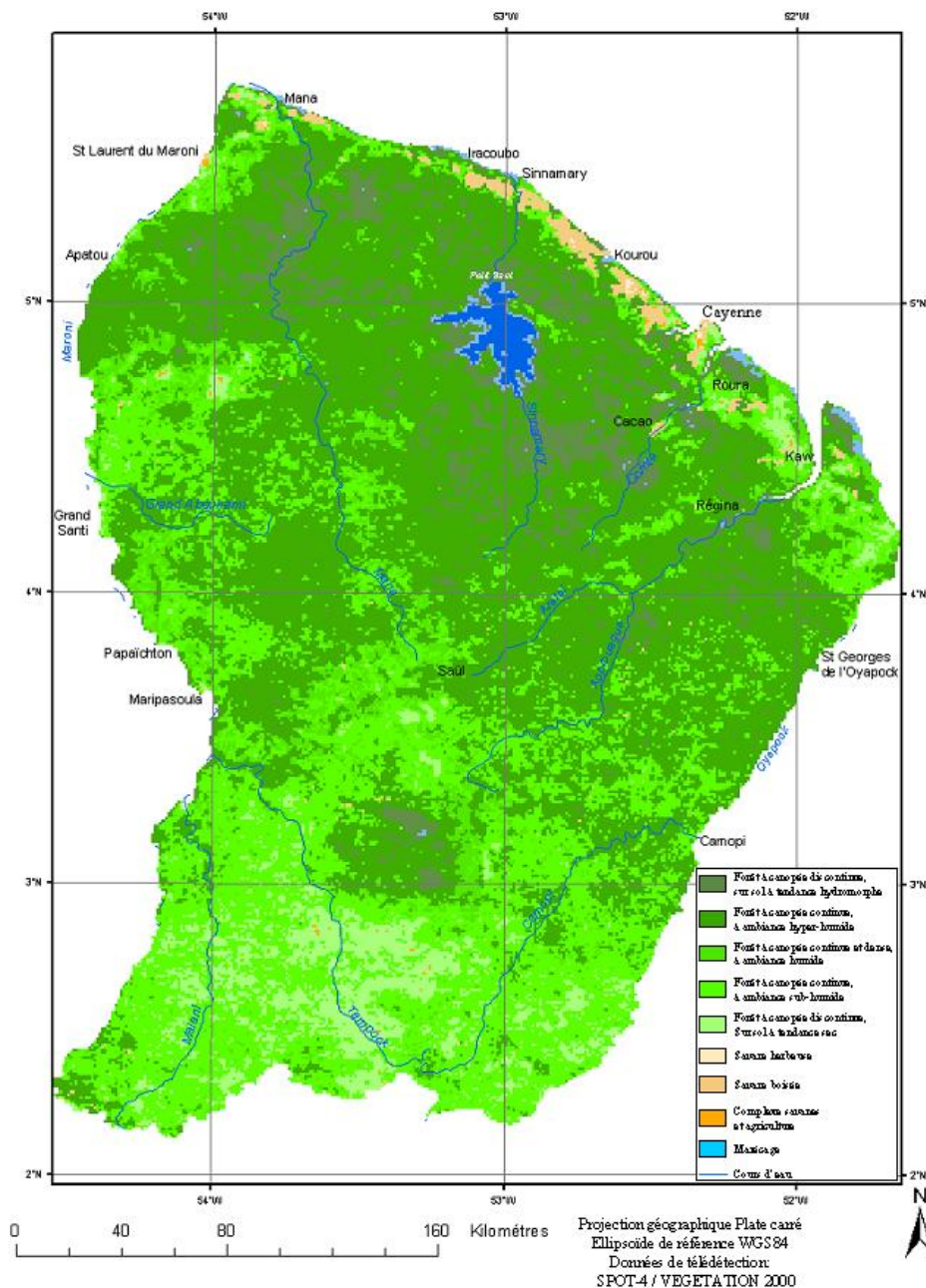


Monitoring Tree Diversity in Permanent Census Plots

BRIDGE – Work-Package 1

Lilian Blanc, Christopher Baraloto (UMR Ecofog)
Stéphane Guitet (ONF)

La végétation en Guyane française



Historical view of forest research activities in FG

- Few data and knowledge on wood resources before the 50s.
- BAFOG (1952-1960): Bureau des Affaires Forestières de l'Ouest Guyanais
- Forest inventory and tree plantation (ONF 1966 and Cirad 1974)
- 1st Research project: ECologie – ERosion – EXpérimentation
(Cirad, IRD, INRA, CNRS, MNHN)
Ecological consequences of clear cutting (paper pulp) and substitution
by forest plantation or agriculture
- 80's: Establishment of forestry permanent plots

ST Elie

Nouragues

Paracou

Bafog

< 1952

Forest logging

1952

Forest productivity (BAFOG)

1968

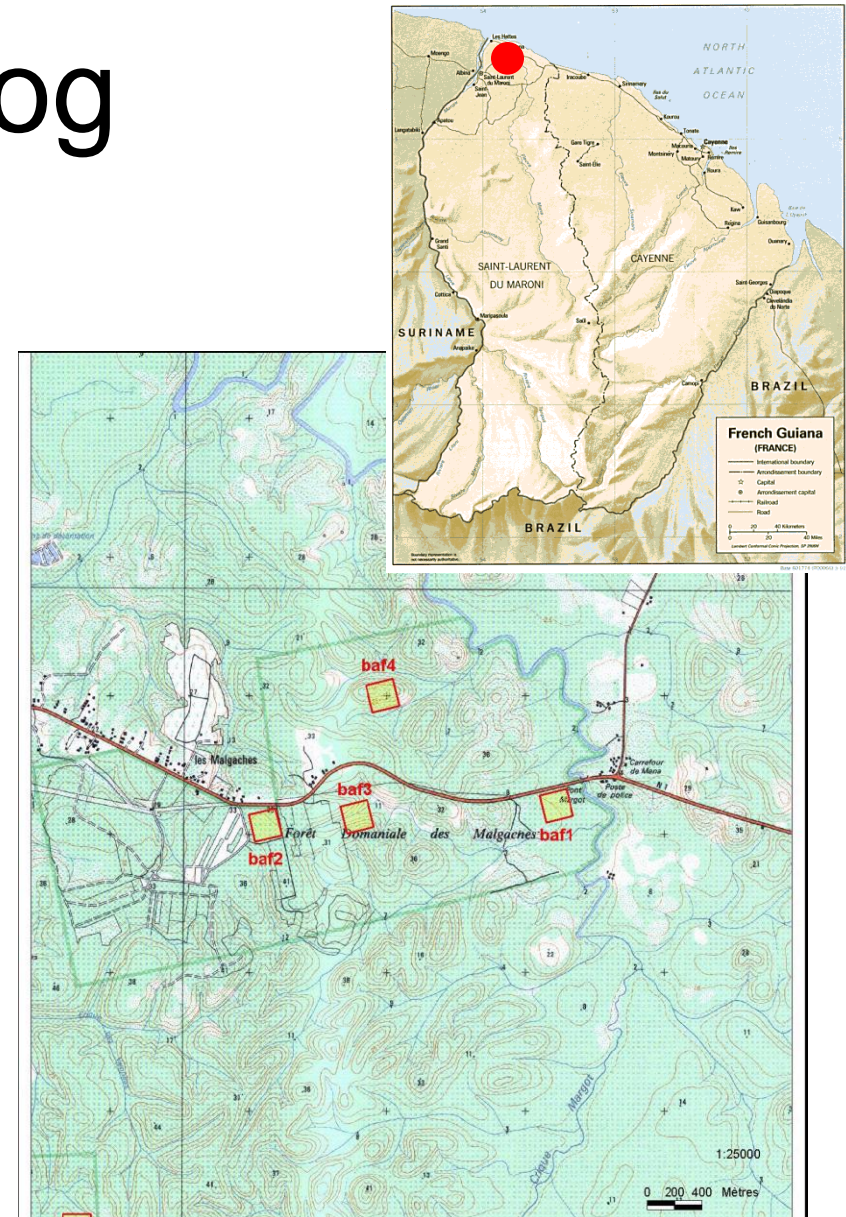
Tree growth and forest dynamics

Inventory and tree mapping
(dbh > 17,5 cm)
on 4 plots (4 ha each)

Since 1968: 6 to 7 inventories

Rainfall: 2500 mm

White sand (podzolized)

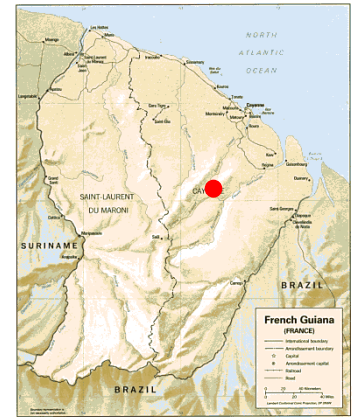


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Les Nouragues

**Establishment in 1986 (CNRS)
Extension to Saut Pararé (COPAS)**

**To understand the functioning of undisturbed
tropical forest ecosystem (flora – fauna)**




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Paracou


Post-logging forest dynamic (UMR Ecofog)

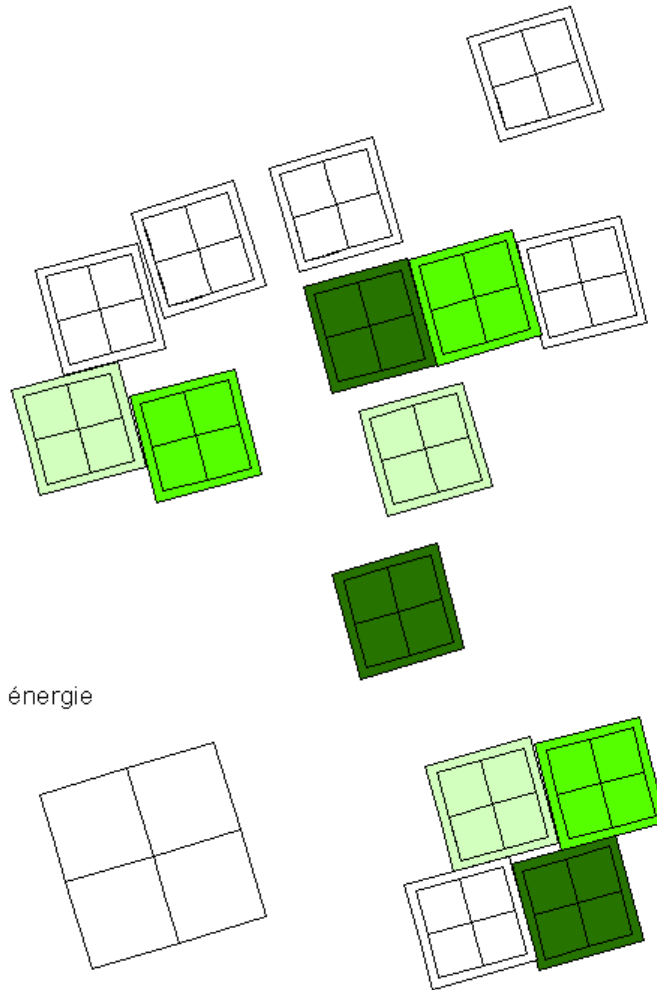
- 125 ha: ~ 73 000 trees
- 3040 mm/year
- Caesalpiniaceae forest
- Schists (ARMINA) and sandstone
- Poorly drained soils

 **Parcelles forêts naturelles**
Parcelles forêts exploitées

 Exploitation bois d'oeuvre

 Exploitation bois d'oeuvre
+ dévitalisation

 Exploitation bois d'oeuvre et bois énergie
+ dévitalisation



200 m

La piste ST Elie

- Tree diversity (Sabatier & Molino IRD)
- 12 plots (1 ha each)
- 2 inventories (88-91 and 03)
- 7121 trees, 500 species
- Lecythidaceae, Caesalpiaceae, Chrysobalanaceae, Sapotaceae: 54 % trees
- Topography and soil maps

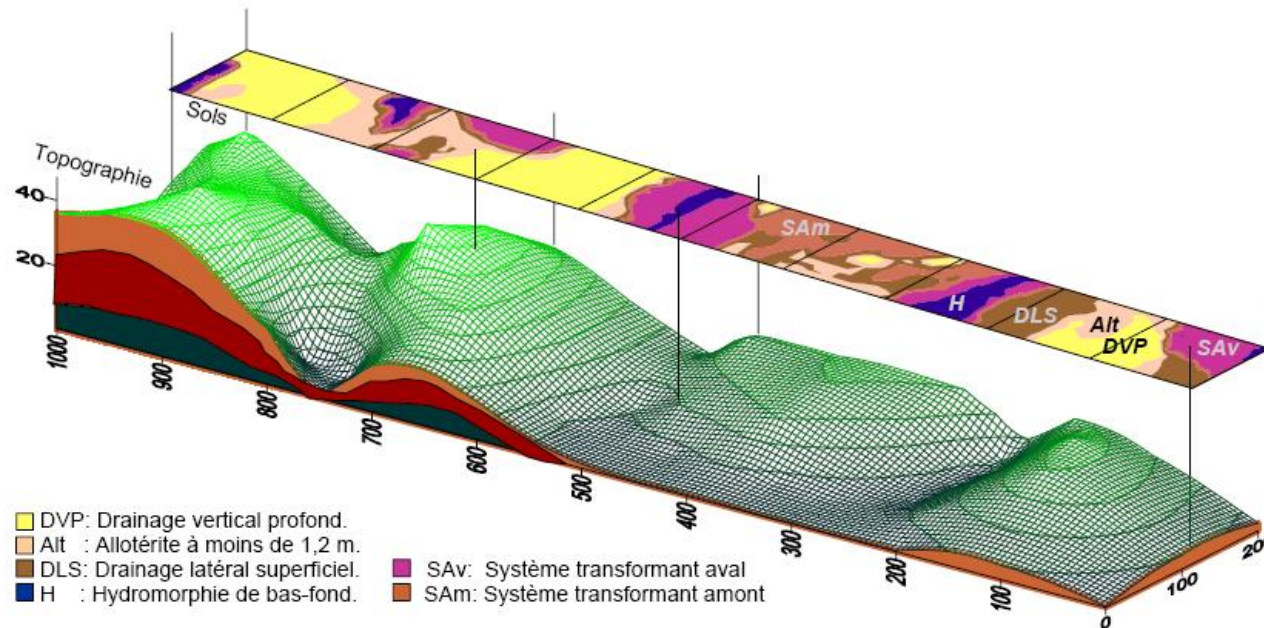
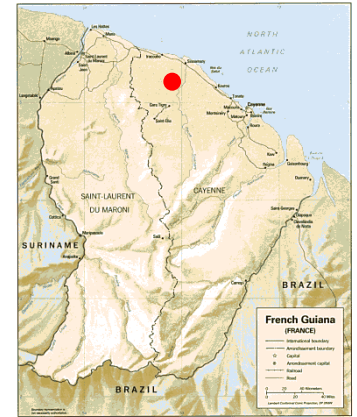


Figure 5 – Topographie et sols des parcelles PSEB, d'après Sabatier *et al.*, 1997.

Crique et Montagne Plomb

Projet Diversité Multi-Echelles (Sabatier & Molino IRD)

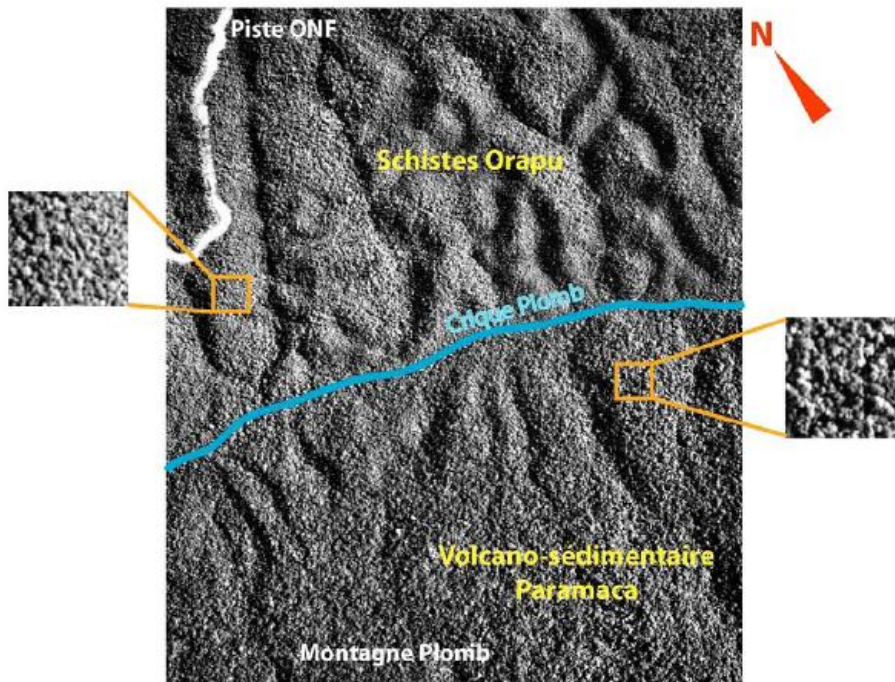


Geological substrate and soils

Natural disturbances



**Tree
diversity**

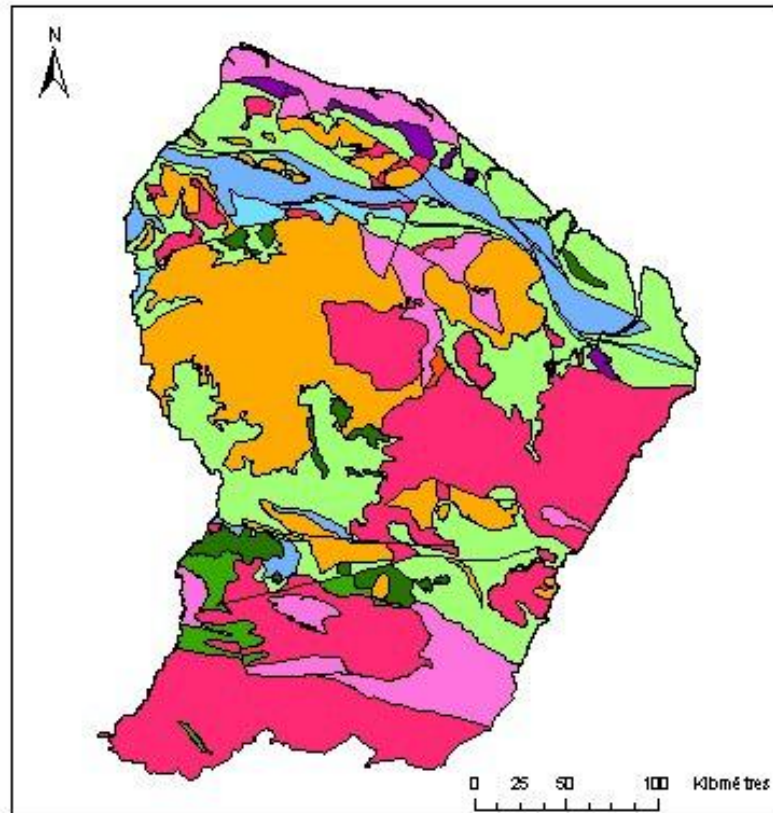


- 18 point base sampling along toposequence (total: 10 ha)
- 8 plots (1 ha each)
- 8 plots (1200 m²)

Sabatier 2007 (Photo IGN 1990)

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Carte géologique de la Guyane



Légende

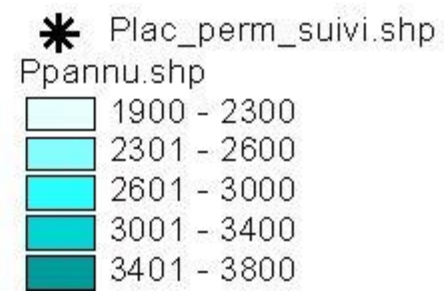
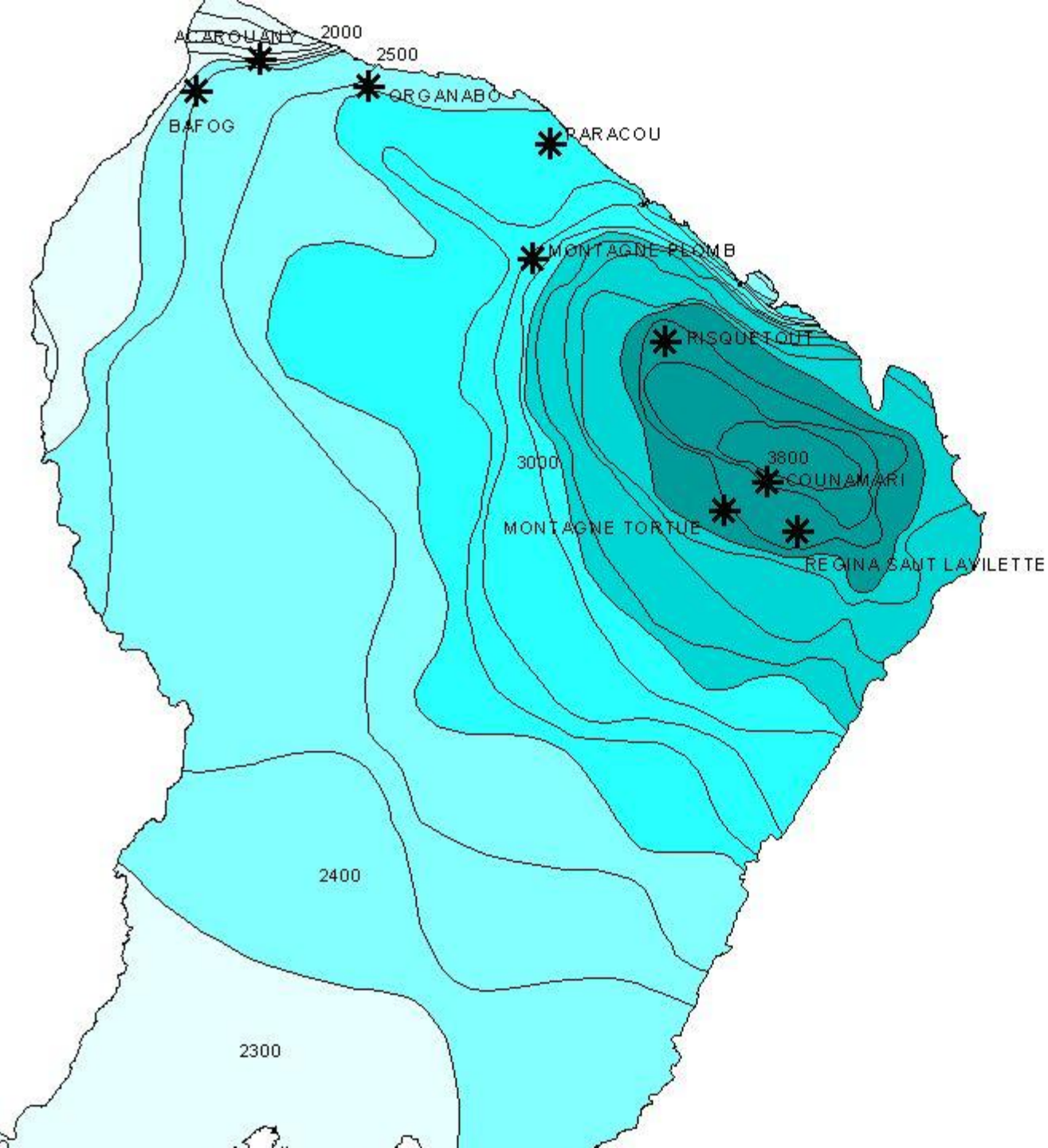
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GEOL

- 9- Mésozoïque mé tamineux
- 10- Plutonisme granitique (éorlyacien)
- 11- Plutonisme TTG mésorhyacien
- 12- Gabbro mésorhyacien
- 13- Complexes N et S mésorhyacien
- 14- Magmatisme trachytique éorlyacien
- 15- Bassin détritique "pallapart"
- 16- Ceinture de Roches Vertes
- 18- Aréolite triennique
- 20- Sédiments de proéolite aréolien

Geology

Rainfall



Eastern forests poorly
documented

Difficulties
to compare data
at a regional scale

GUYAFOR network



Establishment

New plots in the east



Homogeneisation

Data
collection
Data
managemen
t

Data
analysis

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Permanent polts in FG

Geology - Rainfall

RAINFALL	Granits and Migmatites Caraïbes	Schists (Bonidoro)	Volcanic rocks (Paramaca)	White sands	Schists (Orapu)
> 3500 mm	Saut lavilette	Tibourou	Montagne Tortue		
2300 / 3500 m	Acarouany Nouragues (Petit Plateau) Organabo	Paracou Risquetout Piste St Elie	Montagne Plomb <i>(schists- quartzite)</i>	BAFOG	Crique Plomb

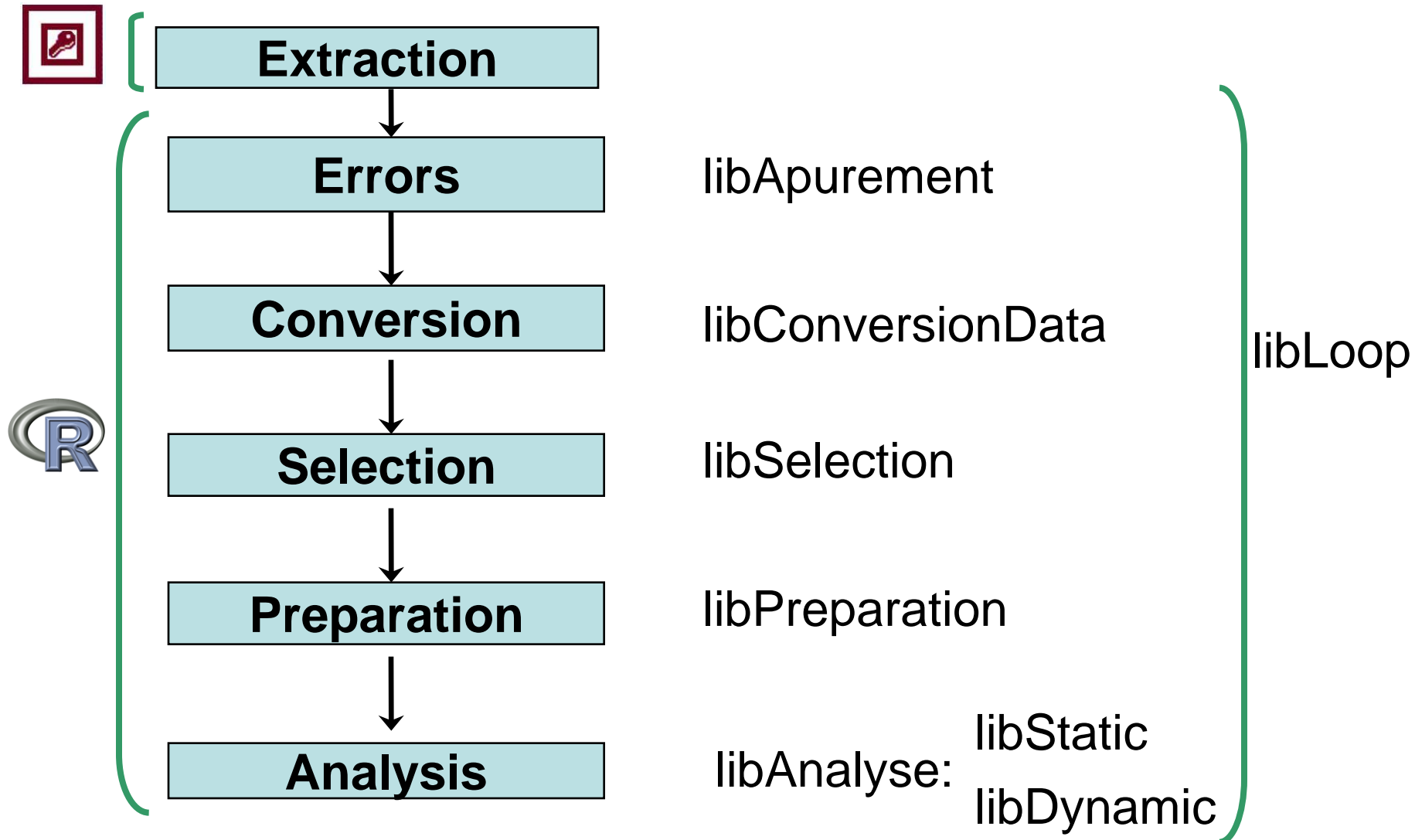
Data collection

- **Trees : Dbh > 10 cm, X and Y**
- **Vernacular names – latin names**

MesuMort correspondant	CodeMesure	Intitule
VRAI	0	arbre normal mesuré à 1,30m ou au dessus des contreforts
VRAI	3	arbre dont la mesure est rehaussée par rapport à la dernière campagne
VRAI	4	arbre dont la circonférence est estimée (pas rond ou non mesurable)
FAUX	5	arbre mort suite au traitement (bois exploité, bris de réserve, dévitalisation)
FAUX	6	arbre mort et tombé (chablis primaire)
FAUX	7	arbre mort par la chute d'un autre arbre (chablis secondaire)
FAUX	9	arbre mort sur pied (chandelle)

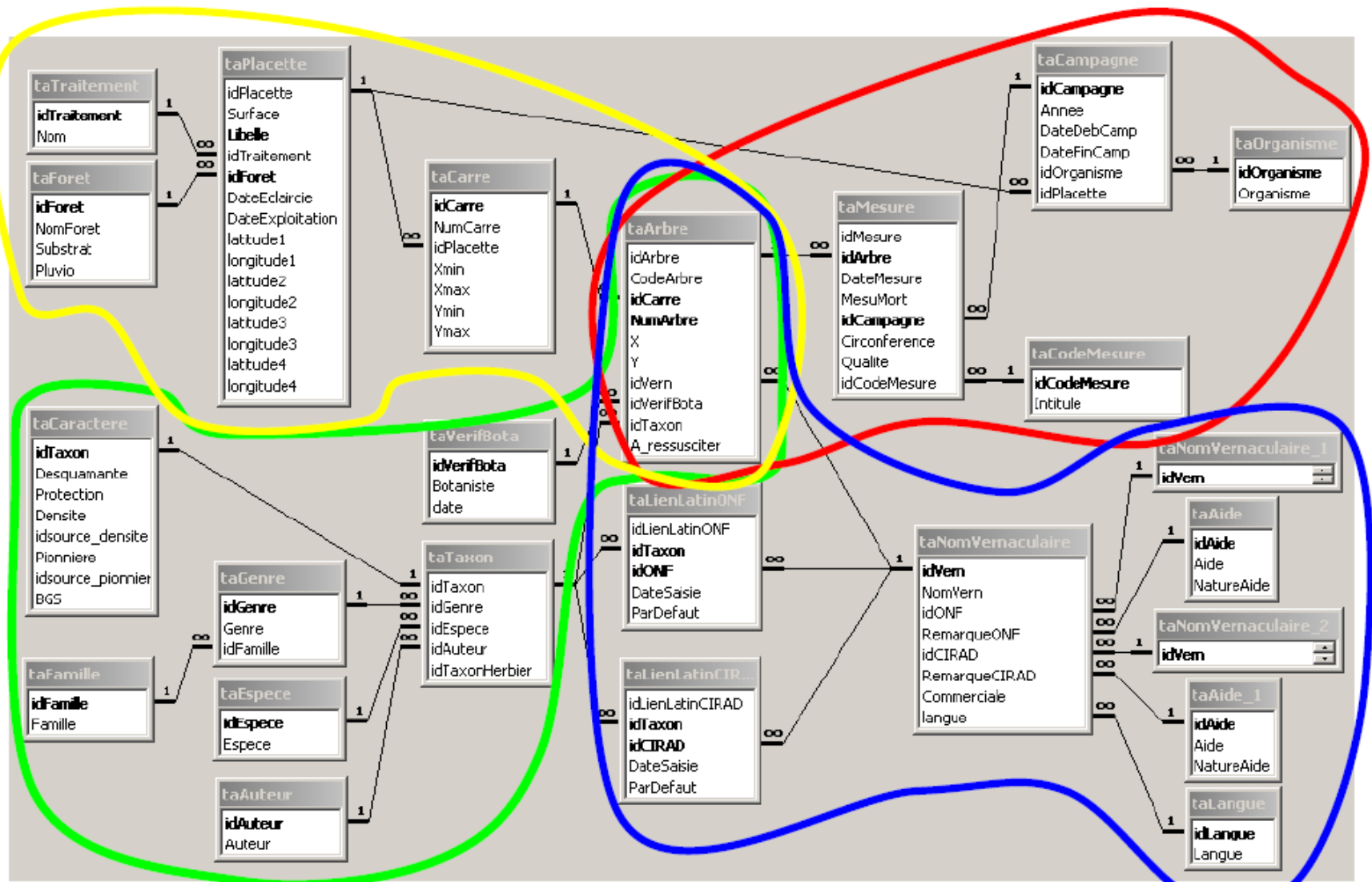
- **Environmental data: rainfall station, geomorphology and soil expertise**

Data analysis



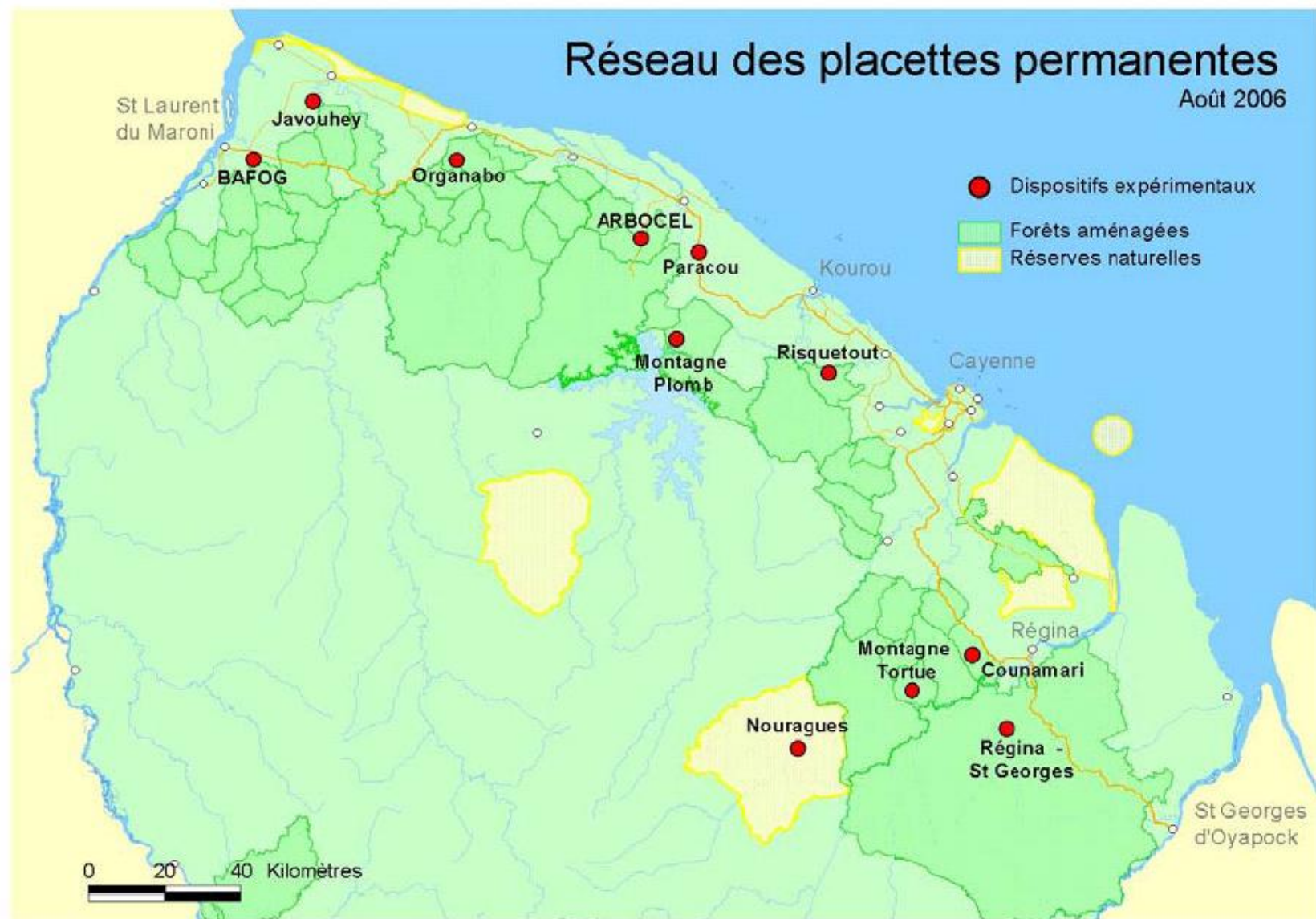
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Data management



Réseau des placettes permanentes

Août 2006



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What we have

- **Permanent plots**
- **Data Base Tree**
- **Data Base Species**
 - Botanical information
 - Ecophysiological data
 - Biomechanical data
 - Soil affinity
 - Architecture – phenology
 - Reproduction systems
 - Demographic data

WP1 Monitoring tree diversity in permanent census plots

What are we doing?

- **Tree census** (5000 trees on 10 plots)
 - Wood core (trees dbh > 30 cm dbh)
 - WP 3 • Leaf tissue (DNA Bar Coding, 0,25 ha)
 - WP 2 • Leaf samples (botanical – ecophysiological)

Sampling?

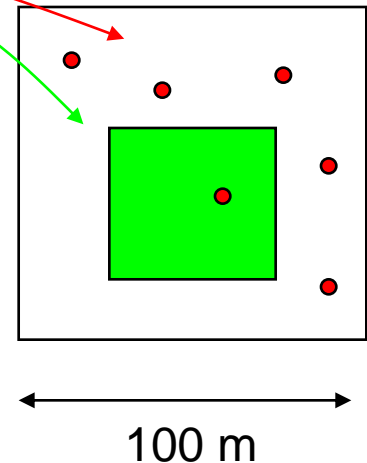
- Height

What for?

- **Analysis of environmental data**

- Pedology
- Soil moisture content
- Topography

- **Tree data base management**



WP1 Monitoring tree diversity in permanent census plots

How and who ?

Field trip organisation (1 or 2 field trip per site ?)

Julien Engel

Bernard Riéra (Cnrs plots)
Stéphane Guitet (Onf plots)
Lilian Blanc (Cirad plots)

Field data collection

8 persons

Tree data base management

Eric Marcon (Audrey Jolivot)

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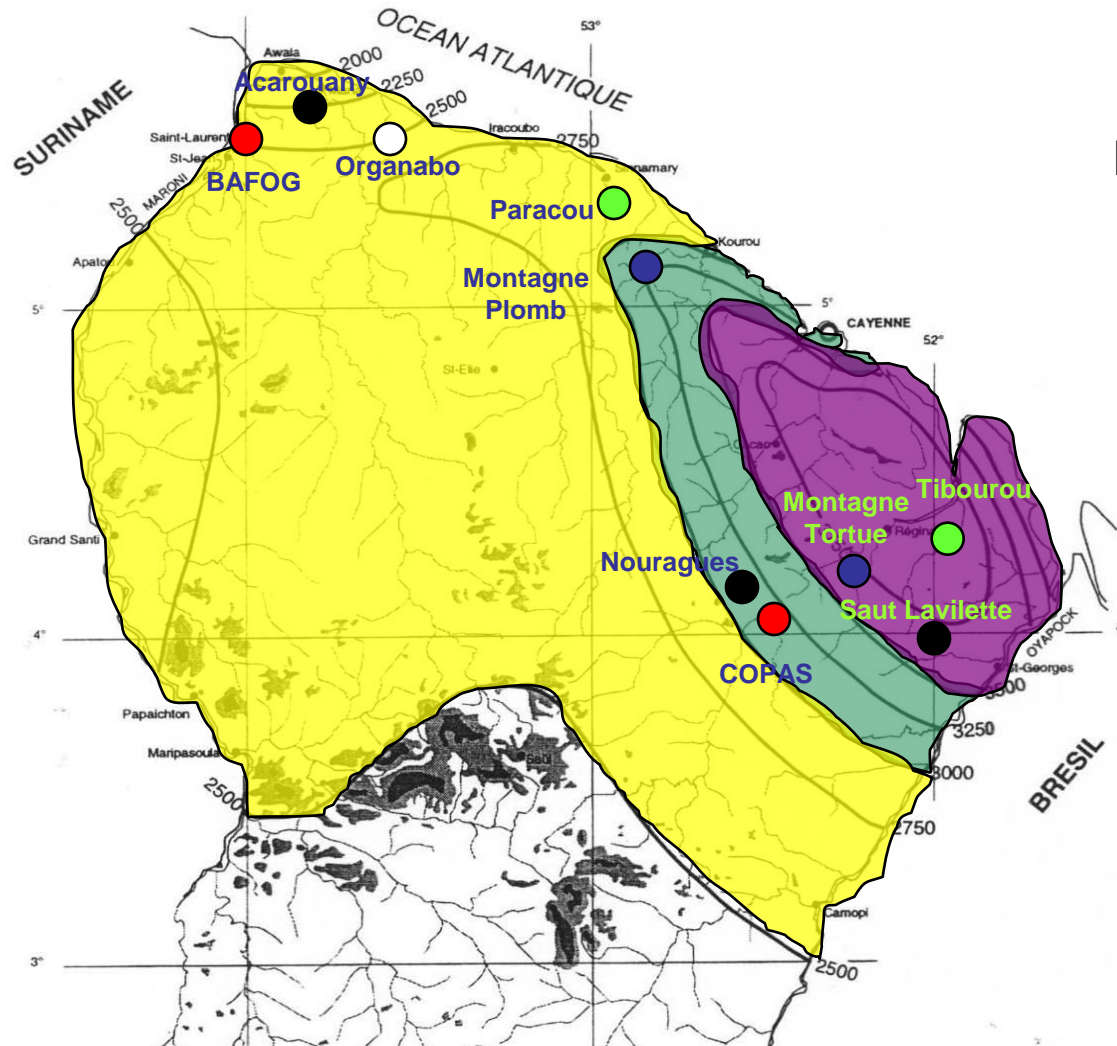
WP1 Monitoring tree diversity in permanent census plots

Who for data collection ?

Activities	Leader	Persons in charge of data collection	Others persons
Botanical determination Tree height	J. Engel	Field work: 2 botanists : P. Pétronelli, C. Baraloto 2 technicians: P. Naisso, M. Baisie, R. Santé 1 climber Herbarium: J.J. De Granville, Gonzalez S., Guerin V., Crozier F.	E. Nicolini, O. Poncy, B. Hérault, S. Gonzalez., M. Gonzalez, N. Norden, E. Boucher, Breton T., O. Brunaux, De Foresta H, Molino JF, Hardy I, Jouard S., Gachet S. + specialists (field work, herbarium?)
Leaf samples and measures	D. Bonal C. Baraloto	1 technician : JY Goret	
Collection of wood core samples	J. Beauchêne	1 technician: K. Frits	
Pedology Soil moisture content Topography	V. Freycon D. Bonal J. Chave	1 technician: J. Weigel, Kago Ficadici	Ferroni N.

WP1 Monitoring tree diversity in permanent census plots

Where?



New plots?

WP1 Monitoring tree diversity in permanent census plots

When?

Now → August 2008 (end of contract Julien Engel)

Plots	Access	Permanent infrastructures	schedule
Paracou	road	yes	April / May 2007
Saut Lavillette	river	No	July 2007
Acarouany	river	yes	September 2007 or March 2008
Tibourou	trail	No	Dry season 2007
Montagne Plomb	trail	No	Dry season 2007
Montagne Tortue	road	yes	Before june 2008
Bafog	road	yes	Before june 2008
Nouragues / Copas	Helicopter - river	yes	Before june 2008

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WP1 Monitoring tree diversity in permanent census plots

What we have to discuss today !

- **Tree census**
 - Leaf samples for ecophysiological measurements: **Sampling strategy?**
 - Leaf samples for botanical détermination : **Botanists: who and when?**
 - Height : **What for?**
 - Wood core (trees dbh > 30 cm dbh)
 - Leaf tissue (DNA Bar Coding, 0,25 ha)
- **Analysis of environmental data**
 - Pedology : **Sampling strategy?**
 - Soil moisture content : **Sampling strategy?**
 - Topography?
 - Additional data?
- **Sites selection**



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GANNT CHART TABLE

Work-packages	Year 1					Year 2					Year 3													
	j	f	m	a	m	j	j	a	s	o	n	d	j	f	m	a	m	j	j	a	s	o	n	d
WP 1																								
1.1 <i>Tree census</i>																								
1.2 <i>Preliminary tree database</i>																								
1.3 <i>Analysis of environmental variables</i>																								

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