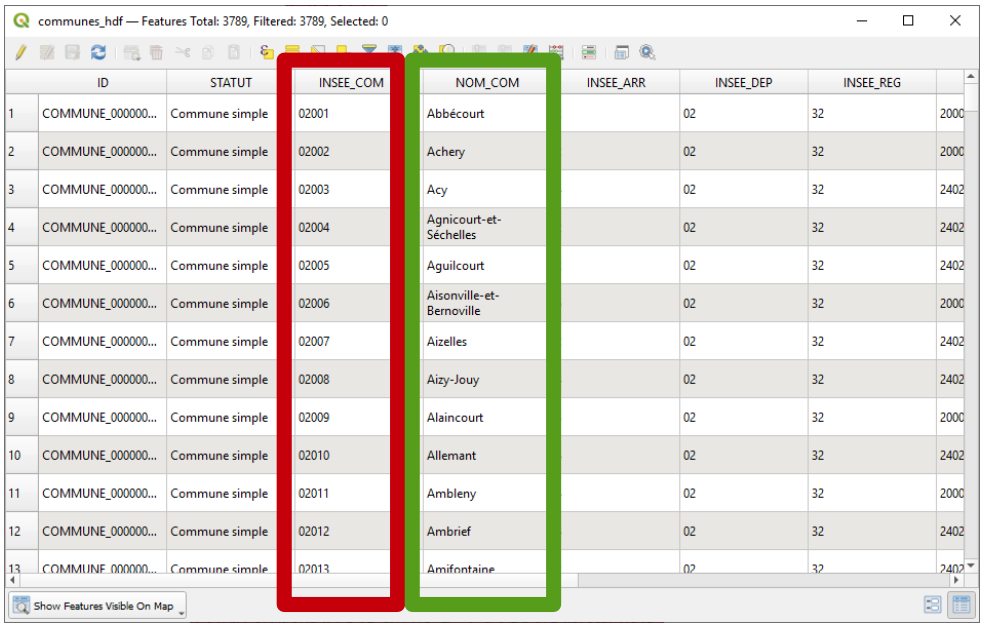
Mobility areas

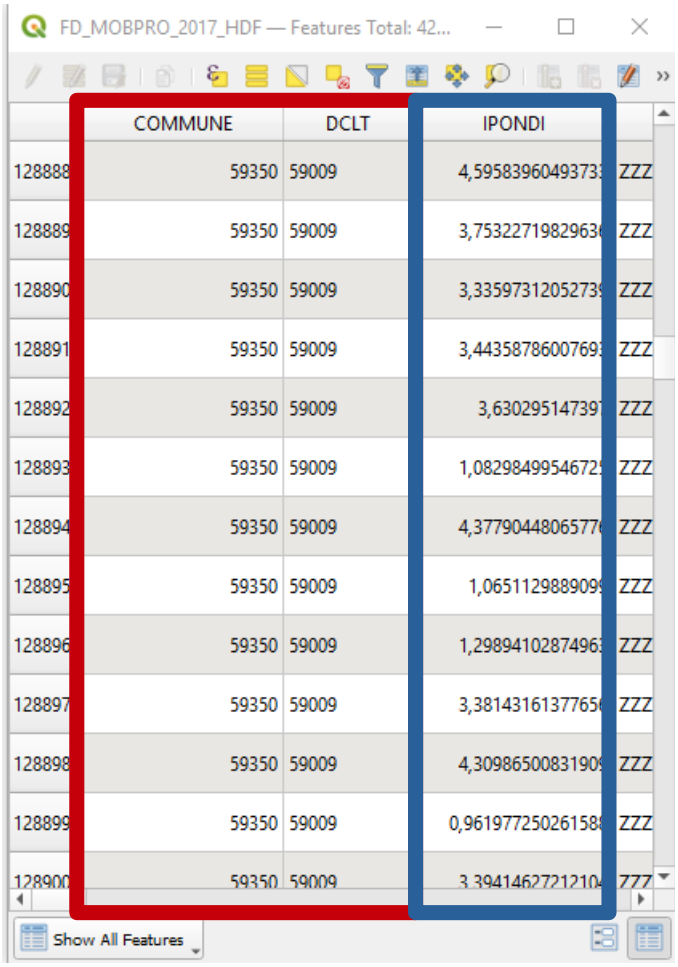
Methodology

Mobility areas are drawn up on the basis of data on flows between origins and destinations. These data can come, for example, from home-work or home-study data from the population census, household travel surveys or other data sources such as mobile trace data (FCD, FMD)
For a rendering through a cartographic visualization, an animation or videos, it is necessary to have a layer of geographical objects corresponding to the zones (origins and destinations of flows) and to have a common zone/origin/destination identifier in the two data sources.
The strongest link in % of flows between two zones is recursively taken from the set of flows. The area of origin is aggregated with the pole area and forms a pool. Migration between zones or areas is then updated and the process is repeated until only one area remains.



	ID	STATUT	INSEE_COM	NOM_COM	INSEE_ARR	INSEE_DEP	INSEE_REG	
1	COMMUNE_000000...	Commune simple	02001	Abbécourt		02	32	2000
2	COMMUNE_000000...	Commune simple	02002	Achery		02	32	2000
3	COMMUNE_000000...	Commune simple	02003	Acy		02	32	2402
4	COMMUNE_000000...	Commune simple	02004	Agnicourt-et-Séchelles		02	32	2402
5	COMMUNE_000000...	Commune simple	02005	Aguilcourt		02	32	2402
6	COMMUNE_000000...	Commune simple	02006	Aisonville-et-Bernoville		02	32	2000
7	COMMUNE_000000...	Commune simple	02007	Aizelles		02	32	2402
8	COMMUNE_000000...	Commune simple	02008	Aizy-Jouy		02	32	2402
9	COMMUNE_000000...	Commune simple	02009	Alaincourt		02	32	2000
10	COMMUNE_000000...	Commune simple	02010	Allemant		02	32	2402
11	COMMUNE_000000...	Commune simple	02011	Ambleny		02	32	2000
12	COMMUNE_000000...	Commune simple	02012	Ambrief		02	32	2402
13	COMMUNE_000000...	Commune simple	02013	Amifontaine		02	32	2402

INSEE_COM : zone Id
NOM_COM : zone label

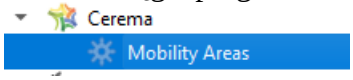


COMMUNE : origin
DCLT : destination
IPONDI : value (number of trips)

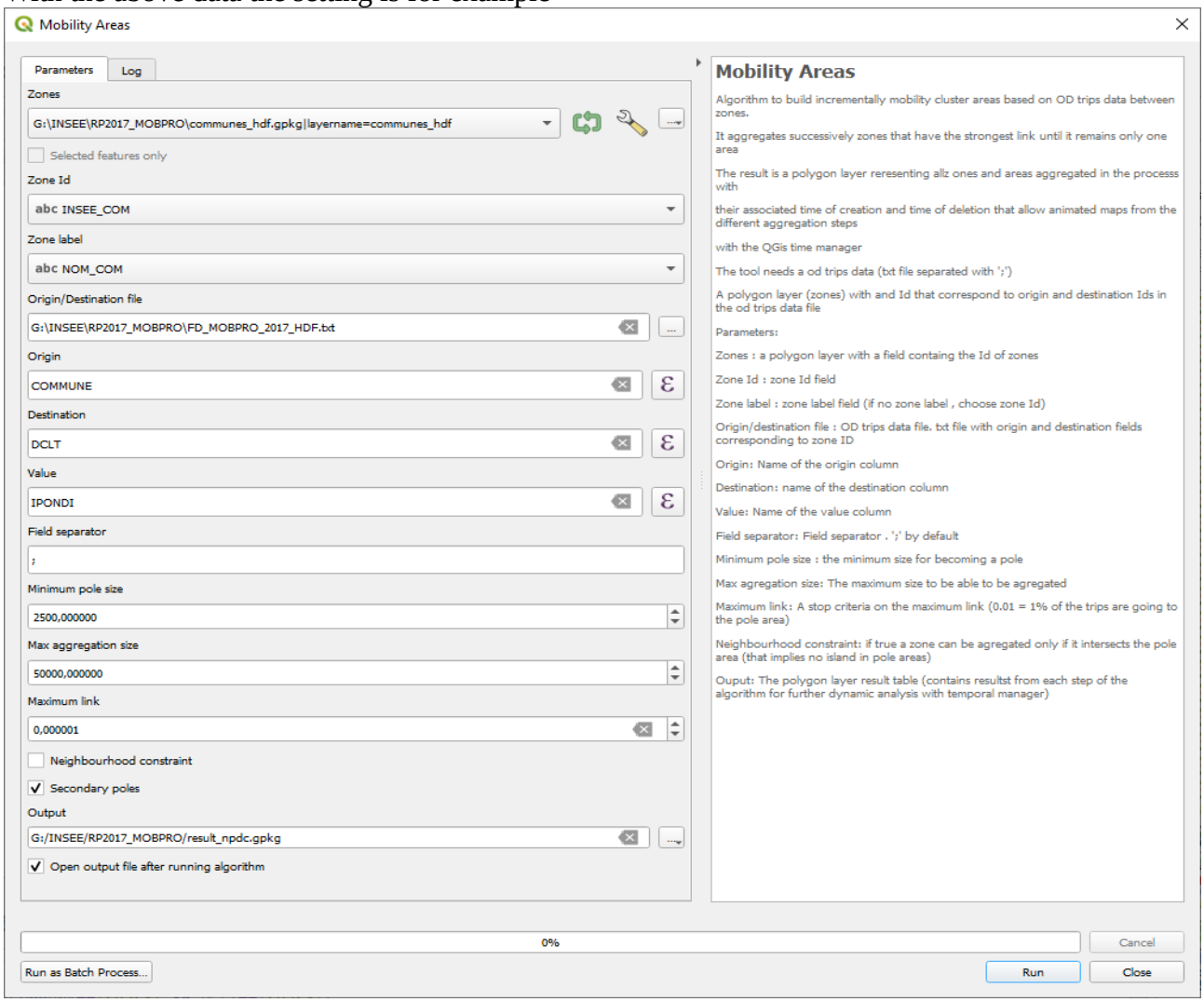
The zone identifier in the zone table (Communes HDF) corresponds to the zone identifiers of the origins and destinations in the flows table (FD_MOBPRO_2017_HDF)

Calculation of mobility areas

Once the Qgis plugin is installed, it appears in the processing box as below



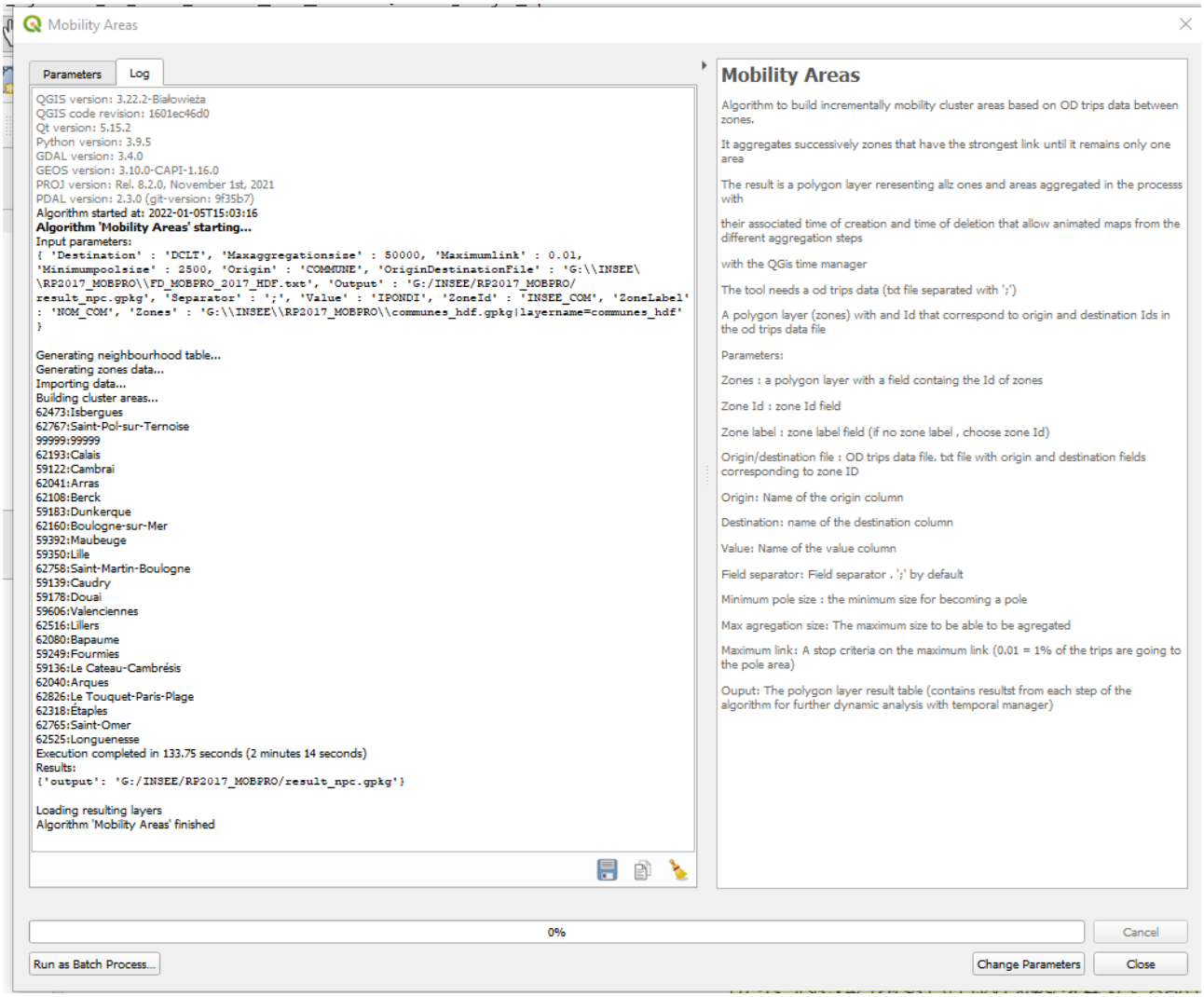
With the above data the setting is for example



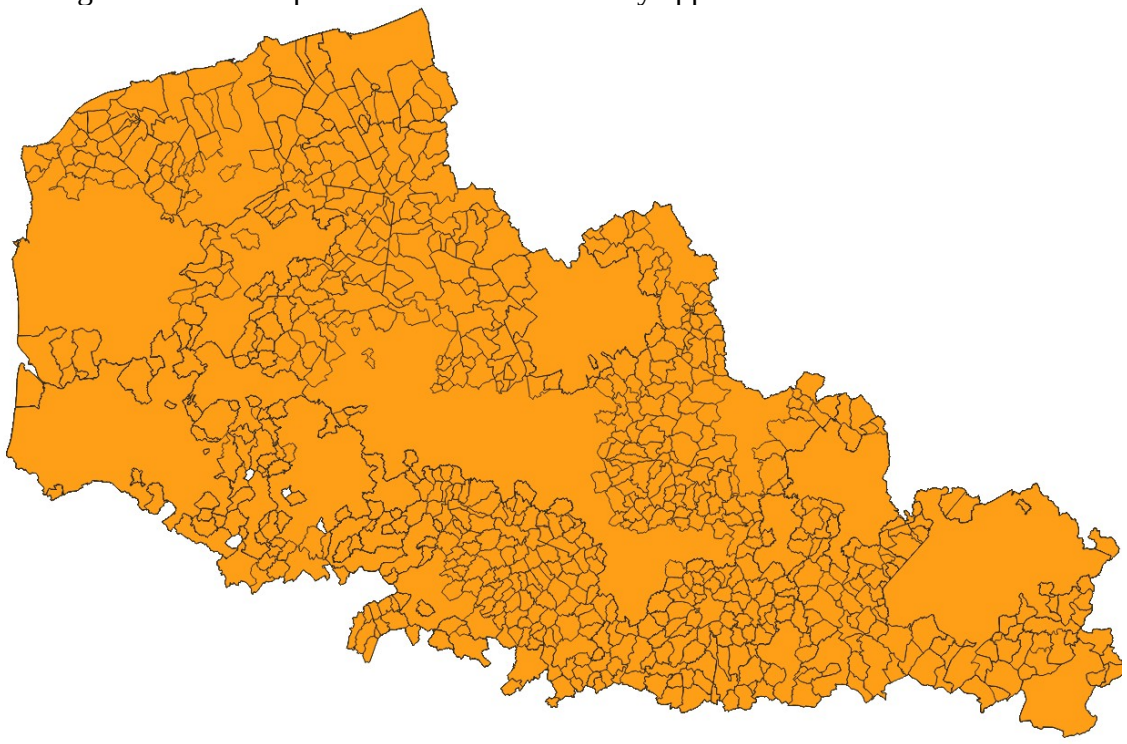
To be a cluster, an area must have more than 2,500 trips or migrations and if the cluster is greater than 50,000 it cannot be aggregated with another cluster in subsequent stages.

When the neighbourhood constraint is checked, in order to be aggregated, zones must intersects geographically the pole area.

Activating secondary poles enables to let appearing smaller poles that could be masked by the main attracting poles for a second level analysis.

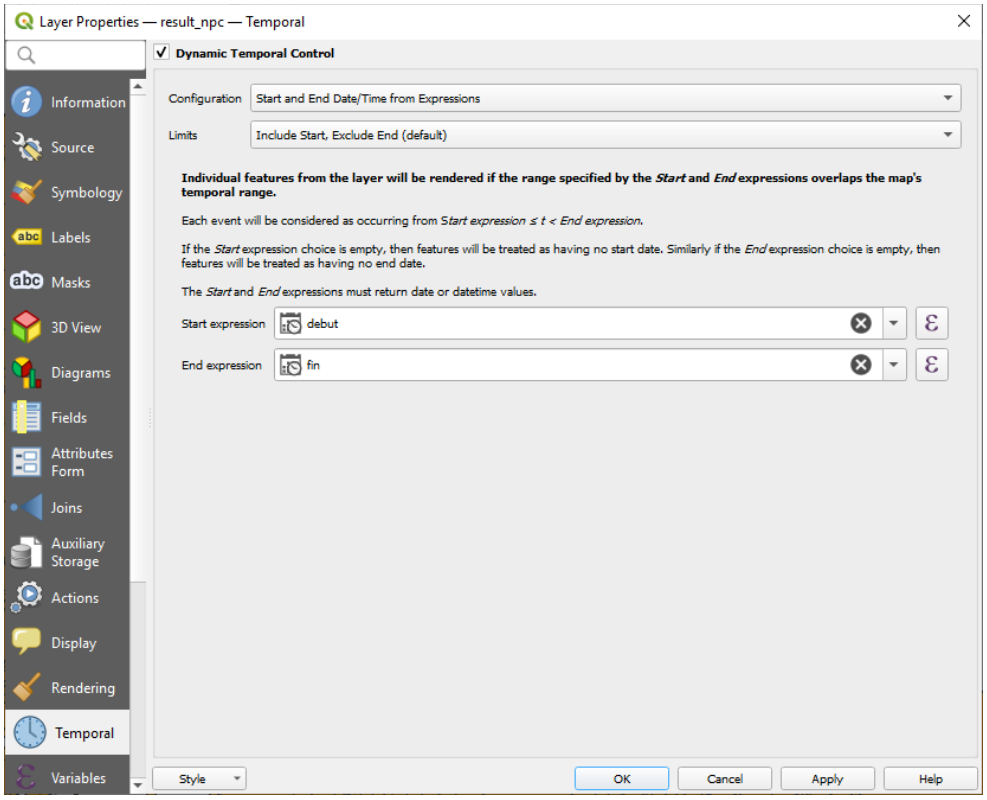


The algorithm lists the poles that have successively appeared and loads the result table

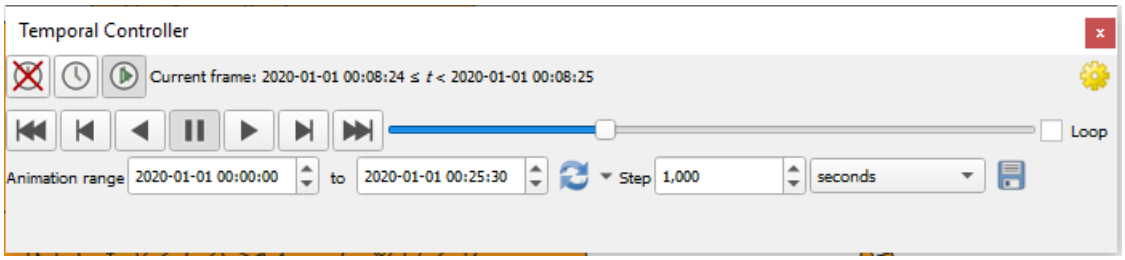


Making the animated map

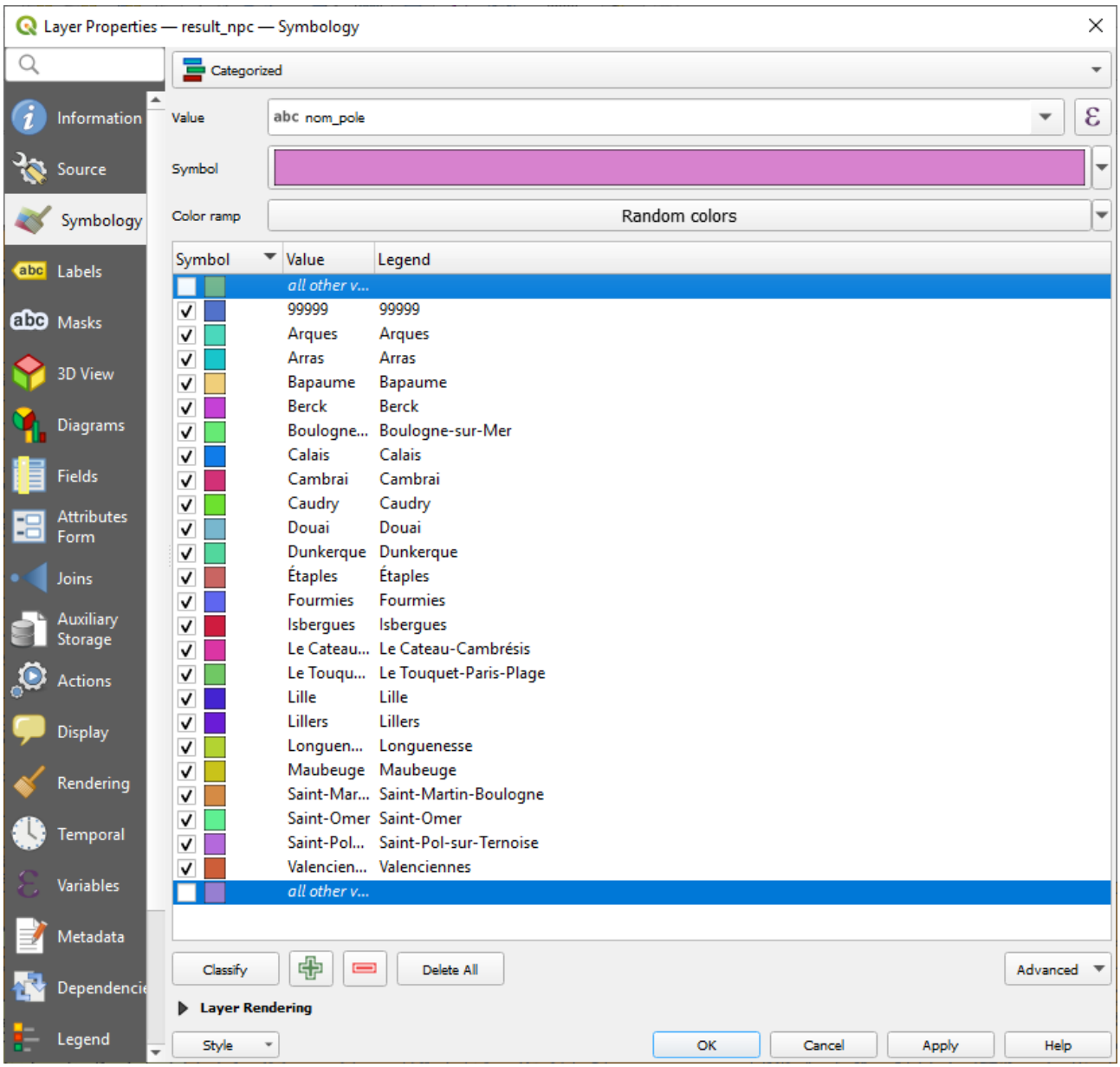
The result layer must first be set up: :



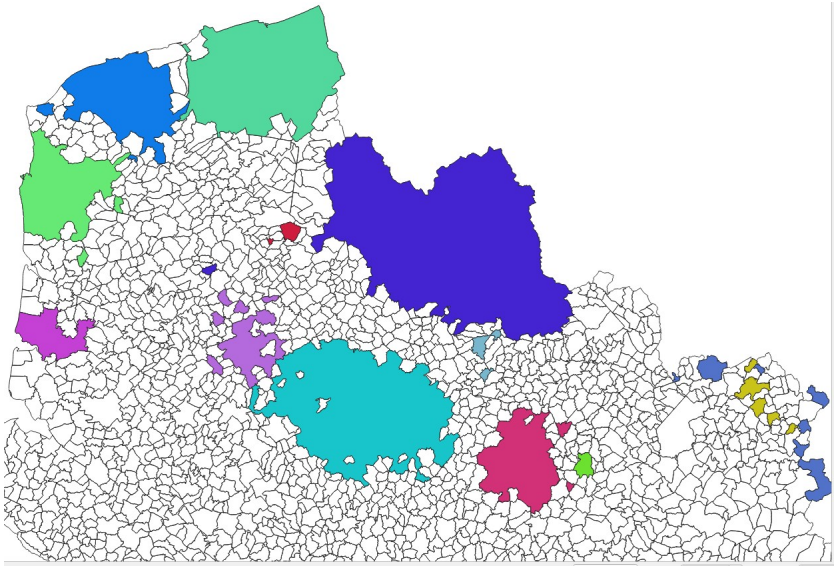
Then set the time controller with a step of 1s on the result layer



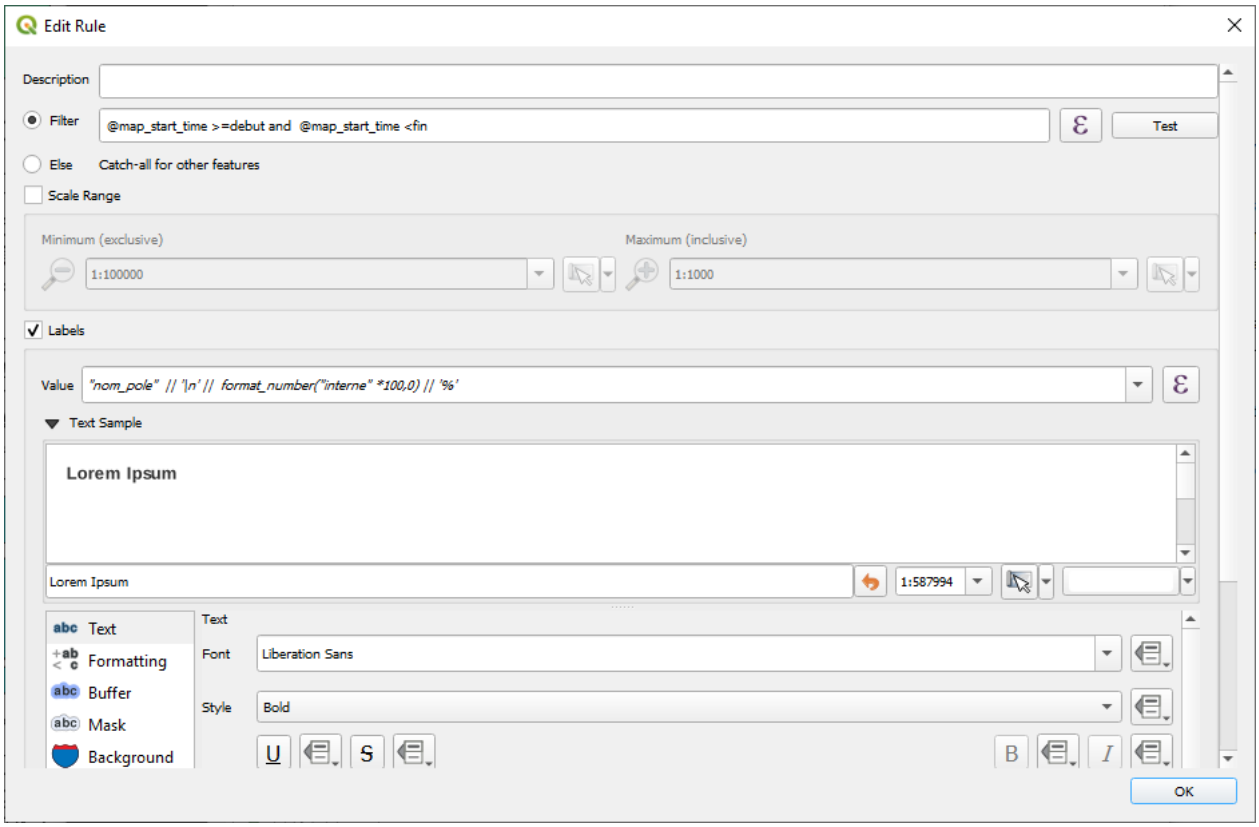
You can then perform a categorized thematic analysis on the column "city_name" and deactivate the values without labels



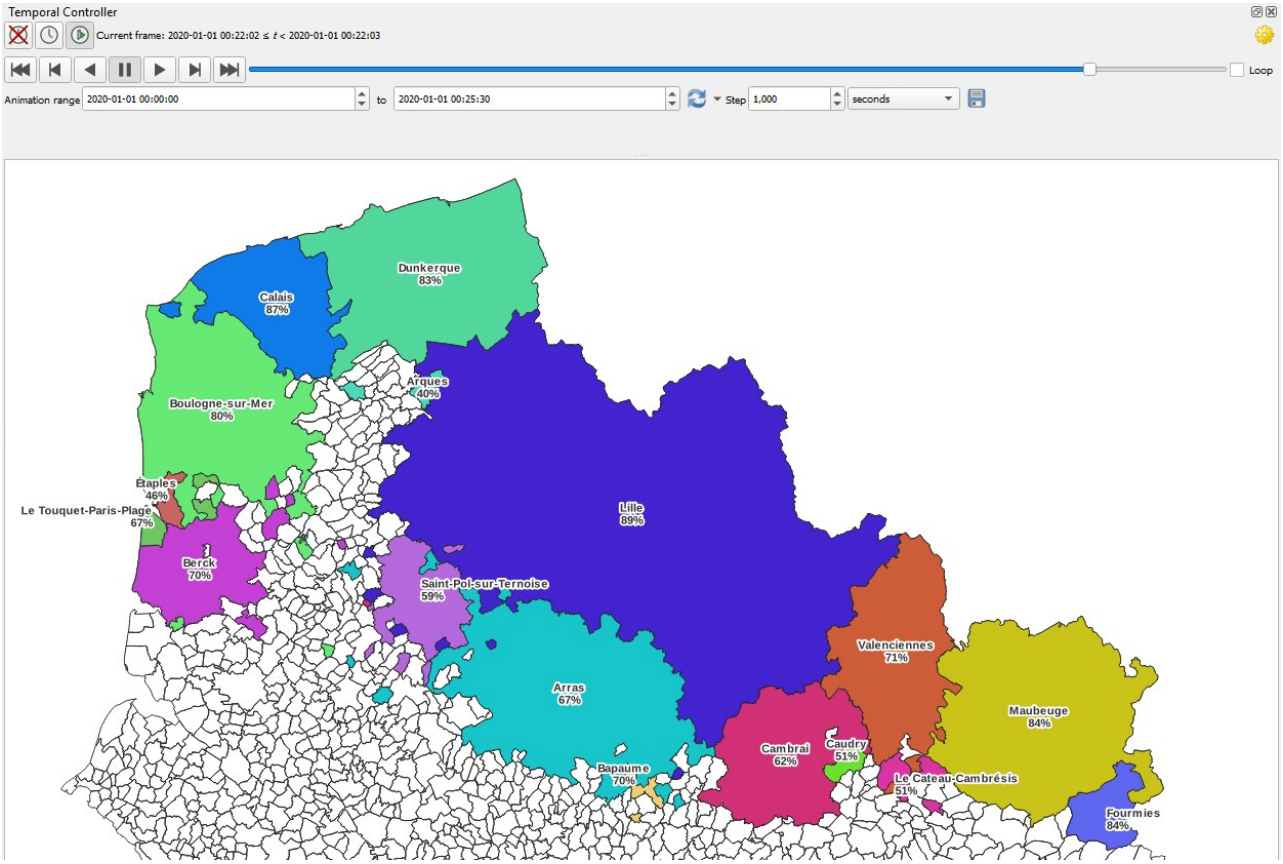
With the time controller, we can see the generation of mobility pools as a function of steps (seconds in the time controller)



The labels can then be set up to display the names of the pools and the percentage of autonomy, for example, by defining labels based on rules



And the result below in animated map

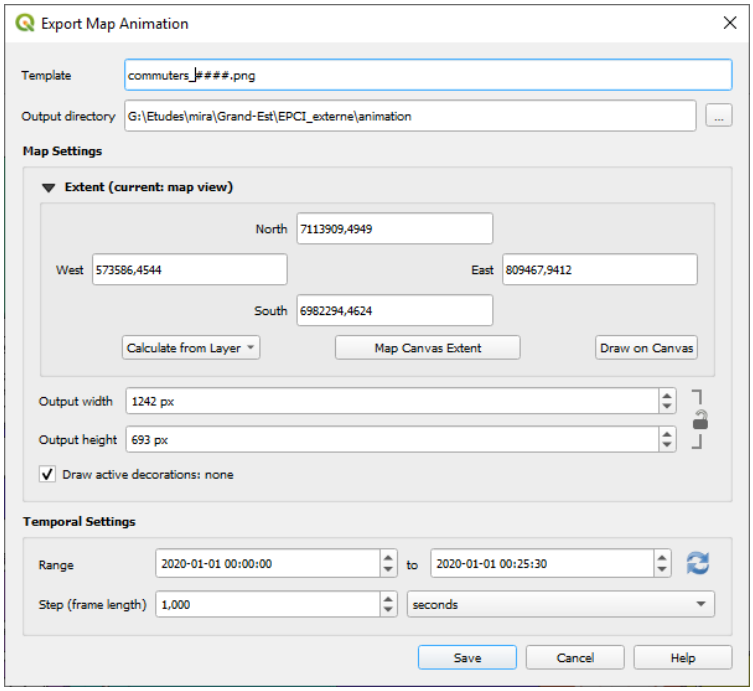


Generating a video

To generate a video there are several solutions.

The principle is to export a frame of each step from the time controller and then from an external tool to assemble each frame to make a video, for example with the open source tool ffmpeg

To do this, you just need to use the export of the animation from the time controller. The images will be called commuters_0001.png, commuters_0002.png, ...



Example of a command with ffmeg to combine the images into a video "mobility_areas.mp4

ffmpeg -r 1 -i b commuters_%04d.png -vcodec mpeg4 -y mobility_areas_hdf.mp4