



# *Consiglio Nazionale delle Ricerche*

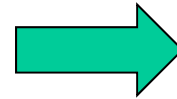


**INTERNATIONAL YEAR  
OF FORESTS • 2011**



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*CNR - Department of Earth and Environment (DTA)*



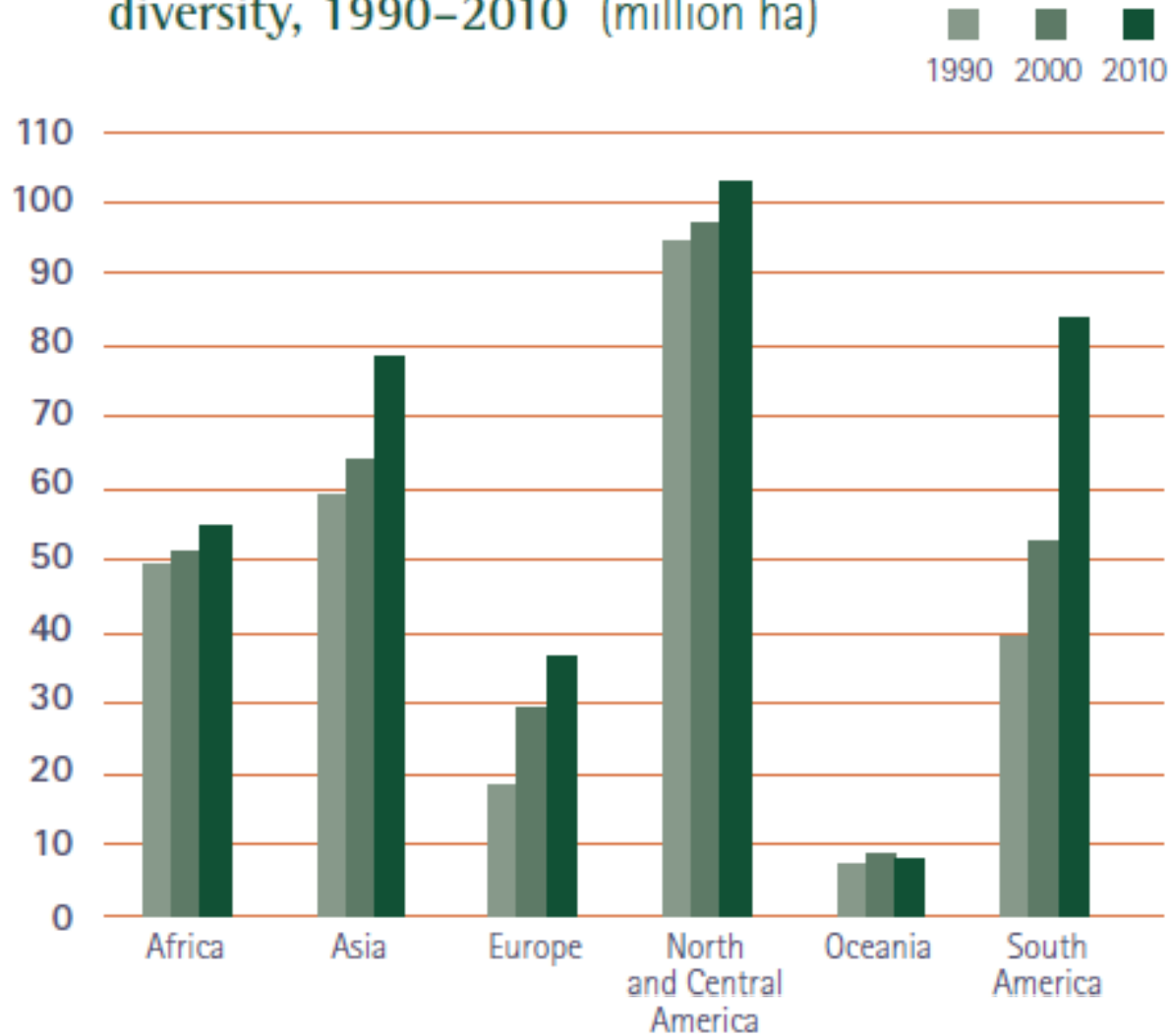
The international year of Forests follows the international year of Biodiversity in 2010

And

We know that just forests hold the majority of the world's terrestrial species in terms of plants, animals and micro-organisms

# Forests and Biodiversity

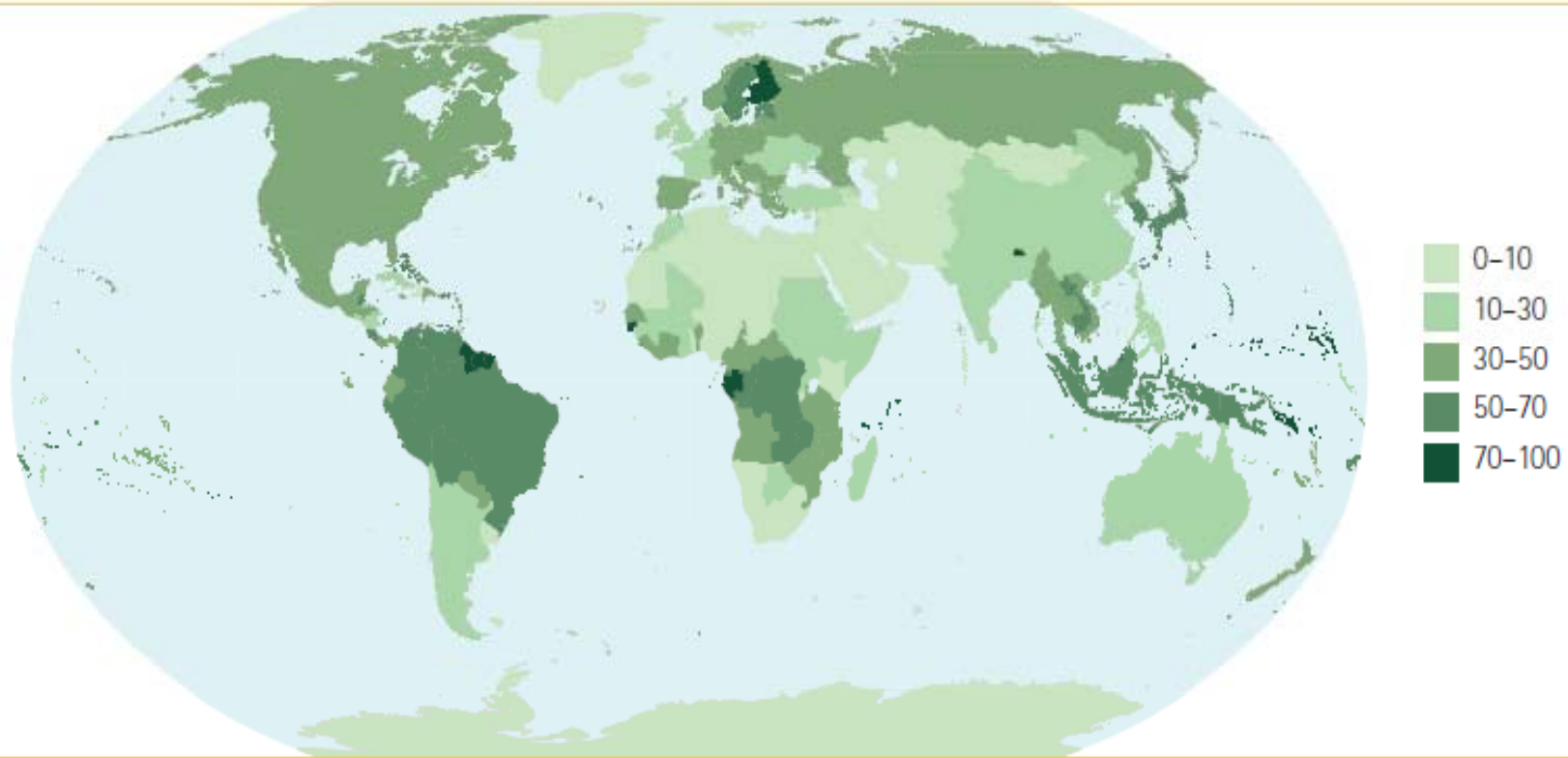
Forests designated for conservation of biological diversity, 1990–2010 (million ha)



FAO, 2010

# Forests cover 31% of Total Land Area

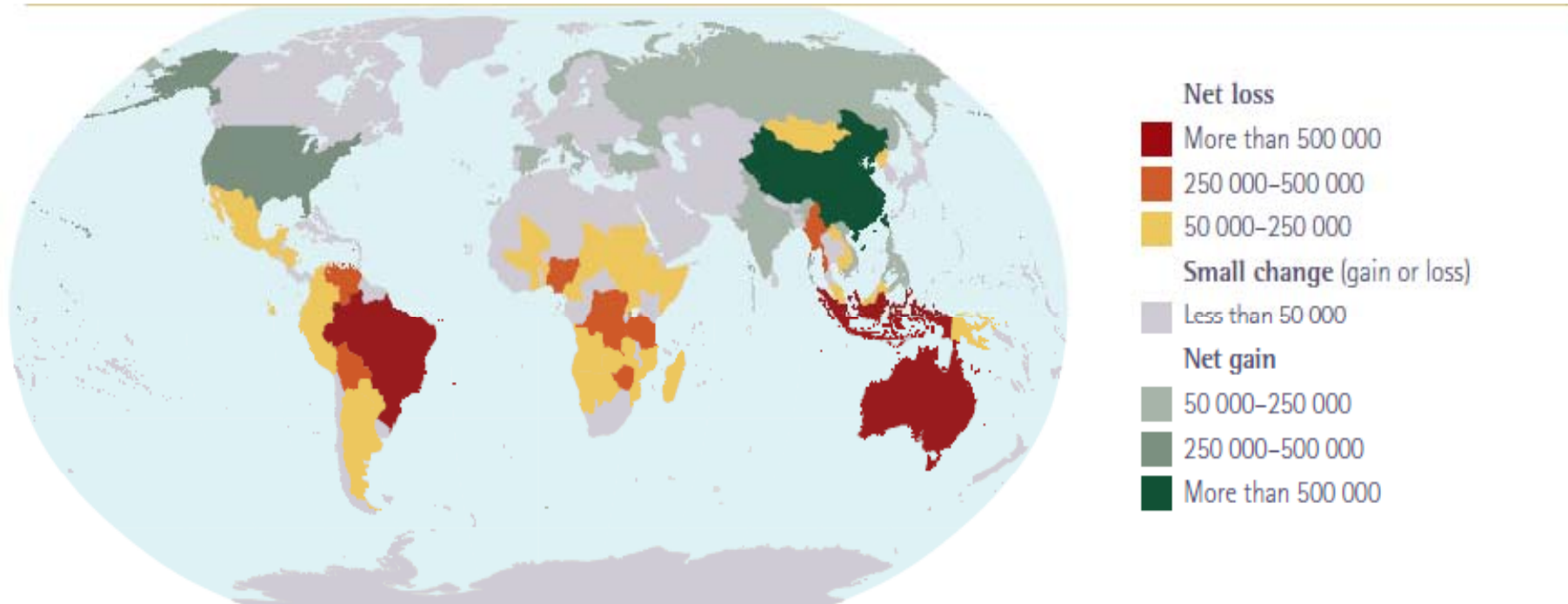
Forest area as percent of total land area by country, 2010



FAO, 2010

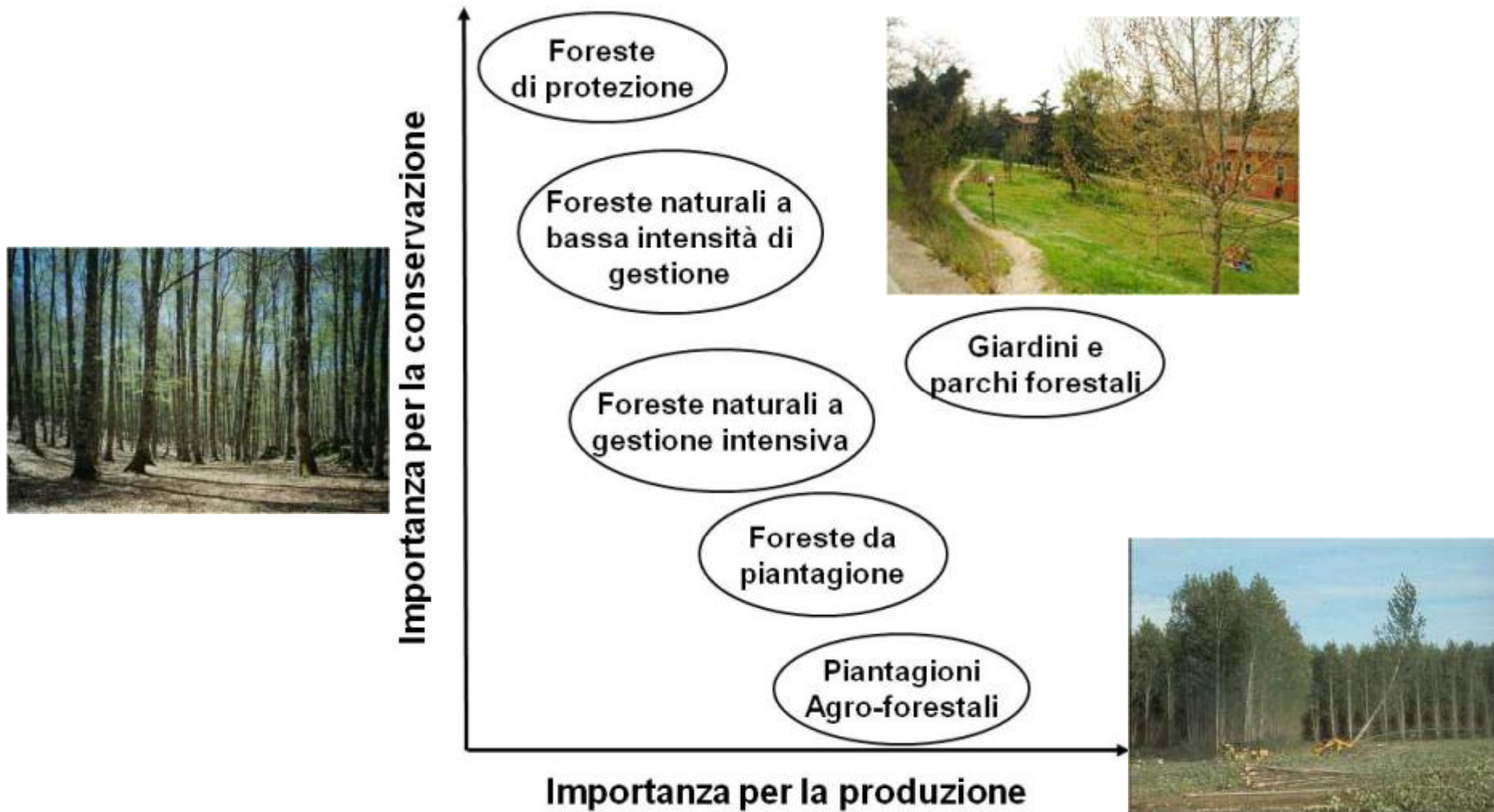
# Forest area is decreasing in tropical areas but generally increasing in other regions

Net change in forest area by country, 2005–2010 (ha/year)



FAO, 2010

# La gestione forestale: da considerare non solo le foreste “tradizionali”



Da Noble & Dirzo, Science, 1997

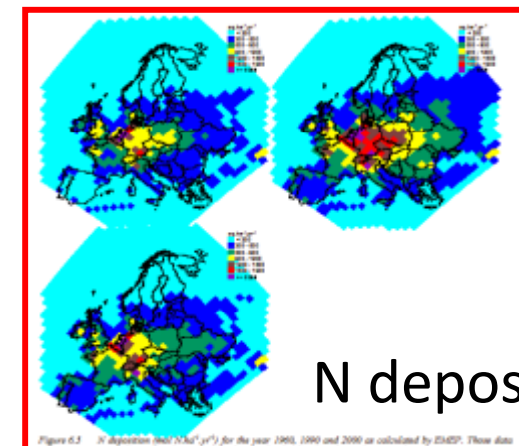
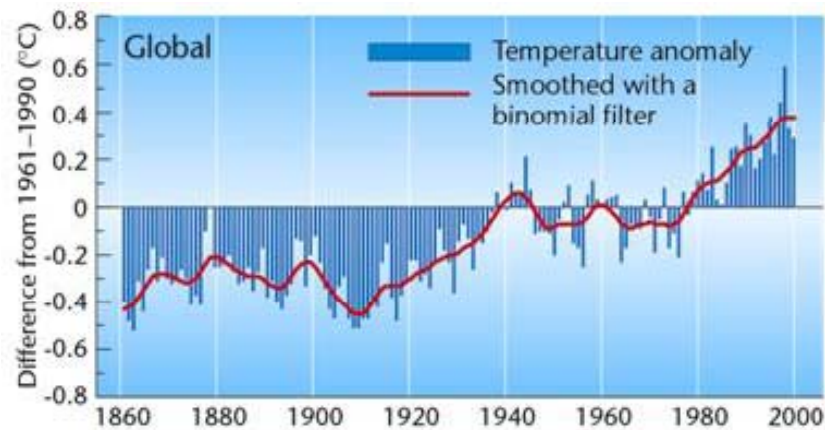
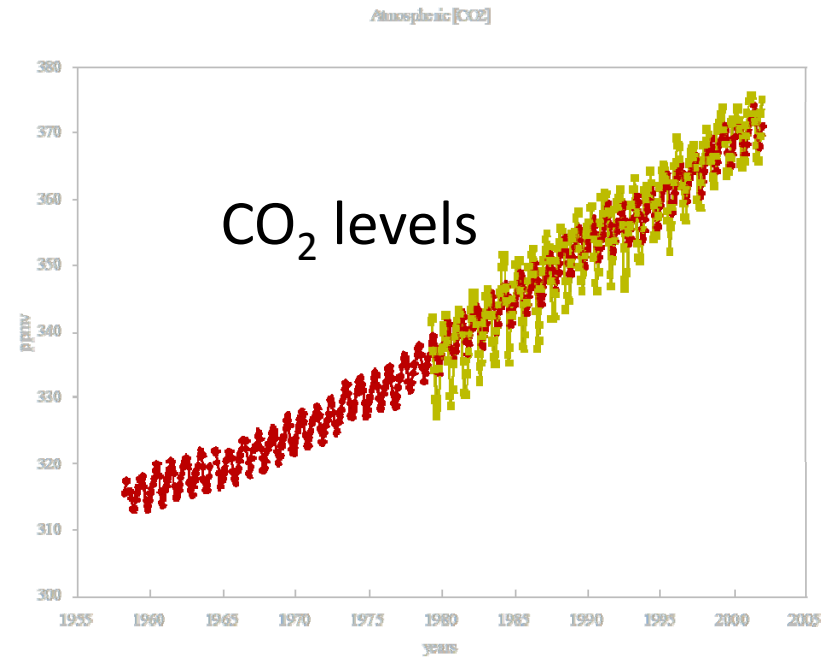
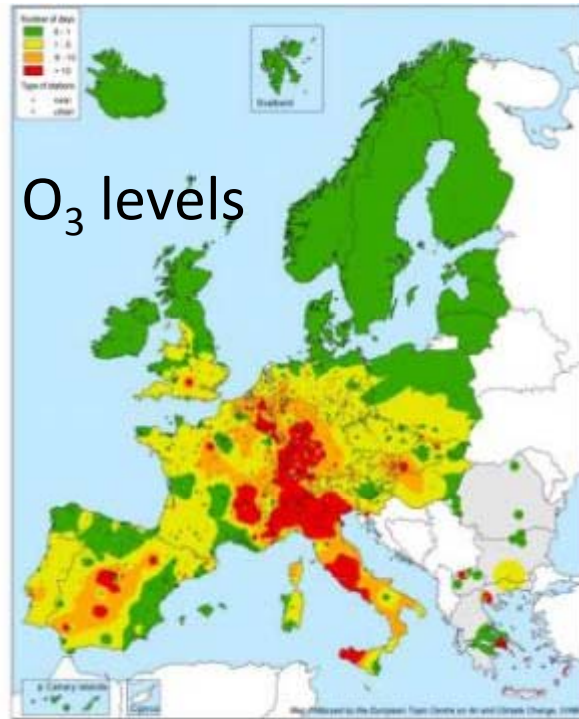
# **Le Foreste in Italia**

**Foreste italiane: 10'467'533 ha,  
34.7% superficie territoriale (INFC,  
2005 CFS e CRA-ISAA)**

**Gestione forestale e protocollo di Kyoto per l'Italia:  
10 Mt CO<sub>2</sub>  
(pari a circa il 10% dell'impegno al 2008)**

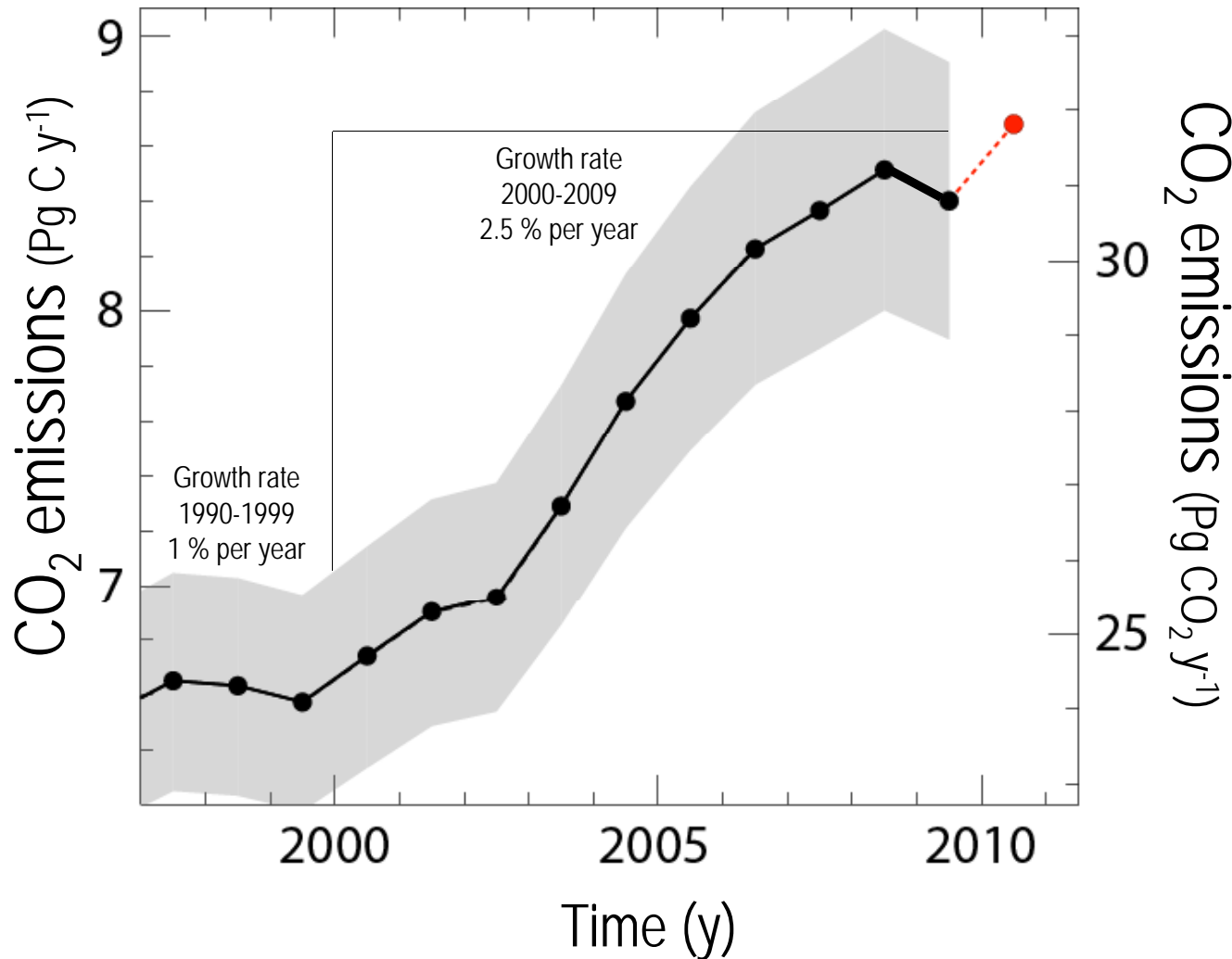


# Global change effects on terrestrial ecosystems





# Fossil Fuel CO<sub>2</sub> Emissions

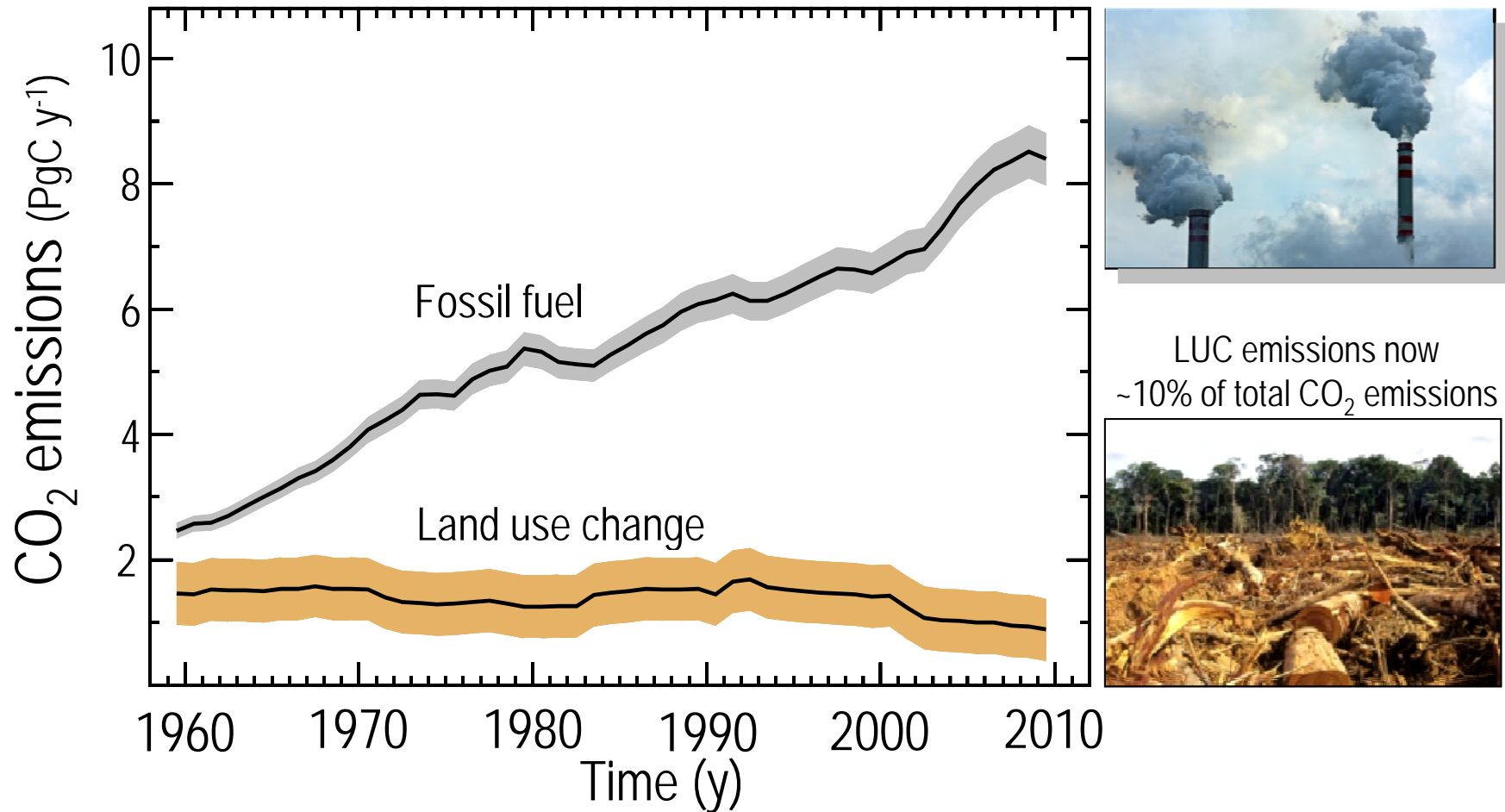


**2009:**  
Emissions:  $8.4 \pm 0.5$  PgC  
Growth rate: -1.3%  
1990 level: +37%

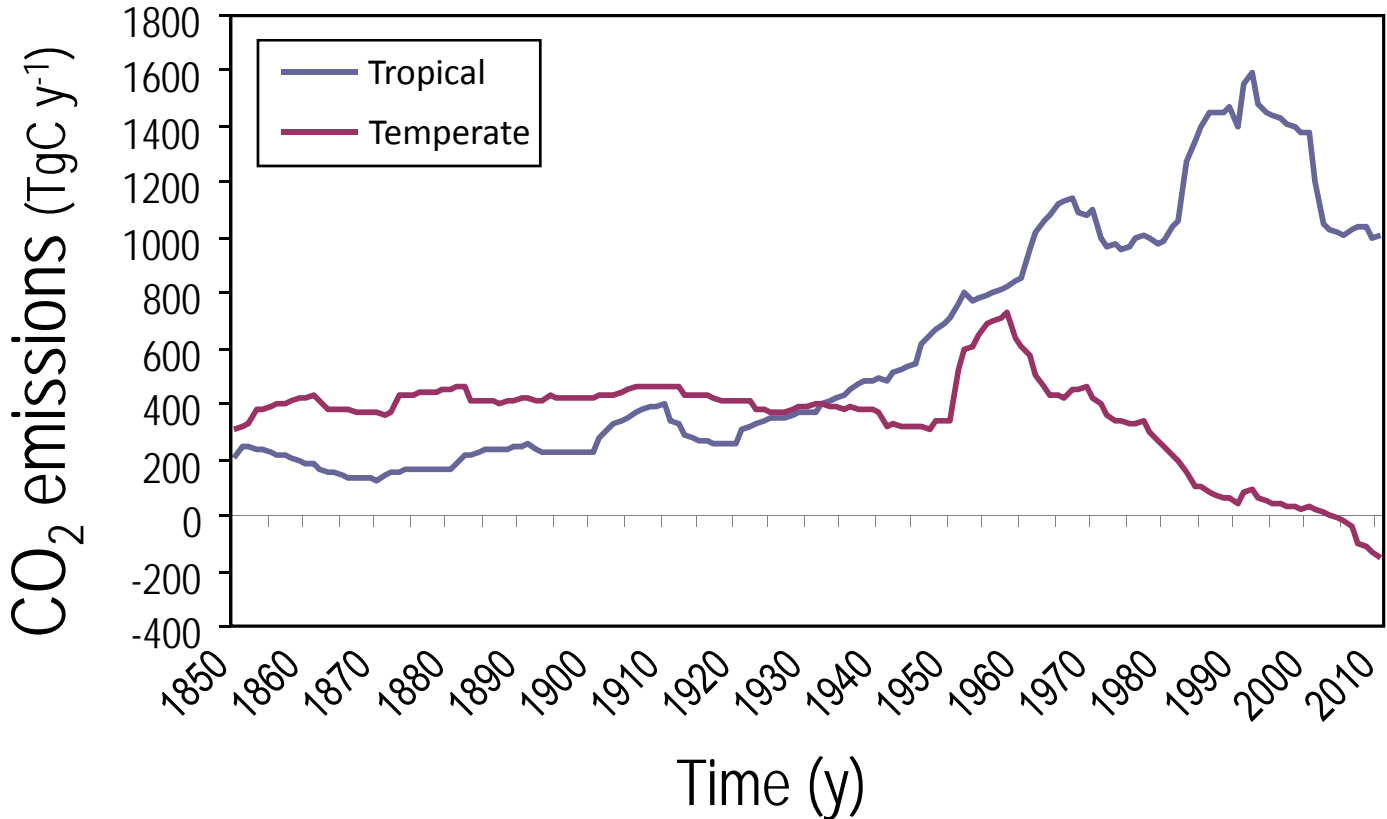
2000-2008  
Growth rate: +3.2%

**2010 (projected):**  
Growth rate: >3%

# CO<sub>2</sub> Emissions from FF and LUC (1960-2009)

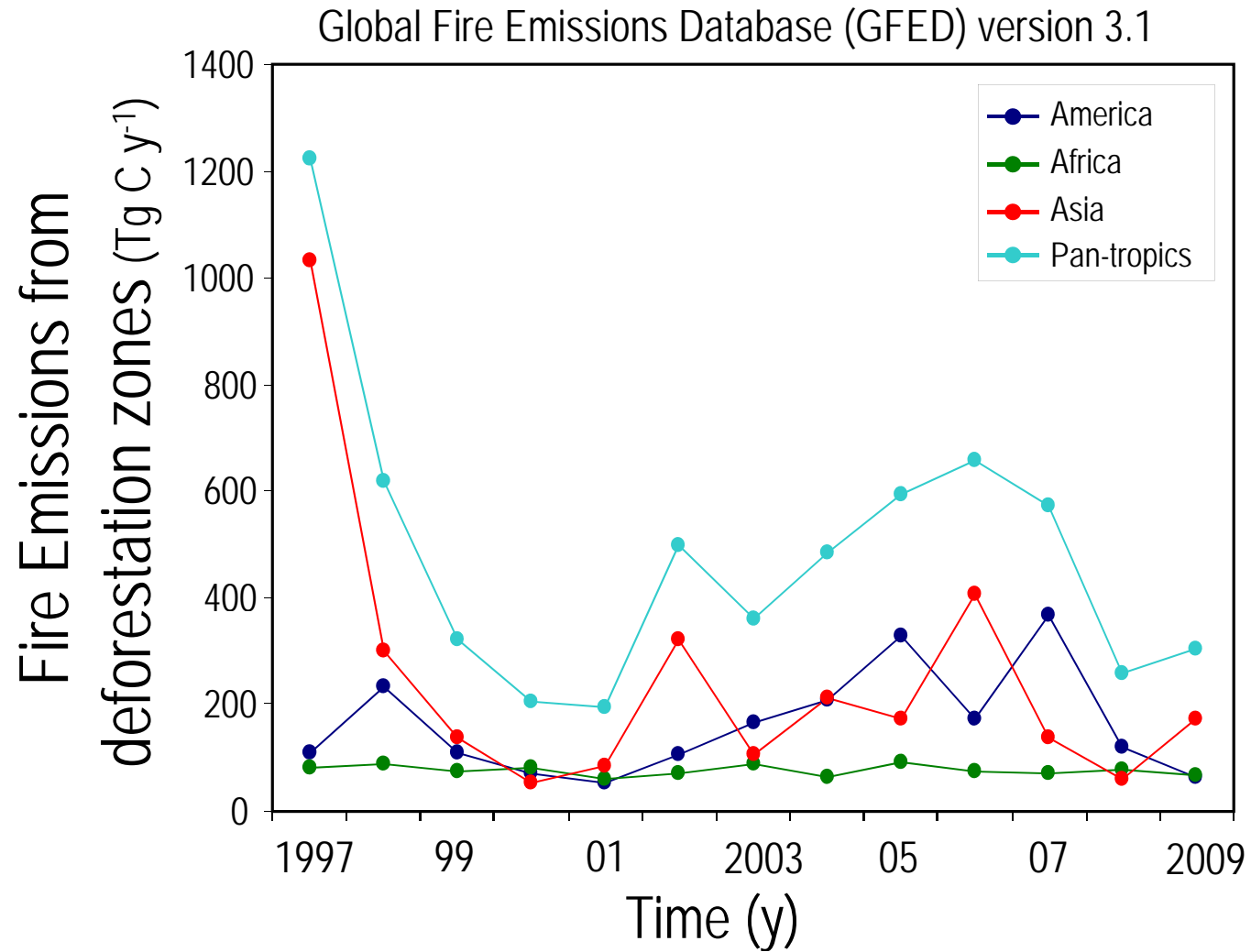


# Emissions from Land Use Change (1850-2009)

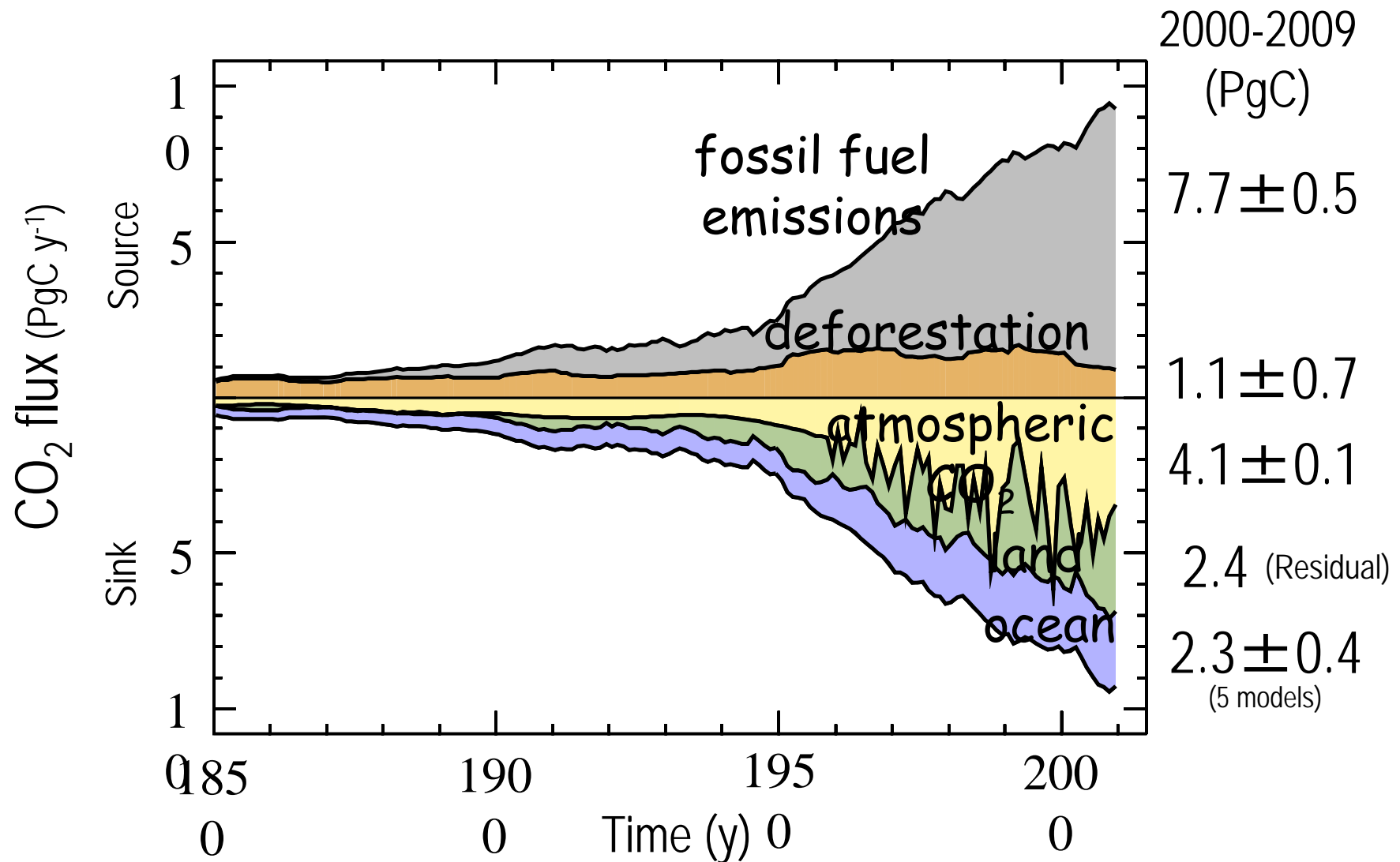


R.A. Houghton 2010, personal communication; GFRA 2010

# Fire Emissions from Deforestation Zones



# Human Perturbation of the Global Carbon Budget



# Fate of Anthropogenic CO<sub>2</sub> Emissions (2000-2009)

1.1 ± 0.7 PgC y<sup>-1</sup>



7.7 ± 0.5 PgC y<sup>-1</sup> +



4.1 ± 0.1 PgC y<sup>-1</sup>

47%



2.4 PgC y<sup>-1</sup>

27%

Calculated as the residual of  
all other flux components



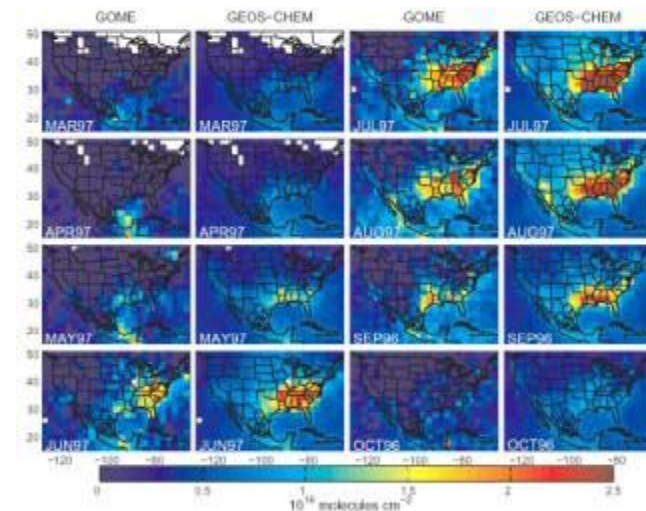
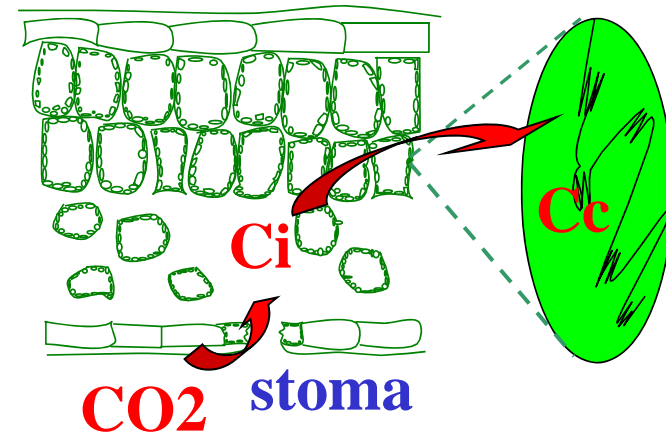
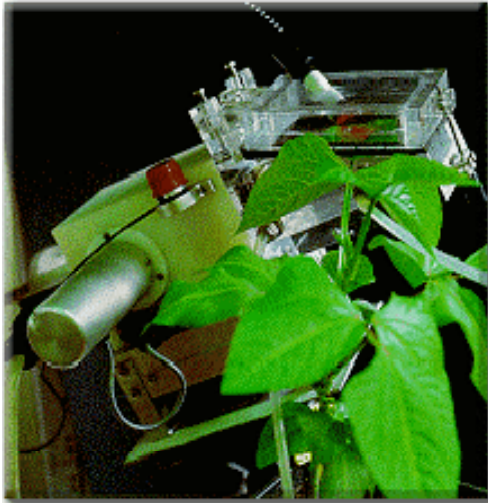
26%

2.3 ± 0.4 PgC y<sup>-1</sup>

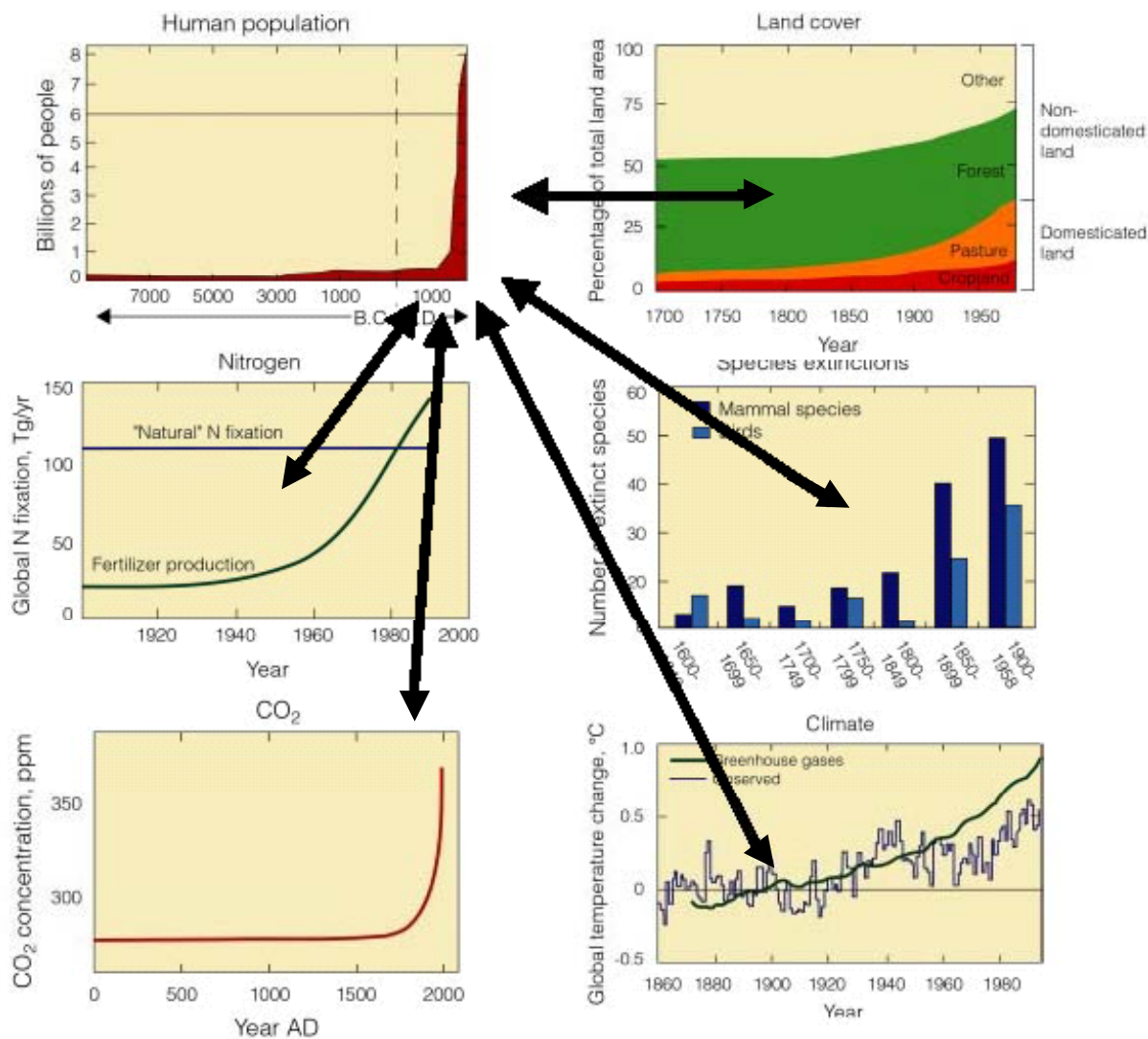
Average of 5 models



# Ruolo della ricerca: aumentare la comprensione del potenziale di assorbimento della CO<sub>2</sub> nelle foreste

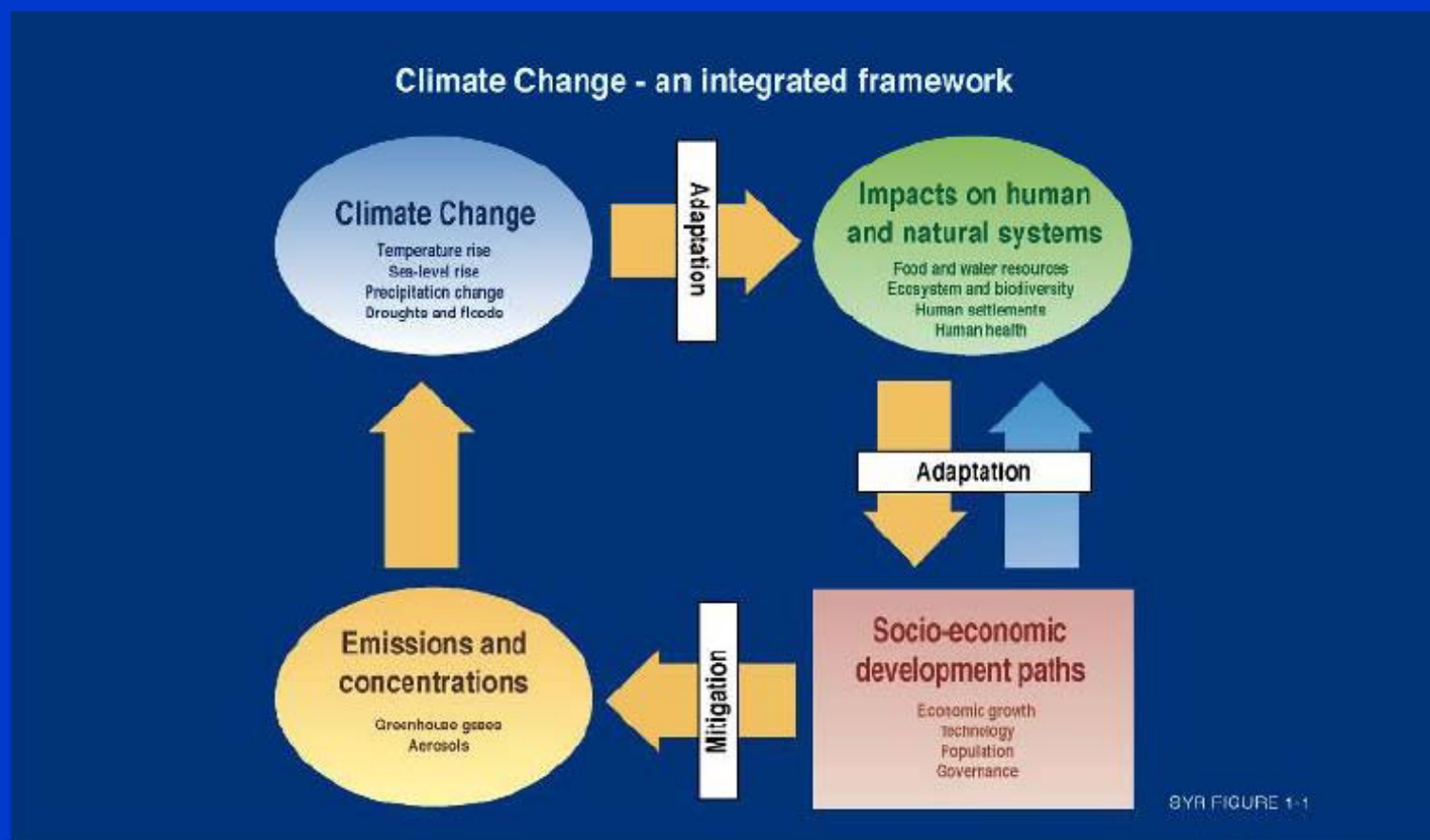


# Global change ↔ climate change



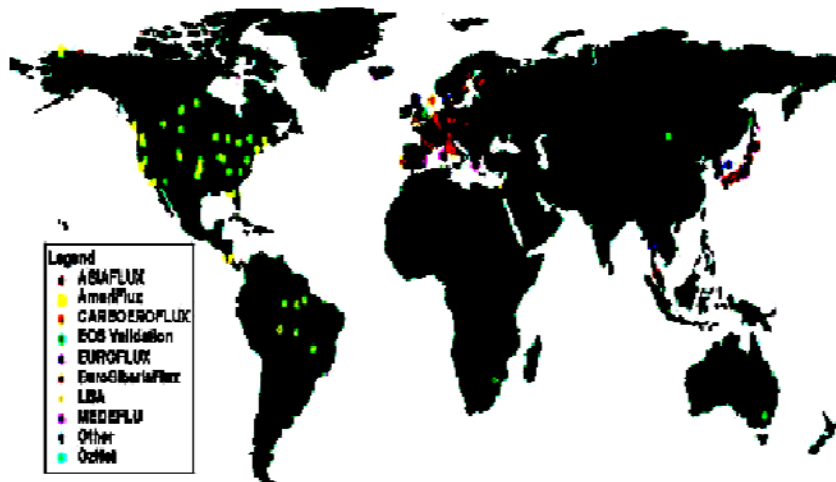


# Adattamento vs. Mitigazione



# Measuring C budget in forests (NEE)

## the FluxNet network



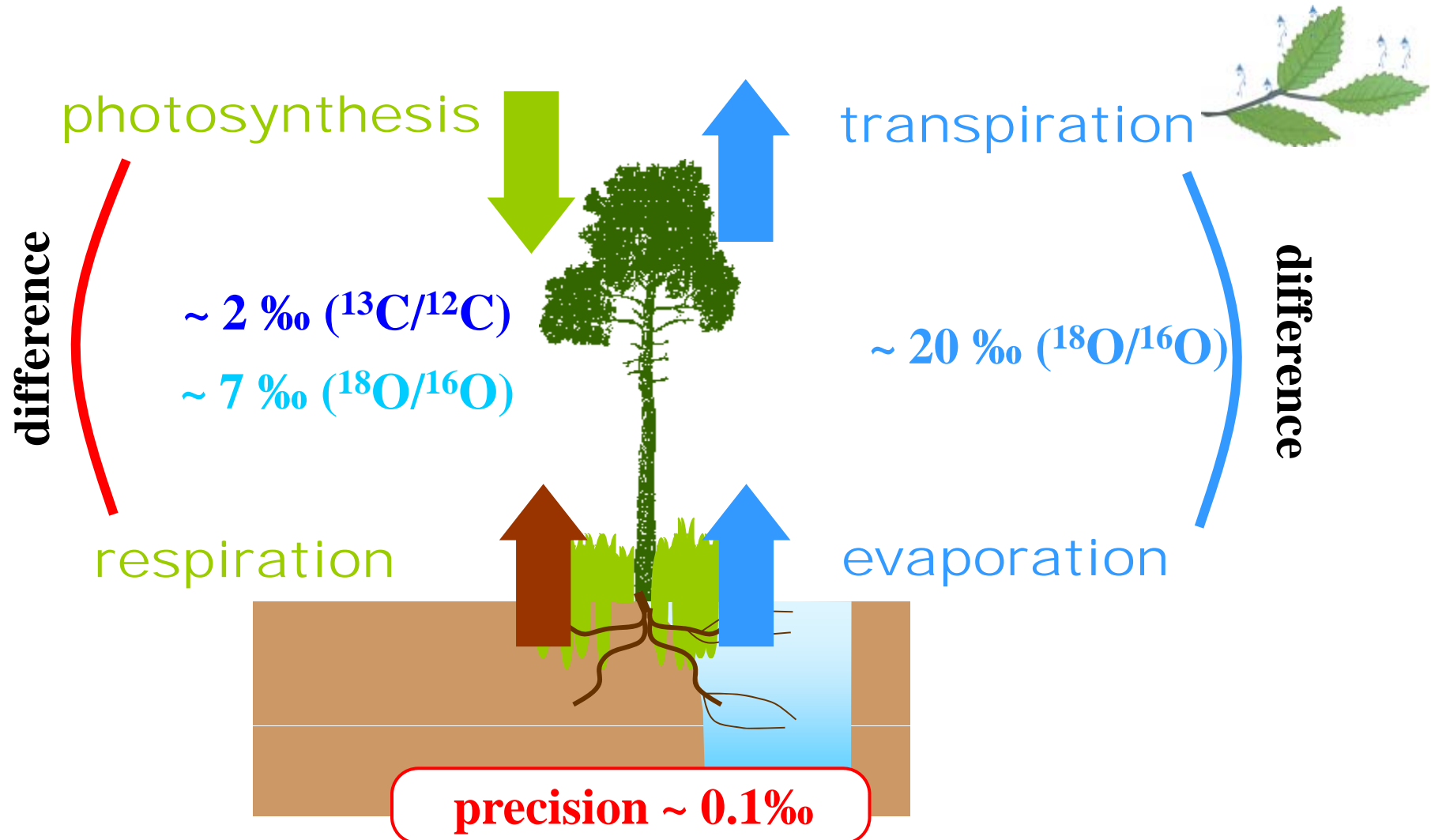
Role of the component fluxes  
(respiration/ assimilation)?

$$F_R/F_A$$

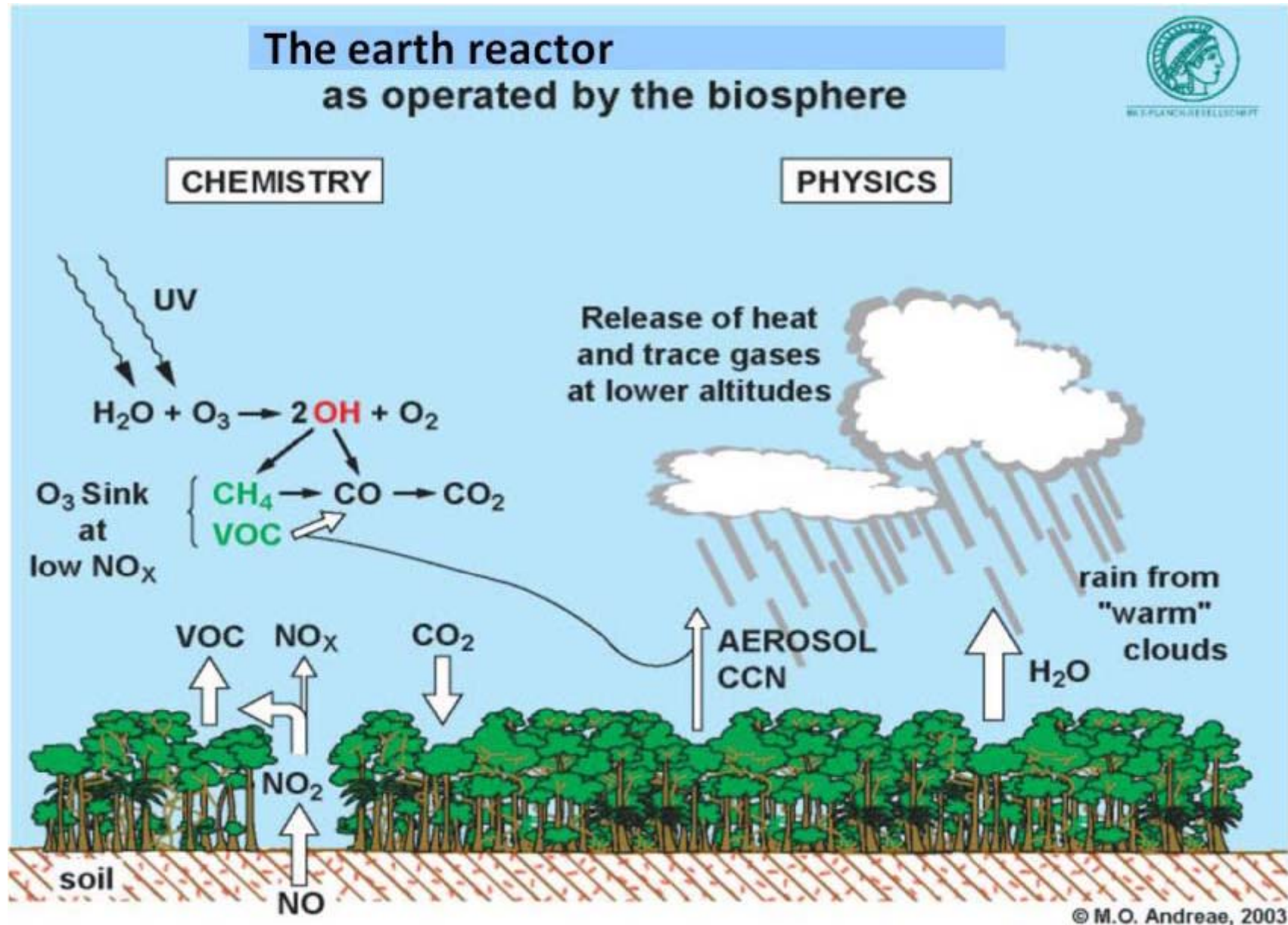


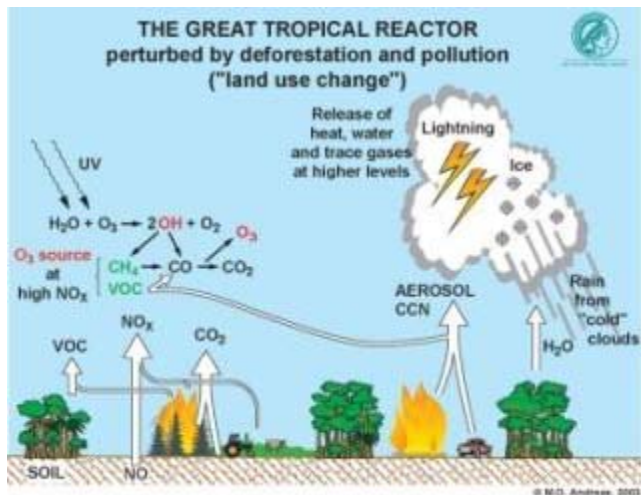
# Using isotopes to partition NEE into $F_A/F_R$

- Gross fluxes have **different** isotopic signatures



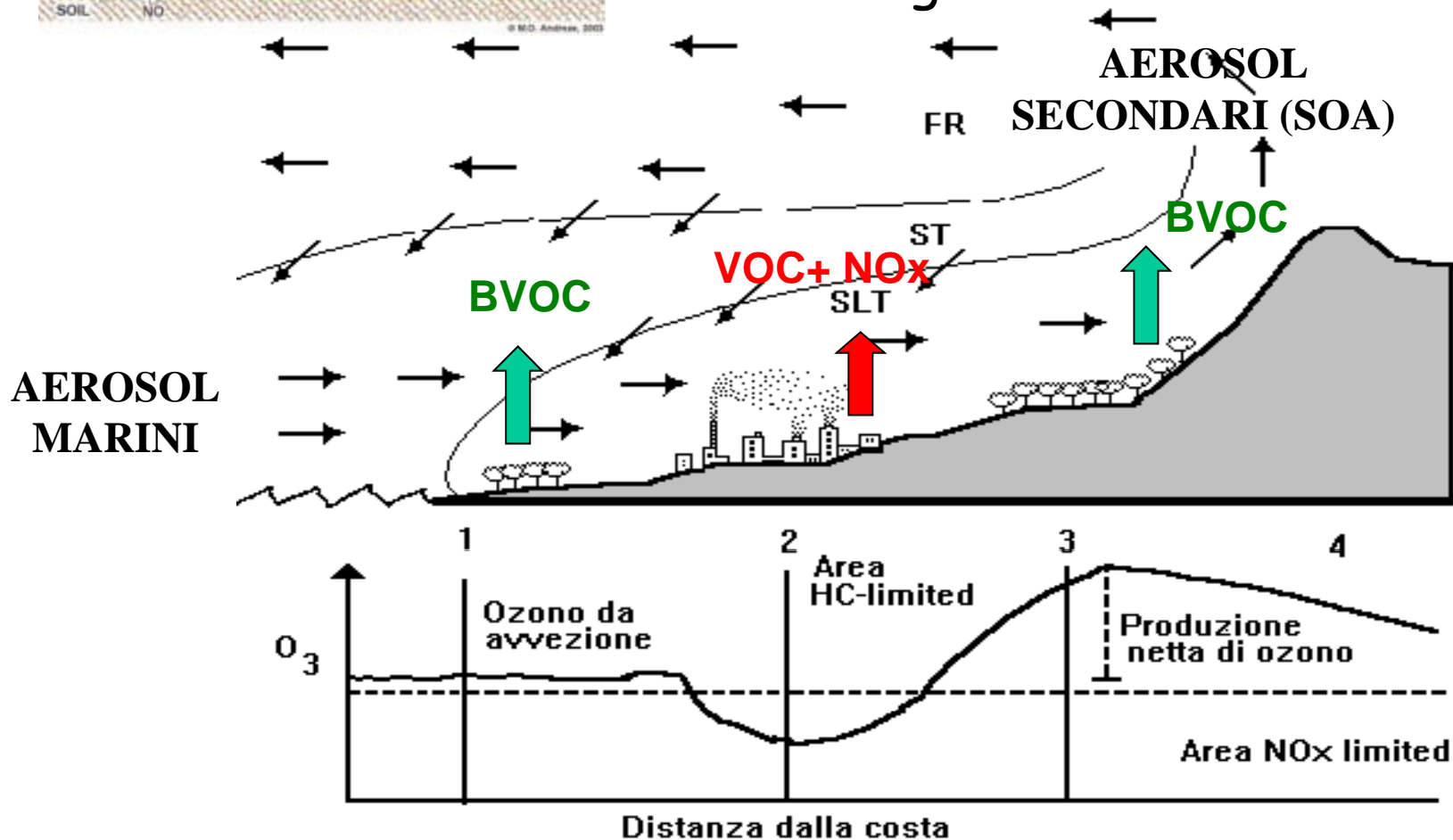
# NON SOLO CO<sub>2</sub> NELLE INTERAZIONI FORESTA-ATMOSFERA





why the Mediterranean is a "hot spot" for BVOC and photochemical pollution.....

...along the coasts



# Il fattore incendi

Con i cambiamenti climatici il rischio incendi può aumentare. La prevenzione e la protezione delle foreste da questo rischio sarà sempre più importante.



## Ricerca:

- Emissioni di gas-serra, altri composti organici e inquinanti in seguito agli incendi
- Potenzialità di recupero aree incendiate
- Ricostituzione
- Possibili dinamiche di successione ecologica

A low-angle photograph looking up at a dense forest canopy. The image is filled with vibrant green leaves and dark tree branches, with sunlight filtering through, creating a bright and airy atmosphere. The perspective is from the ground looking up towards the sky.

Grazie per l'attenzione