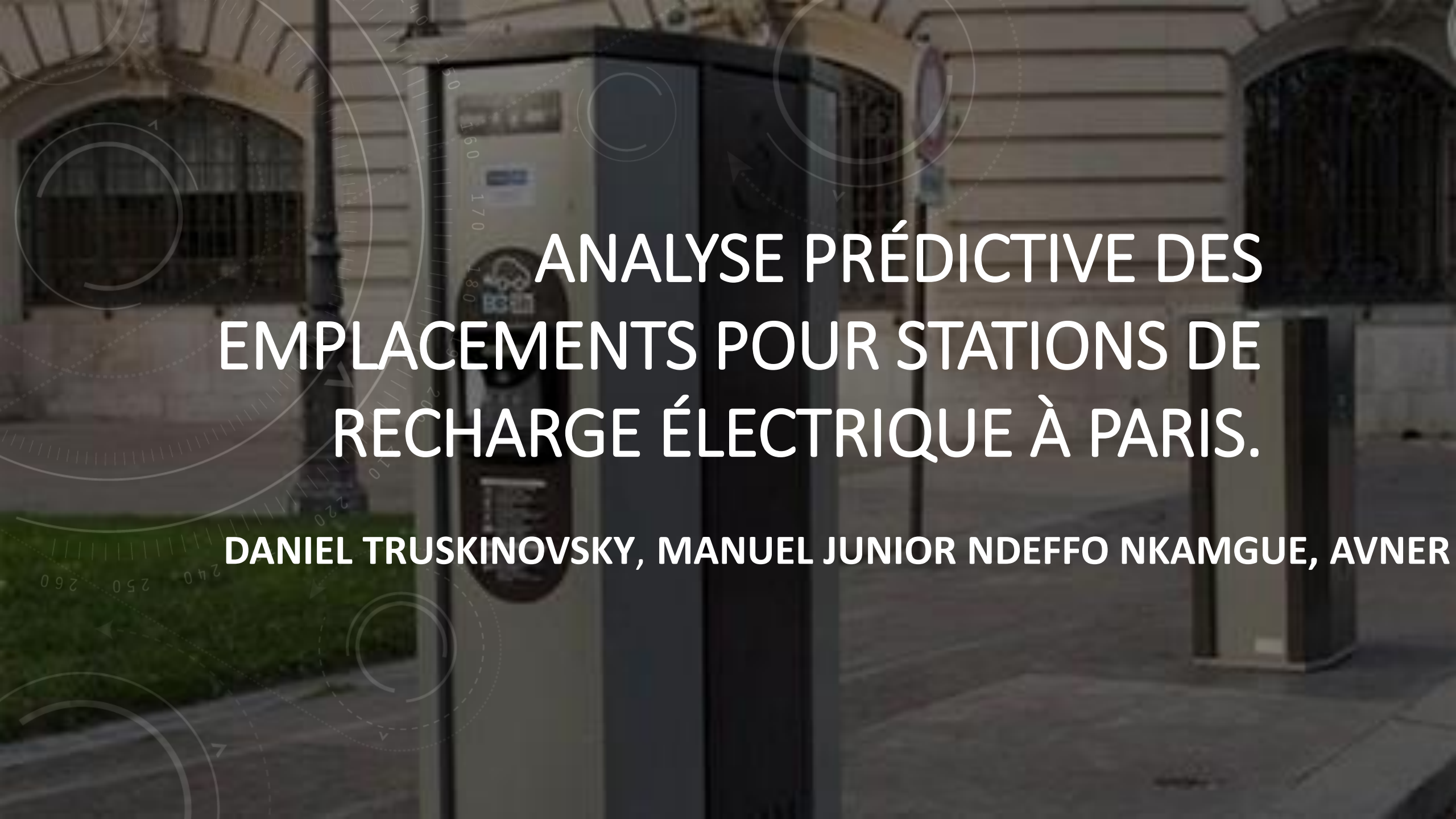
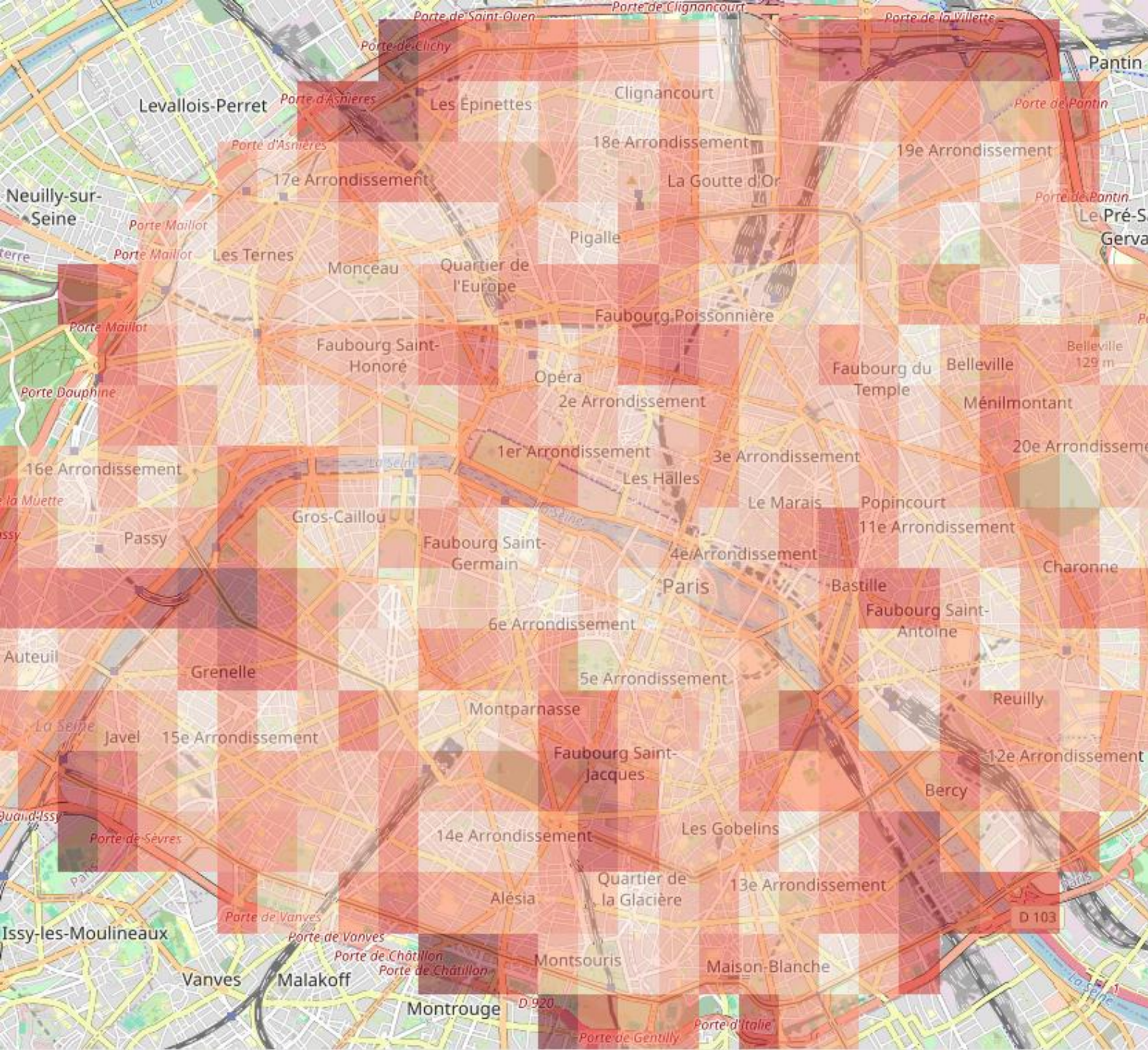




# ANALYSE PRÉDICTIVE DES EMPLACEMENTS POUR STATIONS DE RECHARGE ÉLECTRIQUE À PARIS.

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# DISTANCE À LA STATION LA PLUS PROCHE

- Division de Paris en rectangles de 0.005 de latitudes et de longitudes (555 mètres de latitude et 370 m de longitude)
- Distance de haversine

Haversine formula:

$$a = \sin^2(\Delta\phi/2) + \cos \phi_1 \cdot \cos \phi_2 \cdot \sin^2(\Delta\lambda/2)$$
$$c = 2 \cdot \text{atan2}(\sqrt{a}, \sqrt{1-a})$$
$$d = R \cdot c$$

- Exemple de zones de manques:  
Faubourg Saint Jacques faubourg Saint Antoine

# DATASET ROUTIER

## API RÉFÉRENTIEL FILTRÉ

|   | Identifiant arc |                    | lat                | lon |
|---|-----------------|--------------------|--------------------|-----|
| 0 | 6799            | 48.88610804018005  | 2.3060170797614274 |     |
| 1 | 6839            | 48.882846124767354 | 2.309608336489109  |     |
| 2 | 6381            | 48.88185021600981  | 2.313636877615184  |     |
| 3 | 1240            | 48.867653082202935 | 2.362827833173667  |     |
| 4 | 5164            | 48.83748471020789  | 2.2572392666841106 |     |

## COMPTAGE ROUTIER FILTRÉ 2020

|   | iu_ac | k       | t_1h                |
|---|-------|---------|---------------------|
| 0 | 799   | 0.28167 | 2020-01-22 01:00:00 |
| 1 | 799   | 0.14611 | 2020-01-22 02:00:00 |
| 2 | 799   | 0.10333 | 2020-01-22 03:00:00 |
| 3 | 799   | 0.02778 | 2020-01-22 04:00:00 |
| 4 | 799   | 0.11778 | 2020-01-22 05:00:00 |

## ARRONDISSEMENTS GEOJSON

```
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```

|   | k       | t_1h                | lat              | lon                |
|---|---------|---------------------|------------------|--------------------|
| 0 | 0.28167 | 2020-01-22 01:00:00 | 48.8209057931176 | 2.3552584484462633 |
| 1 | 0.14611 | 2020-01-22 02:00:00 | 48.8209057931176 | 2.3552584484462633 |
| 2 | 0.10333 | 2020-01-22 03:00:00 | 48.8209057931176 | 2.3552584484462633 |
| 3 | 0.02778 | 2020-01-22 04:00:00 | 48.8209057931176 | 2.3552584484462633 |
| 4 | 0.11778 | 2020-01-22 05:00:00 | 48.8209057931176 | 2.3552584484462633 |

## COMPTAGE ROUTIER FILTRÉ PAR CARRÉ ET HEURE

|   | t_1h                | carre_id | moyenne_k | somme_k  | count_k | lati    | long   |
|---|---------------------|----------|-----------|----------|---------|---------|--------|
| 0 | 2020-01-22 01:00:00 | 0_16     | 0.325000  | 0.65000  | 2       | 48.8125 | 2.3375 |
| 1 | 2020-01-22 01:00:00 | 0_20     | 0.000000  | 0.00000  | 2       | 48.8125 | 2.3575 |
| 2 | 2020-01-22 01:00:00 | 10_1     | 1.478148  | 8.86889  | 6       | 48.8625 | 2.2625 |
| 3 | 2020-01-22 01:00:00 | 10_10    | 1.640304  | 18.04334 | 11      | 48.8625 | 2.3075 |
| 4 | 2020-01-22 01:00:00 | 10_11    | 2.367567  | 49.71890 | 21      | 48.8625 | 2.3125 |
| 5 | 2020-01-22 01:00:00 | 10_12    | 2.206557  | 33.09835 | 15      | 48.8625 | 2.3175 |

# DATASET FINAL

COMPTAGE ROUTIER FILTRÉ PAR CARRÉ ET HEURE  
(MODIFICATION T\_1H EN UTC)

|   | t_1h                | carre_id | moyenne_k | somme_k  | count_k | lati    | long   |
|---|---------------------|----------|-----------|----------|---------|---------|--------|
| 0 | 2020-01-22 01:00:00 | 0_16     | 0.325000  | 0.65000  | 2       | 48.8125 | 2.3375 |
| 1 | 2020-01-22 01:00:00 | 0_20     | 0.000000  | 0.00000  | 2       | 48.8125 | 2.3575 |
| 2 | 2020-01-22 01:00:00 | 10_1     | 1.478148  | 8.86889  | 6       | 48.8625 | 2.2625 |
| 3 | 2020-01-22 01:00:00 | 10_10    | 1.640304  | 18.04334 | 11      | 48.8625 | 2.3075 |
| 4 | 2020-01-22 01:00:00 | 10_11    | 2.367567  | 49.71890 | 21      | 48.8625 | 2.3125 |
| 5 | 2020-01-22 01:00:00 | 10_12    | 2.206557  | 33.09835 | 15      | 48.8625 | 2.3175 |

DISPONIBILITÉ DES STATIONS EN TEMPS RÉELS MODIFIÉ  
(FILTRÉE + CALCUL DE TAUX\_OCCUP ET TAUX\_DISPO)

|   | timestamp                 | latitude  | longitude | taux_occup | taux_dispo |
|---|---------------------------|-----------|-----------|------------|------------|
| 0 | 2020-01-22 01:00:00+00:00 | 48.855667 | 2.354089  | 0.666667   | 0.333333   |
| 1 | 2020-01-22 01:00:00+00:00 | 48.864240 | 2.397724  | 0.666667   | 0.333333   |
| 2 | 2020-01-22 01:00:00+00:00 | 48.861016 | 2.283080  | 0.666667   | 0.333333   |
| 3 | 2020-01-22 01:00:00+00:00 | 48.824388 | 2.336857  | 0.666667   | 0.333333   |
| 4 | 2020-01-22 01:00:00+00:00 | 48.846295 | 2.374877  | 0.666667   | 0.333333   |

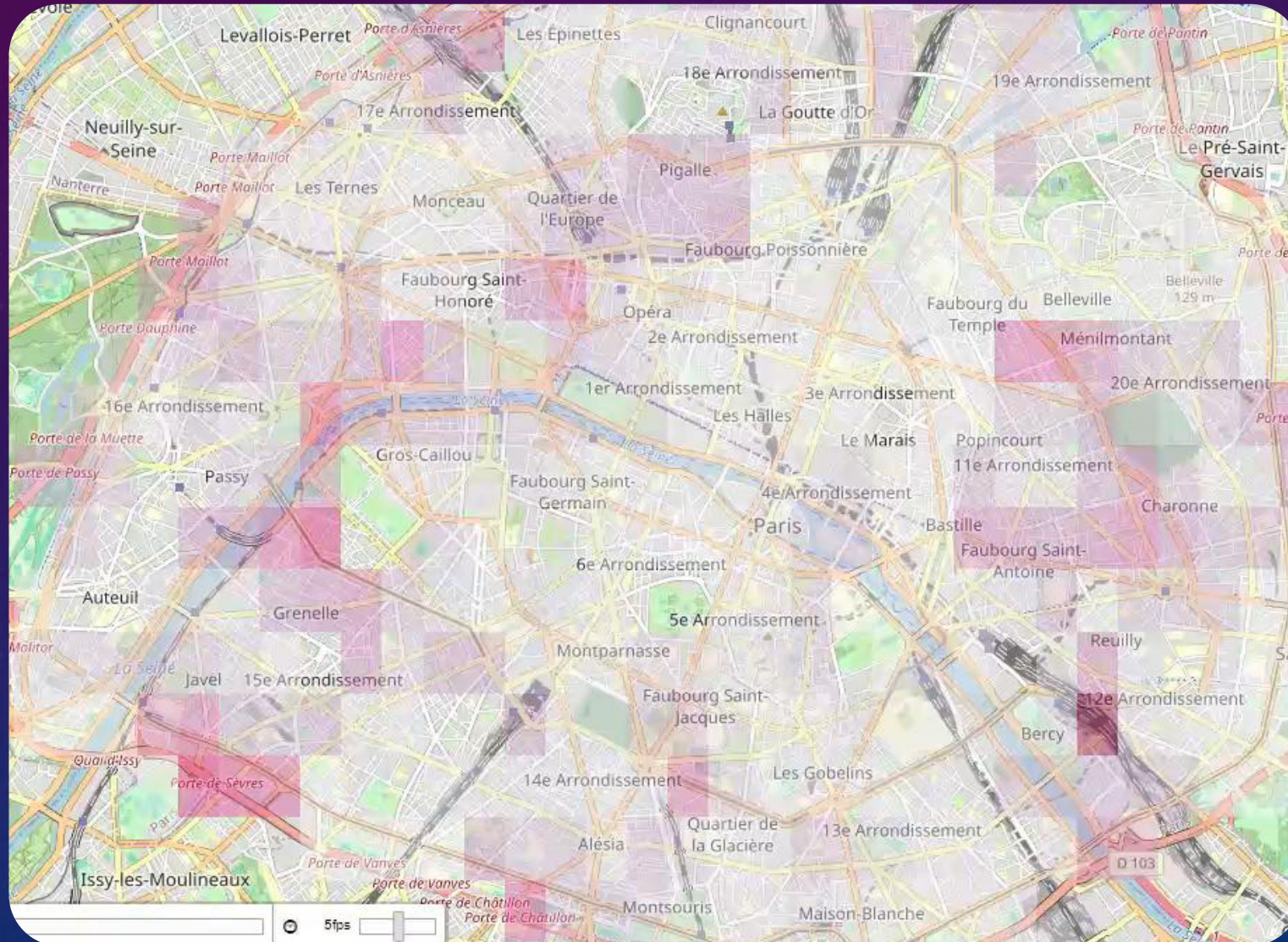
REGROUPEMENT PAR CARRÉ ET CALCUL DES TAUX OCCUPATIONS DES STATIONS LES PLUS PROCHES

|   | timestamp                 | carre_id | center_lat | center_lon | distance_to_closest_1 | taux_occup_closest_1 | distance_to_closest_2 | taux_occup_closest_2 | distance_to_closest_3 | taux_occup_closest_3 | normalized_distance |
|---|---------------------------|----------|------------|------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|----------------------|---------------------|
| 0 | 2020-01-22 01:00:00+00:00 | 1_15     | 48.8175    | 2.3325     | 0.829681              | 0.666667             | 0.895720              | 0.333333             | 1.278762              | 0.333333             | 42.012806           |
| 1 | 2020-01-22 01:00:00+00:00 | 1_16     | 48.8175    | 2.3375     | 0.767356              | 0.666667             | 0.583030              | 0.333333             | 1.089418              | 0.333333             | 38.856816           |
| 2 | 2020-01-22 01:00:00+00:00 | 1_17     | 48.8175    | 2.3425     | 0.381517              | 0.333333             | 0.870231              | 0.666667             | 1.003205              | 0.333333             | 19.318955           |
| 3 | 2020-01-22 01:00:00+00:00 | 1_18     | 48.8175    | 2.3475     | 0.468196              | 0.333333             | 1.045944              | 0.333333             | 1.092598              | 0.666667             | 23.708146           |
| 4 | 2020-01-22 01:00:00+00:00 | 1_20     | 48.8175    | 2.3575     | 0.979265              | 0.166667             | 1.081931              | 0.333333             | 1.758763              | 0.333333             | 49.587318           |

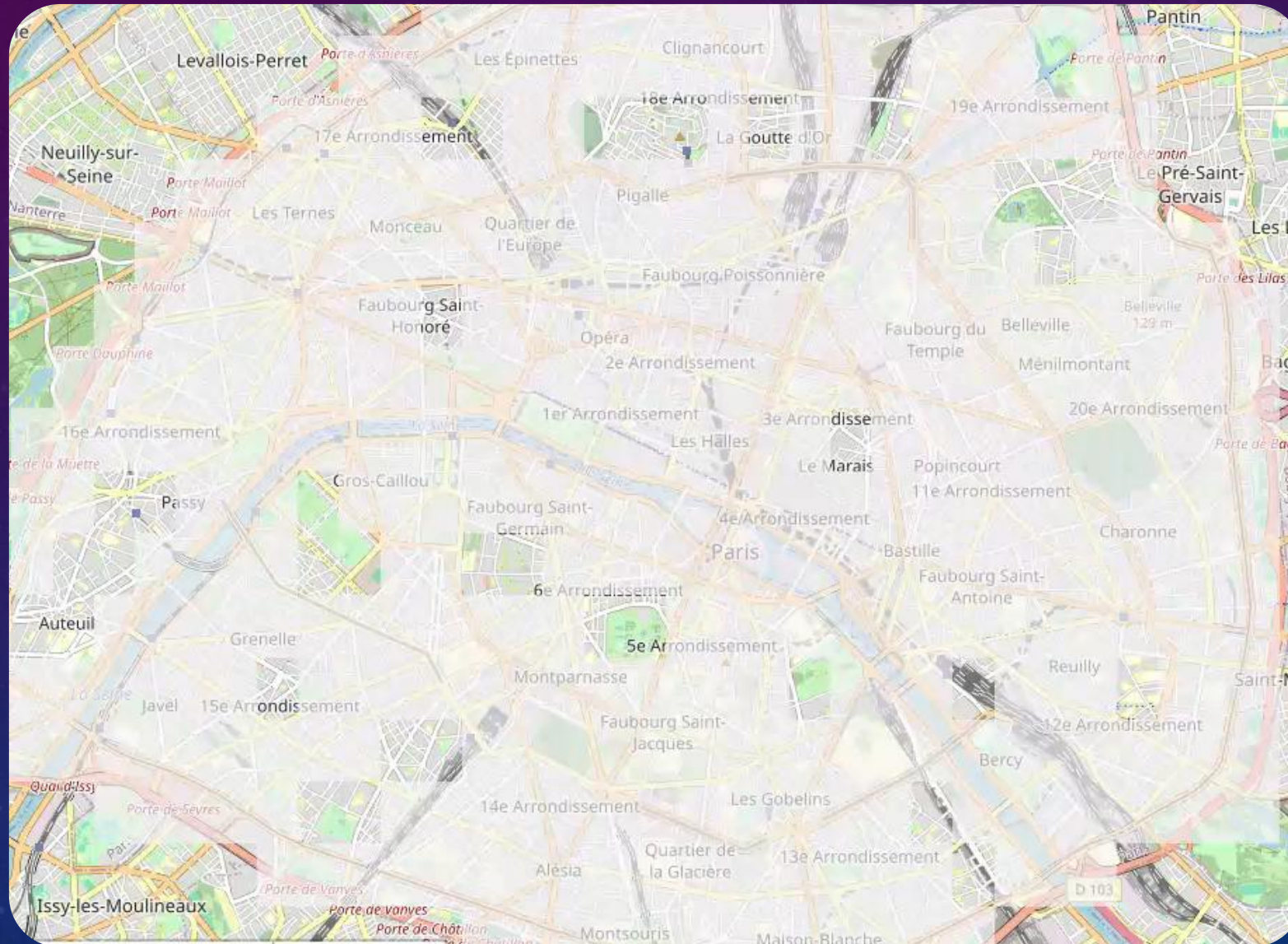
FUSION ET CALCUL DES INDICATEUR OCCUP\_MOY\_I

|   | timestamp                 | carre_id | lati    | long   | moyenne_k | occup_moy_1 | occup_moy_2 | occup_moy_3 |
|---|---------------------------|----------|---------|--------|-----------|-------------|-------------|-------------|
| 0 | 2020-01-22 01:00:00+00:00 | 1_15     | 48.8175 | 2.3325 | 2.515874  | 3.022103    | 2.326714    | 2.327455    |
| 1 | 2020-01-22 01:00:00+00:00 | 1_16     | 48.8175 | 2.3375 | 2.962500  | 2.795084    | 1.928462    | 1.947006    |
| 2 | 2020-01-22 01:00:00+00:00 | 1_17     | 48.8175 | 2.3425 | 0.758611  | 0.694834    | 1.932319    | 1.897239    |
| 3 | 2020-01-22 01:00:00+00:00 | 1_18     | 48.8175 | 2.3475 | 0.157334  | 0.852698    | 1.378808    | 2.245796    |
| 4 | 2020-01-22 01:00:00+00:00 | 1_20     | 48.8175 | 2.3575 | 1.810644  | 0.891740    | 1.431100    | 2.021778    |

## Evolution de la moyenne du taux d'occupation pour les deux stations les plus proches



# Evolution du trafic moyen dans Paris



## Evolution taux d'occupation de la station la plus proche

