INPE's Amazon Deforestation Monitoring Program: A Large Scale Approach to a Land Cover Change MRV System

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GEO Forest Carbon Tracking Task in Support of Developing Countries to Set MRV Systems
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Forest Carbon Tracking

PRODES – forest monitoring project

Scope
- Forest cover of the Brazilian Legal Amazon
- Clear cut monitoring over 4 million km^2
- Regional and state level statistics published yearly
- Assessment of effect of national policies

Verification
Methods, images and digital maps available on the Internet since 2000
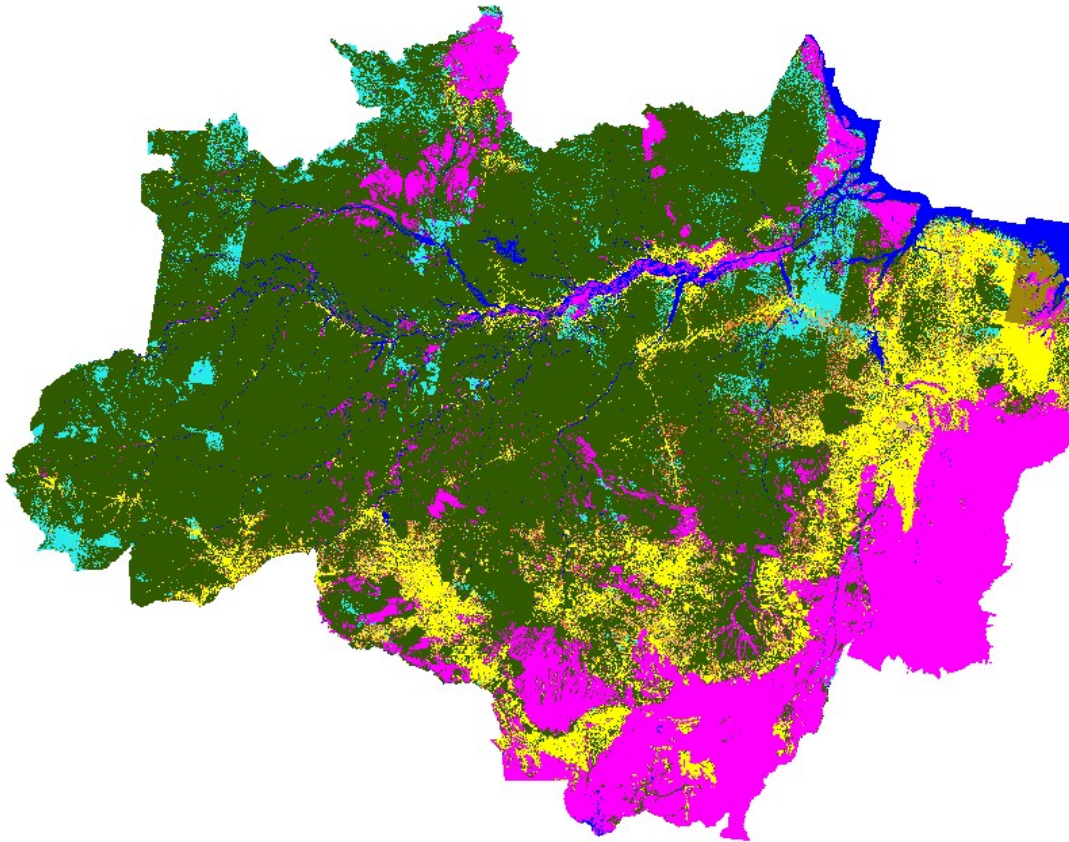
Data use
Policy making and law enforcement, academic research and public awareness

Forest cover
Range of forest typologies ranging from the dense Ombrophilous to dense cerrado forest formations

PRODES – forest monitoring project

PRODES – forest monitoring project

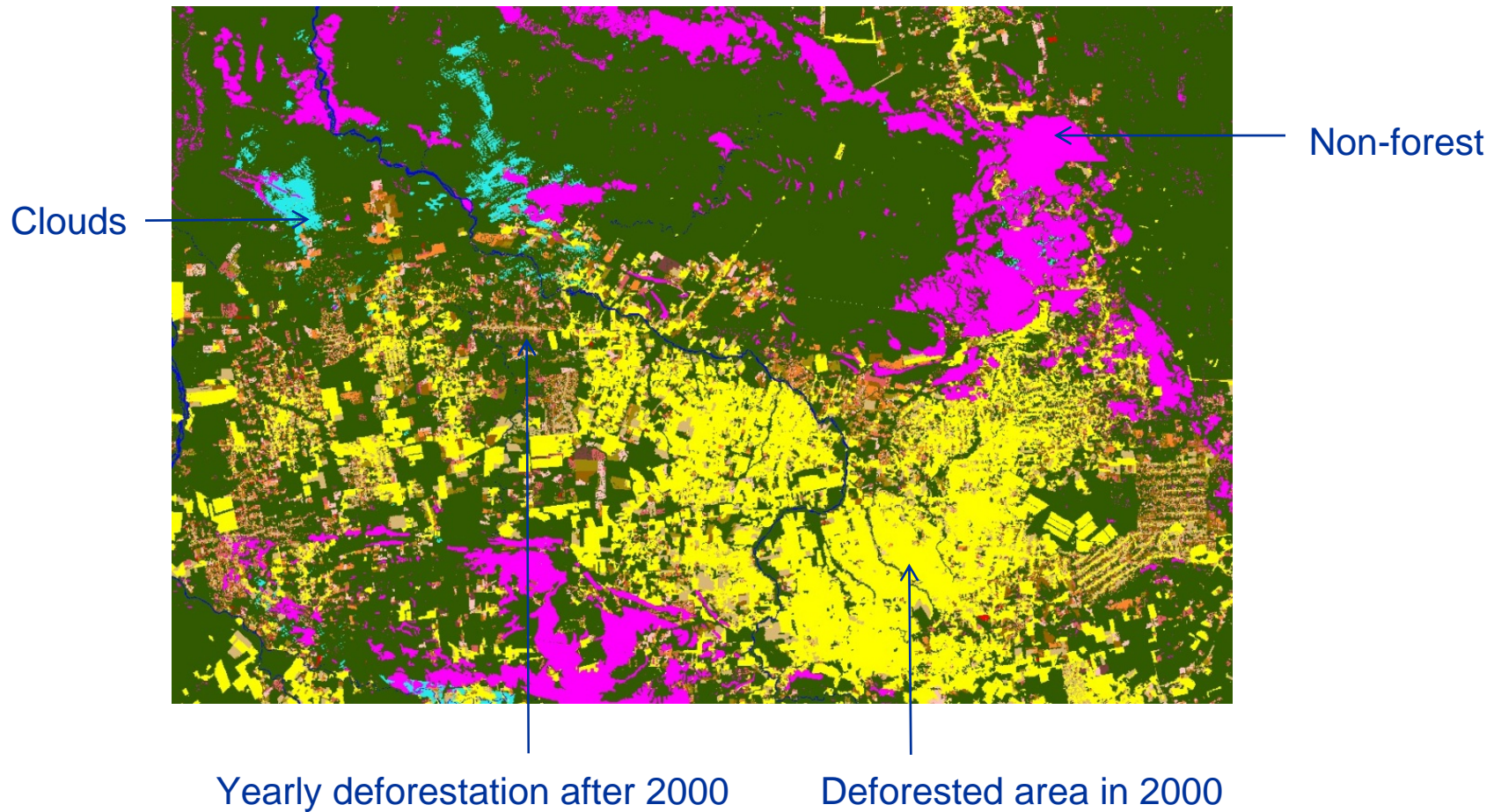|	
Satellite data	Landsat class data – Landsat-5 TM, CBERS CCD, DMC, ResourceSat LISS-3
Georeference	Landsat GeoCover to 1:250,000 standards
Method	Semi automatic: edited segmentation followed by polygo n classification; visual classification at the scale of 1:100,000
Verification	Double checked by a team of experienced Remote Sensing experts (interpreters)

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PRODES – forest monitoring project

Non-forest

Clouds

Yearly deforestation after 2000

Deforested area in 2000

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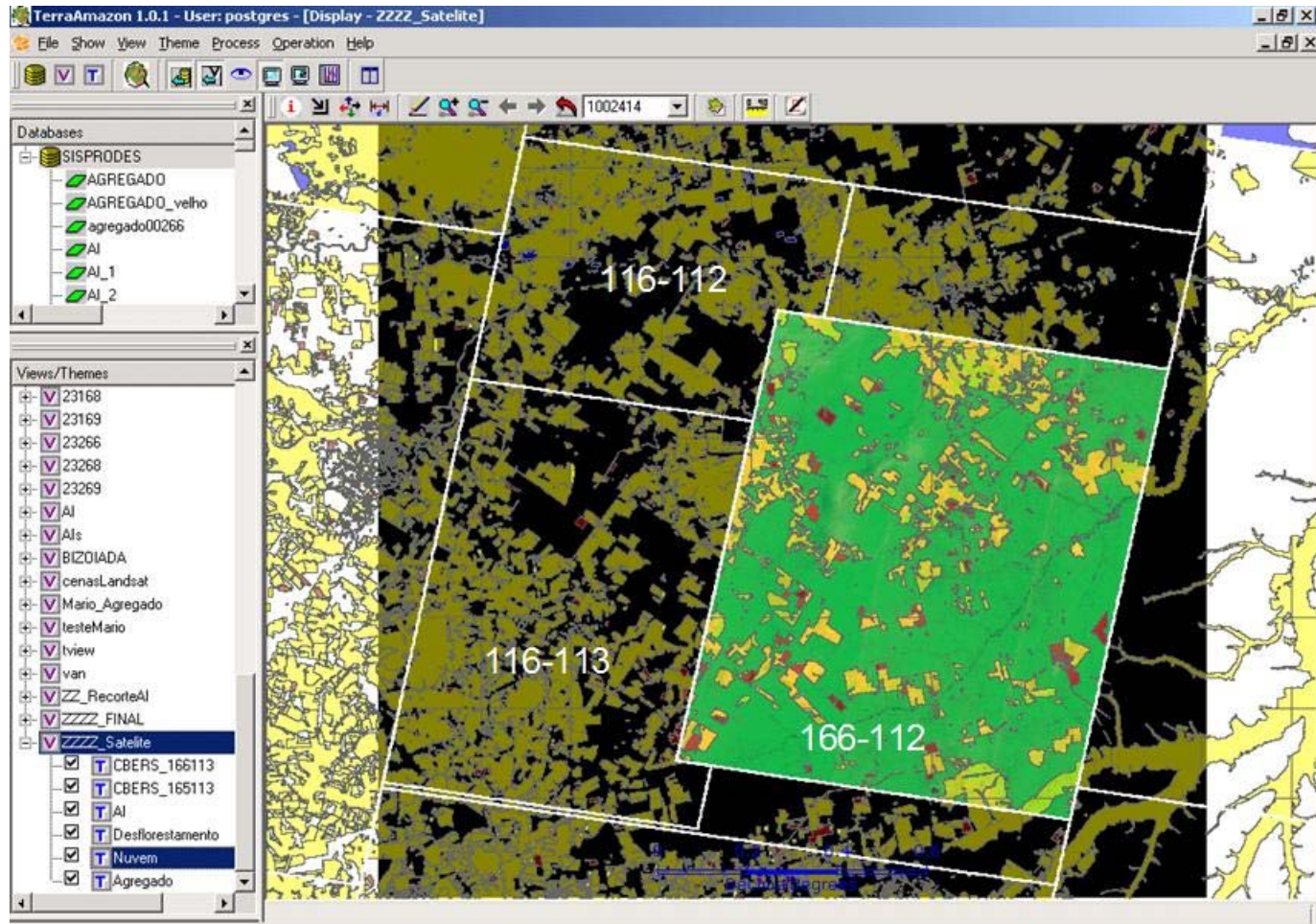GEO GROUP ON EARTH OBSERVATIONS | Forest Carbon Tracking

TerraAmazon – large scale GDB

Based on TerraLib
(OGC compliant)

Multi-data
(with date code)

Multi-user

Concurrency control
(lock / unlock)

PRODES: wall to wall assessment of clear cut deforestation but…

But…

Other types of forest cover changes

State of the forest

Monitoring of forest degradation by illegal and predatory logging and forest fires (DEGRAD)

Monitoring of selective logging (DETEX)

Same image set used for PRODES

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State of the forest

Image transformation
by linear spectral mixing
with three endmembers:
soil, vegetation, shadow

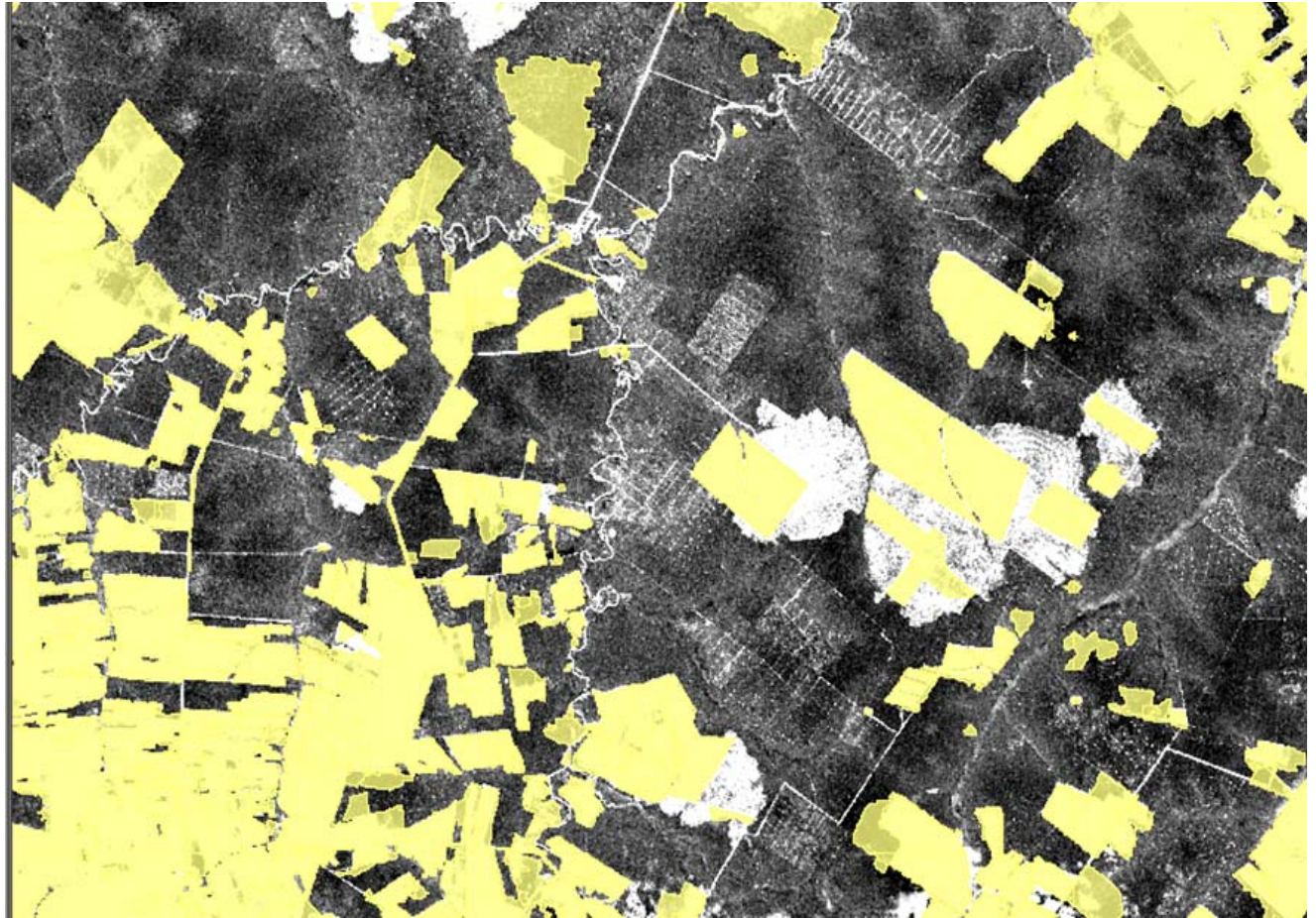Ratio operation:
soil / vegetation

Contrast stretch of the
upper histogram tail

State of the forest

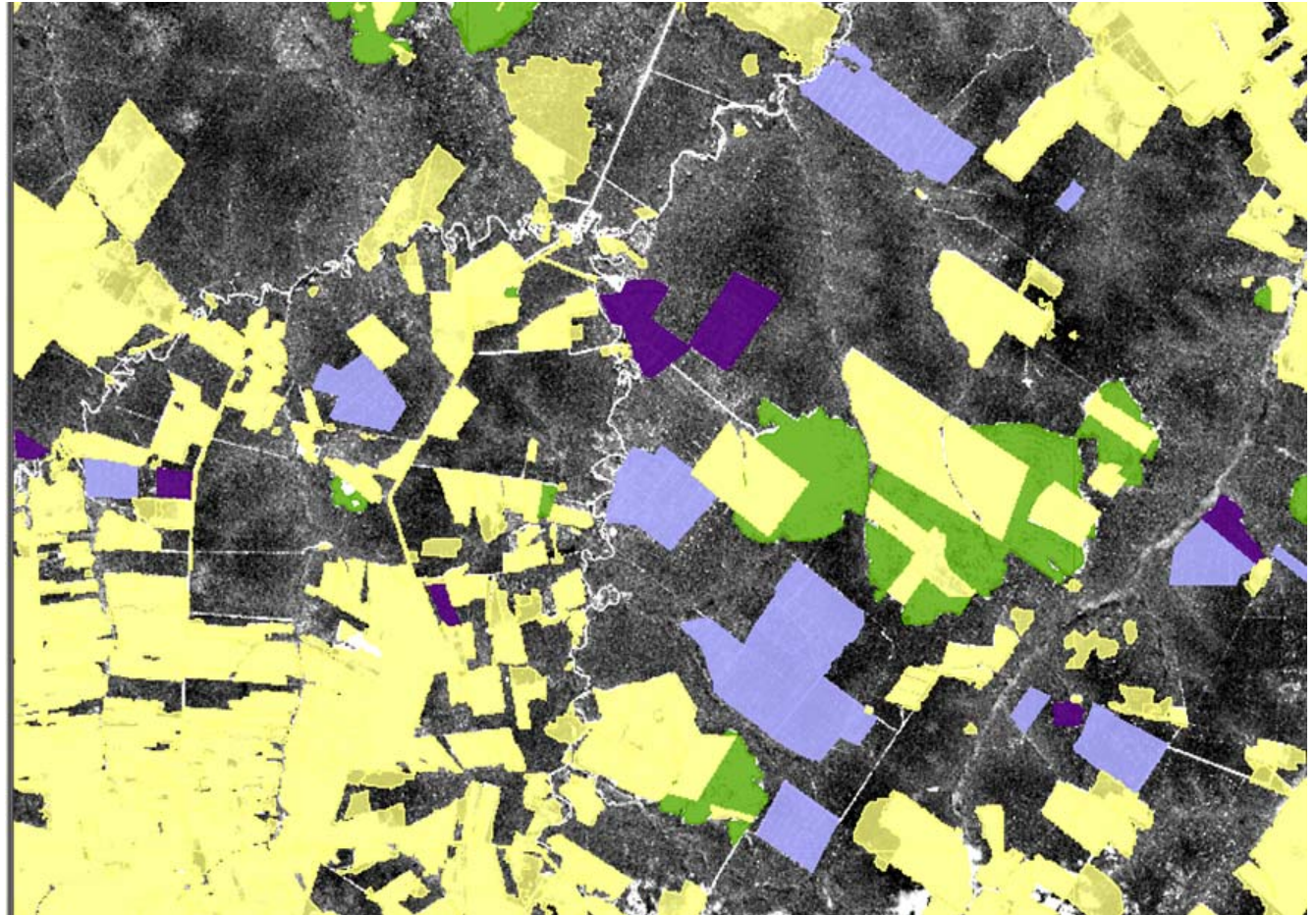Degraded forest
as defined by
DEGRAD and DETEX

Visual interpretation

State of the forest

Selective logging with different impact intensities (purple)
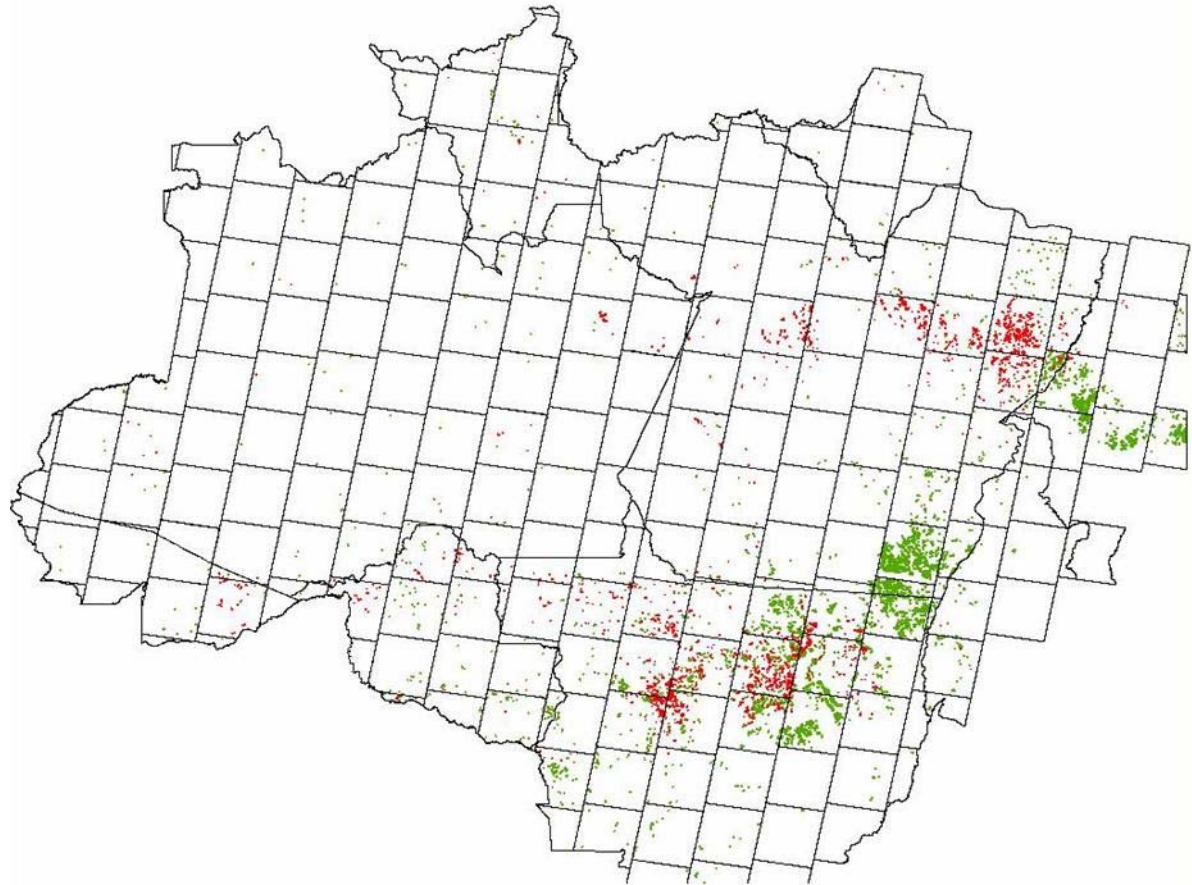
Fire scar degradation (green)

State of the forest

Degradation in
2007: 15,000 km^2
2008: 27,000 km^2

PRODES in
2007: 11,000 km^2
2008: 14,000 km^2

Validation under way
with CBERS-2B HRC

Product development methodology issues

Satellite data *interoperability* (obtaining same thematic results with different sensors) and *complementarity* (adding thematic value by using two or more sensors)

- **Relevant work (but not operational yet) undertaken to investigate the use of different satellite sensors in the context of the Brazilian Legal Amazon Deforestation Monitoring Program:**

  - *Cooperation with JAXA to assimilate ALOS Palsar data*

  - *Investigation to define the possibilities of using CBERS-2B HRC to validate forest degradation and selective logging maps*

  - *Efforts to include ResourceSat-1 in the operational processing chain*

Thank you!