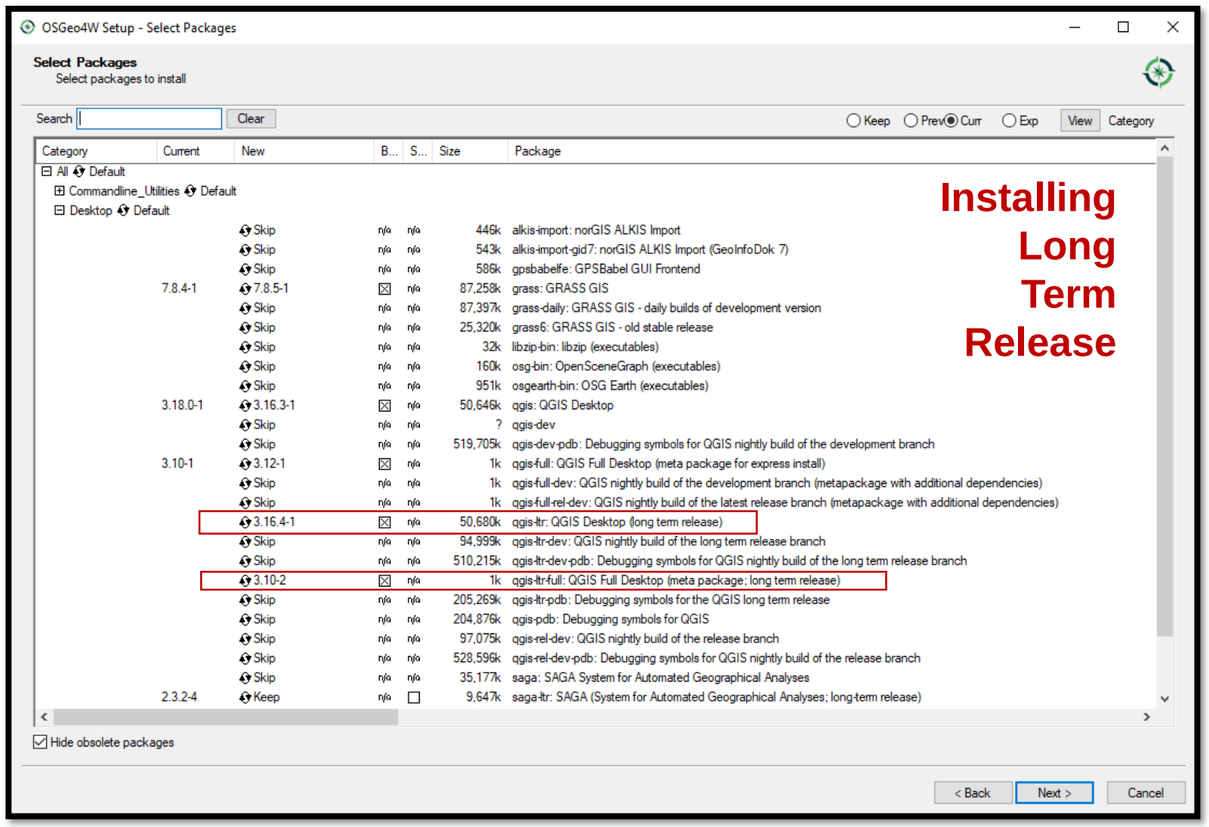


https://qgis.org/en/site/forusers/download.html

Updating

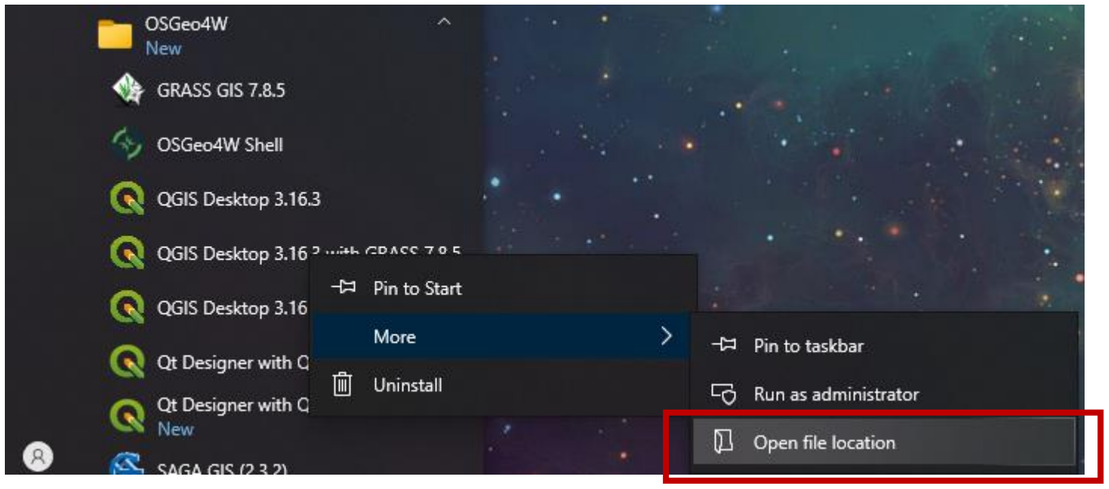


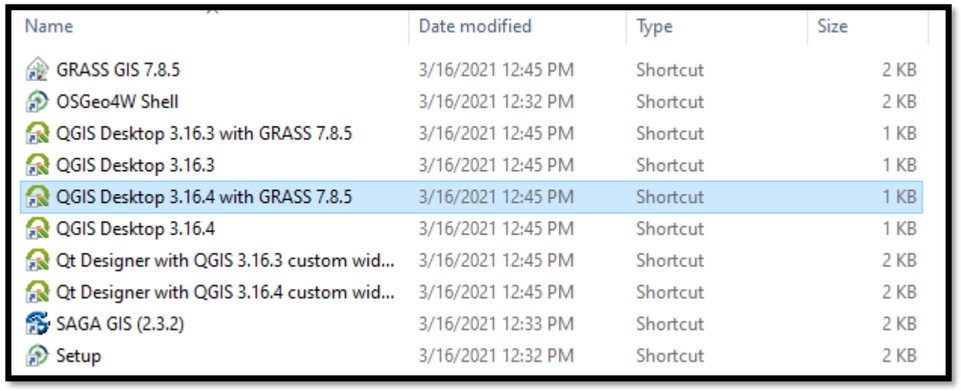




Installing Long Term Release

Opening Quantum GIS (QGIS)





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GRASS GIS 7.8.5	3/16/2021 12:45 PM	Shortcut	2 KB
OSGeo4W Shell	3/16/2021 12:32 PM	Shortcut	2 KB
QGIS Desktop 3.16.3 with GRASS 7.8.5	3/16/2021 12:45 PM	Shortcut	1 KB
QGIS Desktop 3.16.3	3/16/2021 12:45 PM	Shortcut	1 KB
QGIS Desktop 3.16.4 with GRASS 7.8.5	3/16/2021 12:45 PM	Shortcut	1 KB
QGIS Desktop 3.16.4	3/16/2021 12:45 PM	Shortcut	1 KB
Qt Designer with QGIS 3.16.3 custom wid...	3/16/2021 12:45 PM	Shortcut	2 KB
Qt Designer with QGIS 3.16.4 custom wid...	3/16/2021 12:45 PM	Shortcut	2 KB
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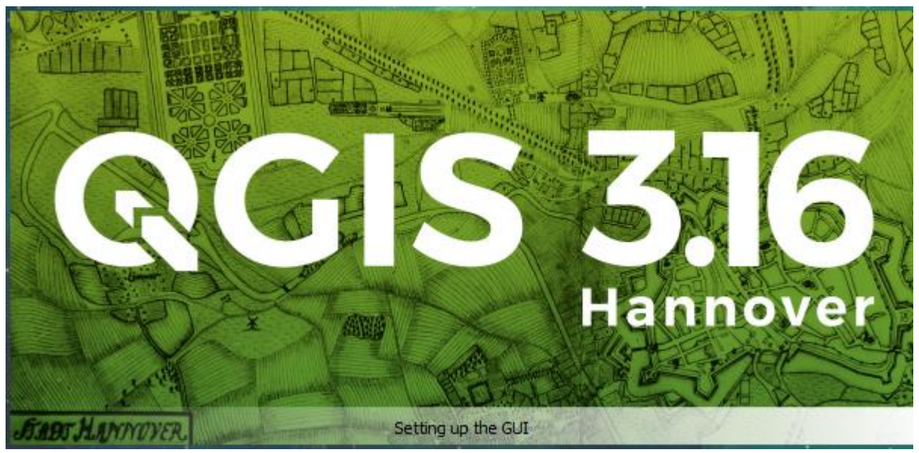
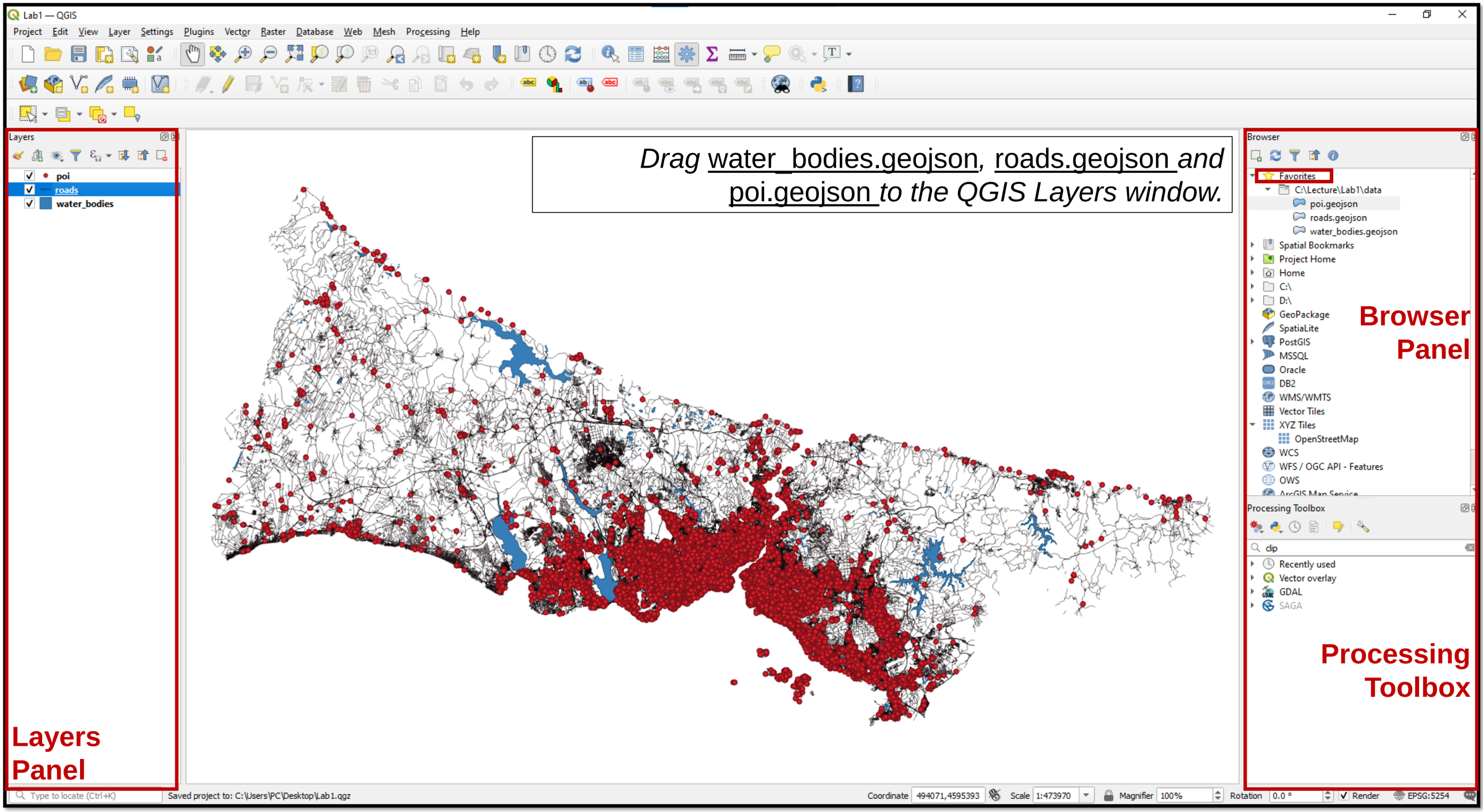


Exploring Quantum GIS (QGIS)



Available Vector Data Exchange Formats in QGIS

- Geopackage (.gpkg)
- ESRI Shapefile (.shp)
- GeoJSON (.geojson)
- Geography Markup Language (.gml)
- AutoCAD DXF (.dxf)
- Comma-separated values (.csv)
- GPS eXchange Format (.gpx)
- Keyhole Markup Language (.kml)
- SQLite/SpatiaLite (.sqlite/.db)

Exploring Data

- *Attribute Table*
- *Coordinate System*
- *Symbology*
- *Labeling*

Adding Basemap

Coordinate System of Dataframe

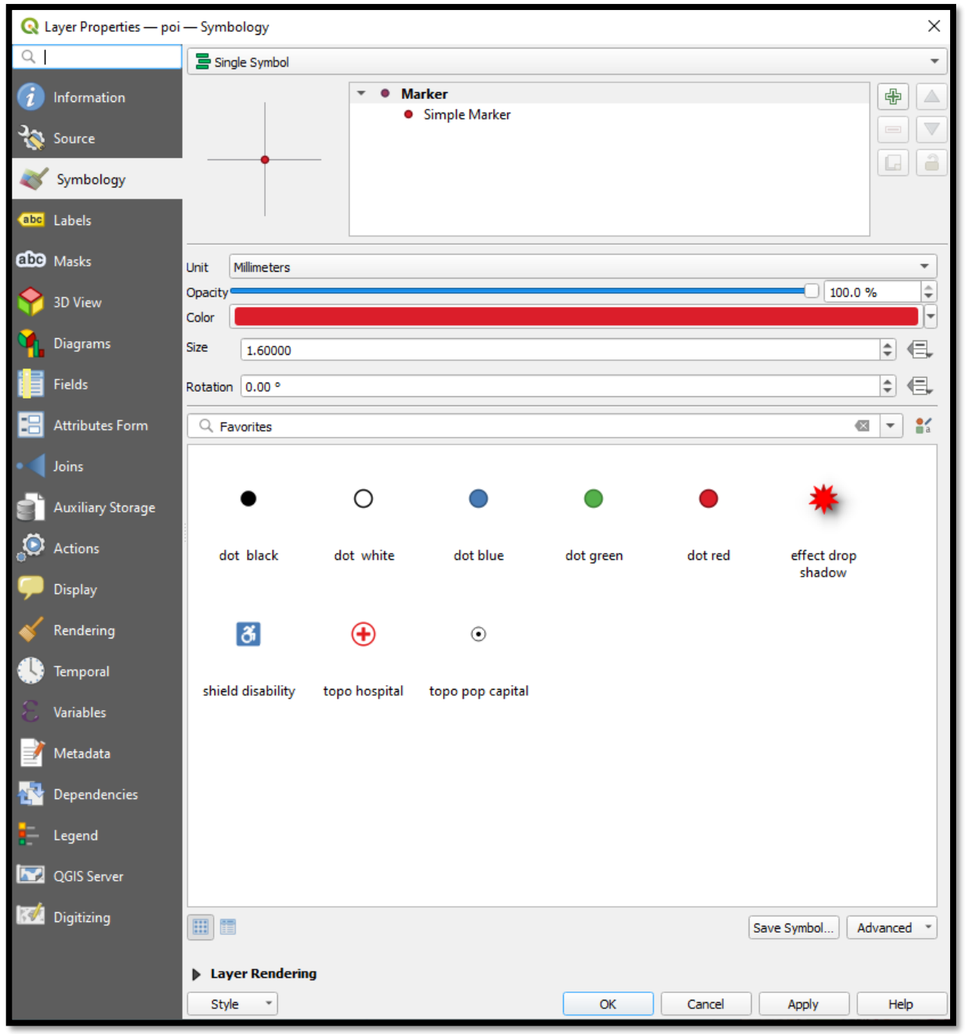
Data Properties

Attribute Table

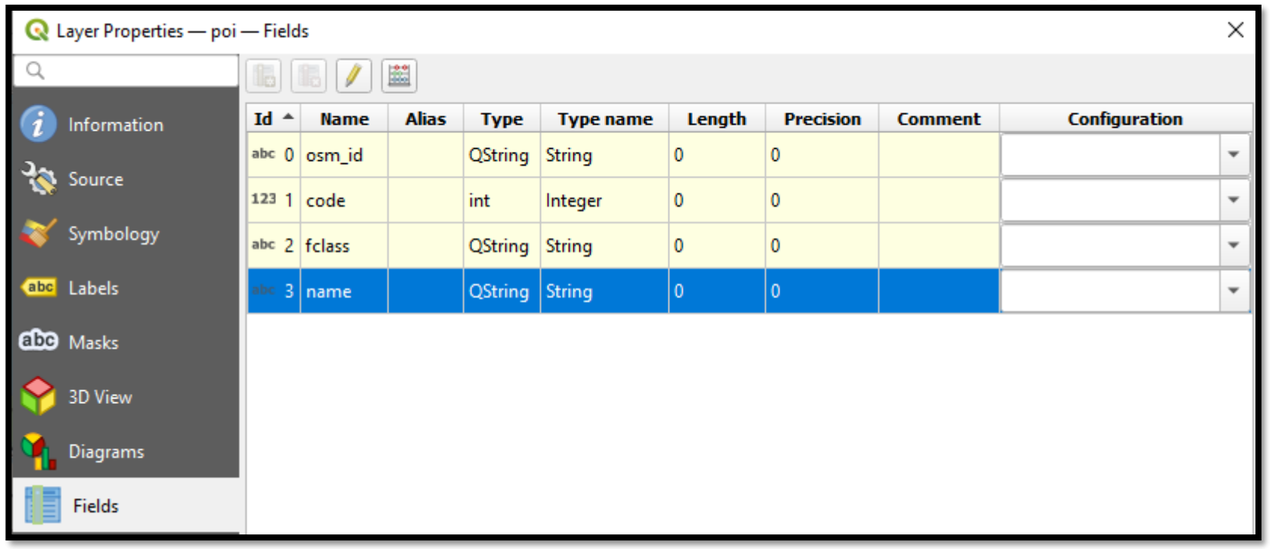
poi — Features Total: 33846, Filtered: 33846, Selected: 0

	osm_id	code	fclass	name
1	262396496	2401	hotel	Yiğitalp Oteli
2	262402714	2301	restaurant	Hamdi
3	266743039	2001	police	Yakacık Polis M...
4	269365937	2005	post_office	PTT
5	269366848	2005	post_office	*NULL*
6	269370709	2721	attraction	Rumeli Hisarı

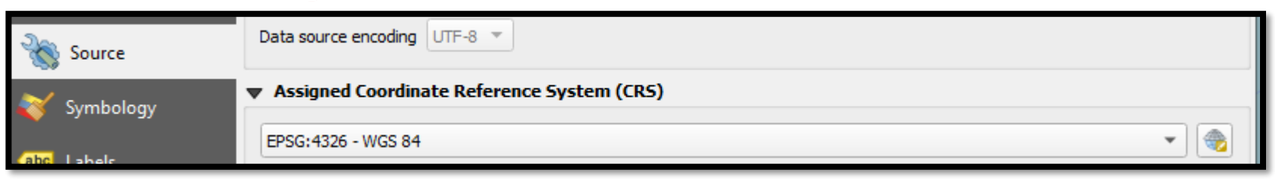
Symbology



Field Properties



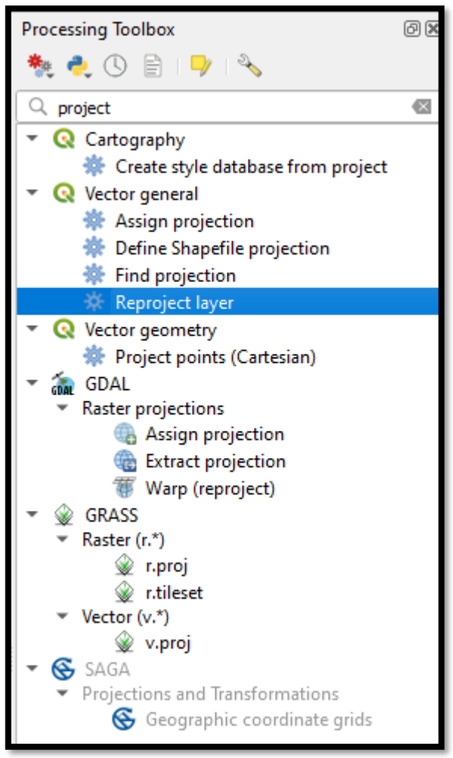
Coordinate System

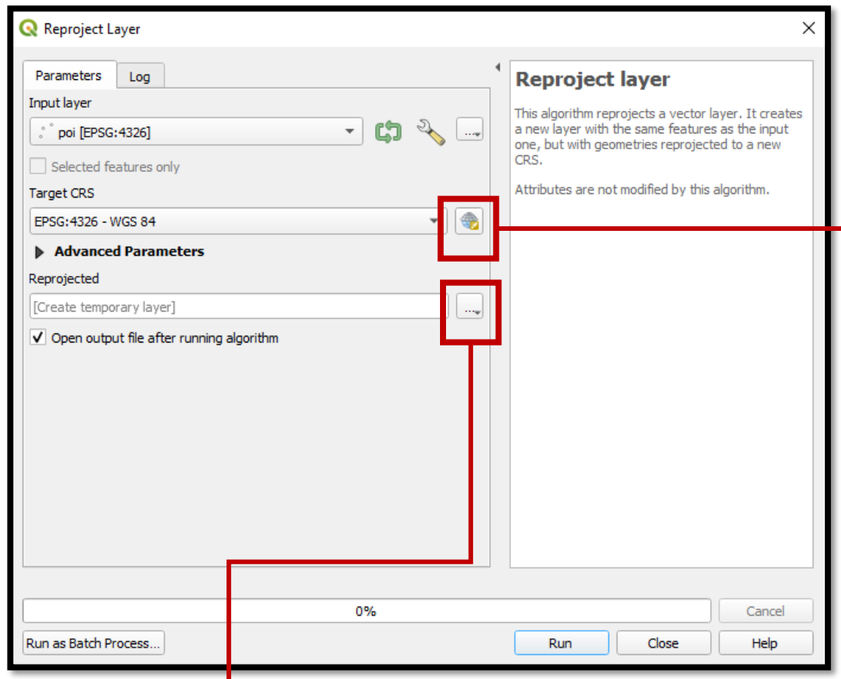


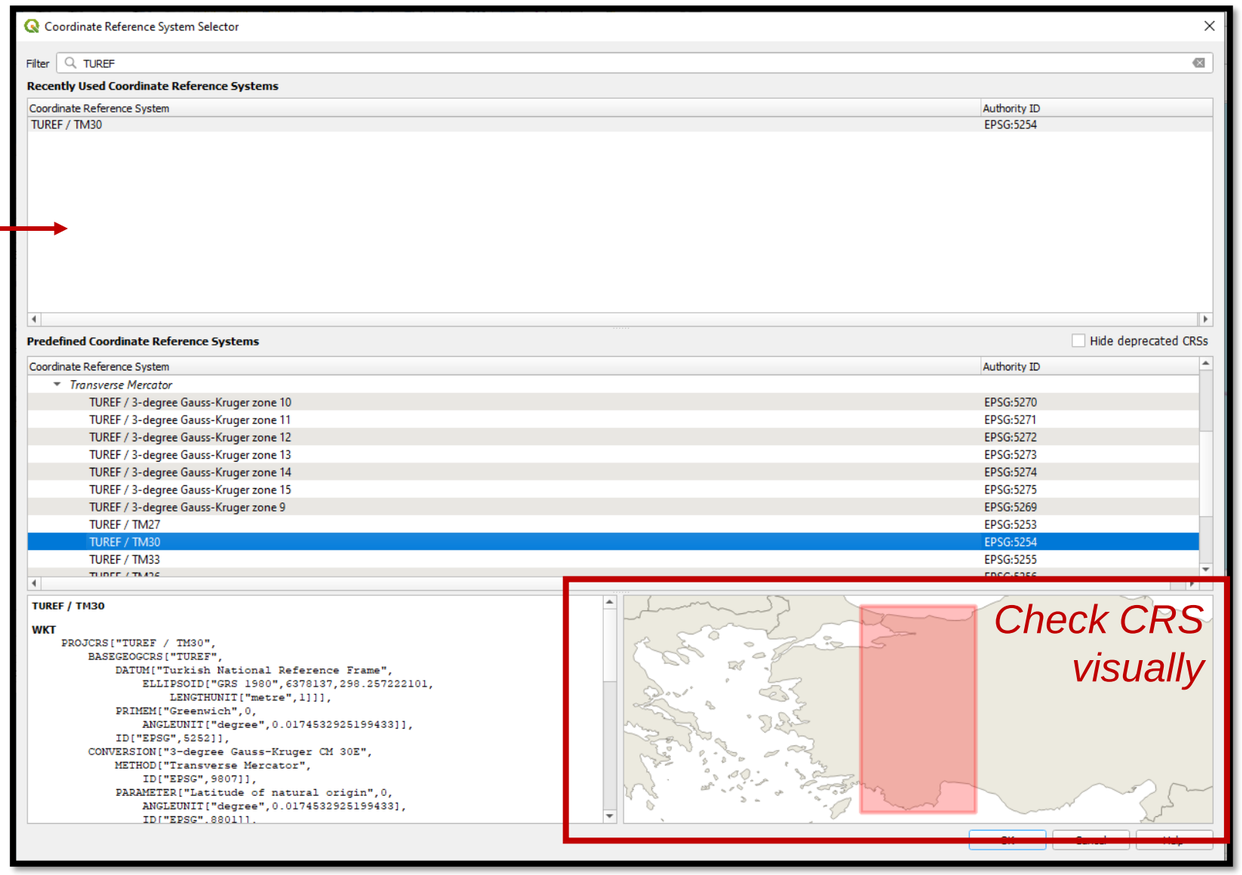
Labeling

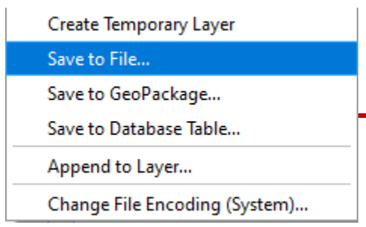
Reprojection

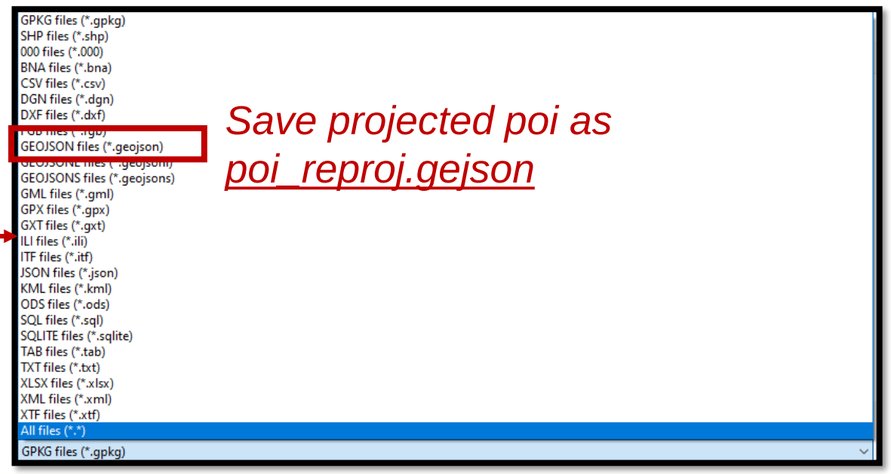
- Reproject POI into TUREF TM30 for Istanbul







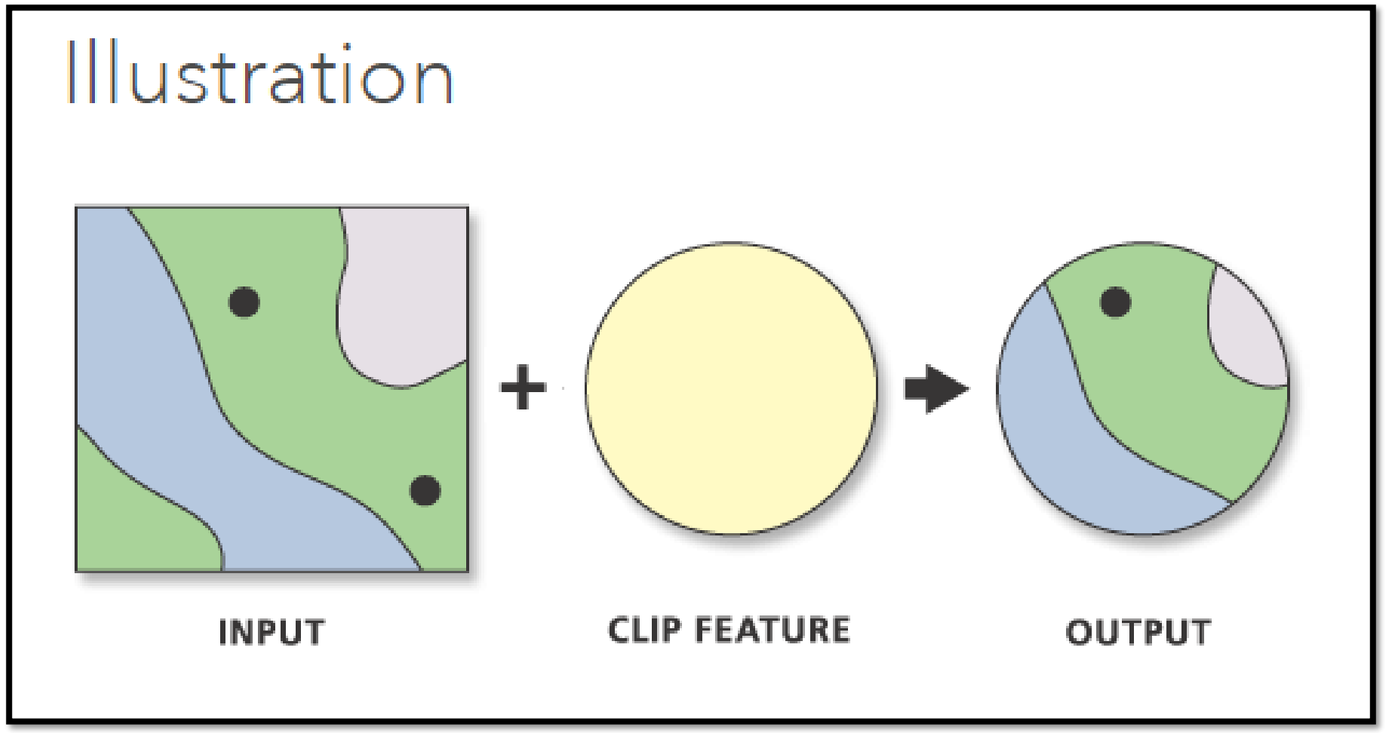


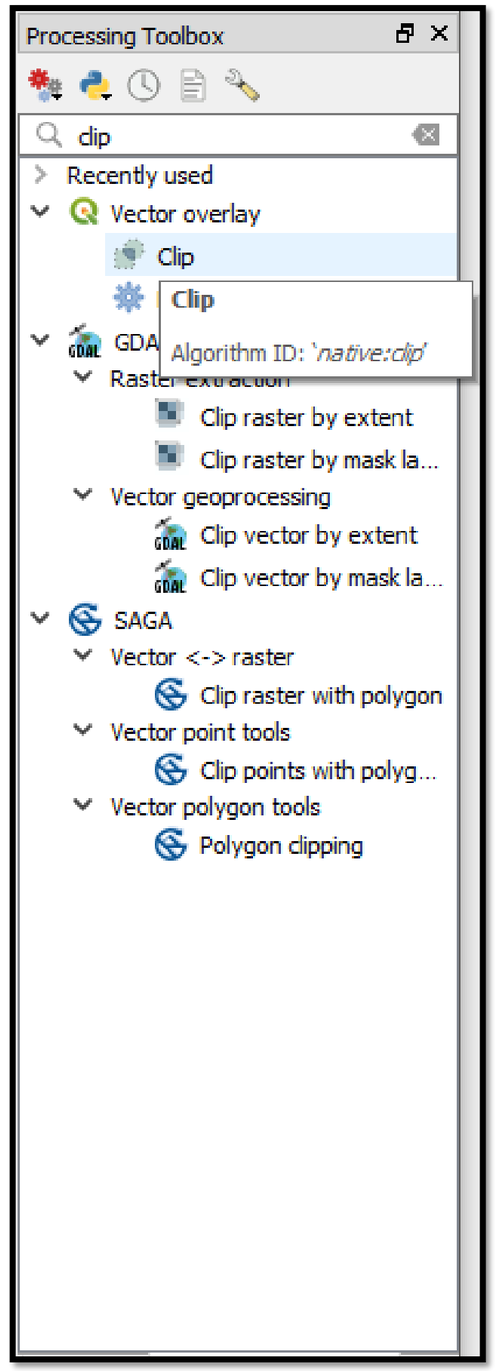


Save projected poi as poi_reproj.gejson

Clip Analysis

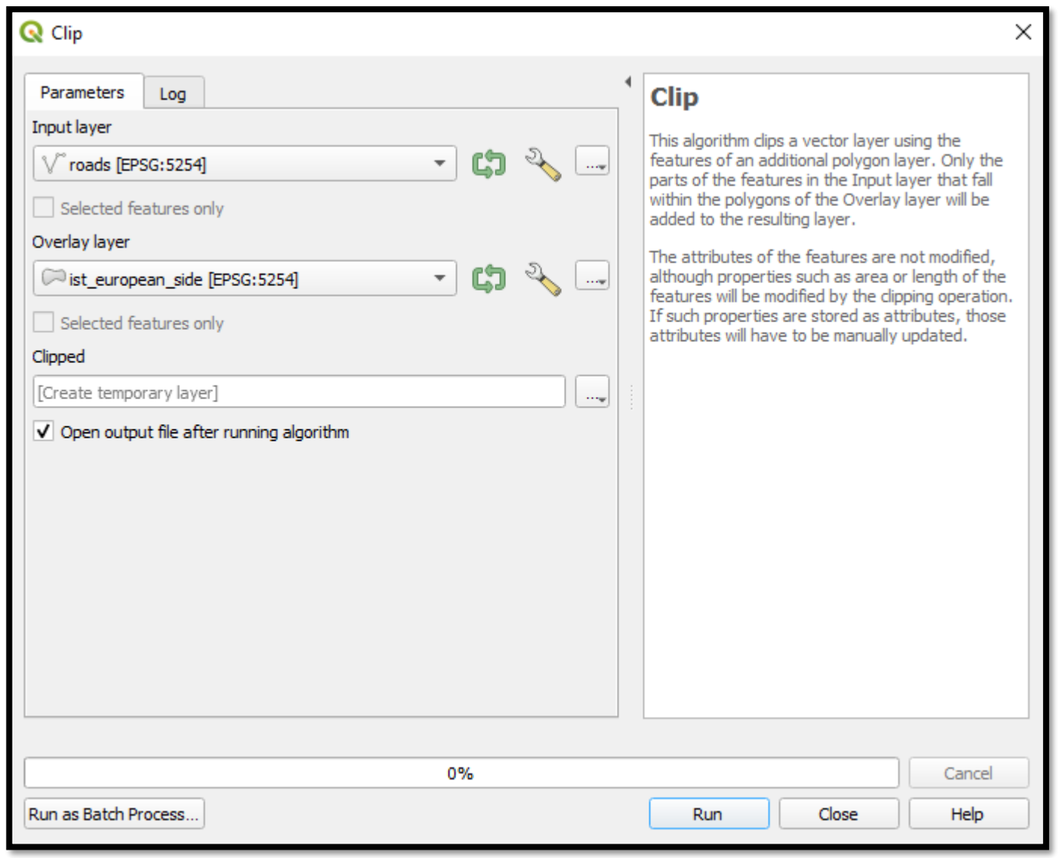
- Extracts input features that overlay the clip features.

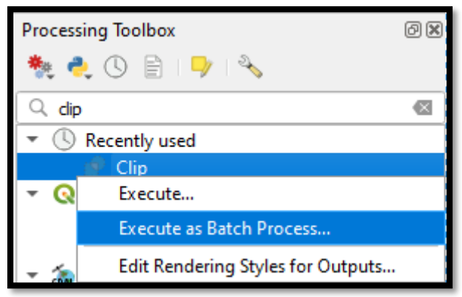




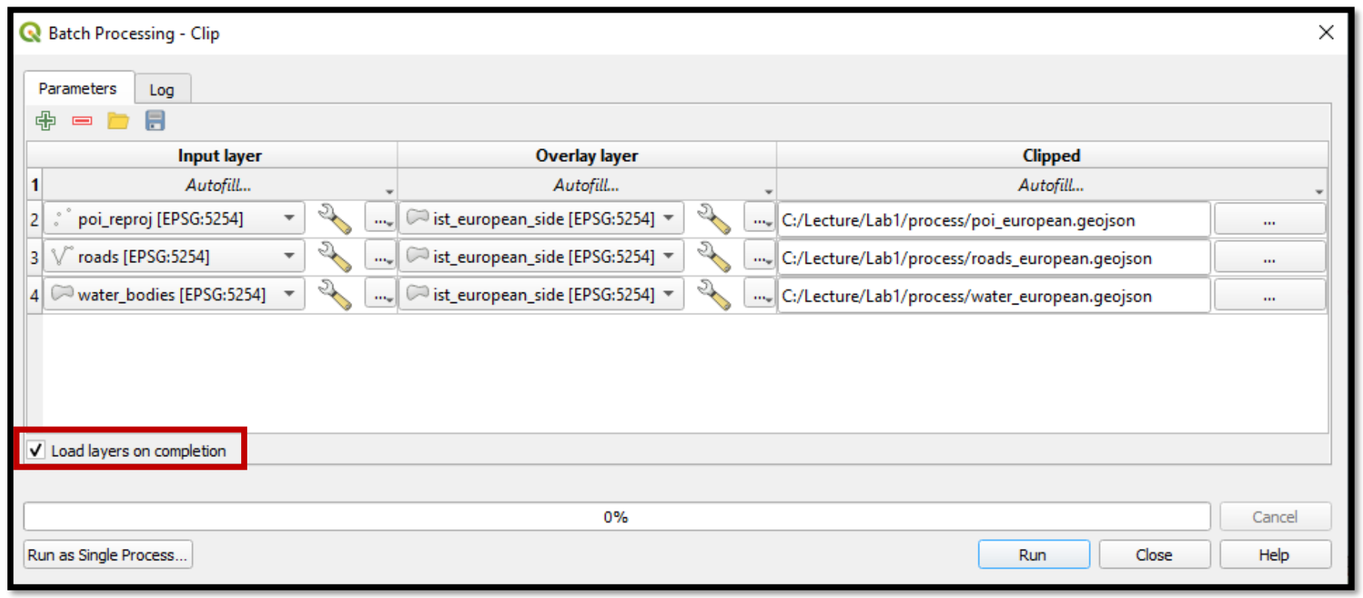
Clip Analysis

- Drag ist_european_side.geojson and clip all input data by using the extent of it

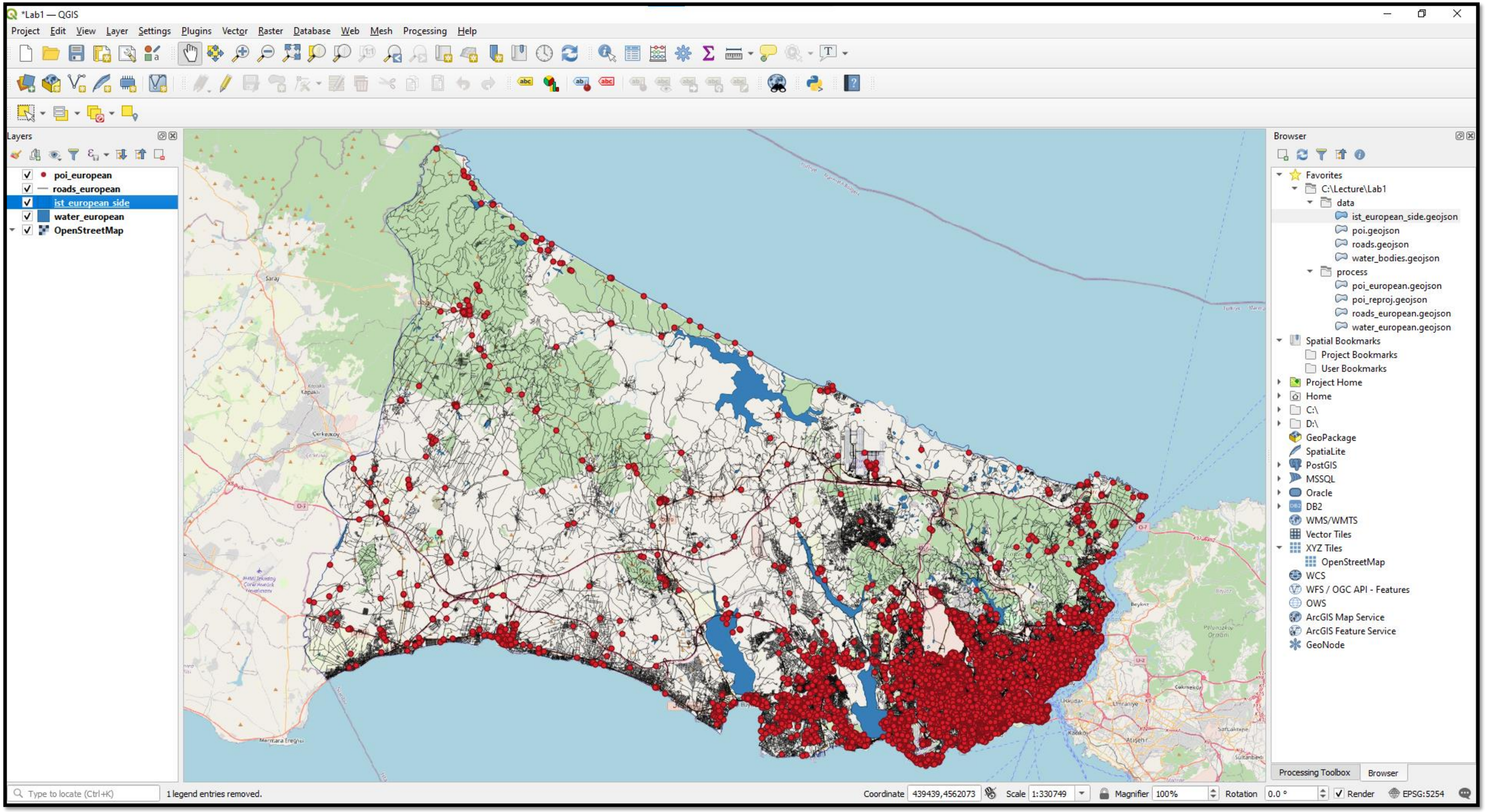




Batch Processing

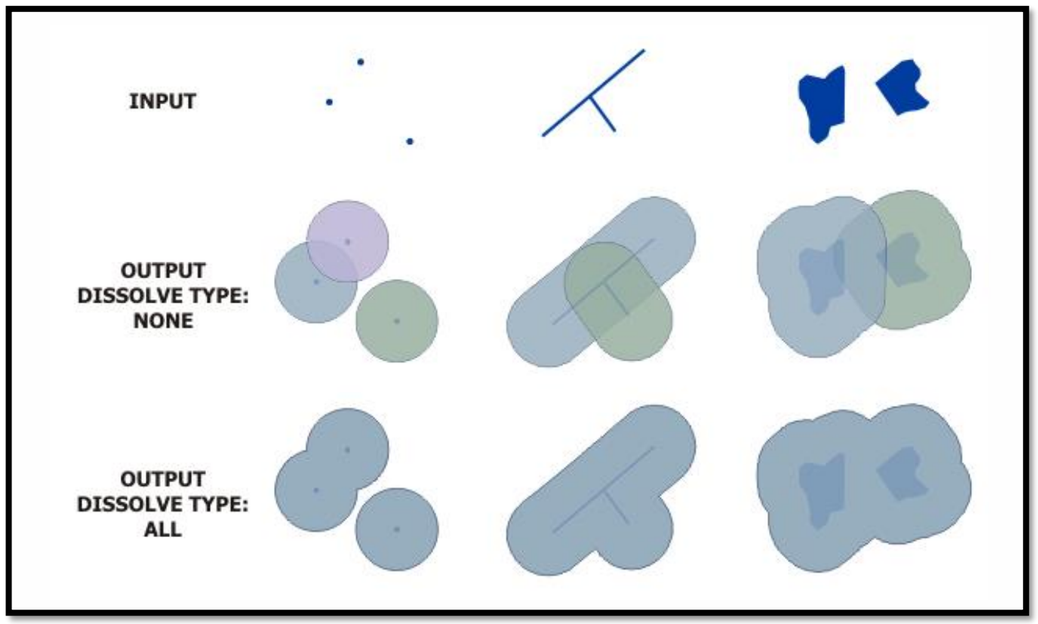


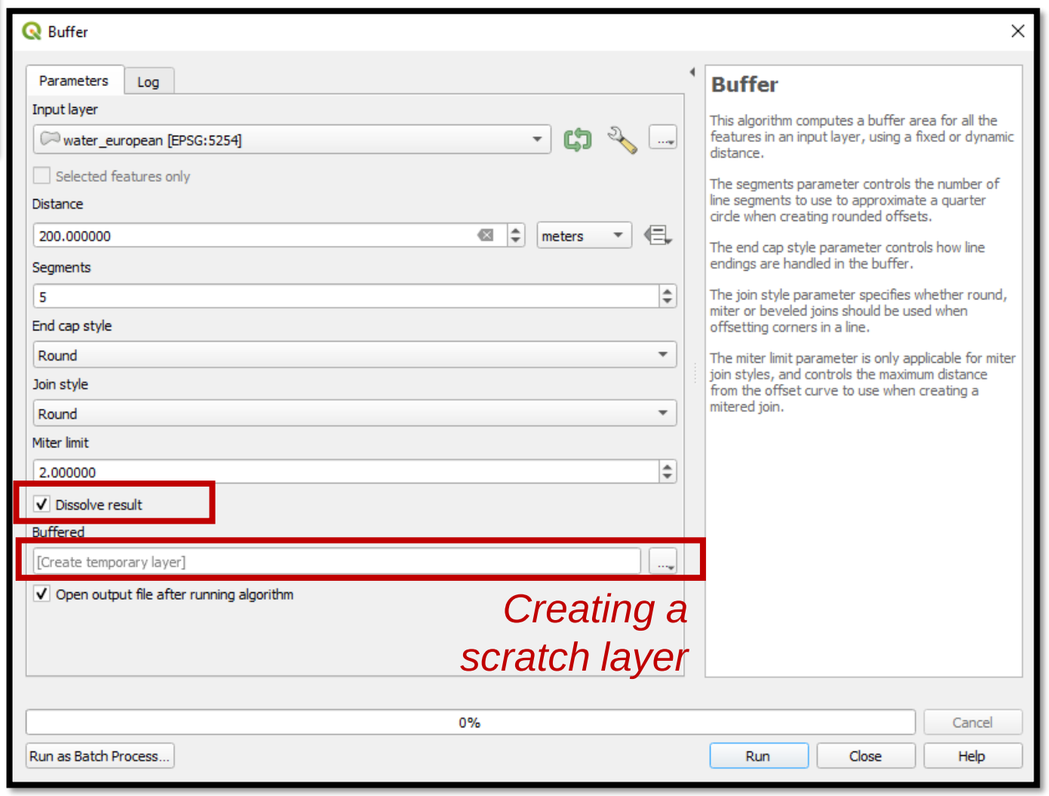
Result of Clip

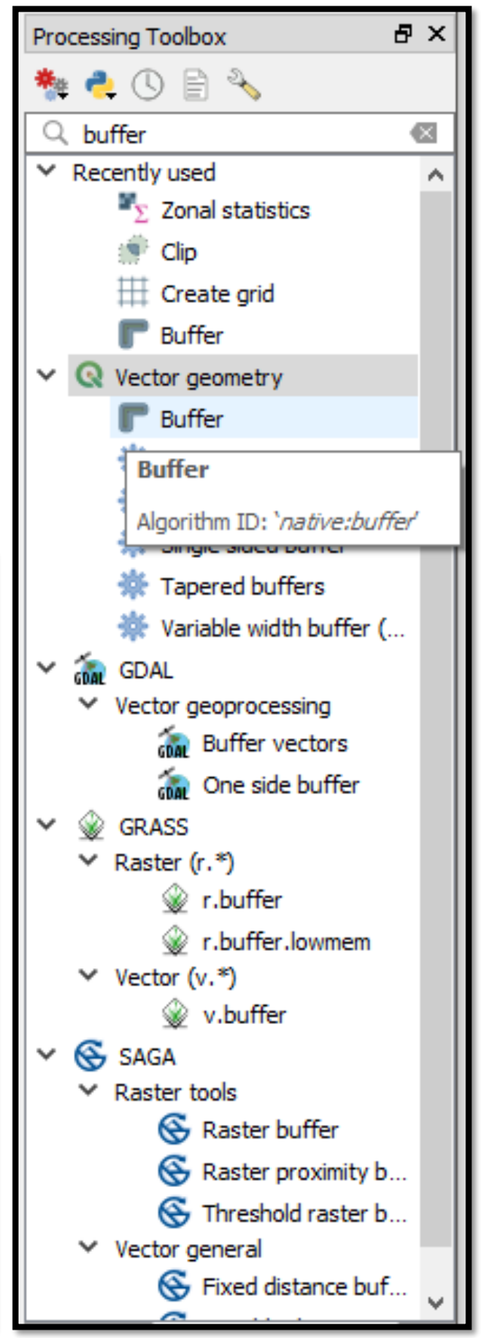


Buffer Analysis

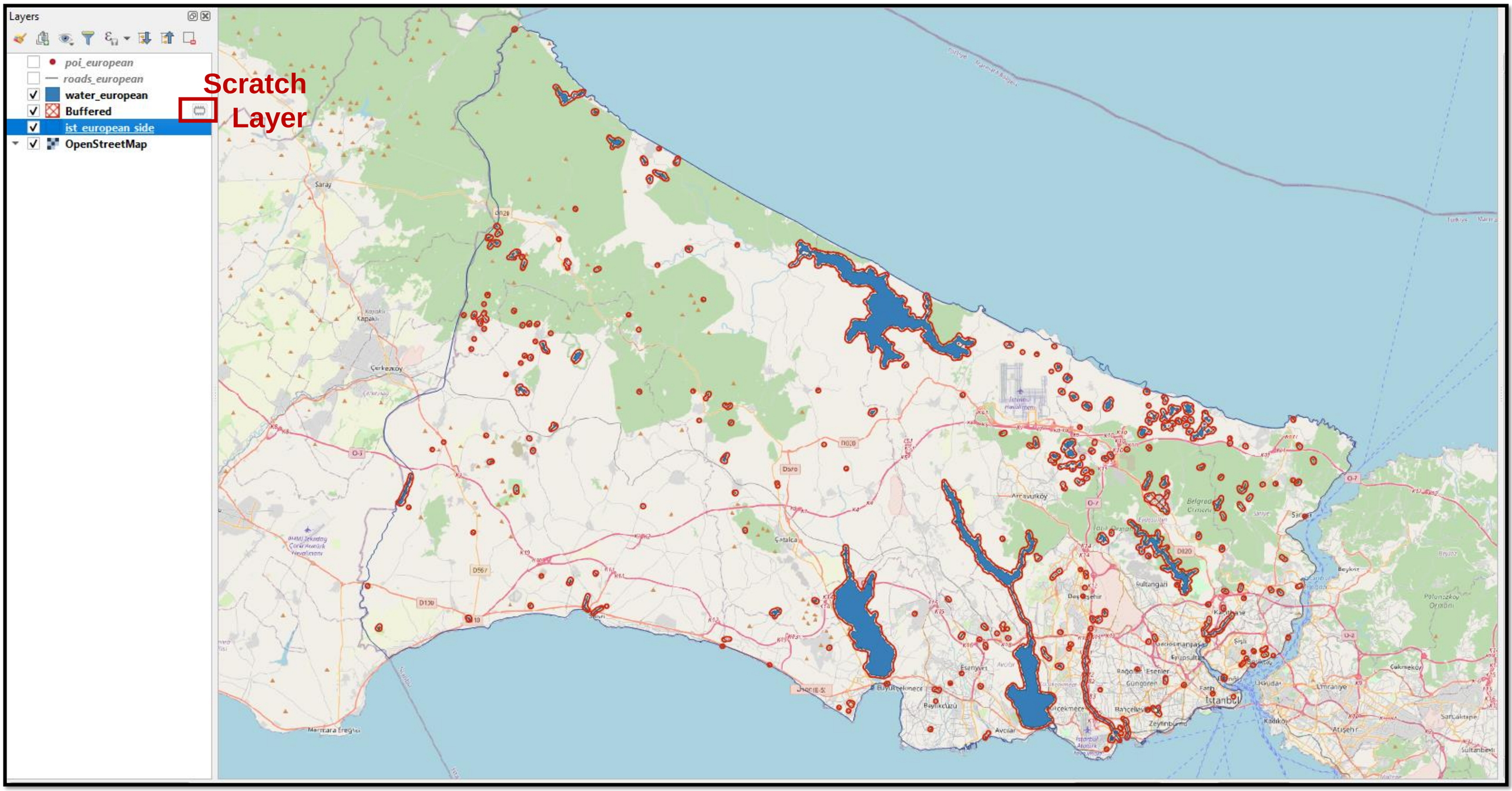
- Creates buffer polygons around input features to a specified distance.
- Use 200m buffer to water bodies to find affected places





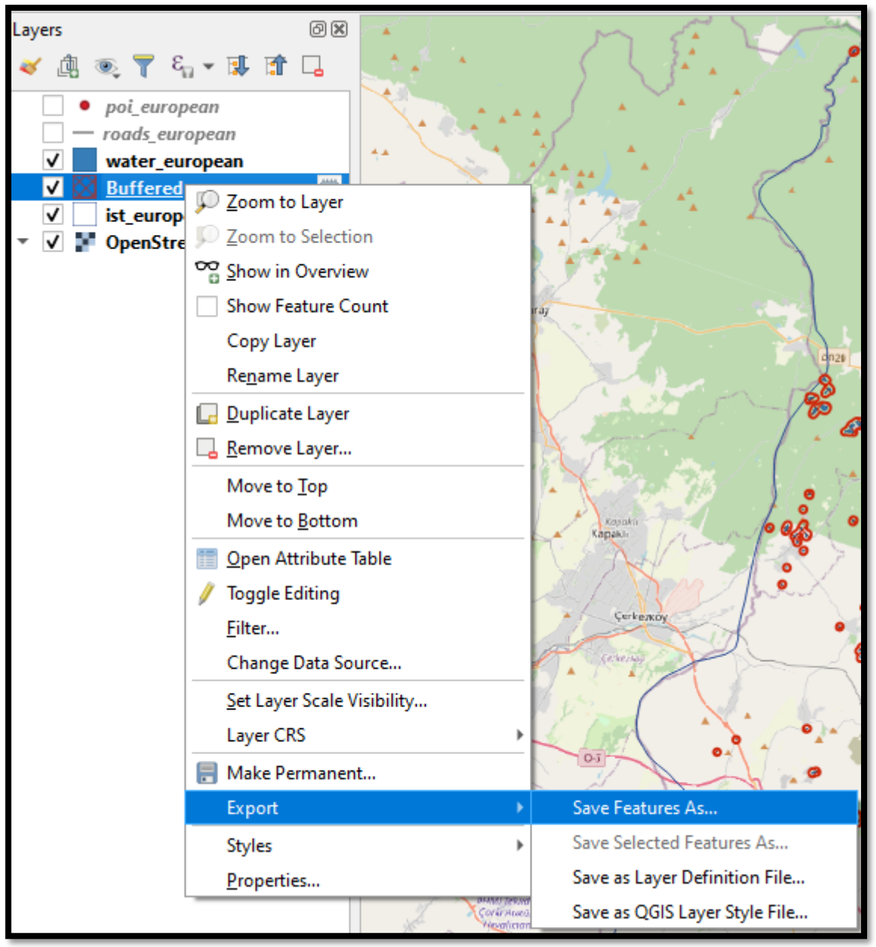


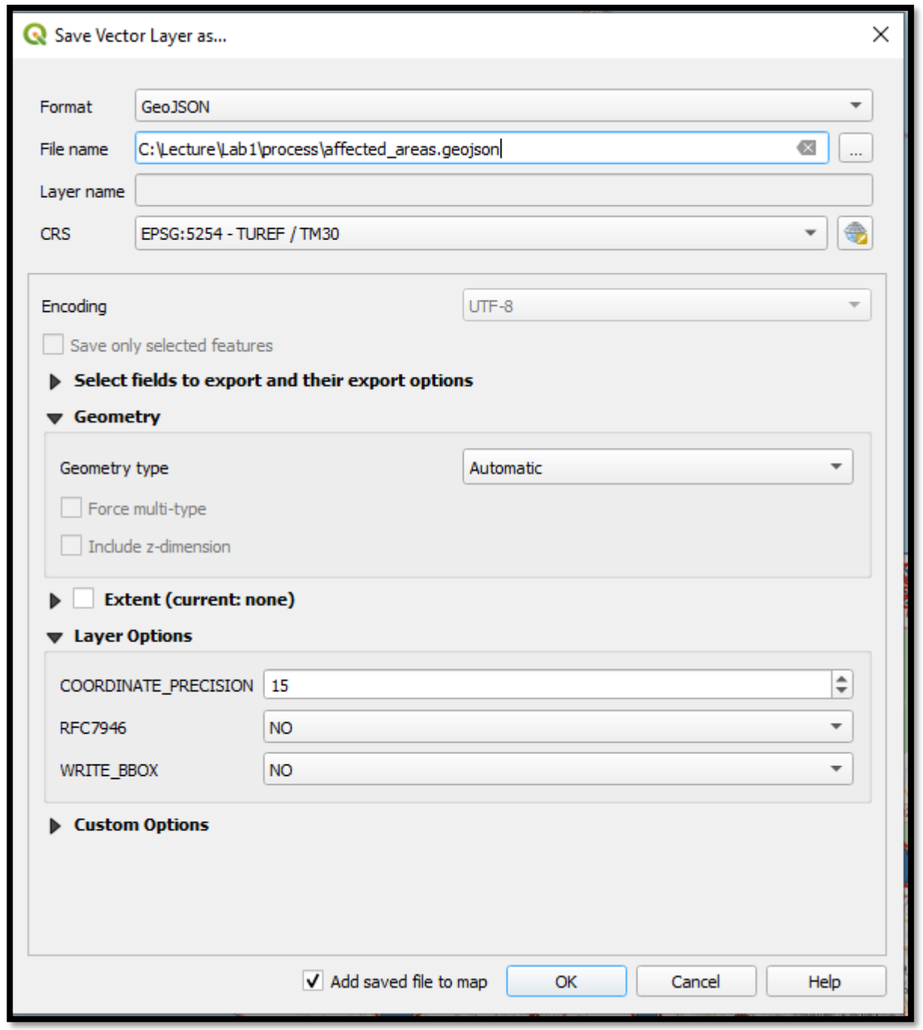
Result of Buffer



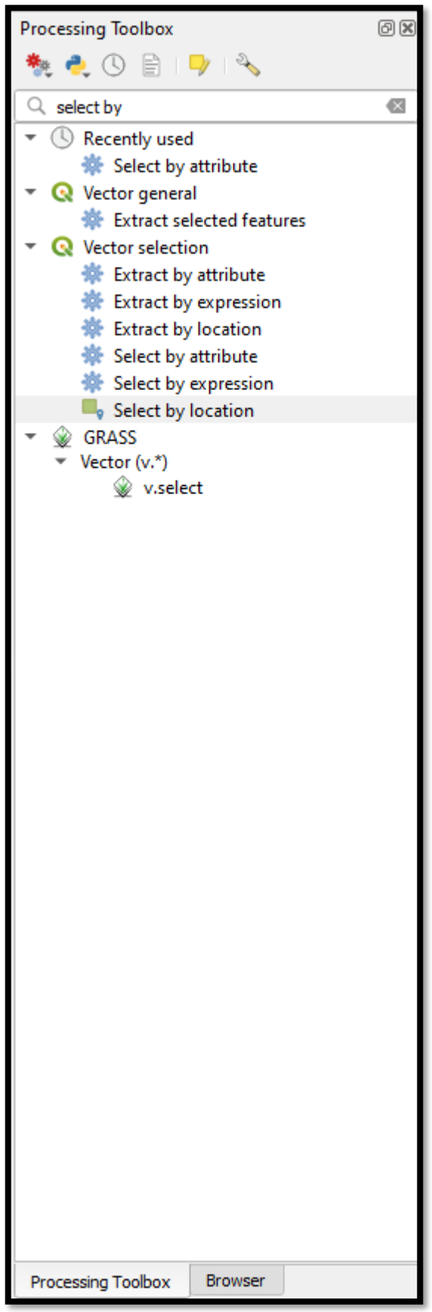
Exporting Spatial Data

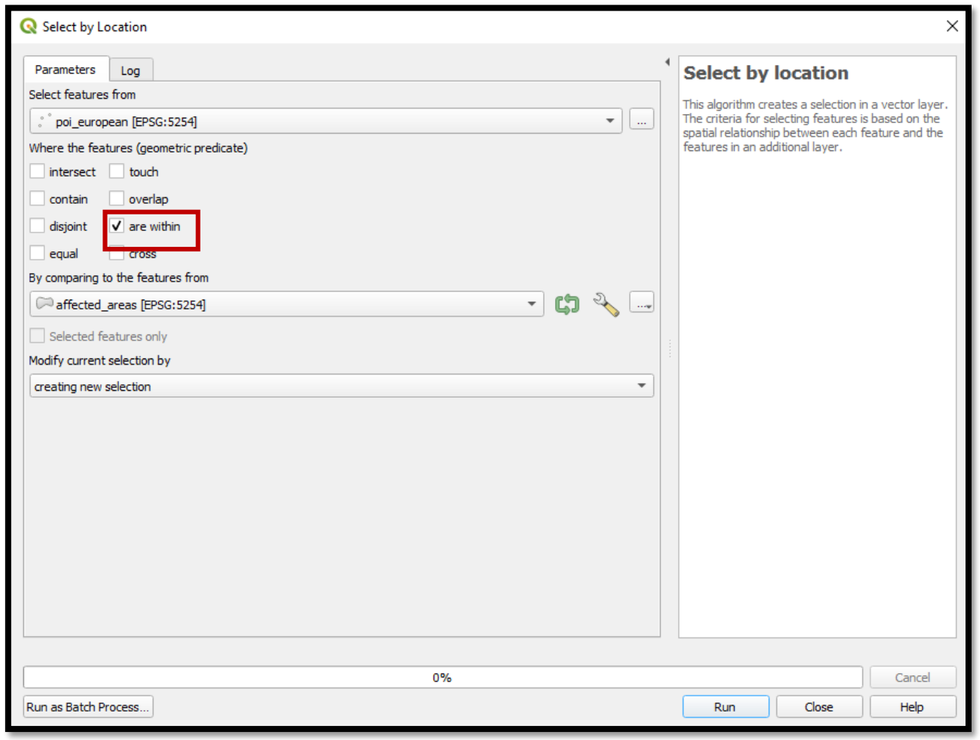
- Scratch layers are not saved into disk, they need to be exported for further uses





Select by Location / Expression



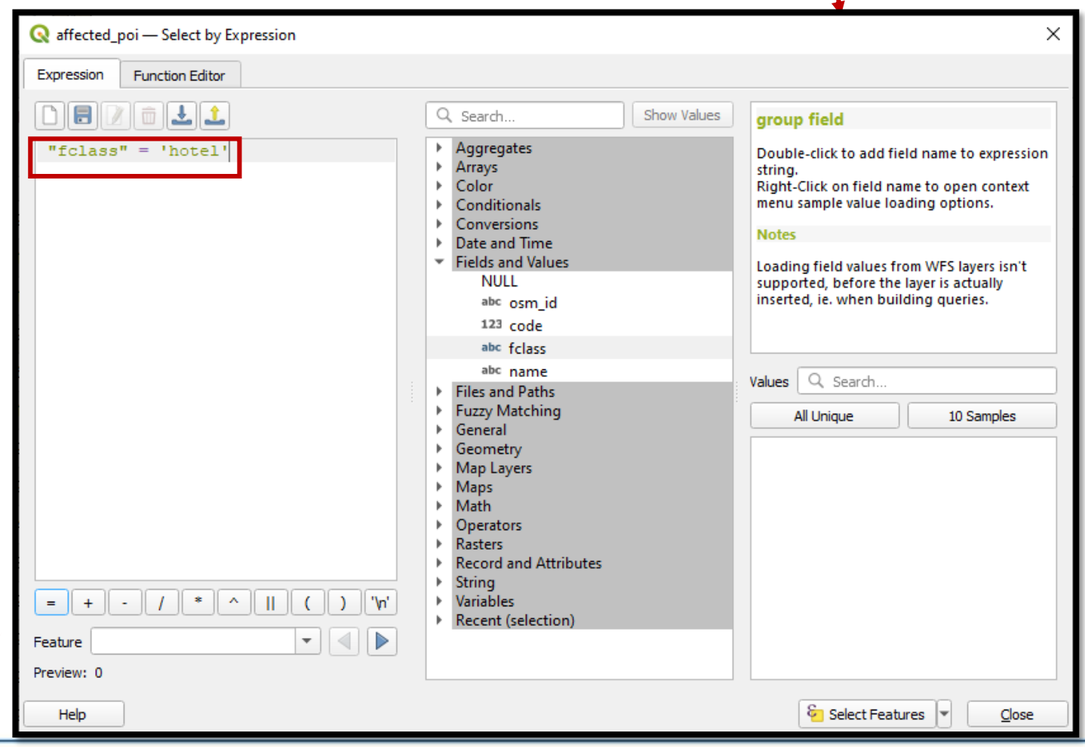


Select by Location

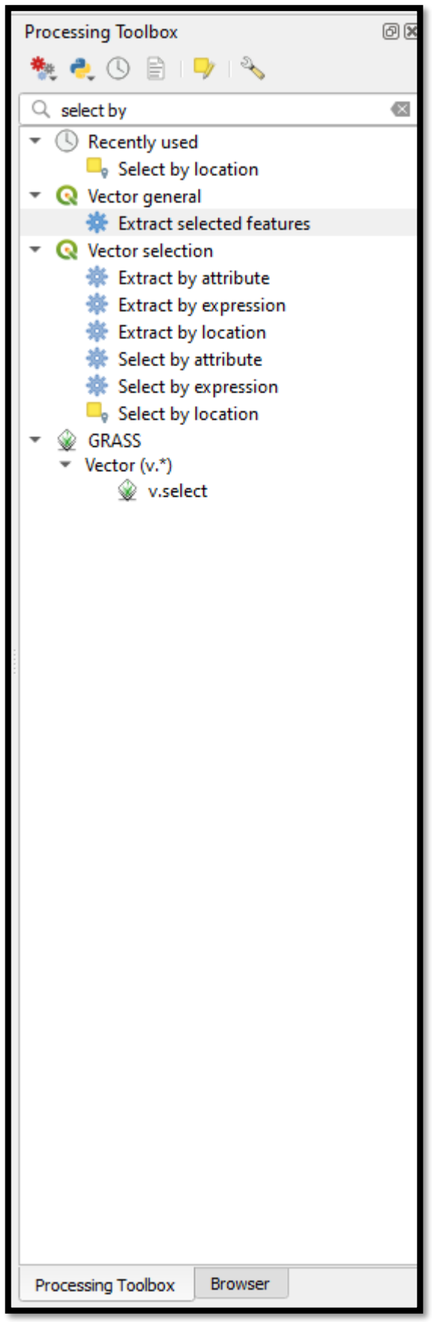
Inspect the results and export selected data as affected_poi.geojson. While exporting data, check "Save only selected features" box. Then perform a query over created feature to find hotels.

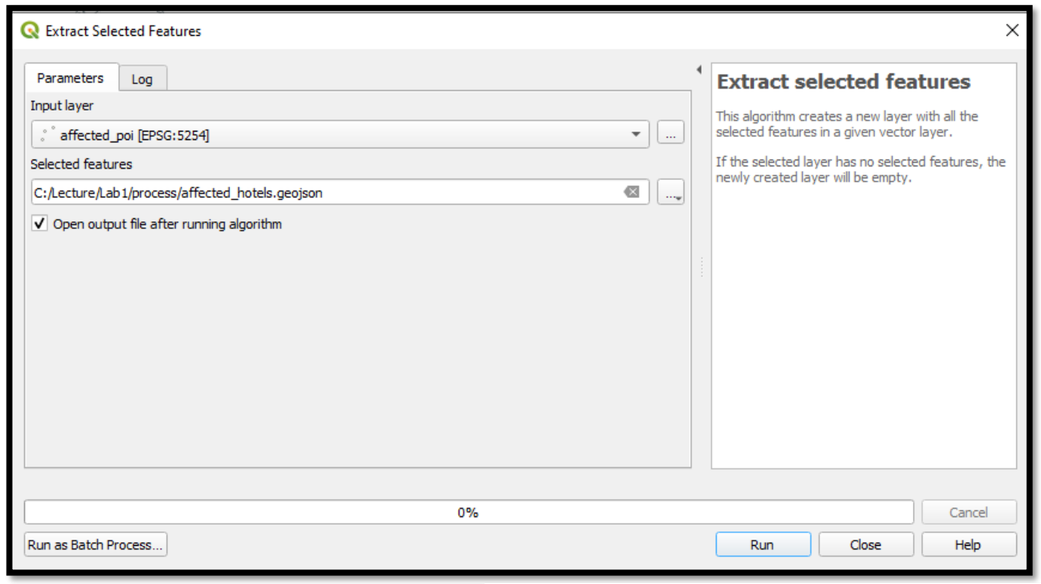
Finding hotels that will be affected by flood from POI file

Select by Expression

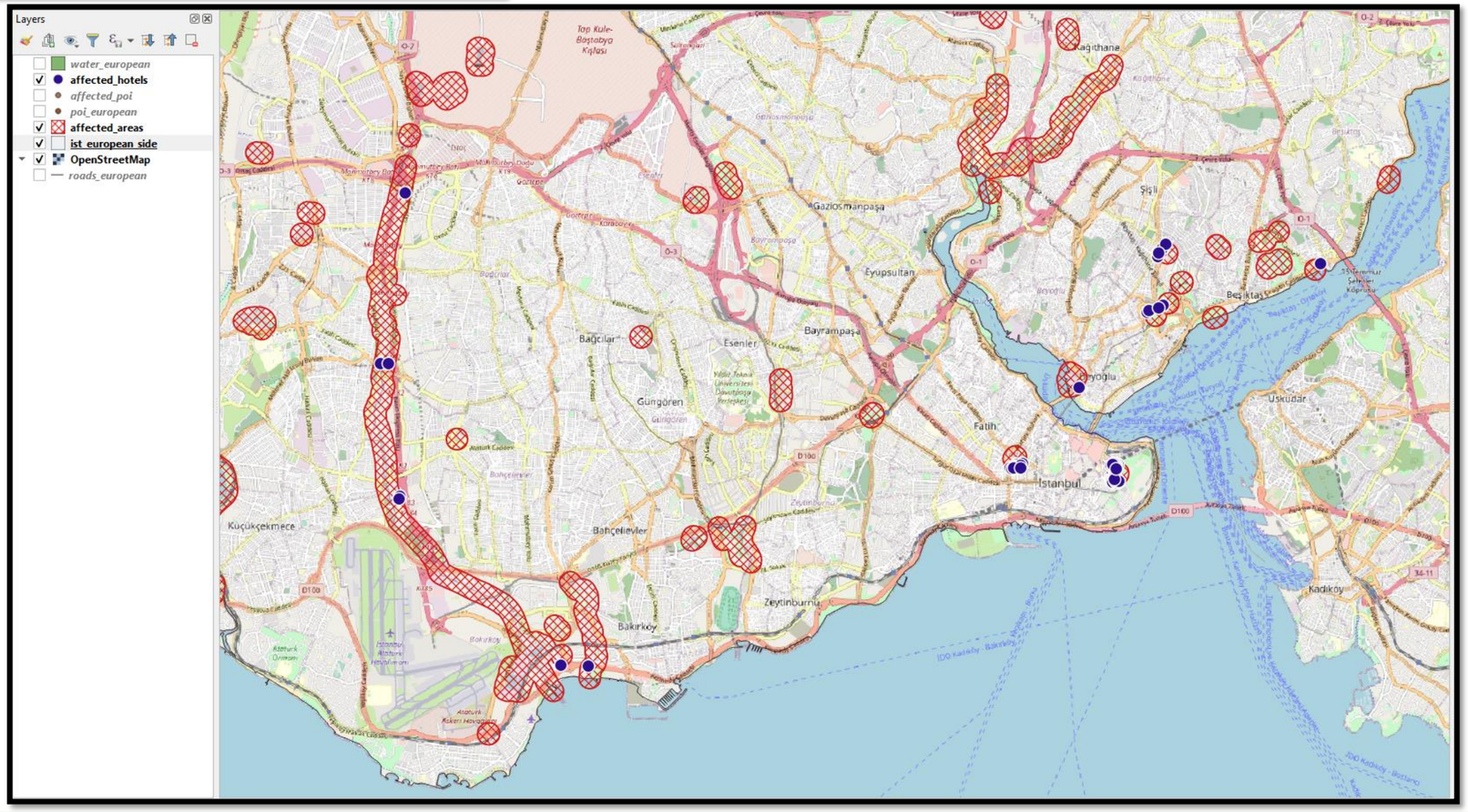


Affected Hotels

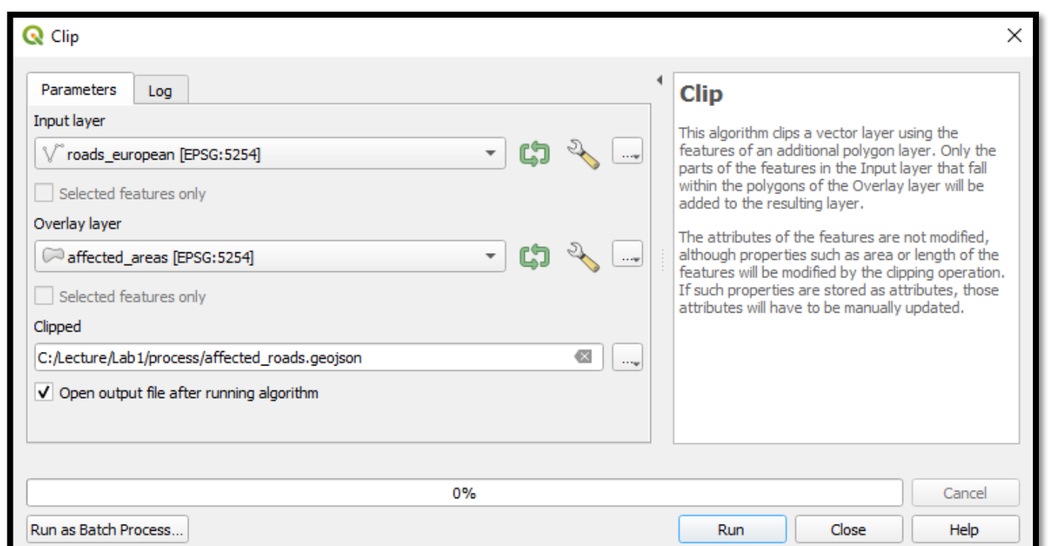


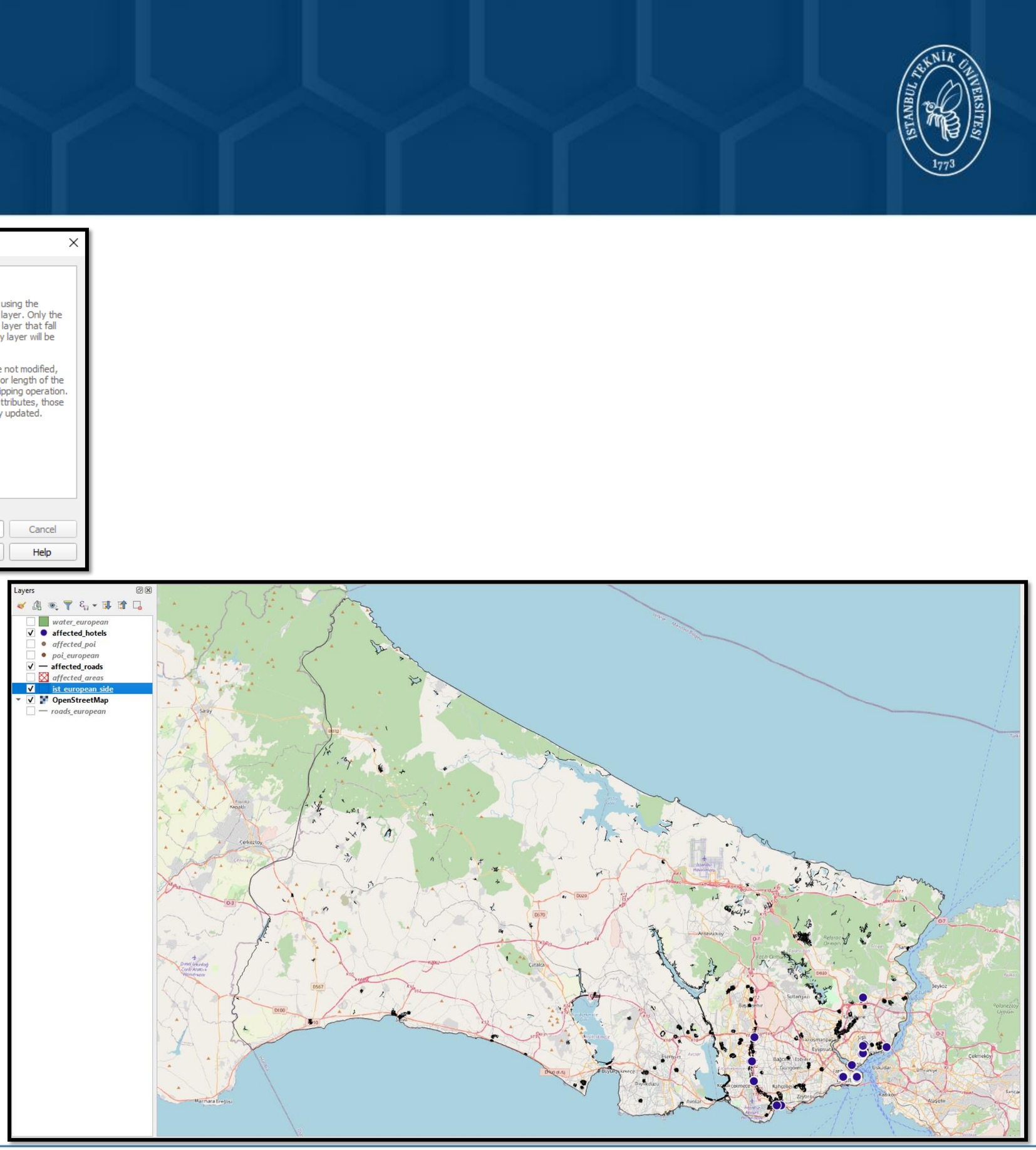


Zoom to Layer



Affected Roads





Results & Take Home

Our aims were

- *Find roads and hotels that will be affected by a possible flood event for the European side of Istanbul.*

Output Data:

- *Affected Hotels (Vector-Point/Geojson)*
- *Affected Roads (Vector-Polyline/Geojson)*
- *Affected Areas (Vector-Polygon/Geojson)*

Take Home Part

- *Find schools and pharmacies that will be affected by using 350m buffer zone.*

Contact:

akinom@itu.edu.tr