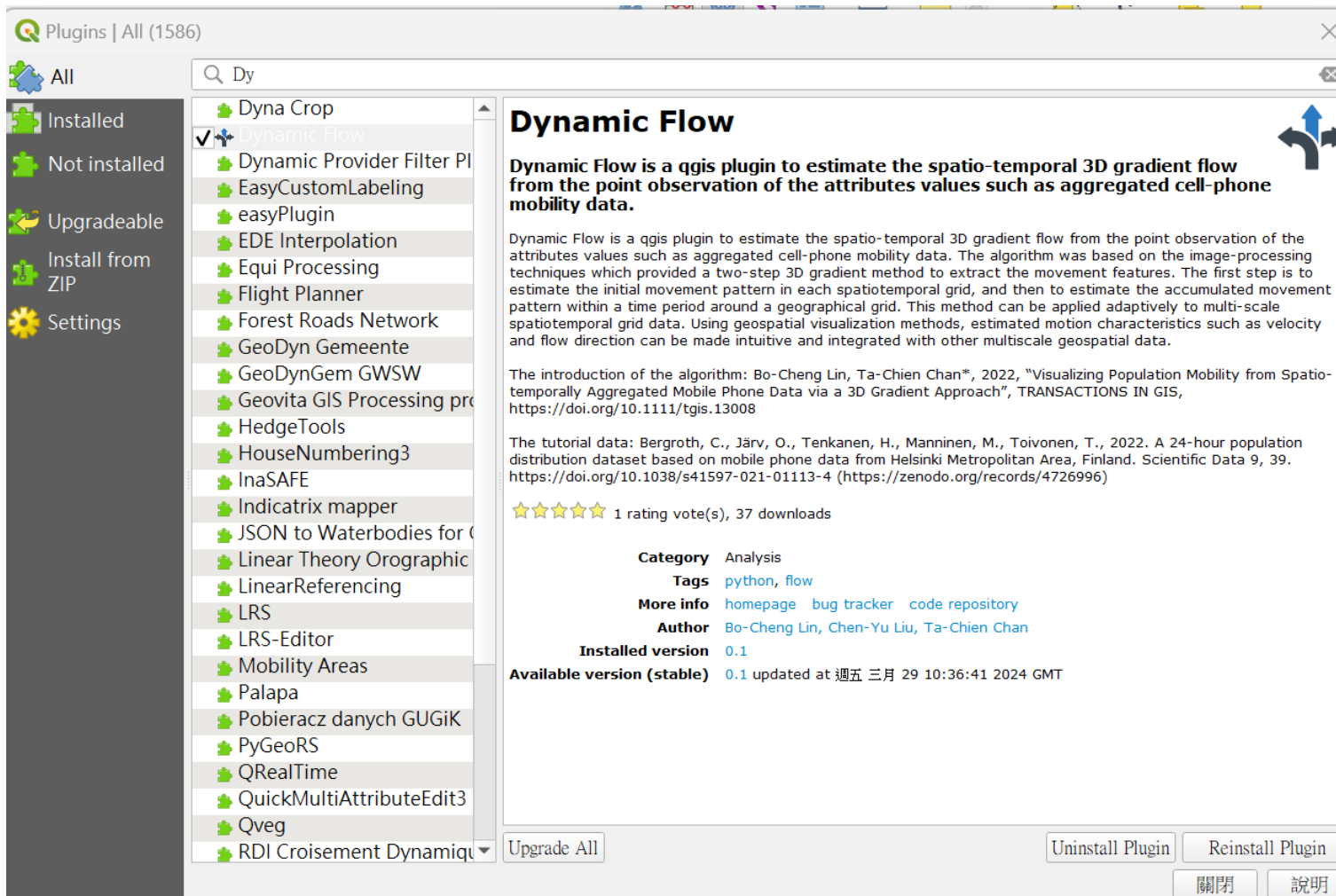


QGIS plugin: Dynamic flow

https://plugins.qgis.org/plugins/dynamic_flow/



The screenshot shows the QGIS Plugins Manager interface. The search bar contains 'Dy'. The 'Dynamic Flow' plugin is selected and its details are displayed in the main pane. The details include a description, a list of authors, a citation, and a rating of 1 star with 37 downloads. The 'Available version (stable)' is 0.1, updated on 2024-03-29.

Dynamic Flow

Dynamic Flow is a qgis plugin to estimate the spatio-temporal 3D gradient flow from the point observation of the attributes values such as aggregated cell-phone mobility data.

Dynamic Flow is a qgis plugin to estimate the spatio-temporal 3D gradient flow from the point observation of the attributes values such as aggregated cell-phone mobility data. The algorithm was based on the image-processing techniques which provided a two-step 3D gradient method to extract the movement features. The first step is to estimate the initial movement pattern in each spatiotemporal grid, and then to estimate the accumulated movement pattern within a time period around a geographical grid. This method can be applied adaptively to multi-scale spatiotemporal grid data. Using geospatial visualization methods, estimated motion characteristics such as velocity and flow direction can be made intuitive and integrated with other multiscale geospatial data.

The introduction of the algorithm: Bo-Cheng Lin, Ta-Chien Chan*, 2022, "Visualizing Population Mobility from Spatio-temporally Aggregated Mobile Phone Data via a 3D Gradient Approach", TRANSACTIONS IN GIS, <https://doi.org/10.1111/tgis.13008>

The tutorial data: Bergroth, C., Järv, O., Tenkanen, H., Manninen, M., Toivonen, T., 2022. A 24-hour population distribution dataset based on mobile phone data from Helsinki Metropolitan Area, Finland. Scientific Data 9, 39. <https://doi.org/10.1038/s41597-021-01113-4> (<https://zenodo.org/records/4726996>)

☆☆☆☆☆ 1 rating vote(s), 37 downloads

Category Analysis
Tags python, flow
More info [homepage](#) [bug tracker](#) [code repository](#)
Author Bo-Cheng Lin, Chen-Yu Liu, Ta-Chien Chan
Installed version 0.1
Available version (stable) 0.1 updated at 週五 三月 29 10:36:41 2024 GMT

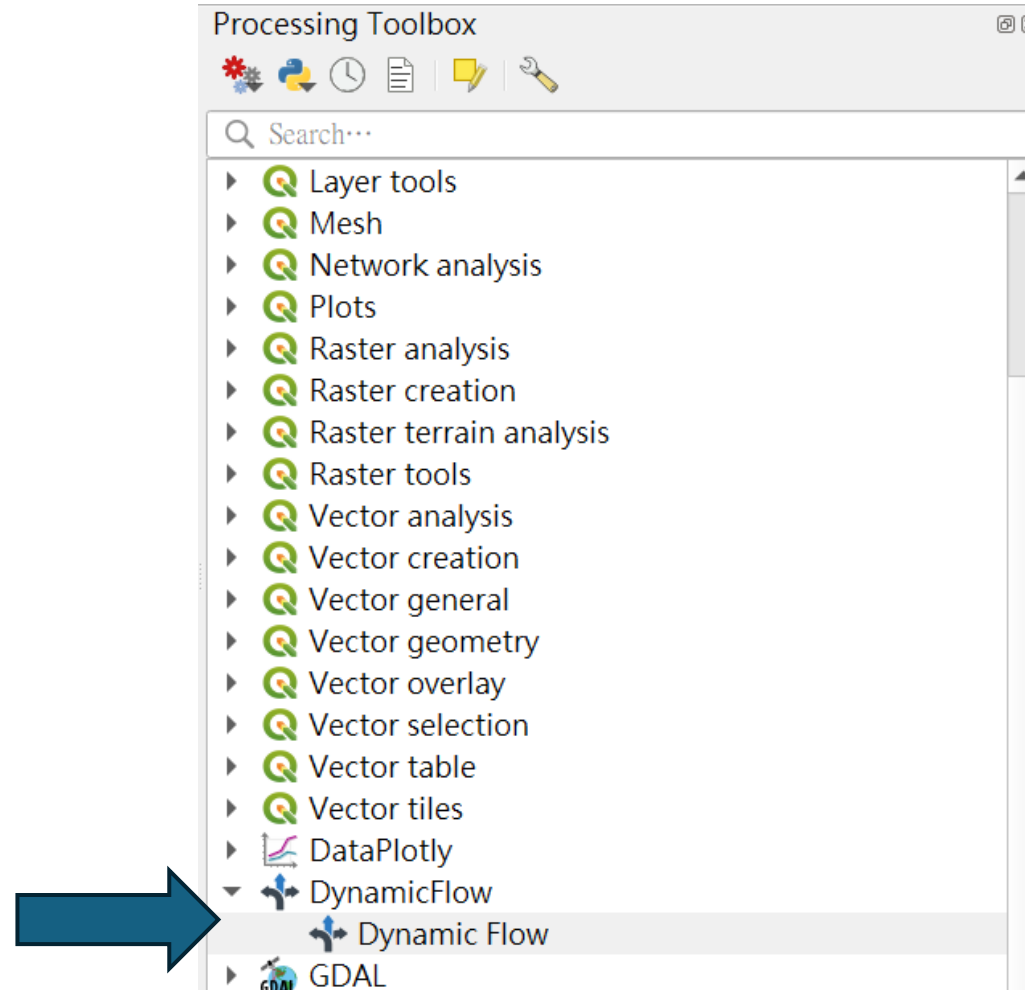
Buttons: Upgrade All, Uninstall Plugin, Reinstall Plugin, 關閉, 說明

[Bo-Cheng Lin \(臺北大學林柏丞助理教授\),](#)
[Chen-Yu Liu \(淡江大學統計系劉宸宇同學/中](#)
[研院GIS中心實習生\),](#)
[Ta-Chien Chan \(中研院GIS中心研究員\)](#)



地理資訊科學研究專題中心
Center for GIS, RCHSS, Academia Sinica

The “Dynamic Flow” plugin will be shown in the Processing Toolbox



The introduction of the algorithm

- Bo-Cheng Lin, Ta-Chien Chan*, 2022, “Visualizing Population Mobility from Spatio-temporally Aggregated Mobile Phone Data via a 3D Gradient Approach”, TRANSACTIONS IN GIS, <https://doi.org/10.1111/tgis.13008>

The tutorial data can be download from the website

The tutorial data: Bergroth, C., Järv, O., Tenkanen, H., Manninen, M., Toivonen, T., 2022. A 24-hour population distribution dataset based on mobile phone data from Helsinki Metropolitan Area, Finland. Scientific Data 9, 39.

<https://doi.org/10.1038/s41597-021-01113-4>
(<https://zenodo.org/records/4726996>)

Dynamic Flow

Parameters Log

Open shp file containing geographical coordinates

C:\Users\tachien\OneDrive\桌面\New_flow_map\data\Helsinki_dynpop_workdays.shp

ID Var

123 YKR_ID

Variables

H8,H9,H10

Accumulated Mask Size (>= 3 Odd Integer)

3

Save Initial Vector File(.csv)

Save Vector Components File(.csv)

Output layer

C:\Users\tachien\OneDrive\桌面\New_flow_map\data/result0404.shp

Open output file after running algorithm

0%

Cancel

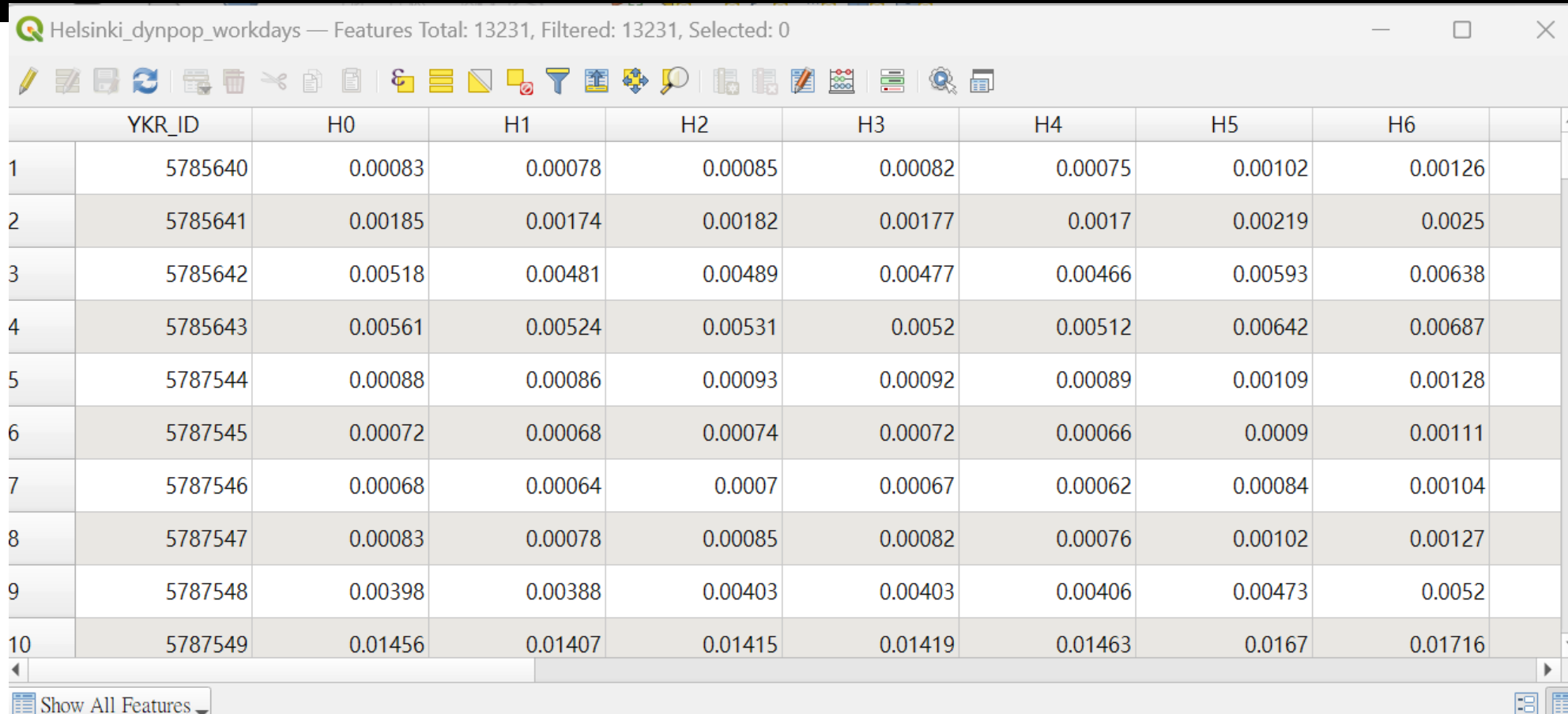
Advanced Run as Batch Process...

Run 關閉

Step 1: Load the shapefile and select at least three population observation time periods (e.g.: H8, H9, H10)

1. Select the dynamic flow in Processing Toolbox and execute it
2. Open the SHP file: Select the SHP file to import.
3. Grid ID: Enter the name of the grid number field
4. Time period: Select at least 3 consecutive times
5. Accumulated Spatial Mask Size: Accumulated spatial range (set the size of the square mask window, the value must be an odd number)
6. Output Initial Vector File: Whether to output the initial flow result of each time (.csv)
7. Output Vector Components File: Whether to output the components of each initial gradient vector (.csv)
8. Output layer: Output the file name containing the folder location

Preview the data in the shapefile



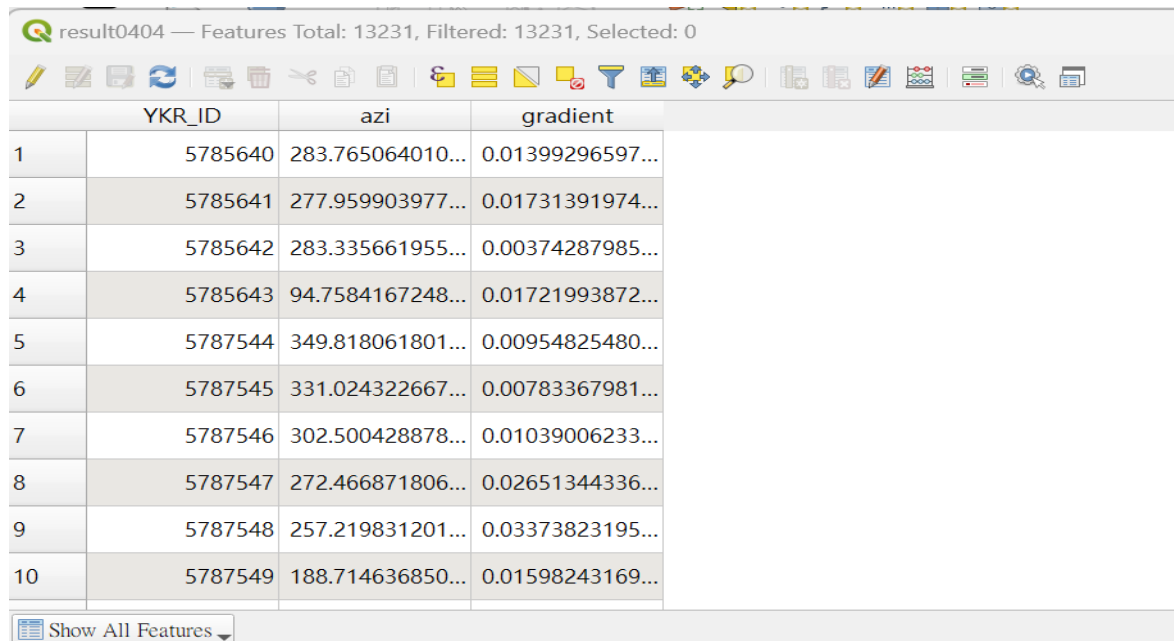
The screenshot shows a software window titled "Helsinki_dynpop_workdays" with a status bar indicating "Features Total: 13231, Filtered: 13231, Selected: 0". The main area displays a table with 10 rows and 9 columns. The columns are labeled YKR_ID, H0, H1, H2, H3, H4, H5, and H6. The data in the table is as follows:

	YKR_ID	H0	H1	H2	H3	H4	H5	H6
1	5785640	0.00083	0.00078	0.00085	0.00082	0.00075	0.00102	0.00126
2	5785641	0.00185	0.00174	0.00182	0.00177	0.0017	0.00219	0.0025
3	5785642	0.00518	0.00481	0.00489	0.00477	0.00466	0.00593	0.00638
4	5785643	0.00561	0.00524	0.00531	0.0052	0.00512	0.00642	0.00687
5	5787544	0.00088	0.00086	0.00093	0.00092	0.00089	0.00109	0.00128
6	5787545	0.00072	0.00068	0.00074	0.00072	0.00066	0.0009	0.00111
7	5787546	0.00068	0.00064	0.0007	0.00067	0.00062	0.00084	0.00104
8	5787547	0.00083	0.00078	0.00085	0.00082	0.00076	0.00102	0.00127
9	5787548	0.00398	0.00388	0.00403	0.00403	0.00406	0.00473	0.0052
10	5787549	0.01456	0.01407	0.01415	0.01419	0.01463	0.0167	0.01716

At the bottom of the window, there is a "Show All Features" button and a scroll bar.

When importing a SHP file into a grid space (point or area), its attributes must include the grid number (unique identification code, YKR_ID) and data for at least three time periods.

Preview the output layer



result0404 — Features Total: 13231, Filtered: 13231, Selected: 0

	YKR_ID	azi	gradient
1	5785640	283.765064010...	0.01399296597...
2	5785641	277.959903977...	0.01731391974...
3	5785642	283.335661955...	0.00374287985...
4	5785643	94.7584167248...	0.01721993872...
5	5787544	349.818061801...	0.00954825480...
6	5787545	331.024322667...	0.00783367981...
7	5787546	302.500428878...	0.01039006233...
8	5787547	272.466871806...	0.02651344336...
9	5787548	257.219831201...	0.03373823195...
10	5787549	188.714636850...	0.01598243169...

Show All Features

1. SHP file: fields include grid number, azimuth (azi) and gradient value (gradient)

Preview the output CSV file

flowestimated_h7toh12_initvec — Features Total: 13231, Filtered: 13231, Selected: 0

lnivec.csv

field_1	YKR_ID	centroid	A2	G2	A3	G3
6	5	5787545 POINT (38137...	348.27331767...	0.0147725827...	345.01974287...	0.0115602897...
7	6	5787546 POINT (38162...	323.03527676...	0.0232604471...	323.71261018...	0.0168280480...
8	7	5787547 POINT (38187...	295.20935485...	0.0398583592...	290.06258764...	0.0296348359...
9	8	5787548 POINT (38212...	278.26626846...	0.1106015985...	275.03908798...	0.0955133095...
10	9	5787549 POINT (38237...	291.62923570...	0.0496766585...	277.38833654...	0.0345770950...
11	10	5787550 POINT (38262...	91.614457806...	0.1340250853...	94.512551035...	0.1152315421...

flowestimated_h7toh12_vcomp — Features Total: 13231, Filtered: 13231, Selected: 0

vcomp.csv

field_1	YKR_ID	centroid	v_2_x	v_2_y	v_2_z	v_3_x
6	5	5787545 POINT (38137...	0.1854787380...	-0.893547205...	-0.408865539...	0.2534538539...
7	6	5787546 POINT (38162...	0.5623279696...	-0.747191140...	-0.354249424...	0.5811725751...
8	7	5787547 POINT (38187...	0.8409779191...	-0.395901896...	-0.368805949...	0.9175012837...
9	8	5787548 POINT (38212...	0.9583948279...	-0.139238493...	-0.249182655...	0.9890768150...
10	9	5787549 POINT (38237...	0.6244381352...	-0.247601194...	-0.740790566...	0.9211300134...
11	10	5787550 POINT (38262...	-0.982129574...	0.0276813850...	-0.186159180...	-0.995126836...

2. CSV file:

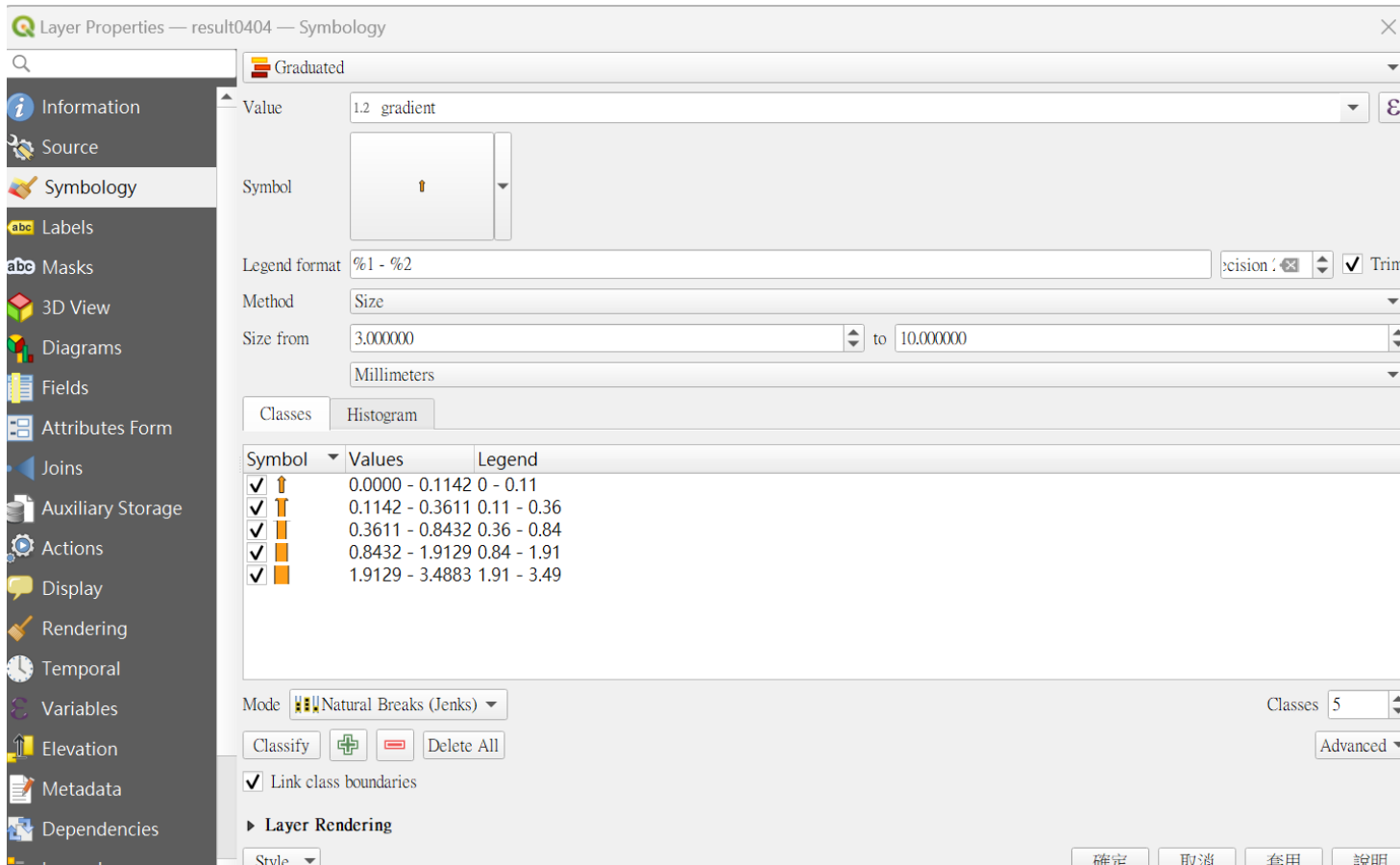
- Original file

name_initvec.csv: It is the initial vector of each period.

The Ai field represents the azimuth of the i-th period, and the Gi field represents the gradient of the i-th period.

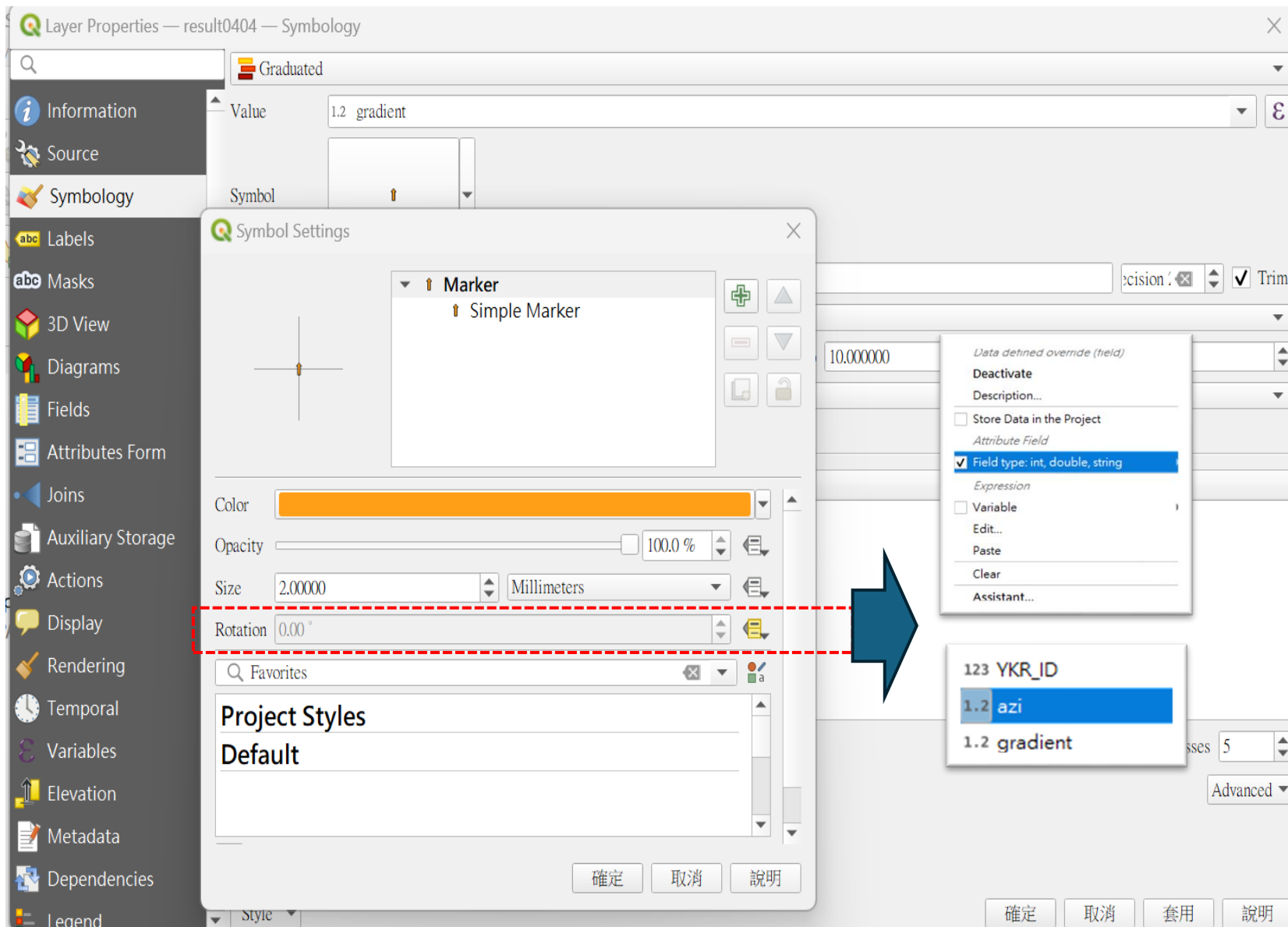
- Original file

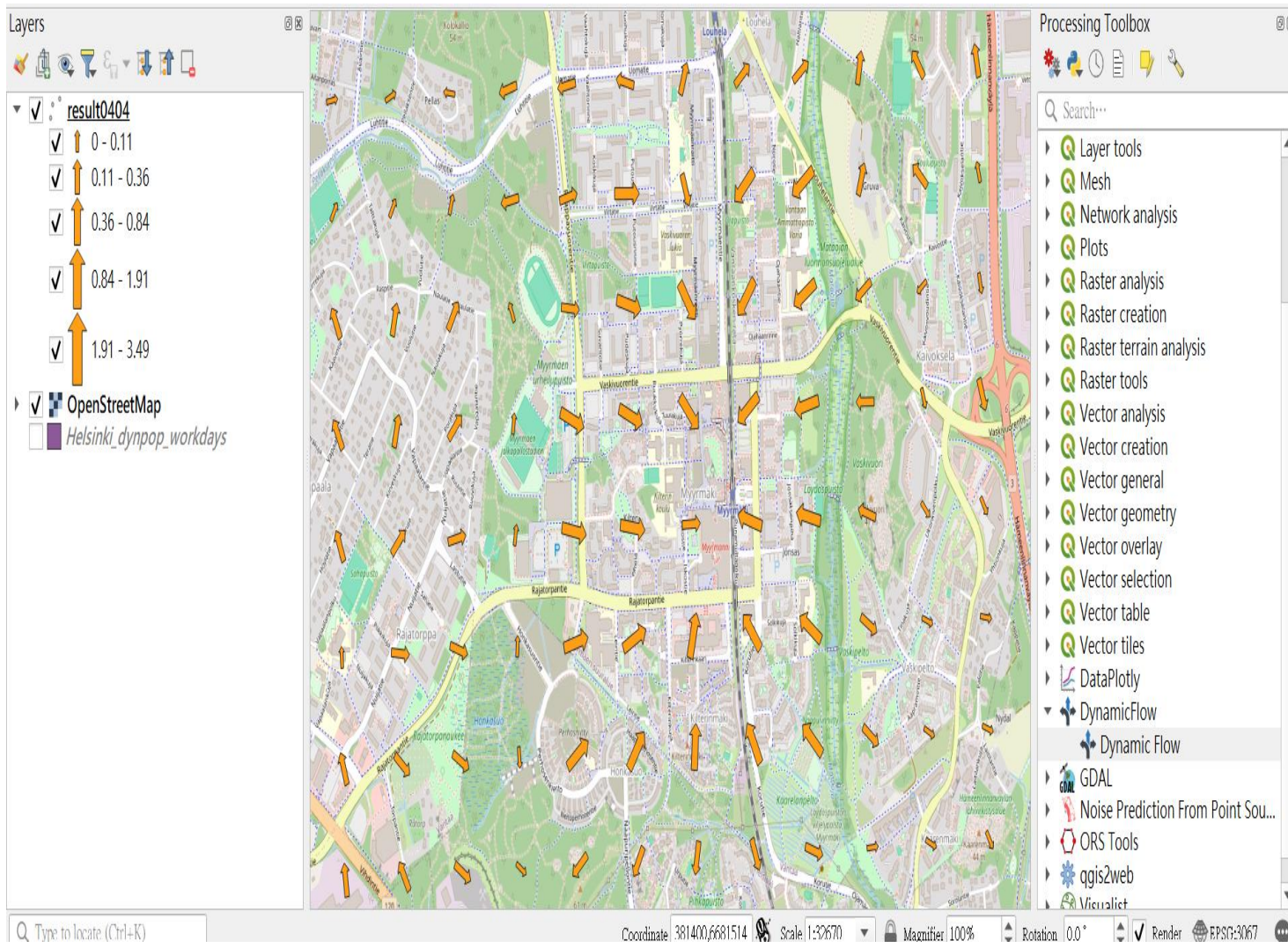
name_vcomp.csv: It is the three components of the initial vector of each period, v_i_x represents the gradient x component of the i-th period, v_i_y represents the gradient y component of the i-th period, v_i_t represents the gradient of the i-th period t component



Step 2:
Visualize the
gradients and
flow direction

1. Start the symbology
2. Select Grading as the symbol type.
3. Select the gradient of the value
4. Click on the symbol: - Simple mark changes to arrow symbol
- Turn on advanced spin options
- Click the field type, a window will pop up to provide selectable numeric fields, and then select the orientation field
5. Method selection size
6. Set size to...
7. Select Natural Breaks in the classification mode Mode.
8. Press the sort button
9. Finally press OK





Step 3: Overlay
the
OpenStreetMap
(OSM) and
observe the
specific POI