Observation d’émissions de CO_2 par satellite

Ministère de la transition écologique et solidaire

IGN : Institut national de l’information géographique et forestière

LSCE : Laboratoire des sciences du climat et de l'environnement

Contexte

Aujourd'hui, les émissions de CO_2 sont suivies via des données d'activité (“inventaires”)

- **Auto-déclaration** de chaque État
- **Qualité hétérogène**
- Peu d’informations à **fine échelle** (ex: ville, saison)
- Issues de **modélisations** des processus émetteurs

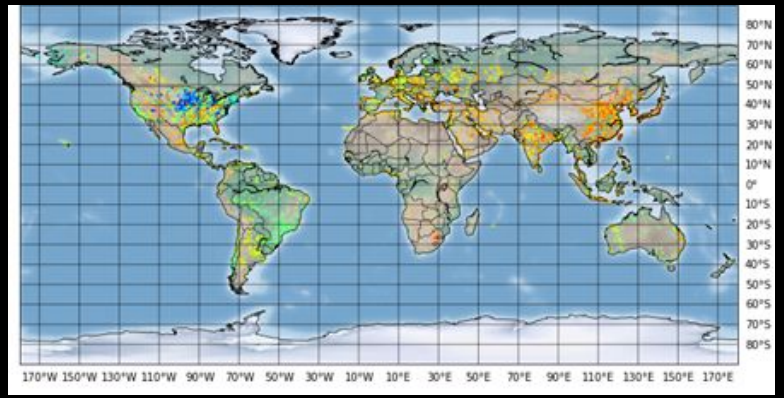
Comment améliorer la qualité, l'objectivité et la résolution des données d'émission de CO_2?

Notre idée : combiner données d'inventaires et satellite

Inventaires

- Villes, centrales (charbon/gaz/fioul), usines…

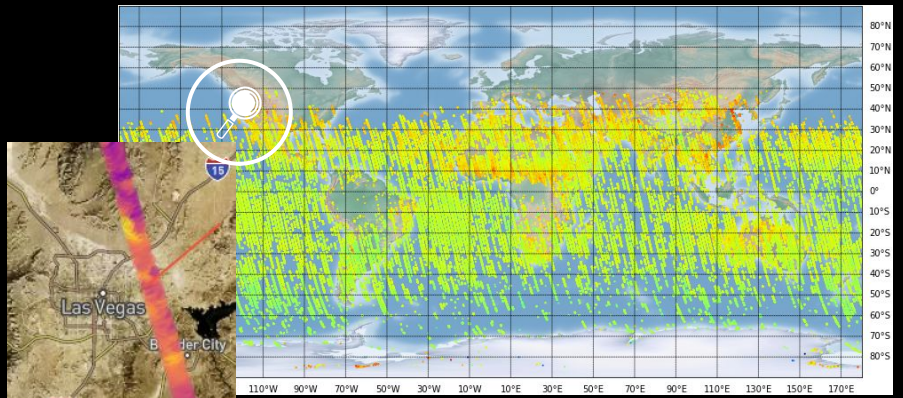
> 5 sources de données, 17500 points / an



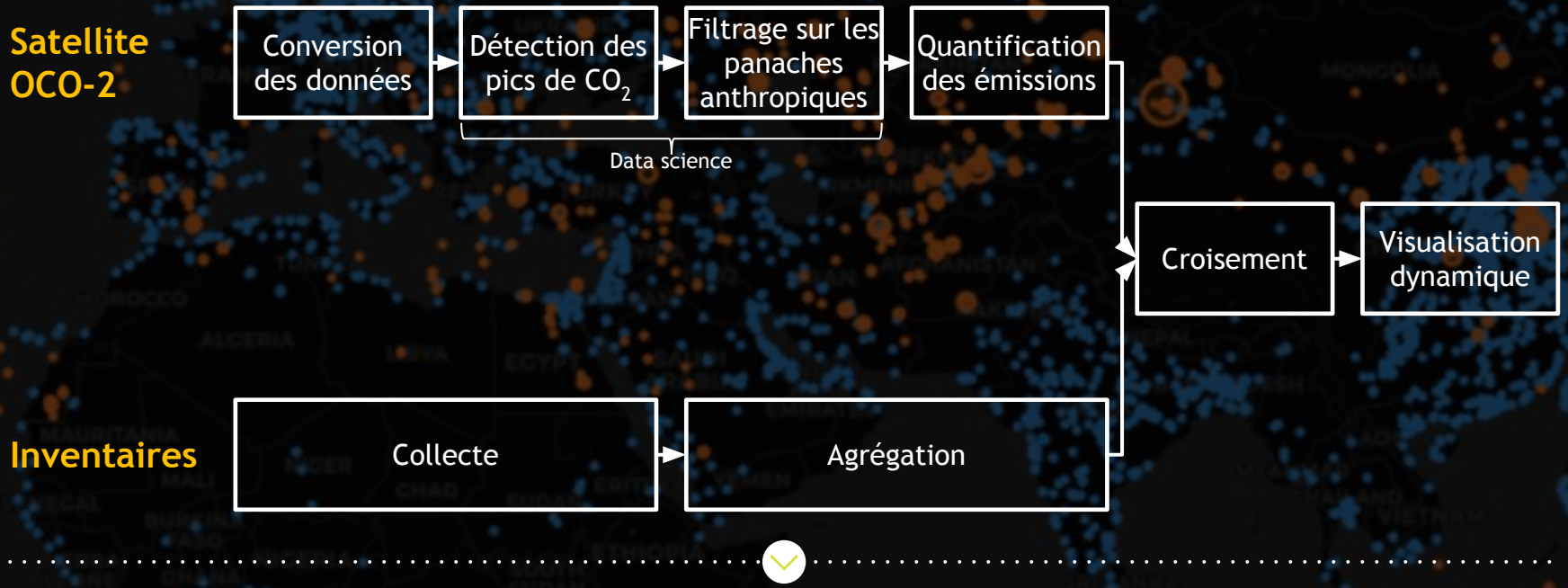
Satellite OCO-2 (NASA)

- Observations des concentrations de CO_2 à proximité de la trace du satellite de jour et en ciel clair

> 2 millions de points / mois



Notre approche



Allons voir le résultat tout de suite : DÉMO !

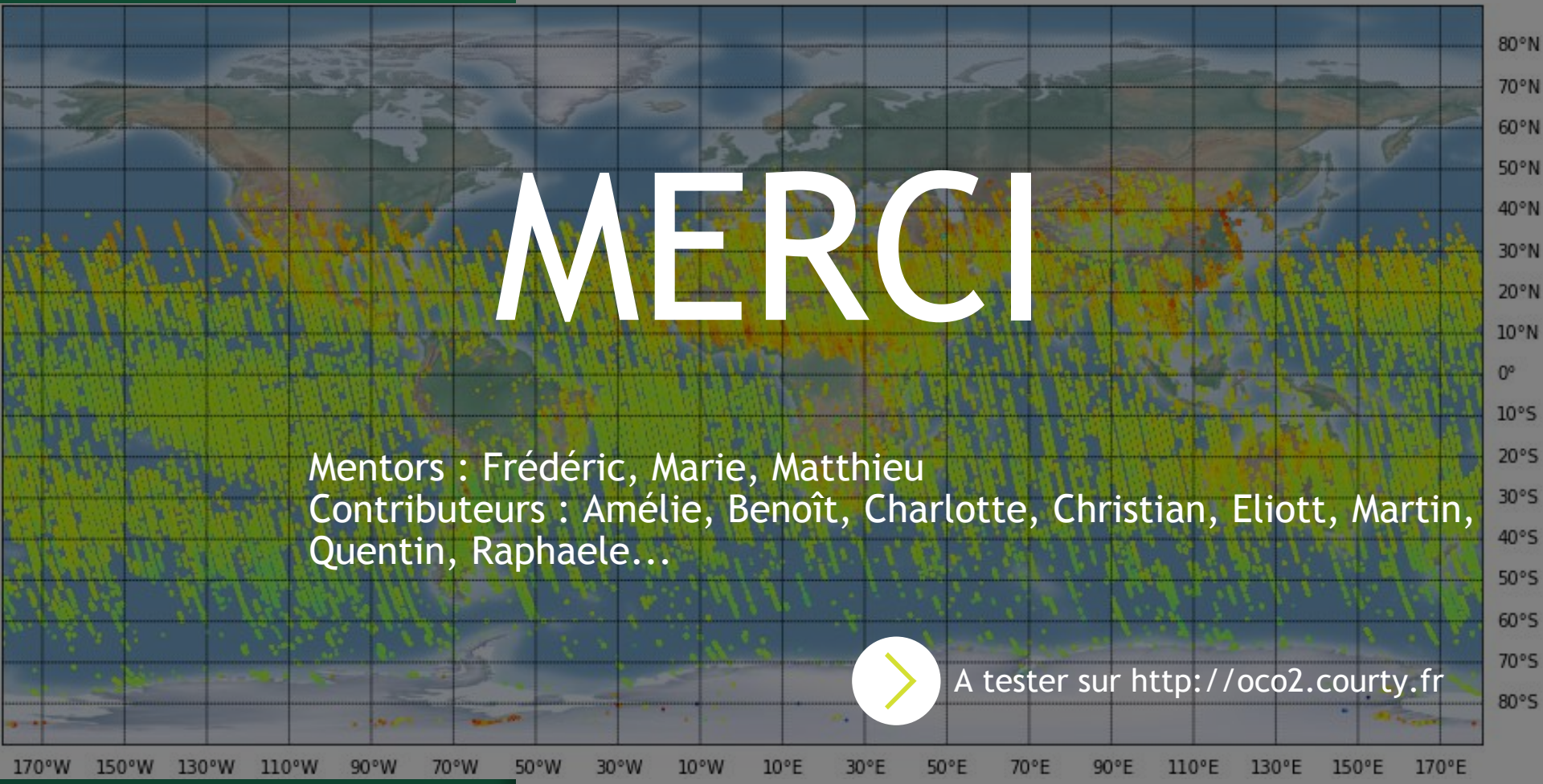
Valeur de la démarche

1er projet aussi poussé

- de croisement des données d'inventaire et satellite à l'échelle mondiale
- offrant aussi une visualisation dynamique & facile d'utilisation

Intérêts déjà exprimés :

- Recherche : Frédéric Chevallier (Laboratoire des Sciences du Climat et de l'Environnement) pour préparer les futurs satellites de surveillance du CO_2 : MicroCarb, CO2M…
- Sandbag : Think tank européen
- Le ministère de la transition écologique (?) : pour aller plus loin dans le suivi des émissions de CO_2 afin de le fonder sur l'observation directe et spatialisée des gaz



MERCI

Mentors : Frédéric, Marie, Matthieu
Contributeurs : Amélie, Benoît, Charlotte, Christian, Eliott, Martin, Quentin, Raphaele...

A tester sur http://oco2.courty.fr

Annexes

CO_2 emissions sources

1/ Estimation of anthropogenic emissions of greenhouse gases
Source: Emissions Database for Global Atmospheric Research (EDGAR)
Link: https://edgar.jrc.ec.europa.eu/overview.php?v=50_GHG

2/ Power plants burning fossil fuels (gas, oil and coal)
Source: World Resource Institute
Link: http://datasets.wri.org/dataset/globalpowerplantdatabase

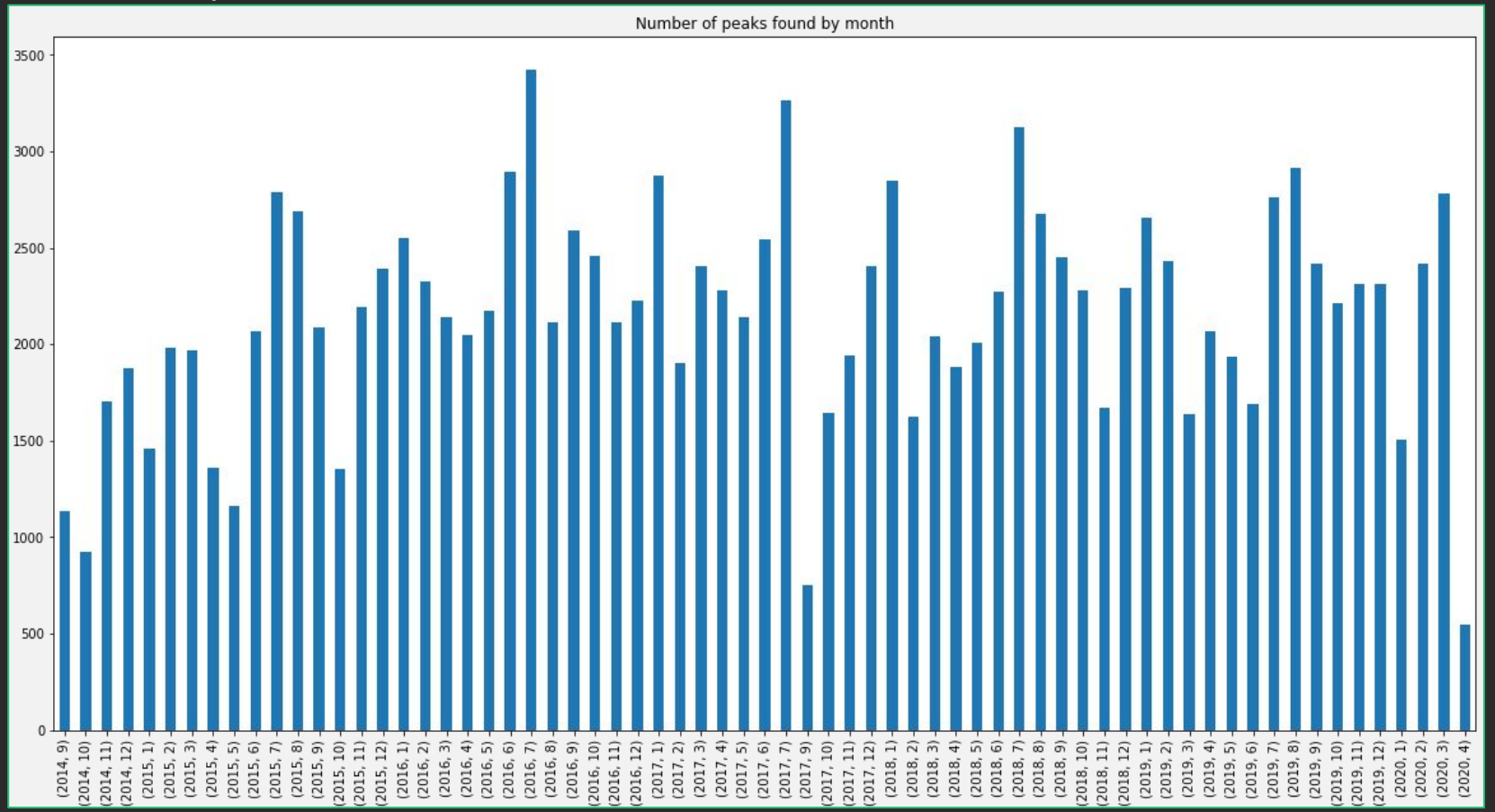
3/ Coal power plants
Source: Global Energy Monitor (GEM)
Link: https://www.gem.wiki/Main_Page

4/ Major cities
Source: Open Data Soft
Link: https://public.opendatasoft.com/explore/dataset/co2-emissions-cities

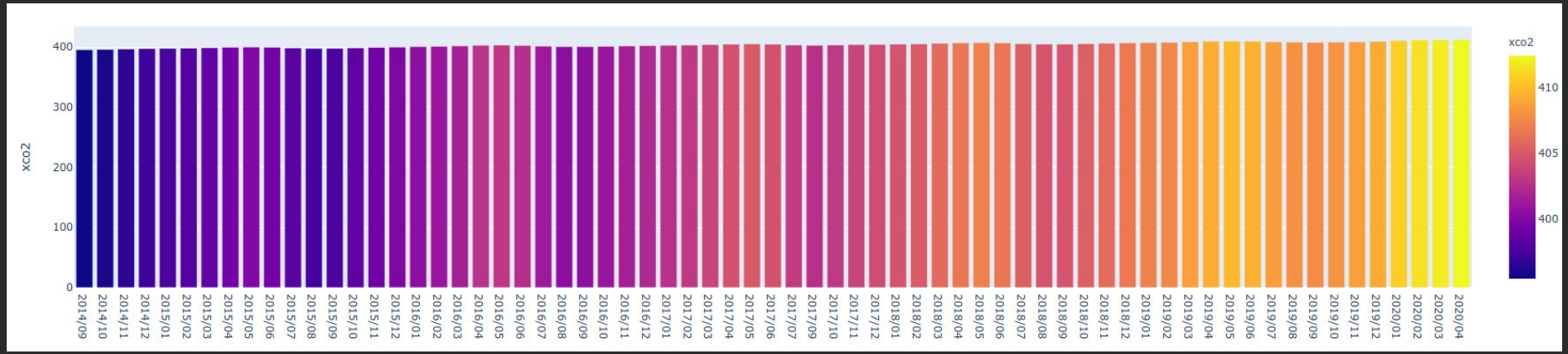
5/ ETS infrastructures
Source: Sandbag
Link: https://sandbag.be/

Nombre de pics détectés par mois

Total : 140 000 pics



Moyennes mensuelles des observations depuis 2014



OCO-2 satellite data analysis

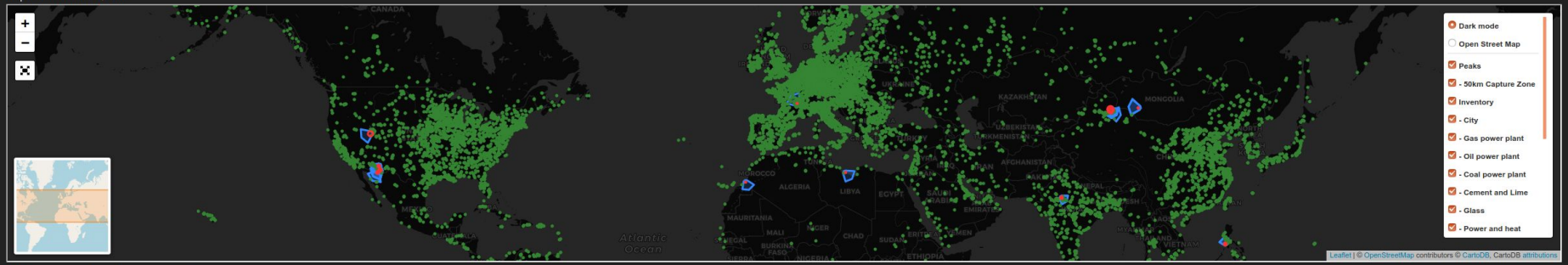
The goal of our project is to localize CO_2 emissions on Earth based on the carbon concentration data measured by the OCO-2 Satellite from the NASA.

- The map shows in red the places where we detect a peak in CO_2 emission based on OCO-2 satellite data.
- We also plot the potential CO_2 source from declarative content (EDGAR, IEA, FAO...), in green.
- You can select a month of observations with the slider below.
- You can click on a peak to view a detailed graph of what the satellite really saw and how we find a peak in this data.

For more info, see our website.

09/2014 01/2015 06 01/2016 06 01/2017 06 01/2018 06 01/2019 06 01/2020 04/2020

Map for data from : 04/2020



Please select a point

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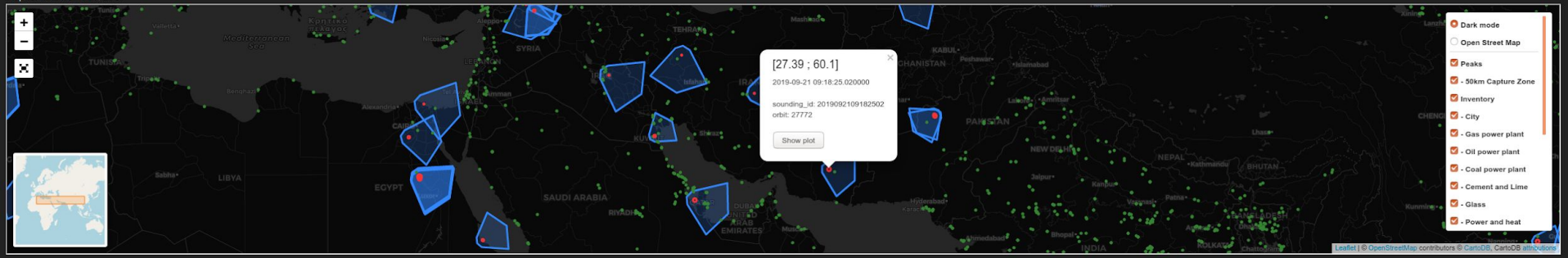

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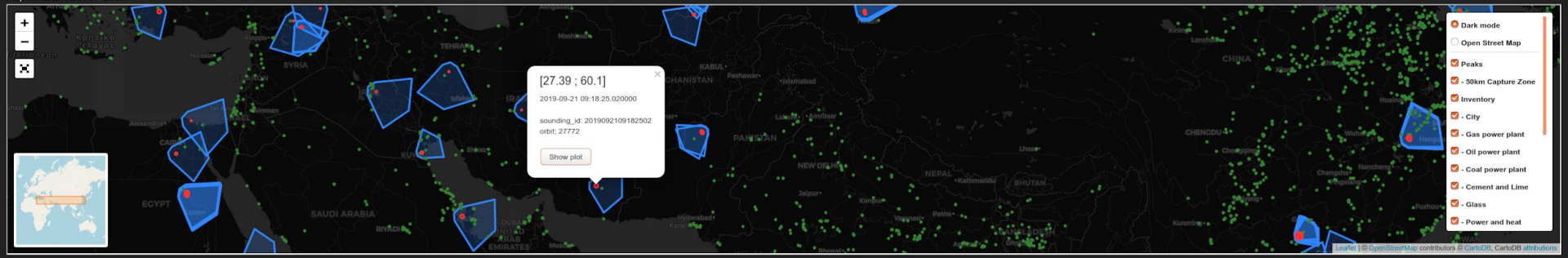

Satellite view of the data

Satellite data for 100km around the peak

The estimated mass of the peak is **1,273.72 ton of CO_2 per hour**

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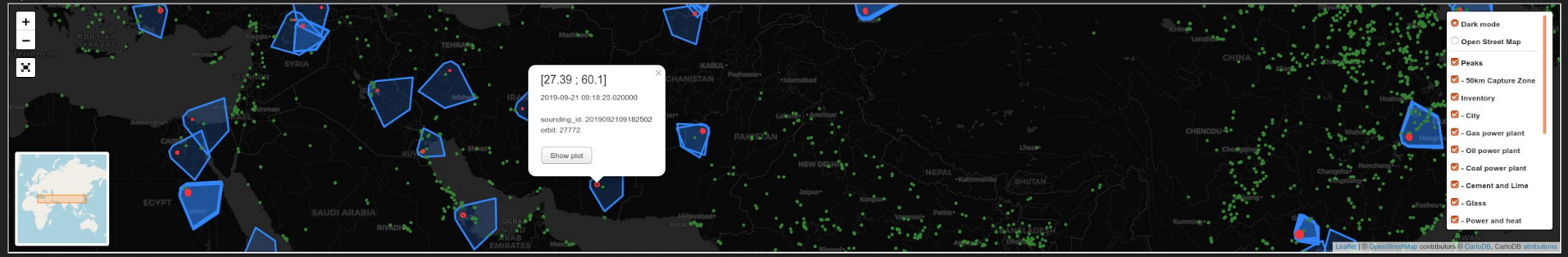

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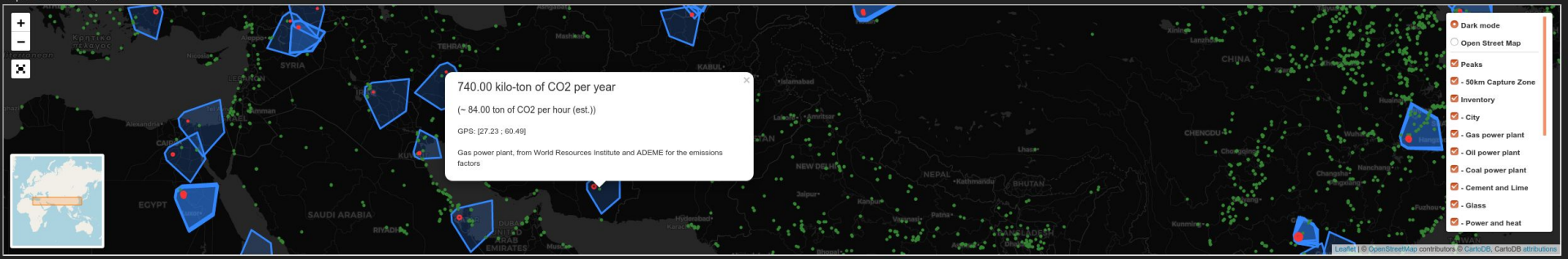

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