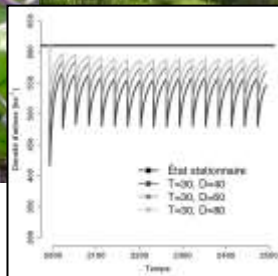


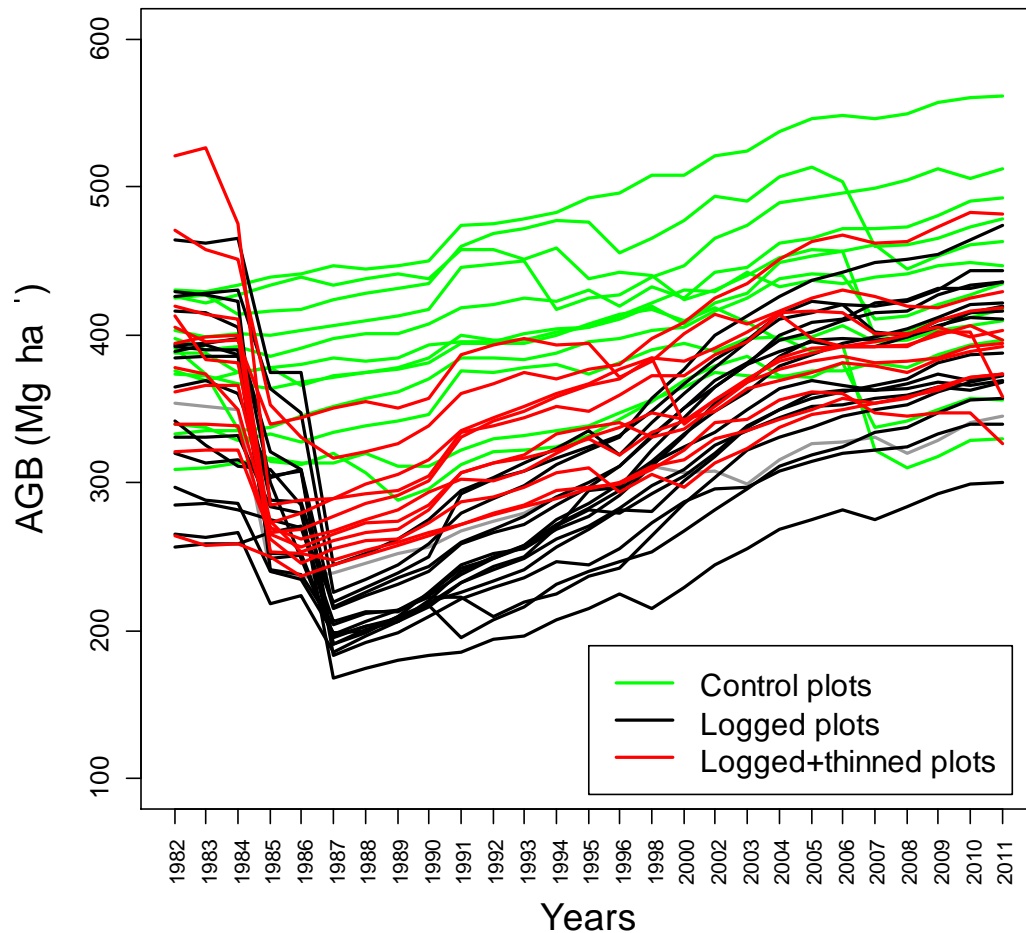
Monitoring African rainforests dynamics

Lessons from M'Baïki and development of the DynAfFor project

S. Gourlet-Fleury, V. Rossi, N. Picard, F. Mortier, F. Baya, F. Benedet and colleagues

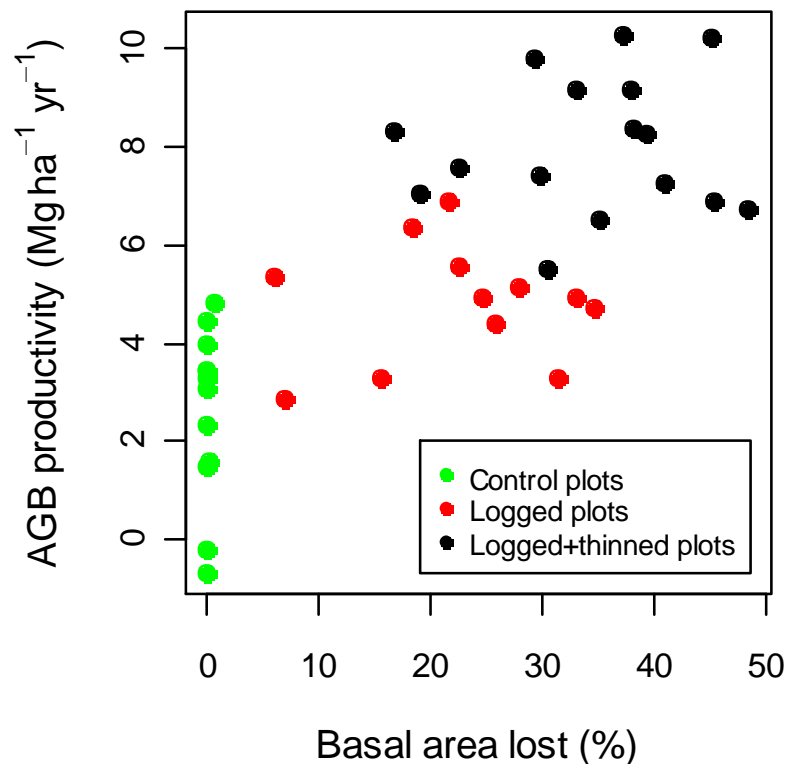


Impact of logging on aboveground biomass: results at M'Baïki



Gourlet-Fleury et al. (2013)

Impact of logging on aboveground biomass: results at M'Baïki

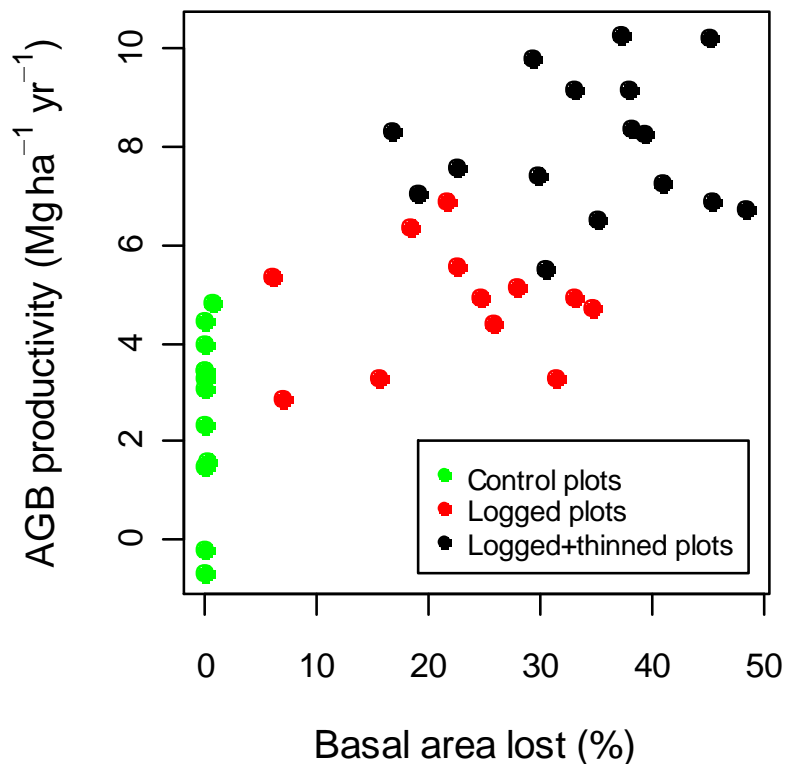


The productivity increased with disturbance

Logging: 5,2 Mg ha⁻¹ yr⁻¹

Thinning: 8,8 Mg ha⁻¹ yr⁻¹

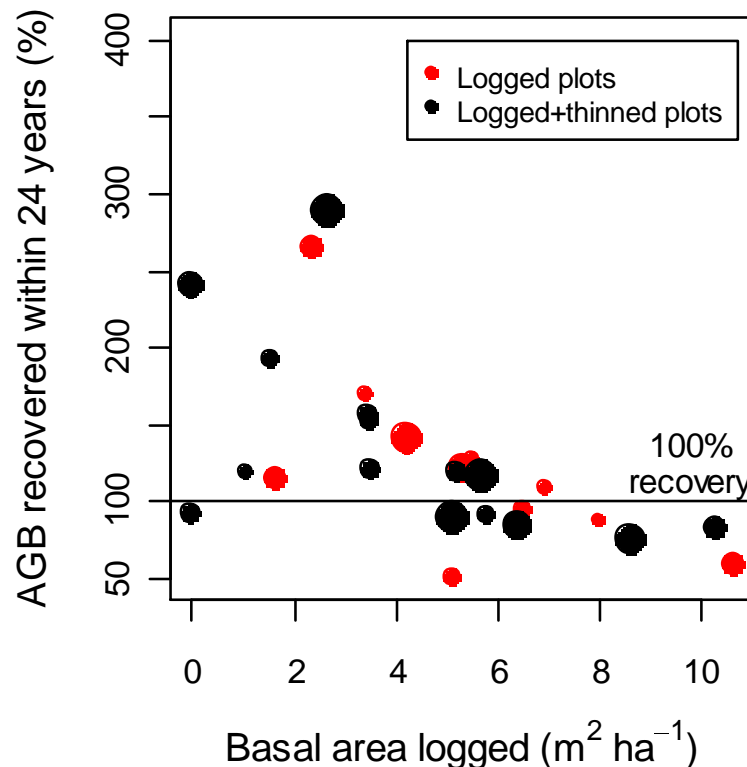
Impact of logging on aboveground biomass: results at M'Baïki



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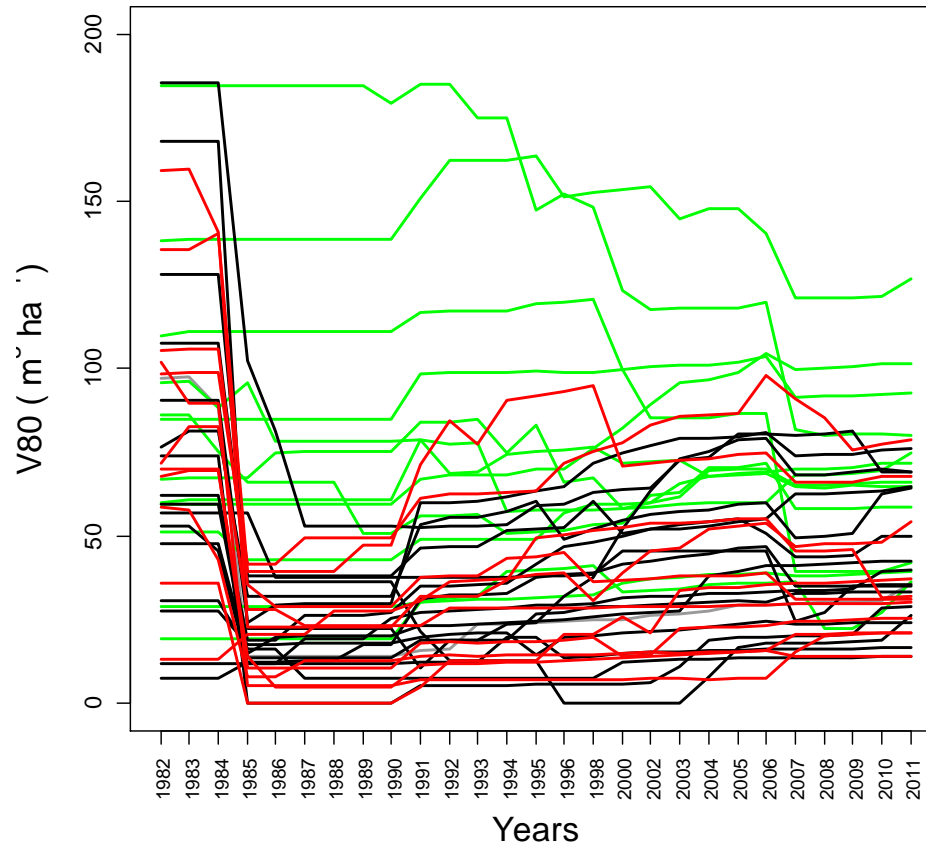
Logging: $5,2 \text{ Mg ha}^{-1} \text{ yr}^{-1}$

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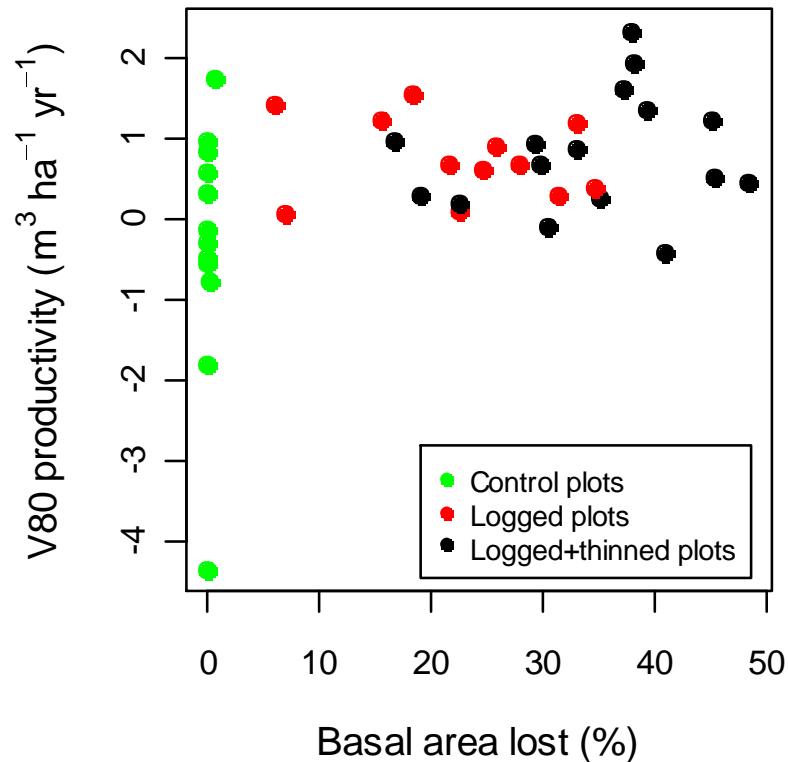
Mean recovery rate over 24 years : 144%
63% of the plots have recovered

Impact of logging on the commercial stock: results at M'Baïki



Gourlet-Fleury et al. (2013)

Impact of logging on the commercial stock: results at M'Baïki

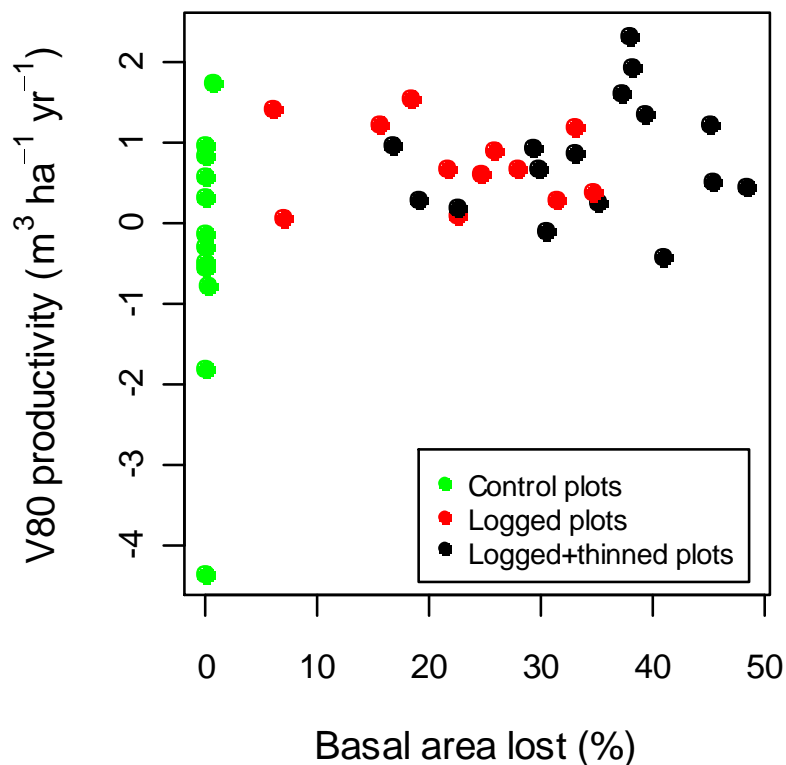


No effect of disturbance intensity on productivity

Logging: 0,8 m³ ha⁻¹ yr⁻¹

Thinning: 0,9 m³ ha⁻¹ yr⁻¹

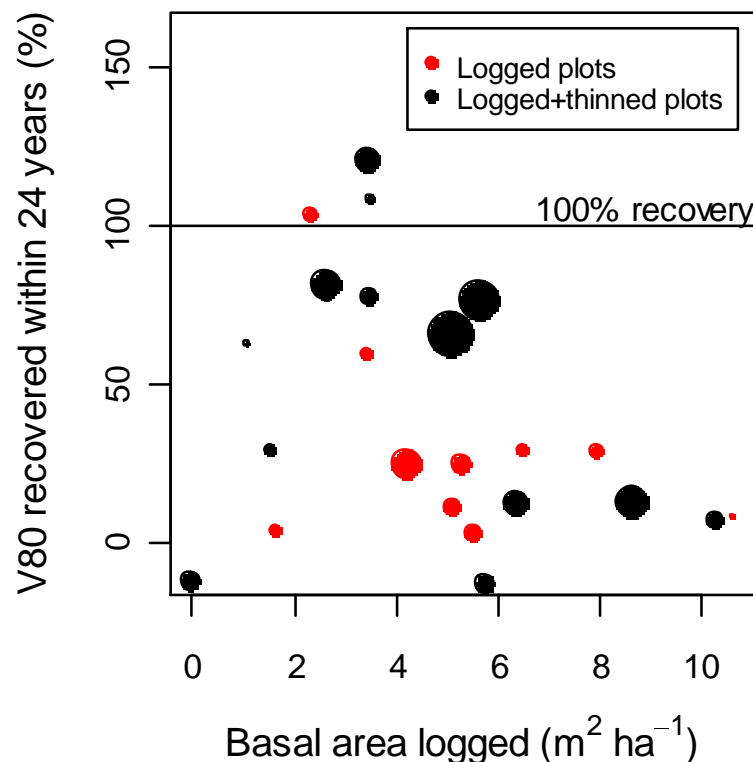
Impact of logging on the commercial stock: results at M'Baïki



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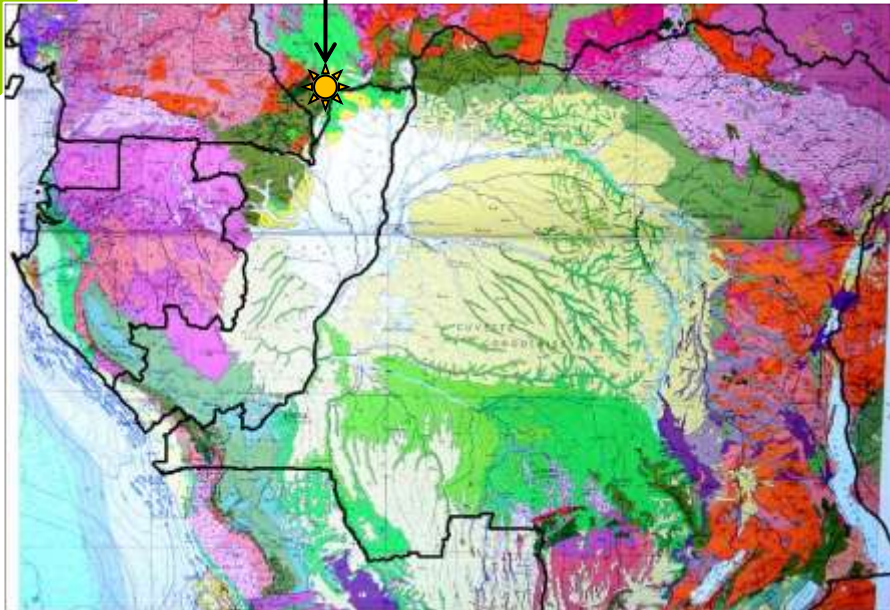
Mean recovery rate over 24 years: 41%
13% of the plots have recovered

Limits: forests vary in their structure, composition and functioning

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- Extend long-term permanent sites to sample different forest types

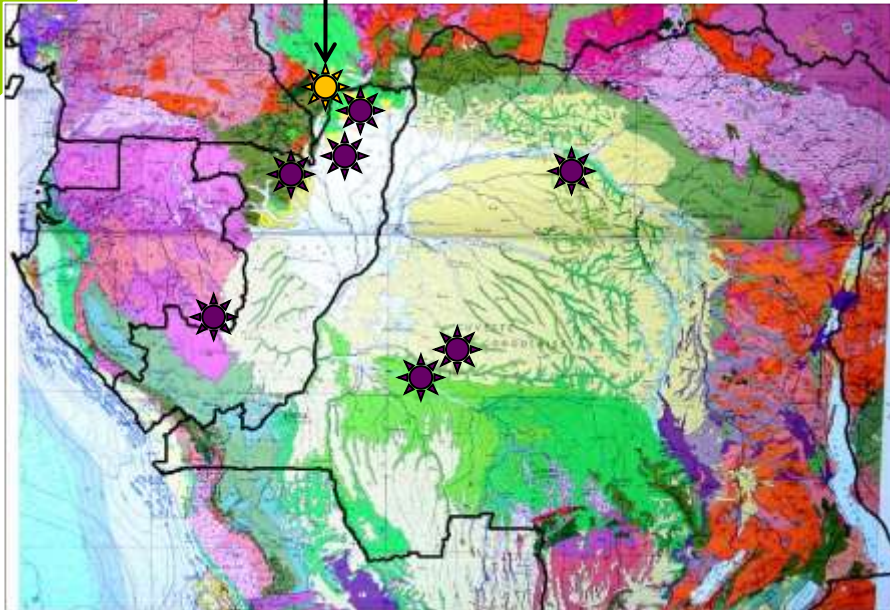
M'Baïki



Limits: forests vary in their structure, composition and functioning

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M'Baïki

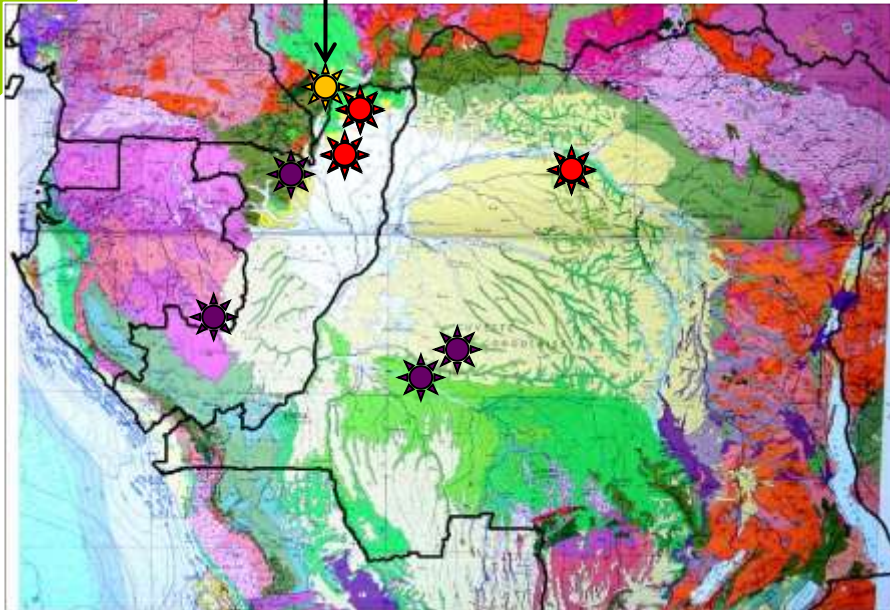


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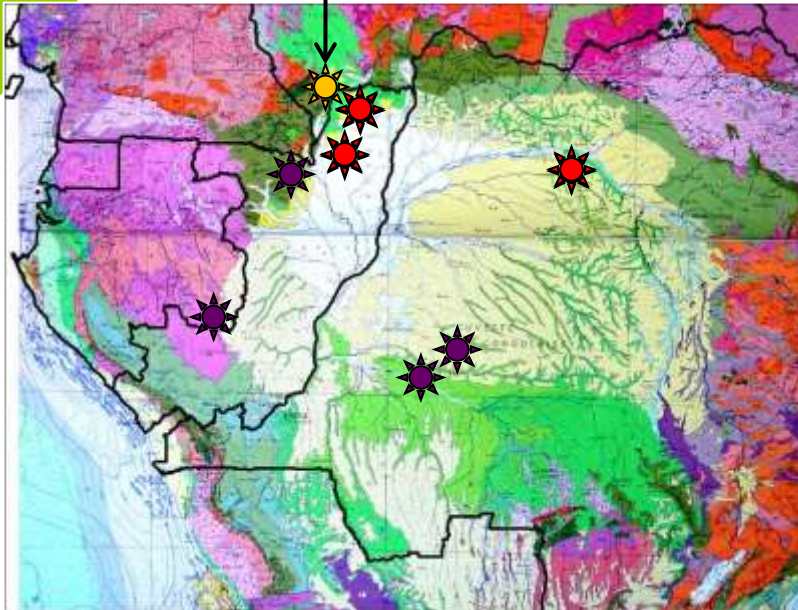


Limits: forests vary in their structure, composition and functioning

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M'Baïki



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Structure, Functioning



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Structure, Functioning



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Structure, Conditioning

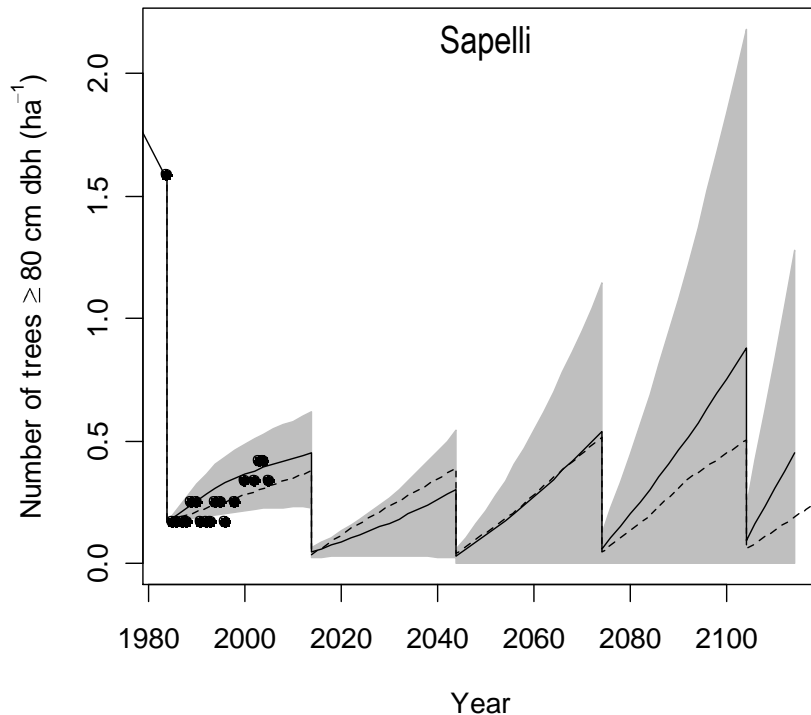


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Limits: samples not large enough

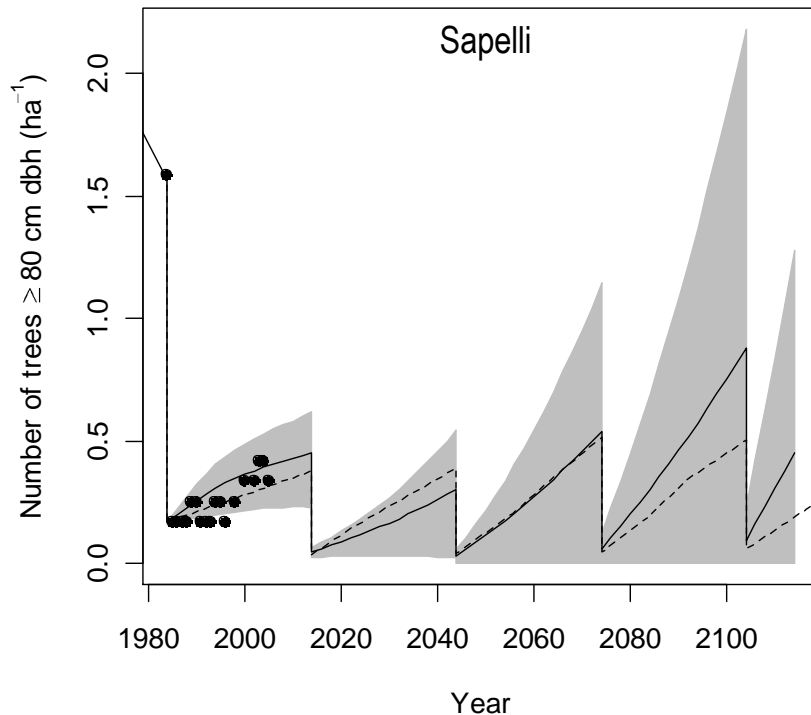
- Accurate predictions require large data sets (timber stock recovery)



Plain line is the evolution predicted by a Usher matrix model, with its 95% confidence limits in grey.

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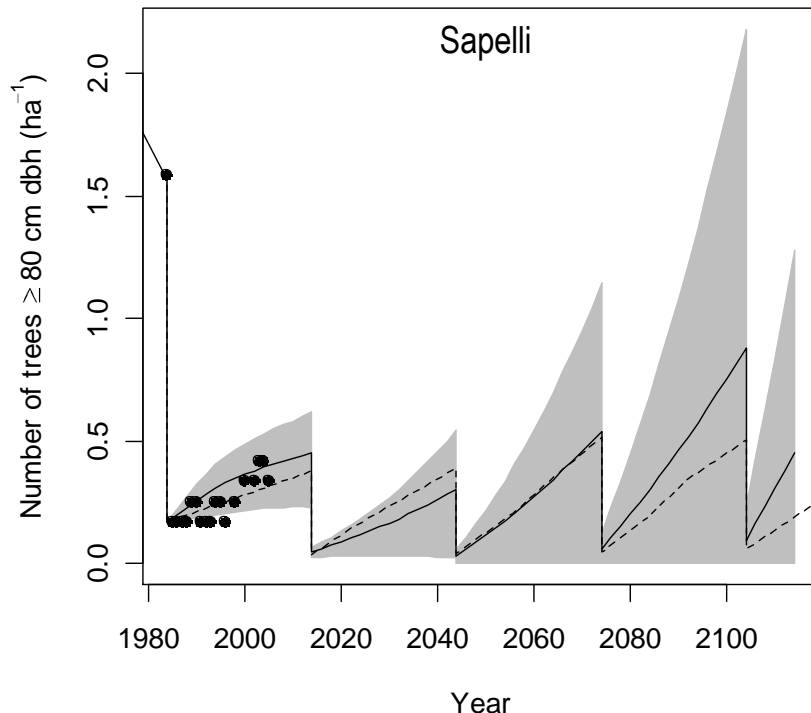


Around 200 trees are necessary to achieve a precision of 10% to 30% on the stock recovery rate, for an α risk of 5 to 20%

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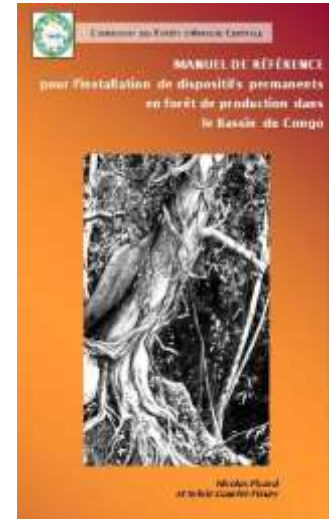
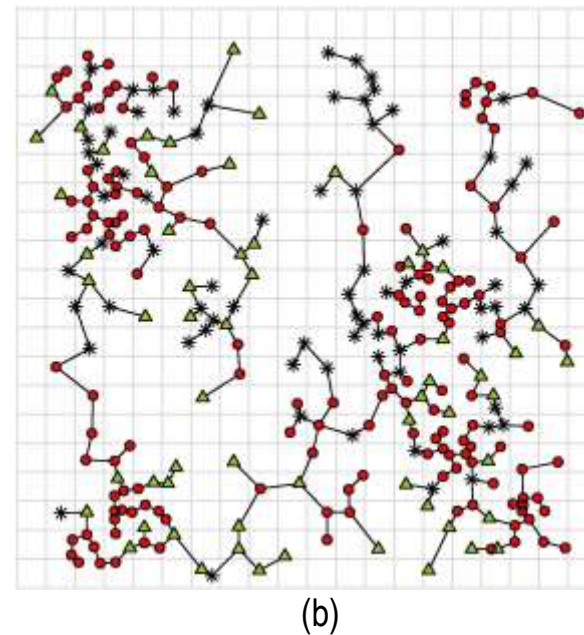
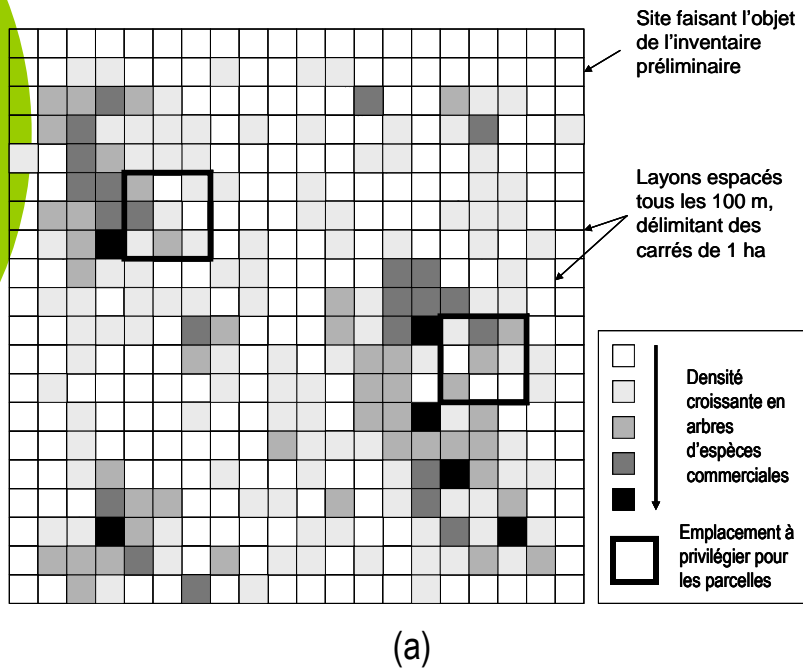


Sapelli (5.6 trees/ha) \Rightarrow 36 ha
Dibétou (1.3 trees/ha) \Rightarrow 154 ha
Sipo (0.2 trees/ha) \Rightarrow 1000 ha !!!

Too large areas needed can be partly compensated by a greater number of re-measurements

Limits: samples not large enough

- Towards a new generation of permanent sites



- Couples of 400 ha plots, combined with 9 ha plots
- One control / one logged after 4 years

Picard et Gourlet-Fleury (2008)

Enough for stock recovery, far enough for biomass ...

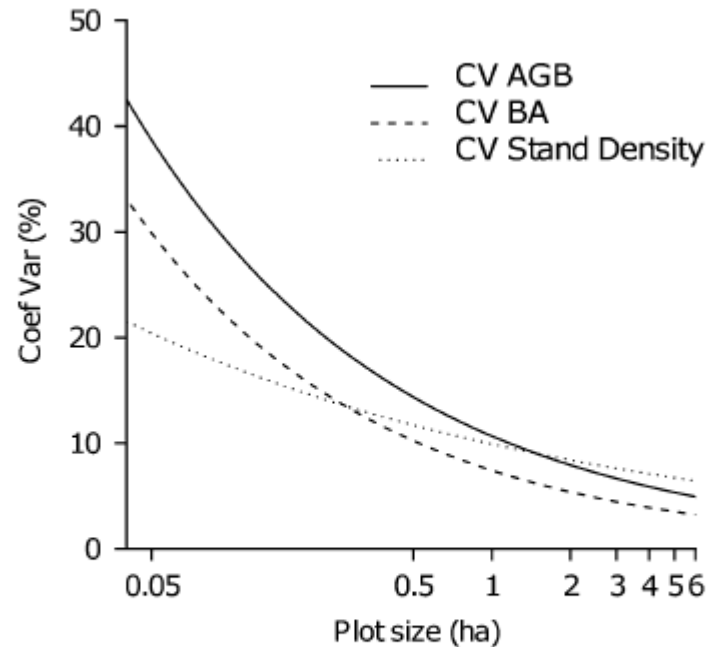


FIGURE 1. Coefficient of variations (CVs) of forest structure descriptors as a function of plot size. $\log(\text{CV}) = \log(\alpha) - (\beta \log(S)) + \log(\varepsilon)$, with S the plot size, α and β the fitted model parameters and ε the model residuals.

Wagner et al. (2010)

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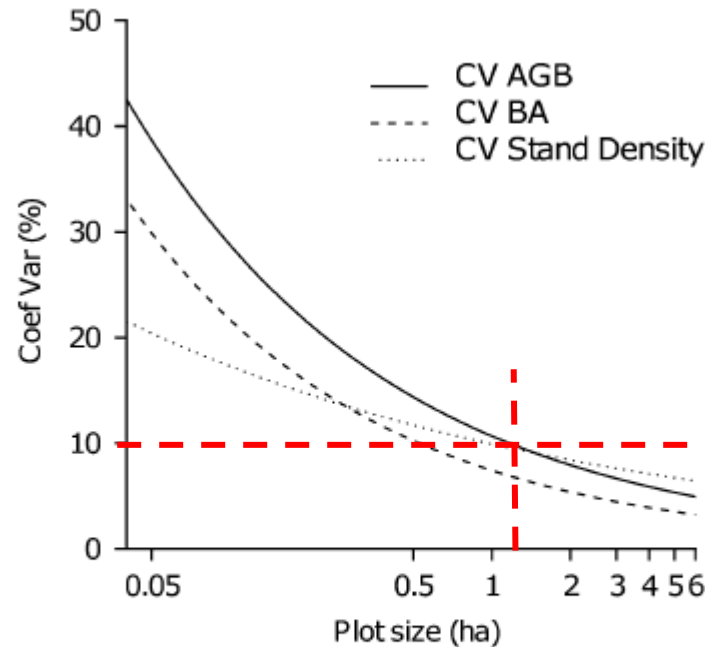


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Wagner et al. (2010)

Will yield results to be compared with other sites

Tropical Managed Forests Observatory



462 permanent sample plots located in 8 countries,
monitored over 5 to 29 years

<http://www.tmfo.org/>

Challenges

- Find money to settle the sites
- Find organizations to manage the sites
- Build capacities to analyse the data
- Join (organize) efforts at the regional scale

Thank you for your attention

