IMPLEMENTATION OF AN AIR QUALITY MODELING AND FORECASTING SYSTEM FOR THE CITY OF GUADALAJARA INVOLVING THE IMPLEMENTATION OF FIXED AND MOBILE MICRO-SENSORS ON VEHICLES

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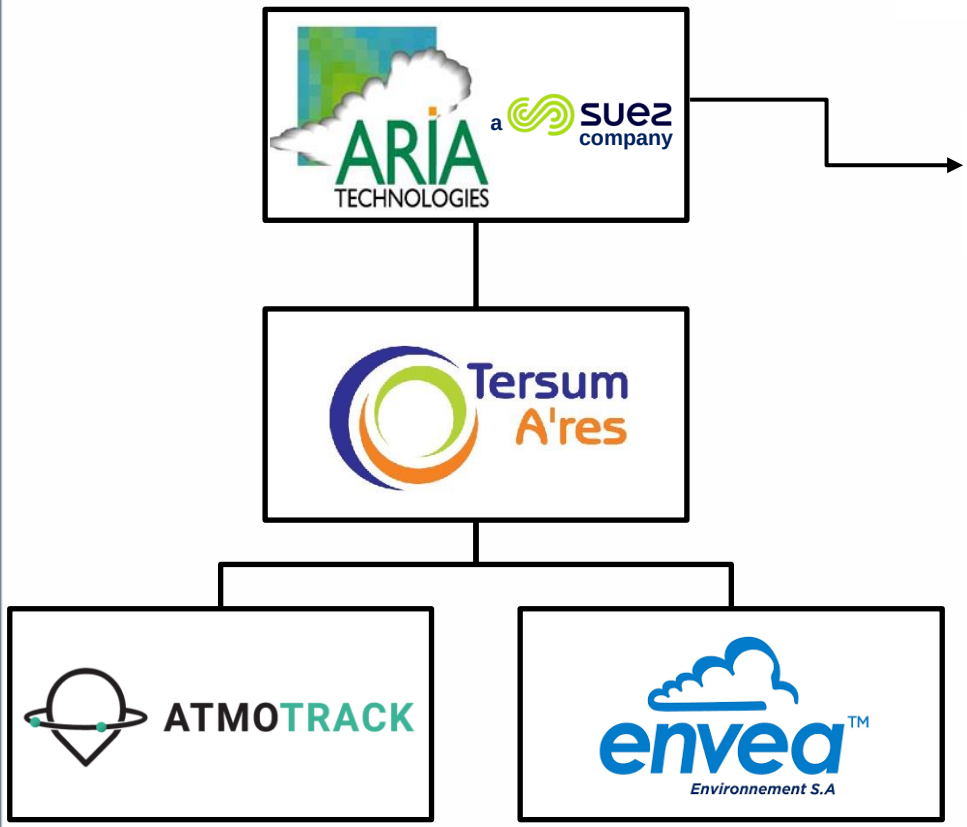
VIE, Coordination du projet
Fanny VELAY-LASRY
Chef de projet
Marc CHIAPPERO
Responsable commercial
Jacques MOUSSAFIR
PDG ARIA Technologies

Who's part of this Project ?



Aired
Plataforma de análisis ambiental

Medio Ambiente y Desarrollo Territorial

Jalisco
GOBIERNO DEL ESTADO

CENTRO DE ANÁLISIS DE DATOS Y SUPERCÓMPUTO
CADS

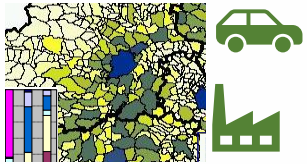
Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

MINISTÈRE DE L'ÉCONOMIE ET DES FINANCES

UNIVERSIDAD DE GUADALAJARA
PIENSA Y TRABAJA

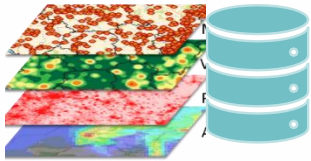
The AIRED project

Emissions

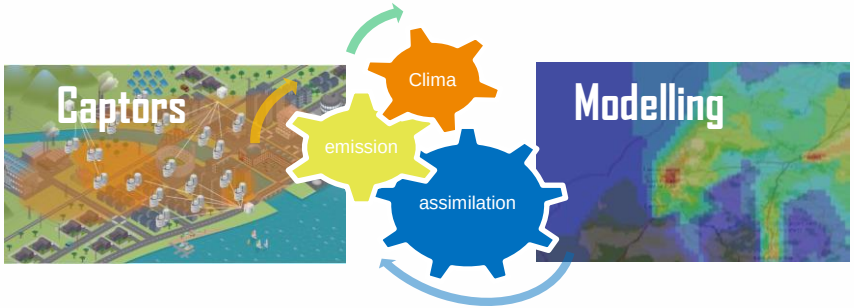


Meteorological Data

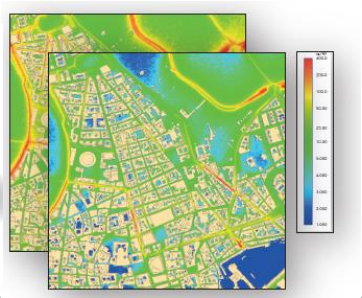
Geographical Data



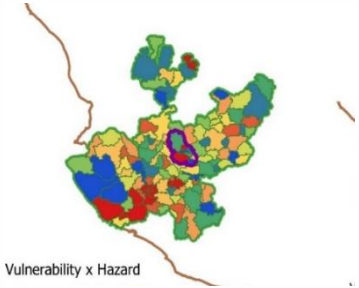
Orgraphie
Landuse
Pop. Density



Emission Scenari



Health Module



Web and phone API

Area of study

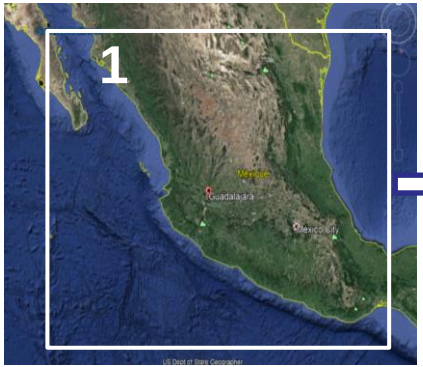
Estado de Jalisco

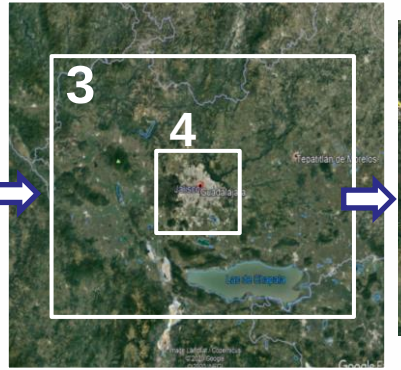
By TUBS - CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=15994634

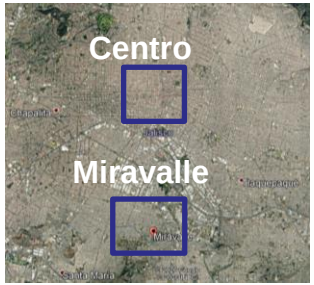
By Jpablo cad - Own work, CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=4926938

- Area: 78,588 km²
- Population 8,348,151 (2020)
- Population density 110/km²

Domains selection







WRF CHIMERE

WRF CHIMERE

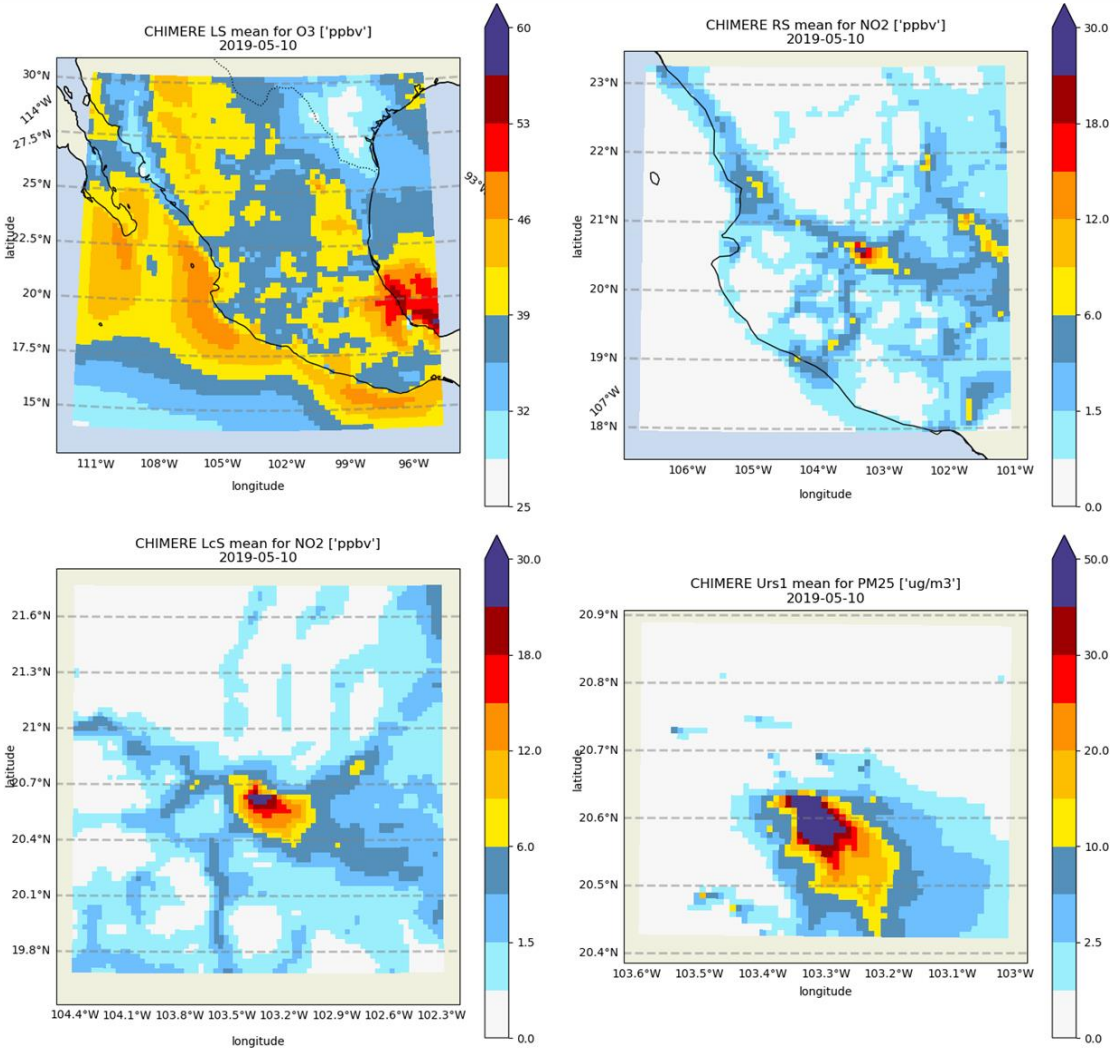
WRF / SWIFT CHIMERE / FARM

SIRANE

SWIFT/ SPRAY

Overview of results

- **CHIMERE multi-scale chemistry-transport model** (https://www.lmd.polytechnique.fr/chimere/)
- **FARM (Flexible Air quality Regional Model) three-dimensional Eulerian model (**http://www.aria-net.it/qualearia/en/**)**



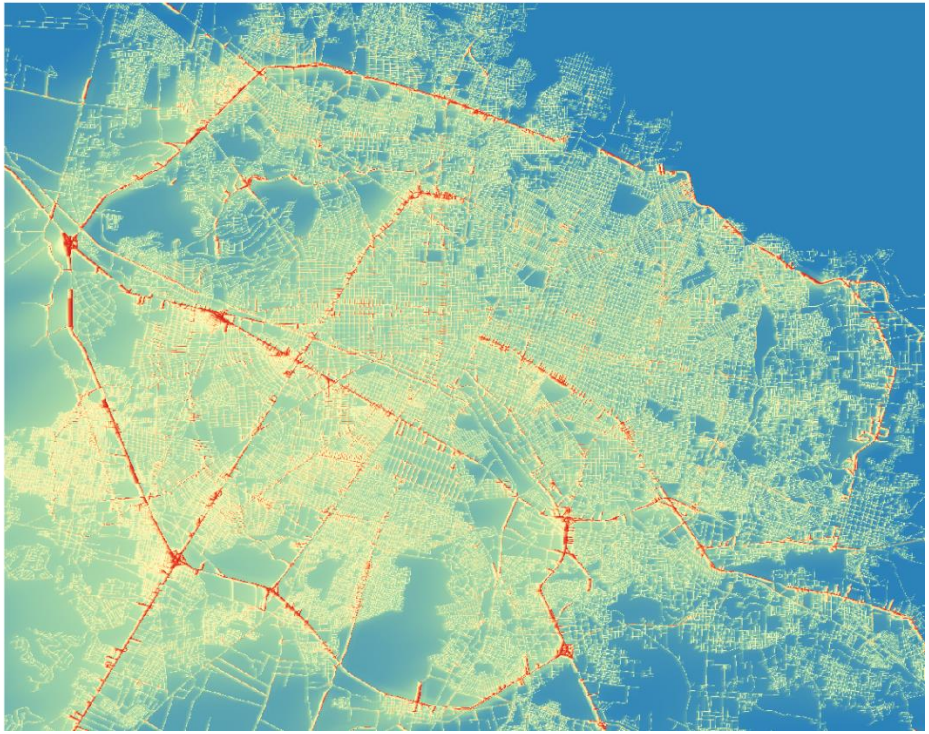
SIRANE model

- **SIRANE:**

Dispersion model combining

- ***A street network with several transport processes in the urban canopy.***
- ***A parametrization of the atmospheric boundary layer coupled to a gaussian model.***

- :



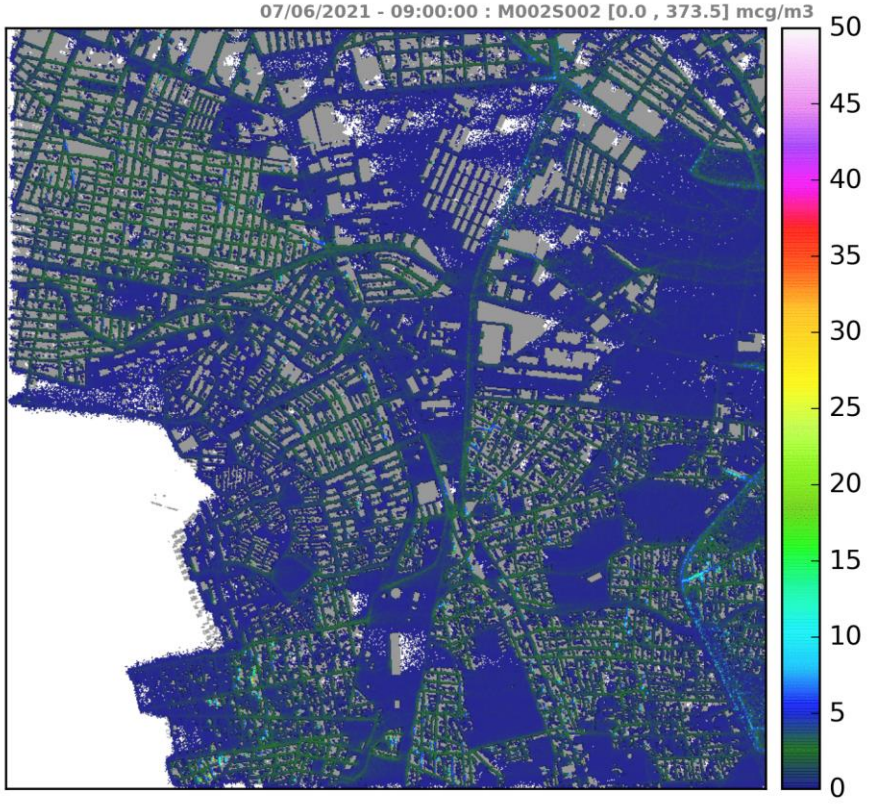
Guadalajara

- Soulhac, L., Salizzoni, P., Cierco, F.-X. et Perkins, R. J., 2011. The model SIRANE for atmospheric urban pollutant dispersion: PART I: presentation of the model. Atmospheric Environment. Volume 45, Issue 39, 7379-7395

PMSS model

- **PMSS:**
  - ***3D dispersion model***
  - ***Building are considered***
  - ***Adapted to Street level modelling***

- ***PMSS name (Moussafir et al, 2013; Oldrini et al, 2017) is derived from Parallel Micro SWIFT SPRAY***

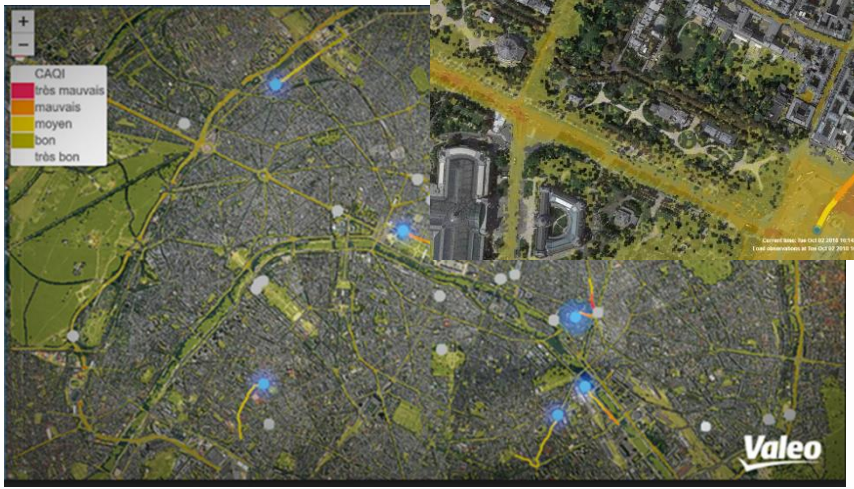


Miravalle

- *Moussafir, J., Olry, C., Nibart, M., and Albergel, A., 2013. Aircity, a very High-resolution 3D Atmospheric Dispersion Modeling System for Paris. In 15th Int. Conf. on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes.*
- *Oldrini, O., Armand, P., Duchenne, C., Olry, C., Moussafir, J., Tinarelli, G., 2017. Description and preliminary validation of the PMSS fast response parallel atmospheric flow and dispersion solver in complex built-up areas. Environ. Fluid Mech. 17, 997–1014. https://doi.org/10.1007/s10652-017-9532-1*

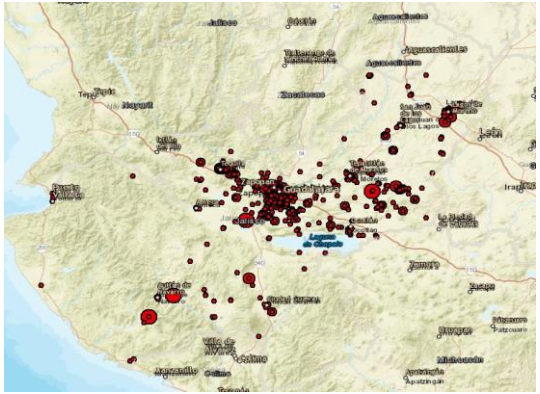
Microcaptors network

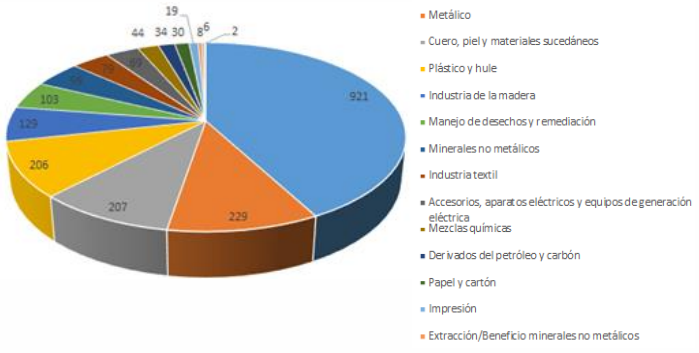
- Purchase and installation of 32 µ-captors
  - ***Will enable data assimilation for model outputs***
  - ***24 µ-capteurs mobiles (ATMOTRACK) y 8 stations fixes (ENVEA)***



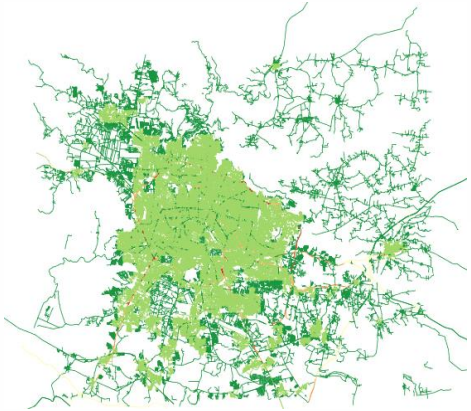
Local emision inventory

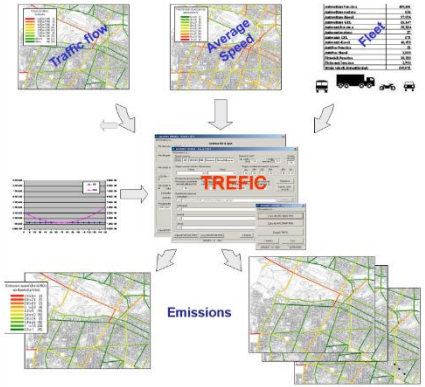
Ponctual sources (SEMARNAT data)



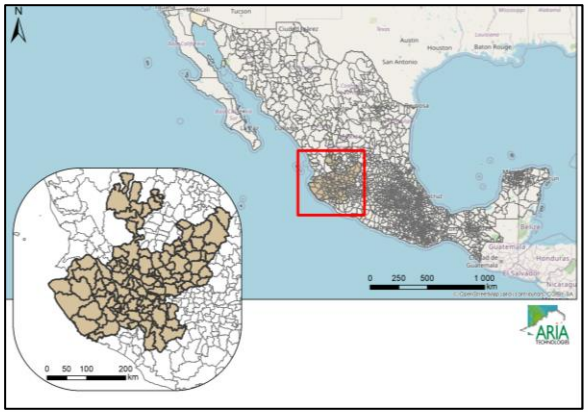


Linear sources



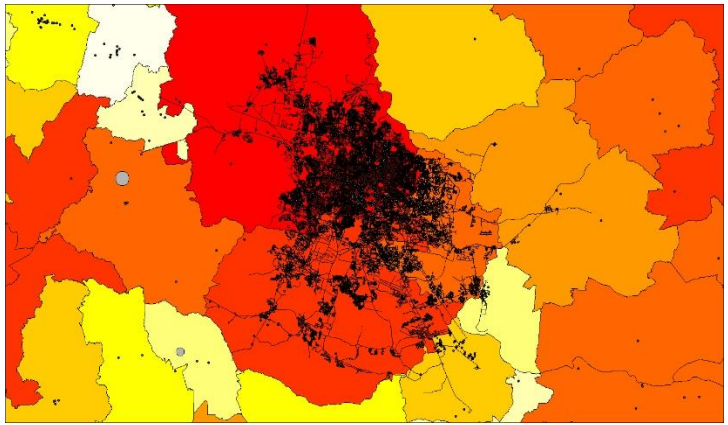


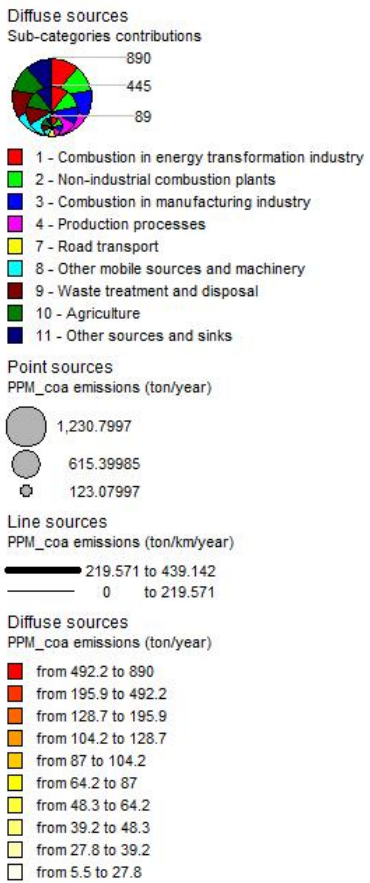
Surface sources (SEMARNAT Data)

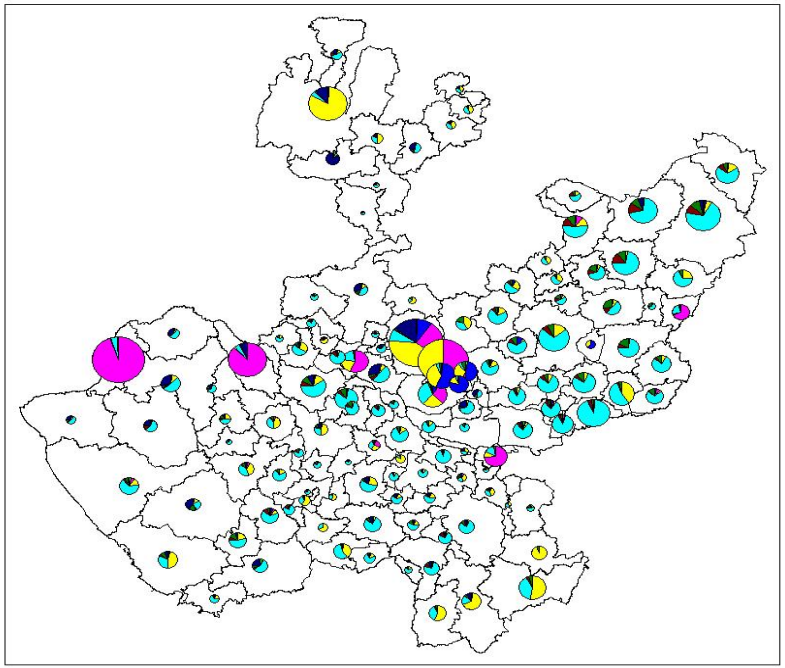


Local emision inventory

- Spatialized emissions PM 10

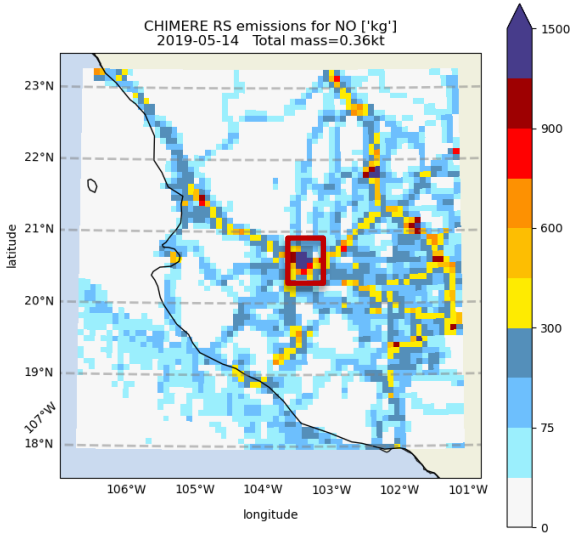


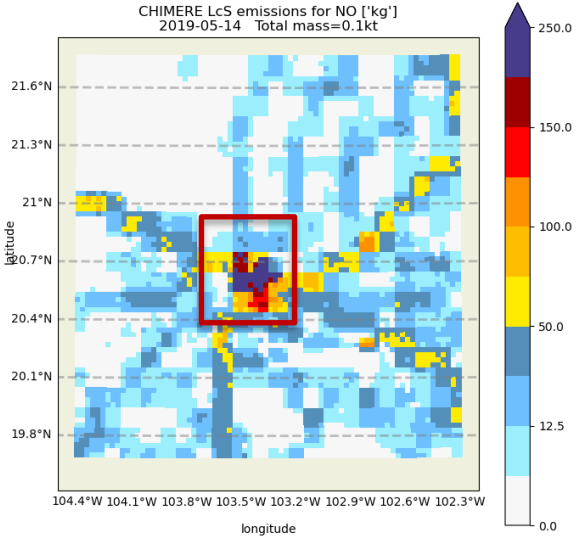




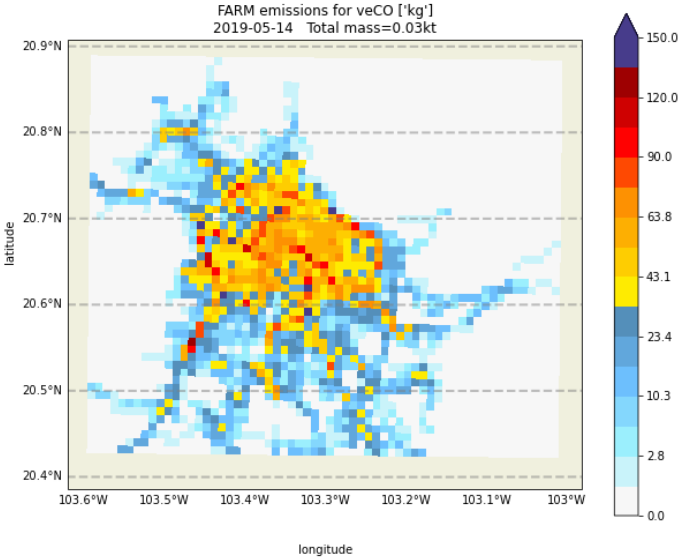
From a global inventory to a local inventory

EDGARv5.0 0.1 x 0.1°



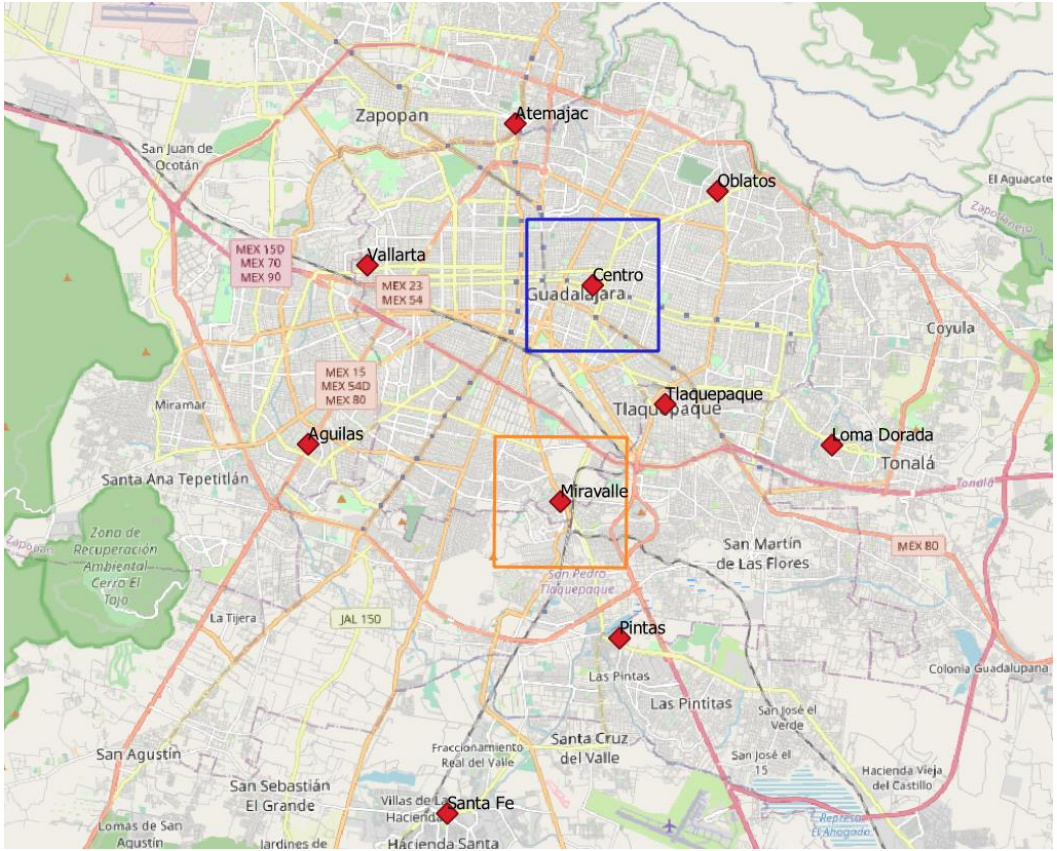


Local invetory emission



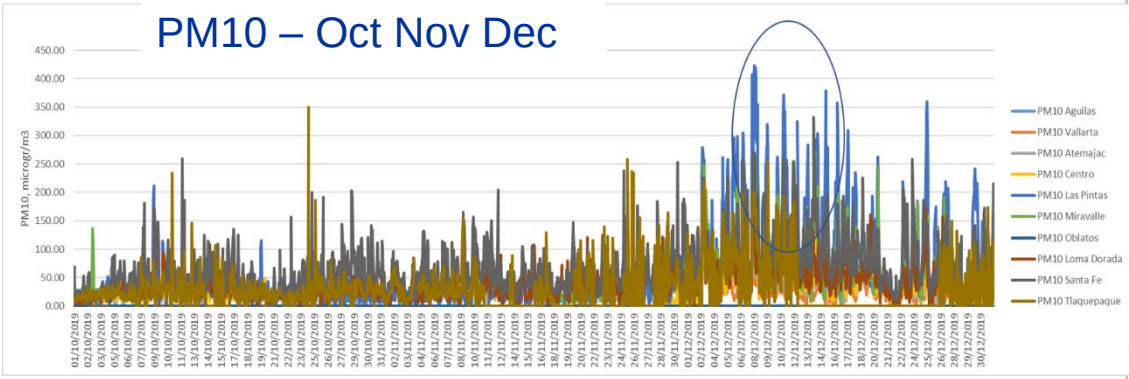
Data available for evaluation

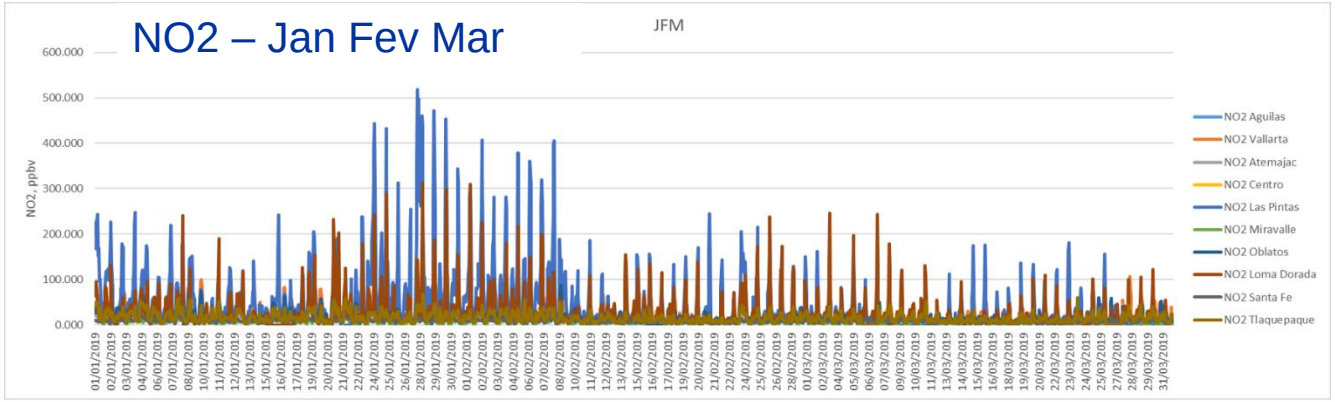
10 air pollution and meteorological monitoring stations are deployed in Guadalajara



Episode selection for validation

- 1st Episode : 27th - 31st january 2019
- 2nd Episode : 14th - 19th may 2019
- 3rd Episode : 29th july - 7th august 2019
- 4th Episode : 8th - 14th december 2019



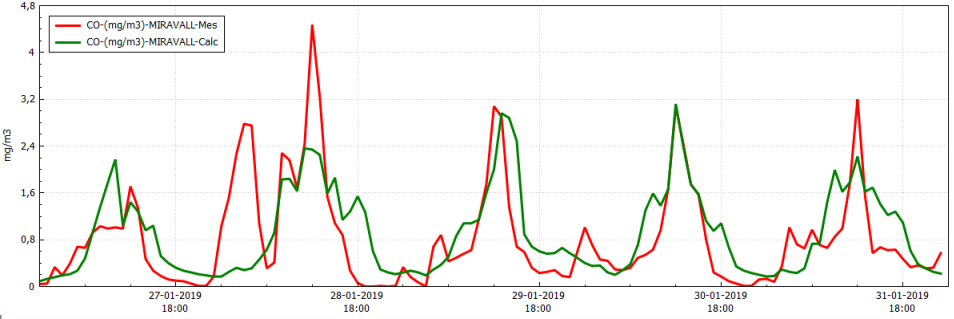


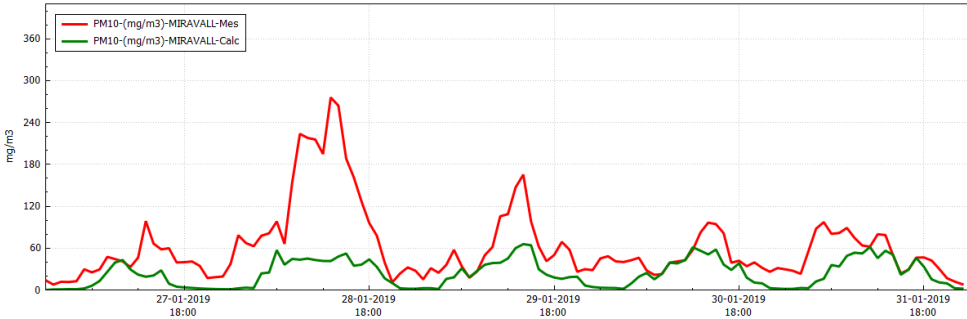
Evaluation d’épisodes pour le modèle FARM

CO - Miravalle

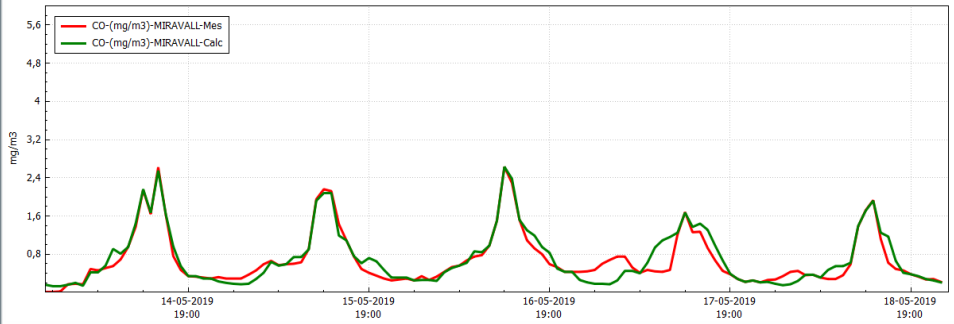
PM10 - Miravalle

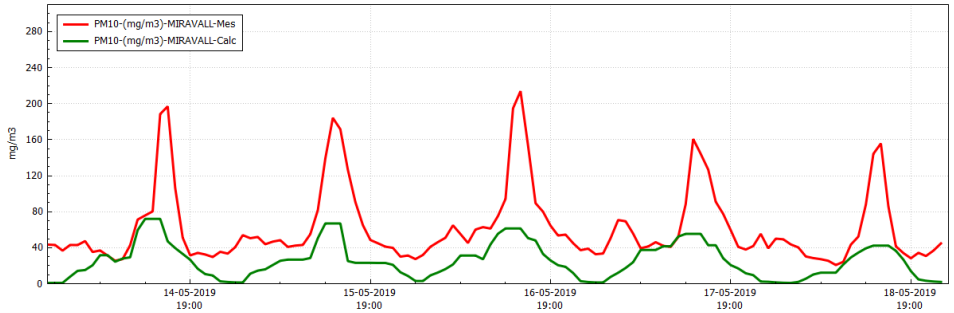
Janvier





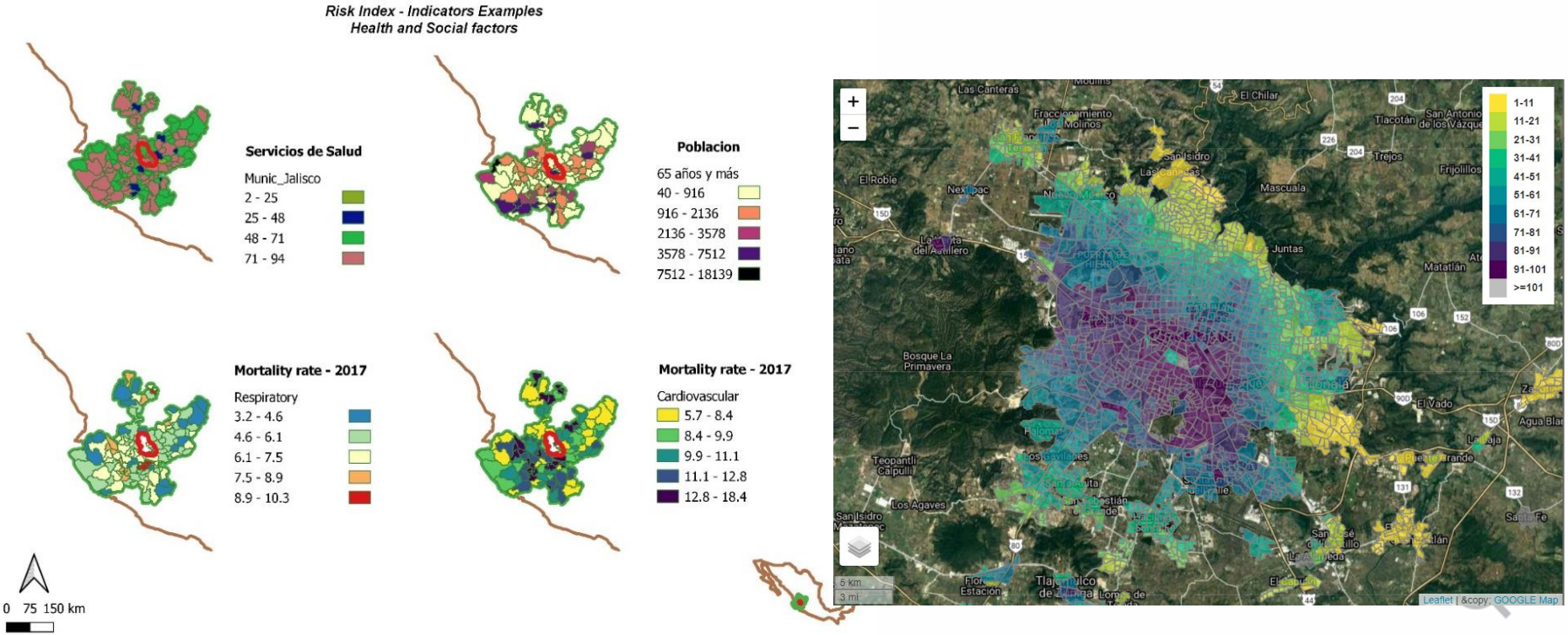
Mai



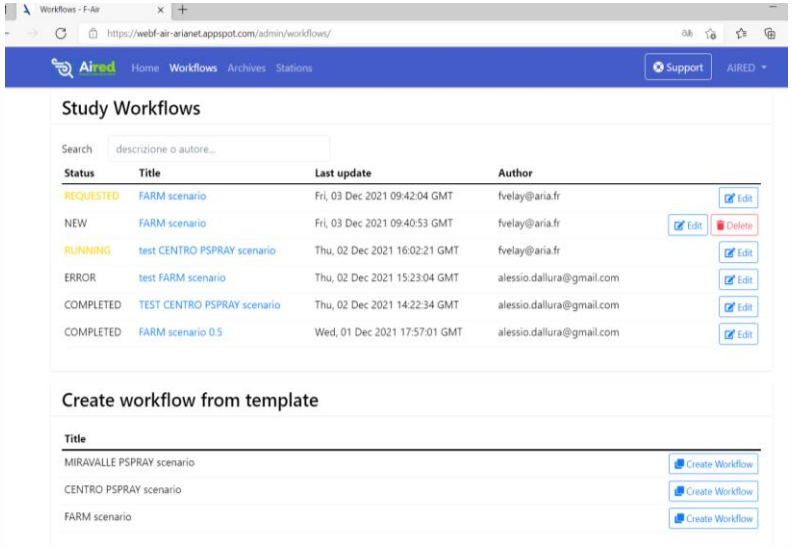


Health module

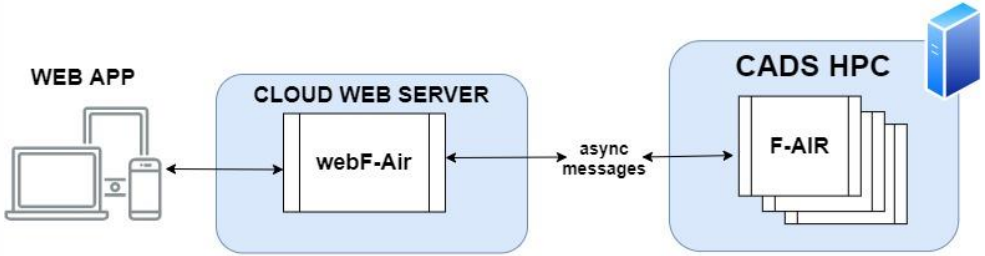
- **Specific factor were defined for the area**

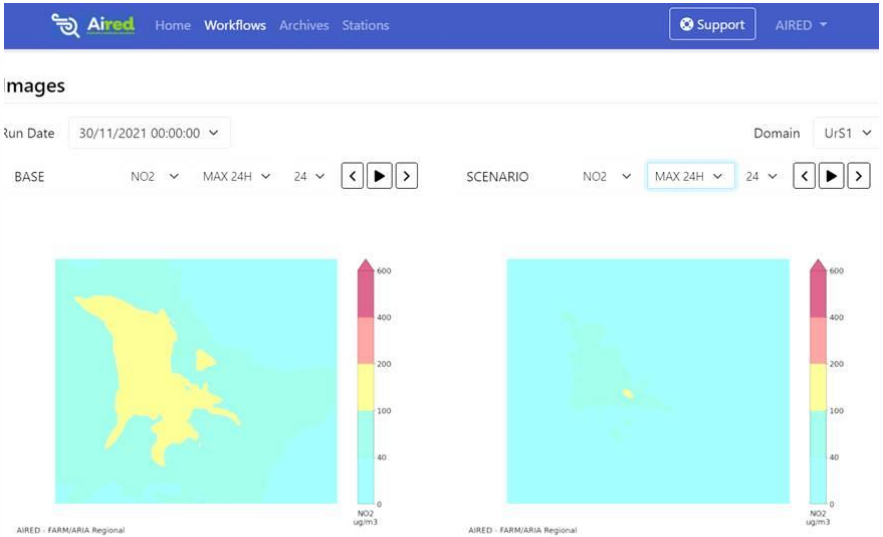


Scénarios d'émissions

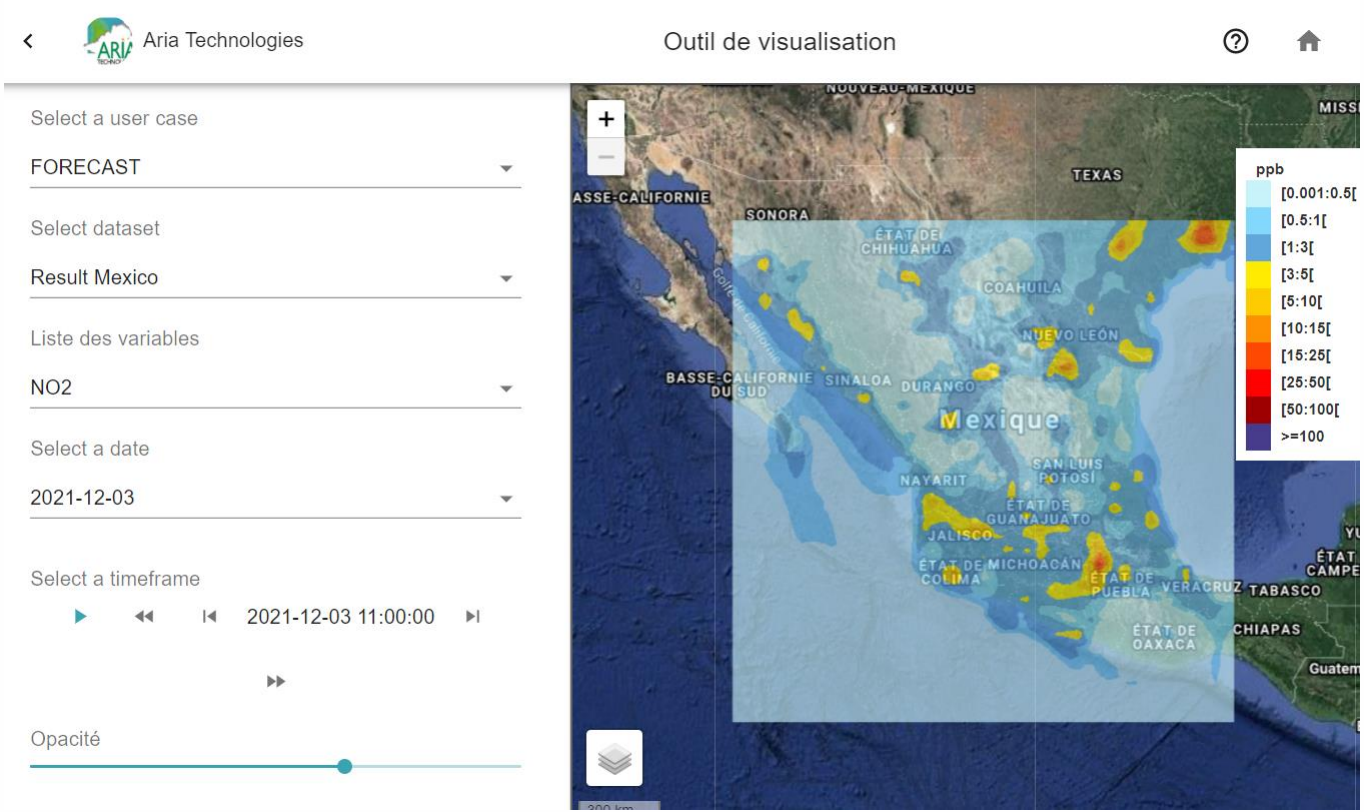


https://webf-air-arianet.appspot.com/





Demonstrateur WEB



https://webapp.aria.fr/demo-api/index.html?project=AIRED

Grazie

Aired
Plataforma de análisis ambiental

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