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CARBON DYNAMICS OF AMAZONIAN FOREST

Carbon stock in Amazonian tropical forests — What do CADAF's estimates tell us ?

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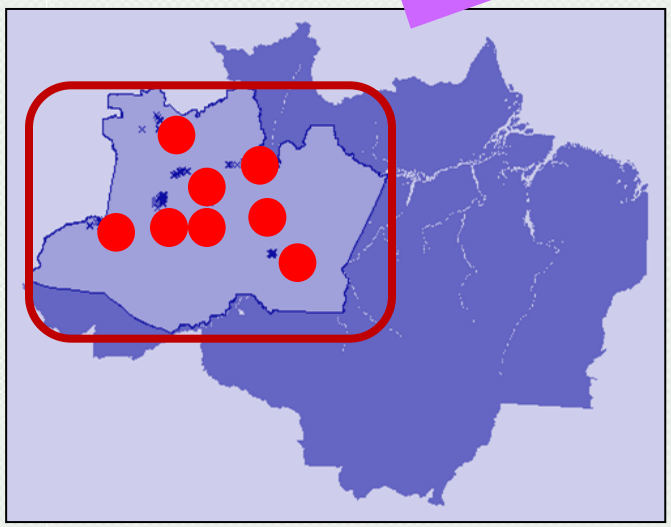
CADAF: Scientific output ?

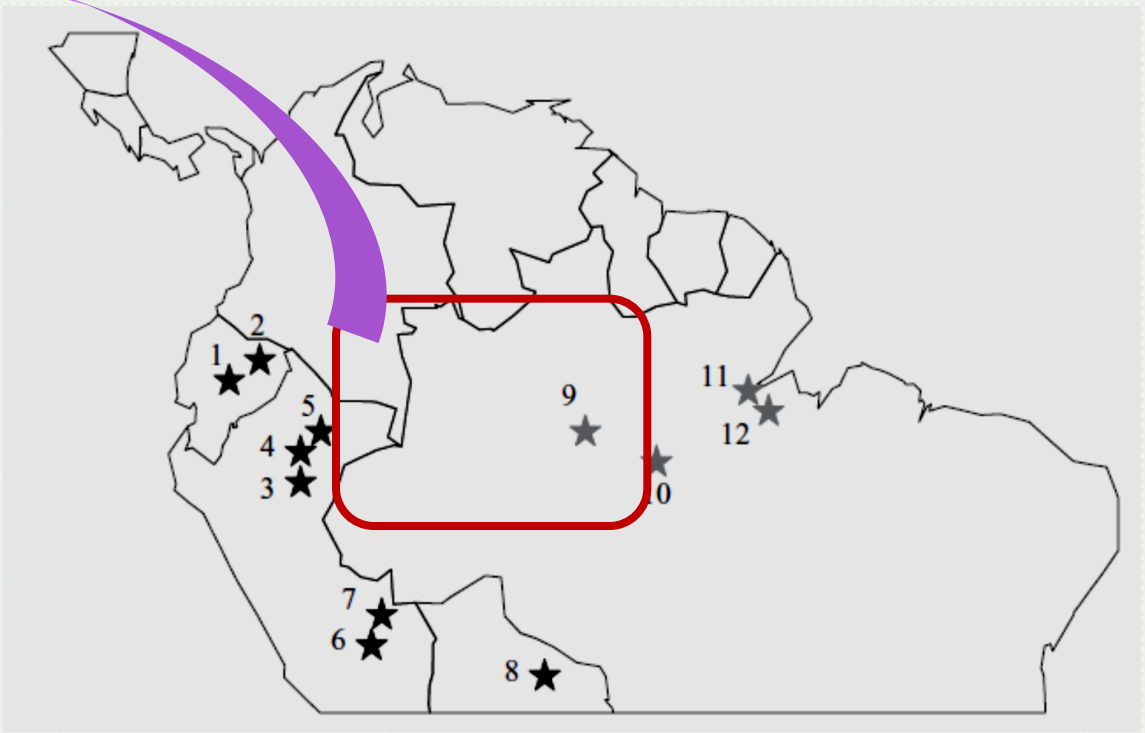
- Inventory
  - Structure, Biodiversity
- Allometry
- Biomass (Carbon stock)
  - AGB, BGB, Fine roots
- Carbon dynamics
- Dendrochronology

Central Amazon was excluded !

- Large-scale patterns suggested previously need to be re-examined by CADAF estimates



- CADAF Inventory Sites

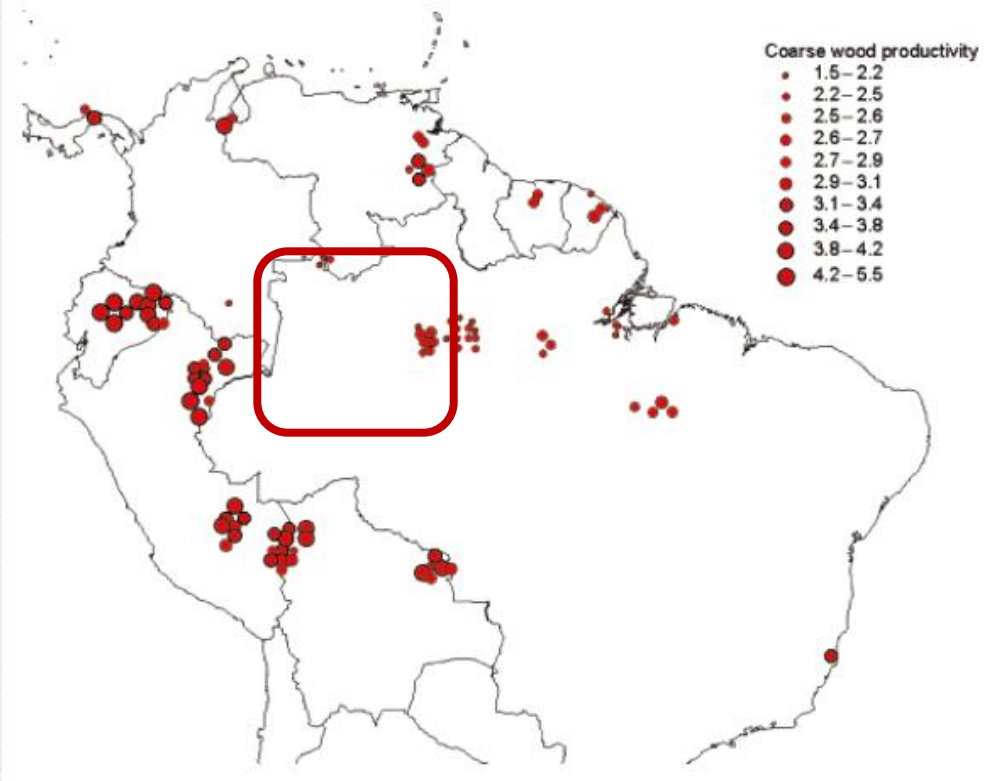


Baker et al. (2004)

How AGB varies within Amazon ?

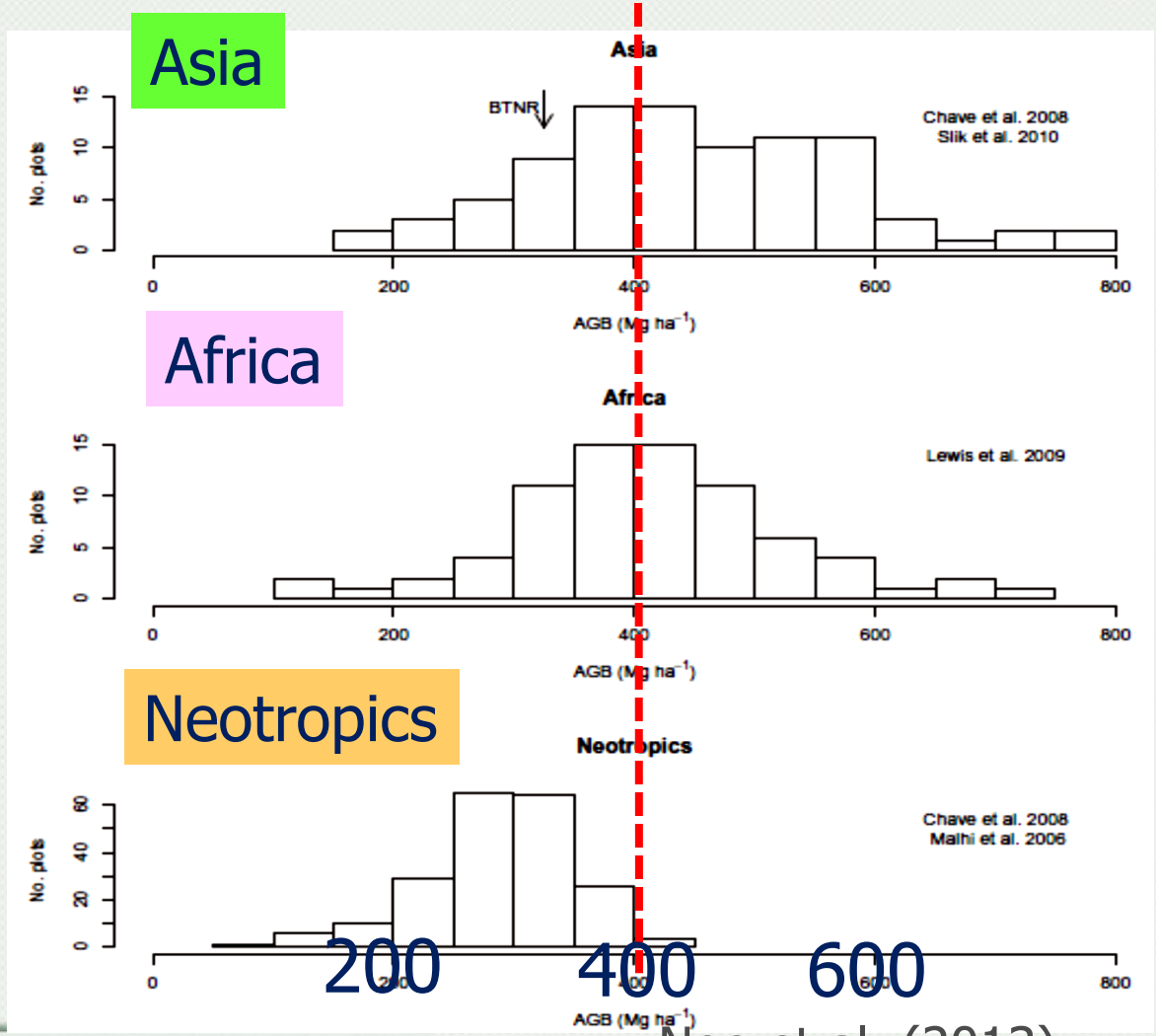
- AGB is suggested to be larger in Eastern, while productivity* is higher in Western.

*Wood productivity: Higher tree growth in Western may be due to frequent disturbance ?



Malhi et al. (2004) *GCB*

Forest C-stock is low in Amazon ?



Ngo et al. (2013)

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Topics:

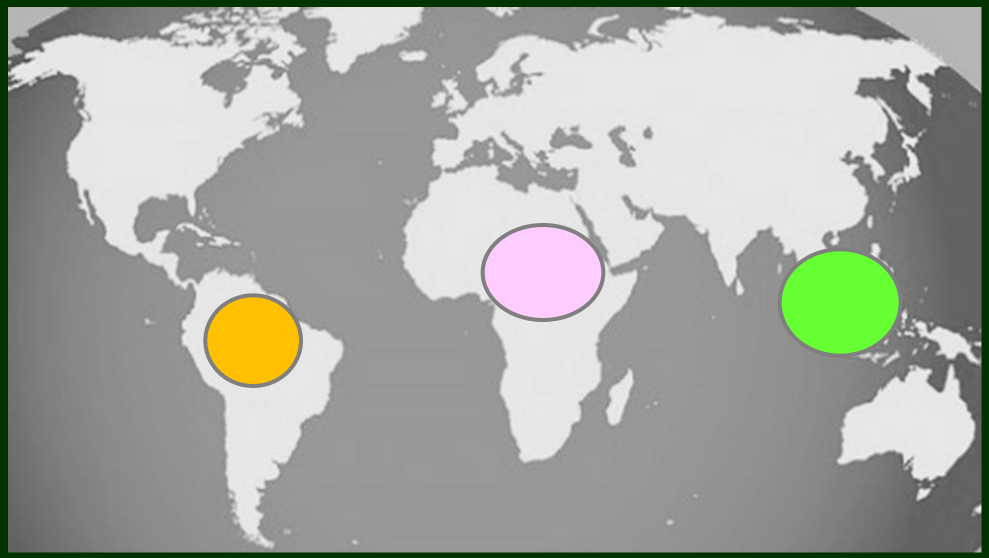
Variations of forest C-stock at ...

- Regional scale:
  Watersheds in Amazonas
- Whole-Amazon scale:
  Eastern vs Western
- Continental scale:
  Amazon vs. SE-Asia, (Africa)

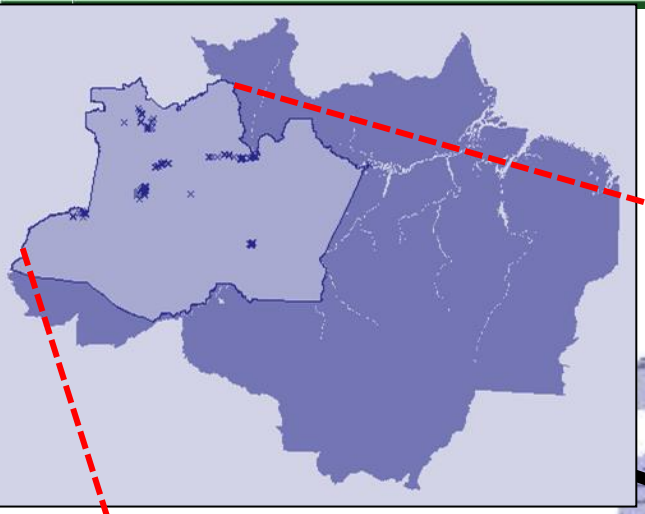
1. Regional

2. Whole-Amazon

3. Continental

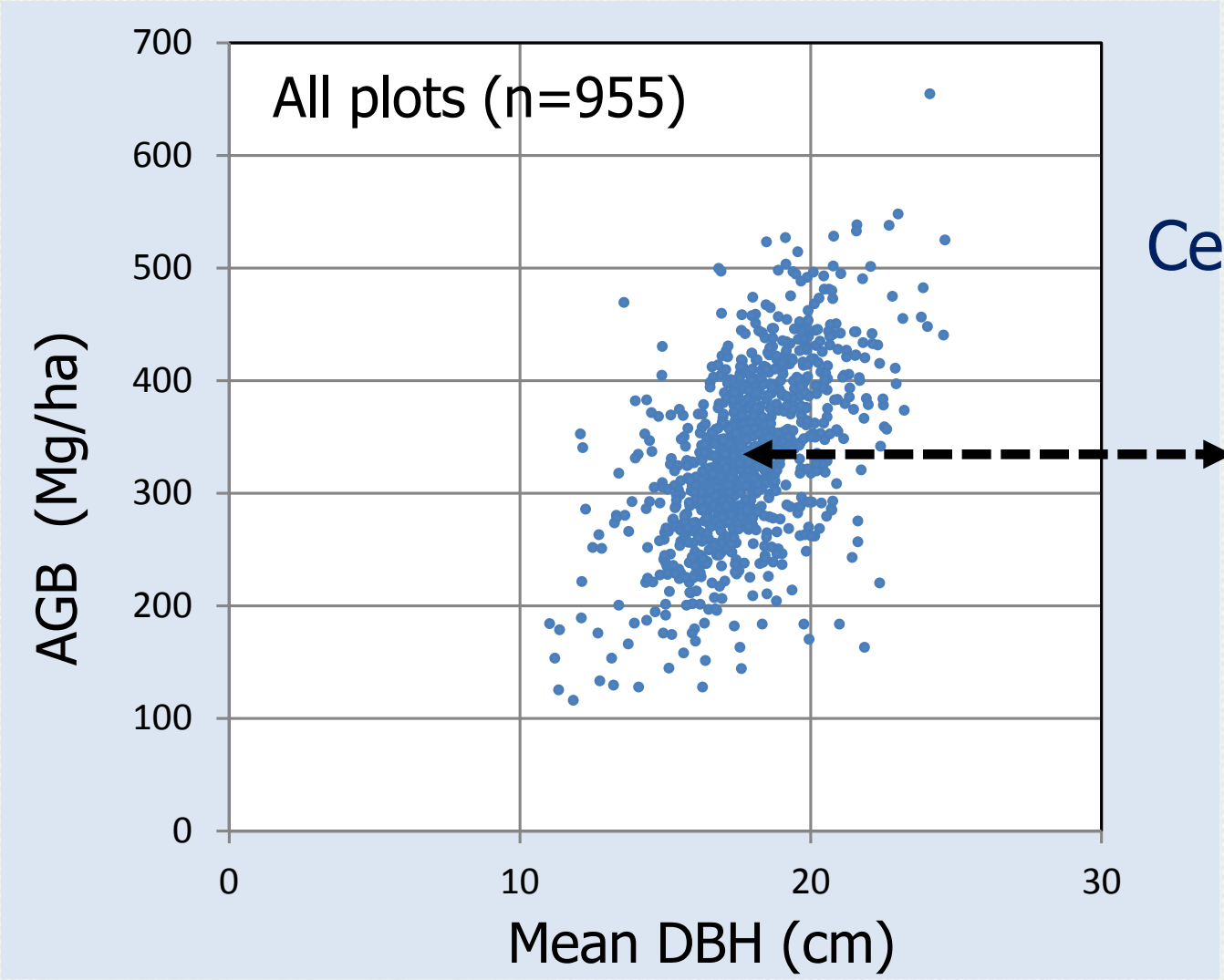


AGB estimated at 8 sites, 955 CFI plots (ca. 25 ha/site)



legends	definition	Source	Hdom 20%
AP	Auati parana (Fonte boa)	CADAF	31.5
AT	Atalaia	CADAF	31.2
CG	Capana grande	CADAF	32
JM	Juma	before C/	27.8
JT	Jutai	CADAF	30.1
PRT	Purus Terra firme	CADAF	24.9
PRV	Purus Varzea	CADAF	26.8
SG	Sao gabriel	CADAF	28
UN	Unini	CADAF	27

Diameter – Biomass relationship



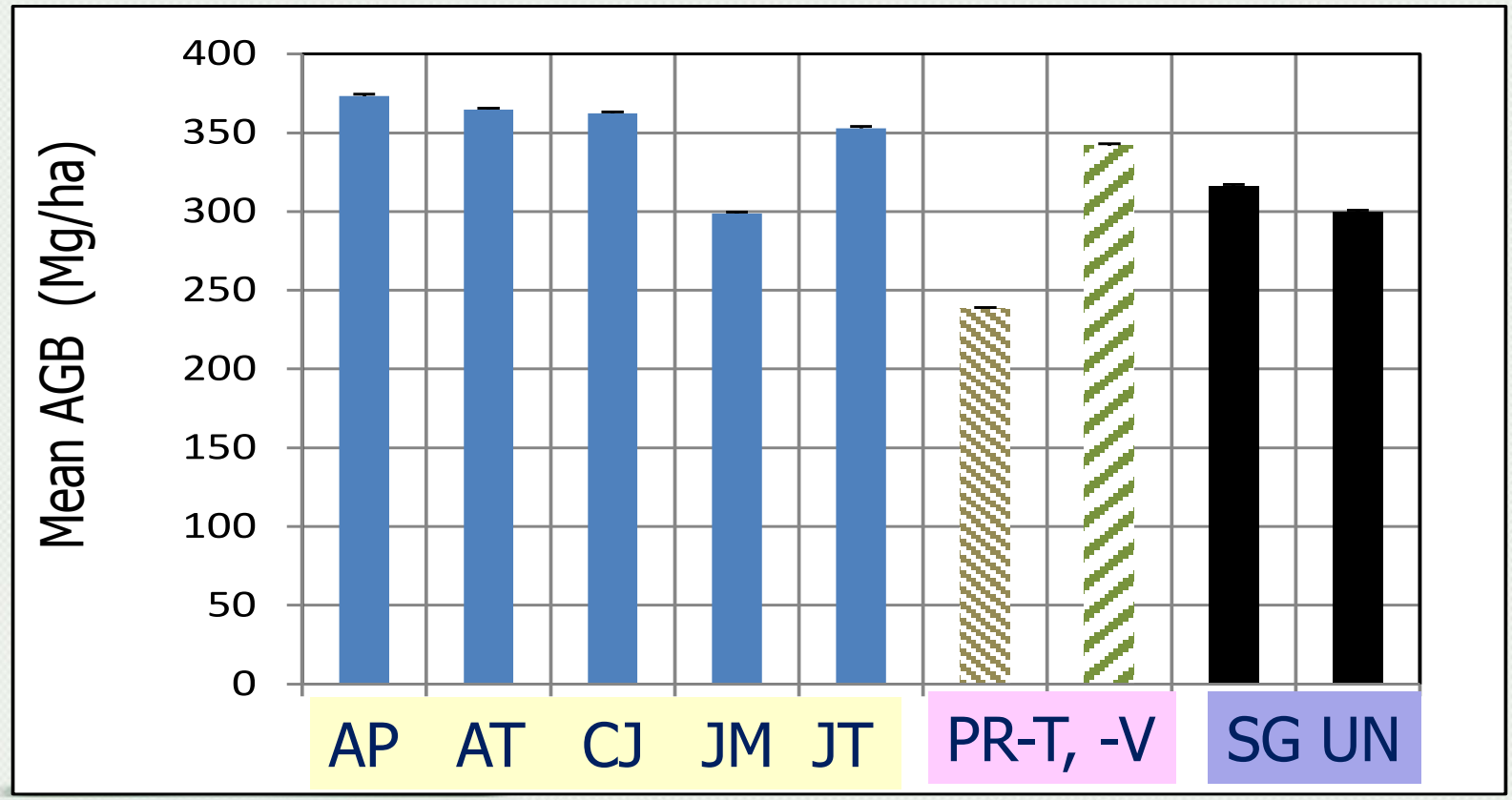
Central Amazon
Mean AGB

331 Mg/ha

Variation in Central Amazon

- AGB likely differs by watershed types

  White Rivers (AT) **>** Black Rivers (SG, UN)



Watershed types in Amazon :

White Rivers

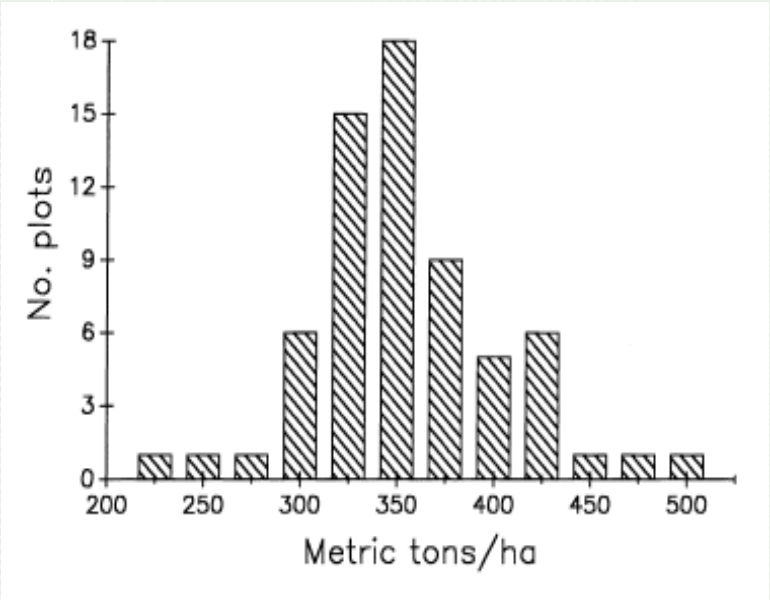
AP AT CJ JM JT

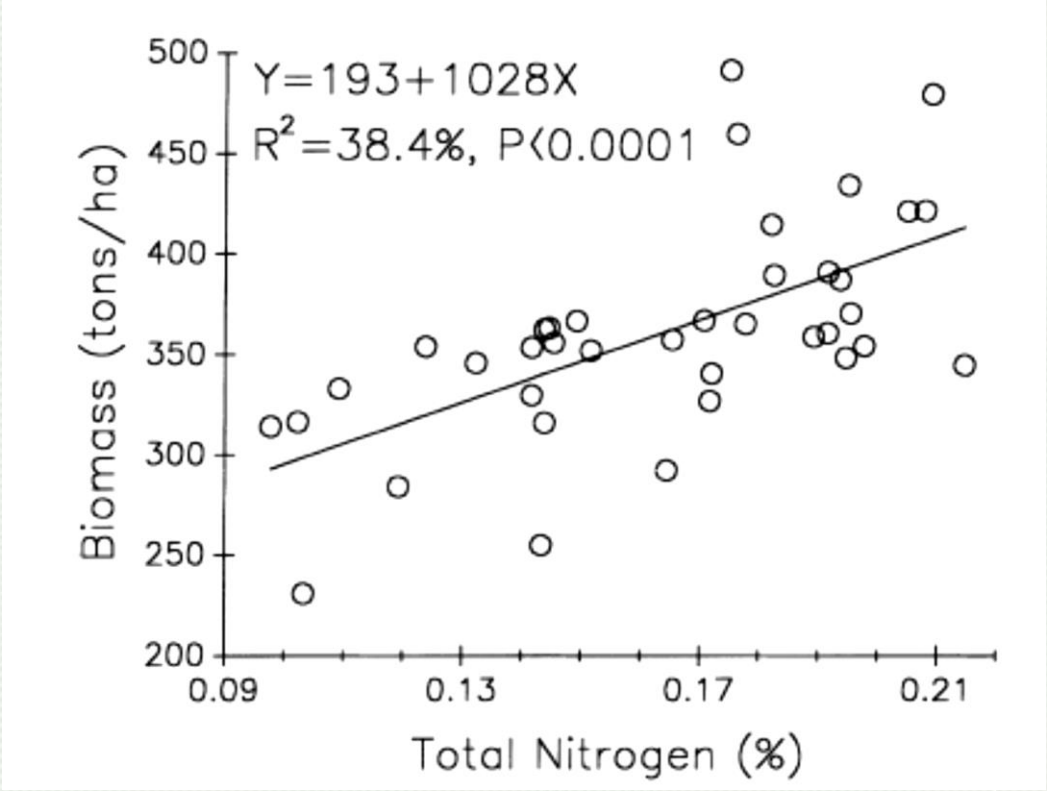
PR-T, -V

Black Rivers

SG UN

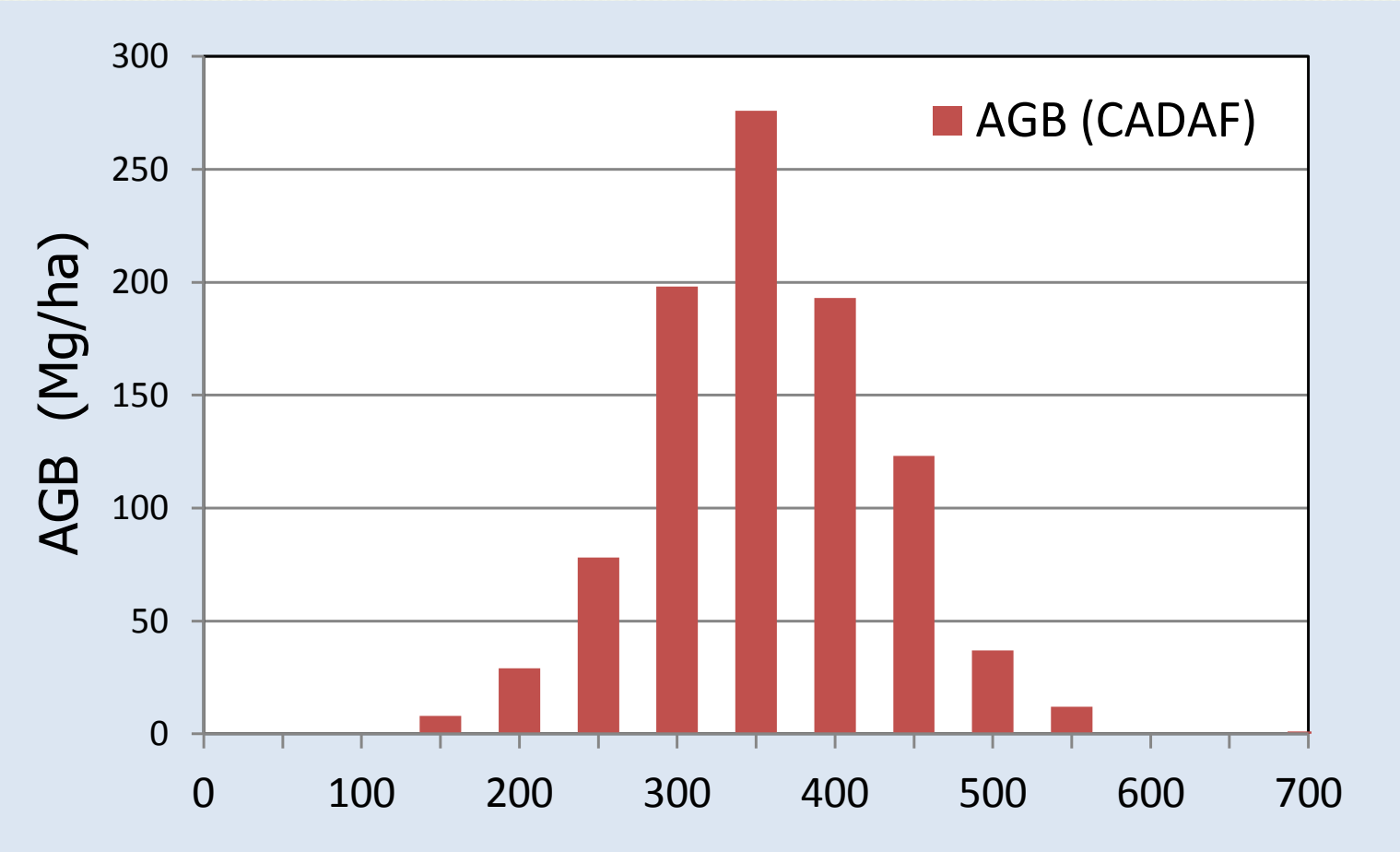
Soil nutrients (N) conditions may cause variation of AGB ?





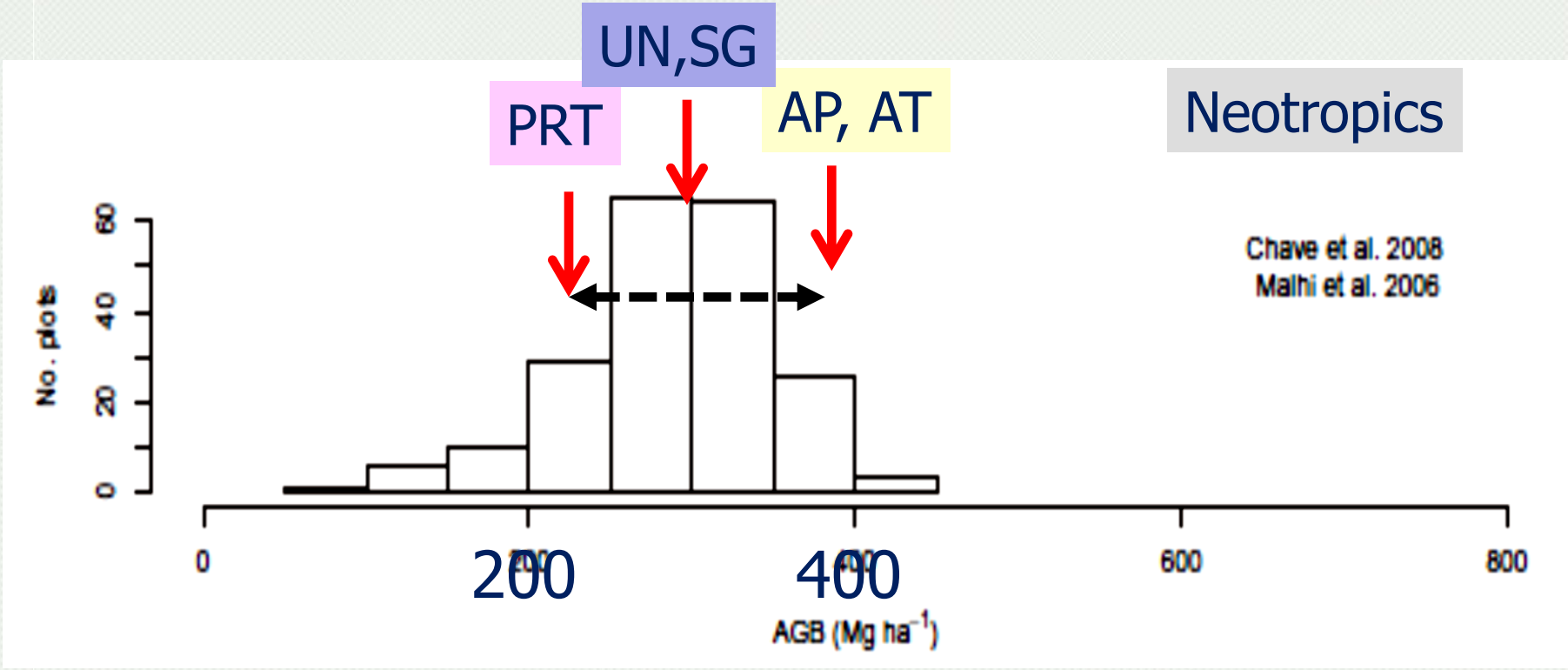
Laurance et al. (1999) FORECO

AGB varies greatly even in Central Amazon



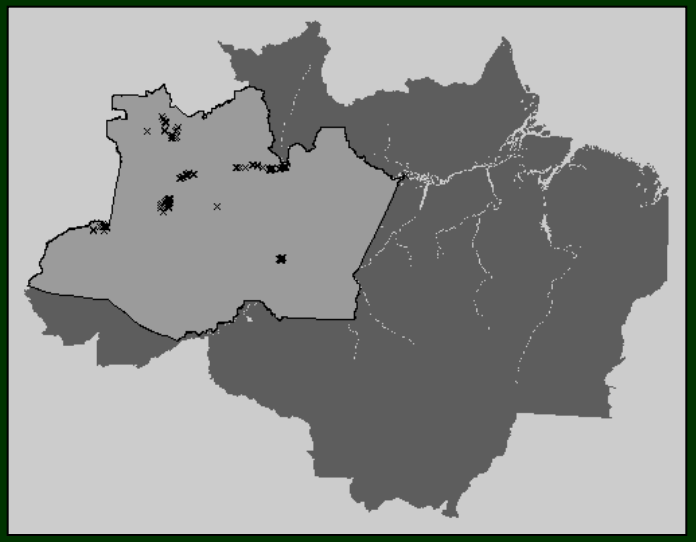
- Whole-Amazon pattern is unclear

AGB varies greatly even in Central Amazon; its extent is same seen in whole-Amazon



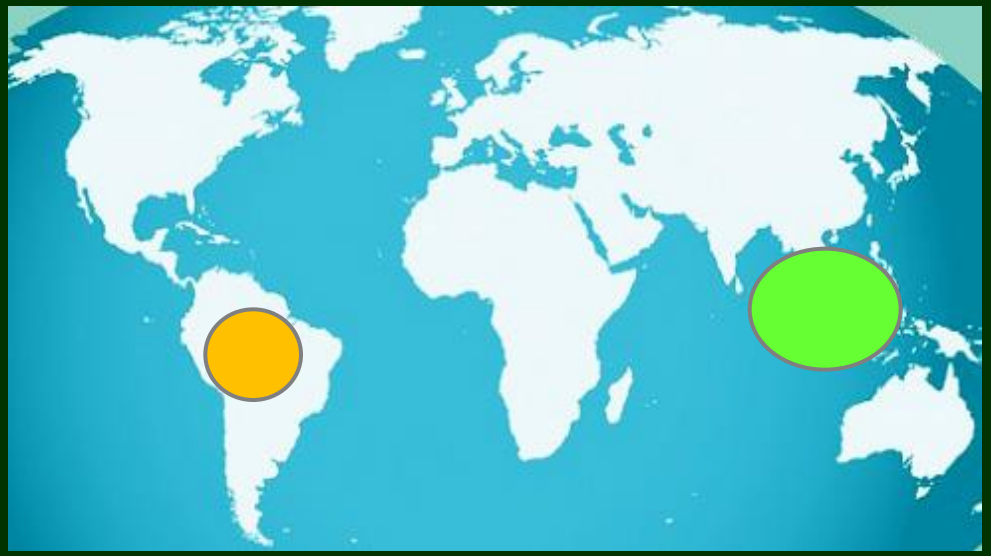
Ngo et al. (2013)

1. Regional



2. Amazon

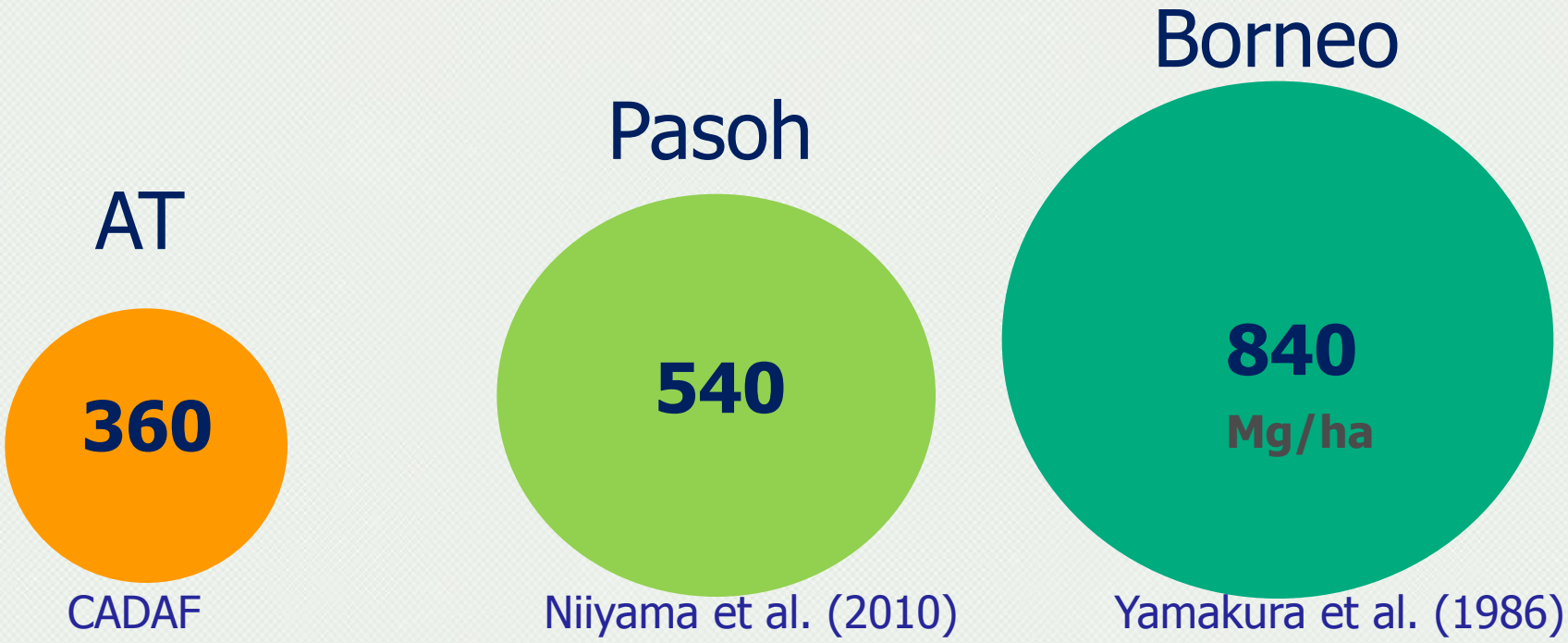
3. Continental



Pasoh (Malaysia)

The largest tree
(*Dipterocarpus cornutus*)
dbh=116 cm, H=50 m

- AGB is likely smaller in Amazon…



Amazon vs. SE- Asia

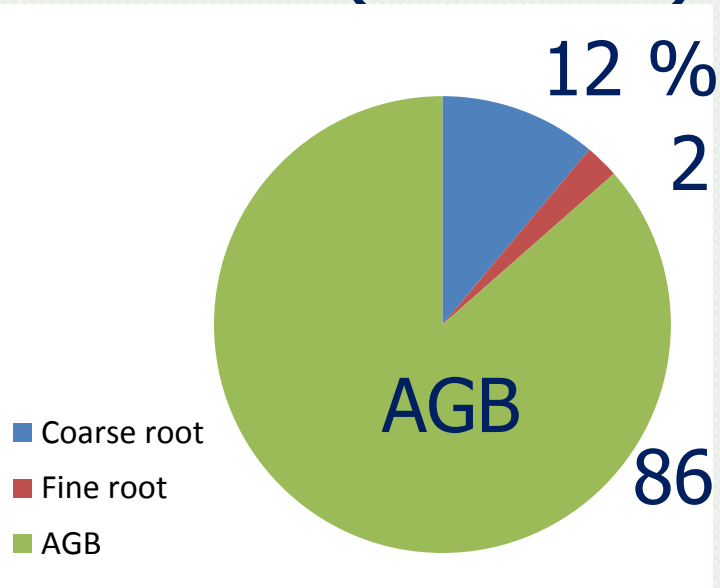
Why AGB differs greatly by continents

- Species, Soils, Climate … ?

  e.g., Dipterocarp grow taller (~70m) in SE Asia

However, C-allocation is very similar

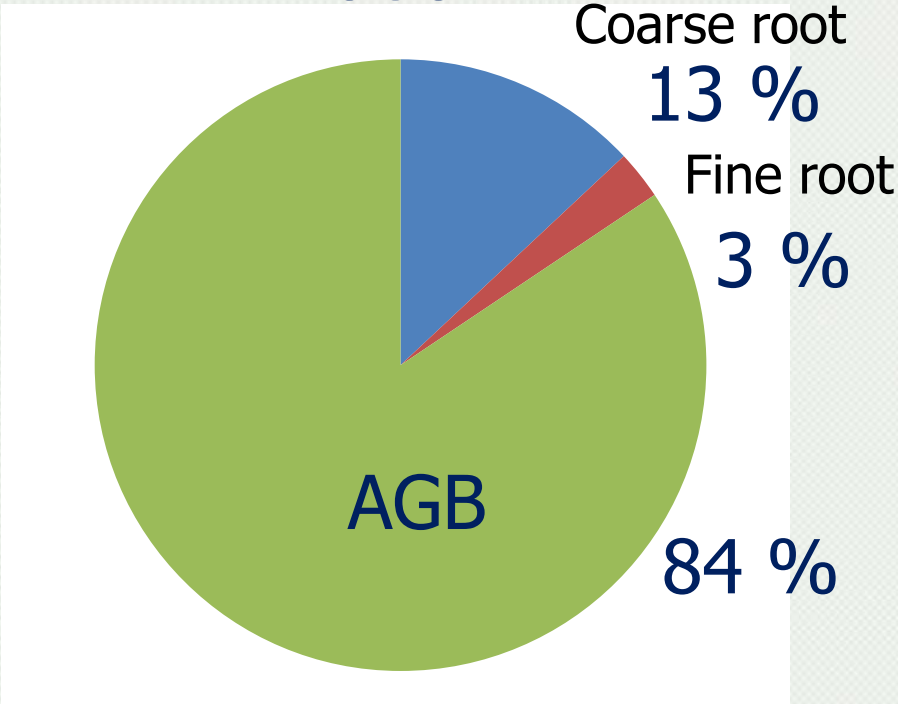
SG (Amazon)



Total **293** **Mg/ha**

Noguchi et al. (2014)

Pasoh



635 **Mg/ha**

Niiyama et al. (2010)

Concluding remarks :

- CADAF's estimates in Central Amazon would improve knowledge of patterns of C-stock of tropical forest in Whole-Amazon but also those between Continents.

- Low C-allocation to roots in both Amazon and SE-Asia, indicates similar architecture of tropical trees against nutrients-poor soil ?
  (or high priority for light competition ?)

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Obrigado !

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