



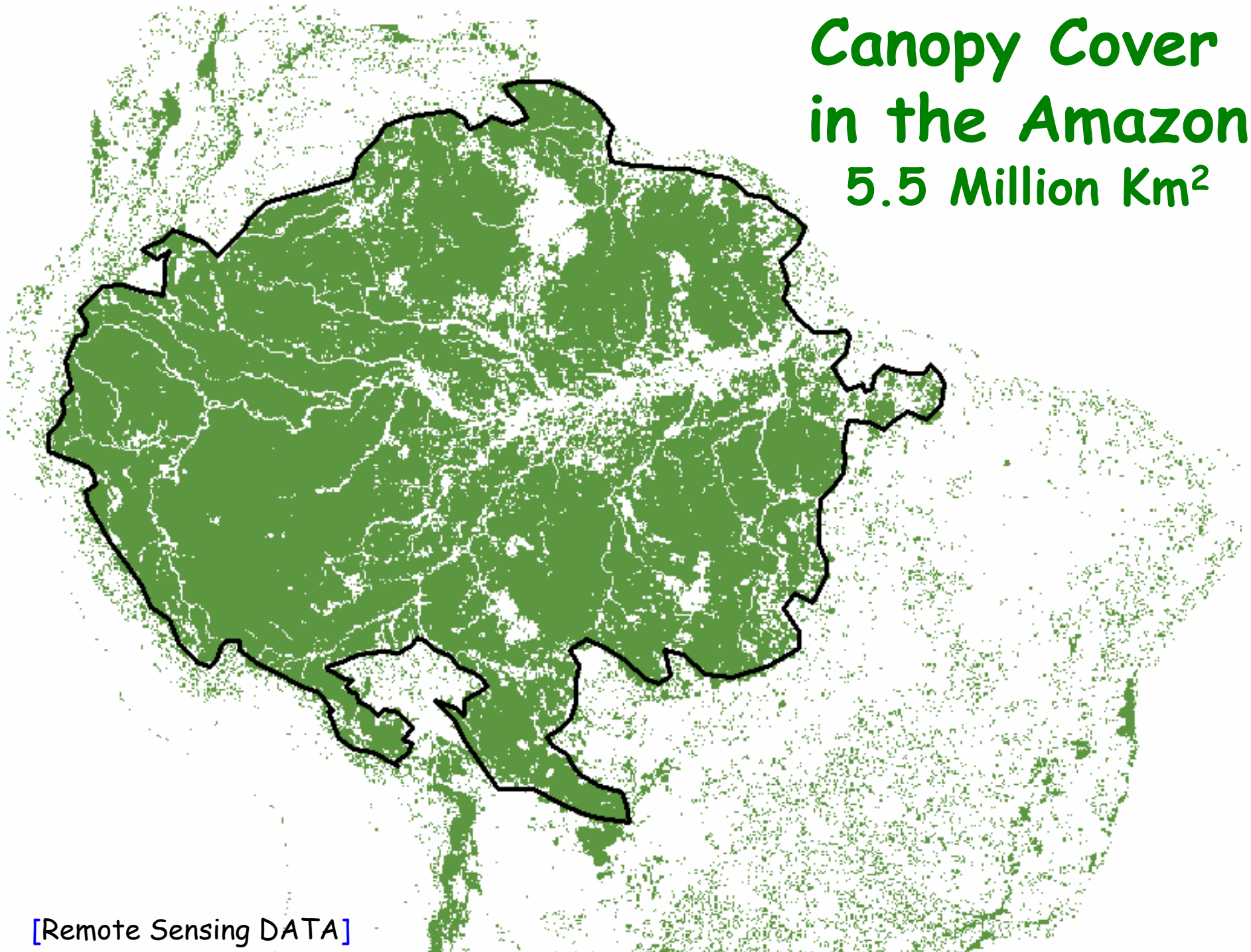
Amazonian biodiversity regulates the climate system: Impacts on Human livelihoods

A.D. Nobre, INPA

*Royal Society UNFCCC Side Event
Biodiversity - Climate Interactions: adaptation, mitigation and human livelihoods
6 December 2007, Bali, Indonesia*

Canopy Cover in the Amazon

5.5 Million Km²



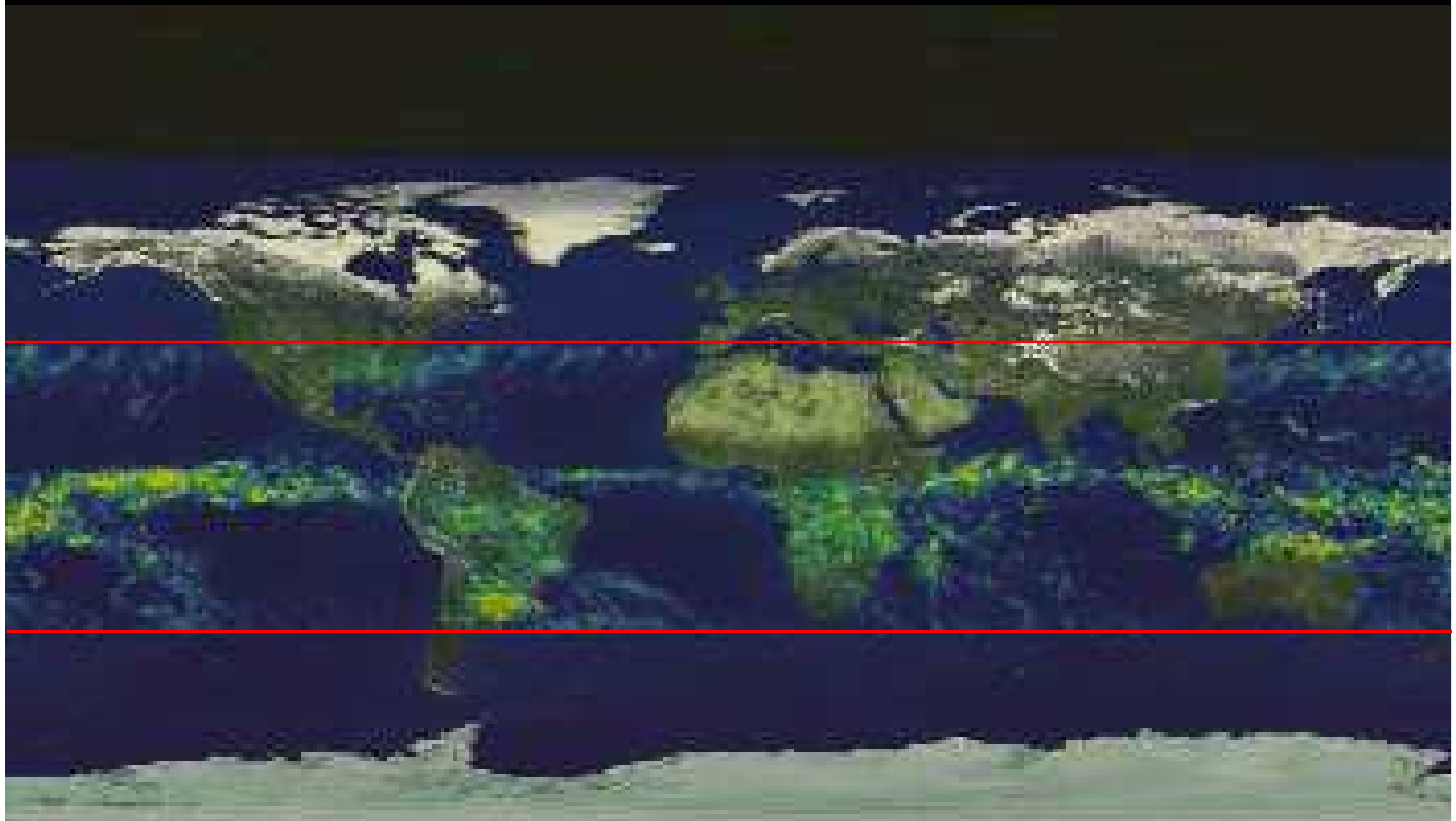
Biosphere - Atmosphere relations
explain the capacity of the rainforest
to resist climate forcing

K34 FLUXTOWER Manaus Brazil

The Green Ocean

Photo Credit: Andrea Artaxo et al.
LBA Smocc Experiment

TROPICAL RAINFALL



Jan 8 1998

2 years data from TRMM
satellite

[DATA]

Animation Credit NASA Goddard

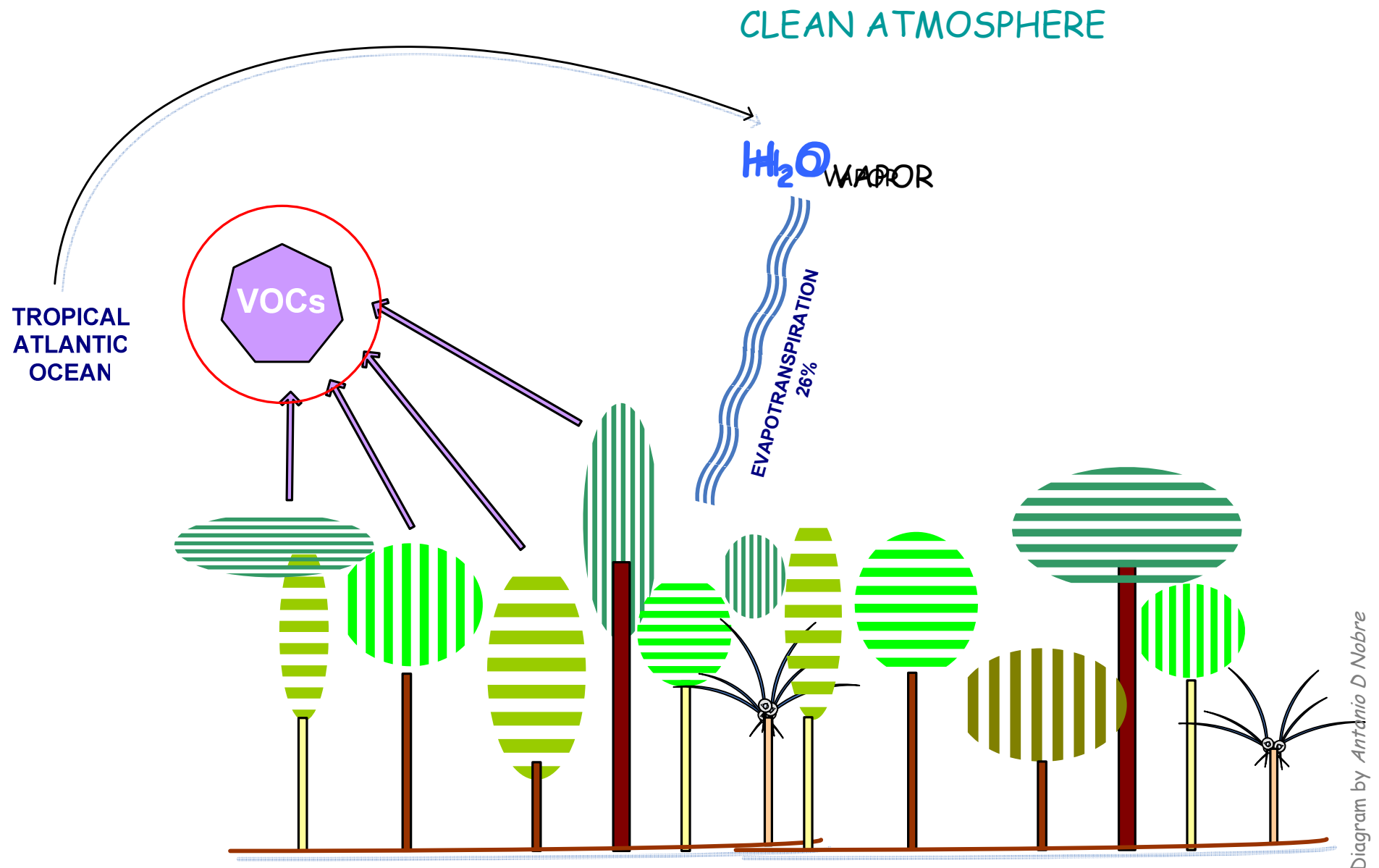


RAINFALL MECHANISM IN AN UNDISTURBED RAINFOREST

Photo Credit *Antonio D Nobre*

RAINFALL MECHANISM IN AN UNDISTURBED RAINFOREST

[MODEL]



based on results of LBA: Claeys et al and Andrea et al. *Science* 2004; Marengo et al 2004, 2005; others

RAINFALL MECHANISM IN AN UNDISTURBED RAINFOREST

Emissions of Volatile Organic Compounds
is Associated with Biodiversity

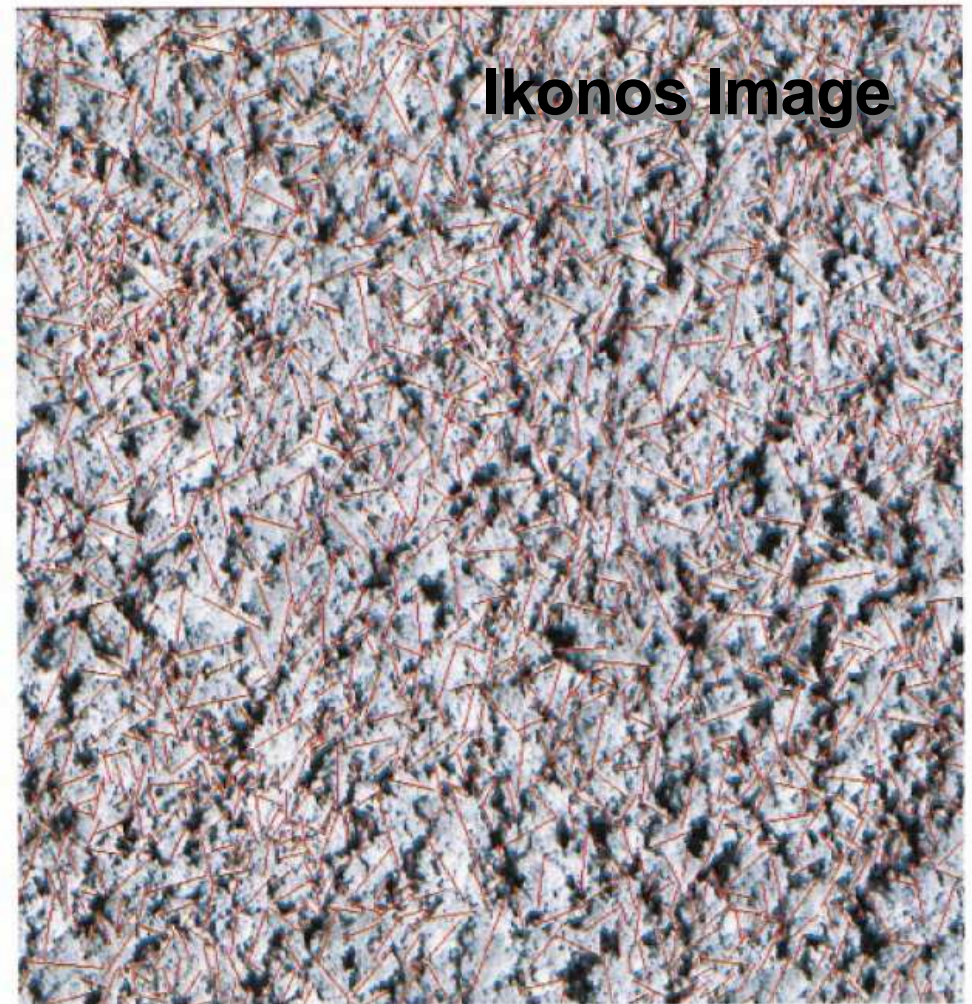
[DATA]

Complexity in the Tree Tapestry

(a) Crown Area



(b) Crown Diameter



Asner et al Biotropica 2002

0m 500m 1000m

RAINFALL MECHANISM IN AN UNDISTURBED RAINFOREST

[MODEL]

CLEAN ATMOSPHERE

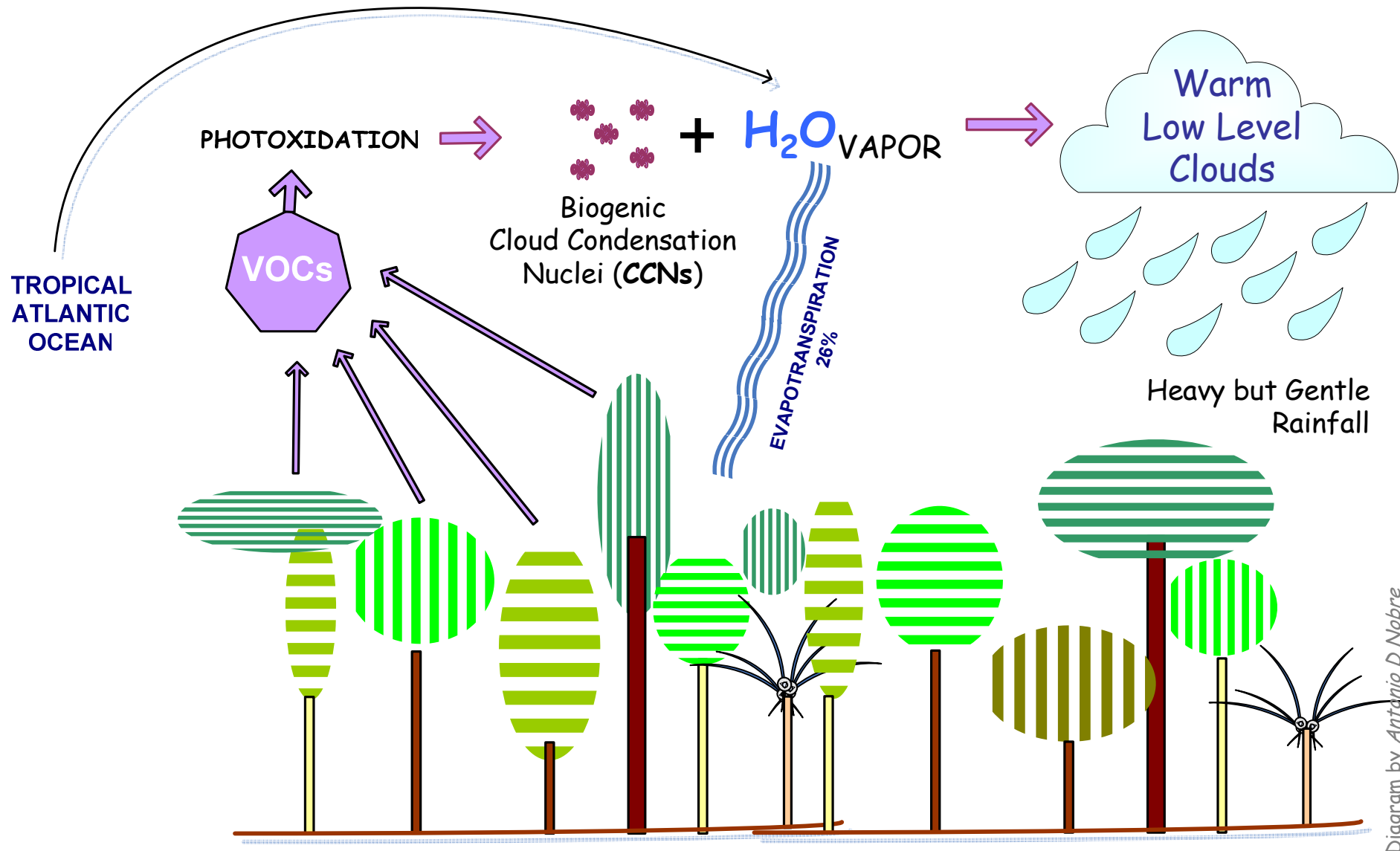
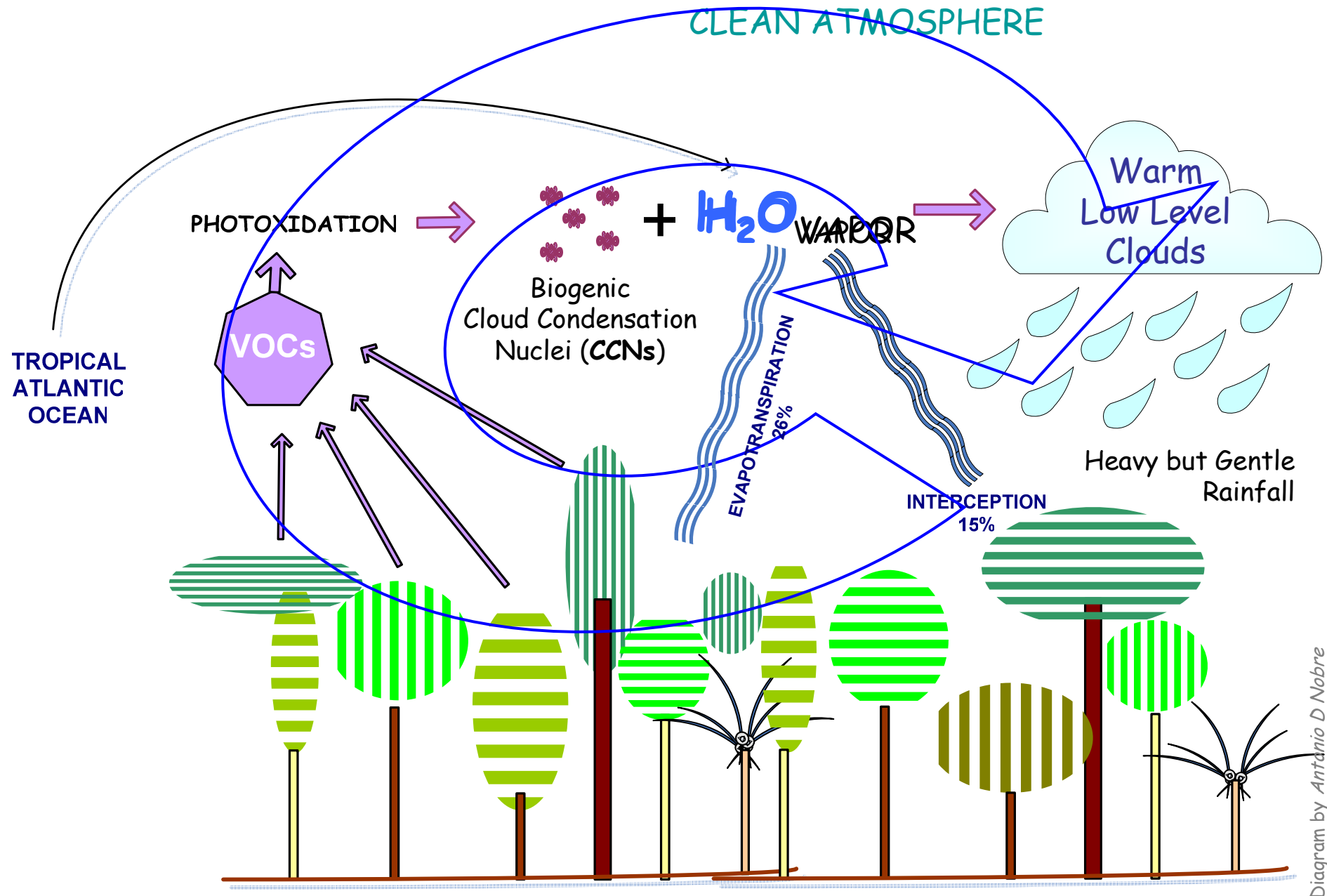


Diagram by Antonio D Nobre

based on results of LBA: Claeys et al and Andrea et al. *Science* 2004; Marengo et al 2004, 2005; others

RAINFALL MECHANISM IN AN UNDISTURBED RAINFOREST

[MODEL]



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Biotic Water Pump

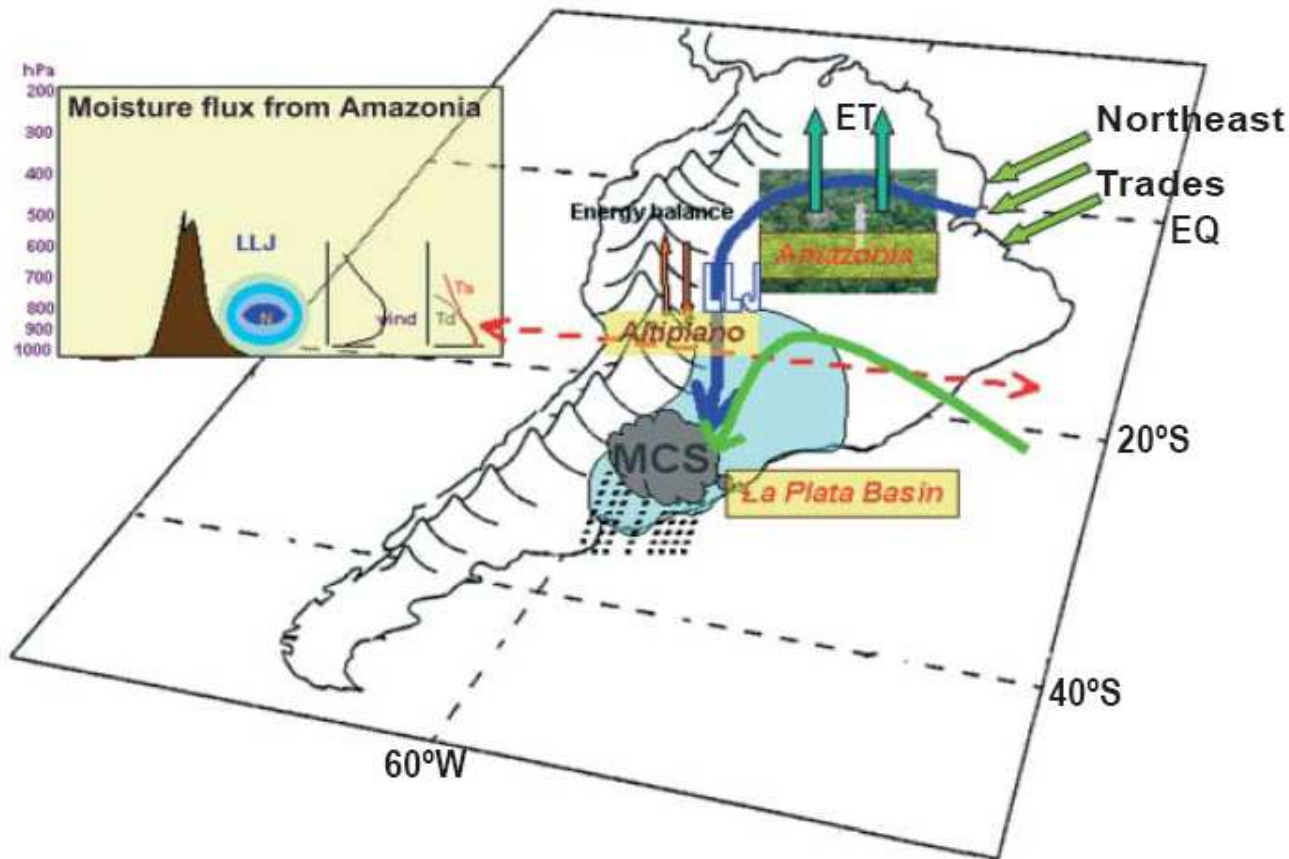
- Long-term average evapo-transpiration is around 3.6mm /day
- For all forest covered area (5,5 million km²) 20 billions tones of water are evaporated every day
- The solar energy consumed in this evaporation is equivalent to the summed electricity production of Itaipu along 145 years!



HUMAN LIVELIHOODS

South America Low Level Jets

Humidity from the Amazon and Sub-tropical Atlantic

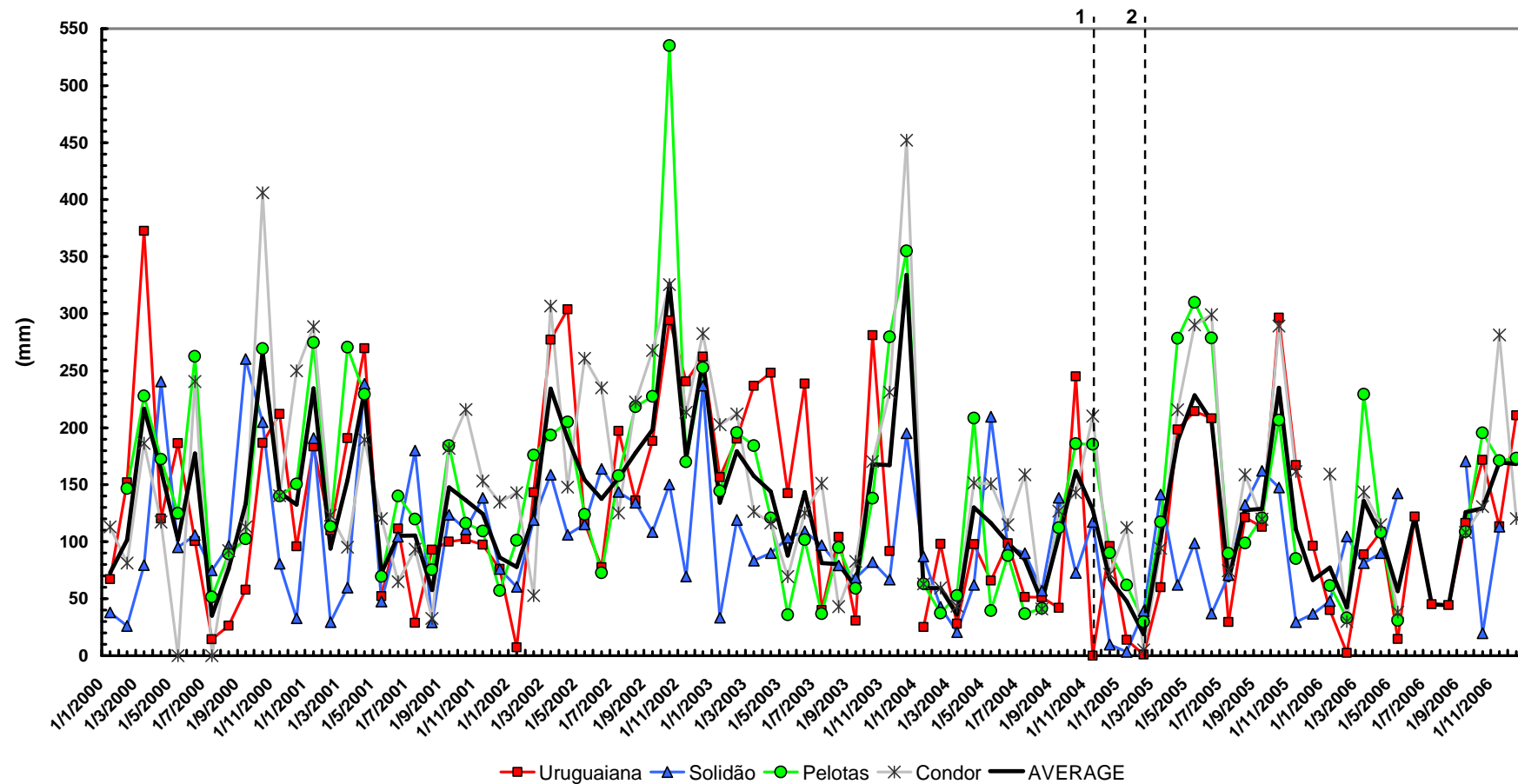


Global Canopy Program
Ecological Environmental Services
Side Event, 7/12 Friday, 8 PM

Adapted from Marengo (2007)

2005 Drought (Brazilian South)

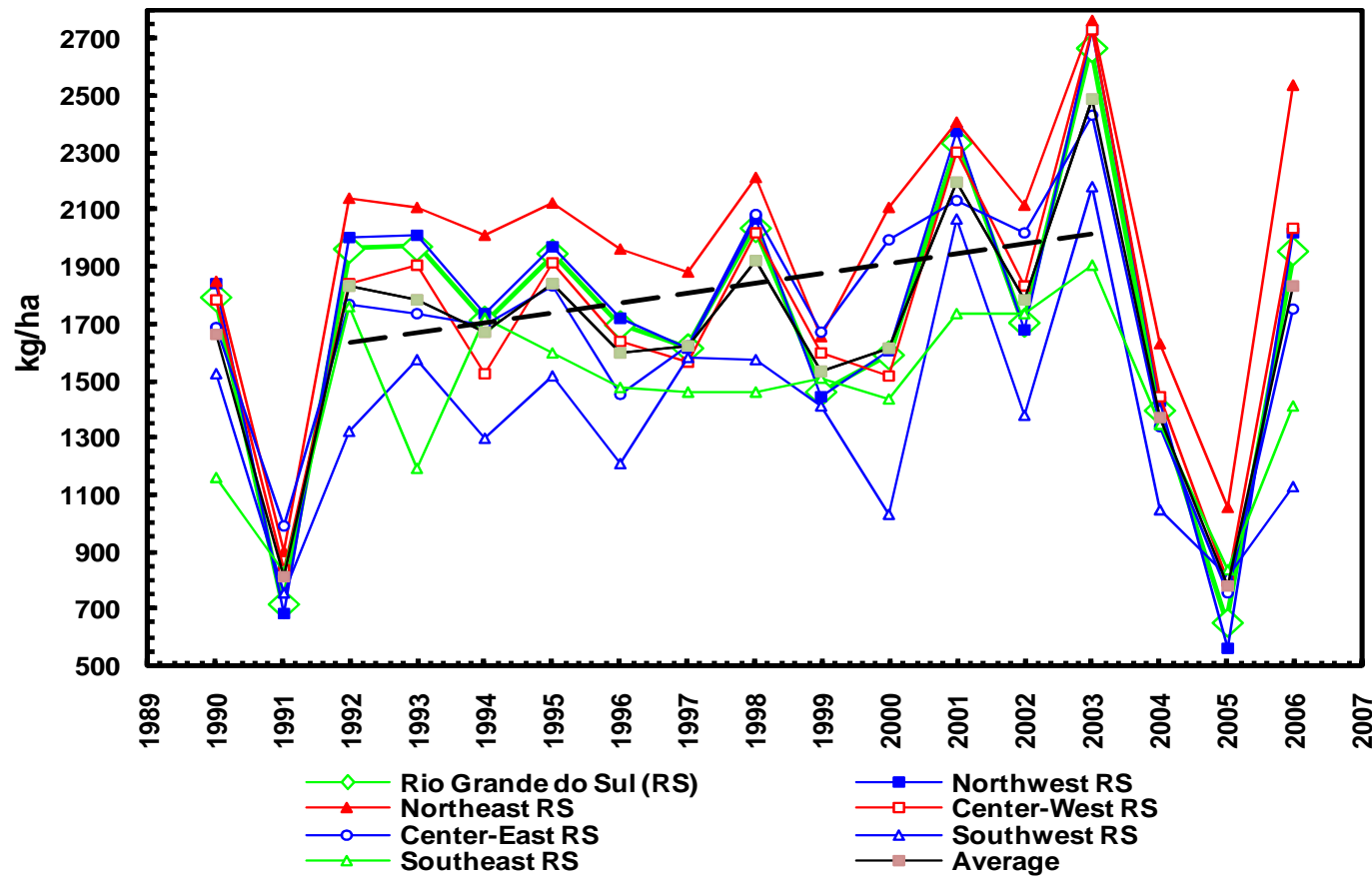
Drought was more critical in the region of SALLJ



Adapted from Agência Nacional das Águas (October, 2007)

2005 Drought: Soy Productivity

Brazilian South faced huge losses in agriculture



53%

Calculated from IBGE (2007)