JOURNEES TECHNIQUES ACOUSTIQUE ET VIBRATIONS
13 et 14 juin 2018

Cartes sonores dynamiques, stochastiques, multisources

NoiseModelling – Saison 2017-2018

Pierre AUMOND, Arnaud CAN, Nicolas Fortin, Léo Jacquesson...

umr ae

Résumé de la dernière saison

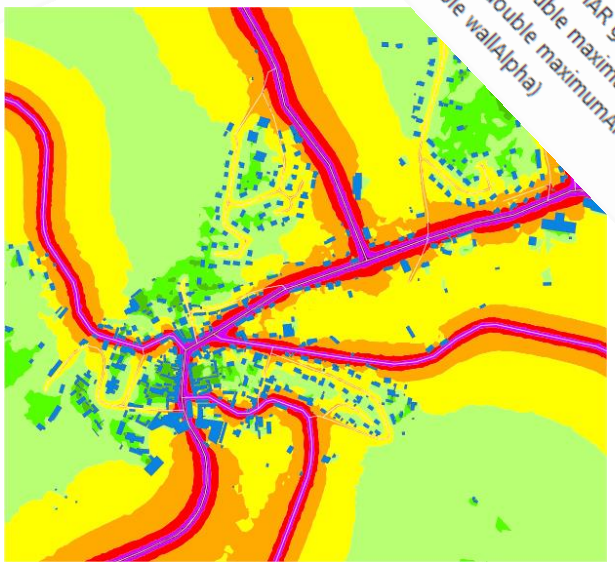
```
-- Sound propagation from sources through buildings
-- Compute only 750m inside the defined source input
drop table if exists tri_lvl;
create table tri_lvl as SELECT * from
BR_TriGrid((select st_expand(st_envelope(st
                                          - 750) the_geom fr

-- Use the triangle area contouring in
-- iso lvls in w corresponding to dB-.
-- the output iso will be [-inf to 45] -
-- Theses levels corresponding to the rang
drop table if exists tricontouring_noise_map;
create table tricontouring_noise_map AS SELECT
```

BR_TriGrid3D

Table function,Sound propagation in 3 dimension. Return 6 colu
polygon,W_V1 double,W_V2 double,W_V3 double,CELL_ID integer.

BR_TriGrid

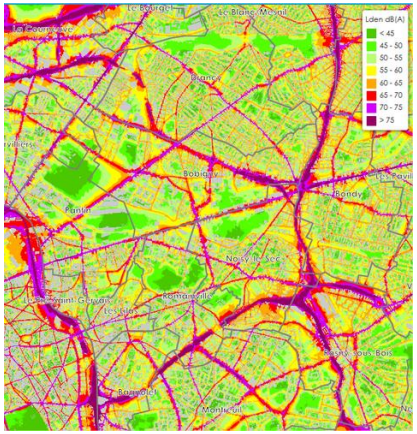
Table function,Sound propagation in 2 dimension. Return 6 columns. TRI_ID integer,THE_GEOM
polygon,W_V1 double,W_V2 double,W_V3 double,CELL_ID integer.
BR_TriGrid(VARCHAR buildingsTable, VARCHAR sourcesTable,VARCHAR
sourcesTableSoundFieldName, VARCHAR groundTypeTable, double
maximumPropagationDistance, double maximumWallSeekingDistance, double roadsWidth,
double receiversDensification, double maximumAreaOfTriangle, int soundReflectionOrder, int
soundDiffractionOrder, double wallAlpha)

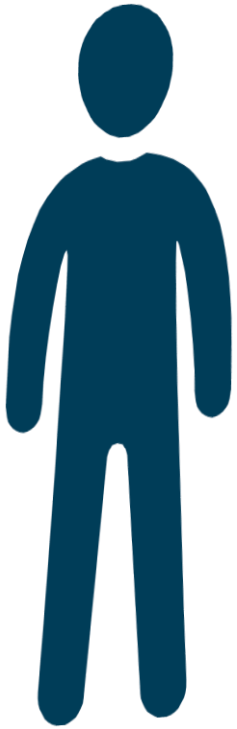


CONTEXTE

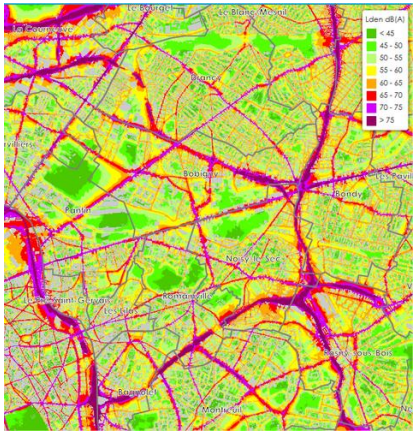
Cartes multisources ?
Cartes stochatisques ?
Cartes dynamiques ?

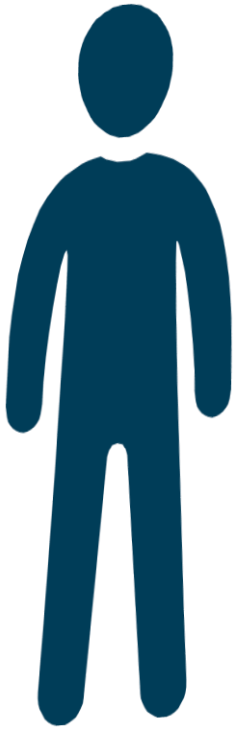
Perception vs cartes réglementaires





Perception vs cartes réglementaires



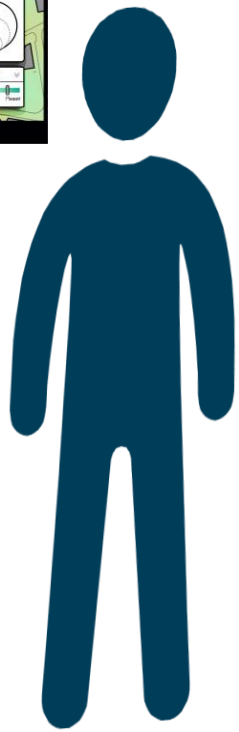


Transport seulement ?

Variabilité temporelle ?

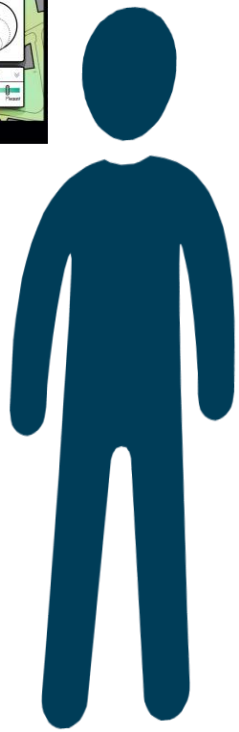
Typologie des environnements sonores ?

Perception vs cartes « paysage sonore »



Perception vs cartes « paysage sonore »

Modélisation ?



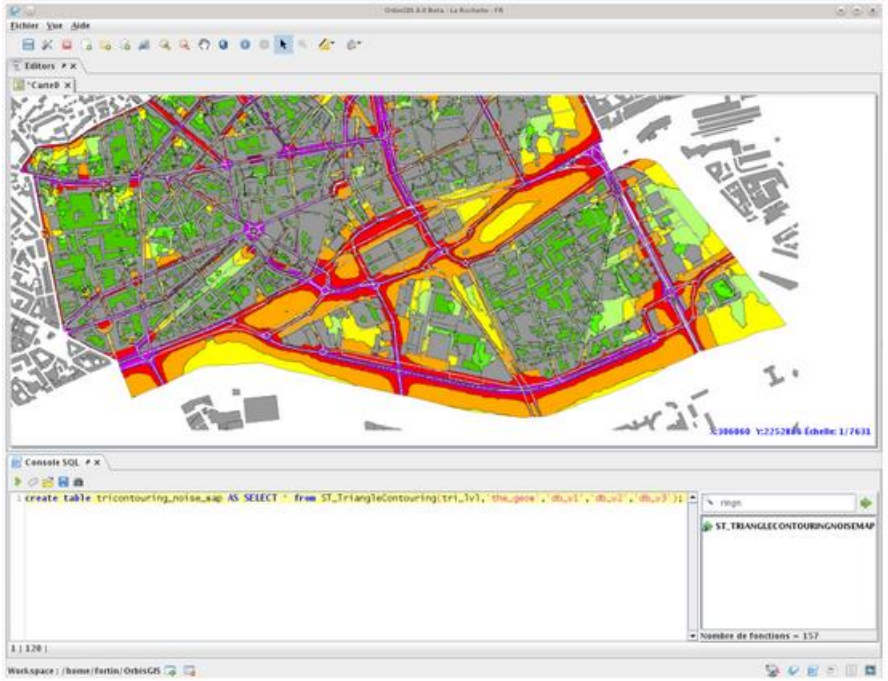
Modélisation

OrbisGIS, NoiseModelling

Environnement de travail

OrbisGIS

NoiseModelling



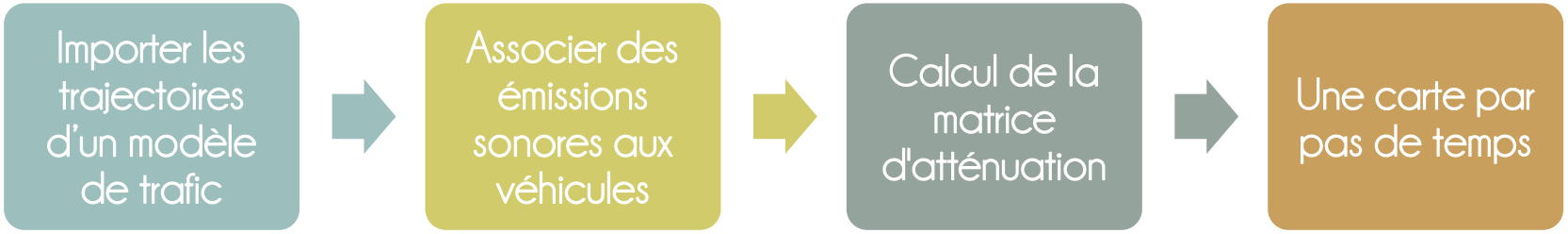
http://noise-planet.org/noisemodelling.html

open source initiative

Dynamique

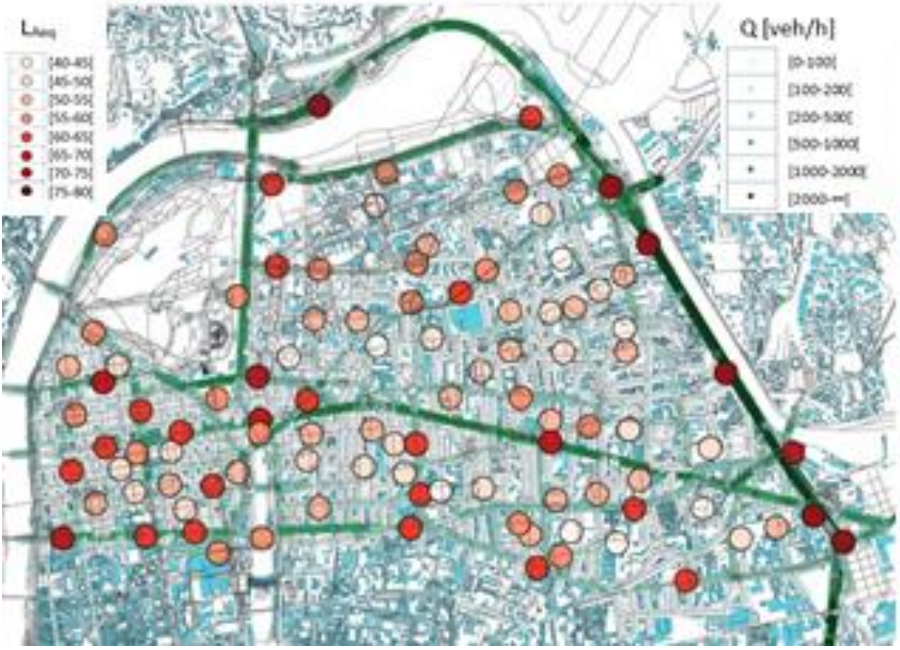
SimCity !

4 étapes…


Importer les trajectoires d'un modèle de trafic
Associer des émissions sonores aux véhicules
Calcul de la matrice d'atténuation
Une carte par pas de temps

Cours Lafayette

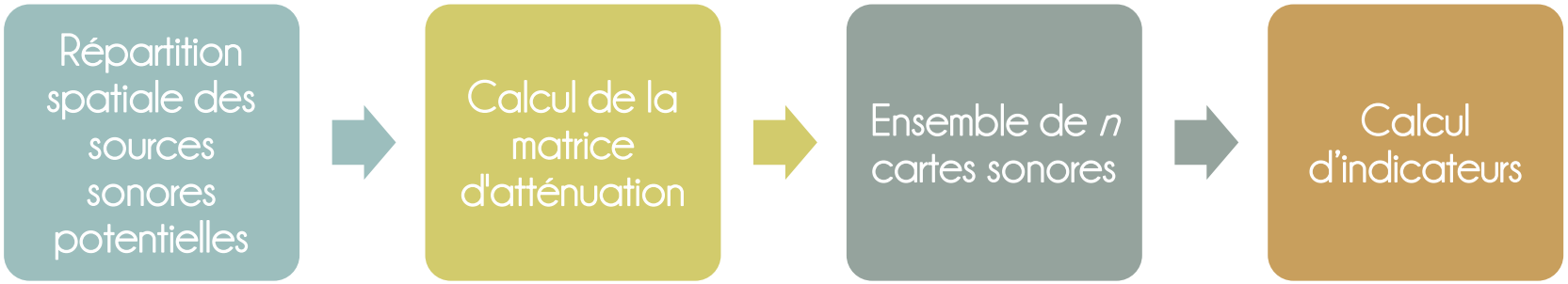
Lyon, analyse de réseau



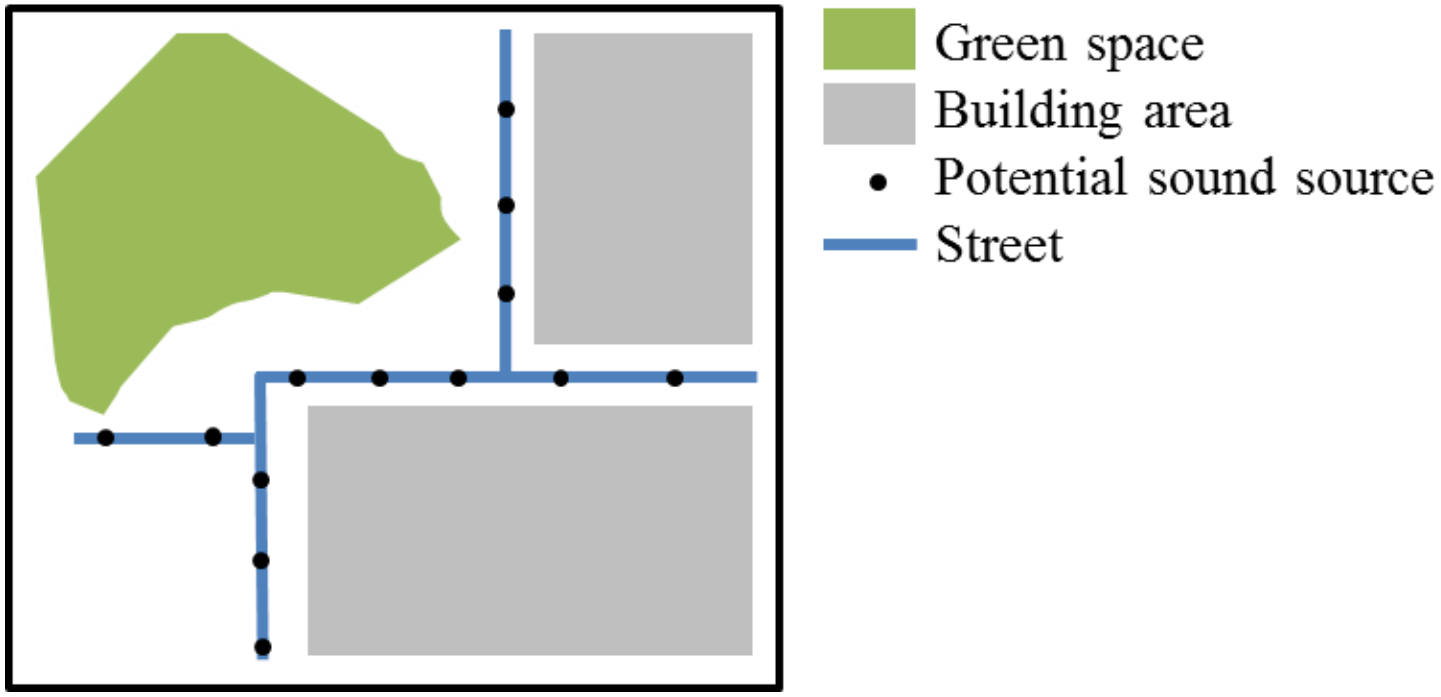
Stochastique

Lançons les dés !

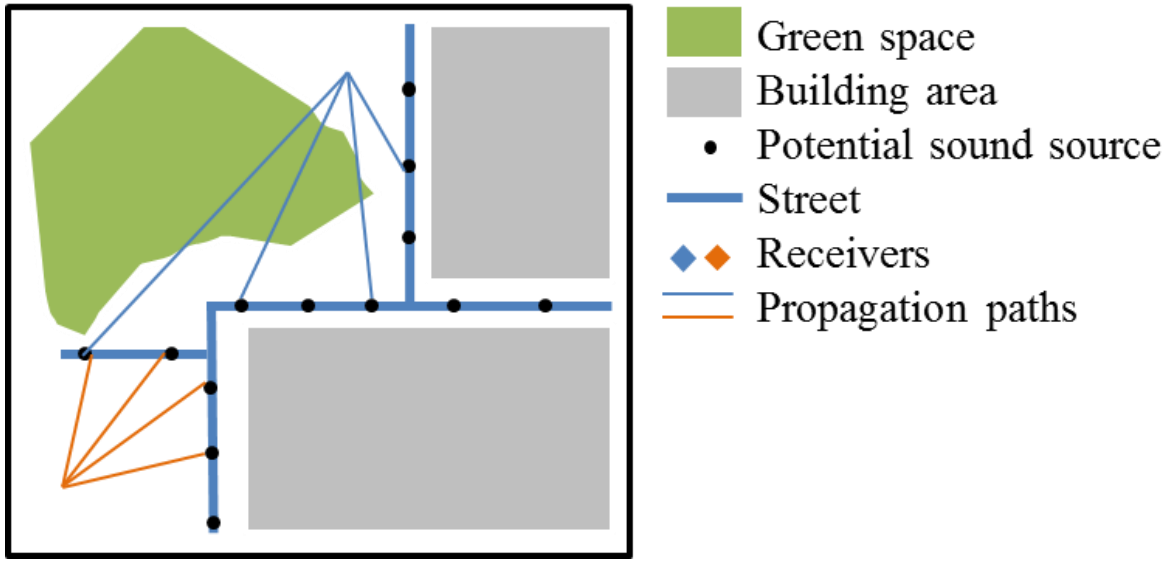
4 étapes…


Répartition spatiale des sources sonores potentielles
Calcul de la matrice d'atténuation
Ensemble de *n* cartes sonores
Calcul d'indicateurs

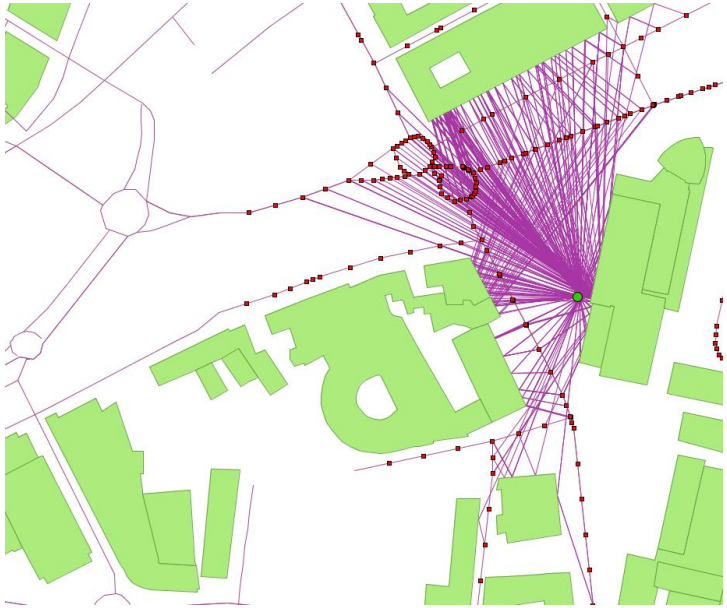
Répartition spatiale des sources sonores potentielles



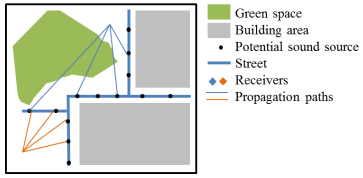
Calcul de la matrice d'atténuation



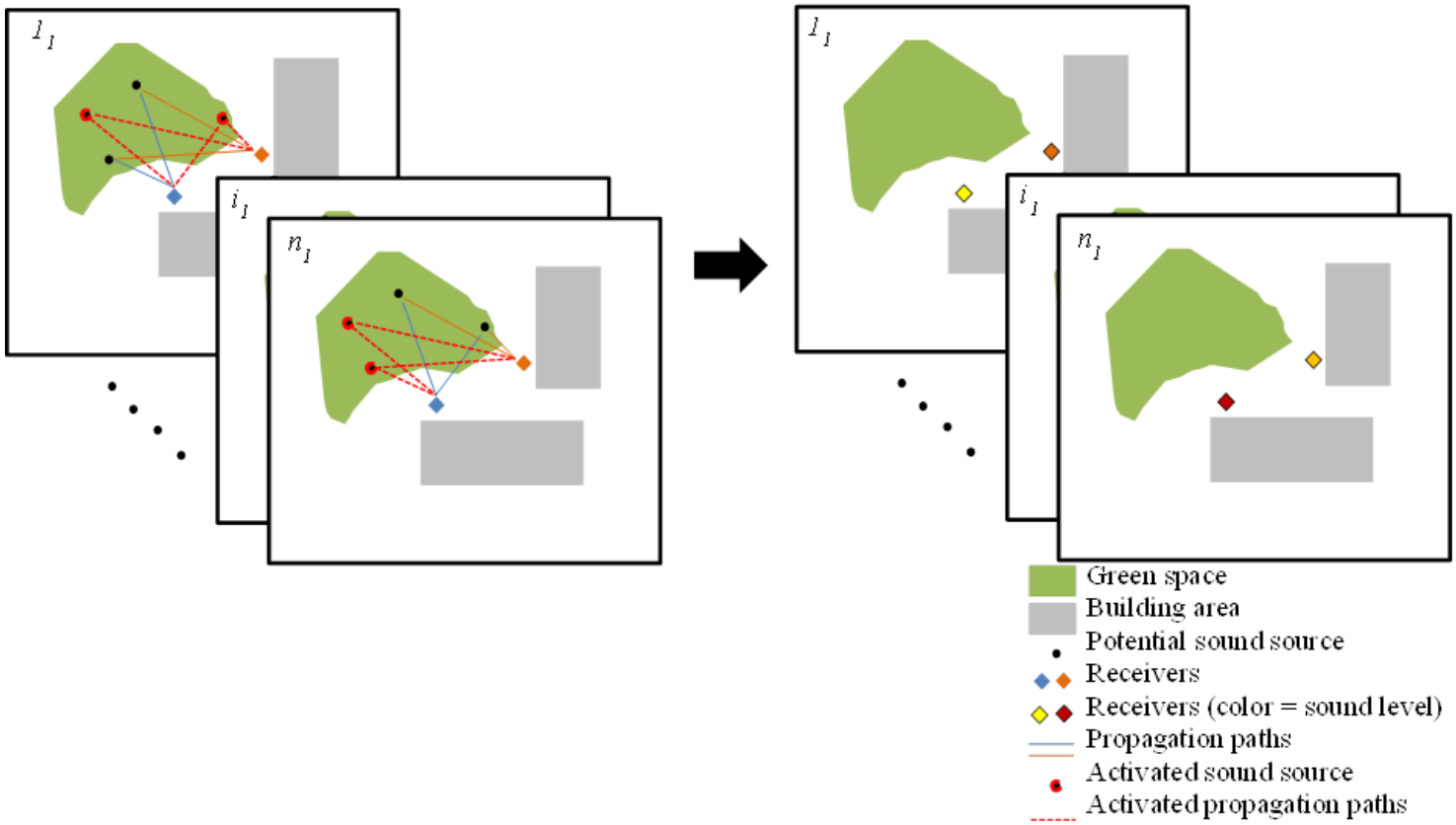
Calcul de la matrice d'atténuation



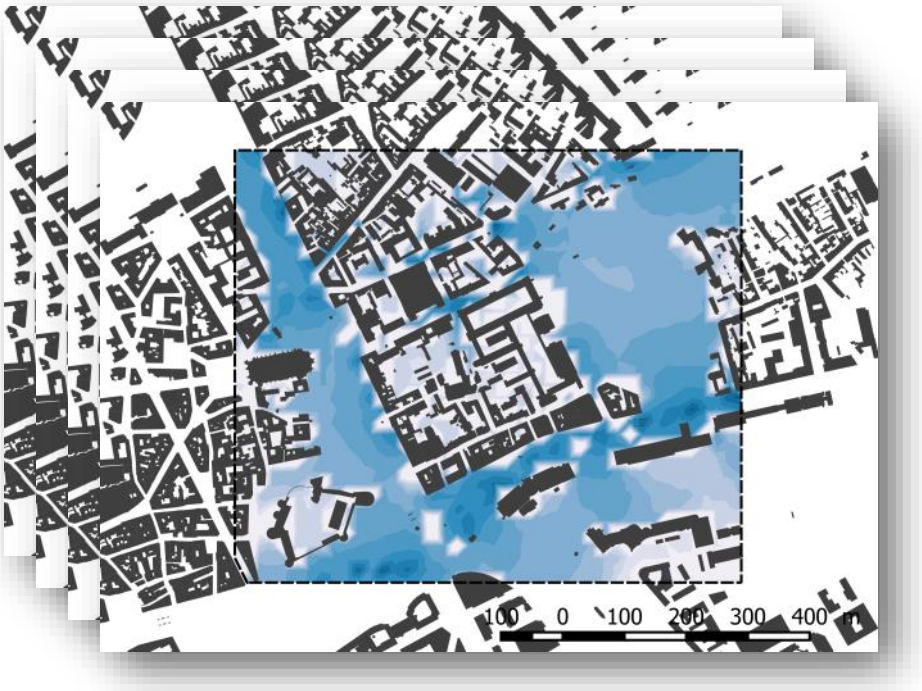
User defined parameters	User configuration for this study
Reflection order	2
Diffraction Order	1
Maximum propagation distance	500 m
Maximum seeking wall	50 m
Buildings height	10 m
Receivers height	1.5 m
Ground absorption	0



Ensemble de *n* cartes sonores



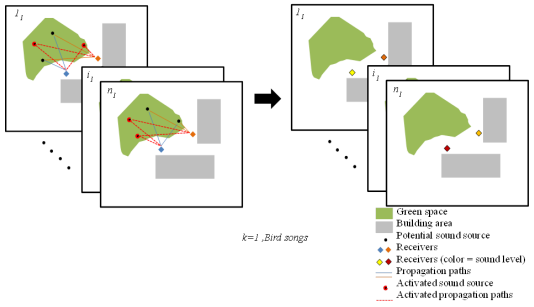
Ensemble de *n* cartes sonores



EMISSION & PROPAGATION

CNOSSOS

Sound sources every 5 m
Q = 900 veh/h - V = 30 km/h
-> K = 0.03 veh/m
-> Probability of activation is 15%.



Grafic & Cartasur (ademe)

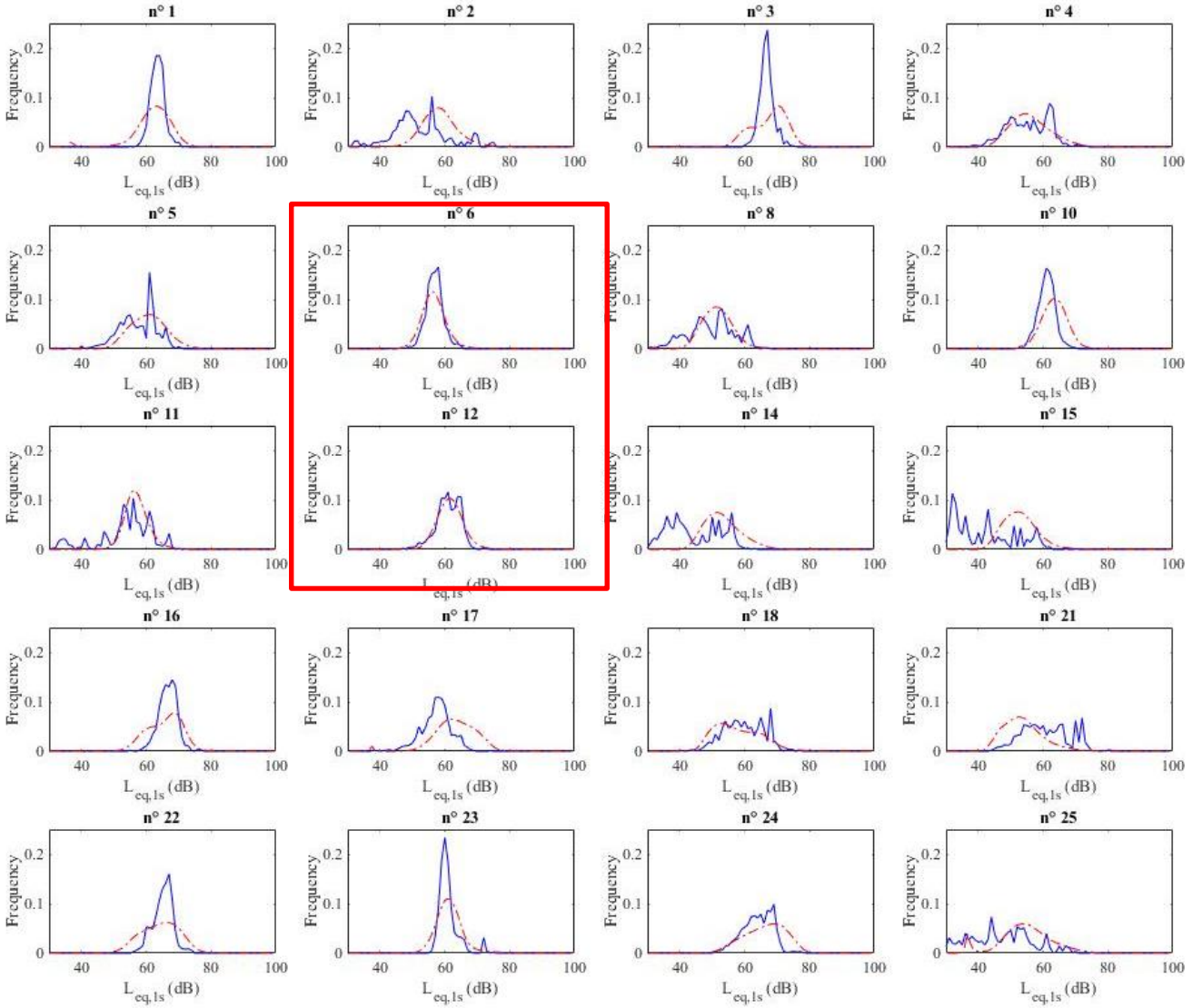
- XIIIe et XIVe arrondissement de Paris
- 2014-2016
- 2 méthodologies proches

Mesures acoustiques

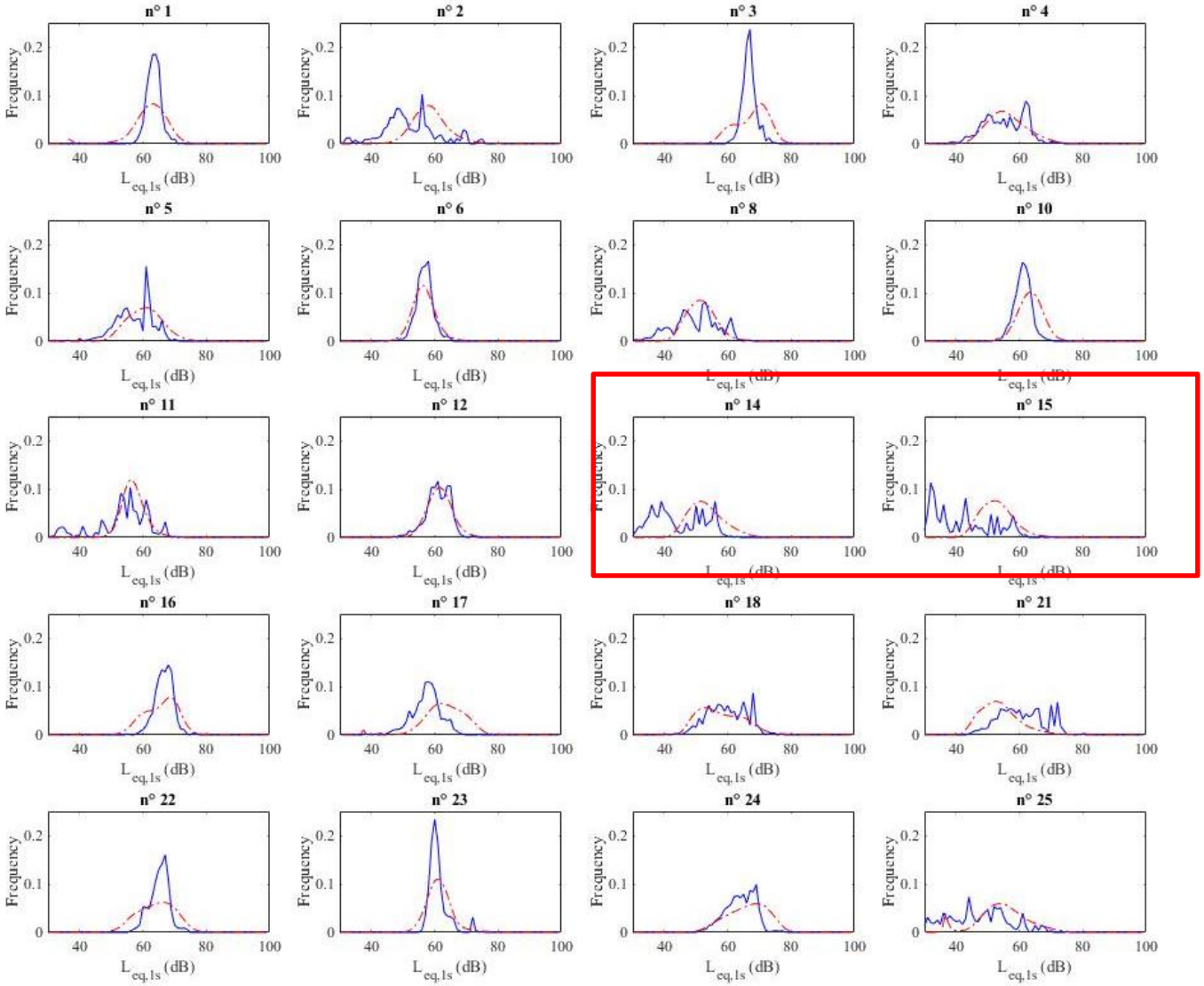
Mesures acoustiques

- 8 mois
- Asasense
- 125 ms / tiers d'octave

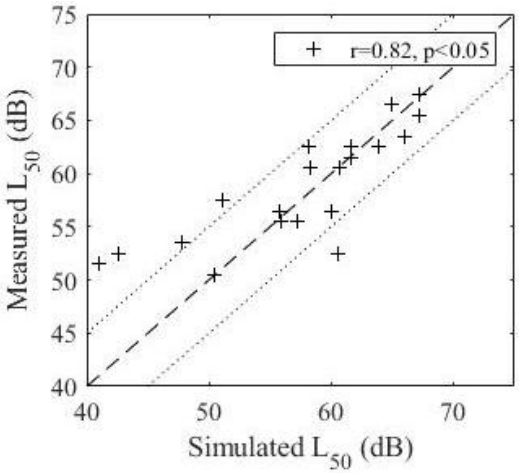
Distribution des niveaux sonores

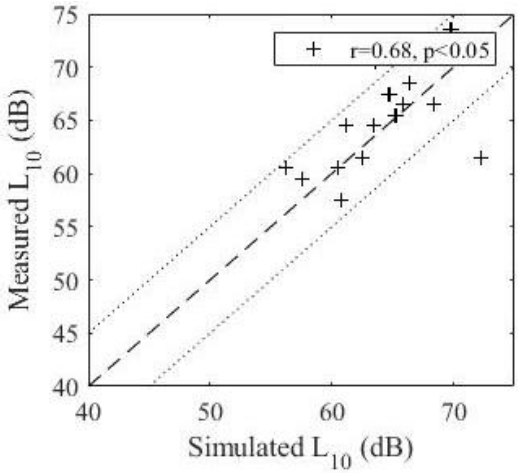


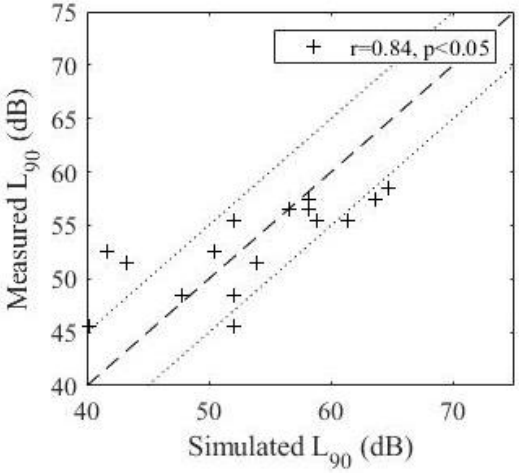
Distribution des niveaux sonores

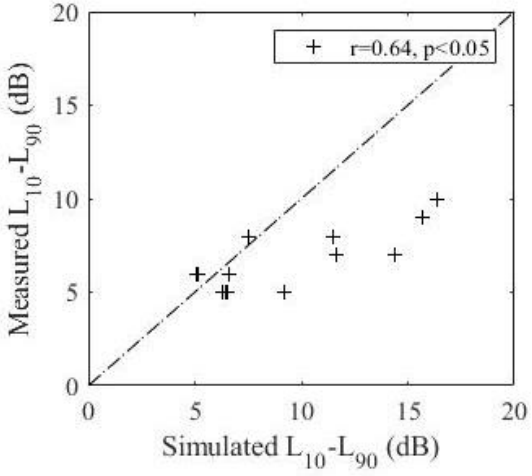


Indicateurs statistiques









Rappel

Données entrées:

- Hauteur = 10 m
- TMJA jour = Paris
- G=0
- …

Multi-sources

Vers une cartographie du paysage sonore

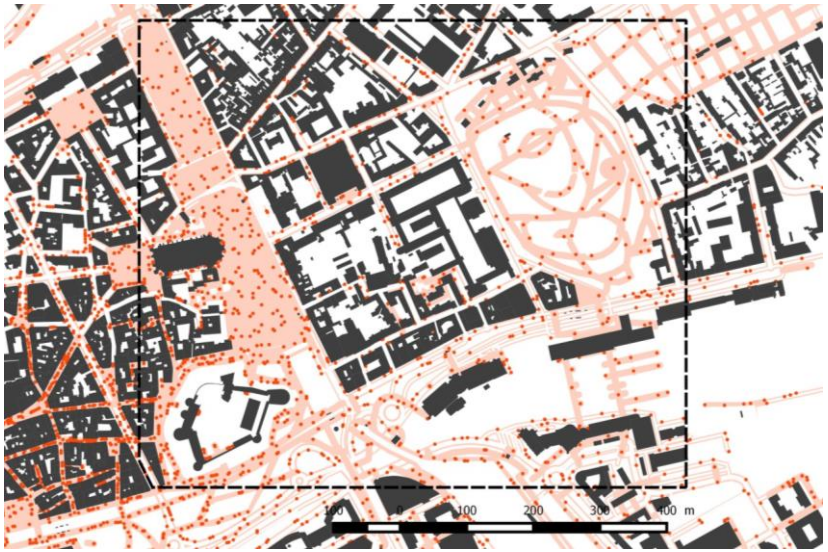
5 étapes…


Répartition spatiale des sources sonores potentielles
Calcul de la matrice d'atténuation
Ensemble de *n* cartes sonores
Calcul d'indicateurs
Compétition entre sources sonores

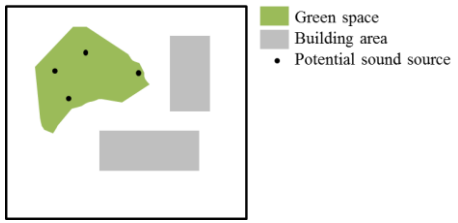
Répartition spatiale des sources sonores potentielles

Densité voitures ~ Débit/speed
Présence = routes
Données +++ (Ville de Paris)

Densité oiseaux ~ constante
Présence = Arbres + parcs + « jardins »
Données – (Biblio)



Densité piétons ~ Débit ~ restaurants + magasins + tramway
Présence = Troittoirs + places + parcs + chemins
Données – (Biblio + analogie Montréal & Copenhague)



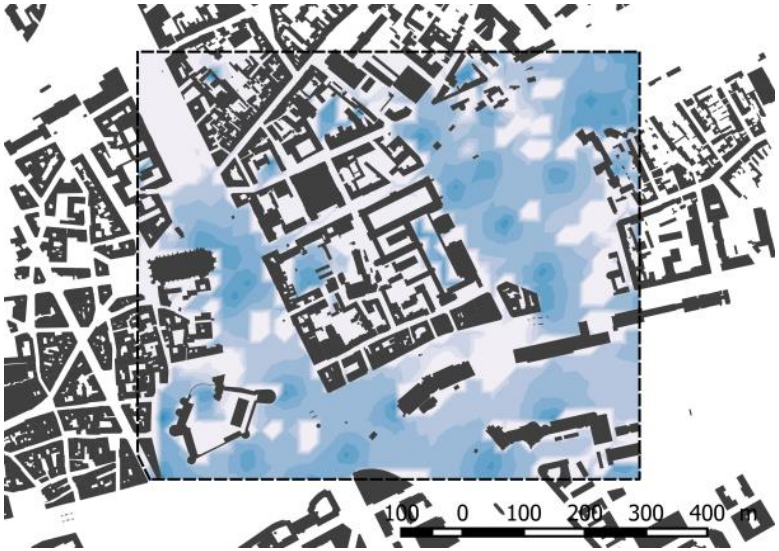
Calcul de *n* cartes

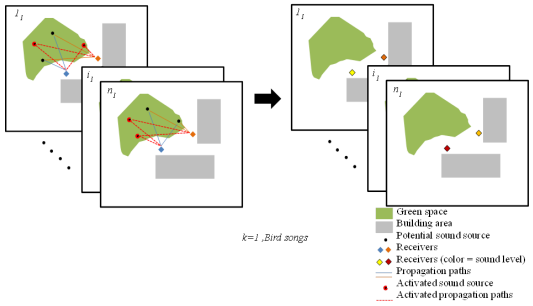
EMISSION + PROPAGATION

Spectre routier = CNOSSOS

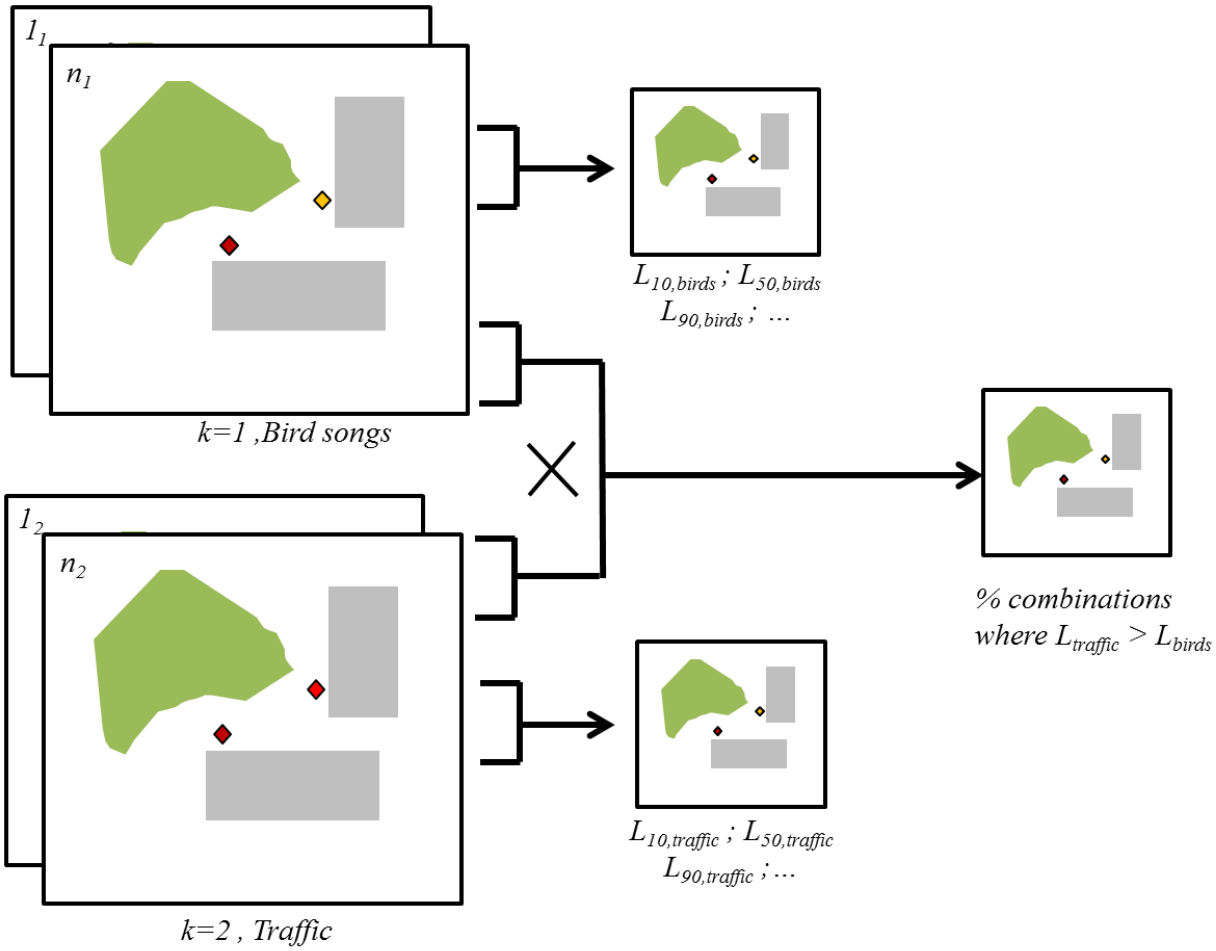
Spectres voix = Biblio +++
« Temporalité » = Biblio +

Spectres oiseaux = Biblio +++
« Temporalité » = Biblio -

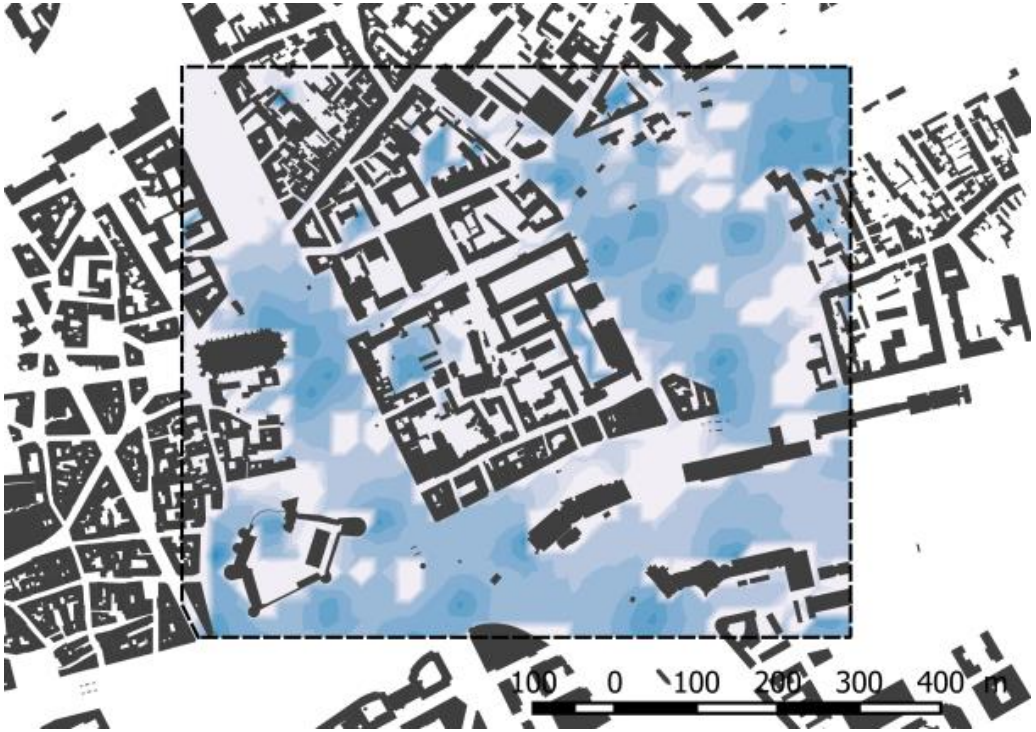


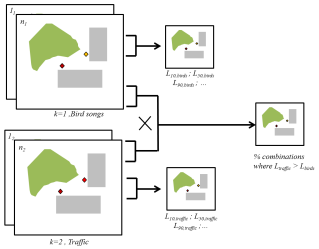


Combinaison entre les cartes

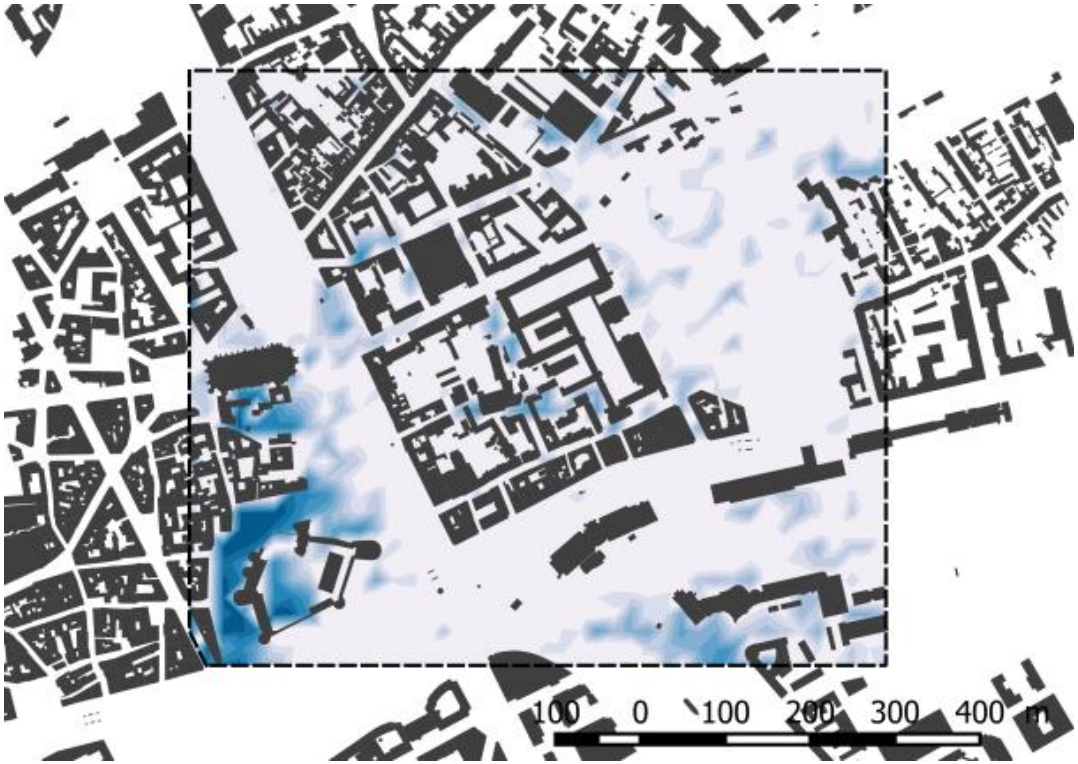


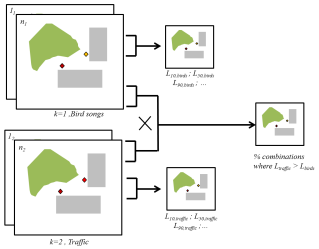
Sound sources competition





Sound sources competition





Grafic & Cartasur (ademe)

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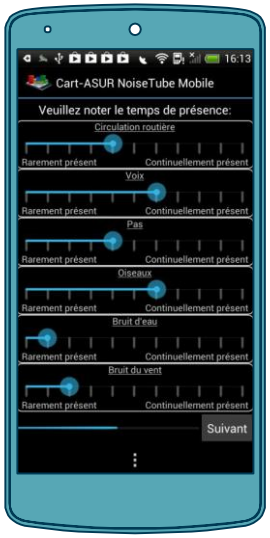
- 2 méthodologies proches

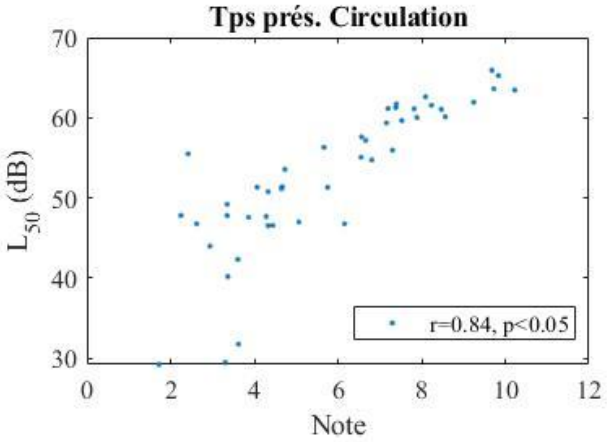
Mesures perceptives

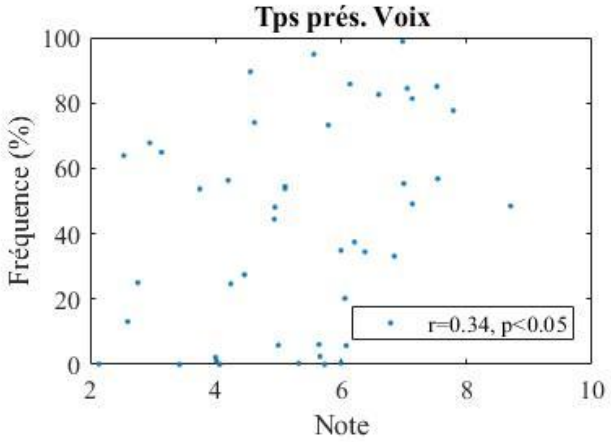


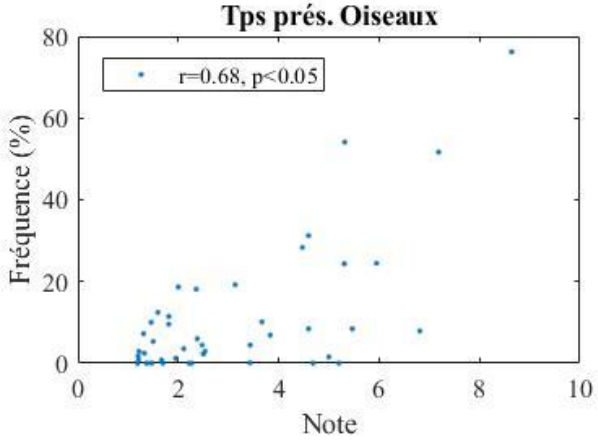
Mesures perceptives

- Questions fermées
- Questionnaire téléphone (Cartasur)
- Questionnaire papier (GRAFIC)

Probabilité d'entente d'une souce sonore







CONCLUSIONS

& Perspectives

Conclusions

- Approche dynamique
- Approche stochastique
- Modélisation multi-sources

Futur

- Interface « Pointe & Clique »
- Intégration futurs amendements CNOSSOS
- Intégration de « cas tests » / « tests unitaires »

Noise-Planet.org

OnoMap

A Spatial Data Infrastructure (SDI) dedicated to environmental noise assessment.

NoiseCapture

tag v0.5.0

A free and open-source Android application to measure and share noise environnement.

NoiseModelling

release v1.1.1

A free and open-source GIS-based model to compute noise maps (formerly NoiseM@p).

Community Maps

An interactive maps viewer, to display noise data and feeded by the community.

open source initiative®

Merci !

Des questions?

NoiseModelling, Saison 2017-2018

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UMRAE, IFSTTAR

http://soundcartography.wordpress.com