



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

PRESENTER : MARIE-LINE GOBINDDASS

FRENCH GUIANA PARTICIPANTS :

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GUYANE ATMO : K. PANECHOU (HEAD OF ATMO GUYANE)

FRENCH PARTICIPANTS :

IRD : M. GOSSET

BRAZIL PARTICIPANTS :

UNIFAP : P. GUSTAVO PELLEGRINO (PU)

BRAZILIAN AGRICULTURAL RESEARCH COMPANY : E. DOFFSOTTA

UFPA : CRISTINA LUCIA DIAS VAZ (PU)

SURINAM PARTICIPANTS :

U. ANTON DE KOM : P. MAX HUISDEN (PU), KATHLEEN GERSIE (LECTURER)



OBJECTIVES

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

- II) 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

- III) 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.



I- LEGAL FRAMEWORK OF SAFETY MEASURES AND POLLUTION STANDARDS (WATER, AIR) IN BORDER AREAS, KNOWLEDGE AND RESPECT OF LIMIT VALUES BY THE POPULATION.

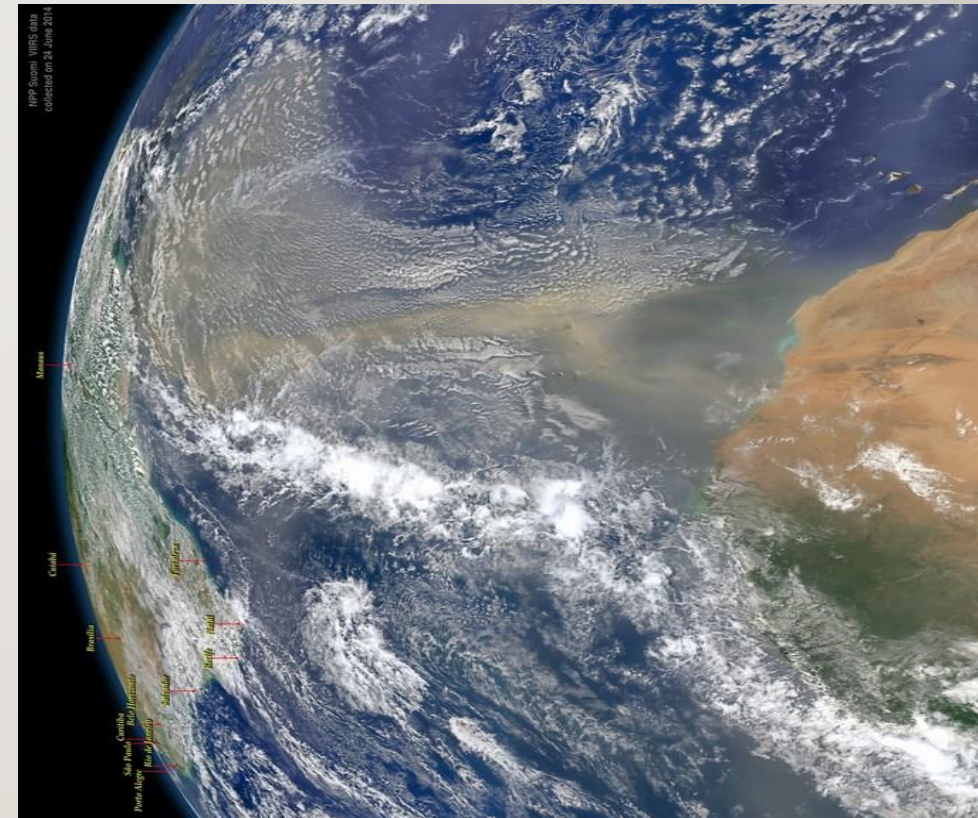
- Rosuel Lima Pereira have a specific plan to obtain these data for Brazil from now
- A post-doctorant will start to write a common document for Brazil, French Guiana and Surinam in January 2022
- A study about respect of limit values by the population will also be done during the year 2022



II) IMPACT AND MONITORING OF NATURAL POLLUTION (DESERT DUST, MARINE CHLORINE, ETC...)

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)



II) IMPACT AND MONITORING OF NATURAL POLLUTION (DESERT DUST, MARINE CHLORINE, ETC...)

- Master degree student have developed with me a method to compare the images of different with each other and then to search the correlation with natural pollutants from sensors on ground (Atmo Guyane sensor).

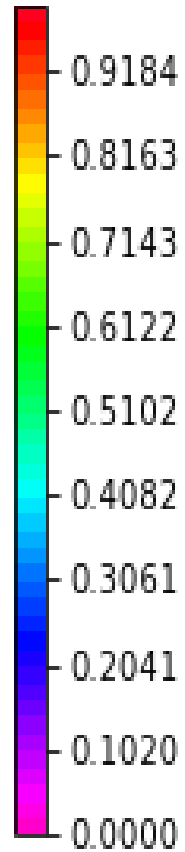
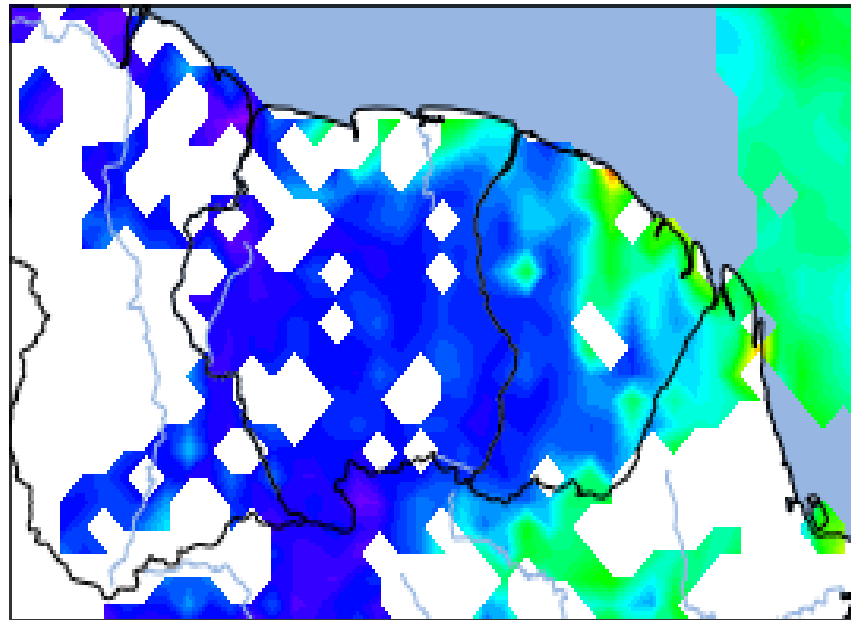
→ **M.L. Gobinddass, L. Orgambide, K. Panechou. This work should be completed by December 31, 2021.**

- Due to the low number of pollutant sensor on ground now in French Guiana we will buy two pollutant sensors (one for French Guiana/Brazil, and one for French Guiana/Surinam).

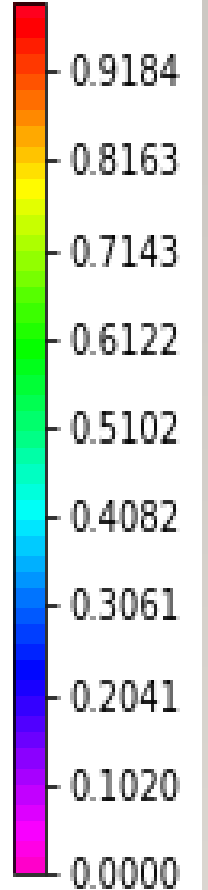
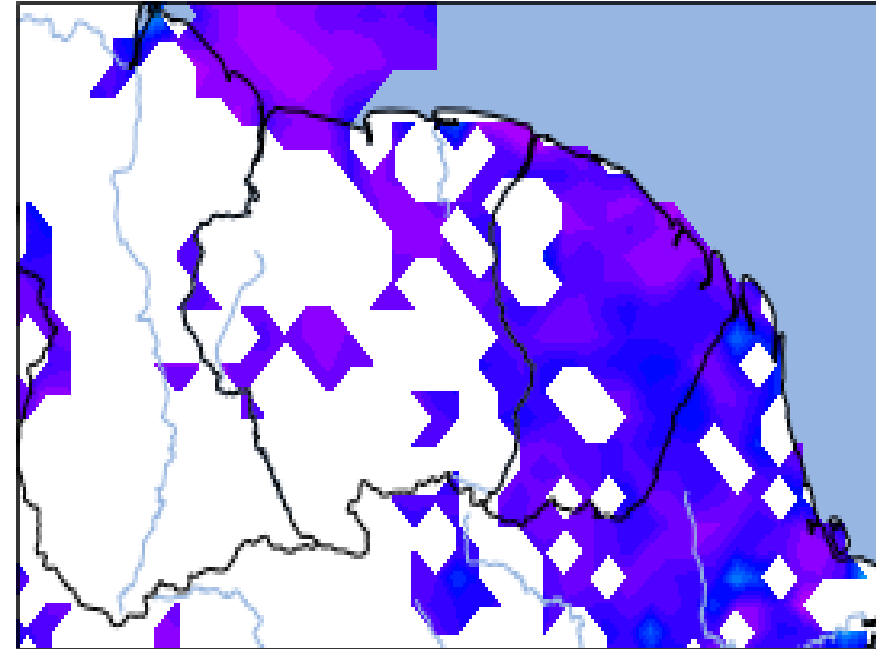
→ **M.L. Gobinddass, L. Orgambide, K. Panechou. This work should be completed by November 30, 2021.**



PM10/AOT IN FRENCH GUIANA AND CROSS-BORDER REGION SURINAM AND BRAZIL



March 27 2018 : $100 \text{ ug.m}^{-3} < \text{PM}_{10} < 150 \text{ ug.m}^{-3}$



July 8 2017 : $\text{PM}_{10} < 20 \text{ ug.m}^{-3}$



II) IMPACT AND MONITORING OF NATURAL POLLUTION (DESERT DUST, MARINE CHLORINE, ETC...)

- With the first results of comparison between satellites images data and natural pollutants from sensors we will make for French Guiana, Brazil and Surinam a Numerical and Optimization model

→ **A. Fontaine, A. Omrane, M.L. Gobinddass K. Panechou, J. Fozzani, M. Franca, M. Gosset, M. Huisden, K. Gersie.** This work should be completed by **May 30, 2022.**

- Post-doctoral student will work about mapping and monitoring natural pollutant by taking into account Numerical and Optimization model develop by this project before August 31 2022

→ **M.L. Gobinddass, A. Fontaine, A. Omrane, K. Panechou, J. Fozzani, M. Franca, M. Huisden, K. Gersie.** This work should be completed by **August 31, 2022.**



II) IMPACT AND MONITORING OF ANTHROPOGENIC POLLUTION (NOX, BENZENE, MERCURY, ETC.) LINKED TO THE DEVELOPMENT AND CHANGE OF LANDSCAPE AROUND THE BORDER AREAS ...)

- Master degree developed with me a method to compare the images of different with each other and then to search the correlation with anthropic pollutant sensors on ground (Atmo Guyane station).
- **M.L. Gobinddass, L. Orgambide, K. Panechou. This work should be completed by December 31, 2021.**
- Due to the low number of anthropic pollutant sensor on ground now in French Guiana we will buy two pollutant sensors (one for French Guiana/Brazil, and one for French Guiana/Surinam).
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- With the first results of anthropic pollutant from sensors a comparison between satellites images data and these data will be made for French Guiana, Brazil and Surinam a Numerical and Optimization.
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III) 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.

- Master degree student have to 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).

→ **M. Franca, J. Fozzani, M. Huisden, M.L. Gobinddass, A. Fontaine work**

- Mabiane Franca and Jerome Fozzani will 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.
- → **M. Franca, J. Fozzani, M. Huisden, M.L. Gobinddass work**



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).