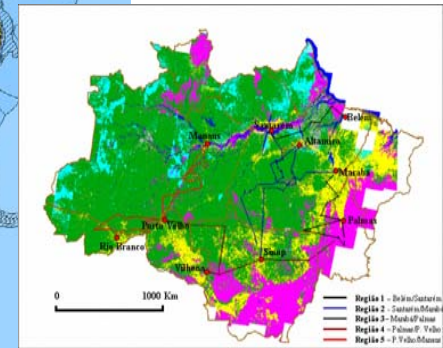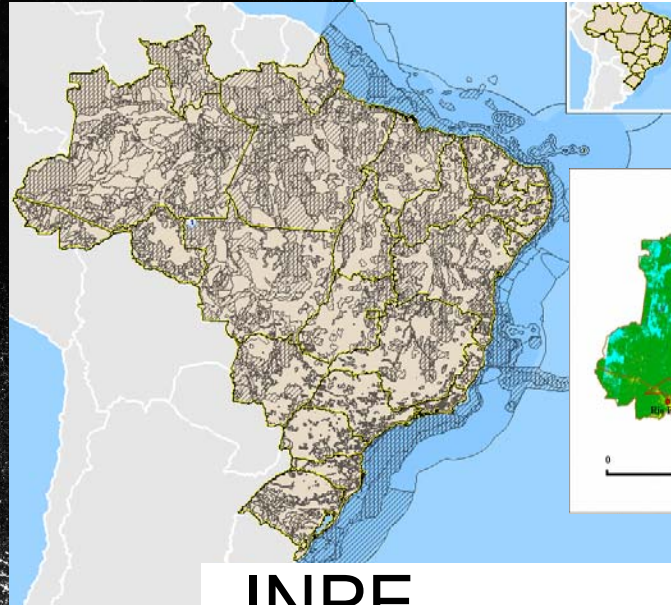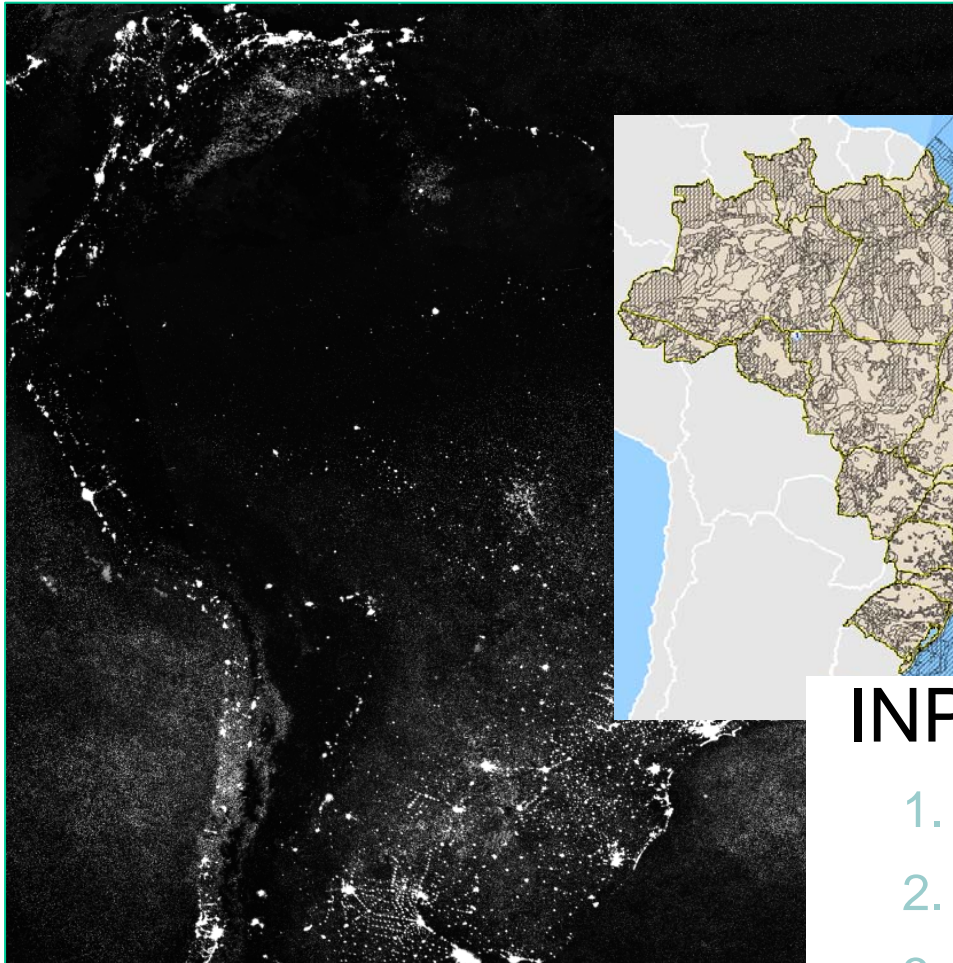# Biodiversity Modelling at INPE

Silvana Amaral
Lúbia Vinhas
Luciana Arasato
Alexandre Jardim
Missae Yamamoto
Karla D. Fook
Arimatea Ximenes
André V. Jardim
Cristina B. Costa
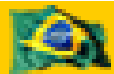Dalton Valeriano
Antonio Miguel V. Monteiro

IEA- USP 2008

National Institute for Space Research

INPE - www. inpe.br

INPE

1. Data Provider
2. Technology Development
3. Research

INPE Basic Initiative: Study group

- Study group: the process of modeling biodiversity
  - Ecology theory
  - Algorithms
  - Climate effects
  - Historical effects
  - Others…

www.dpi.inpe.br/referata

Referata Biodiversa — DPI

- Home
- Agenda

REUNIÕES

- **11/maio/2007**
  9. A dependência espacial em modelagem preditiva de vegetação.
     Apresentação: Aldair Santa Catarina - INPE
     Paper de referência
     Apresentação
     Arquivo de voz:(Apresentação)

- **27/março/2007**
  8. Modelos de Vegetação Potencial (PVM) e cenários de alterações climáticas para os biomas brasileiros.
     Apresentação: Dr. Carlos Nobre - INPE
     - Paper de referência1 e referência2
     - Apresentação
     - Arquivos de voz: (Apresentação1, Apresentação2)

- **07/dezembro/2006**
  7. Indicadores de Diversidade Beta na Flora Amazônica.
     Apresentação: Dr. Bruce Nelson - INPA
     Paper de referência
     Apresentação
     Arquivos de voz:(Apresentação1 e Apresentação2)

- **28/novembro/2006**
  6. O projeto OpenModeller - um framework para modelagem de distribuição de espécies - Seminário de acompanhamento de projeto
     Apresentação: POLI, CRIA e INPE
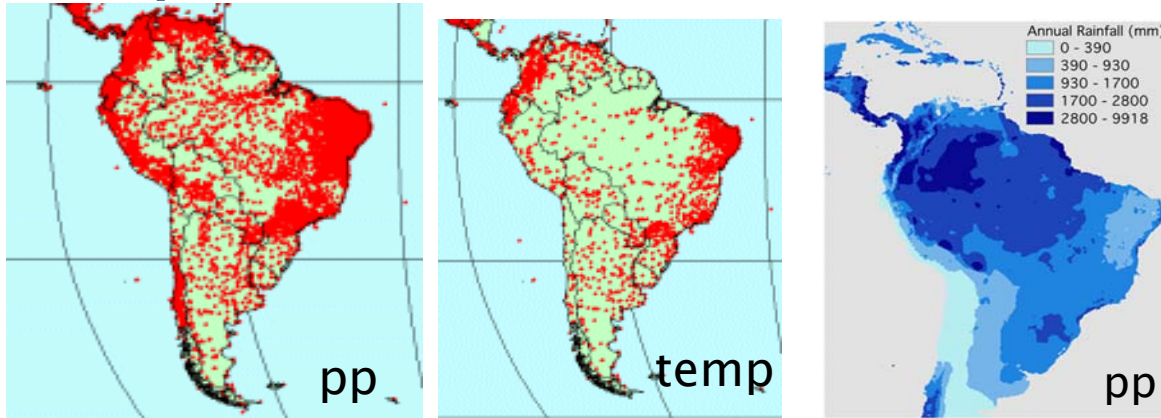   Paper de referência
     Apresentações e arquivos de voz

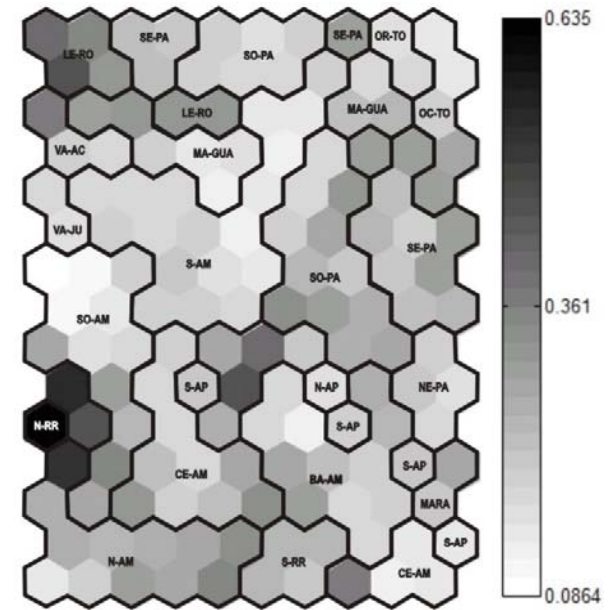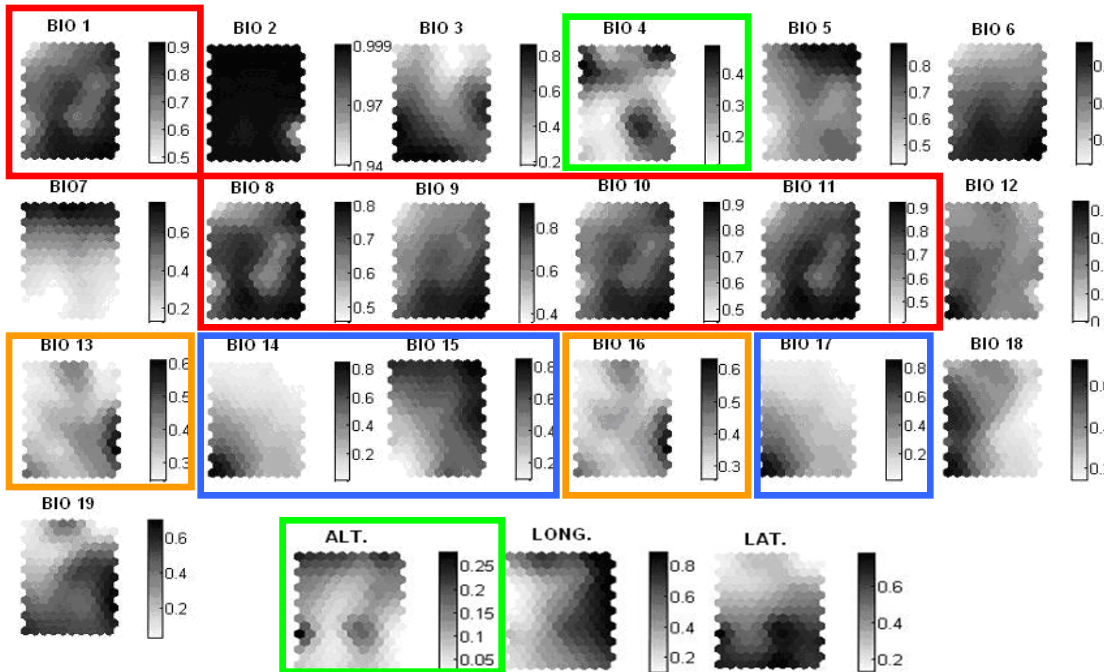# Environmental Data Generation and Pré-processing

variables dependence

pp

temp

pp

Dataset – HAND, Rivers Density, Radar image, clima, etc.

Self Organizing Mapping - Ximenes (2008)
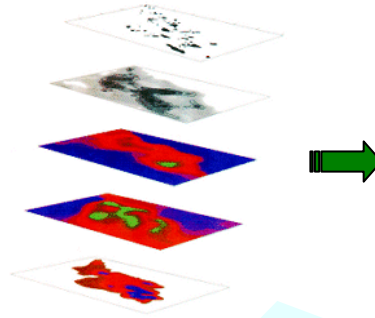
And other algorithms as Chi-Square…

Data Sources / Tools

TerraView: TerraLib–OM Plugin

- Species occurrences

- Environmental variables
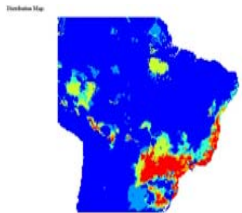
- Results of species distribution modeling

An approach for sharing species distribution modelling on Web

WBCMS
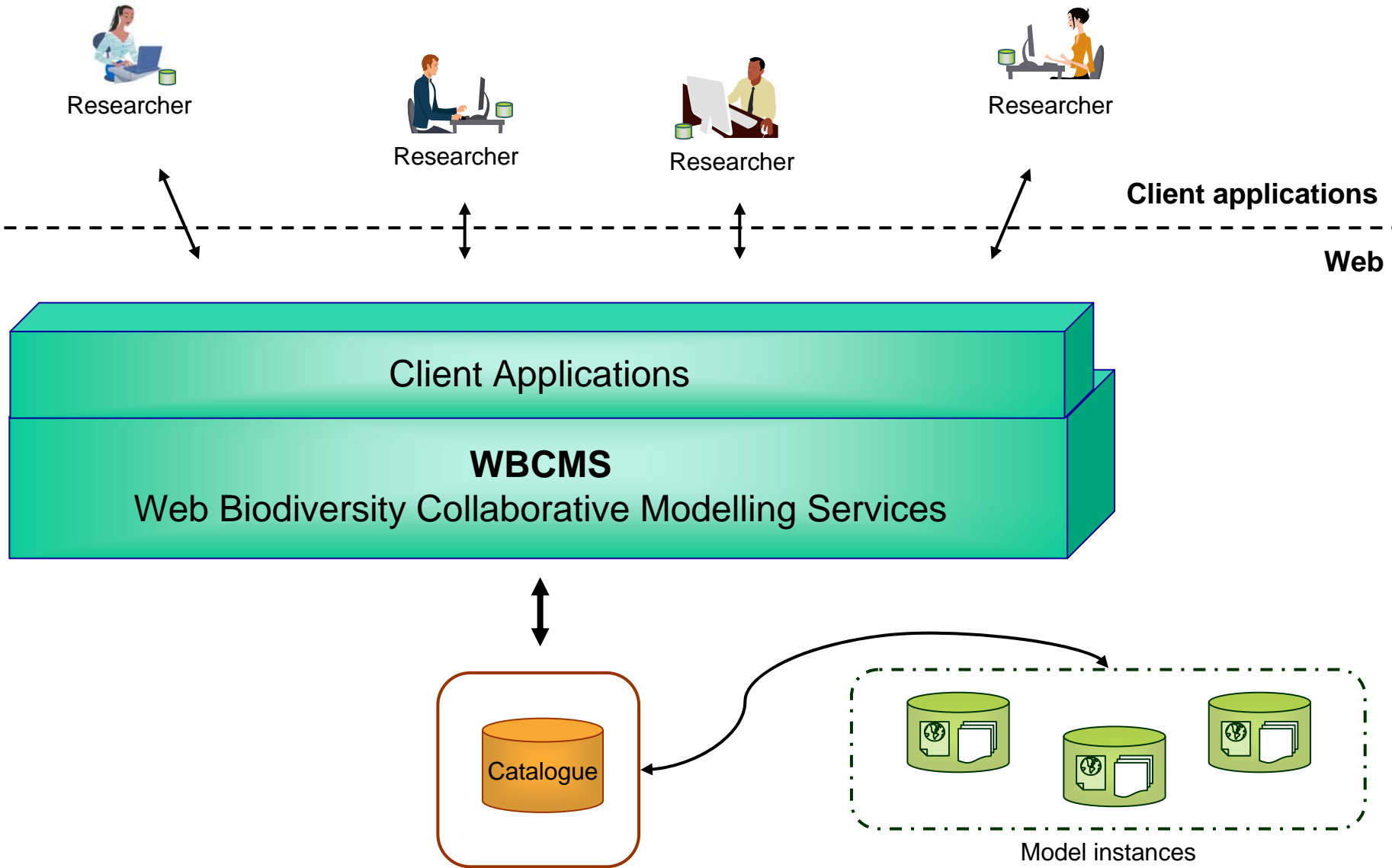**Web Biodiversity Collaborative Modelling Services**

Pelargonium Cordifolium
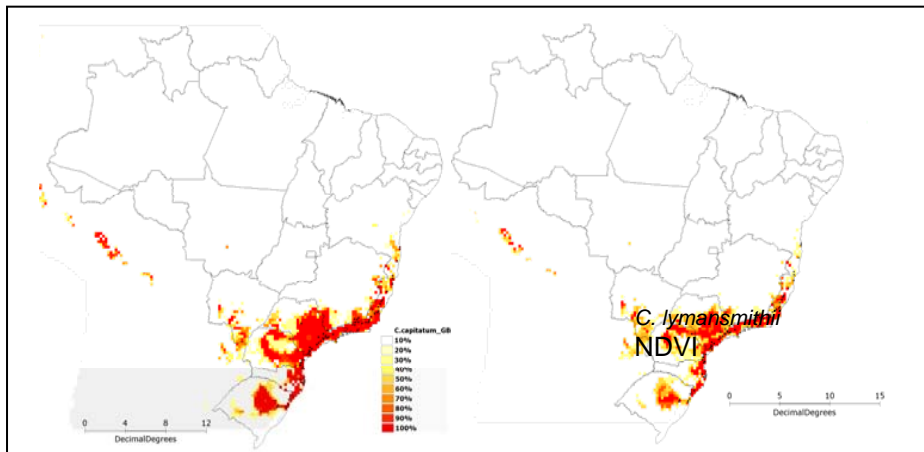
Callicebus Coimbrai & Callicebus barbarabrownae
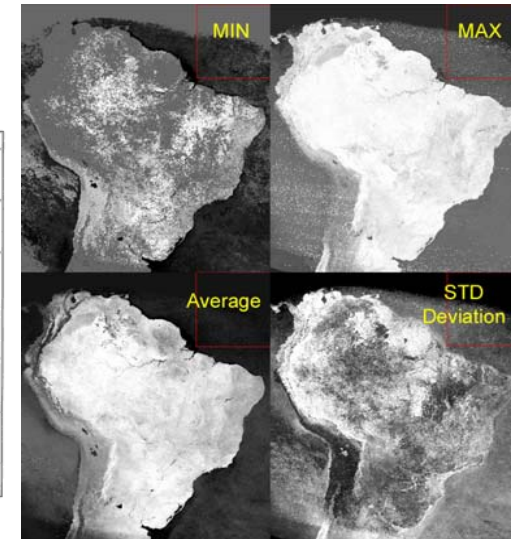
Fook (2008)

WBCMS Architecture

Researcher

Researcher

Researcher

Researcher

Client applications

Web

Client Applications

WBCMS
Web Biodiversity Collaborative Modelling Services

Catalogue

Model instances

Fook (2008)

Study Cases

Modeling *Coccocypselum sp.*

C. lanceolatum

C. lanceolatum

C. hasslerianum

C. erythrocephalum

Foto: C.B. Costa

C. cordifolium
NDVI

C. lymansmithii
NDVI

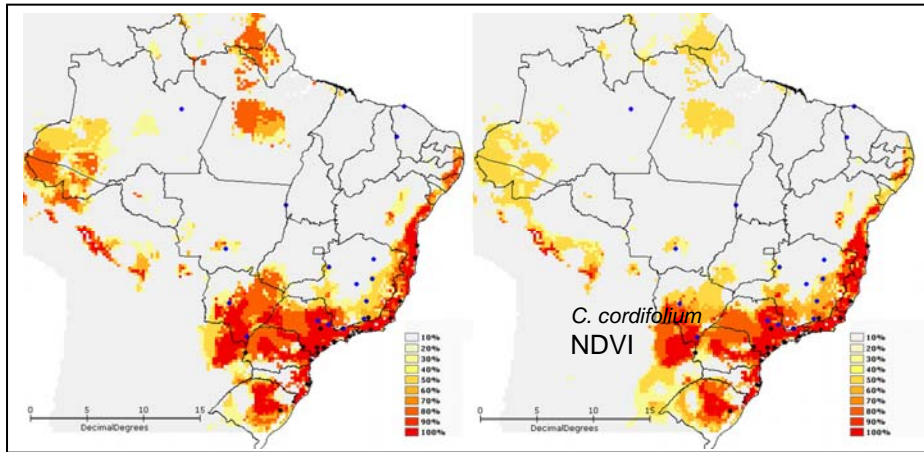MIN   MAX

Average   STD Deviation
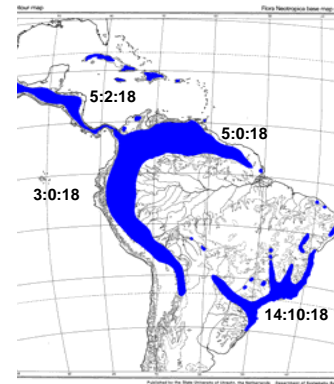
Specie	Kappa		Mann-Whitney (U Statistic)			
	no NDVI	NDVI	no NDVI	NDVI	Critical value (α =5%)	N
C. lymansmithii	0.8	0.8	7.5	7.5	2	5
C. erythrocephalum	0.5	0.5	21.5	22.5	12	8
C. pulchellum	0.83	0.83	16*	15*	37	12
C. capitatum	0.6	0.53	55*	48.5*	64	15
C. cordifolium	0.75	0.56	46.5*	36*	75	16

Costa (2007)
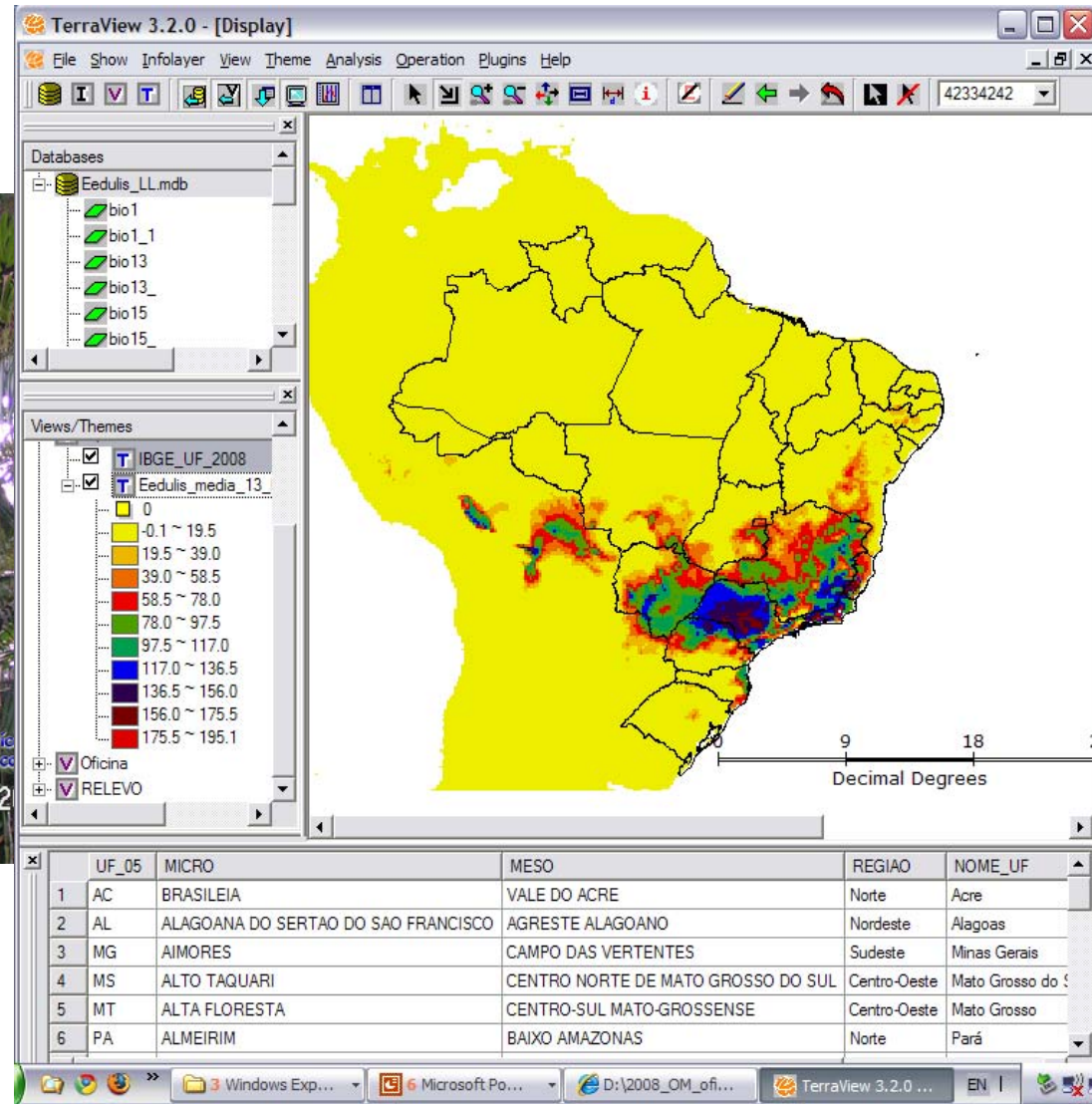
Study Cases
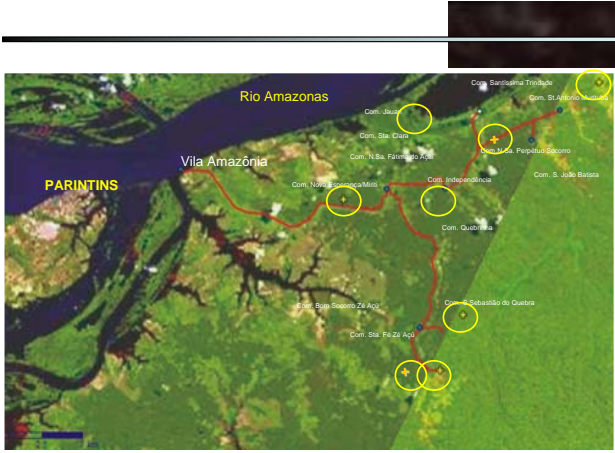

Modeling *Euterpe edulis*

Arasato (2008)

Study Cases
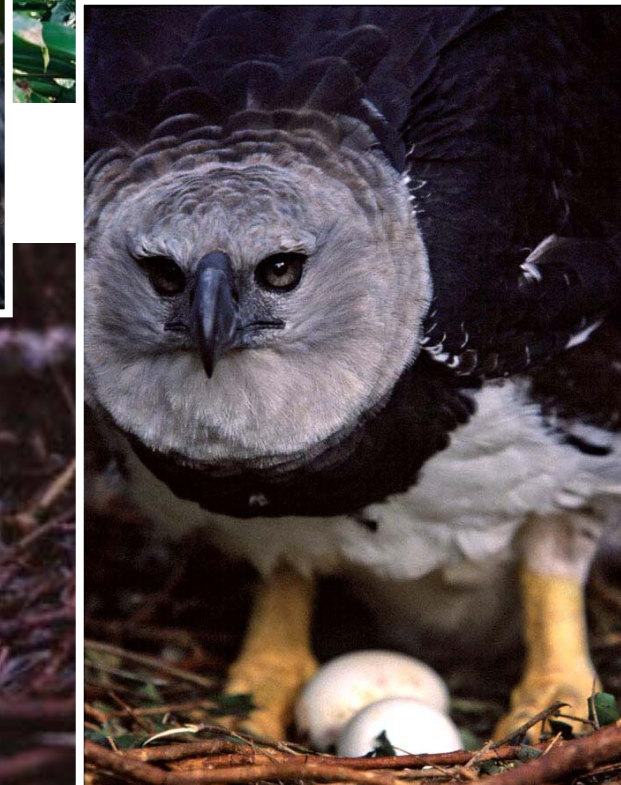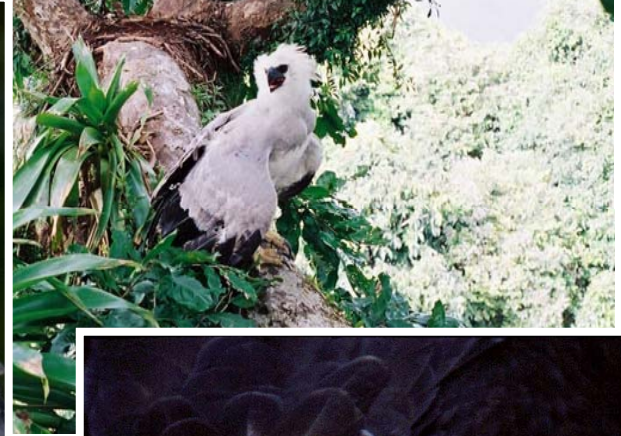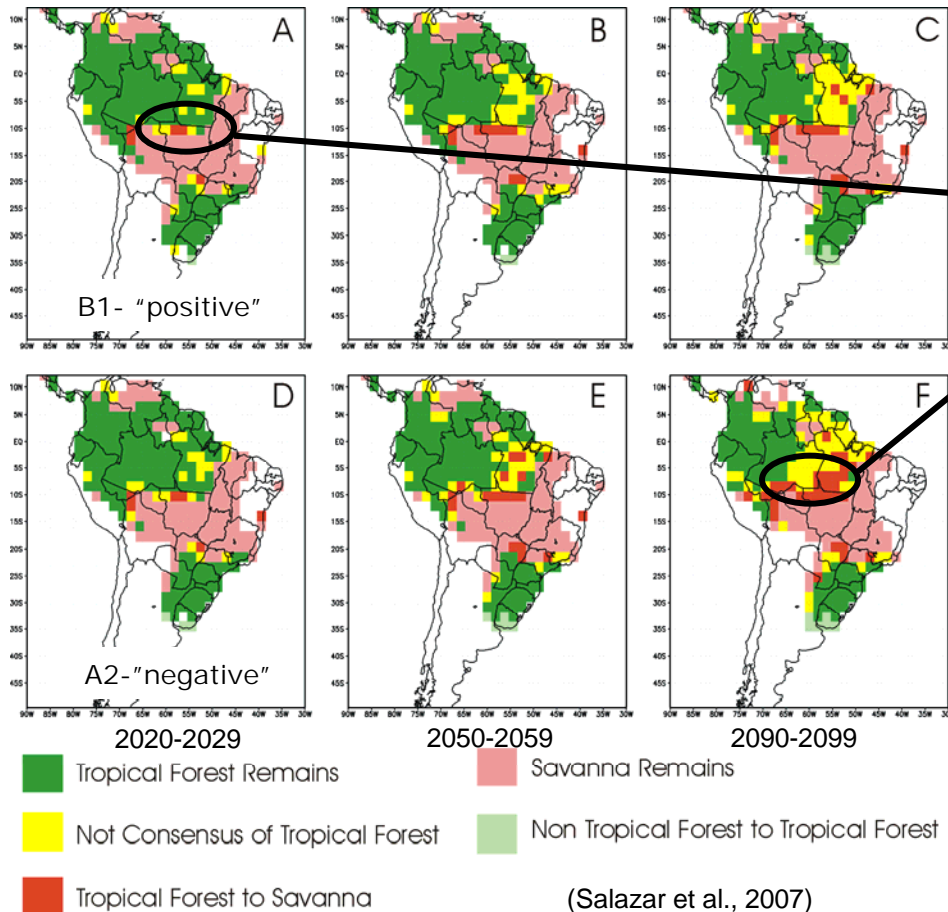

Ortophytum sp

Louzada (2008)

Study Cases

Luz B

Harpia   harpyja

Sanaiotti (2008)

Modeling Biodiversity based on Life Form

- ## Global Climate Change Modelling

  - ### "Savanization" process

B1- "positive"

A2-"negative"

2020-2029   2050-2059   2090-2099

Tropical Forest Remains

Not Consensus of Tropical Forest

Tropical Forest to Savanna

Savanna Remains

Non Tropical Forest to Tropical Forest

(Salazar et al., 2007)

??? Given the climate warming and based on the plant form spectra, is there a tendency of "savannization" of Amazonian forest ?

(Species grouped by their form of life and survival strategy & E.Box Model)

Jardim (2008)

Thank you!

silvana@dpi.inpe.br