POLLUTION, URBANIZATION AND PRECARIOUS HABITATS

LANDSCAPE IN AMAZONIAN ENVIRONMENT, STANDARDS STUDY OF POLLUTION AND MONITORING OF ANTHROPOGENIC AND NATURAL POLLUTANTS

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SUMMARY

- OBJECTIVES

- EXPECTED RESULTS

- POLLUTION & BIOMASS FRAMEWORKS :

I - *LEGAL FRAMEWORK VERIFICATION FOR POLLUTION (AIR, WATER) IN FRENCH GUINA AND ITS FRONTIERS WITH BRAZIL AND SURINAM*

II - *POLLUTANT ANALYSIS IN FRENCH GUIANA AND ITS FRONTIERS WITH BRAZIL AND SURINAM*

III - *CHARACTERIZATION OF BIOMASS IN FRENCH GUINA AND ITS FRONTIERS WITH BRAZIL AND SURINAM*

OBJECTIVES

- Legal framework of safety measures and pollution standards (water, air) in border areas, knowledge and respect of limit values by the population.

- Impact and monitoring of natural pollution (desert dust, marine chlorine, etc…) and of anthropogenic pollution (NOX, benzene, mercury, etc.) linked to the development and change of landscape around the border areas

- Estimate the biomass of different types of vegetation in the transboundary areas of French Guiana/Brazil and French Guiana/Suriname based on field measurements obtained through forest inventories and available data, to check the carbon stock in each vegetation type.

EXPECTED RESULTS

- Assessment of the need to harmonize countries' environmental compliance with the implementation of transboundary environmental standards.

- Modelling, mapping and monitoring of natural and anthropogenic pollutants (mathematical models: dynamics atmospheric dispersion of pollutants, air quality models will be used) and sensitivity of remote sensing observations to the state of aerosol mixing.

- Characterization and modeling of biomass using satellite imagery and ModeFlora2 of UFAC University (Embrapa).

I- LEGAL FRAMEWORK VERIFICATION OF FRANCO-SURINAMESE AND FRANCO-BRAZILIAN SAFETY MEASURES AND STANDARDS OF POLLUTION (WATER, AIR),

- **Objectives :**

- Analytical and comparative study of the legal norms (environment, safety..) in France, Brazil and Suriname.
- Knowledge of the legal norms of cross-border areas (Saint Georges de l'Oyapock and Saint Laurent du Maroni).
- Detection of homes, neighborhoods, schools, communities to help of reducing the production of waste and pollutants.

- **Expected Results :**

The main results of this work will enable policy makers to make recommendations :

- For land management
- For public health

- **Benefits for French Guiana, Surinam and Brazil :**

Our analytical and comparative study on the environment, security and pollution may also allow, in addition recommendations, a pedagogy component contextualized to the reality of the Guiana shield and its environment.

II - IMPACT AND MONITORING OF THE POLLUTION OF ANTHROPOGENIC AND/OR NATURAL FINE PARTICLES (DESERT DUST, NOX, ETC.) RELATED TO THE DEVELOPMENT AND CHANGE OF LANDSCAPE AROUND THE BORDER AREAS (FRENCH GUIANA/BRAZIL, FRENCH GUIANA SURINAME)

- **Main Objective :**

Complete the measurement campaigns carried out by the French Guiana Regional Air Observatory (ATMO Guyane) in transboundary areas.

It will help to have a better knowledge of pollution rates (natural and anthropic) and also to estimate health risks. A prediction scenario based on the rate of urbanization will be done

- **Expected results :**

- cartography and prediction of their evolution according to the territory planning considered by the political authorities.
- New pollutants models (spatiotemporal evolution)
- Modelling and statistical analysis of pollutants

- **Benefits for French Guiana, Surinam and Brazil:**

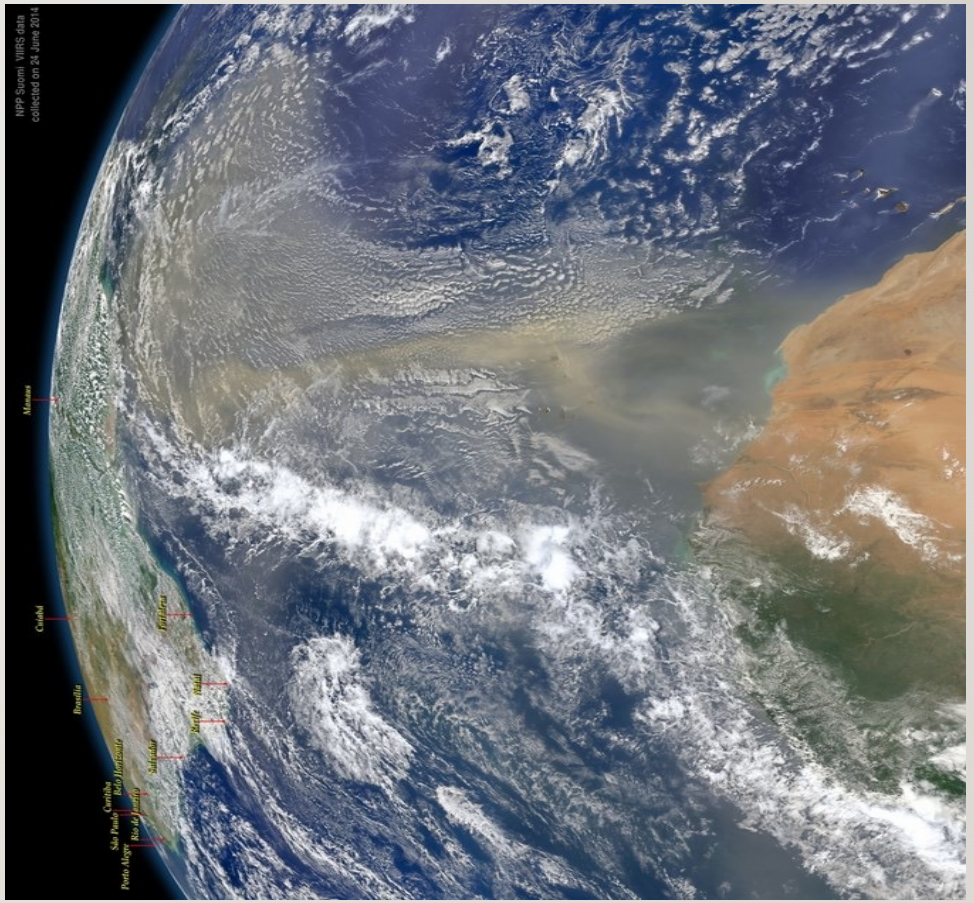
- Establishment of transboundary environmental monitoring of pollution (Suriname / French Guiana/ Brazil)
- Set up prevention plans in agreement with local public structures.
- Creation of an e-learning support dedicated to the monitoring of the evolution of pollutants (anthropic or not) in the Amazonian environment by satellites and through ground sensors.

NATURAL POLLUTANTS (1/2)

Among the 2 major types of natural pollutants in French Guiana there are :

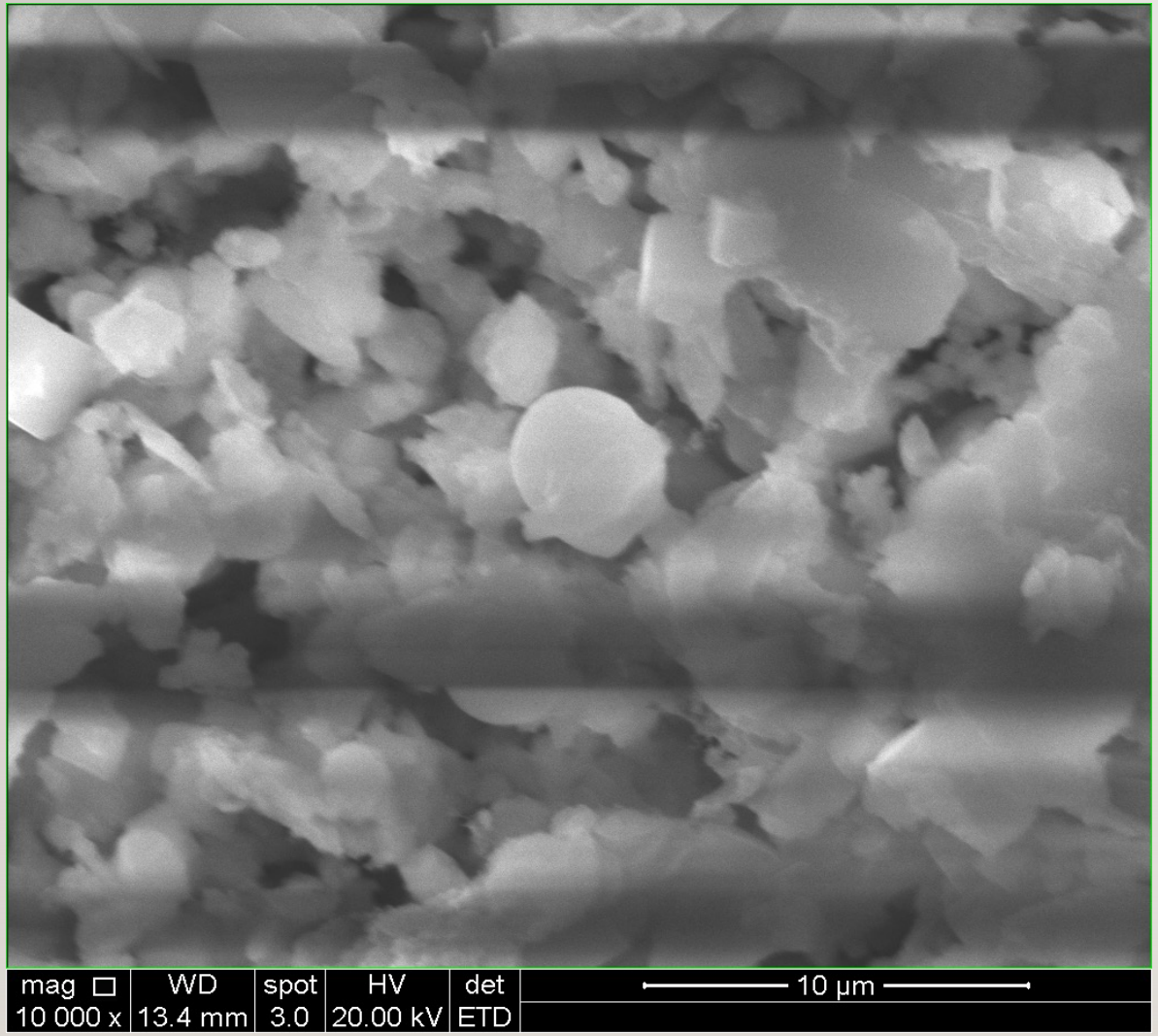
- Marine aerosol chlorine **(Gobinddass et *al.*, 2020)** et,

- Desert dust characterized by Atmo Guyane during measurements of PM10, PM2.5 and by satellite images with optical thickness extraction (AOT) **(Gobinddass et *al.*, in prep)**

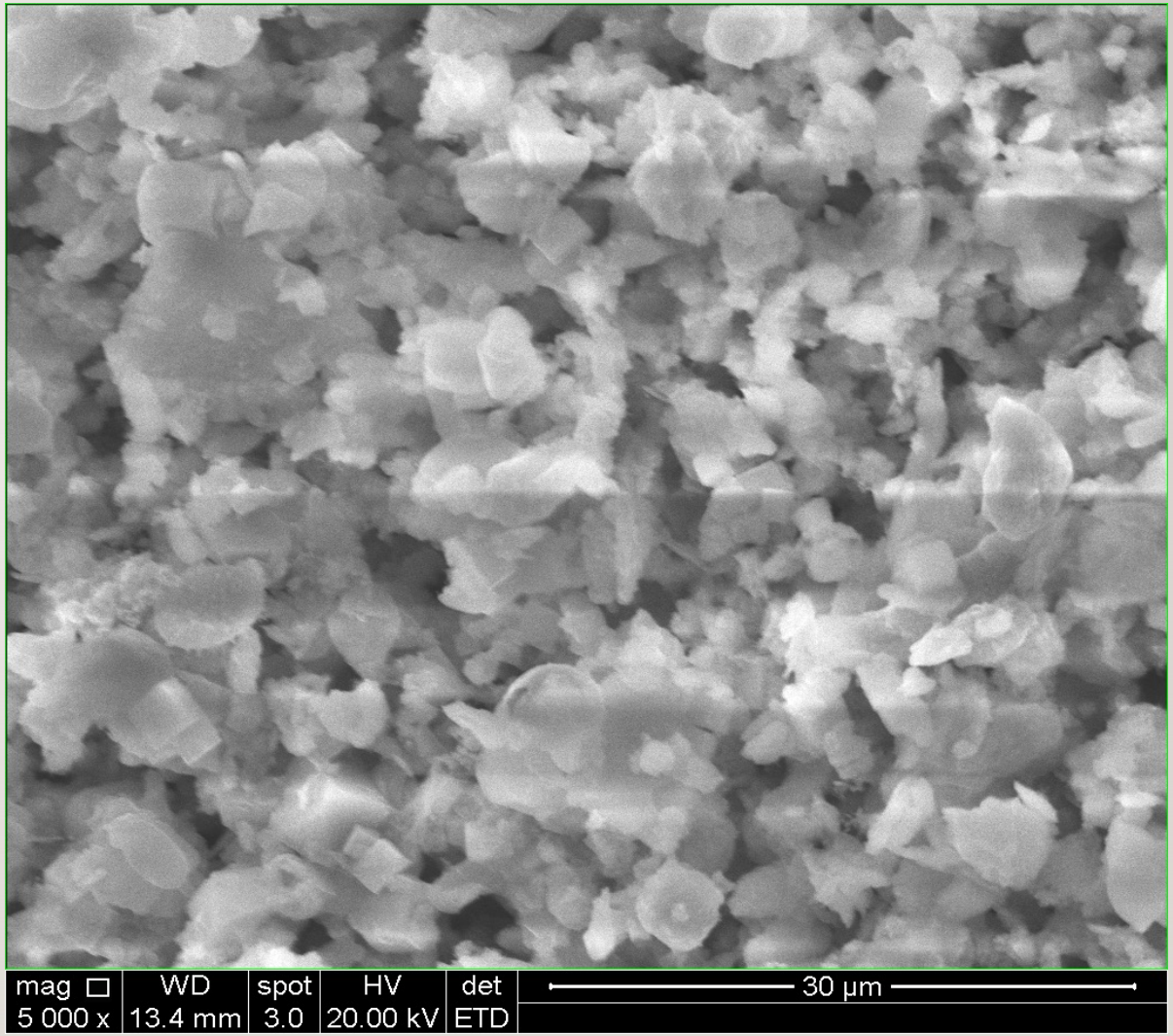


Desert dust transport from Africa to French Guiana (NASA)

NATURAL POLLUTANTS (2/2)

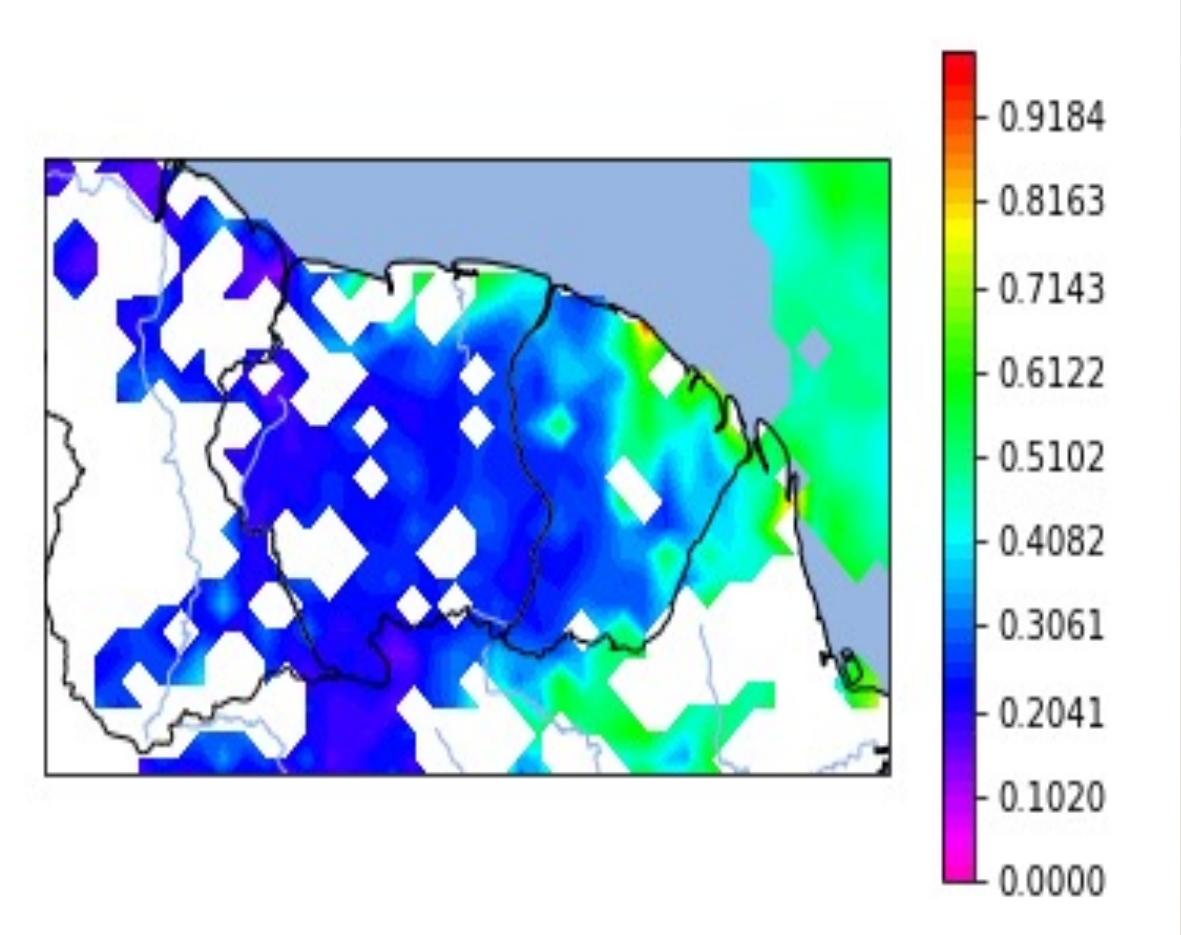


Aerosol desert dust Al Si by scanning electron microscope

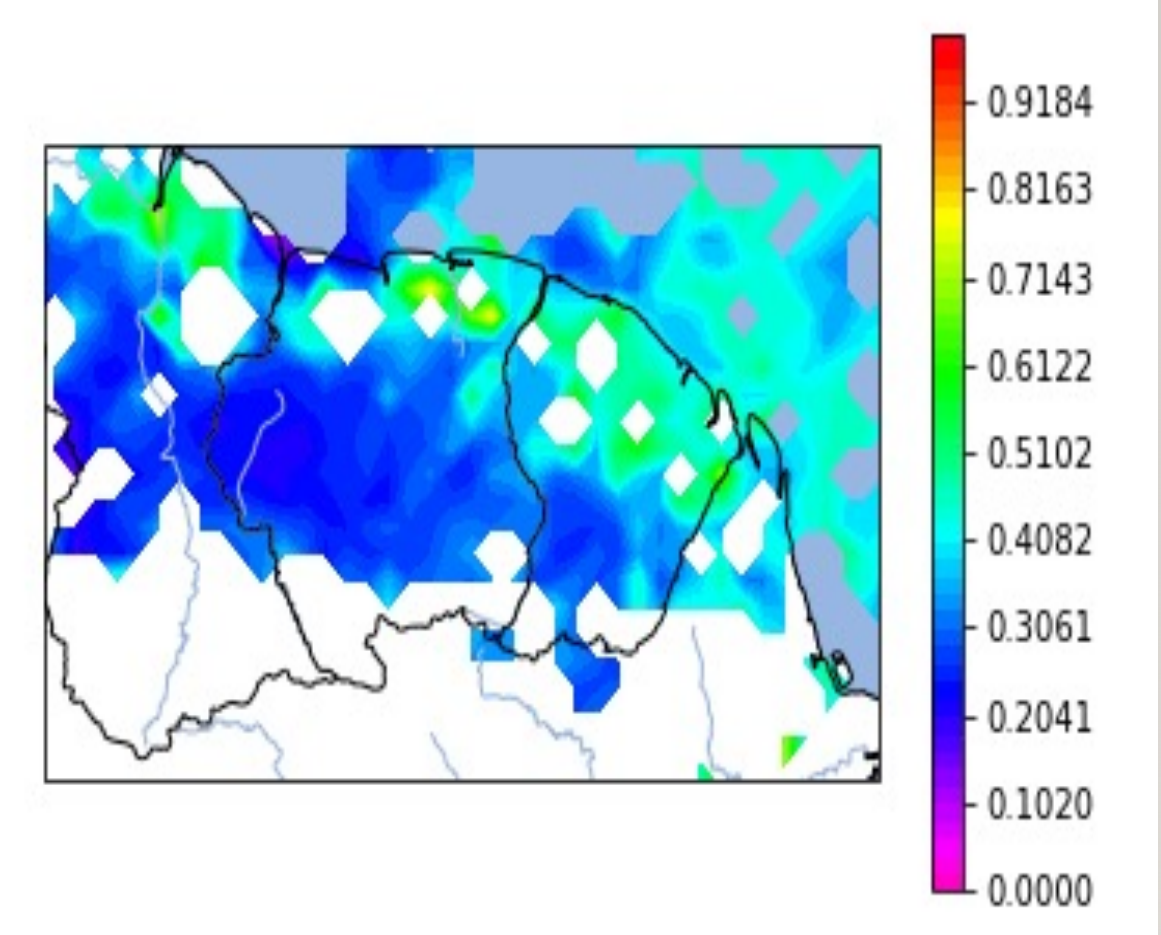


Marine Aerosol Cl by scanning electron microscope

PM10/AOT IN FRENCH GUIANA AND CROSS-BORDER REGION SURINAM AND BRAZIL (1/2) :

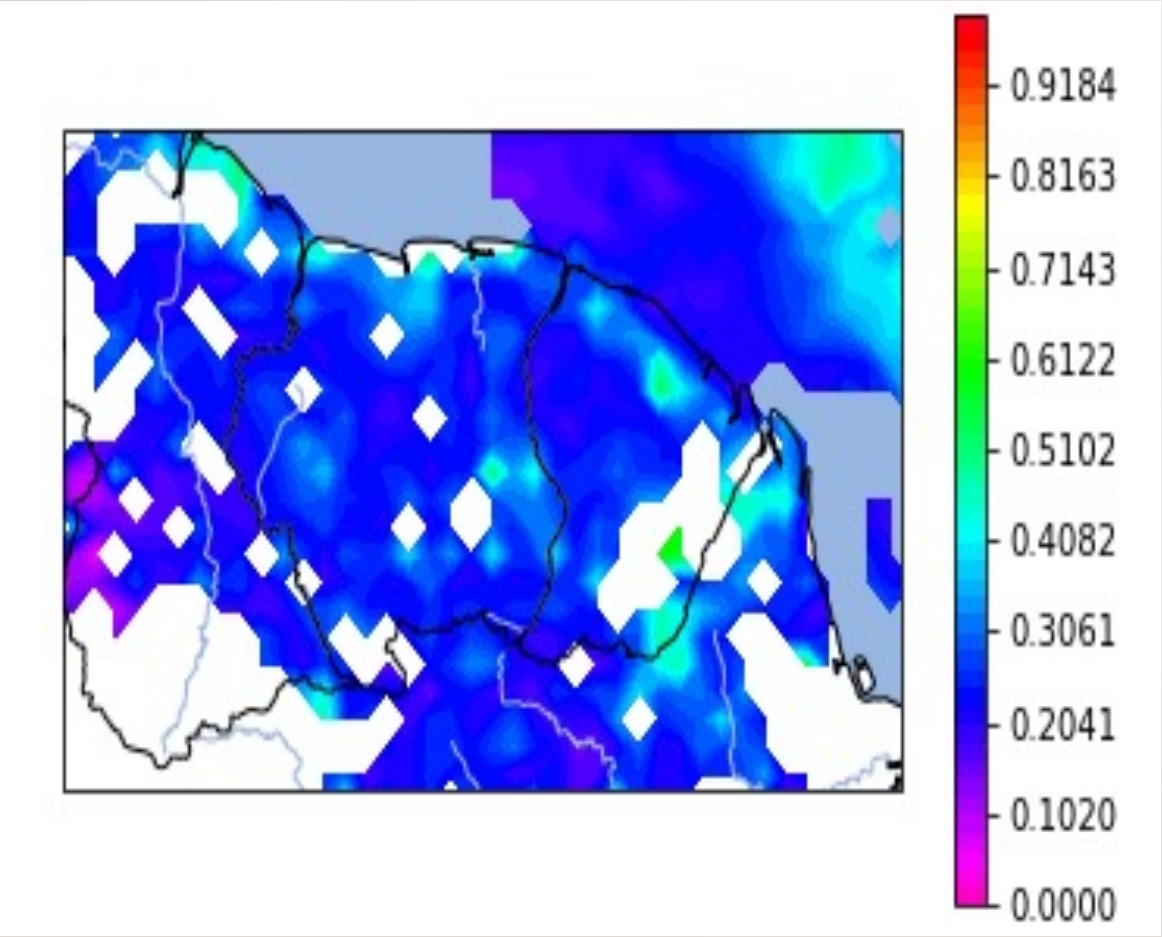


March 27 2018 : 100 ug.m-3<PM10<150 ug.m-3

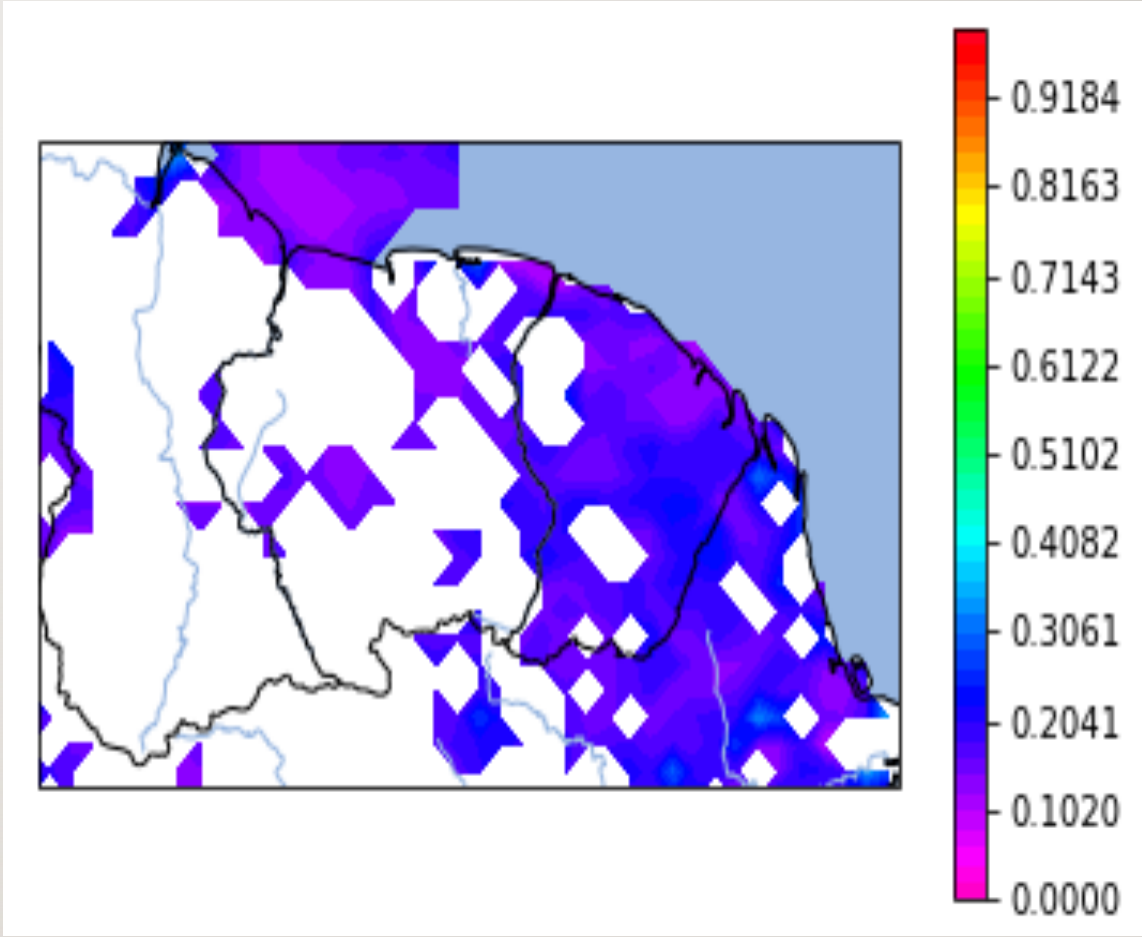


April 11 2018 : 50 ug.m-3<PM10<100 ug.m-3

PM10/AOT IN FRENCH GUIANA AND CROSS-BORDER REGION SURINAM AND BRAZIL (2/2) :



April 4 2015 : 20 ug.m-3<PM10<50 ug.m-3



July 8 2017 : PM10<20 ug.m-3

ANTHROPOGENIC POLLUTANTS

- Benzene, found in fuels, tires, pesticides, **Formula** : C_6H_6
- Nitrogen Oxide : NOX
- Polycyclic aromatic hydrocarbons : PAHs
- Volatile organic compound : COV
- Carbon dioxide : CO2
- Mercury : Hg

III - CHARACTERIZATION OF BIOMASS (FRENCH GUIANA/BRAZIL AND FRENCH GUIANA/ SURINAME) FROM SEAS DATA AND BY REMOTE SENSING AND MODELING TOOLS.

- **Objective :**

Estimate the biomass of different types of vegetation in the transboundary areas of French Guiana/Brazil and French Guiana/Suriname based on field measurements obtained through forest inventories and available data, to check the carbon stock in each type of vegetation.

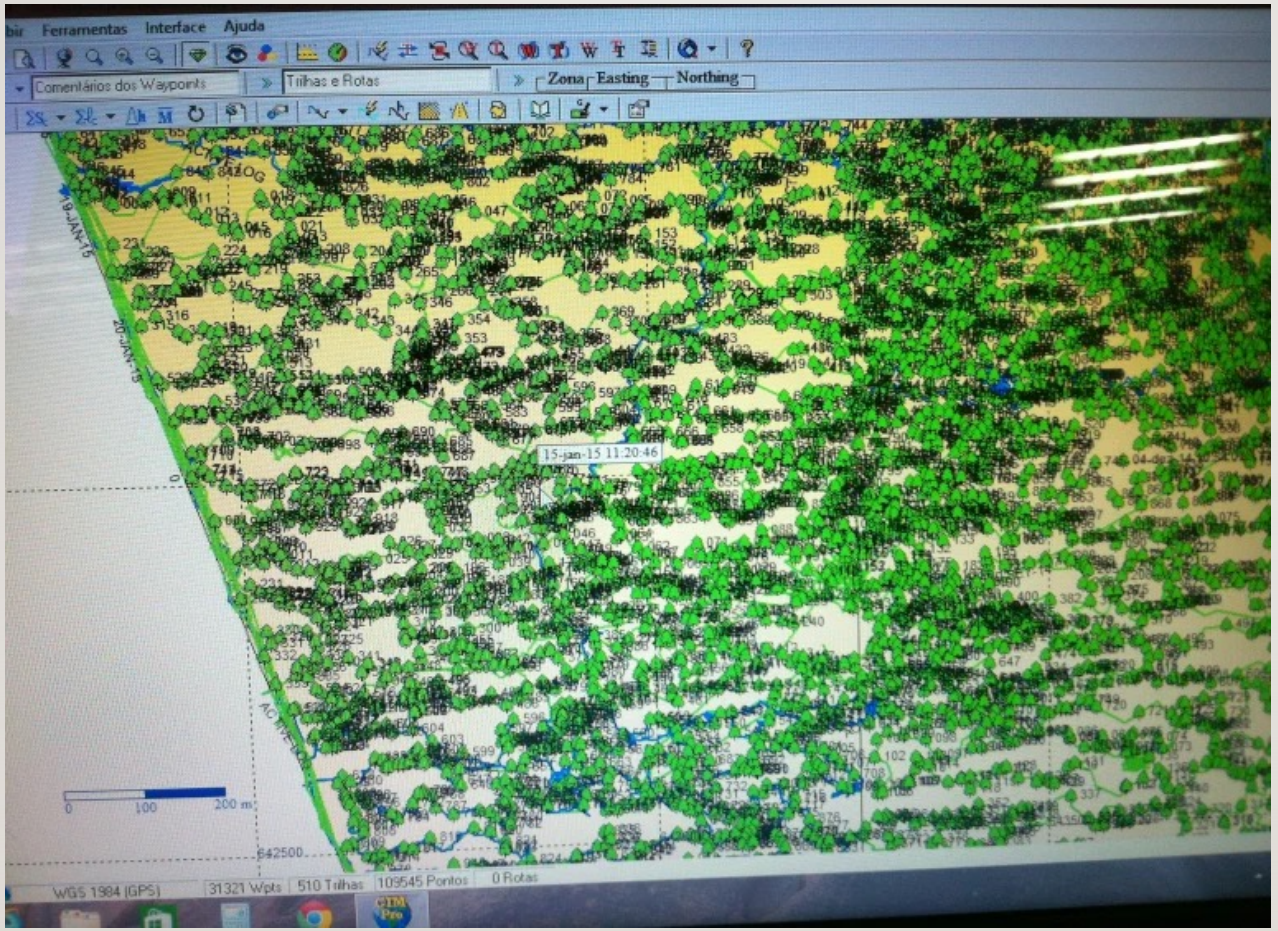
- **Expected Results :**

- A database by type of vegetation, biomass and its carbon stock, with the objective of better territorial management.
- Cartography of vegetation and land cover types using the images provided by axis 1.

- **Benefits for French Guiana, Surinam and Brazil :**

Quantifying the carbon (emitted and / or stored) of forest biomass in transboundary areas French Guiana / Brazil and French Guiana / Surinam: data from time series of NDVI, SAVI and fractional images (shade, vegetation and soil) will be analyzed according the Franca Method (2009).

III-CHARACTERIZATION OF BIOMASS (FRENCH GUIANA/BRAZIL AND FRENCH GUIANA/ SURINAME) FROM SEAS DATA AND BY REMOTE SENSING AND MODELING TOOLS



Digital representation of the forest inventory carried out following the taking of GPS data in the field using ModeFlora 2 method from UFAC Embrapa in Brazil

THANK YOU FOR YOUR ATTENTION!

ANY QUESTIONS ?