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K&C Initiative
An international science collaboration led by JAXA

K&C Phase 4 – Status report

Forest Structure to Map Forest Types

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Brazilian Forest Service - Minister of Environment

SERVIÇO FLORESTAL BRASILEIRO

Science Team meeting #23
Hatoyama, Japan, January 18-20, 2017

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.

Besides the project objectives present opportunities for data sharing and demands with PALSAR data:

1. Biomass estimation (stock levels).
2. Regrowth estimation and monitoring.
3. Other uses of the Mosaics Brazilian Forest Service.

Opportunities for cooperation, supporting systems for environmental analysis in Brazil (governmental purposes) and enhance a network with state governments.

Project outline and objectives

The secondary objective is to use oporationally the PALSAR-2 mosaics for Forest Monitoring (Intact Forest, Forest Dynamics and Forest under Regeneration).

The area is all of Brazil, but to regard the qualify dynamic and types of forest we need to consider it in multi-scale analysis.

The projects supports *the thematic drivers* (**C**limate Change and Environmental **C**onservation)

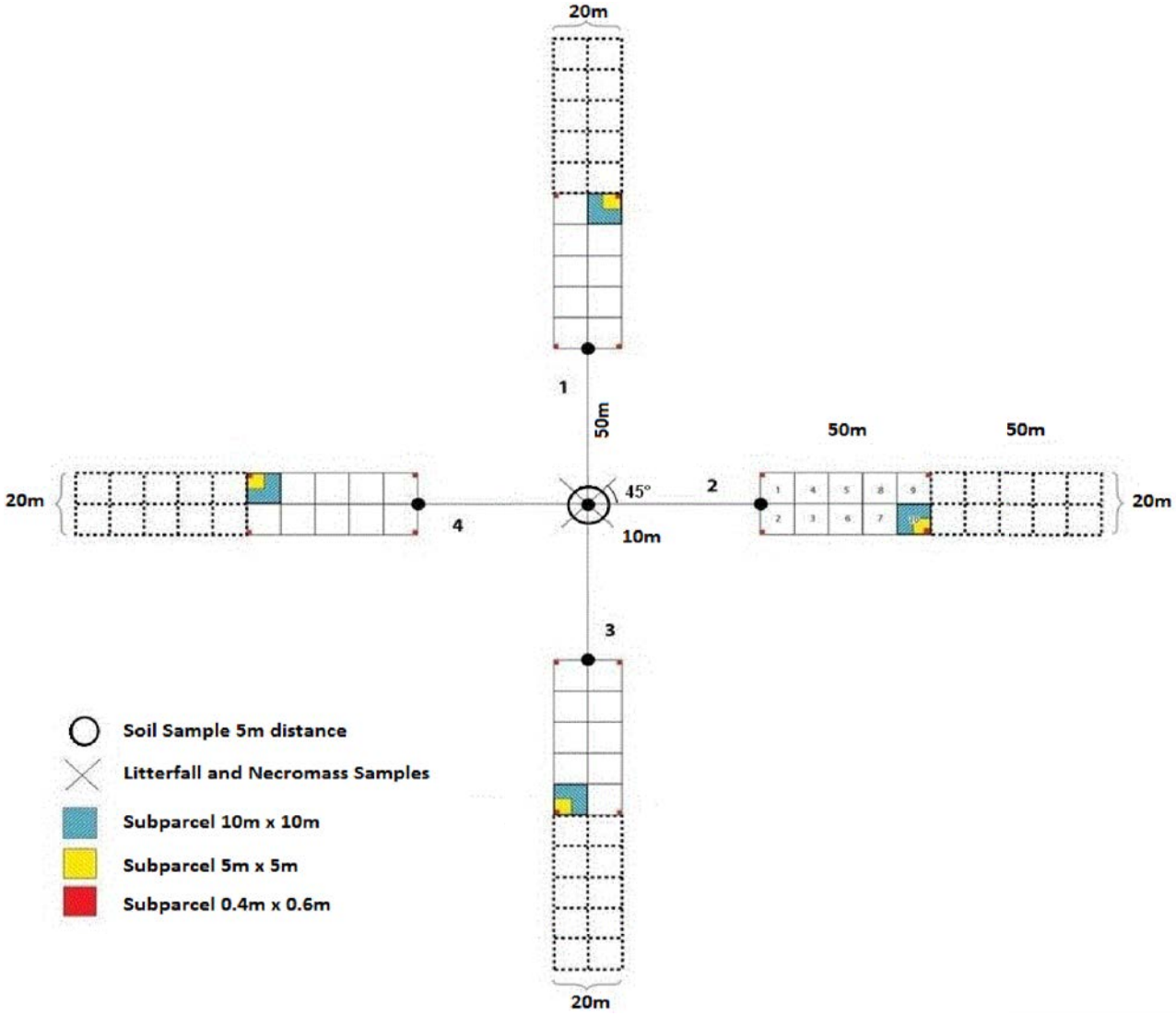
National Forest Inventory in Brazil

For all Brazil 21.940 Clusters with 4 sample plots, with systematic sampling of 20 km x 20km.

Navigation GPS (one hour average for coordinates collection).

Magnetic Cardinal Directions to Define the Sample Plots Position.

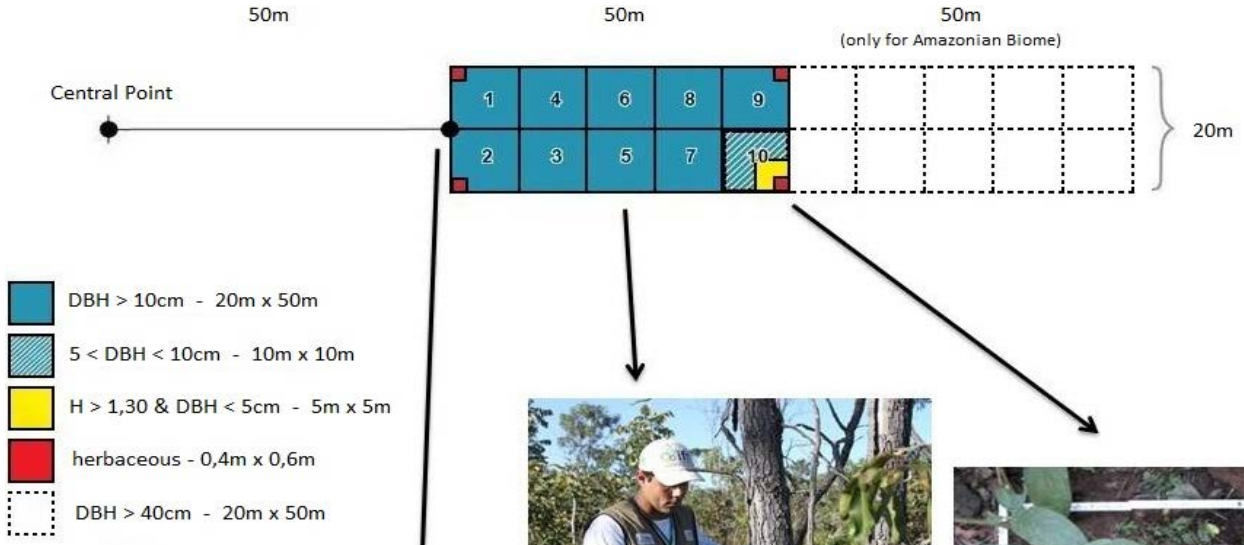
- 100m x 20m for Amazonia
- 50m x 20m for other Biomes



National Forest Inventory in Brazil

For each Sample Plot
Sub parcels:

- 1DBH >10:
  0 or 20 of (10m x10m)
- DBH >5 & <10:
  1 of (5x5)
- DBH <5:
  4 of (0,4m x 0,6m)



Cardinal directions for each of 4 parcels

DBH Measurement

Herbaceous Sub Parcel Measurement

Brasil ifn
Inventário Florestal Nacional

National Forest Inventory in Brazil

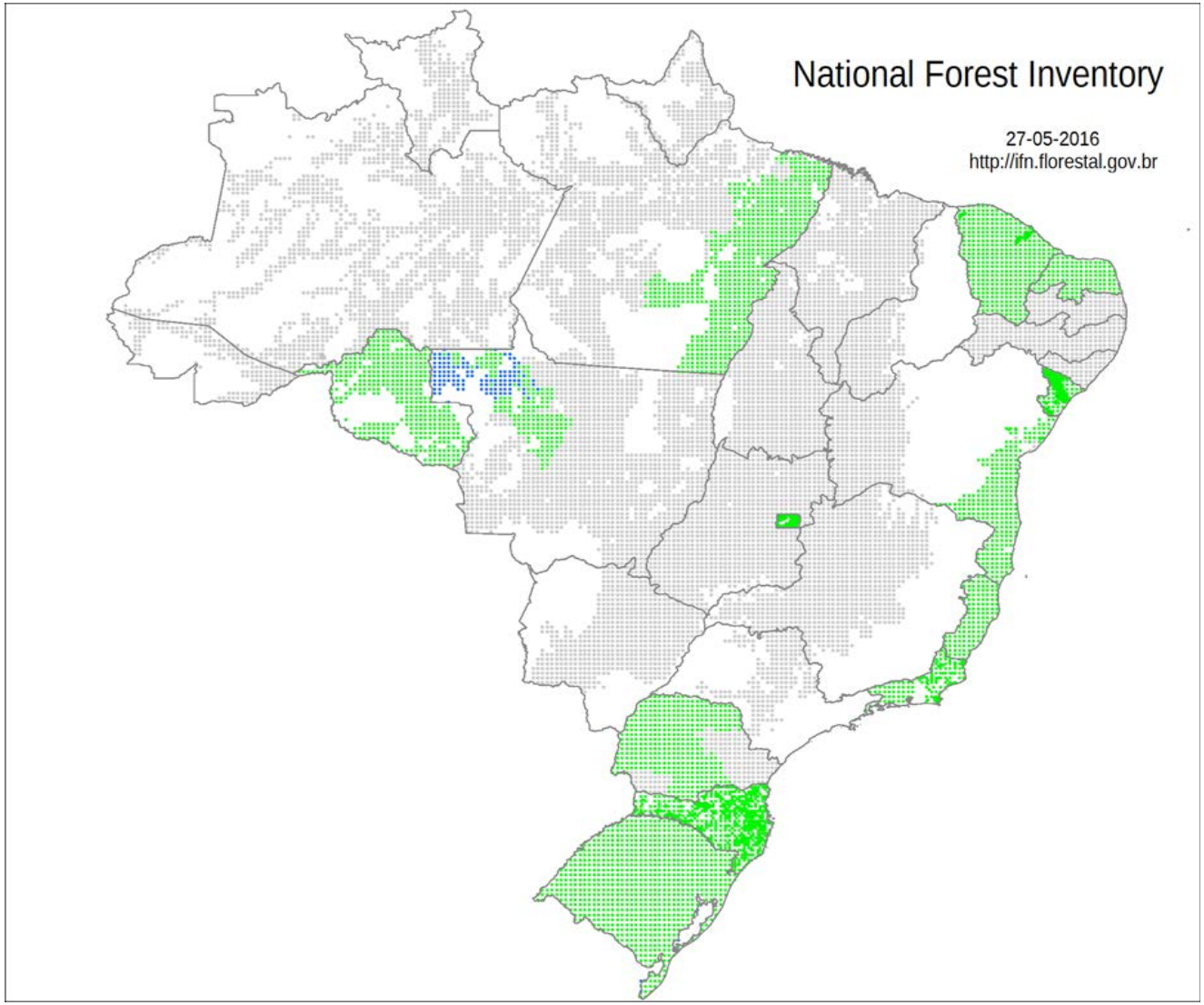
Variables collected:

- Land use/cover Class
- Height and DBH
- Species Name - Botanical Identification
- Soil Samples
- Trees´s health
- Necromass and Litter
- Forest/Non-forest sites

Allometric Equations Development

National Forest Inventory in Brazil

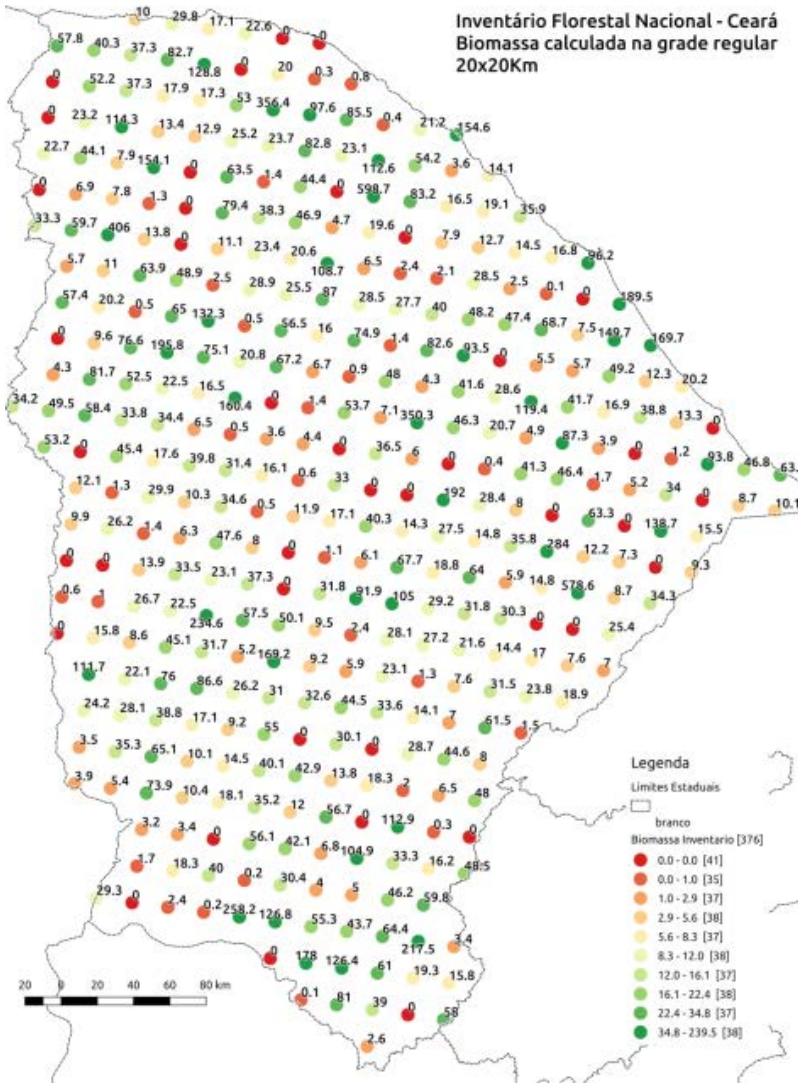
- Some areas restricted due to wet season or indian lands.
- 4500 done of ~15000 clusters expected to be done (2012-2019).
- Different financial sources
- Frequency of update:
  cycle of 5 years.

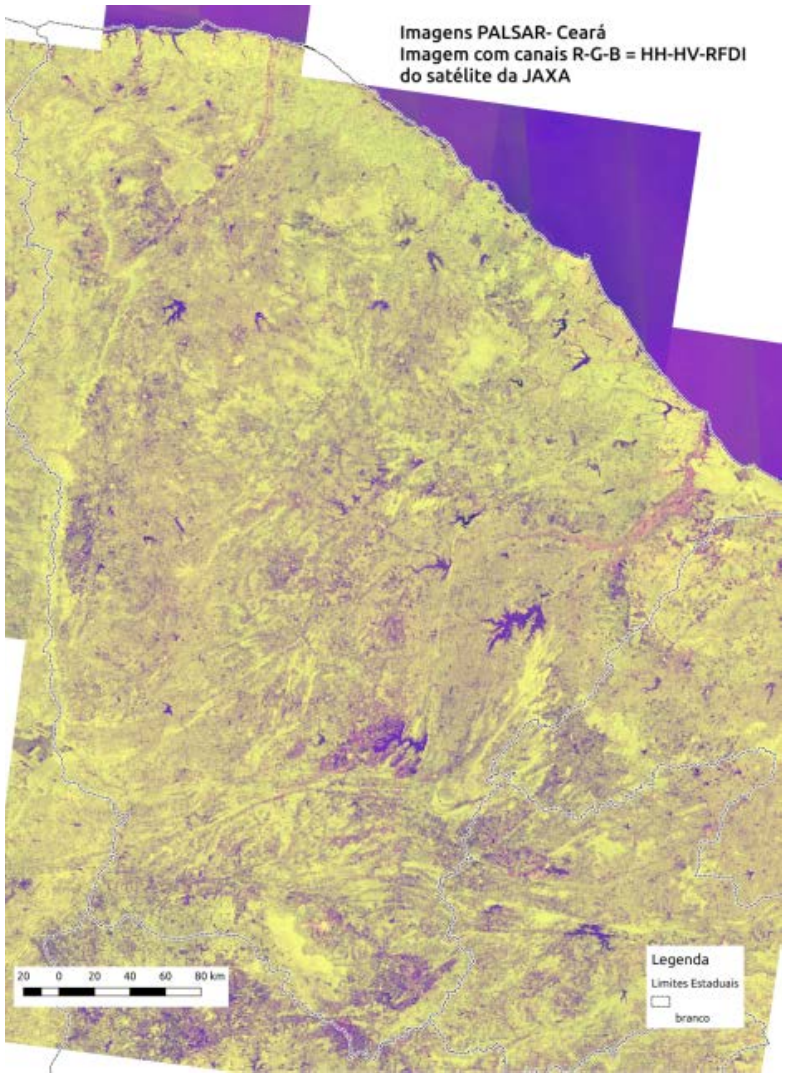


In blue in course data collection and green finished

Biomass from alometric equations.

But the results were not good because of the spatial associations with the ground data

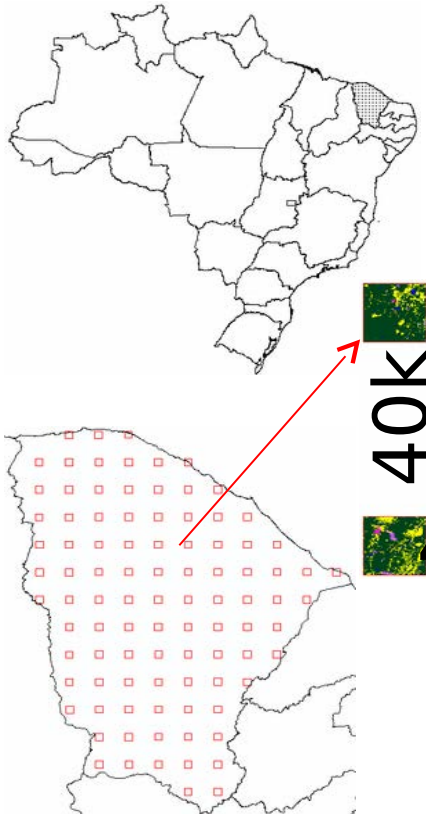




National Forest Inventory in Brazil - UpScaling Strategies

Sub-sampling NFI plots 40km by 40km for Landscape analisysl

10km by10km satelite image classification to genarate landscape metrics for each plot.

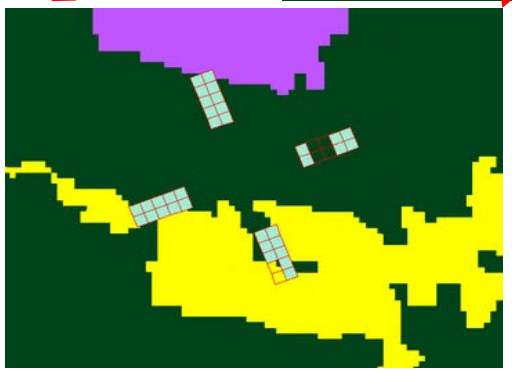


40km

40km

10km

10km



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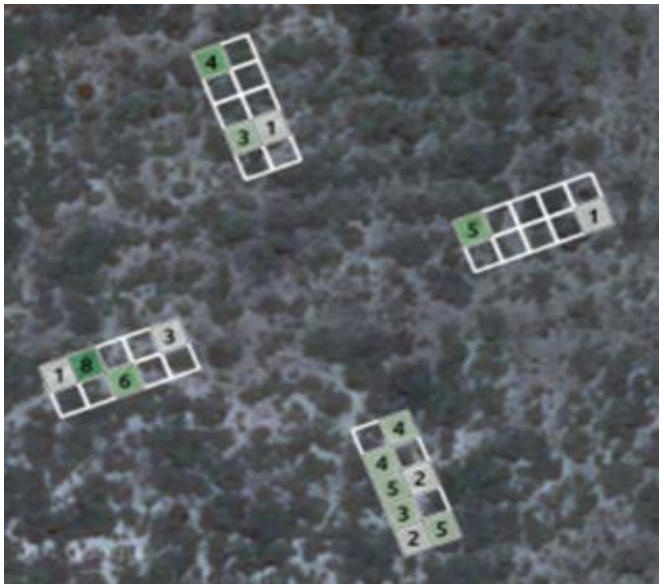

National Forest Inventory in Brazil - UpScaling Strategies

Some Preliminary Results of Ground Data Collected on Brazilian Caatinga (State of Ceará).

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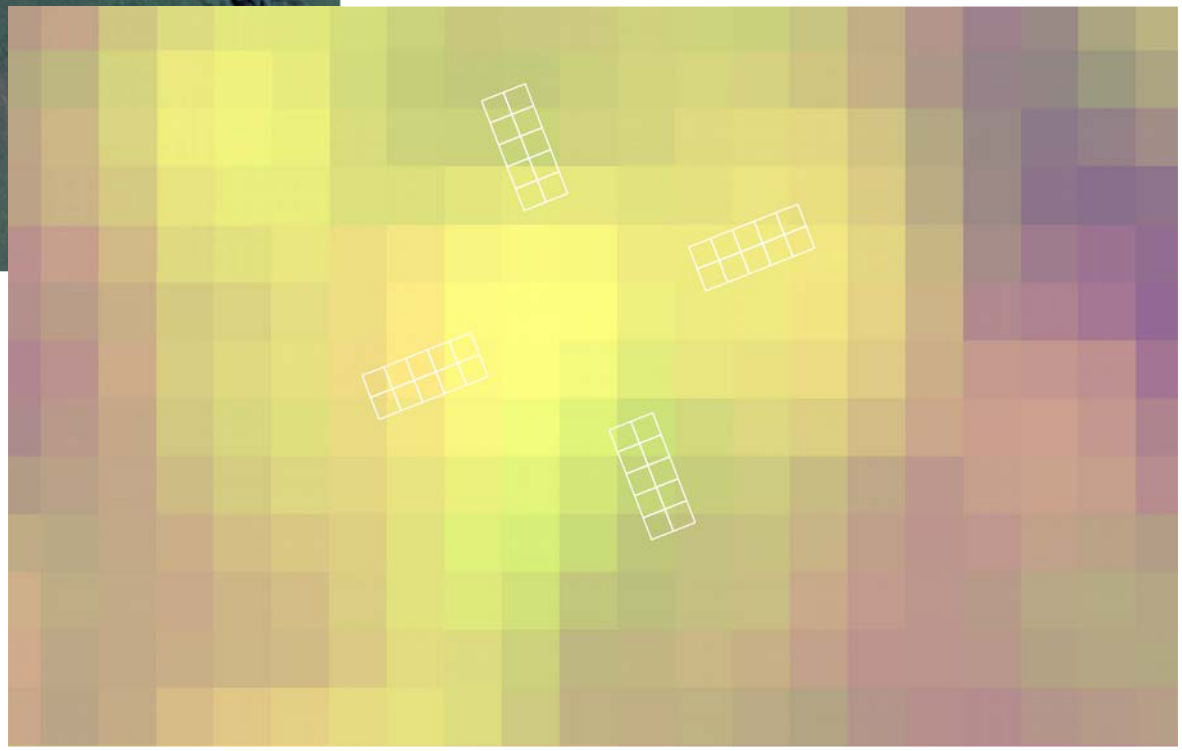
National Forest Inventory in Brazil - UpScaling Strategies

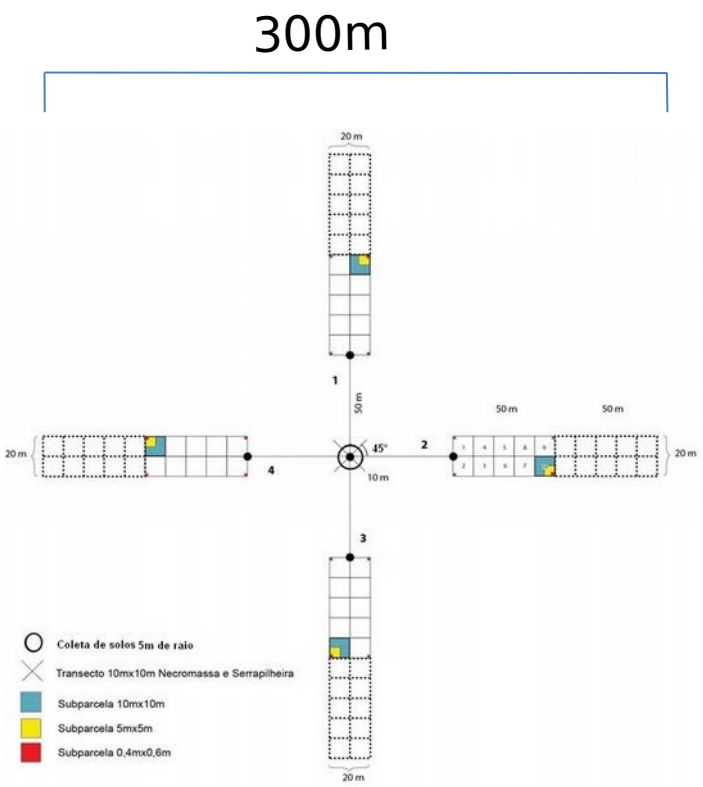


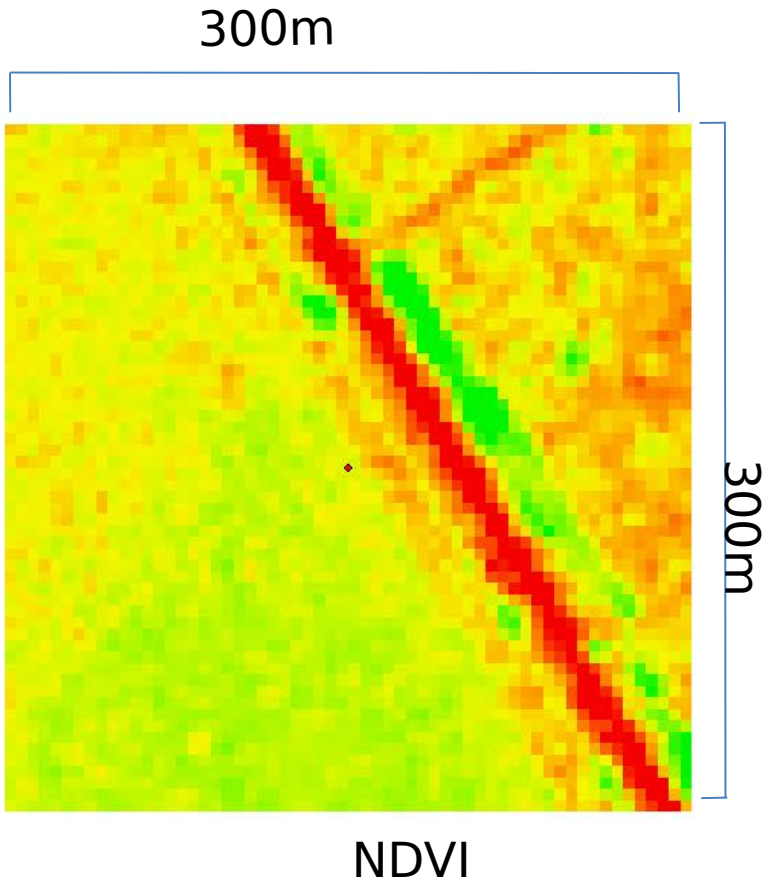
Some Preliminary Results of Ground Data Collected on Brazilian Caatinga (State of Ceará).

FBD mosaics for support NFI planning the national forest inventory (using K&C4) for preview information about

We had try to use RapidEye NDVI images to estimate non forest for all 22.000 plots.

The results were not good for Cerrado and Caatinga Vegetation.



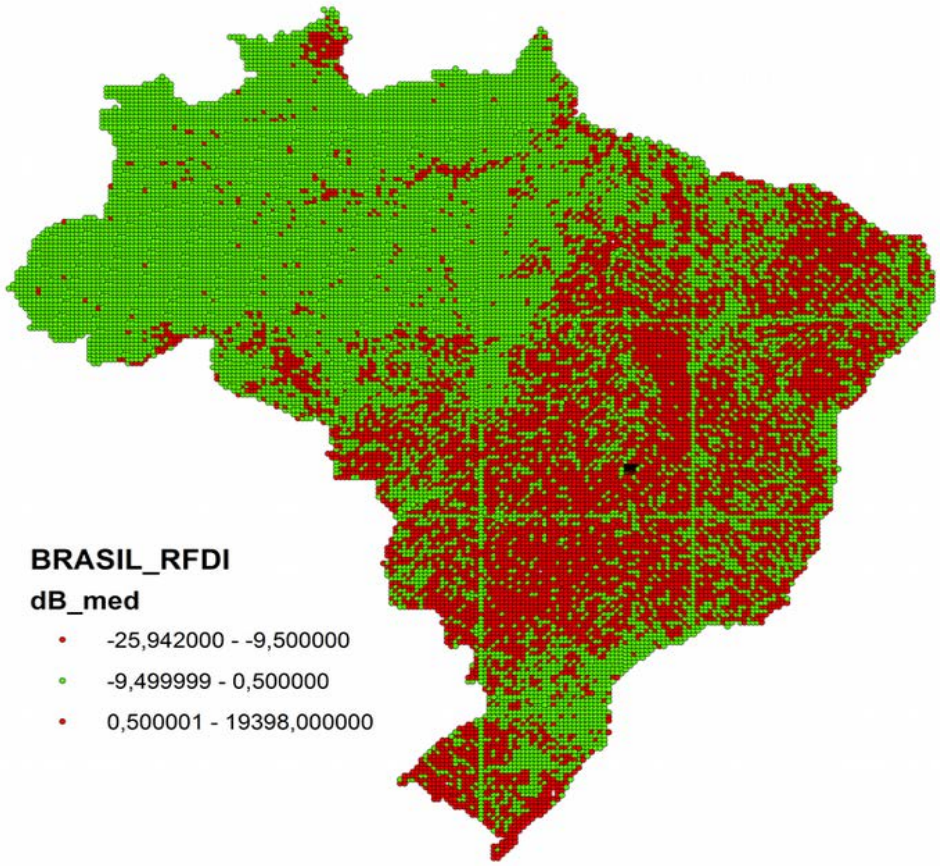


FBD mosaics for support NFI planning the national forest inventory (using K&C4) for preview information about

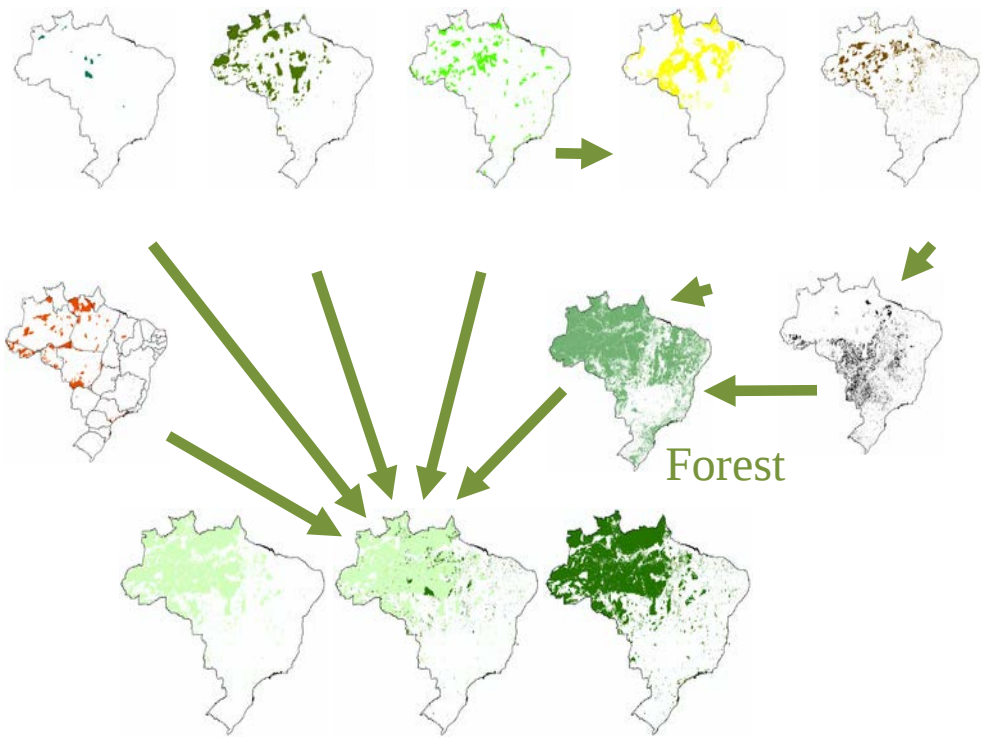
ALOS FBD to identify Non Forest for each plot of the systematic sample strategy for the National Forest Inventory Grid (~22.000 samples) of Brazil.

Use 300m x 300m (size of the cluster) and statistics we estimate nom forest plots.

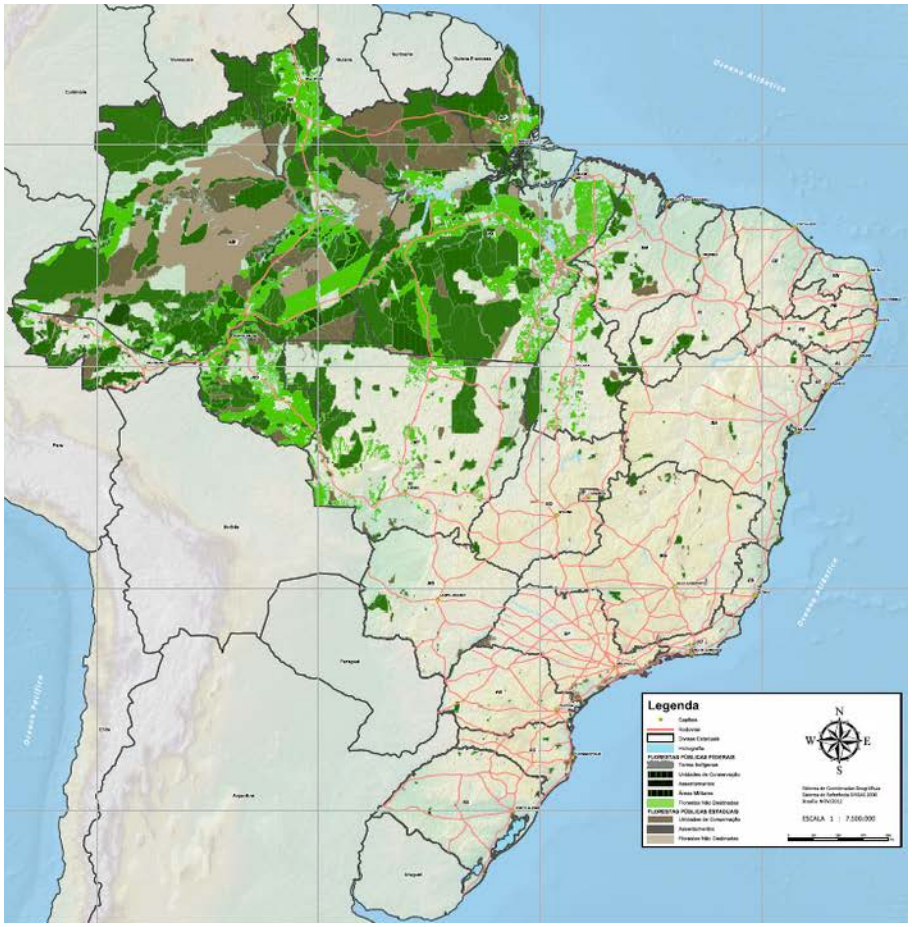
We got good results with SAR for dry forests of Brasil.



National Register of Public Forest of Brazil



Updating



National Register of Public Forest of Brazil

Compare BFS Forest Map with ALOS/PALSAR FNF map

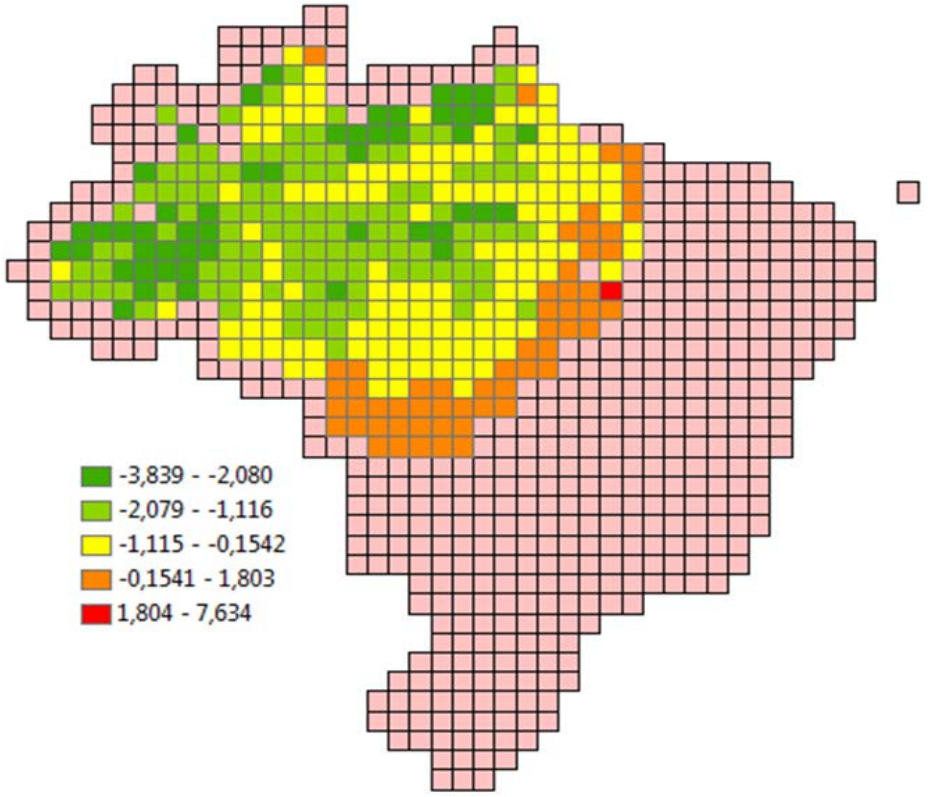
Forest and non-forest map validation with Maps produced by Brazil (1degree tiles)

ALOS Forest Non-Forest (FNF)

X

PRODES Map (1degree tiles)

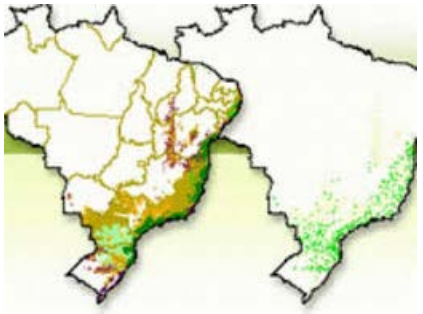
only untouch forest, don't consider planted forest and regrowth

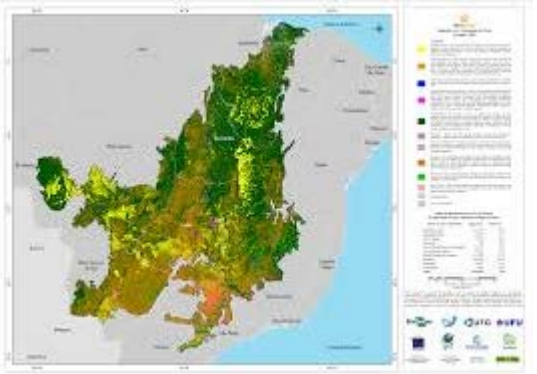


We made up 1 degree tiles to be compared with ALOS FNF map

National Level:

PROBIO, IBGE





Regional:

Amazonia (PRODES and TerraClass Amazonia), Atlantic Forest (2 iniciatives), Cerrado (Terra Class Cerrado)

State:

SP, MG, SC, BA, SE, RJ , PR

Compare and distinguish Natural and Planted Forests

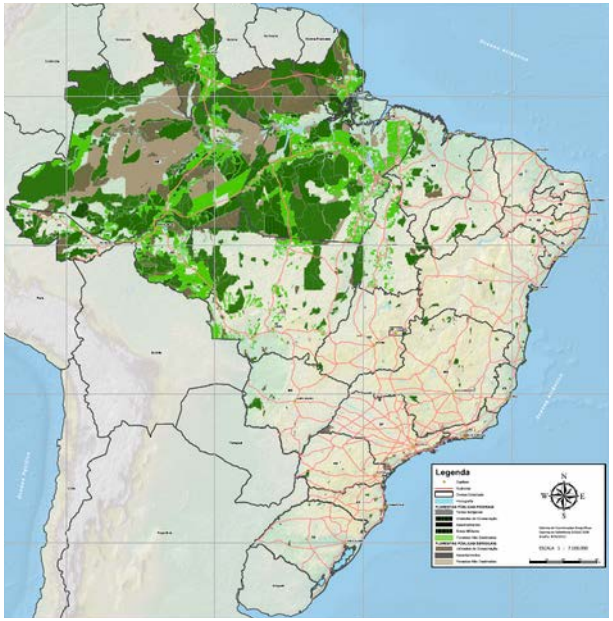
National Register of Public Forest

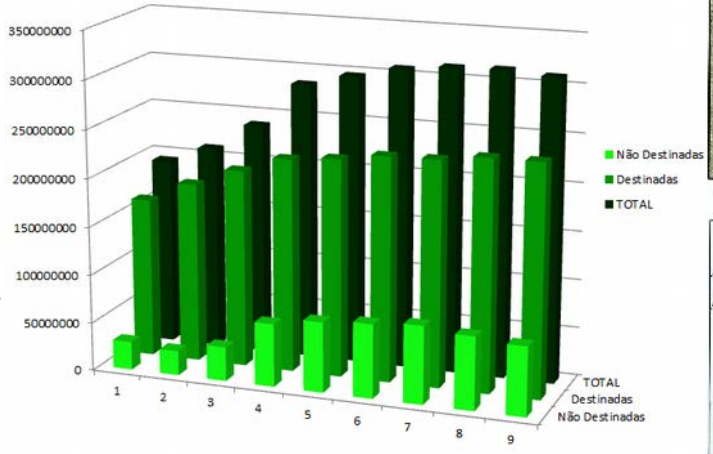
Light green areas are not public but not designated

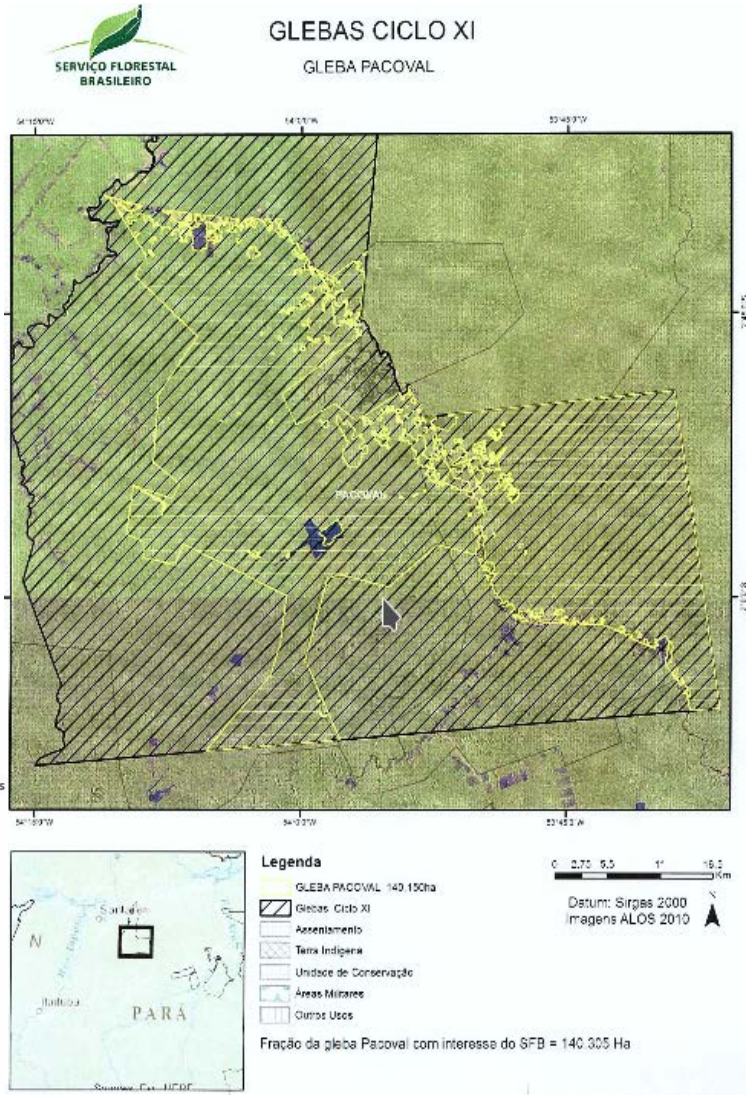
About 37 milhon ha are undesignated

Qualify Undesignated Public Forests in order to Designate it For Conservation

Last year 4 milhon ha Conservation Units was created



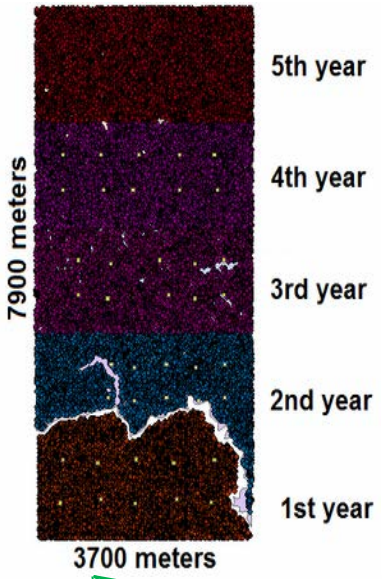


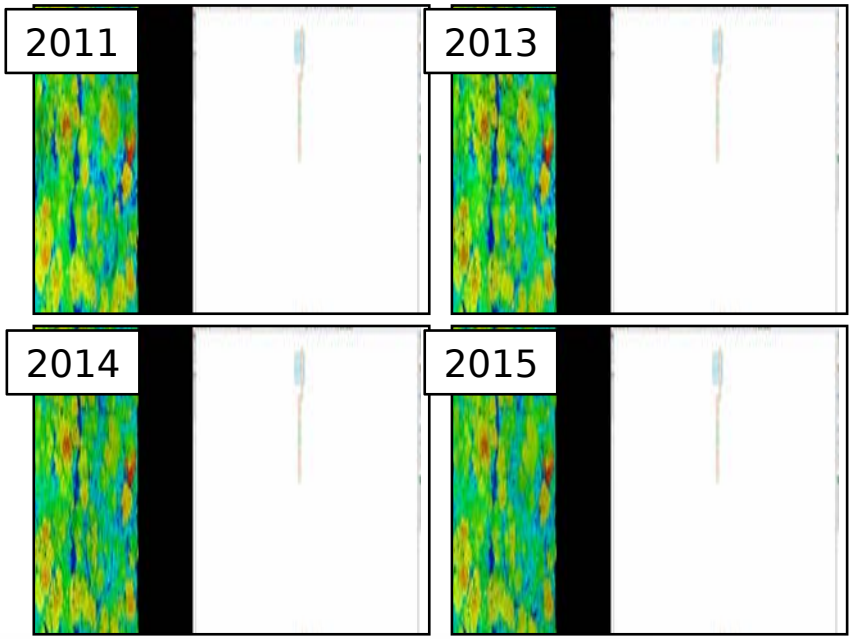


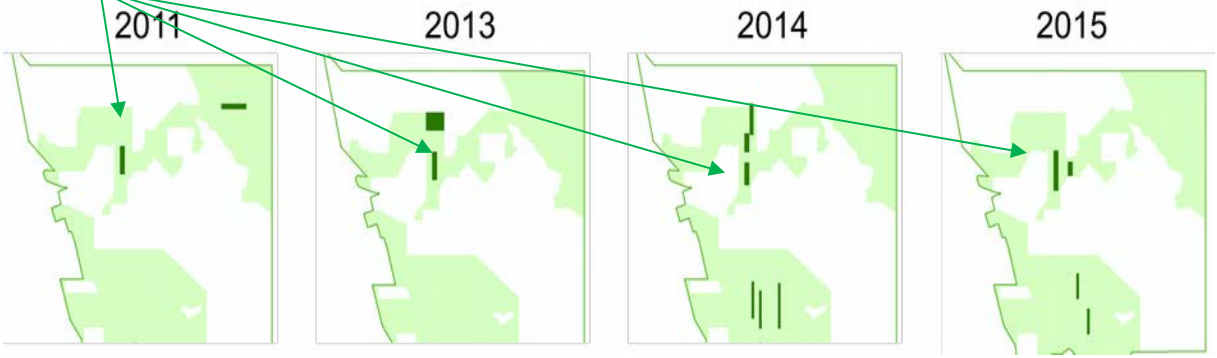
Evaluate PALSAR 2 under Concessions Areas

Looking new studant and Institution for cooperation we have a lot of data.

Ground data (all trees DBH >40), LIDAR (4 years) data and long term monitoring (30 years)

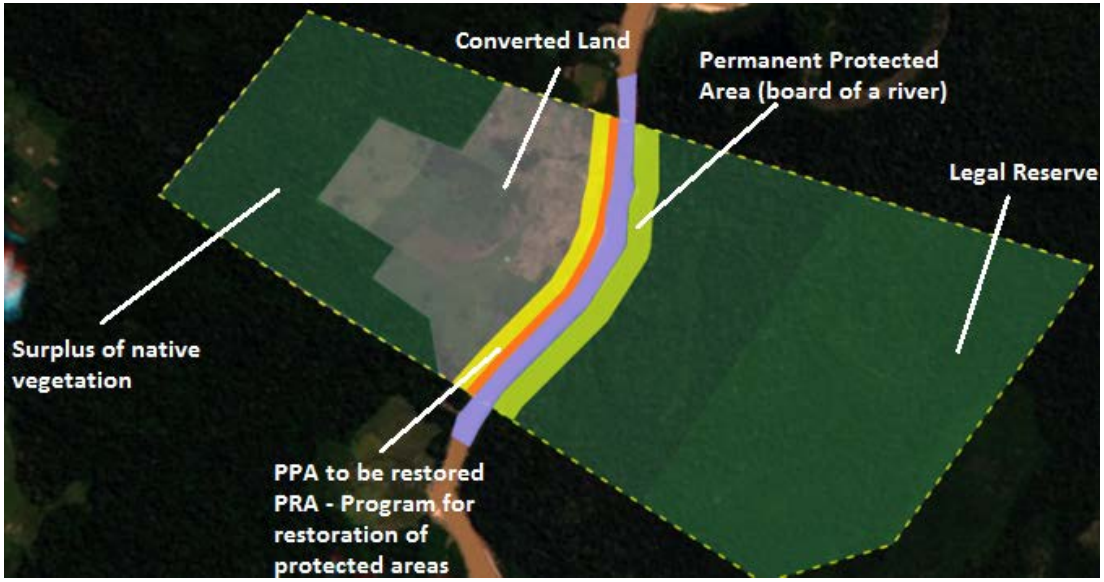






Rural Land Environmental Register (CAR)

Recognize the natural vegetaion and Enviromental Situation on private land.



3.242.840 private lands about 405.450.200,10 ha registered.

Next steps evaluate the owner declarations and monitor the future regrowth of the vegetation. Mostly with optical but PALSAR mosaics can help the analists in the seasonal vegetation and areas covered by clouds. 5 years of Rapid Eye for all over Brazil.

http://www.car.gov.br/publico/imoveis/index

Forest Regrowth on Areas Afeted for Water Avaiability Crisis on Big Cities in Brazil

Largest Cites in Brasil are getting water crisis.

ENVIRONMENT

Water crisis in Brazil: Why the largest city in the Americas is drying out

BY LISA NIKOLAU ON 15 DECEMBER 2015 1

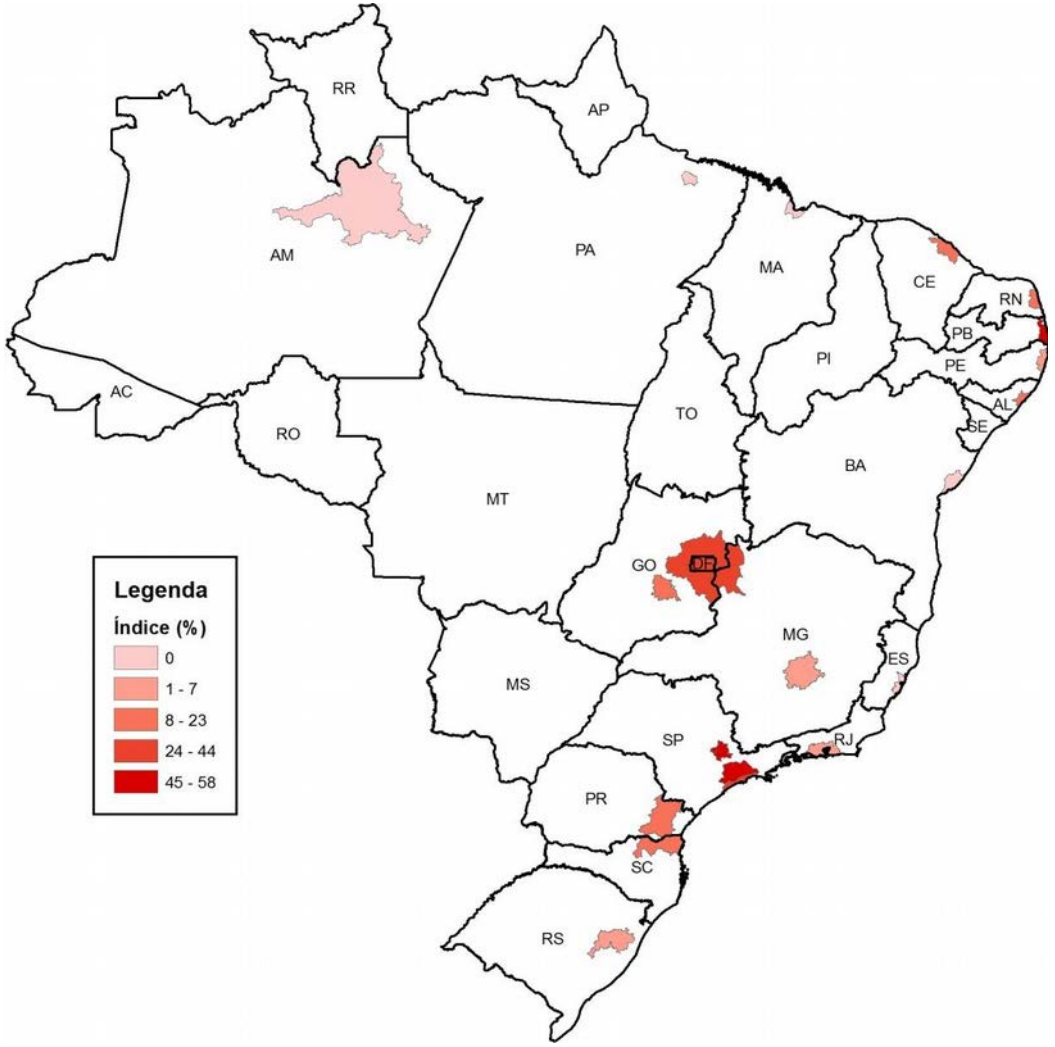
(Credit: Thomas Hobbs/Flickr)

São Paulo, the largest city in the Western Hemisphere, is facing its greatest water crisis in

Problem in some rural lands areas in central part of Brazil.

Forest Regrowth on Areas Afeted for Water Avaiability Crisis on Big Cities in Brazil

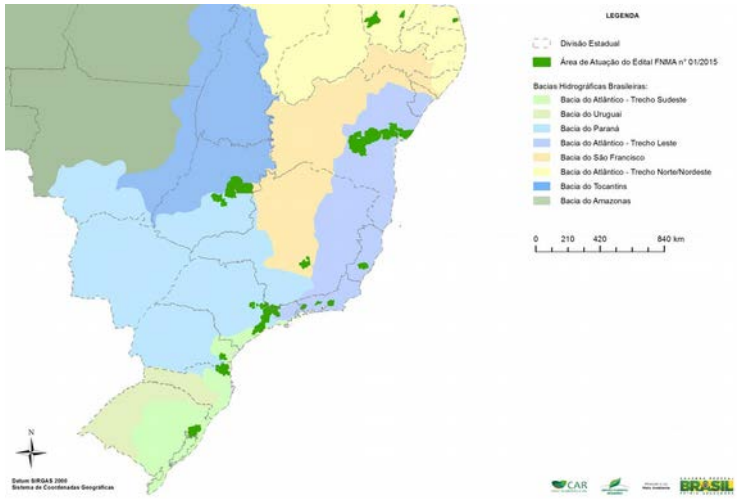
15 Million Dollars was offered in 2016 by Min of Environment for projects to implement Riparian Forest Restoration on Water Basin that provide water for big cities in Brazil. They will start in 2017 on 6 metropolitan areas in Brazil.

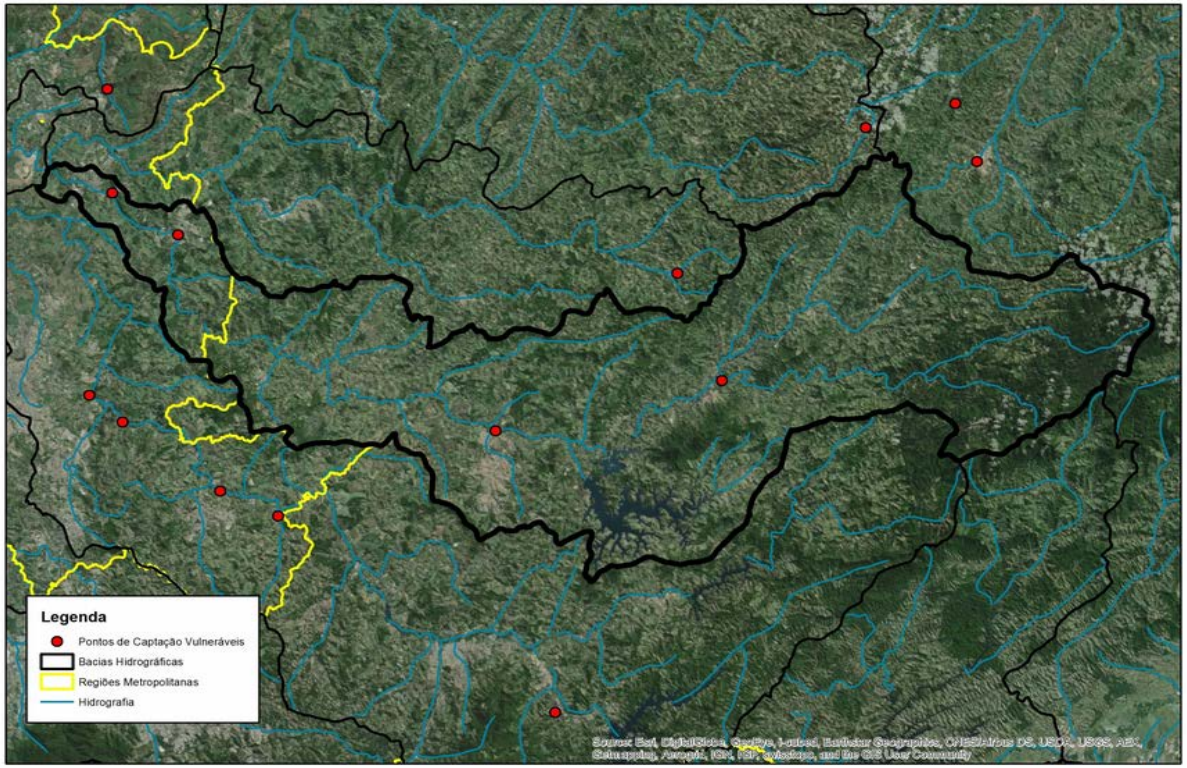


Forest Regrowth on Areas Afeted for Water Avaiability Crisis on Big Cities in Brazil

6 drainage water basins were select for Forest Restoration Projects on last year.

Remote Sensing are expected to be used to monitor forest regrowth in a long term (PALSAR can retrive levels biomass recovehering).



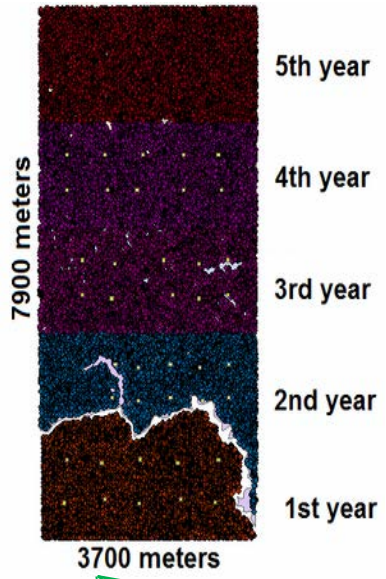


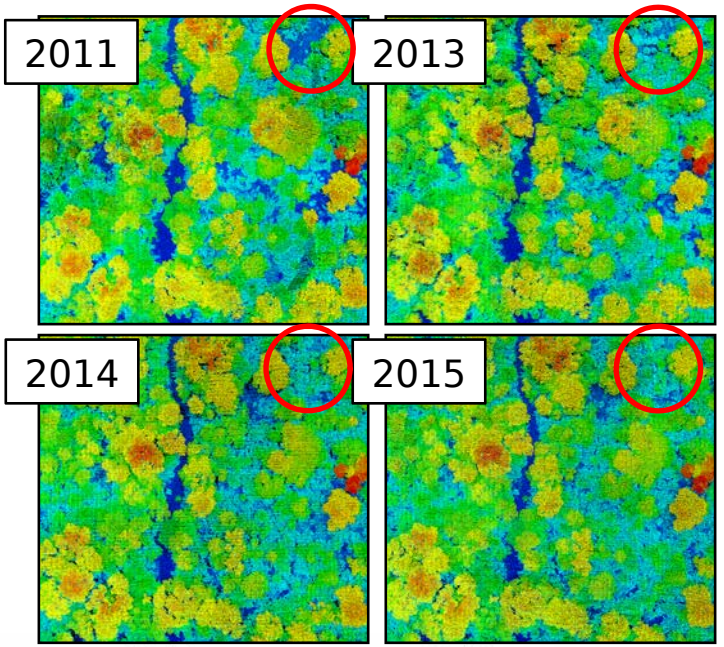
Red dots are points of water intake

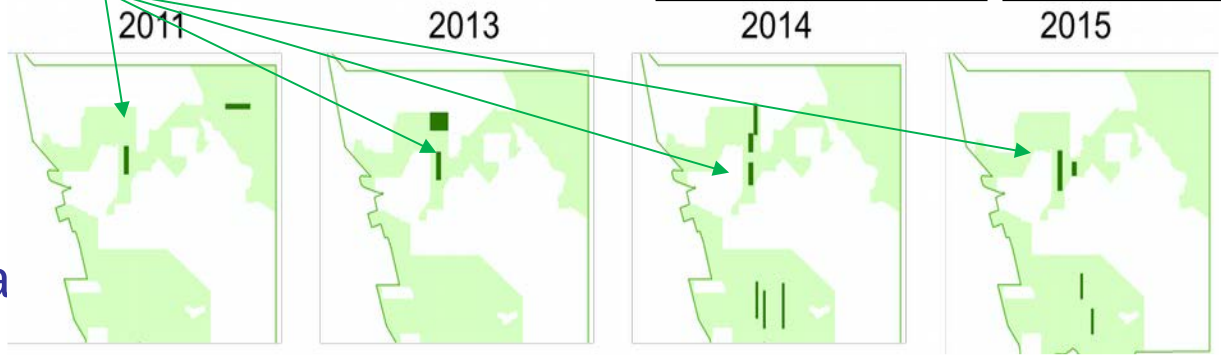
Evaluate PALSAR 2 under Concessions Areas

Looking new studant and Institution for cooperation we have a lot of data.

Ground data (all trees DBH >40), LIDAR (4 years) data and long term monitoring (30 years). Each anual production area bigger than 1.000ha and more than 2000 trees in each.







Results

In order to increase our results (in the mening of use os the mosaics) we would like to make avaliable for more people (for state governments and public in general).

We just have partial results but a complete evaluation of FNF map for all of Brasil will be done until the end of the phase 4.

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

Thank You!

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