ALOS

K&C Initiative
An international science collaboration led by JAXA

K&C Phase 4 – Status report

Forest Structure to Map Forest Types

Humberto Navarro de Mesquita Jr.
Executive Manager – Forest Information System
Brazilian Forest Service - Minister of Environment

Eraldo Aparecido Trondoli Matricardi
UnB · Department of Forestry Engineering

Osmar Abilio de Carvalho Júnior
Department of Geography

SERVIÇO FLORESTAL BRASILEIRO

Science Team meeting #24
Tokyo, Japan, January 29-31, 2018

University of Brasília

Project outline and objectives

1. Use forest non forest data from National Forest Inventory (NFI) to validate Forest Non Forest Map Produced by JAXA.

2. Improvement the Forest Map used by Brazilian Forest Service using the ALOS FNF map and ALOS images mosaics.

Academic Results

3 Msc dissertations: 2 were finisheded and 1 are in course:

- **Biomass estimative derived from Krigagem of NFI data and ALOS PALSAR.**
- **Flooded areas estimation on Bananal Island using multitemporal ALOS PALSAR images, for protection of traditional local communities.**
- **Retrieving forest biophysical parameters from ALOS PALSAR on the National Forests under Public Concessions (in course).**

Main Operational Results

ALOS PALSAR was used by Brazilian Forest Service:

- **To decide propose the sustainable use of Undesignated Public Forest in Brazil, support the creation of 2.830.000ha of 5 new conservation units in the Amazonia.**
- **To plan NFI, and choose the viable points of total NFI Grid (22.000 points).**
- **To provide information on the areas of main stream Amazonian River and States of Rondonia an Amapá were optical data are not available.**

National Forest Inventory (NFI) in Brazil

21940 samples grid 20km x 20km of Brazil

Restricted areas ~7000

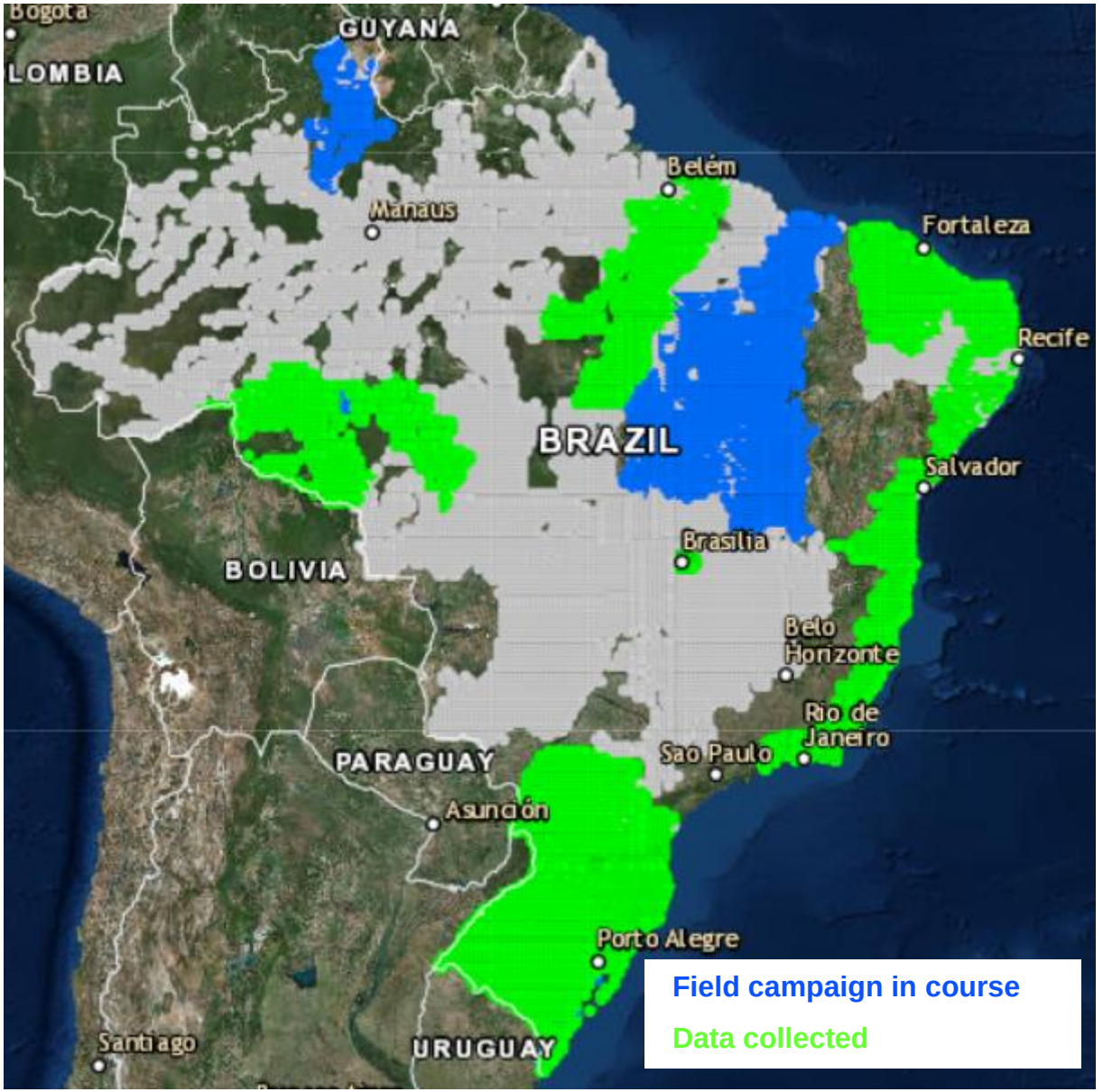
Jan/17 = 4500 (4 years)

Jan/18 = 6140

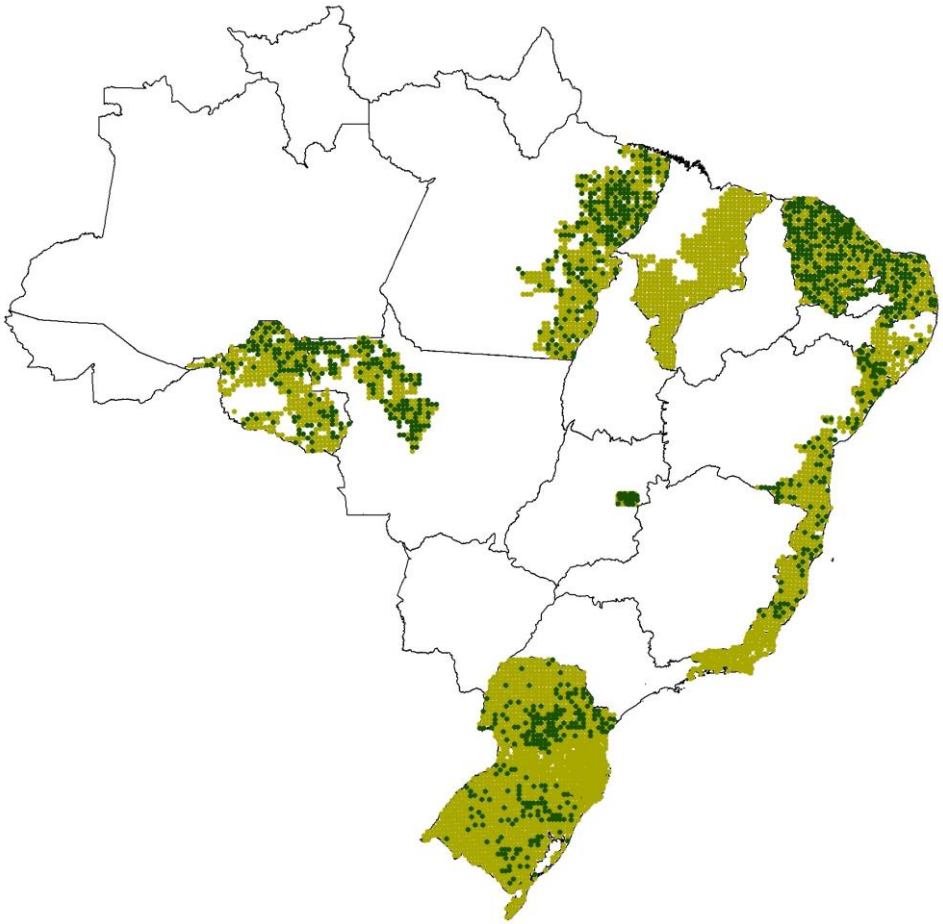
Best rate 1640/y in 2017

Probably will increase in 2018

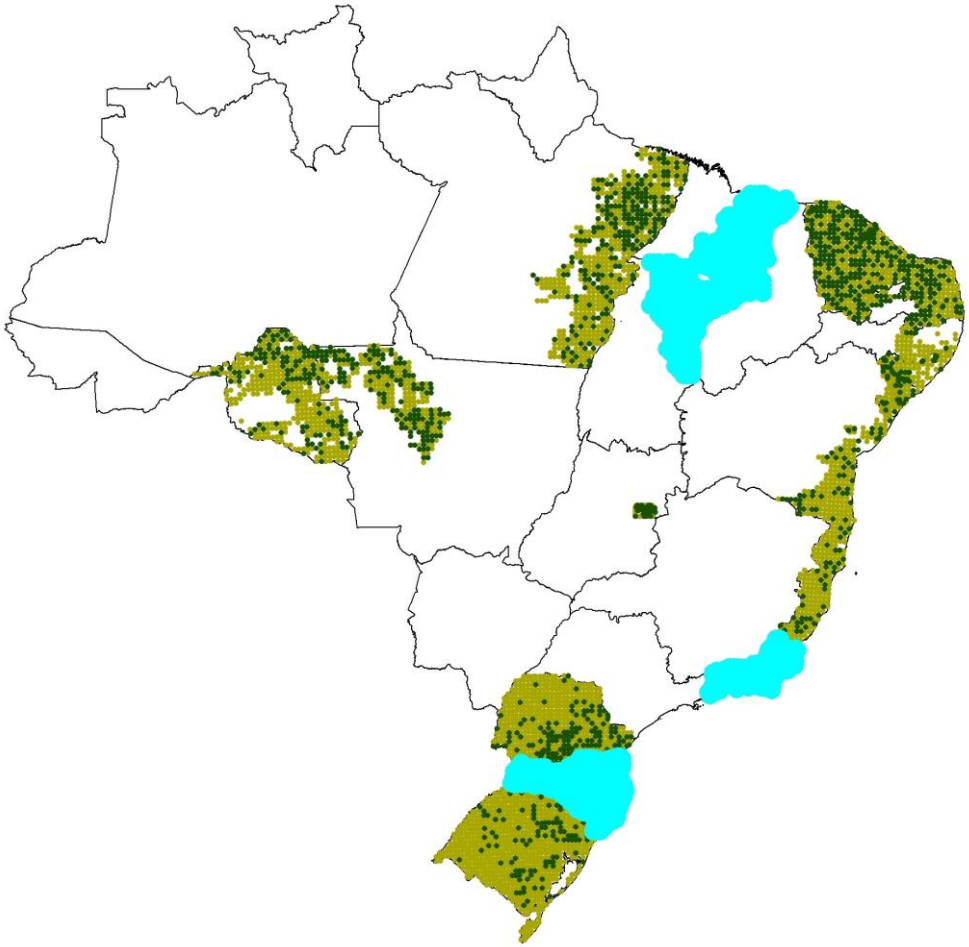
http://www.florestal.gov.br/index.php?option=com_content&view=article&id=132:andamento-ifn&catid=106



Ground Truth from NFI

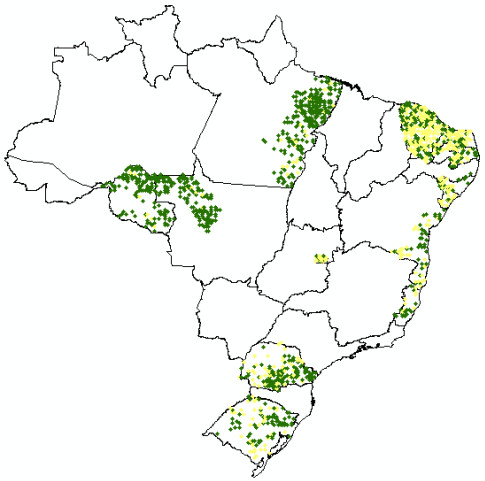
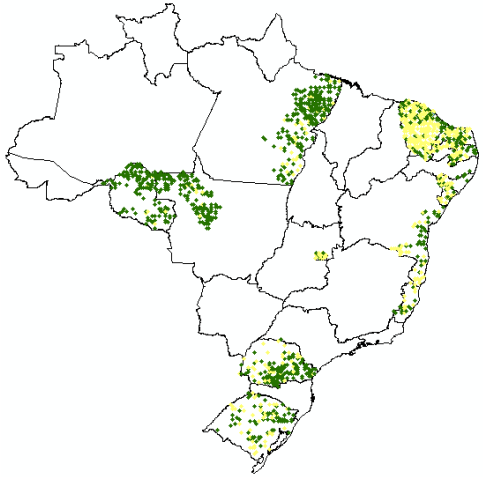
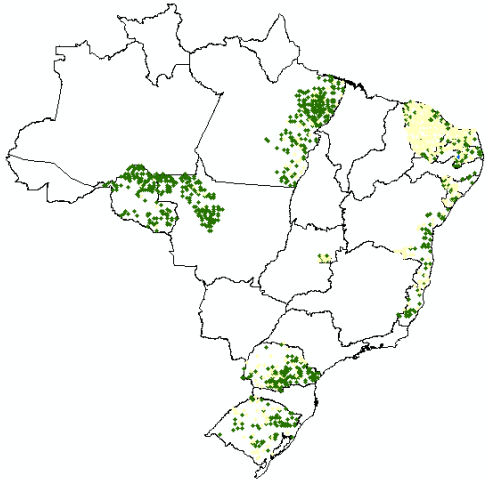
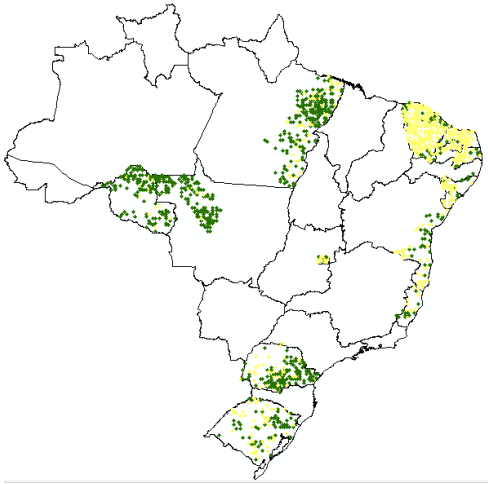


5586 the field work were available and1393 were not analyzed yet.



From the 4193 already analyzed 1296 have forest

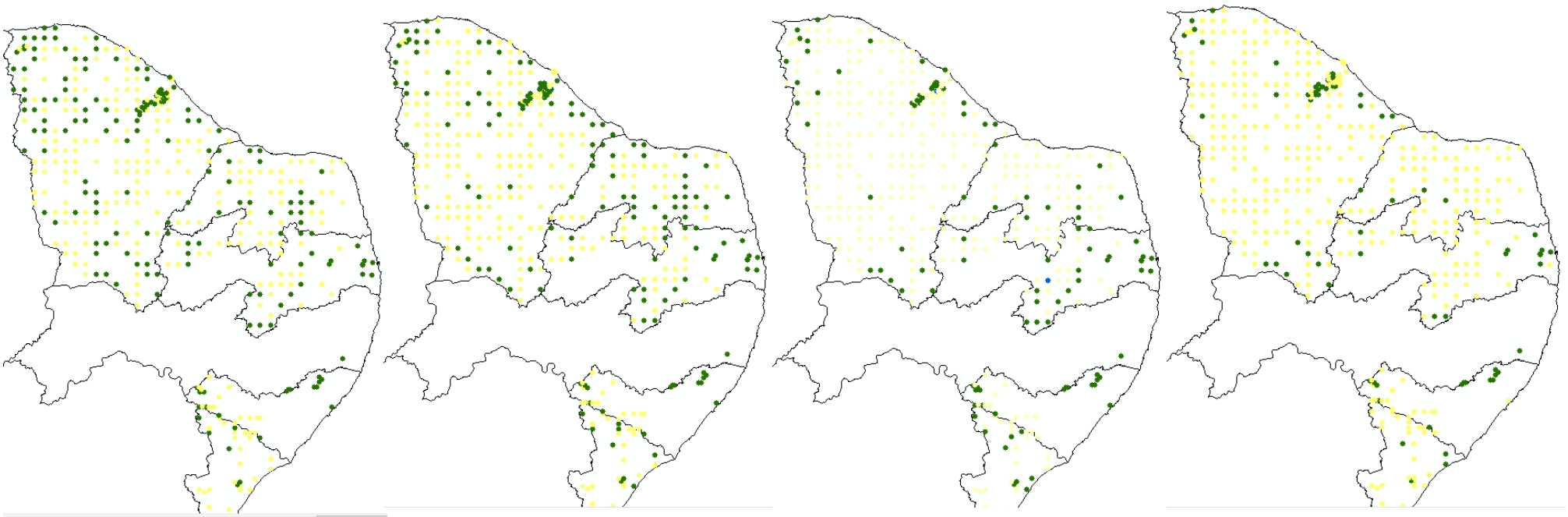
NFI Field Data and JAXA Global Forest Non Forest Map

2008	2009	2010	2015
			
903 Forest 462 Non Forest	880 Forest 482 Non Forest 1 Water	811 Forest 543 Non Forest 3 Water	753 Forest 601 Non Forest 1 water

753 (coincident 2008, 2009, 2010)

NFI Field Data and JAXA Global Forest Non Forest Map

2008 2009 2010 2015



Most affected area were the semi arid vegetation of Caatinga

Caatinga Vegetation

5 a 160 t/ha average 30t/ha

Caatinga is Decidual Forest

Improvement of Brazilian Forest Map

Vegetation Map

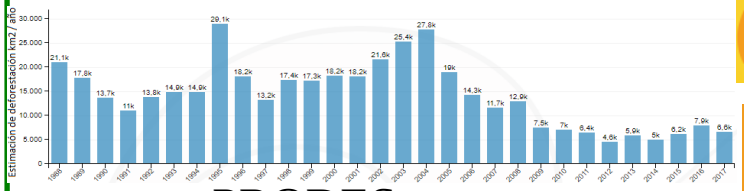
Based on Field Campaings 70` and Side-looking airborne radar (SLAR) very old technology analised on 1:300.000 paper printed images.

New release will be delivered soon by IBGE, updated the geolocation of the vegetation map using optical images (1:250.000).

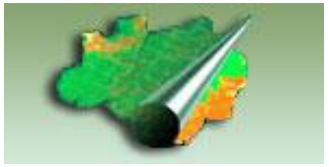
Caracterización de Brasil y de sus bosques

ALOS — An international science collaboration led by JAXA

Deforestation



PRODES



DETER

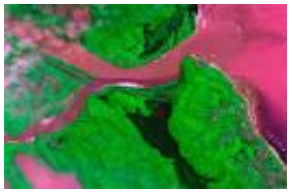
Degradation

INPE - Instituto Nacional de Pesquisas Espaciais
Programa Queimadas
Monitoramento por Satélites

Área queimada

DEGRAD

Regenaration



TerraClass

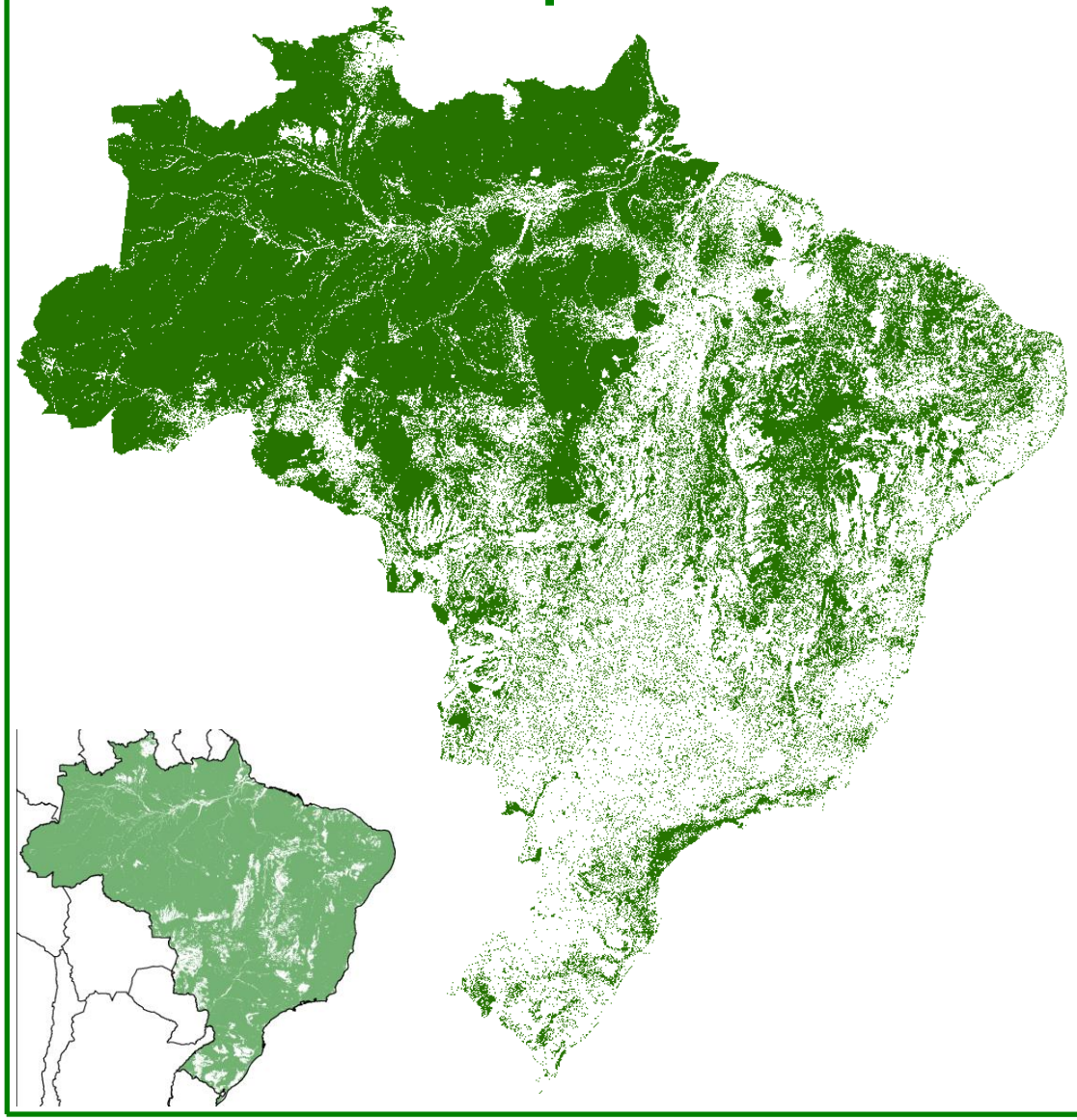
All of them based on optical data and looking what was lost intensively changed.

IBAMA MMA

Brazilian Biomes Monitoring System

INPE

Improvement of Brazilian Forest Map



From the Vegetation Map

Selection of Natural and planted Forest

– Deforestation

+ Regenaration

Forest Map and extension.

Several Other Optical Maps are available

State Maps:

AL, BA, DF, MG, PR, RJ, SC, SE, SP, TO

Regional Maps:

ALOS - Atlantic Forest (2008)
PRODES (2006)
Brazilian Biomas Monitoring
Terra Class Amazonia (2008, 2010, 2012, 2013)
Terra Class Cerrado (2013)

National:

PROBIO
Carbon Emissions
1992 2000 2010
Forest Reference
Emission
Map Vegetação IBGE
MapBioma

Global:

Hansen

All of theses are optical: for most of them the Vegetation is a reference (no change) and deforastation is the goal.

Low rates of change on the forest are usually considered as na error of classification between dates or different initiatives.

Looking for small changes and the qualification of forest types (combine optical and PALSAR)

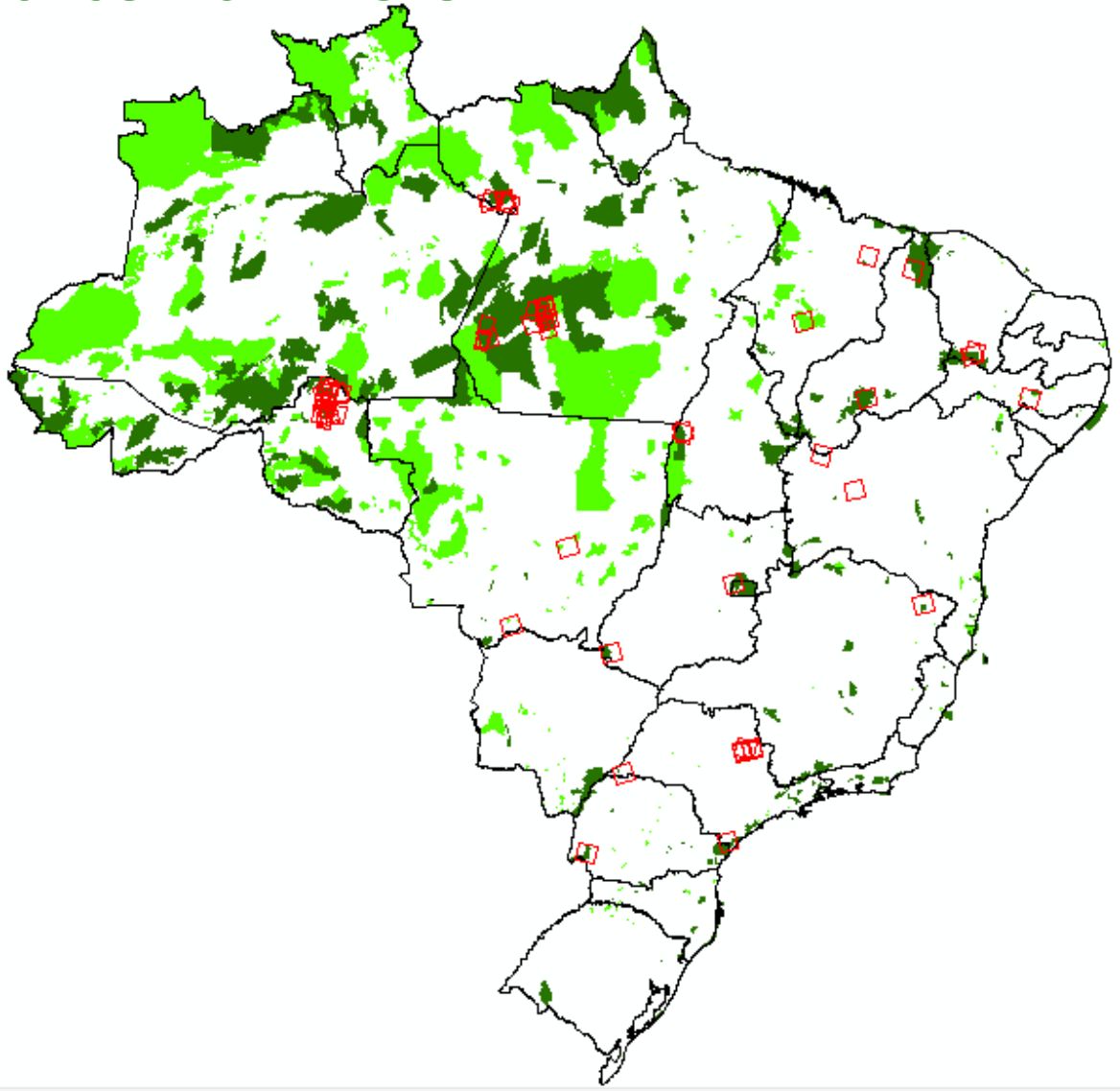
- Aforestation
- Decrease of forest hight
- Savanization
- Regrowth

PALSAR and optical retrieve different biophysical information (structure and physiology), combine them to classify the forest types.

100 cenes from AUIG

- All images on areas of well protected Forests (good conservation), Conservation Units or Indian Lands

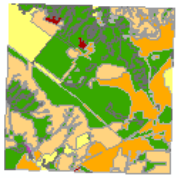
- 48 on Amazonian Region on National Forests under public concessions



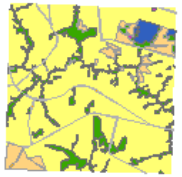
1000 Landscape Analysis Units will be processed this year

- On the FNI grid we subsample a grid of 40 x 40 km.

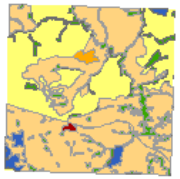
26 were sampled in two states (1000 in 2018)

- Square of 10 x 10 will be mapped on 5 meter resolution to identify types of vegetation (and forest types), the center is FNI point.



- On these areas we will analised by a temporal series of ScanSAR images to qualify the scructure of the forest remnants (> 100ha).



Qualify the Forest Remnats based on reference sites

Evaluate PALSAR 2 under Concessions Areas

Cooperation Oportunity !!!

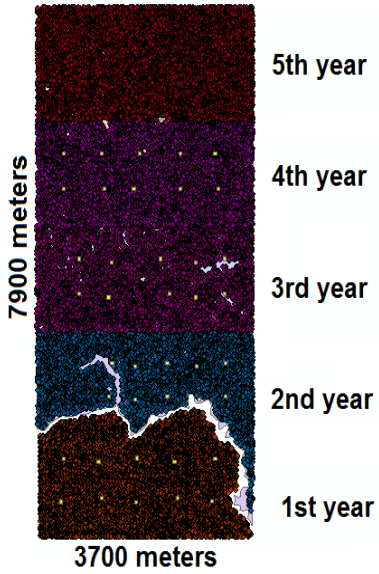
We have a lot of data.

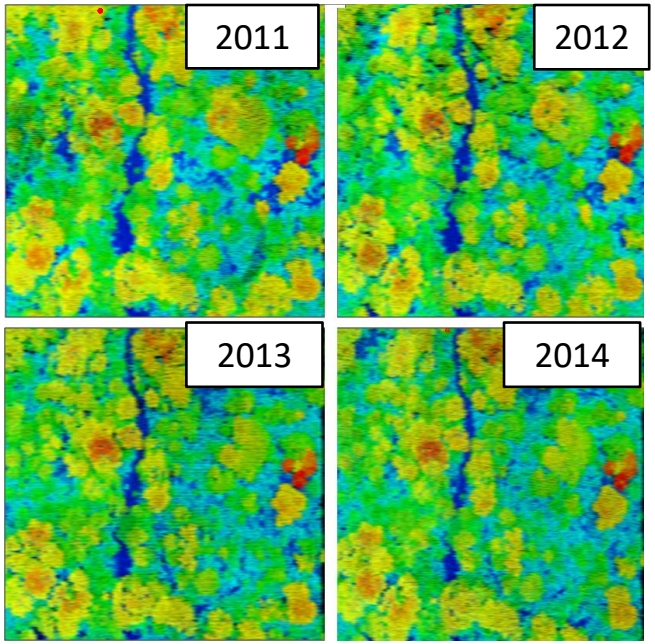
Every year :

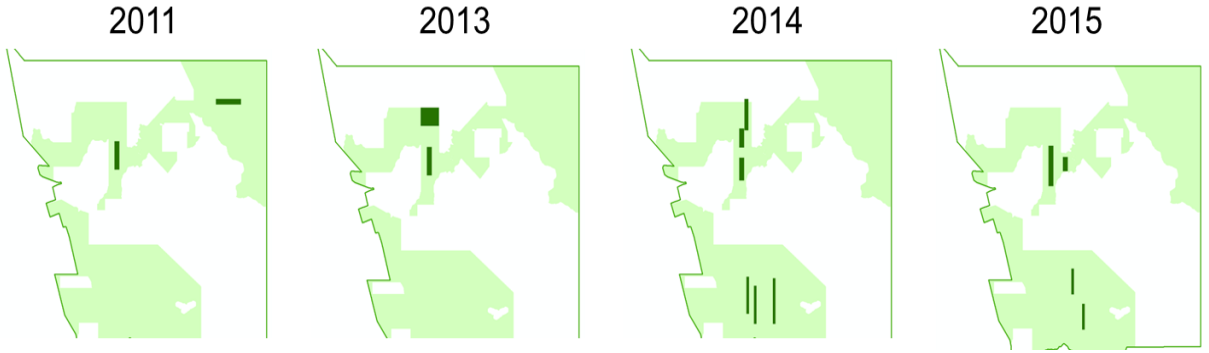
- Ground data (all trees DBH >40)
- Airborne LIDAR

5 years of data and long term monitoring (30 years).

Each anual production area bigger than 1.000ha and more than 2000 trees are sampled in each (11 in corse).







Results

All lidar data and ground data we can share with K&C grop to be used by JAXA and partners, every year we will have more data available (NFI, Ground Data from Concessions and LIDAR).

Thank You!

humberto.mesquita-junior@florestal.gov.br