Spatial Relationships & Geometric Operations



ISTANBUL**TECHNICAL**UNIVERSITY Sp. Anly. and Alg. in GIS Week 5

Res. Assist. Ömer AKIN

Aim of the Study



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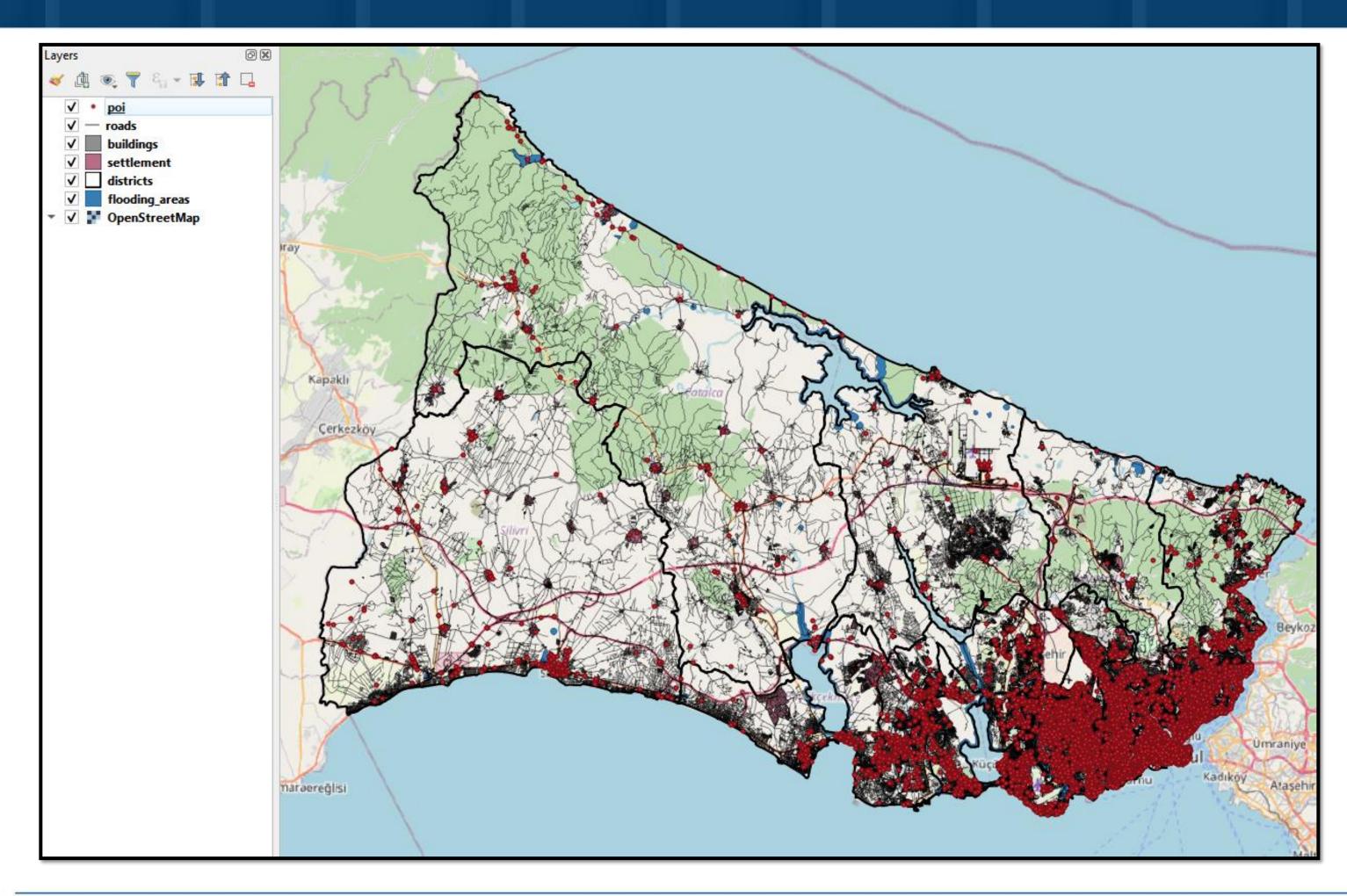
- Find and observe the different types of relationships in spatial data
- Apply geometric operations to data to enhance the understanding

Input Data:

- Data (Geopackage)
 - POI (Vector-Point)
 - Roads (Vector-Polyline)
 - Buildings (Vector-Polygon)
 - Settlement (Vector-Polygon)
 - Districts (Vector-Polygon)
 - Flooding Area (Vector-Polygon)

Exploring Data

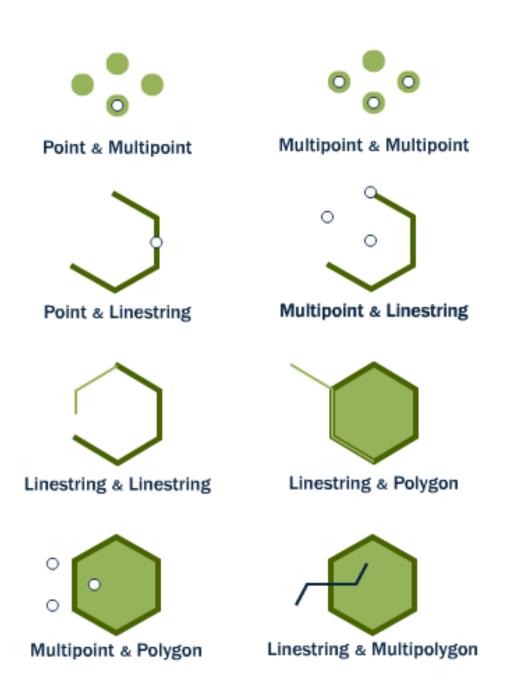


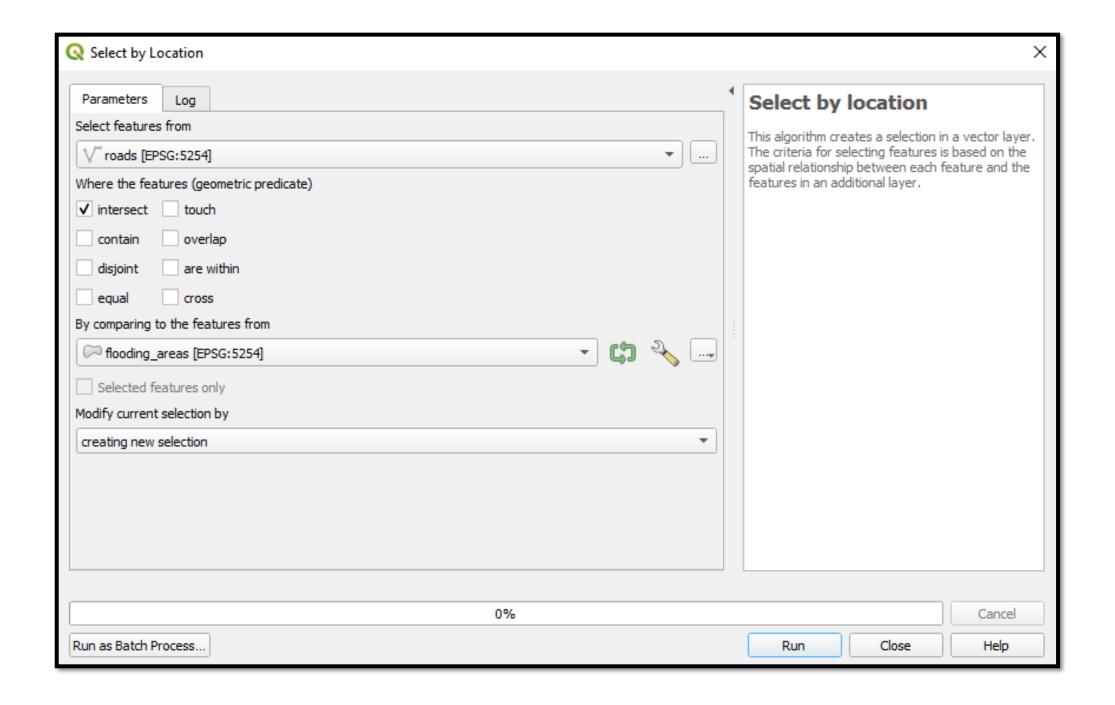


Intersect



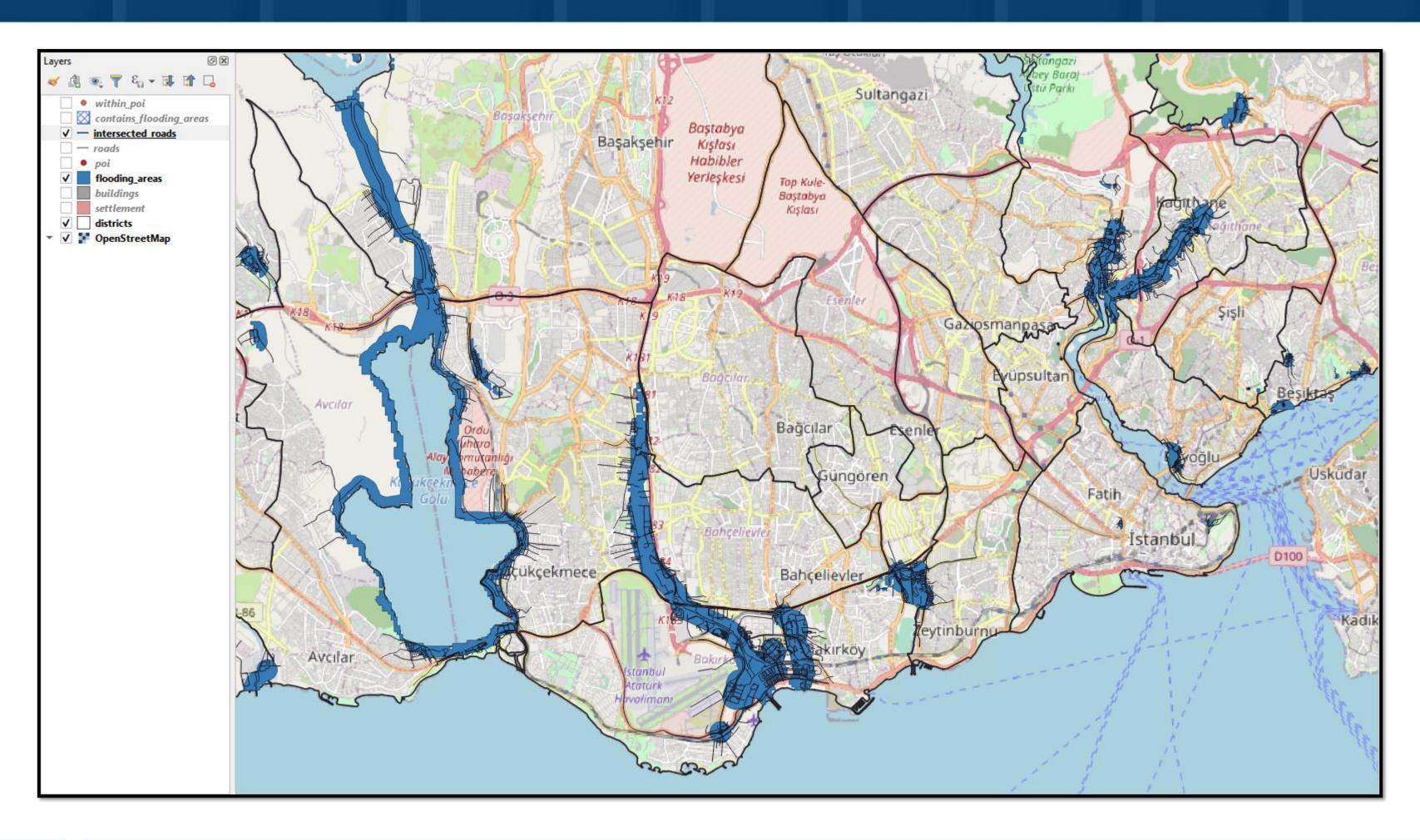
ST_Intersects(geometry A, geometry B) returns t (TRUE) if the two shapes have any space in common, i.e., if their boundaries or interiors intersect.





Intersect

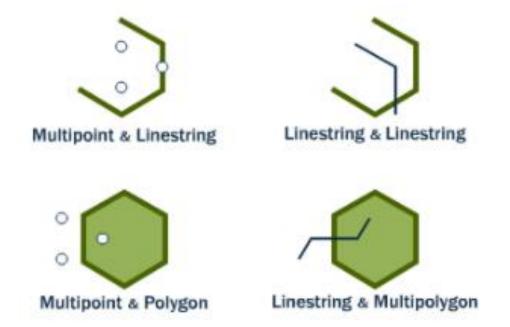


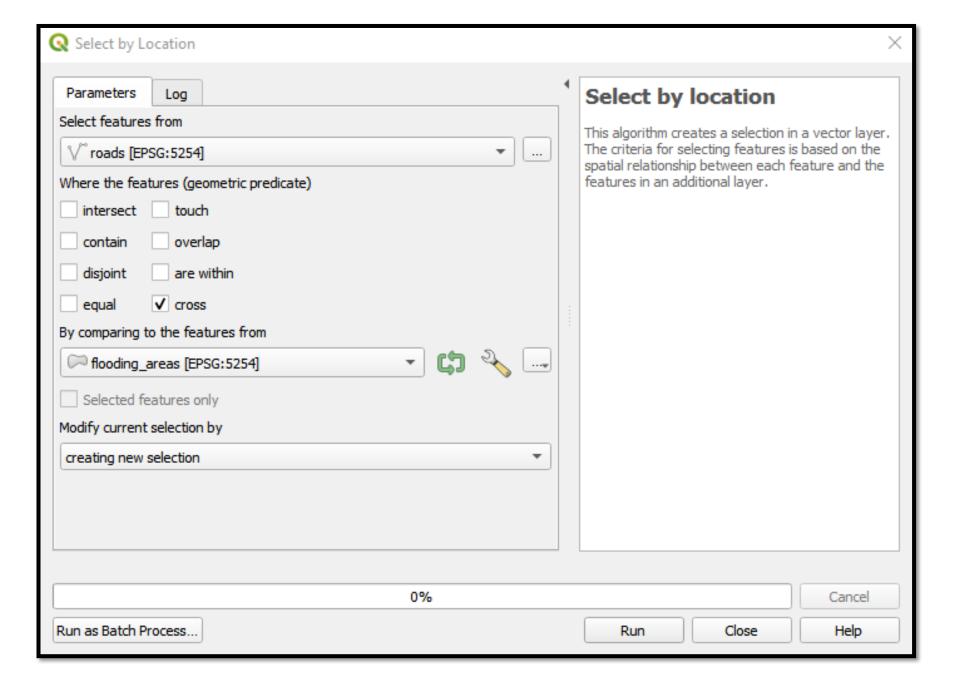


Cross



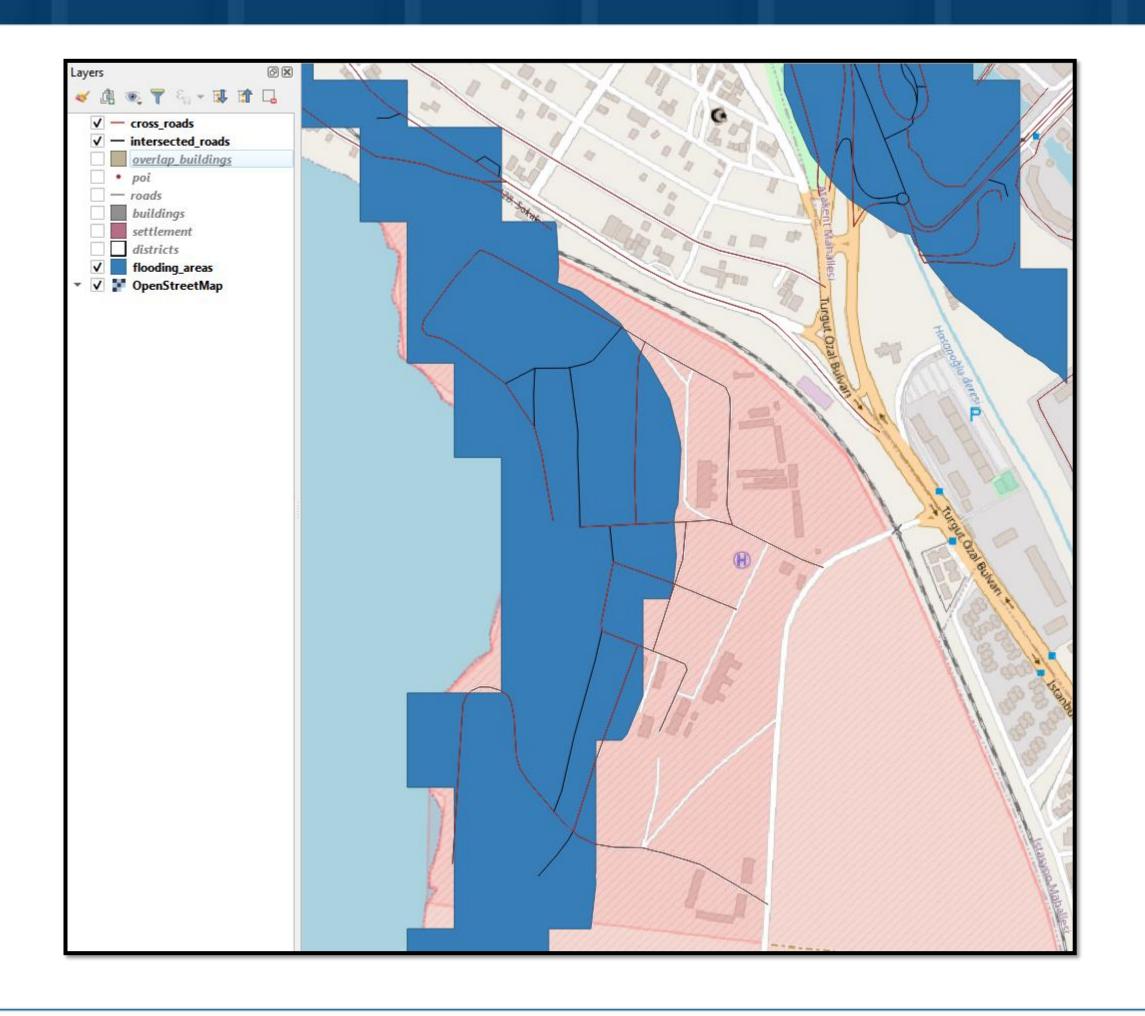
ST_Crosses(geometry A, geometry B) returns t (TRUE) if the intersection results in a geometry whose dimension is one less than the maximum dimension of the two source geometries and the intersection set is interior to both source geometries.





Cross



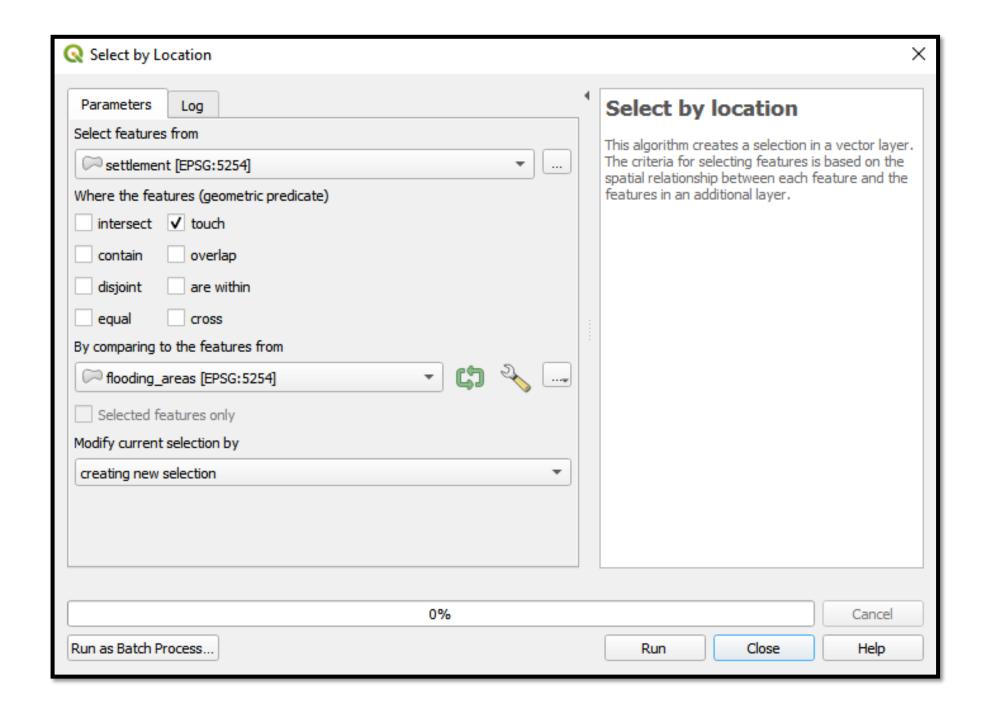


Touch



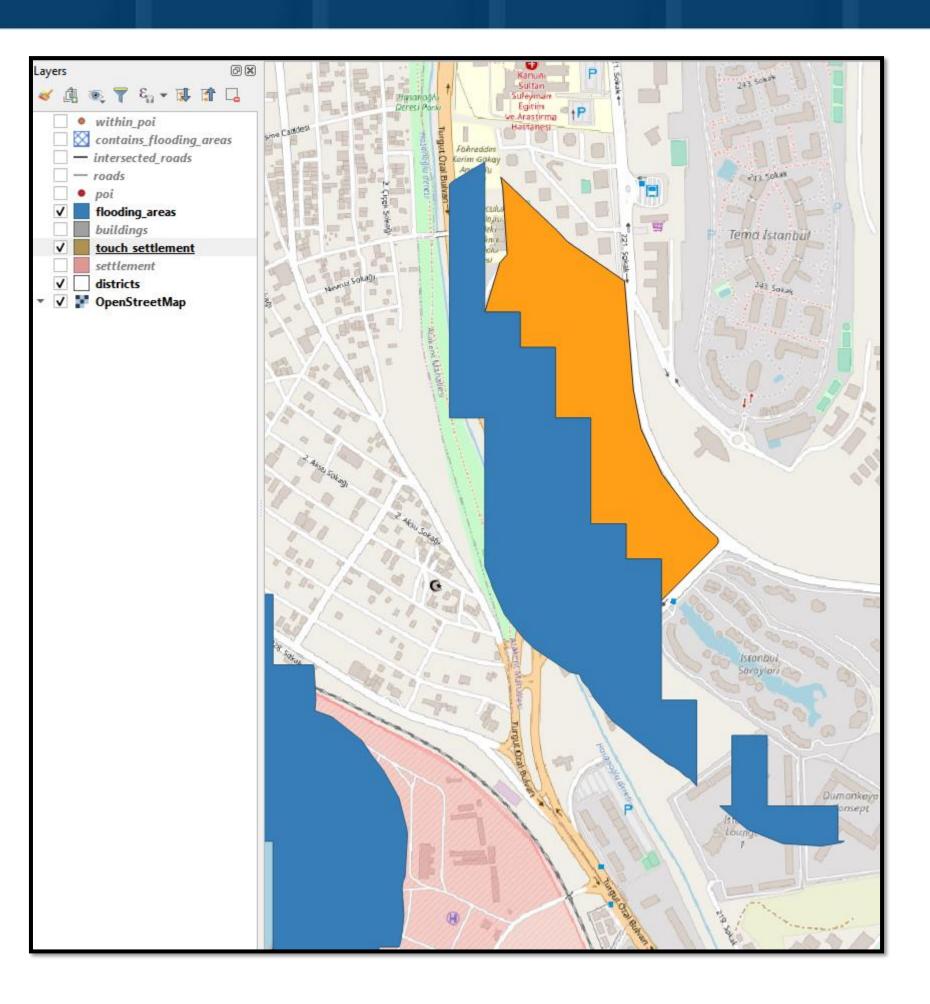
ST_Touches(geometry A, geometry B) returns TRUE if either of the geometries' boundaries intersect or if only one of the geometry's interiors intersects the other's boundary.

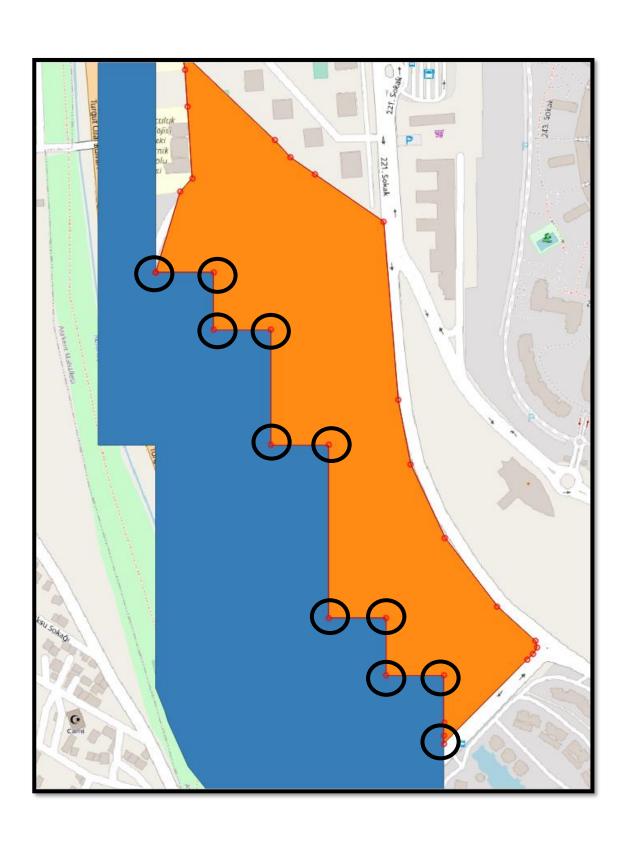




Touch





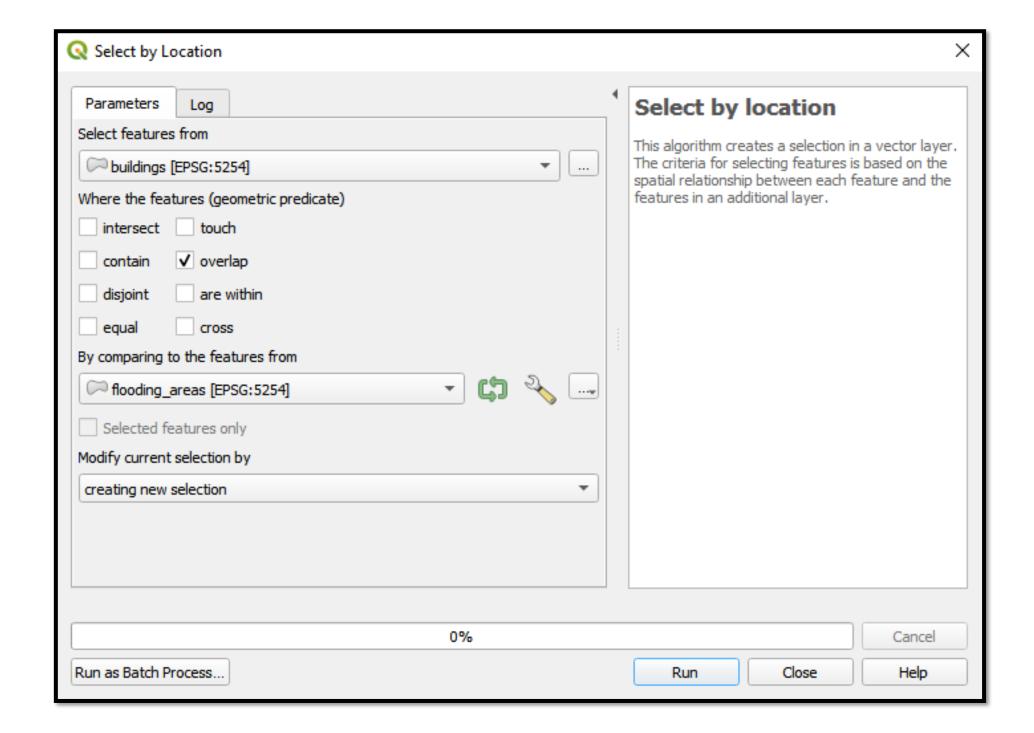


Overlap



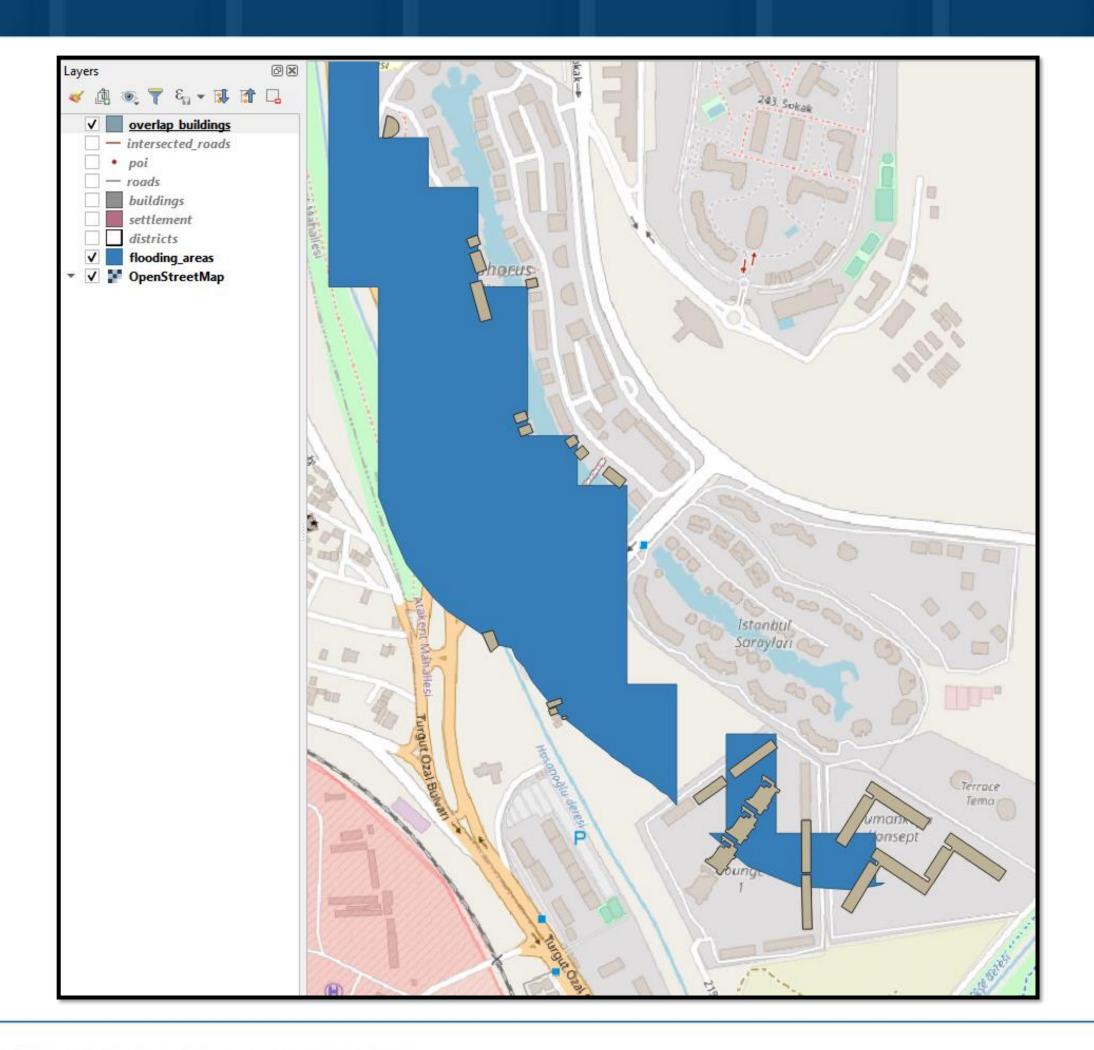
ST_Overlaps(geometry A, geometry B) compares two geometries of the same dimension and returns TRUE if their intersection set results in a geometry different from both but of the same dimension.





Overlap

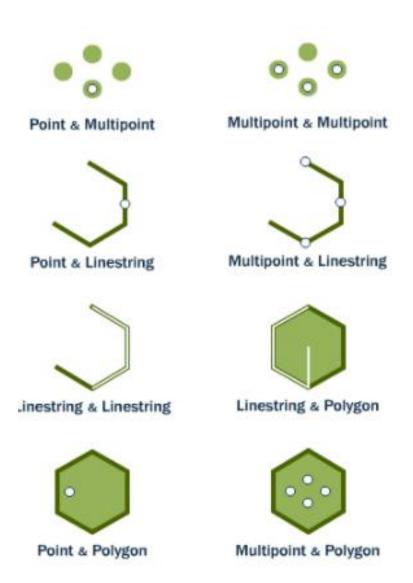


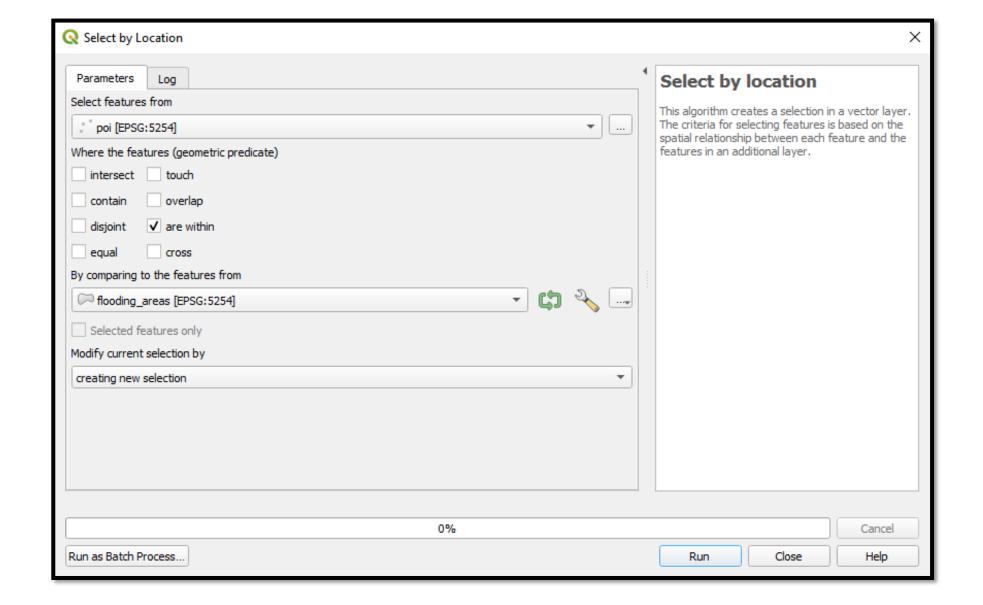


Within



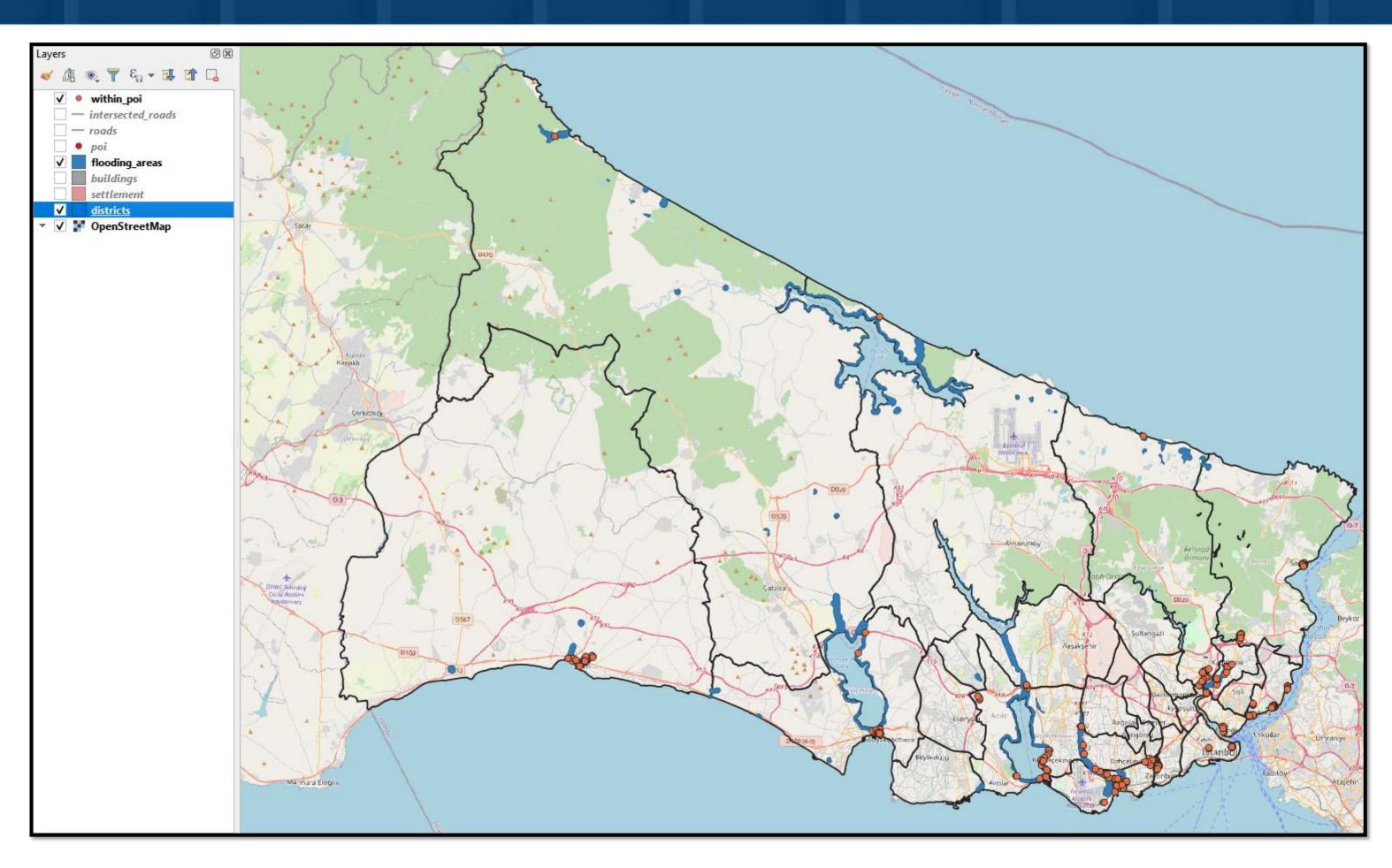
ST_Within(geometry A, geometry B) returns TRUE if the first geometry is completely within the second geometry. ST_Within tests for the exact opposite result of ST_Contains.





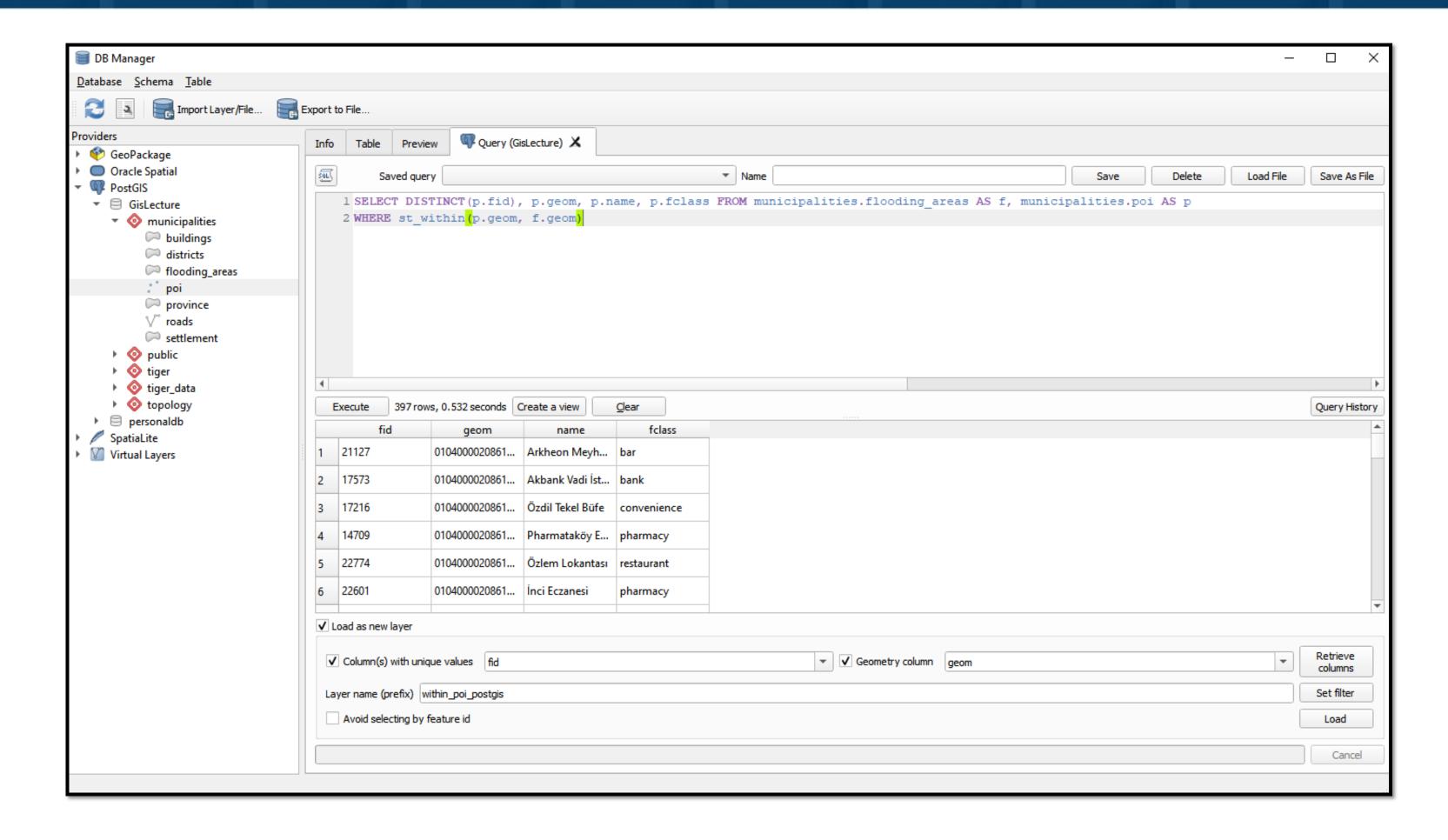
Within





Within using PostGIS

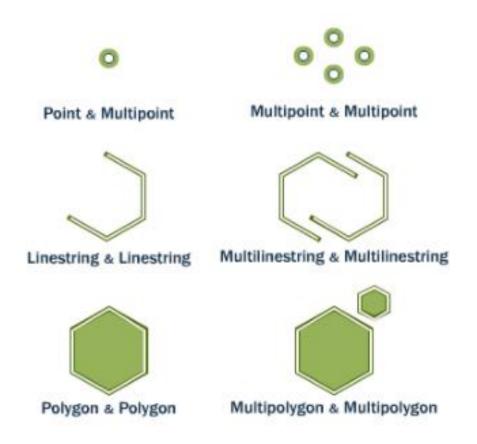


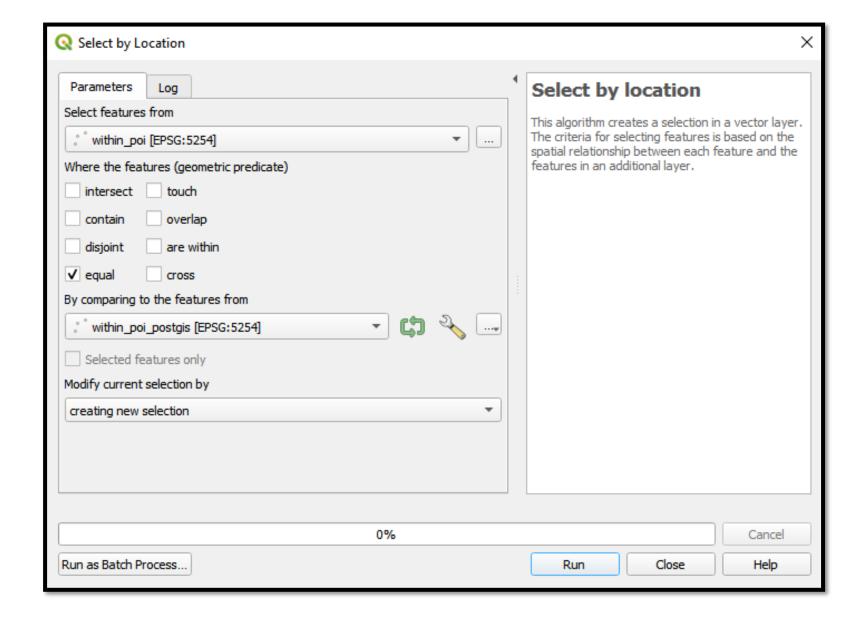


Equal



ST_Equals returns TRUE if two geometries of the same type have identical x,y coordinate values, i.e. if the second shape is equal (identical) to the first shape.





Equal

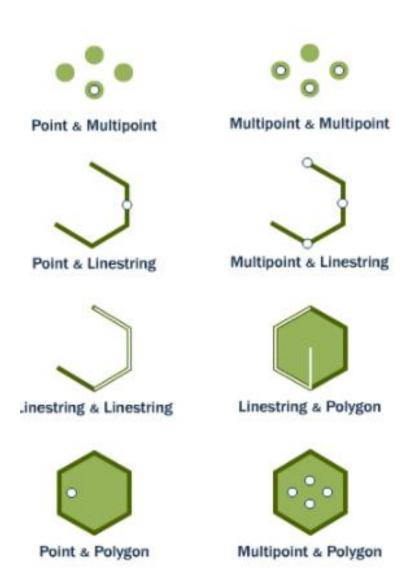


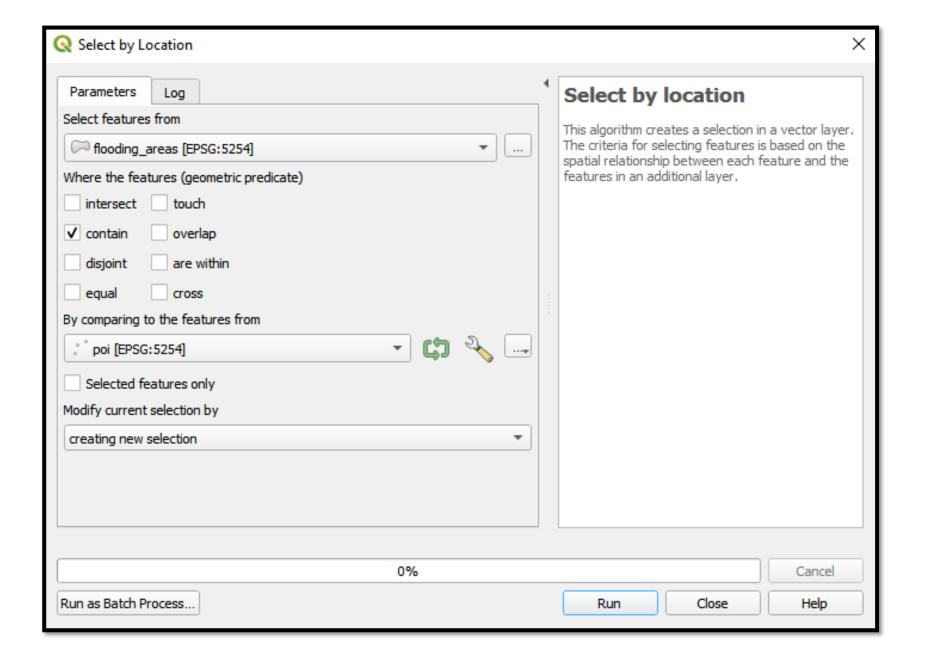
Q	within_poi — Featu	ures Total: 397, Filt	ered: 397, Selected: 3	397				_	
/	7 6 C 15	· · · · · · · · · · · · · · · · · · ·	8 8 0	🌡 🕇 🏗 🌺 .			R.		
	id	fid	osm_id	code	fclass	name	d_id		
1	17173	17173	6307790685	2303	cafe	Biz Bize Çay Ba	13		
2	2066	2066	4948245826	2422	camp_site	Terkos kamp	5		
3	16136	16136	4827740541	2101	pharmacy	Haliç Eczanesi	34		
1	16137	16137	4827740542	2101	pharmacy	Birgül Eczanesi	34		
,	16138	16138	4827740543	2101	pharmacy	Büyük Eczanesi	34		
5	17711	17711	7443741186	2907	camera_surveill	NULL	14		
7	4683	4683	6424090393	2401	hotel	NULL	27		
3	16646	16646	7371824085	2401	hotel	فندق بولما	11		
)	14562	14562	4440045657	2543	doityourself	Tekzen	30		
0	3114	3114	5667641524	2525	mobile_phone	Turkcell	8		
1	14032	14032	5958061185	2405	hostel	NULL	29		
2	1522	1522	7264036788	2907	camera_surveill	NULL	1		
3	3119	3119	5667641532	2544	furniture_shop	Koşar mobilya	8		
4	22882	22882	2282050727	2902	bench	NULL	38		
5	14570	14570	4441188291	2101	pharmacy	Altın Eczanesi	30		
6	22884	22884	2282196088	2741	picnic_site	Paşaeli Picnic Site	38		
_	Show All Features								

Contain



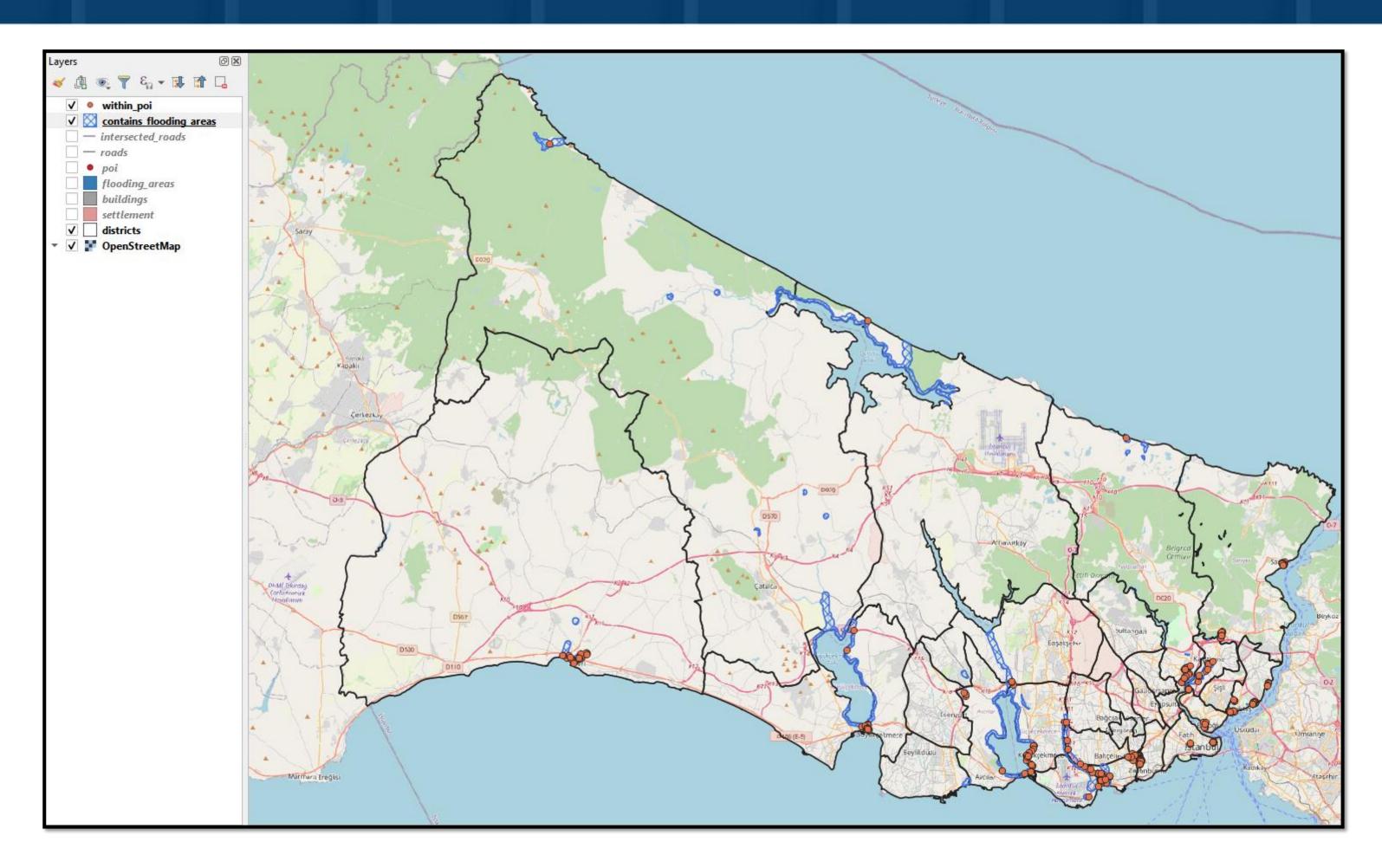
ST_Contains(geometry A, geometry B) returns TRUE if the second geometry is completely contained by the first geometry.





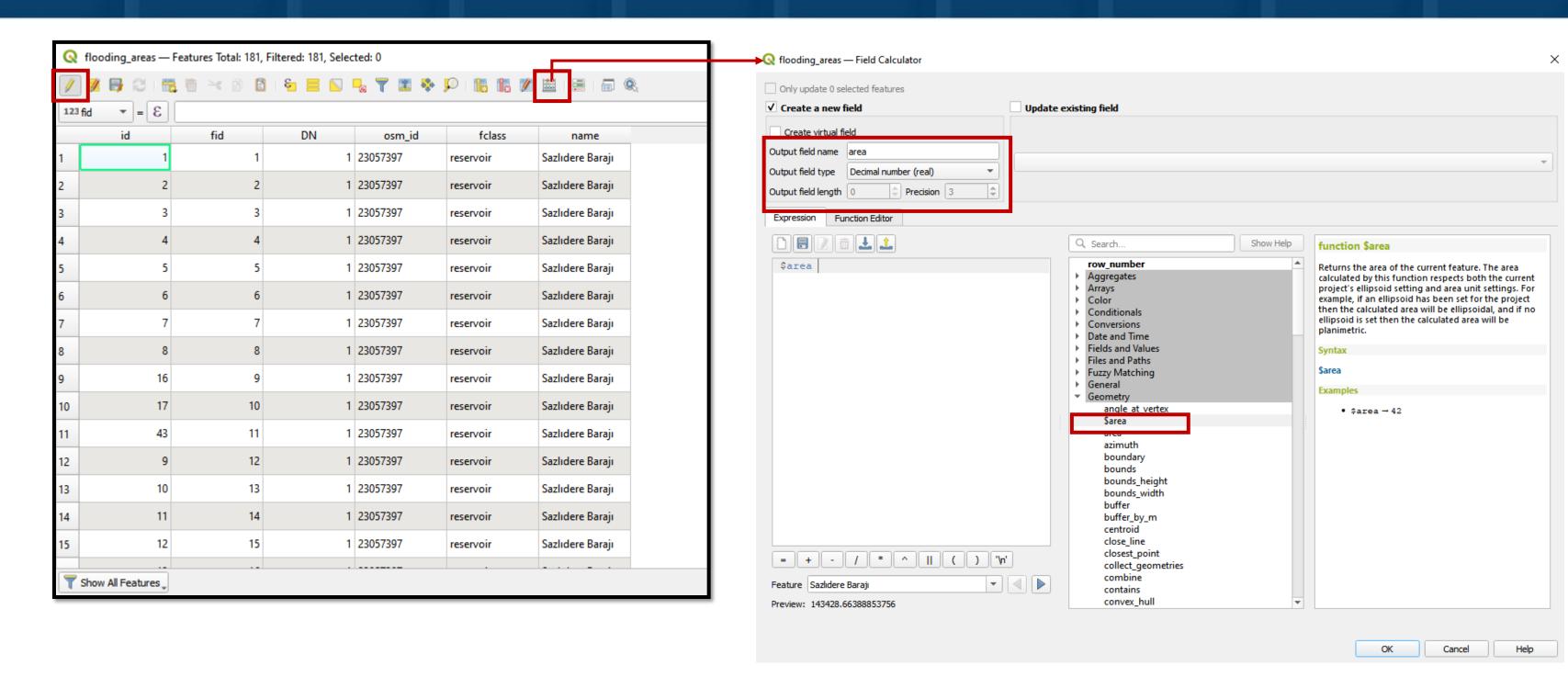
Contain





Area & Distance Calculations

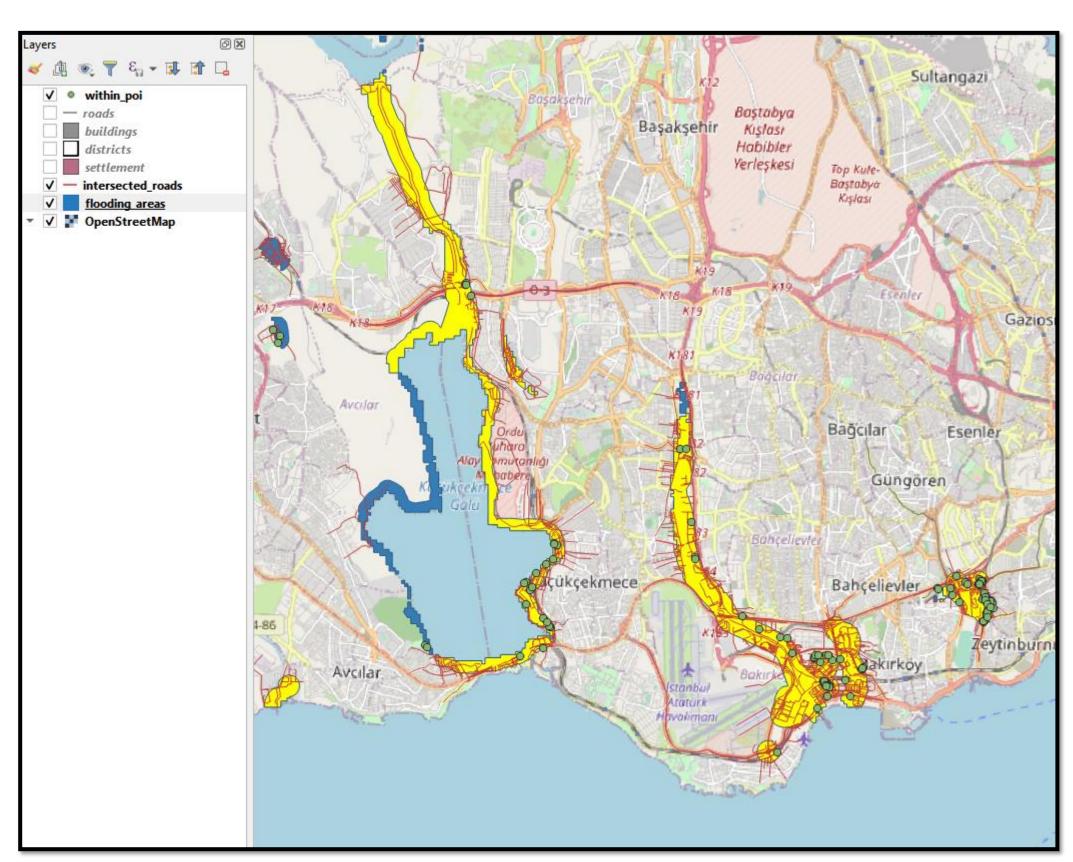




New Column named "area" is added showing corresponding areas of each polygon

Convex Hull

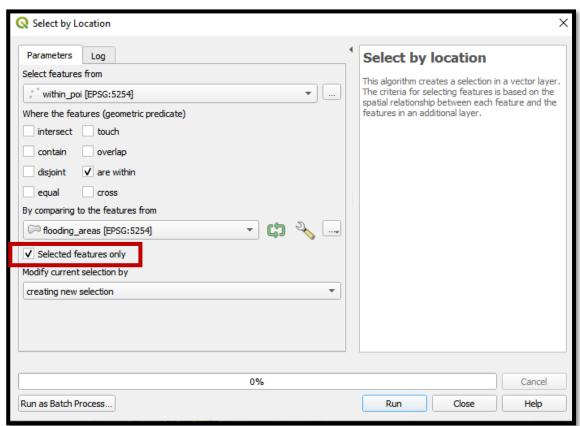




Select the polygon feature by hand with using



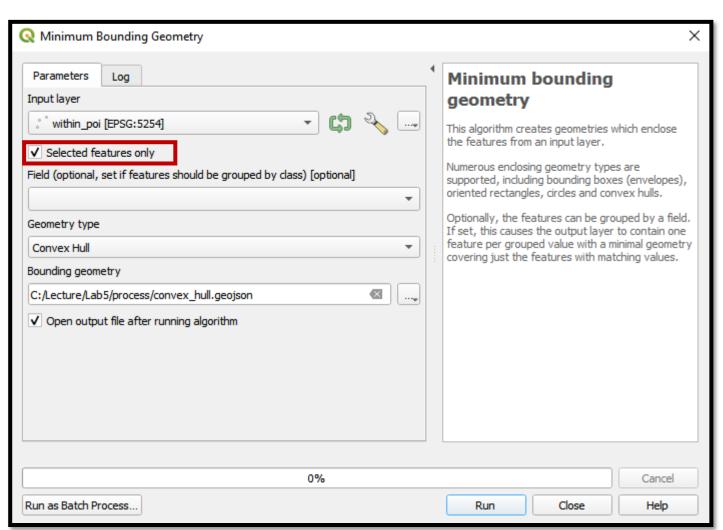
and apply "within" by using only selected features

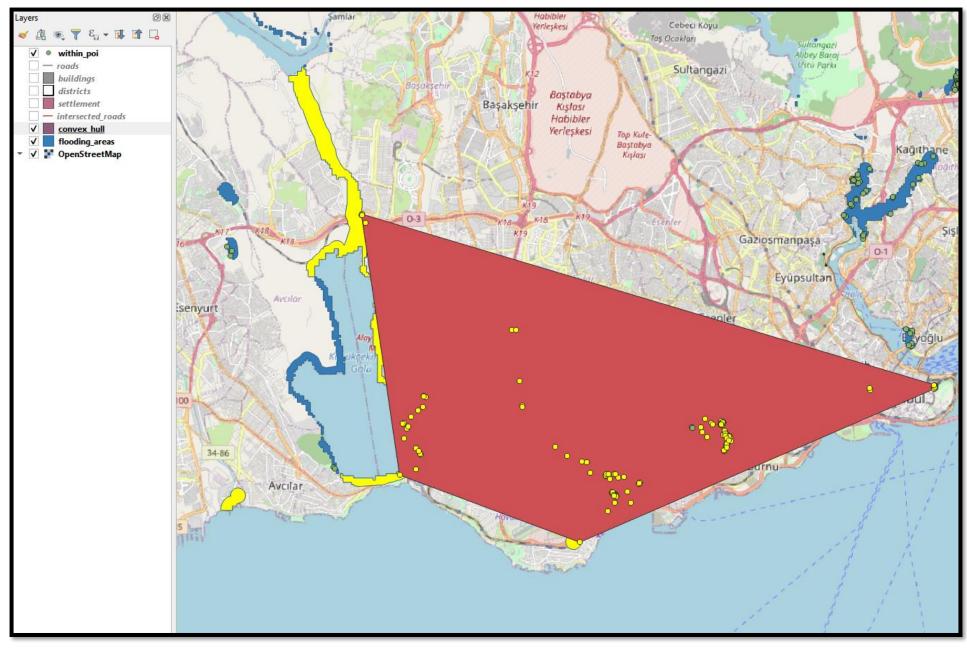


^{*} To see how Convex Hull algorithm works, check: https://github.com/omrakn/randomalgorithms/tree/master/convexhull

Convex Hull

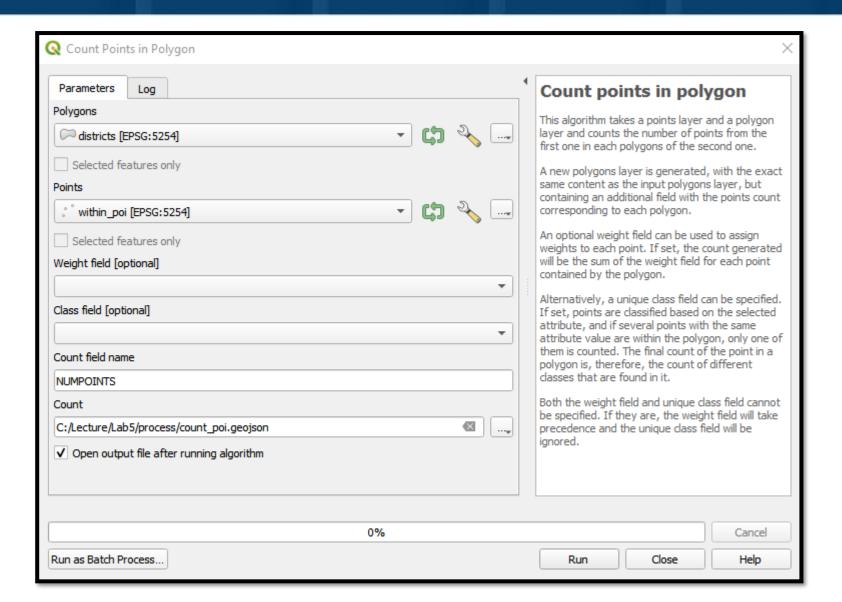


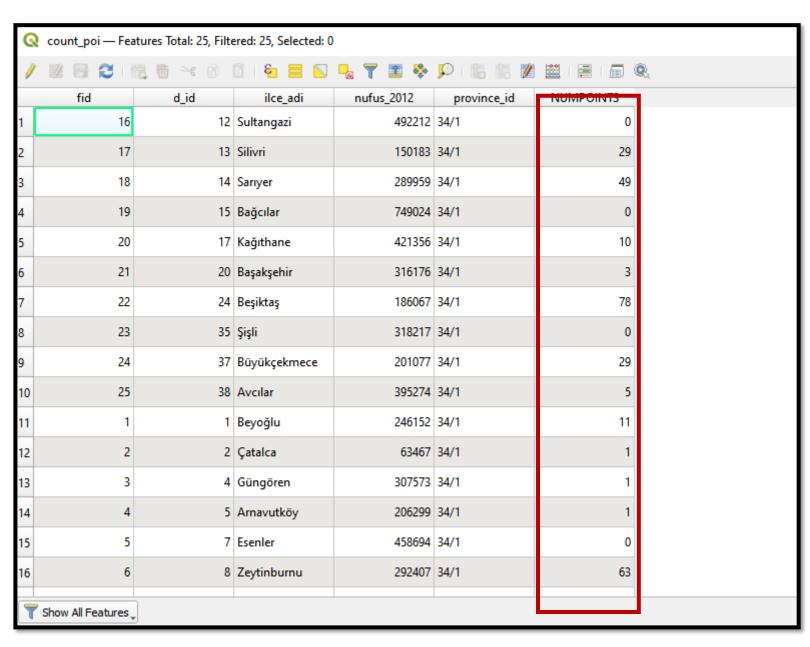




Point in Polygon



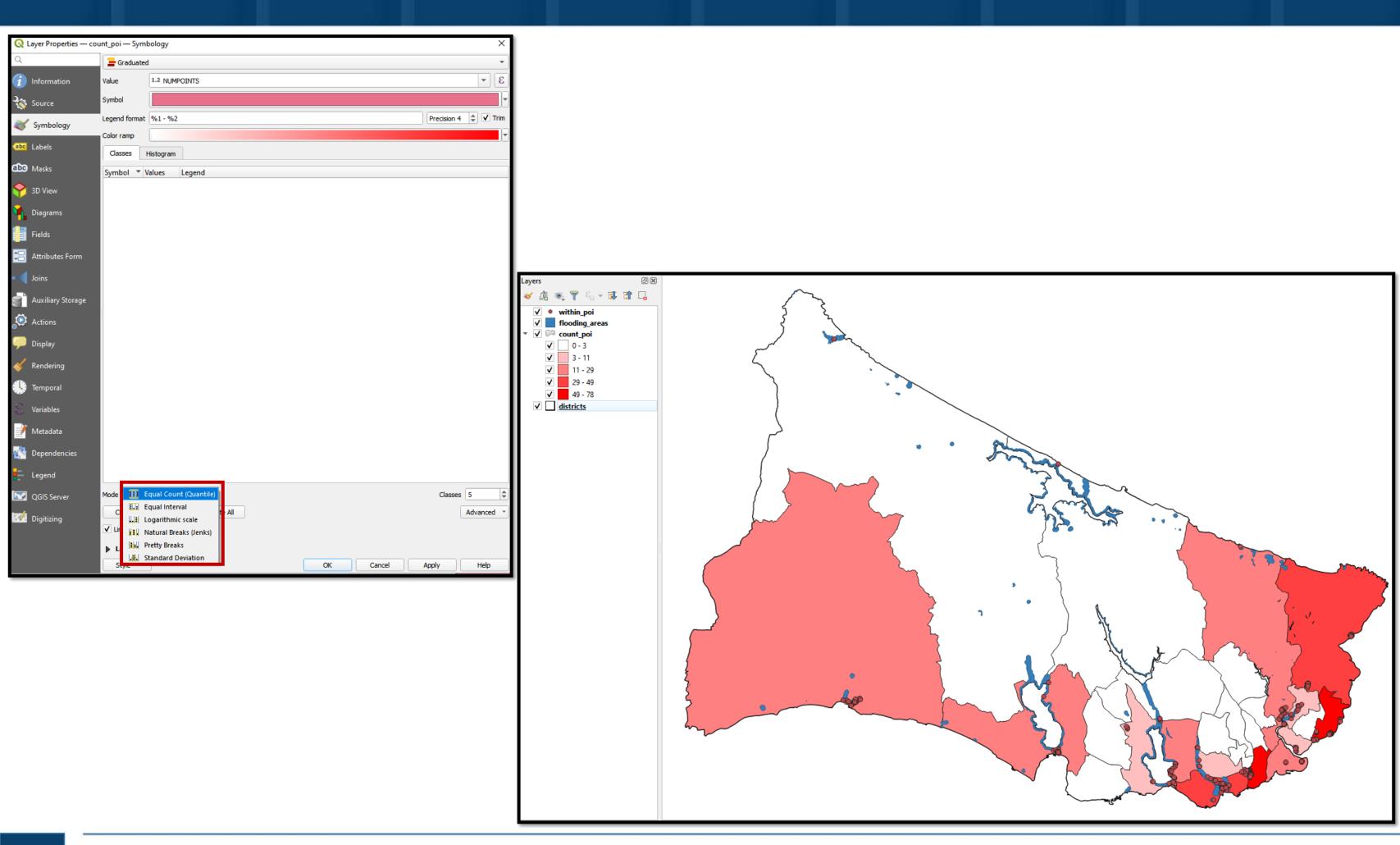




^{*} To see how Point in Polygon algorithm works, check: https://github.com/omrakn/randomalgorithms/tree/master/pointinpoly

Classification of Results







Contact:

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