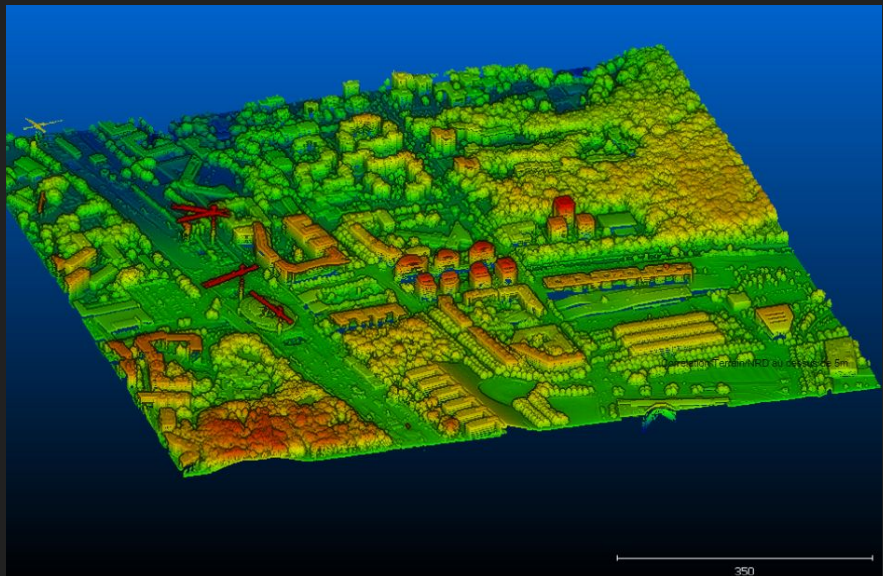
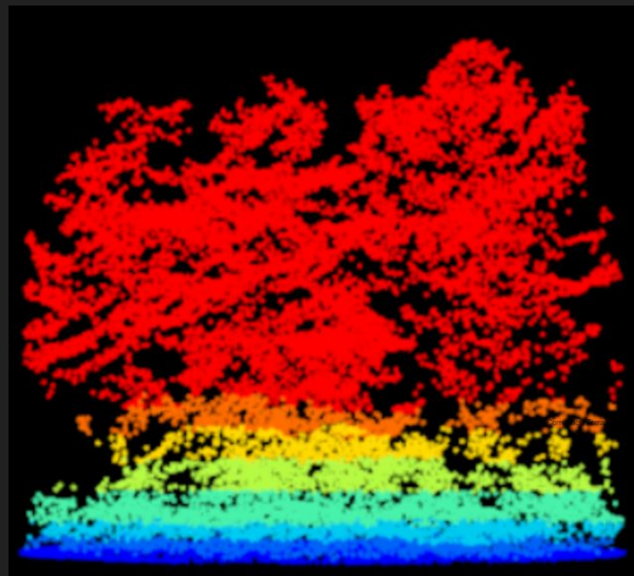
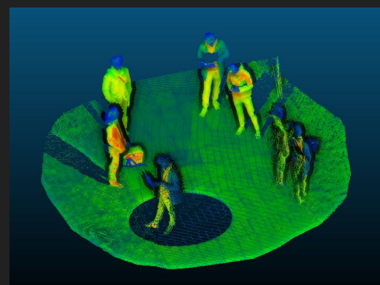
Classification du combustible forestier à l'aide des données LiDAR HD et Sentinel-2 pour la modélisation du risque incendie





Réalisé par Mathurin Pain, Amaury Blotin et Eliot Barriere

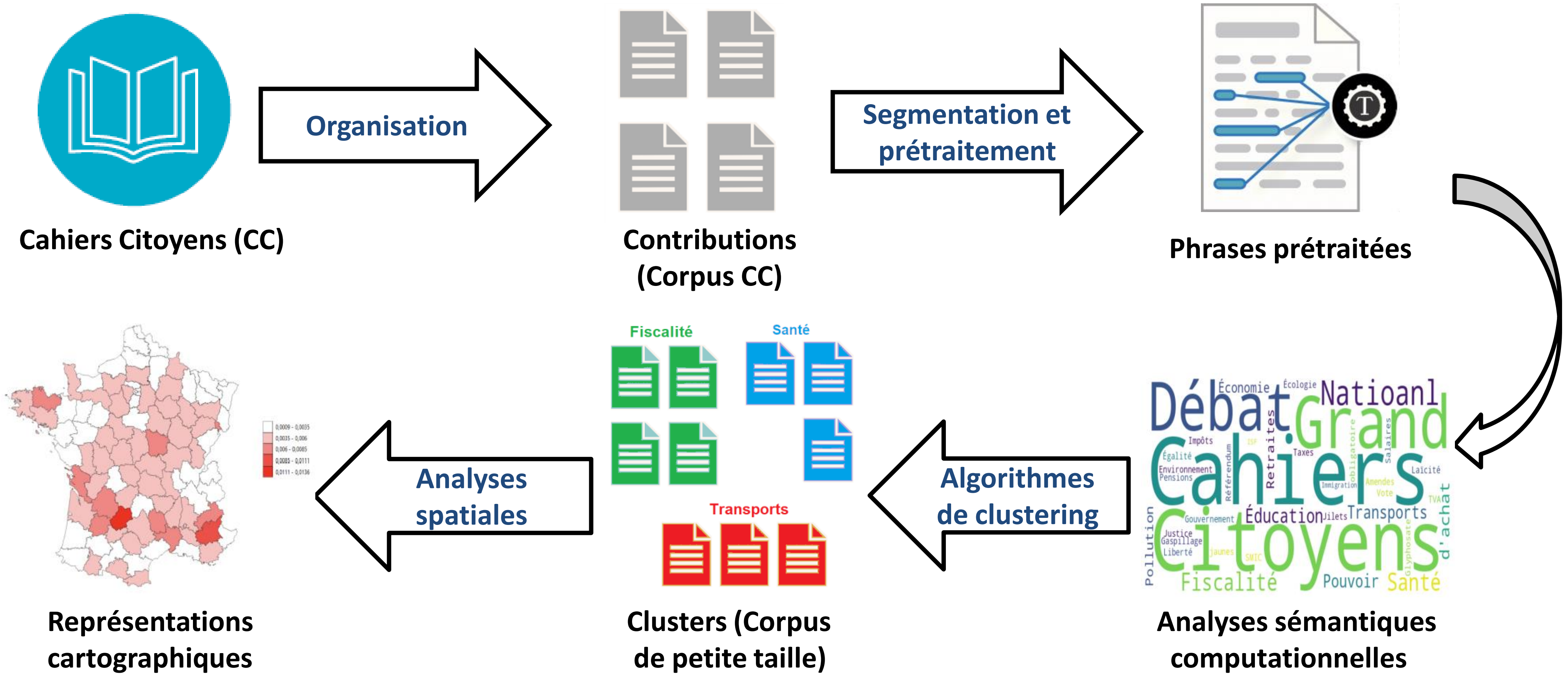
Projet commandité par SOMA Maxime et AUBARD Valentine (UMR RECOVER, INRAE PACA)
et encadré par Marc POUPEE



Analyse sémantique computationnelle et spatialisée du corpus des Cahiers citoyens :

Caractérisation de « corpus de petite taille » à l'aide de profils sémantiques

- Sami GUEMBOUR -



Mass redistributions at the core mantle boundary from satellite gravity

Charlotte Gaugne[1], Isabelle Panet[1,2], Marianne Greff[1], Mioara Mandea[3], Séverine Rosat[4]

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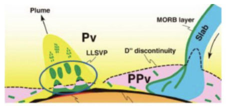
[2] ENSG - Géomatique, IGN, F-77455 Marne-la-Vallée, France,
[3] Centre National d'Etudes Spatiales, Paris, France,
[4] Université de Strasbourg, CNRS, EOST, ITES UMR7063, Strasbourg France

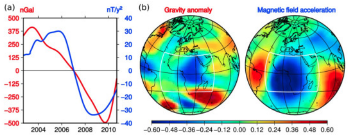
Motivations

The GRACE mission (since 2002) can provide new constraints on deep mass redistributions by measuring the space-time variations of the gravity field. This could help to better understand sudden changes in the secular variation of the geomagnetic field, called geomagnetic jerks.

Characterize the origin of sudden changes in core flows: link to variations of the topography in the CMB ?



(Hirose et al. 2008)



(Mandea et al. 2015)

Objective: Search for gravity signatures of mass redistributions at the CMB at timescales of months up to 2-3 years

Methods

- GRACE/SLR and pure SLR geoid models: GRGS04 compared with CSR06, ITSG2018, COST-G, SLR-AIUB
- We subtract a mean, annual and semi-annual signals (2003-2015) and apply a moving average of 1 year on the residual time series

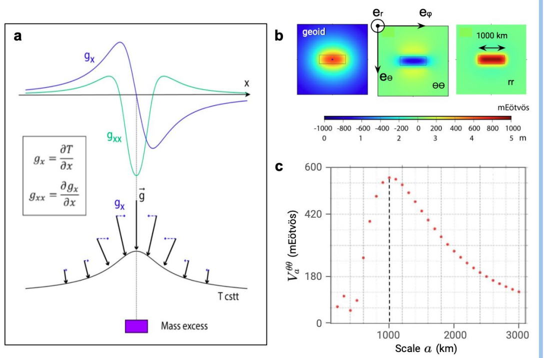


Figure 1 - Multi-scale gravity gradients

(Panet et al. 2022)

- Gravity gradients in the local spherical frame, at different spatial scales (no terms of degree 0 nor 1)
- Rotations of the spherical frame to align with the orientation of the signals → separate signals with different characteristic scales and orientations
- Wavelet transform of the gravity gradients time series at scales 28-32 months : search for peaks in the period June 2006 - December 2007
- Bump in the time series ↔ peak in the wavelet-transformed coefficients

Detection of signal

Anomalous North-South oriented signal across the boundary between the Atlantic ocean and the African continent, with a high intensity (≥1µEötvös) at the largest 9000-km spatial scales of the analysis in January 2007.

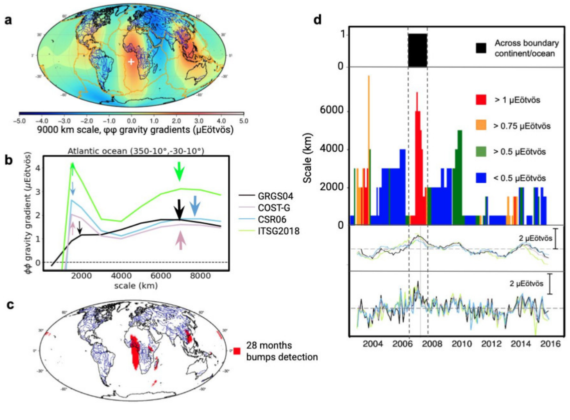
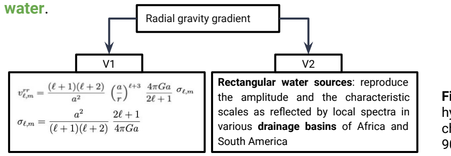


Figure 2 - Characterisation of the extracted signal in January 2007. (a) Map of the 9000 km scale gravity gradient in January 2007 in GRGS04. (b) local spectrum of the φφ gravity gradients pointing to the characteristic scale. (c) Map showing the locations (in red) where an anomalous bump-like transient is detected between June 2006 and December 2007 in the time series of the 7000-km scale φφ gravity gradients. (d) Unicity of the signal detected

Water cycle

To investigate a potential origin of the 2007 Atlantic signal within the fluid envelopes of the Earth, we now compare its spatio-temporal fingerprint with those of hydrological, oceanic and atmospheric sources based on global circulation models, GRACE-based reconstructions (V1) and the geographic distribution of land and ocean (V2).

Hypothesis: observed gravity variations are solely due to water.



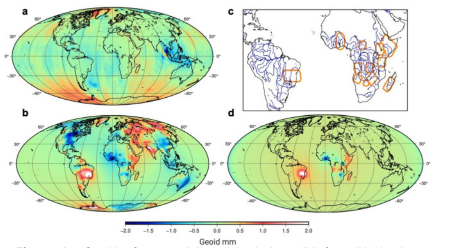


Figure 4 - Geoid of ocean (a) and hydrology (b) from V1 in January 2007, and of hydrology from V2 (d). Orange rectangles represents the zone where we put a hydrological signal for V2 (c).

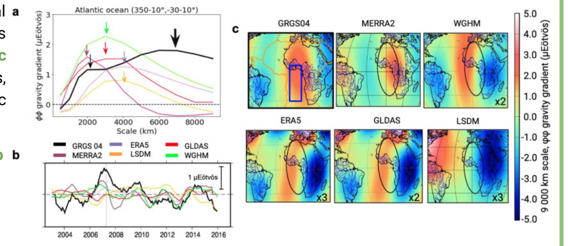


Figure 4 - Multiscale gravity gradient spatio-temporal fingerprint of water sources in hydrological models. (a) local spectrum of the φφ gravity gradients pointing to the characteristic scale of these signals. Time series (b) and map in January 2007 (c) of the 9000 km scale gravity gradient.

For continental hydrology and oceanic sources (modelled or reconstructed from GRACE), and their combinations, the characteristic scale and location different from those of the 2007 GRACE anomaly.

- Their local spectra in the Atlantic box indeed all peak between 2000 and 4000-km scales which is consistent with a first maximum in the GRACE-observed spectrum.
- Location across the ocean/continent boundary is also not well explained by any of the considered hydrological models.

The 2007 Atlantic signal is not well explained by surface water sources, these conclusions support the possibility of a deeper origin within the solid Earth.

Mass redistributions at the CMB / in the D" layer

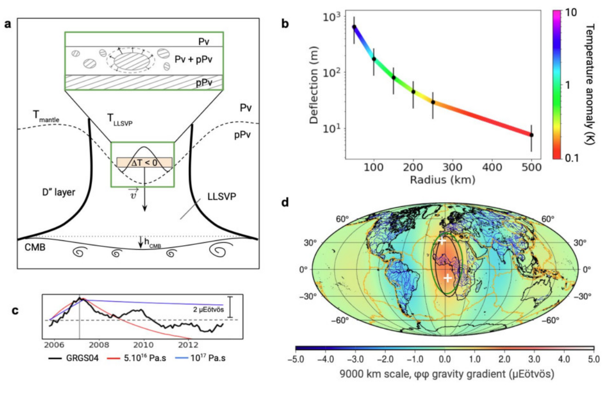


Figure 5 - (a) Negative temperature anomaly passing through the Pv-pPv phase transition. (b) Deflexion of the phase transition as a function of radius of the anomaly and his temperature. (c) Time series of the 9000 km scale φφ gravity gradients for the model for 2 different viscosity in the D" layer. (d) Map of the 9000 km scale φφ gravity gradients for the model adding hydrology V2.

Source from the core is expected to be to small to generate dynamic CMB topography, we focus on a mantle side source.

Source at the top of the CMB can not explain both geomagnetic jerk and gravimetric magnitude anomaly.

Source in the mantle above CMB:

- Characteristics of Pv-pPv : fast (Langrand et al 2019), density contrast (100 kg/m^3), occur in the D" region
- African LLSVP : Pv-pPv phase transition deeper (7-14 K/m)
- **Scenario proposed:** Pv cold anomaly (T') passing through the phase transition and transform to pPv before other material at temperature T creating a mass anomaly.
- **Model parameters:** visco-elastic D" layer of 350 km and viscosity of 5.10^{16} Pa.s, phase transition at 50 km above CMB, 2 calottes (4°W,29° N and 5°E,15°S) modelling the transformed pPv of different size (radius from 50 km to 500 km)
- Reproduce characteristic of the 2007 anomalous signal (spatio-temporal fingerprints)
- Generate a dynamic CMB topography of at least 12.5 cm.

Conclusion

The 2007 Atlantic signal is not **well explained by surface water sources**. This leads us to propose that part of this gravity signal could **reflect deep mass redistributions** from the **Pv-pPv** phase transition and generate a **dynamic CMB topography** notable. We next propose to do the same study on the magnetic field.

References

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- J. Wahr, et al, JGR, 103(B12):30205–30229, 1998
- Langrand et al, Nature communications,10(1), 5680, 2019

Acknowledgment

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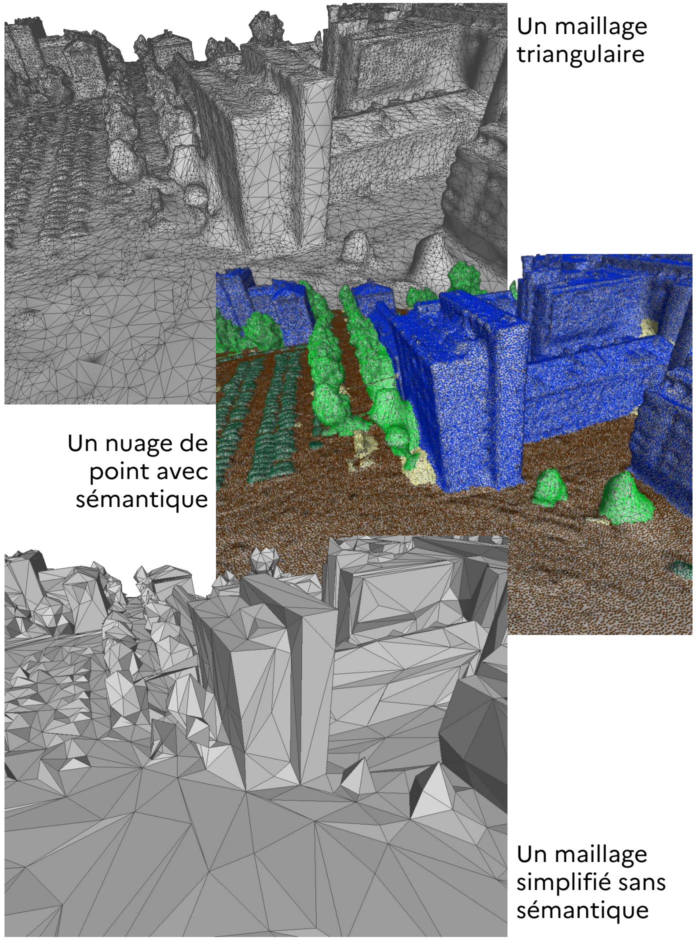
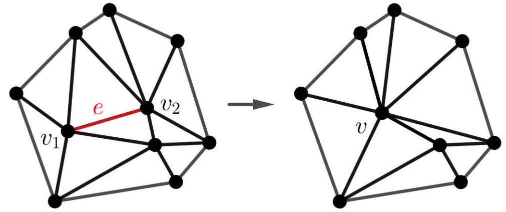
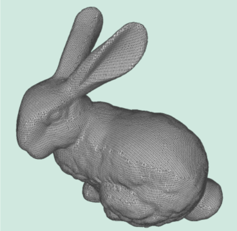
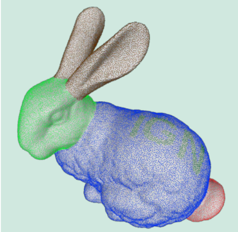
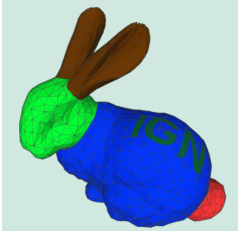
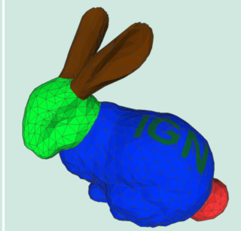
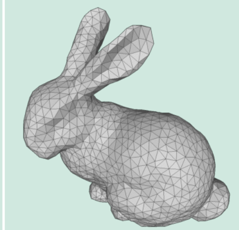
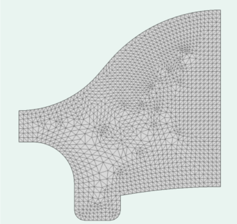
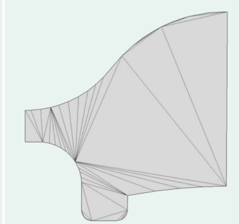
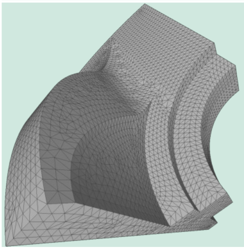
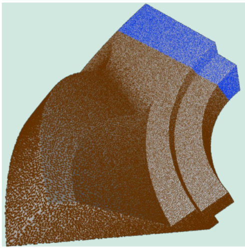
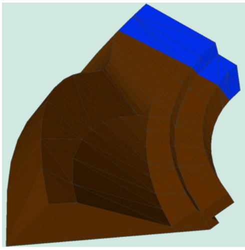
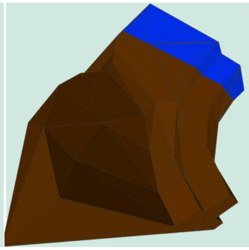
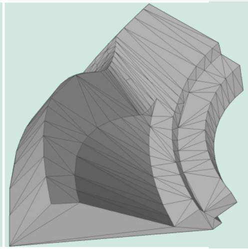
SEMANTIC EDGE COLLAPSE – Grégoire Grzeczkowicz





Contraction d'arête
=> maillage simplifié

Comment prendre en compte la sémantique ?

Modèle	Maillage	Nuage de points	Placement sémantique et géométrique	Placement géométrique uniquement	Sans sémantique
Bunny					
Fandisk, vue 1					
Fandisk, vue 2					

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Neural 3D Implicit Modeling

Karim Kassab

Start date
February 2023

PARIS EST SUP — ÉCOLE DOCTORALE Mathématiques et STIC
Université Gustave Eiffel

Inverse Graphics Problem: How to model a 3D object representation using its images?

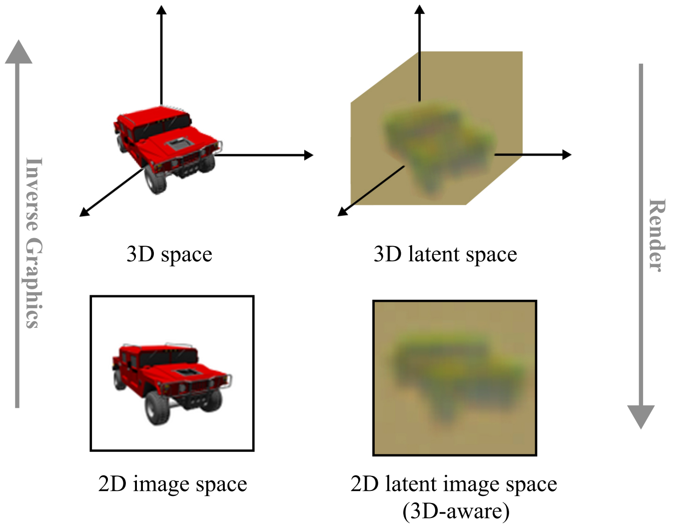
Proposal 1
RefinedFields: Radiance Fields Refinement for Unconstrained Scenes

(a) K-Planes (b) RefinedFields (c) GT

https://refinedfields.github.io

Qualitative Results. Given images of the Trevi fountain from Phototourism, as well as a pre-trained model, our method leverages the pre-trained model and refines K-Planes with finer details that are under-represented when optimizing the same K-Planes on the images alone.

Proposal 2
Exploring 3D-aware Latent Spaces for Efficiently Learning Numerous Scenes



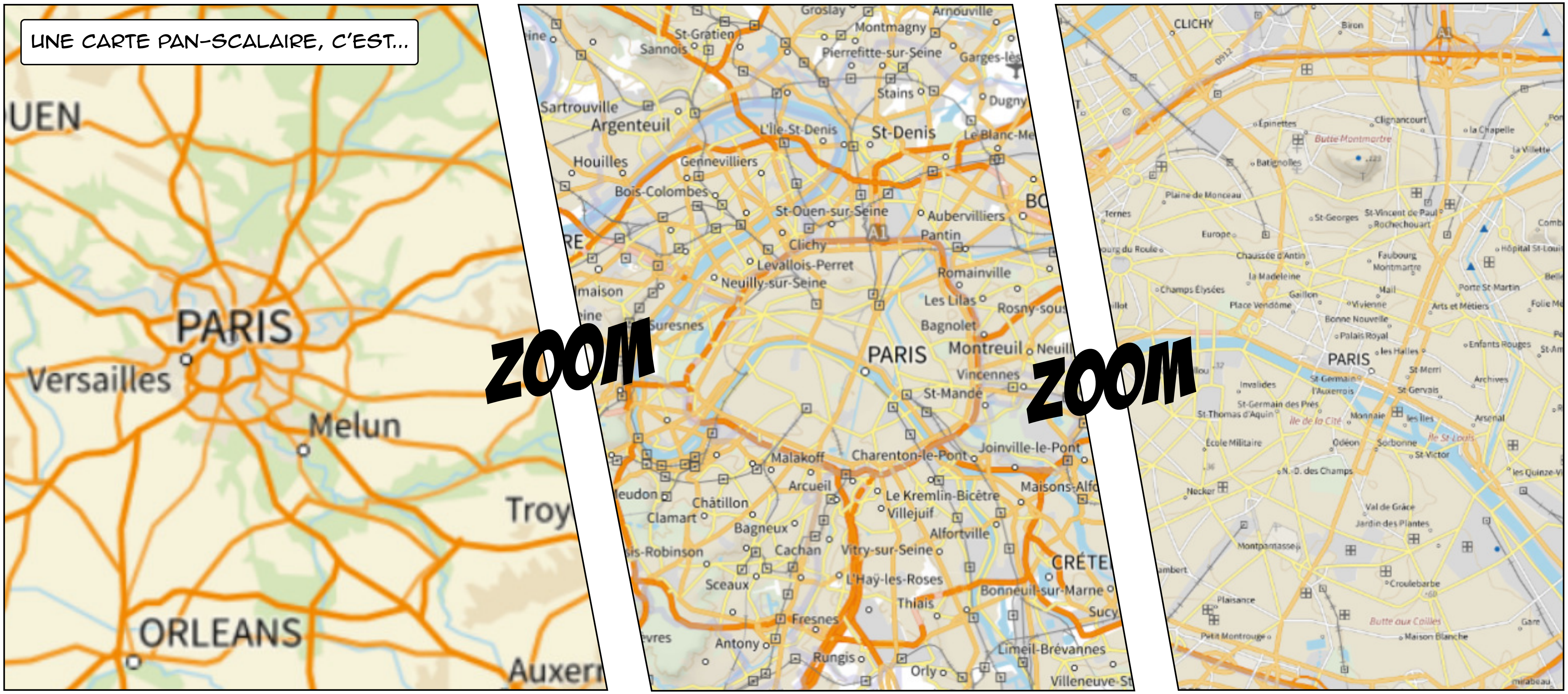
https://3da-ae.github.io

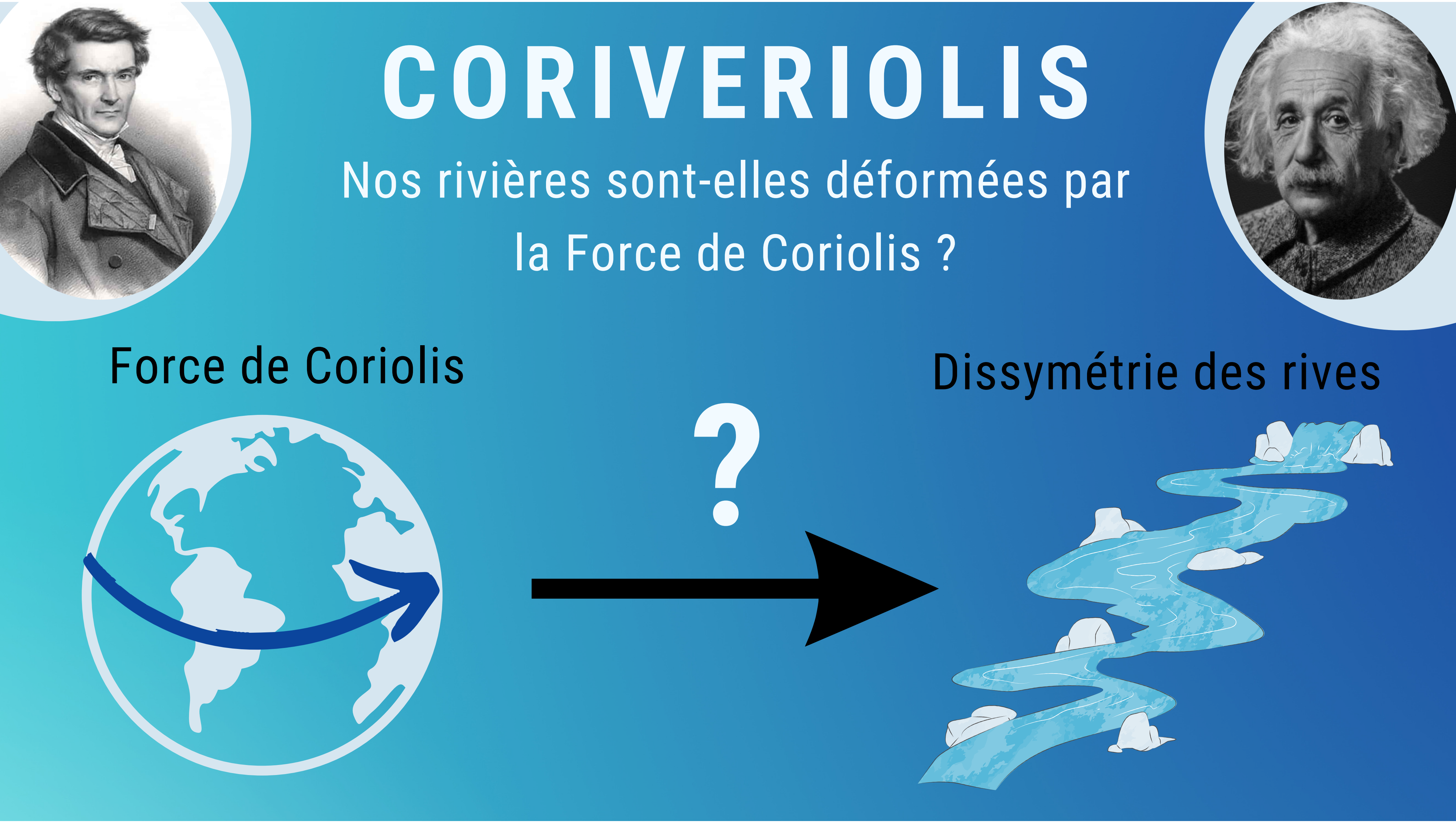
3D-aware latent space. We draw inspiration from the relationship between the 3D space and image space and introduce the idea of a 3D latent space. We propose a 3D-aware autoencoder that encodes images into a 3D-aware (2D) latent image space, in which we train our scene representations.

LIRE UNE CARTE COMME UNE BANDE DESSINÉE

JOURNÉES DE LA RECHERCHE
2024

BÉRÉNICE LE MAO ET GUILLAUME TOUYA




CORIVERIOLIS
Nos rivières sont-elles déformées par
la Force de Coriolis ?
Force de Coriolis
?
Dissymétrie des rives

Reconnaissance de lieu à large échelle,
Application à la prévention de fake news

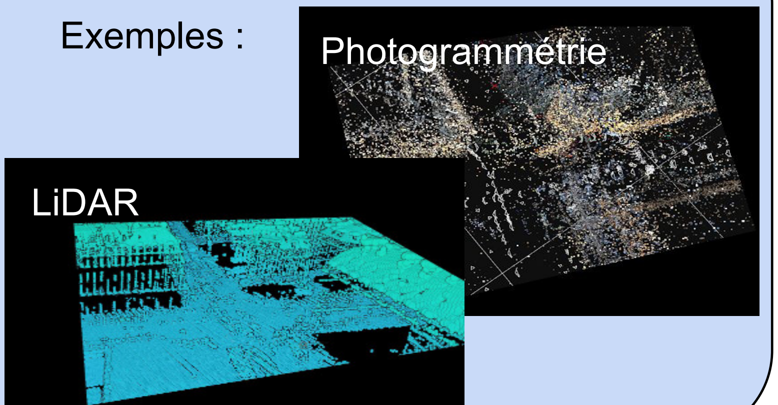
Chahine-Nicolas Zede

Objectifs :

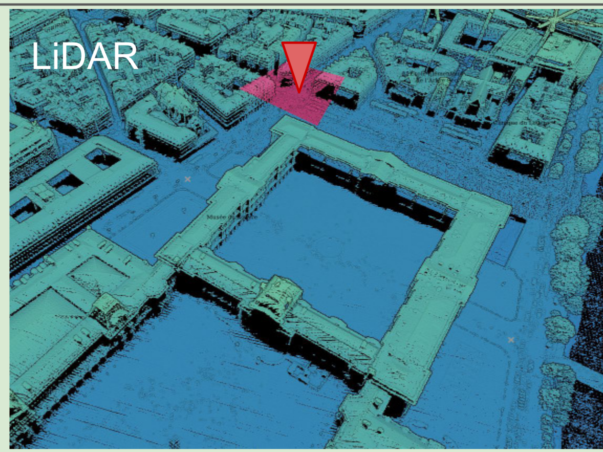
- Géolocaliser un nuage de point
- S'adapter aux méthodes d'acquisitions (Photogrammétrie, SLAM, LiDAR ...)
- Être applicable à grande échelle
- Évaluer la solution dans le contexte de la prévention de fake news de contenus vidéo (FranceTV, Gendarmerie Nationale)

Requête : un nuage de points

Exemples :



Sortie



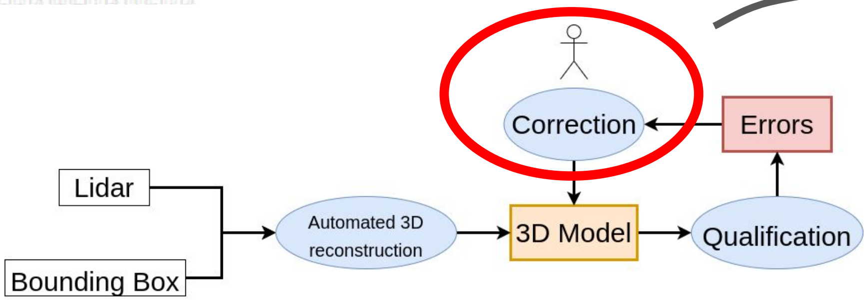
Direction : Valérie Gouet-Brunet
Encadrement : Laurent Caraffa

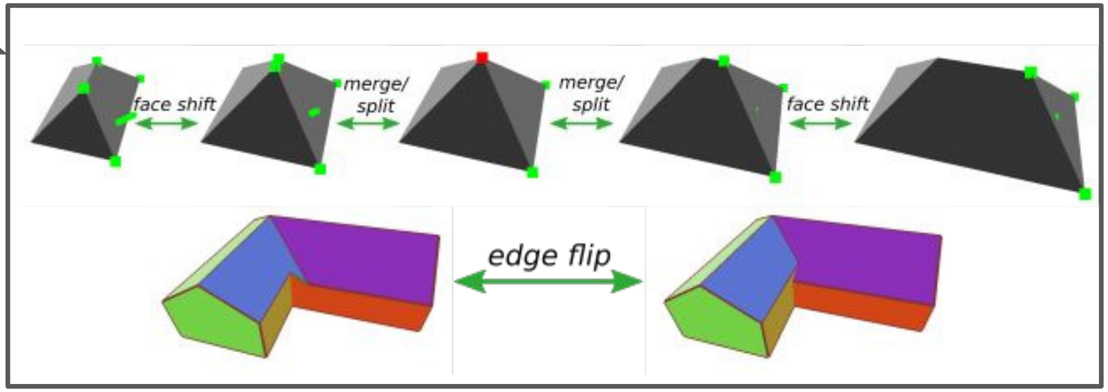
Thèse commencée en Janvier 2023
Laboratoire LASTIG

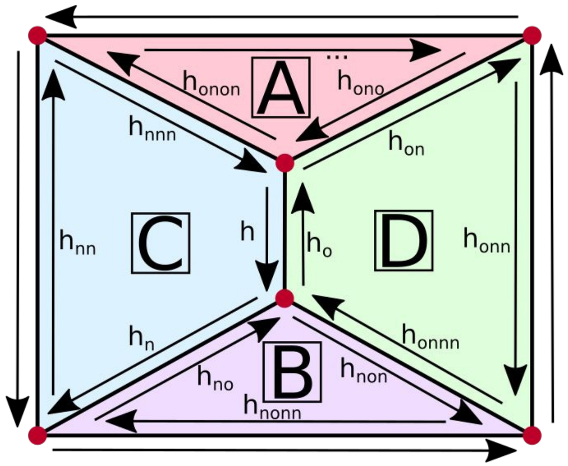
3D INTERACTIVE MODELLING OF 3D CITY MODEL

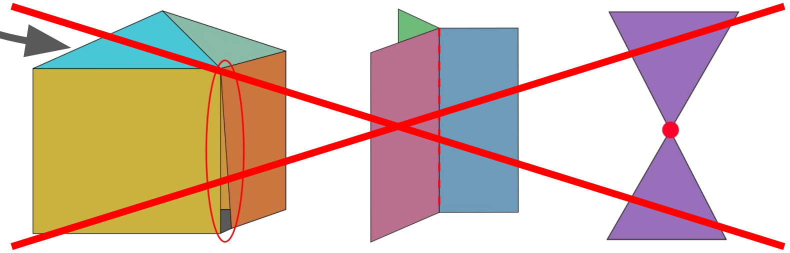
CREATION OF A SEMI AUTOMATIC RECONSTRUCTION PIPELINE

Florent Geniet



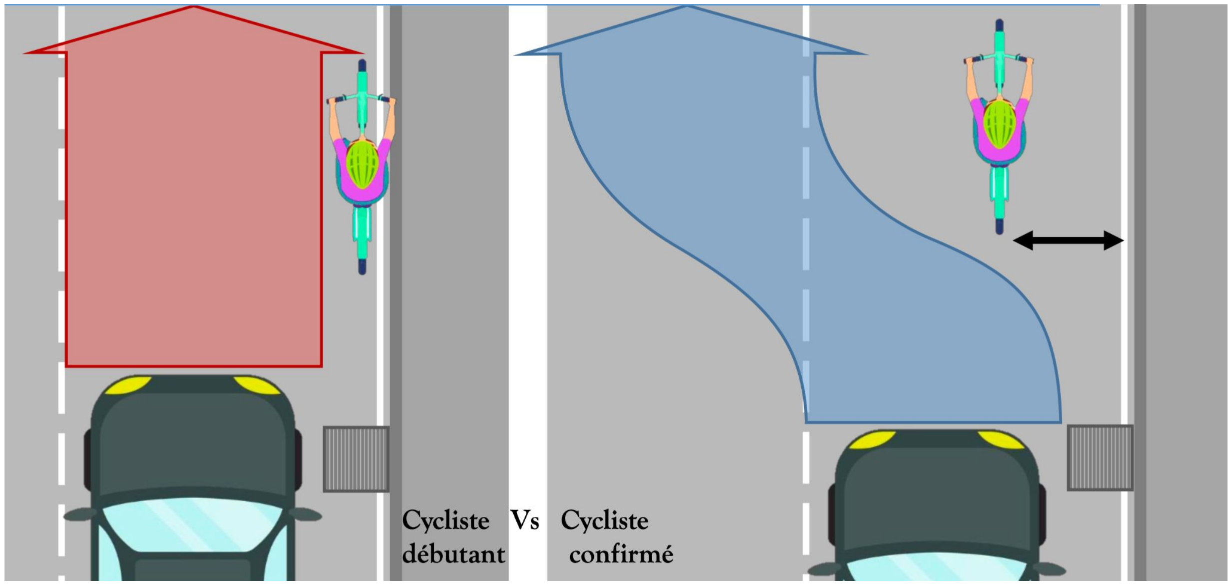


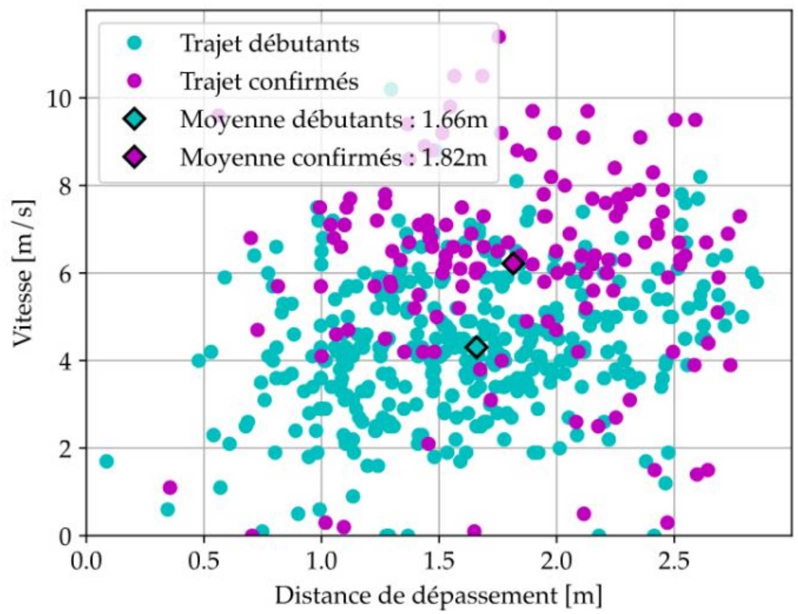




Étude des risques de dépassement au quotidien pour les cyclistes

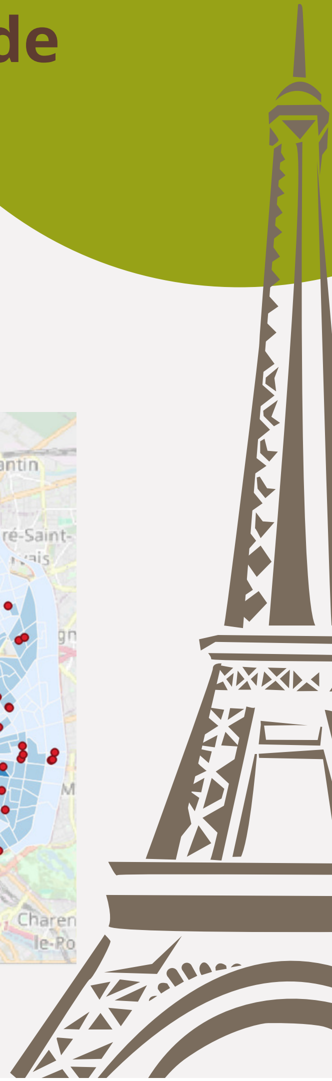
par Alexandre ESTEOULLE, Gabin BOURLON et Elisabeth GIROUX
commandité par Emmanuel CLEDAT



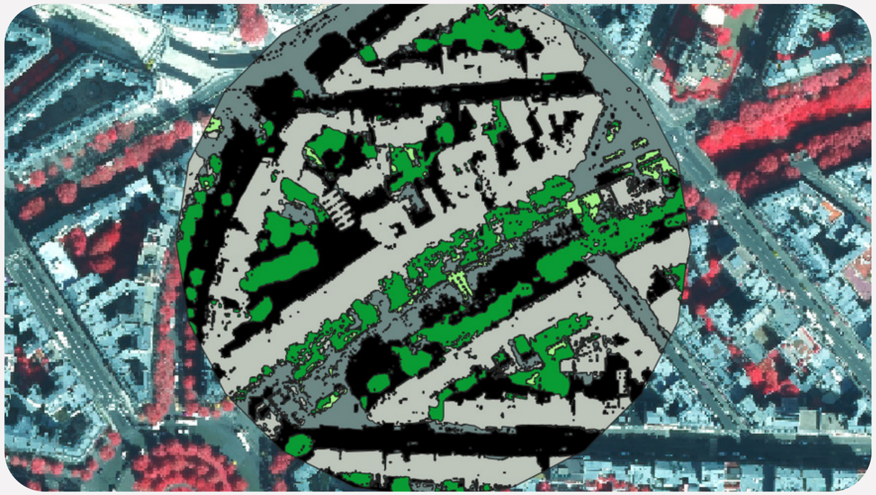


MOINEAUX EN MILIEU URBAIN

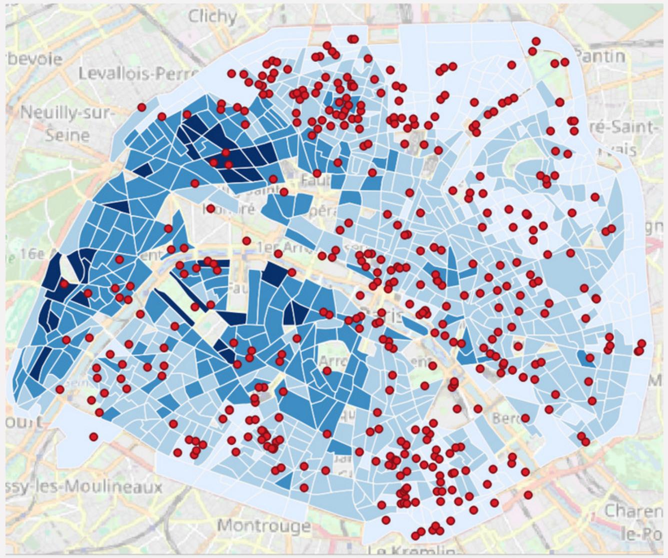
Étude de facteurs corrélés à la présence de colonies de moineaux en milieu urbain



étude de la distribution spatiale de la végétation



étude du bâti



Élaboration d'une méthode low-cost pour tracer des sentiers en forêt

LE PRINCIPE DE NOTRE PROJET :

Vérité Terrain

Cheminement polygonal fermé au tachéo + références GNSS

pour évaluer →

Données de tests

(photogrammétriques)

Méthode retenue : photos avec un smartphone, autofocus bloqué, mode rafale, à 45°

pour évaluer →

Données issues du crowd-sourcing

Traces GNSS des coureurs ou cyclistes

Les données que nos commanditaires veulent utiliser pour améliorer la BD TOPO

Université Gustave Eiffel

ENSG Géomatique — École Nationale des Sciences Géographiques

IGN — Institut National de l'Information Géographique et Forestière

Etudiants : Paul Calloch, Brice Labbé & Lorine Peseux

Commanditaires : Franck Tertre, Emmanuel Clédat, Yann Méneroux & Ana-Maria Olteanu Raimond

TRACER L'UTILISATION DES CARTES WEB POUR MIEUX COMPRENDRE LEUR UTILISATION

Comment identifier et analyser le comportement des utilisateurs d'une carte web ?

Rieulle BRUSQ, Lilia CAMPO, Vanessa PECH
Commandité par Guillaume TOUYA et Laura WENCLIK