



มหาวิทยาลัยราชภัฏนครปฐม



7202304

Fundamentals of Geographic Information System



Chapter 10: Overlay Analysis

Course: Fundamentals of GIS (QGIS-based)

Topic: Combining Spatial Layers

Duration: 3 Hours (Lecture + Lab)



Learning Objectives

Explain the concept of overlay analysis

Differentiate overlay tools (Intersect, Union, Clip)

Perform overlay operations in QGIS

Interpret overlay results correctly

Apply overlay in real-world GIS problems



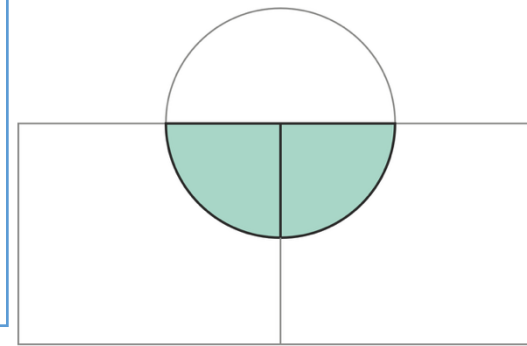
What is Overlay Analysis?

Combines two or more spatial layers

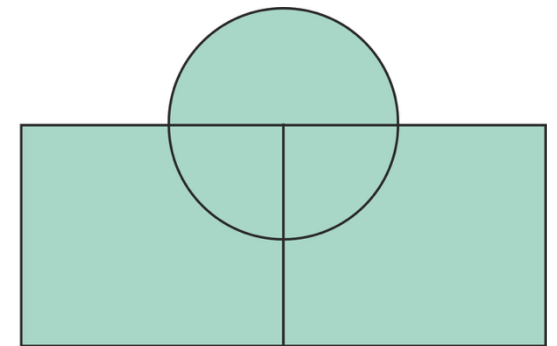
Identifies spatial relationships

Produces new output layer

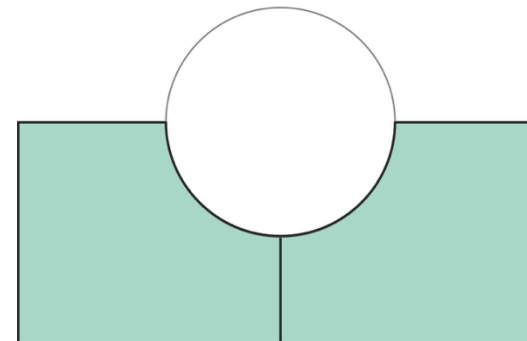
Used for suitability and risk analysis



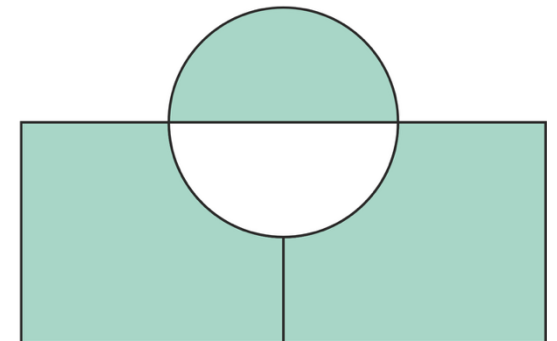
Intersection



Union



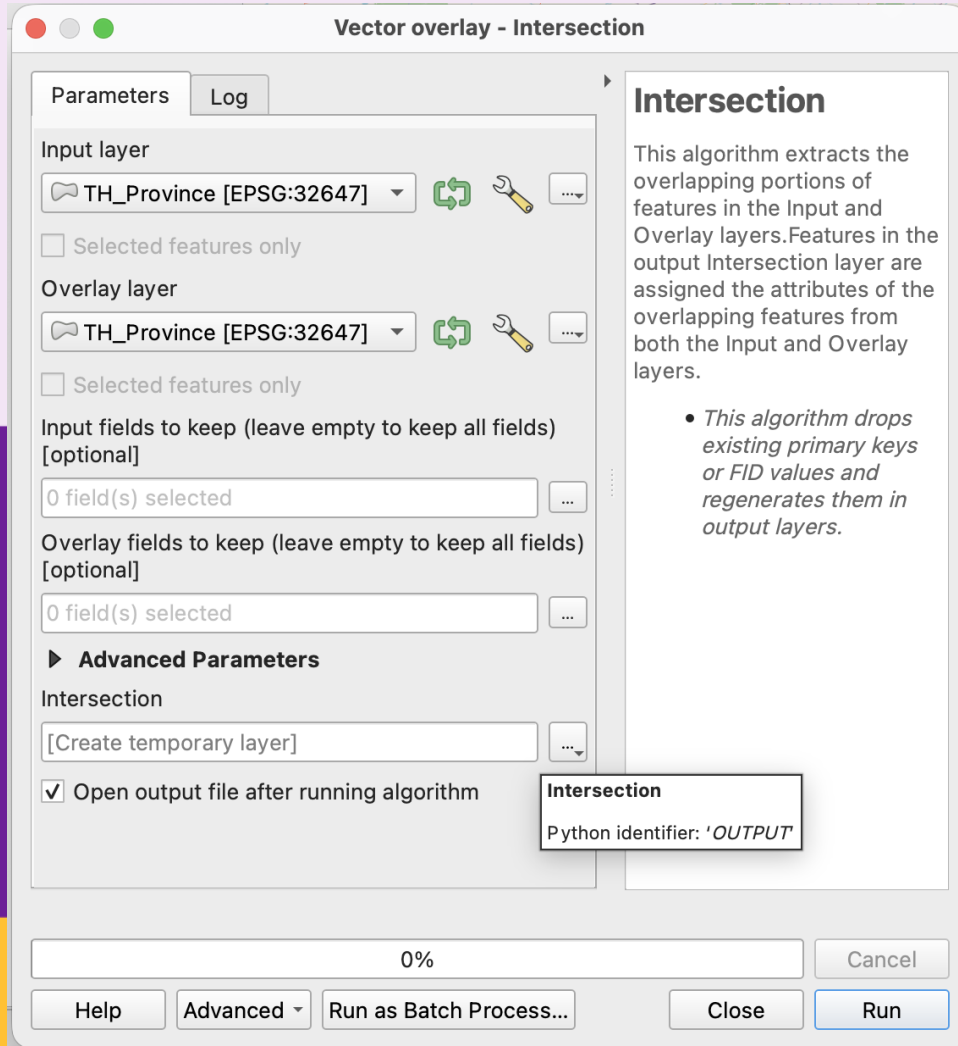
Difference



Symmetric difference



Common Overlay Tools



Intersect – keeps overlapping areas only

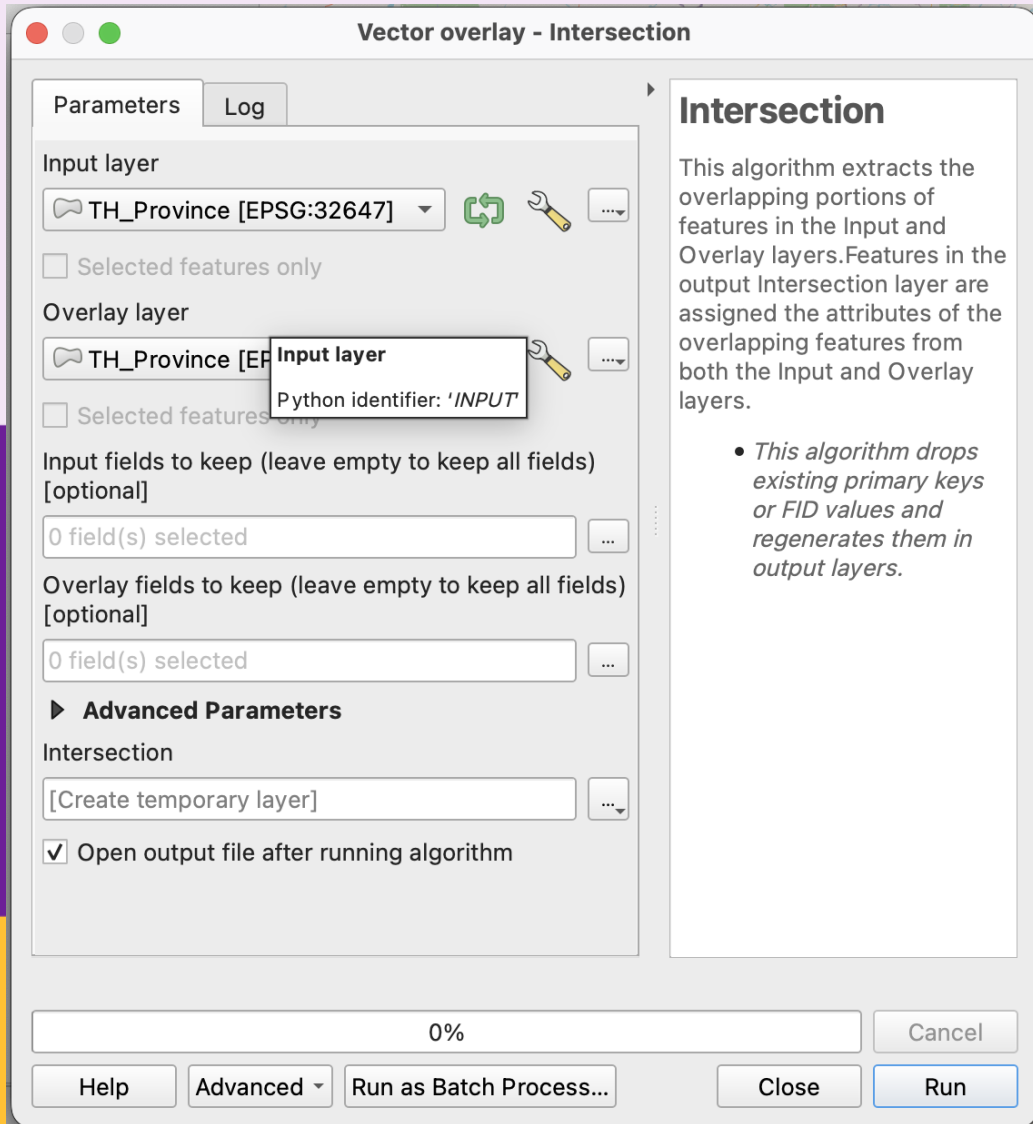
Union – merges all features

Clip – extracts portion of a layer

Difference – subtracts overlapping area



Intersect Tool



Intersection

This algorithm extracts the overlapping portions of features in the Input and Overlay layers. Features in the output Intersection layer are assigned the attributes of the overlapping features from both the Input and Overlay layers.

- This algorithm drops existing primary keys or FID values and regenerates them in output layers.

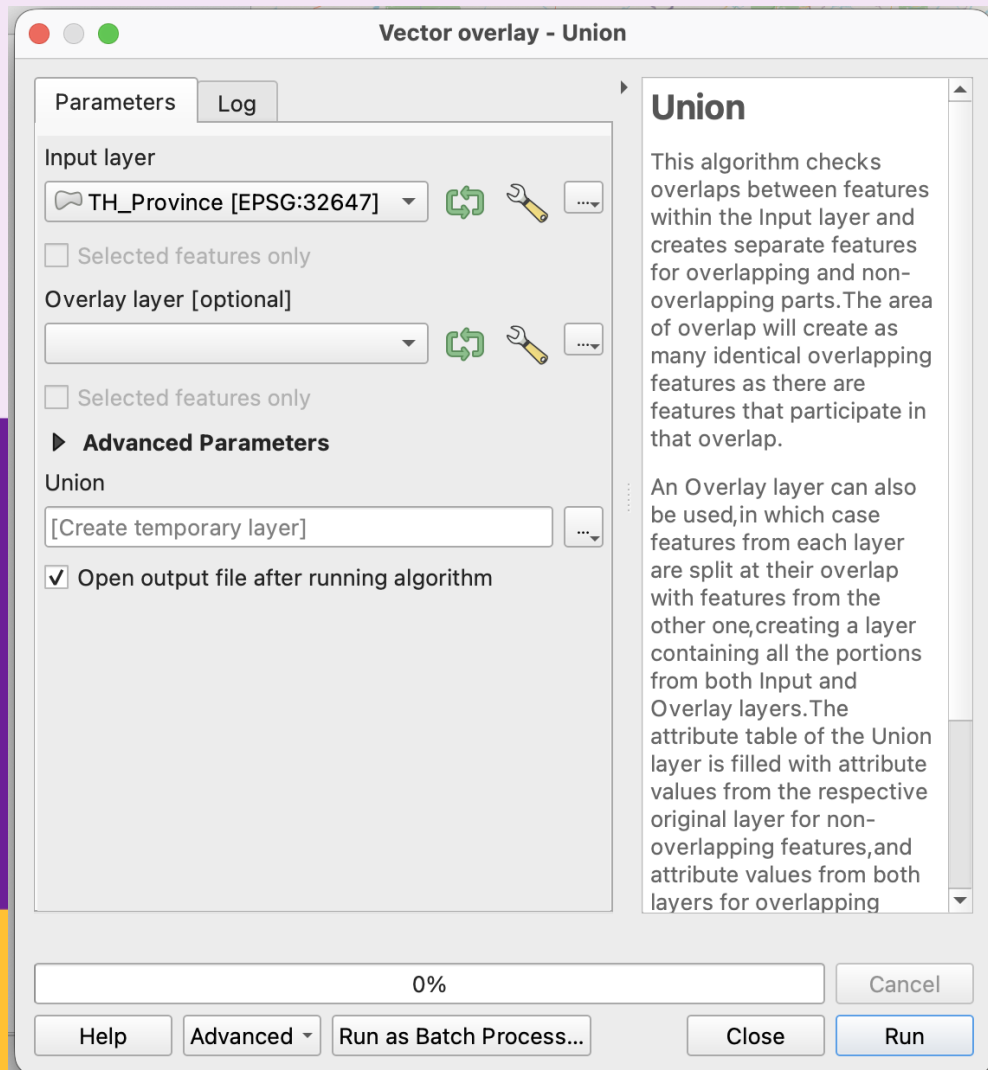
Keeps only overlapping areas

Combines attributes from both layers

Used for suitability analysis



Union Tool



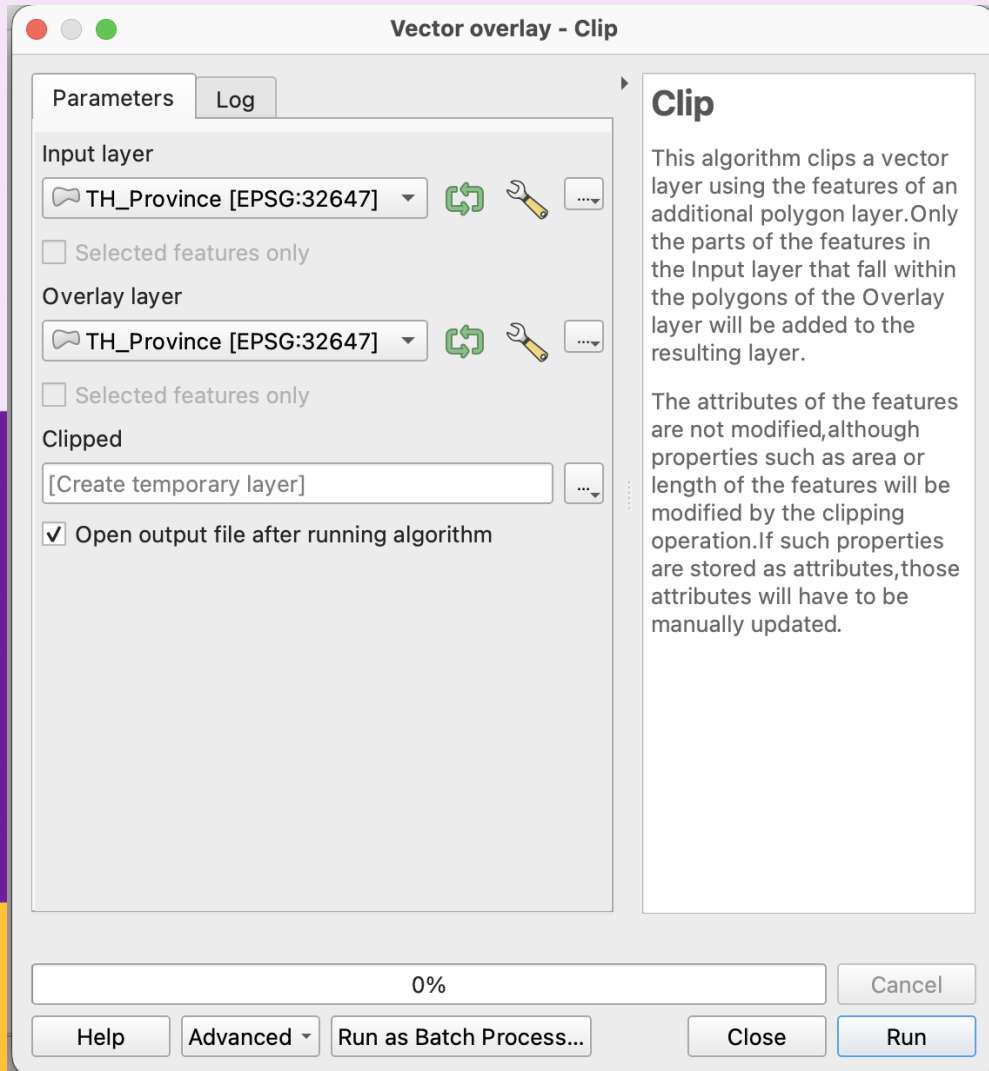
Combines all features from both layers

Preserves all boundaries

Used for full spatial comparison



Clip Tool



Clip

This algorithm clips a vector layer using the features of an additional polygon layer. Only the parts of the features in the Input layer that fall within the polygons of the Overlay layer will be added to the resulting layer.

The attributes of the features are not modified, although properties such as area or length of the features will be modified by the clipping operation. If such properties are stored as attributes, those attributes will have to be manually updated.

Cuts one layer using another layer boundary

Extracts specific geographic area

Commonly used in project boundary extraction



Steps: Overlay in QGIS

Open Processing Toolbox

Select overlay tool (Intersect/Union/Clip)

Choose input layers

Run process

Review output layer



Practical Examples

Agricultural land within flood risk area

Urban area inside buffer zone

Protected forest overlapping development zone



Lab Activity (60 Minutes)

Perform Intersect analysis

Perform Clip analysis

Calculate area of resulting polygons

Create map layout for presentation



Common Issues

CRS mismatch

Invalid geometries

Attribute duplication

Topology errors



Assessment Criteria

Correct overlay tool selection

Accurate output result

Proper area calculation

Clear interpretation and map presentation



มหาวิทยาลัยราชภัฏนครปฐม