Mobility-Metrix

AI-Powered Mobility Decisions

www.mobility-metrix.fr

May 15, 2025

THE CHALLENGES OF MOBILITY DECISION-MAKERS

Obligation to decarbonize

01

The transport sector is the largest emitter with more than 30% of emissions.
How to decarbonize the sector?

02

Knowledge of travel

Knowledge of mobility mainly through surveys.
How to bring continuous knowledge?

Data jungle

04

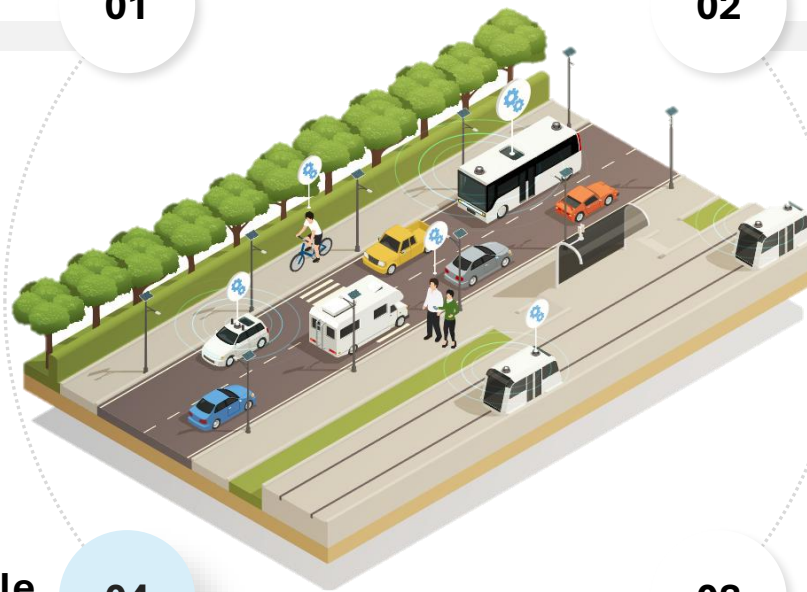There are many sets of mobility data, all with biases.
How to use them?

03

Understanding the ecosystem

All mobility services are linked and many factors affect them: freight, weather, urban planning, tariffs ...
How to act in a systemic context?

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OUR SAAS SOFTWARE SOLUTION

1 | **Reliable business indicators**

Modal share

Origin-Destination flow

Sending & generating poles
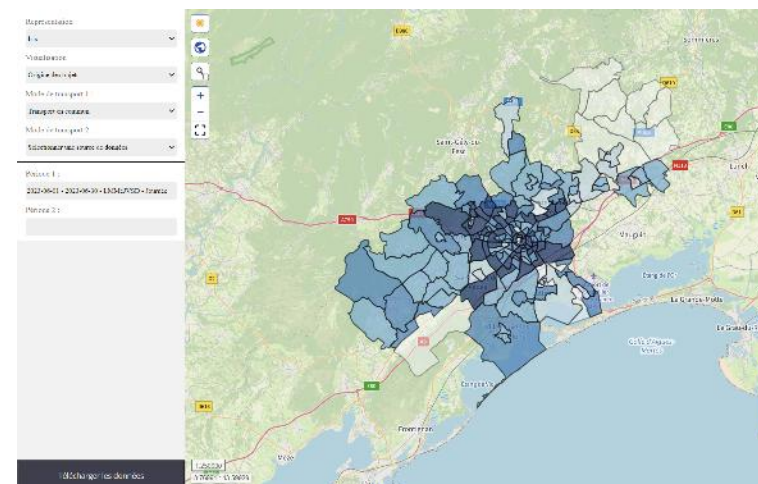

Travel time

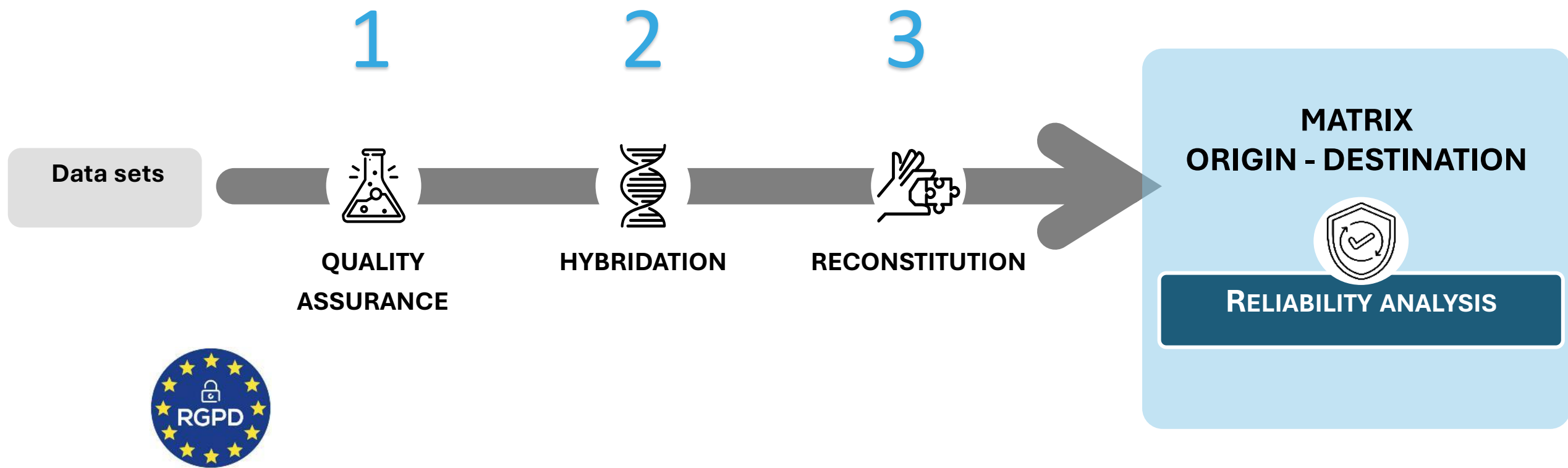**2** | **Monitoring of developments**

Evolution of mobility

Impact of decisions

3 | **Intuitive mapping**

HOW? A WORK ON DATA

1

2

3

Data sets

QUALITY
ASSURANCE

HYBRIDATION

RECONSTITUTION

RGPD

**MATRIX
ORIGIN - DESTINATION**

RELIABILITY ANALYSIS

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SOURCES OF DATA

Data in open data

Open data from public sources such as the National Institute of Statistics, GTFS files of public transport networks, open street map data, weather ... as well as various open-access survey databases.

Territory data

Data provided by local authorities and mobility operators, including road traffic counts, bicycle count, camera data, public transit ticketing data... .

Data purchased

Data sets acquired from private suppliers, such as GPS geolocation data for smartphone apps, telecoms flows (antenna borages), GPS traces of car manufacturers and mobility information from technology partners.

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They **trust** us

ATM

GRAND REIMS
COMMUNAUTÉ URBAINE

Tours
métropole
Val de Loire

DIJON
métropole

BOURGES
PLUS
COMMUNAUTÉ D'AGGLOMÉRATION

Grand
Annecy

ROYAN
ATLANTIQUE

valence
romans
AGGLO

tisséo
COLLECTIVITÉS

Montpellier
méditerranée
Métropole

MÉTROPOLE
Toulon Provence Méditerranée

Mobility-Metrix

HexaDone

transdev
the mobility company

GROUPEMENT
LACROIX & SAVAC

Thank you

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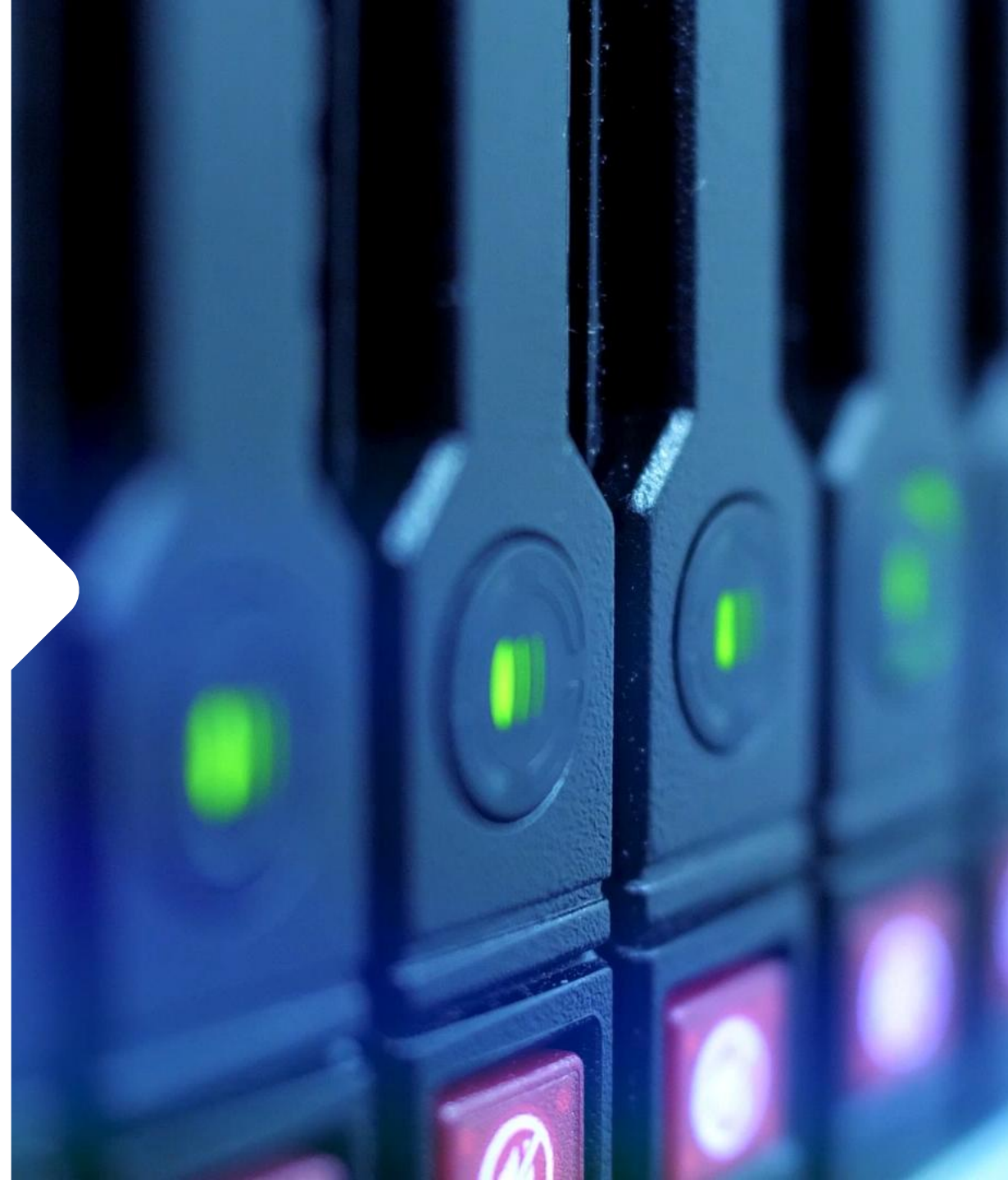
1 QUALITY MANAGEMENT

Data quality at Mobility Metrix is based on two key steps:

1. **Data cleaning:**
   - Identification and correction or deletion of errors,
   - Consistency of data sources .

2. **Qualification of data** :
   - Assignment of transport mode to GPS tracks. (©Mobility Metrix algorithm)

2 HYBRIDIZATION

Mobility Metrix then crosses the datasets by:

1. **Establishment of the data genome** : As in genetics, each source – GPS, ticketing, counting, telecoms (Orange's Flux Vision) – has its own code, with its strengths and weaknesses. We analyse these mobility "genes" to understand their complementarity and build a strong common base.

2. **Data Quality Transplant** : Like a biological transplant to strengthen an organism, we cross the best characteristics of each source. We select the most reliable variables to correct biases and produce a more accurate hybrid data that is representative of real mobilities.

3. **Production of a first partial OD matrix** : At the end of these first 2 treatments, we generate a first partial multimodal origin-destination matrix.
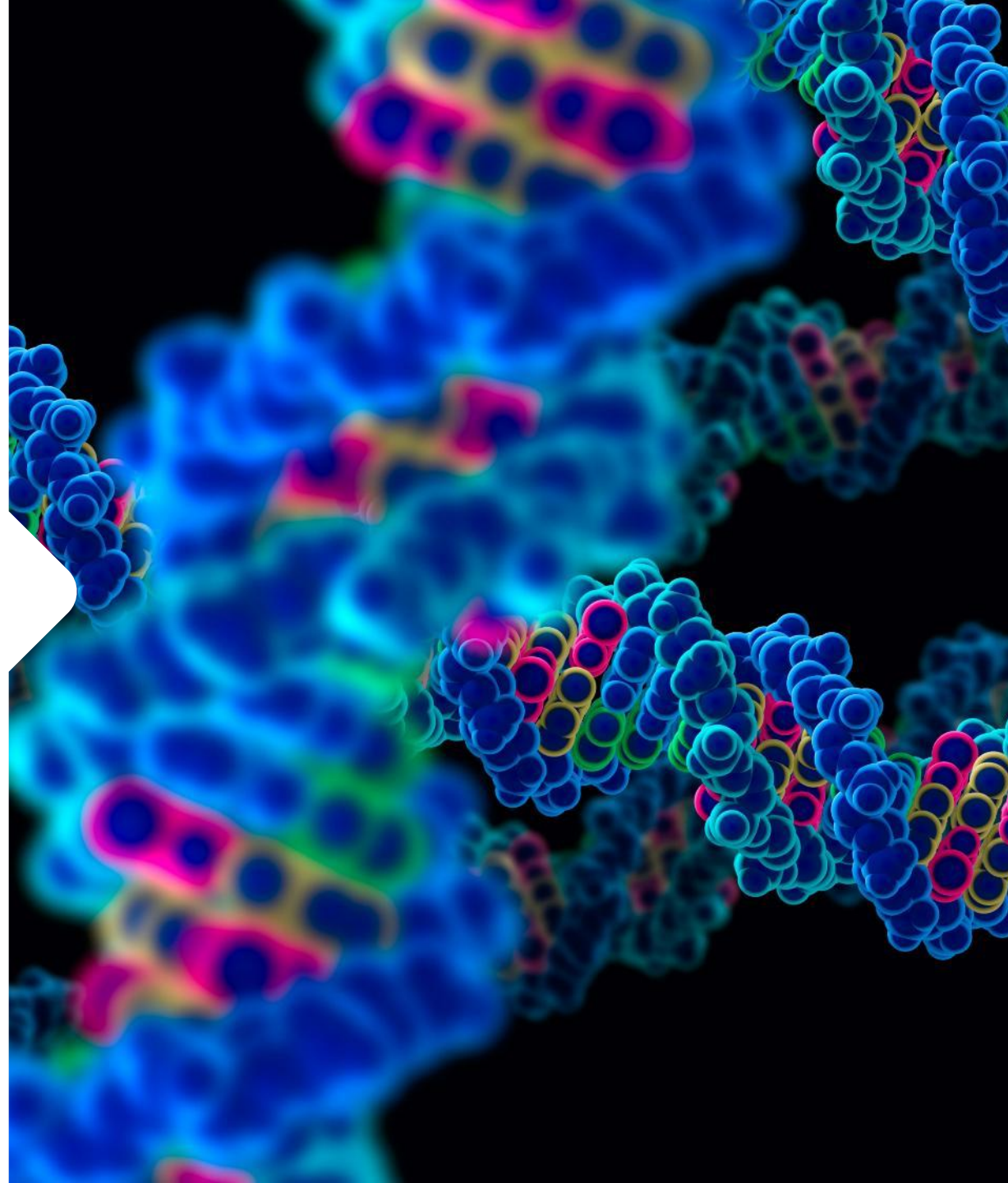
3 RECONSTITUTION

From the partial OD matrices, **Mobility Metrix trains machine learning models to reconstruct an image of all the movements of the territory:**

1. **Automatic learning** of missing data
   - Use of INSEE data (population statistics, CSP, age , income…), weather data, OSM data, housing data, POI data … to train the ML models
   - Implementation of supervised and unsupervised machine learning algorithms to predict missing data.

2. **Realignment** of travel volumes
   - Weighting of sources to best reflect the reality of mobility flows.
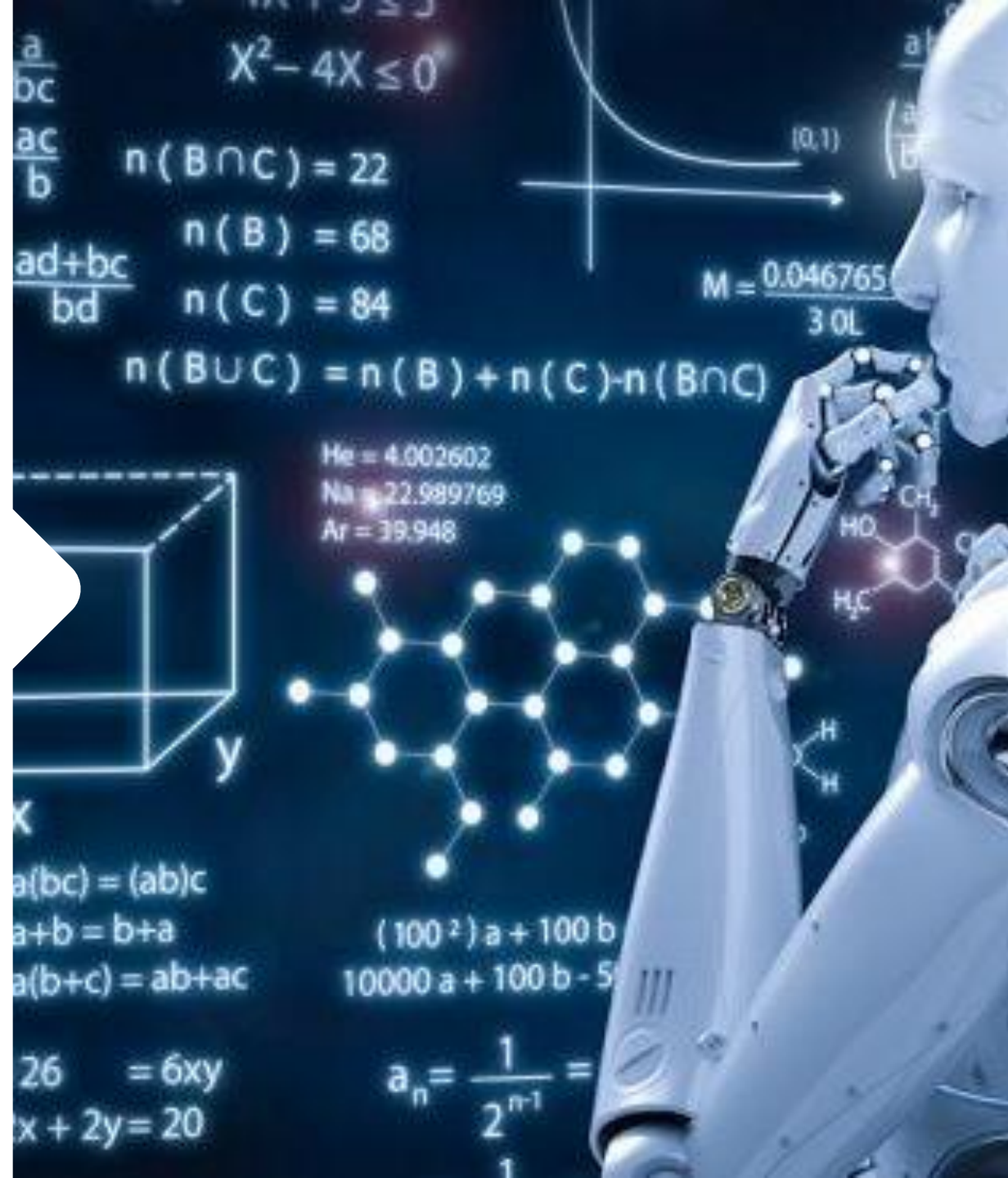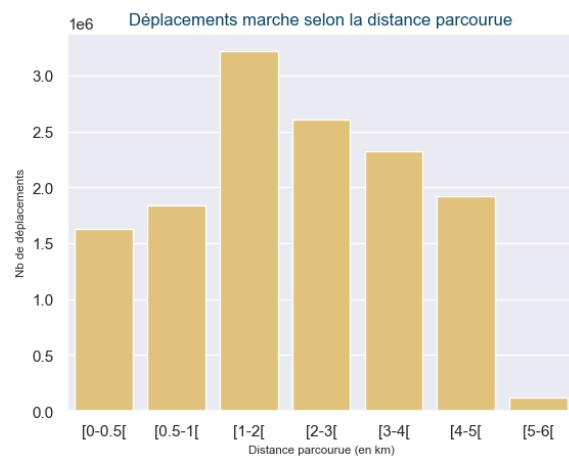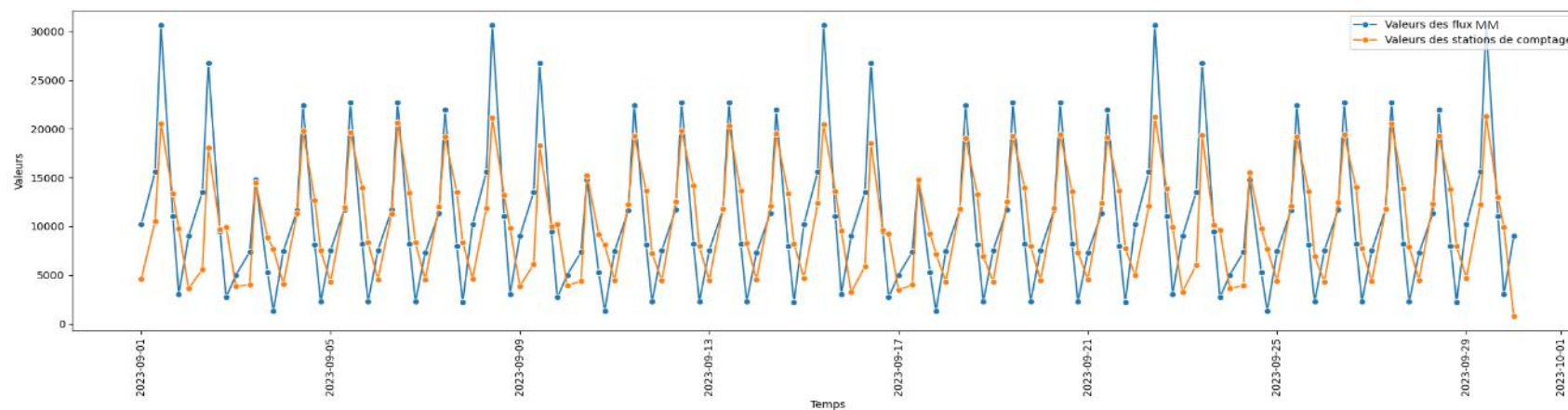
RELIABILITY ANALYSIS

- 100% reliability does not exist.

- The finer the spatiotemporal mesh, the less reliable it is.

- We inform users of the level of reliability achieved by producing a reliability report.
 - Examples

Number of walk travel per distance travelled

Correlation between the counts of a "real" station and a "virtual" station.

USE CASES: LOCAL AUTHORITIES

- Sharing information internally and with partners

  with the neighbouring authorities, the Region, the planning agency...

- Easily view values from databases

  Per period, per typical day and per time slot:
  - Road traffic, pedestrian and bicycle counts, ticketing validations
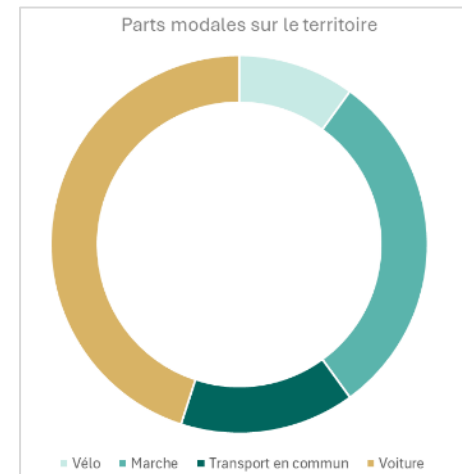 - Use of bike stations, car parks
  - INSEE data

- Have a mapping tool to read the survey databases
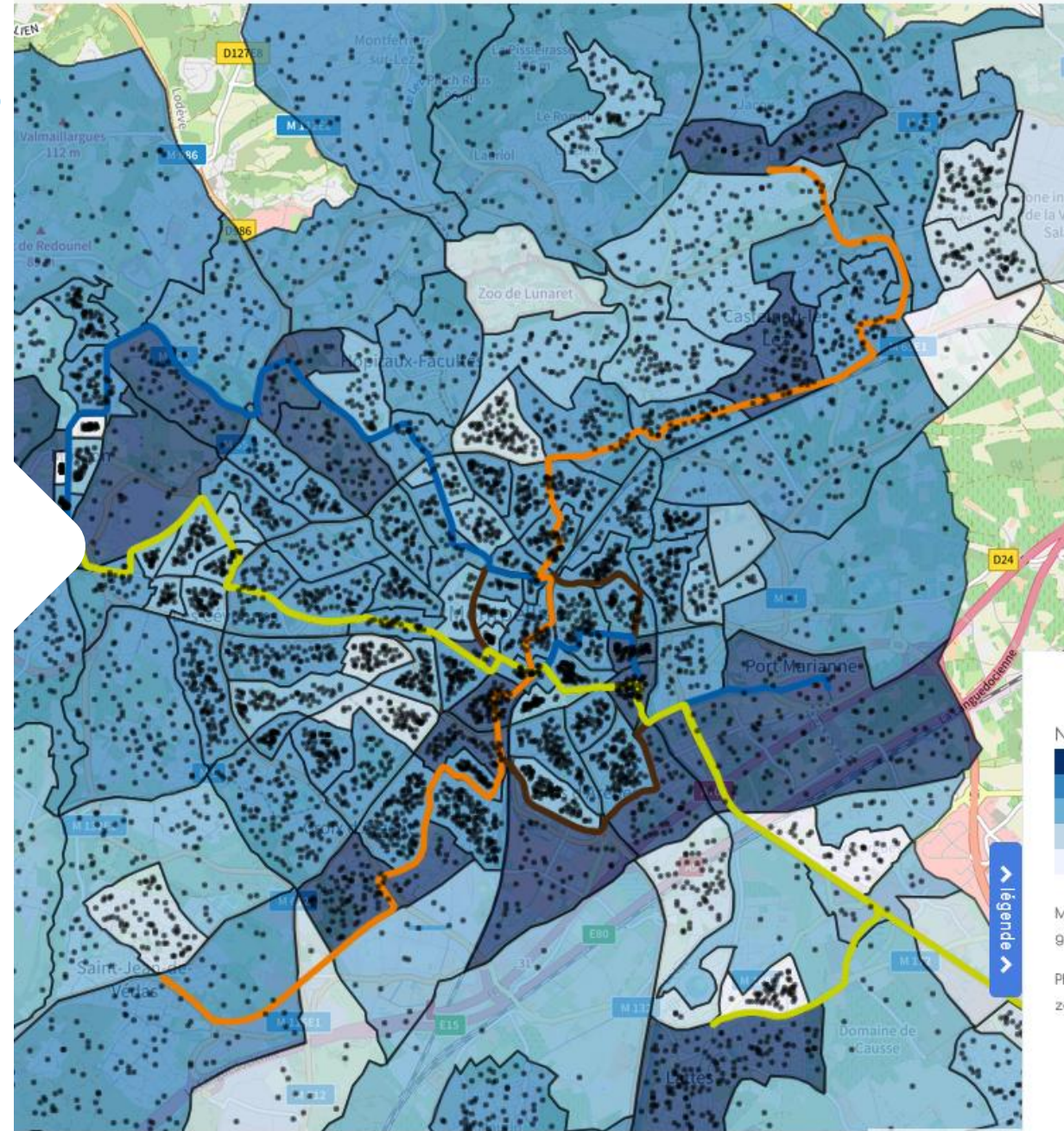
USE CASES: LOCAL AUTHORITIES

- Make a diagnosis of mobility
   as part of a strategic plan or draft

- Have decision-making support and objectivation

- Obtain reliable input data for long-term planning

- Track the impact of a decision

- Follow the objectives of a strategic plan
   - Evolution of modal shares,
   - Trends in CO_2e emissions
   - …

Kilomètres d'aménagements cyclables

201 km
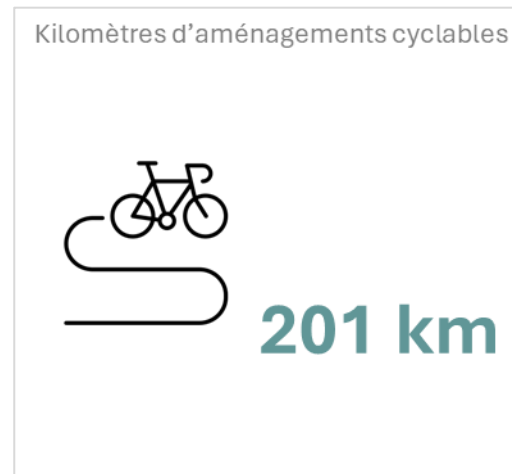
Monitoring the objectives of a DMP

Parts modales sur le territoire

Vélo Marche Transport en commun Voiture

Mobility Diagnosis/Sharing

Juin 2023	Juin 2019
51 008 t CO2e	109 481 t CO2e
🚗 50 043 t CO2e	🚗 108 493 t CO2e
🚌 955 t CO2e	🚌 980 t CO2e
🚲 10 t CO2e	🚲 8 t CO2e

Monitoring CO_2e emissions

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USE CASES: OPERATORS

- Analyze the relevance of the positioning of public transportation stops

- Analyse the public transport offer
  - Highlighting important car flows with a low or non-existent TC modal share
  - Identification of less competitive journey times in the face of the car

- Compare transit/cars modal shares from several municipalities

- Analyze and compare actual travel times of each mode of transport

Relevance of judgments
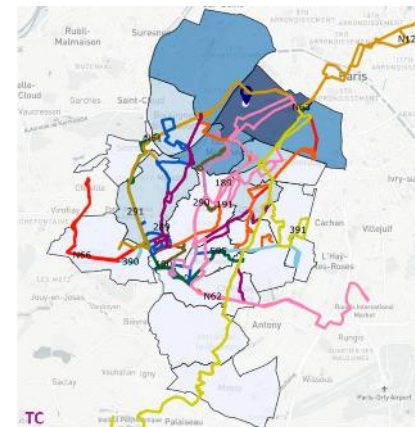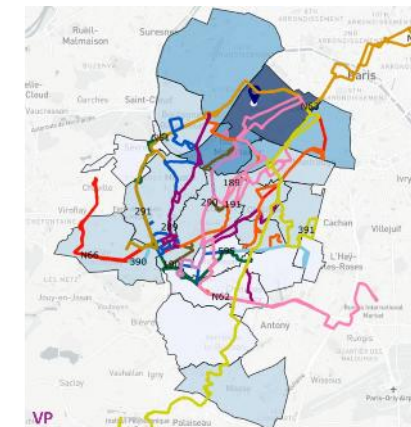
Comparison of modal shares

USE CASES: OPERATORS

- Analyse the potential of a new offer
  bus, TOD, train ...

- Sizing a new offer
  Example: extension to Sunday of an existing
  service on Saturday
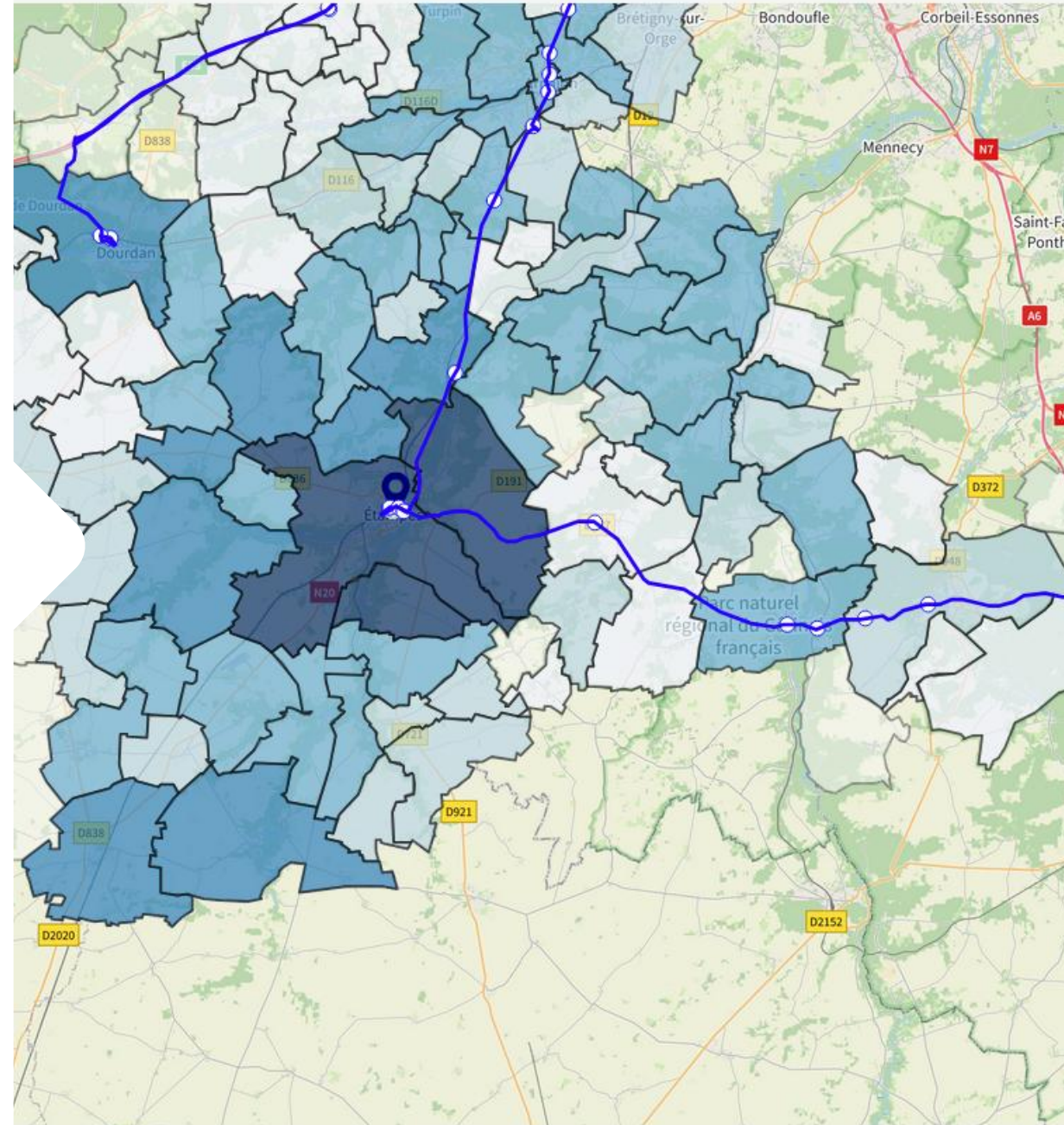
USE CASES: POI MANAGERS

- Know the number of unique visitors

- Understand the recurrence of their visits

- Know how long you are there

- Identify and analyse the areas of residence, origin and mode of travel of visitors

- Monitor changes in $CO2_e$ emissions
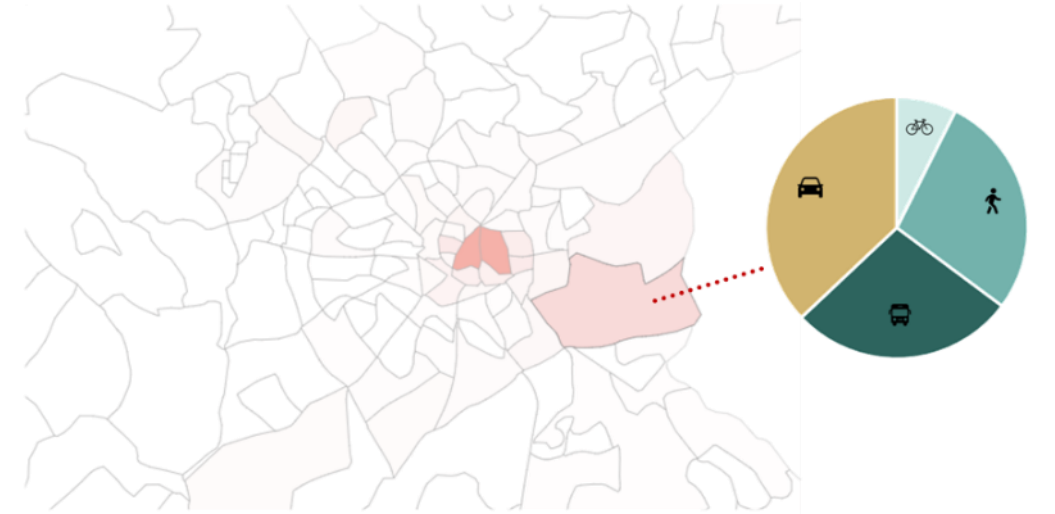
Residence and mode of travel for visitors
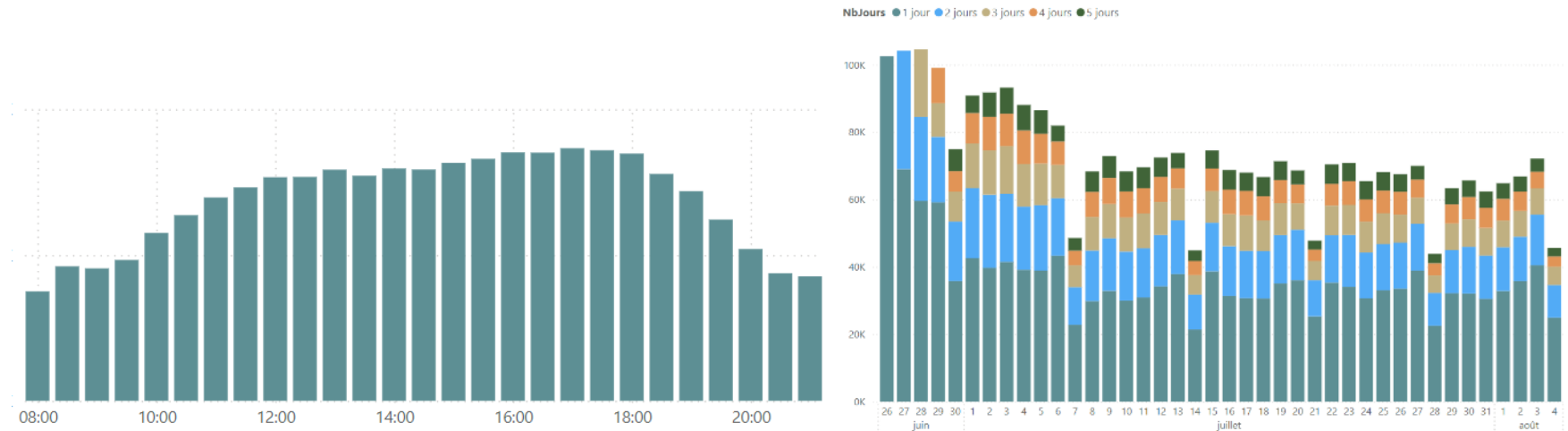
Schedule profile of visits

Recurrence of visits

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CUSTOMIZABLE DASHBOARD
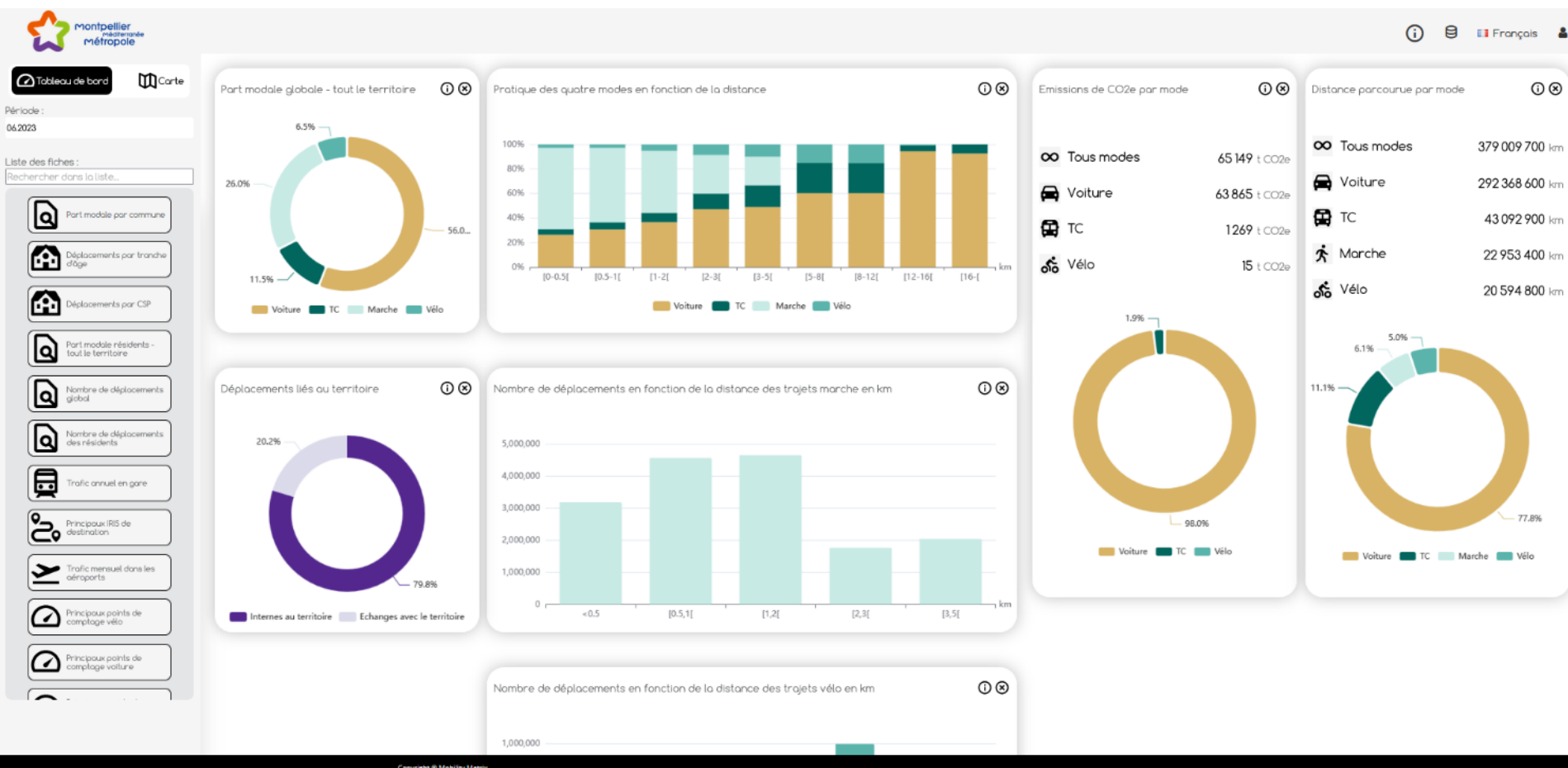
Records

- Parts modales
- Number of trips
- Distances travelled by mode
- Main countingpoints by mode
- PrincipleODflows by mode
- Trafficairport
- Smugglers
- …

EXAMPLE MAPPING OF THE SENDING POLES BY IRIS

Representation of the origins of public transport journeys by IRIS, with semis of points of the student population, and drawn tramway lines in the background.

EXAMPLE MAPPING OD VP FLOW FROM CASTELNAU-LE-LEZ

Few trips to this IRIS

Many trips to this IRIS

Visualisation of INSEE data of the selected IRIS (name, global population and categories) and modal shares from the selected IRIS in the cartridge that opens when an IRIS is selected.
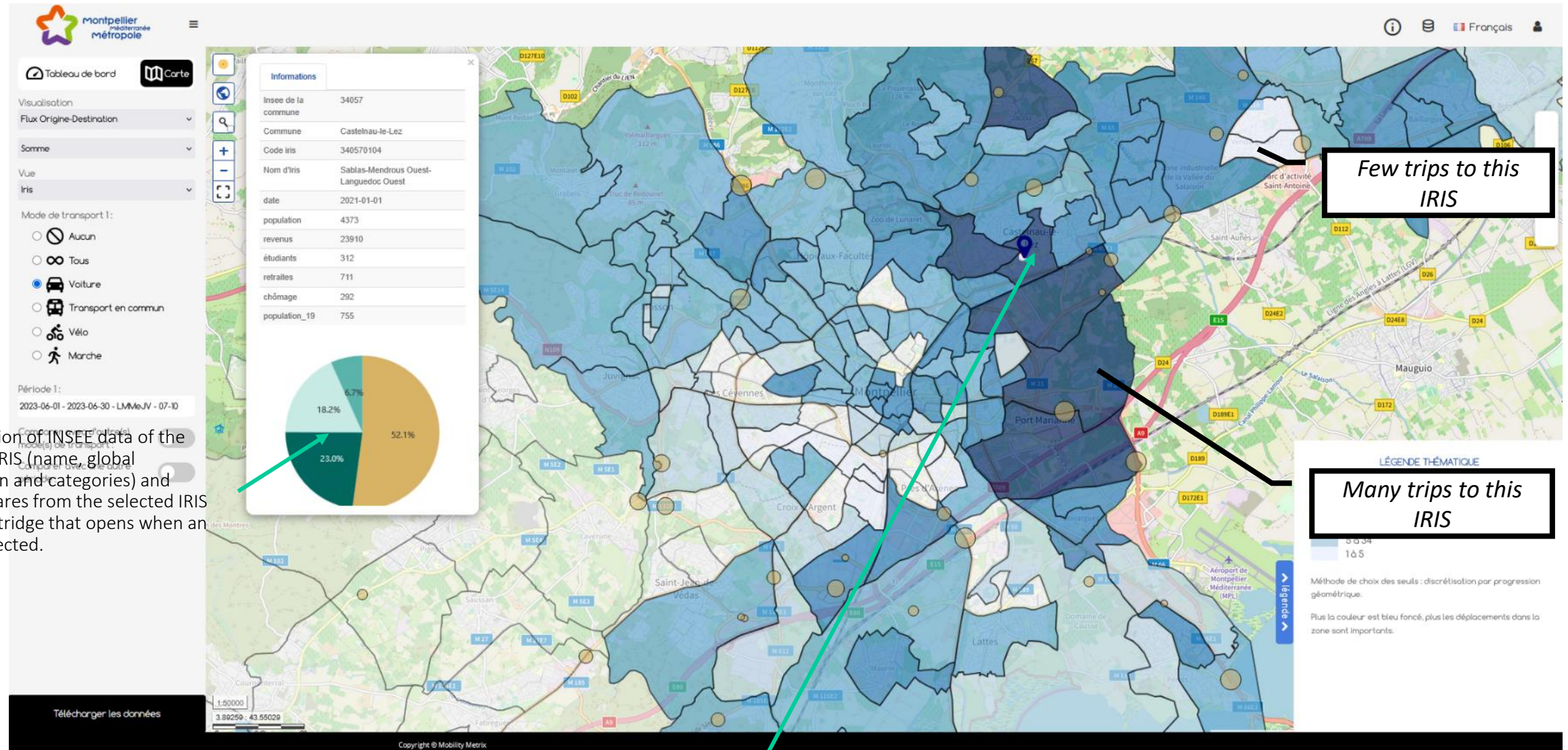
Representation of the flows from Origin to Destination in number of car trips from the selected IRIS "Sablas..." (marked with a blue chip) of the commune of Castelnau-le-Lez.
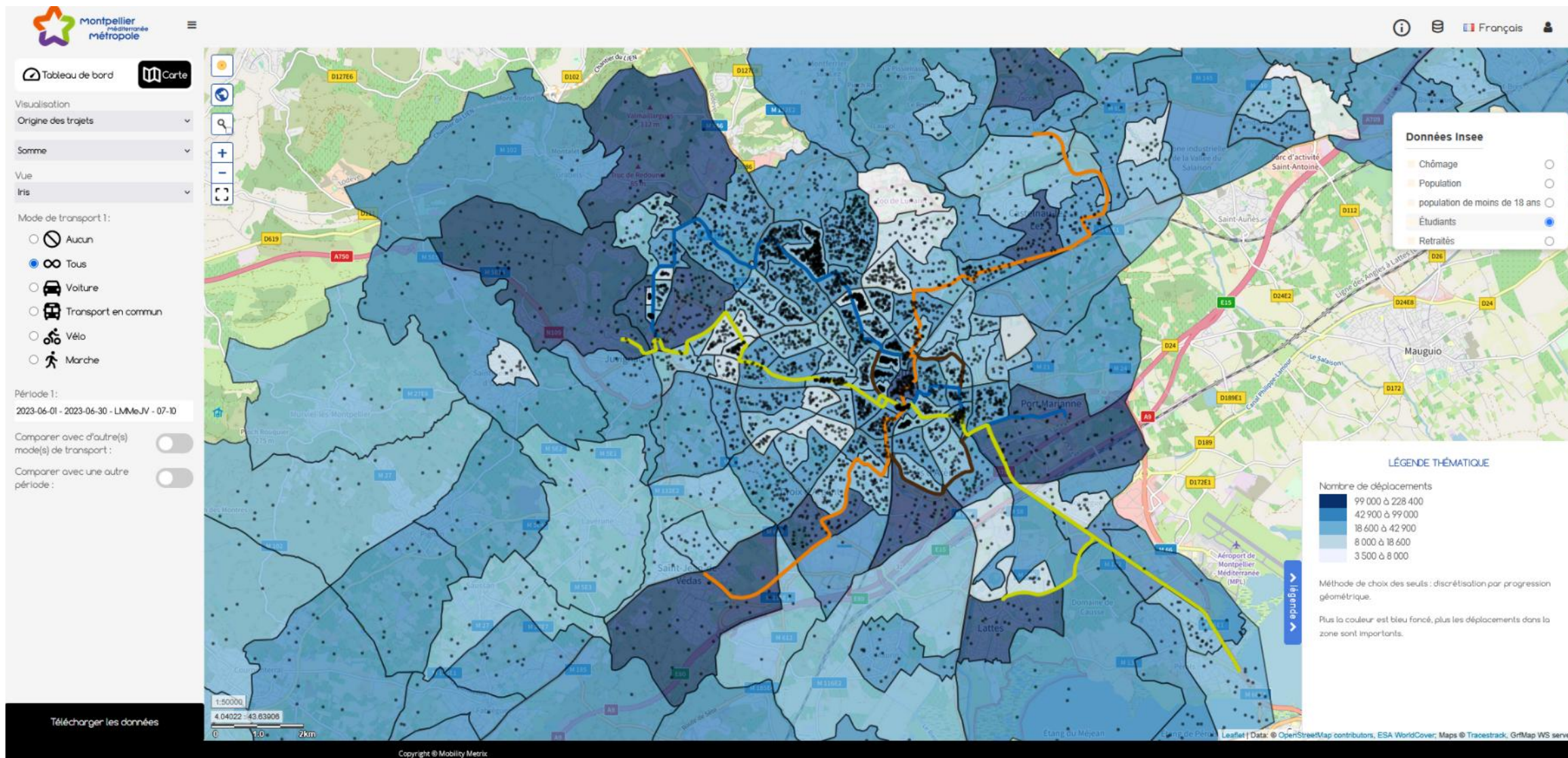The more IRIS are dark blue, the more destinations to this IRIS from the selected IRIS.
The beige circles represent car counting stations. The larger the diameter of the circle, the greater the number of vehicles detected passing through this point.

VISUALIZATION OF TRAVEL TIMES

- Analysis of journey times by mode of transport/typical day/time slot;

- Comparison of the evolution of travel times for a mode of transport;

- Comparison of journey times for different modes of transport.
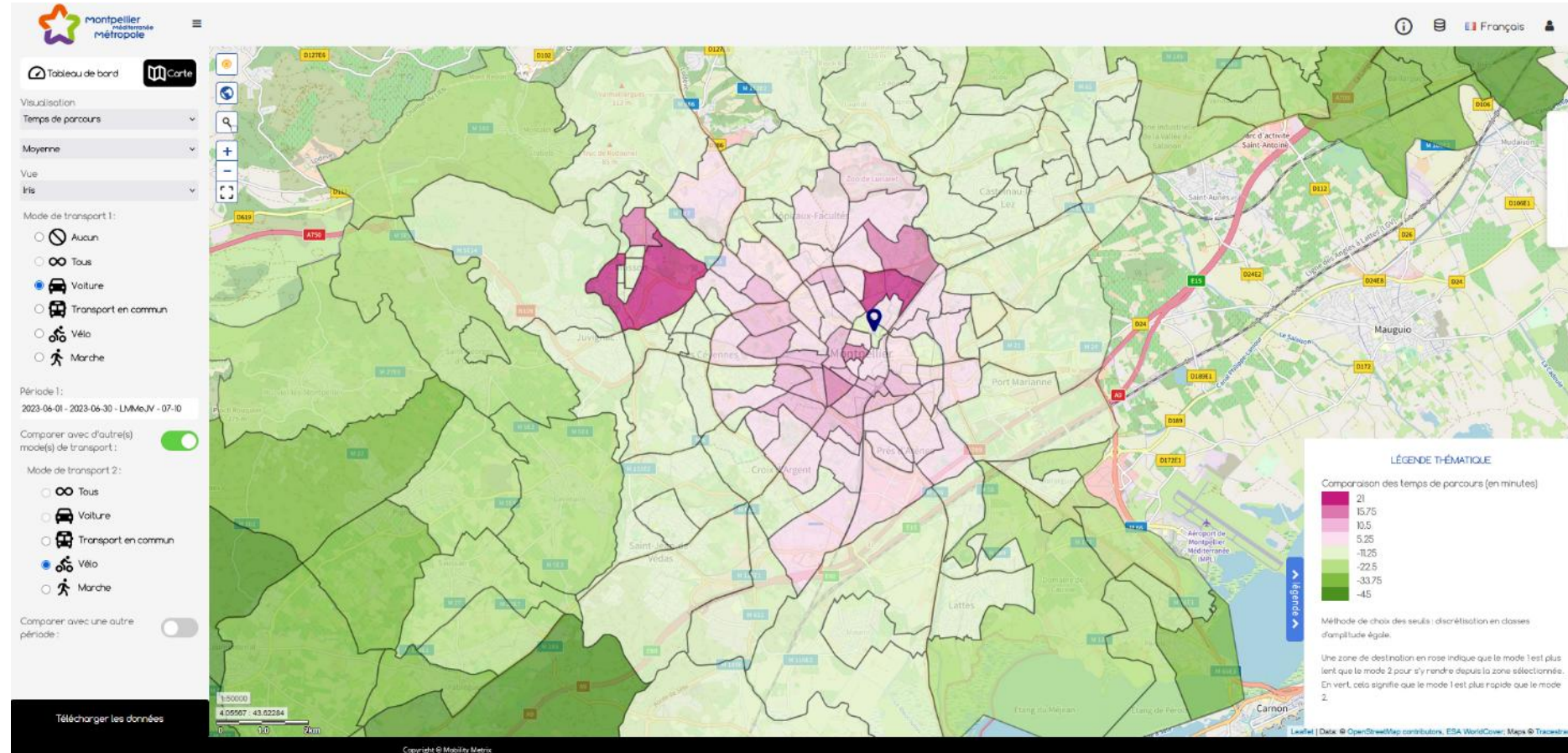
Here comparison of travel times between the common car and bike from an IRIS in the center of Montpellier. In pink times faster routes by bike, in green faster by car.

ALSO

Mobility Metrix Platform also offers many other features making the solution a very complete observatory. For example Mobility MetrixPlatform can offer visualization (if available):

- the layout of TC network lines and stops,
- the number of validations at the time of arrest,
- the layout of cycling facilities,
- the different population statistics,
- data from counting stations available on the territory (road traffic, cycling, walking),
- Parking and ridesharing fills,
- Bike stations,
- electrical charging stations,
- events (accidents, construction sites...),
- Heat map of travel.

Example opposite: "Heatmap" (heat map)

The small white circles are TC stops. The blue/green/pink zones represent the density of departures/arrivals of journeys, all modes combined (GPS smartphone base representing ~30% of the population- not rectified). This representation has made it possible, for example, to study the positioning of bus stops on the port of Gennevilliers (IDF).

ORIGIN-DESTINATION (OD) MATRIX

- An OD matrix expresses the number of people travelling from one point or neighbourhood to another point/neighbourhood

- Mobility-Metrix creates OD matrices:
  - by IRIS INSEE (French National Institute of Statistics ~NSO)
    - IRIS is a neighbourhood defined by INSEE
  - by mode of transport
  - per day
  - per hour slot

  Example:

IRIS Origine	IRIS Destination	Date	Tranche horaire	Marche	Vélo	VP	TC
212780103	212780103	02/02/2024	0h-7h	-	15	150	25
212780103	212780103	02/02/2024	7h-9h	-	15	180	32
212780103	212780103	02/02/2024	9h-16h	244	18	2820	350
212780103	212780103	02/02/2024	16h-18h	250	1	2510	420
212780103	212780103	02/02/2024	18h-0h	537	12	1280	122
212780103	212780102	02/02/2024	0h-7h	4396	5	850	-
212780103	212780102	02/02/2024	7h-9h	15860	6540	-	150
212780103	212780102	02/02/2024	9h-16h	12021	6330	-	120
212780103	212780102	02/02/2024	16h-18h	132	9	657	85
212780103	212780102	02/02/2024	18h-0h	-	-	1238	253
212780103	212311502	02/02/2024	0h-7h	296	24	560	-
212780103	212311502	02/02/2024	7h-9h	830	170	289	50
212780103	212311502	02/02/2024	9h-16h	1953	100	1280	90

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WHO ARE WE ?

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2022: Creation of the company

Today 10+10 people

A team of 10 people supported by
10 Advisors: Elected representatives, heads of companies, directors of large groups, business experts

LABELISED
DEEP
TECH

LA FRENCH TECH

bpifrance

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