

# Improving estimates of Amazon carbon fluxes within the GEOCARBON project using DOFOCO

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with contributions of

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LABORATOIRE DES SCIENCES  
DU CLIMAT ET DE  
L'ENVIRONNEMENT



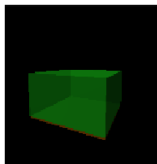
UNIVERSITY OF LEEDS

## Collaboration LSCE-Leeds in GEOCARBON

The collaboration aims to improve the characterisation of the **seasonality and interannual variability** of carbon fluxes in the Amazon... through the application of **inversion and data assimilation systems** to combine multiple data sources (ORCHIDEE-DOFOCO, forest biomass, Fluxnet and CO<sub>2</sub> profiles).

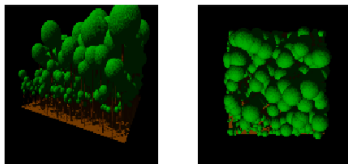
# DOFOCO – Canopy structure and productivity

## ORCHIDEE



Solid mass of vegetation

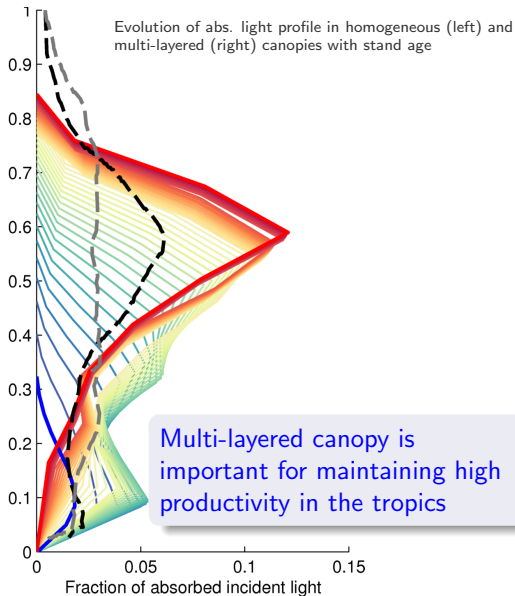
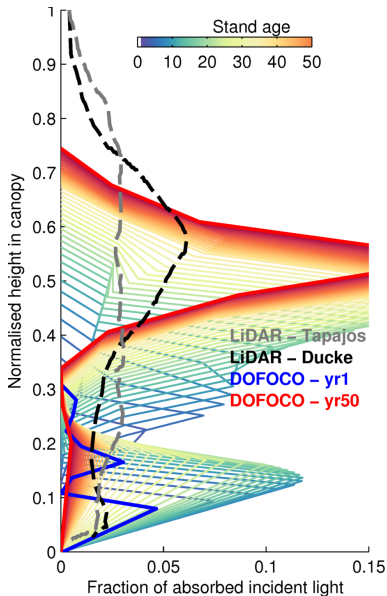
## DOFOCO canopy structure



- + Canopy structure based on allometry
- + Prognostic number of trees
- + No actual tree positions (Poisson distribution)

New canopy and forest structure has implications for biophysics and biogeochemistry, especially in the tropics

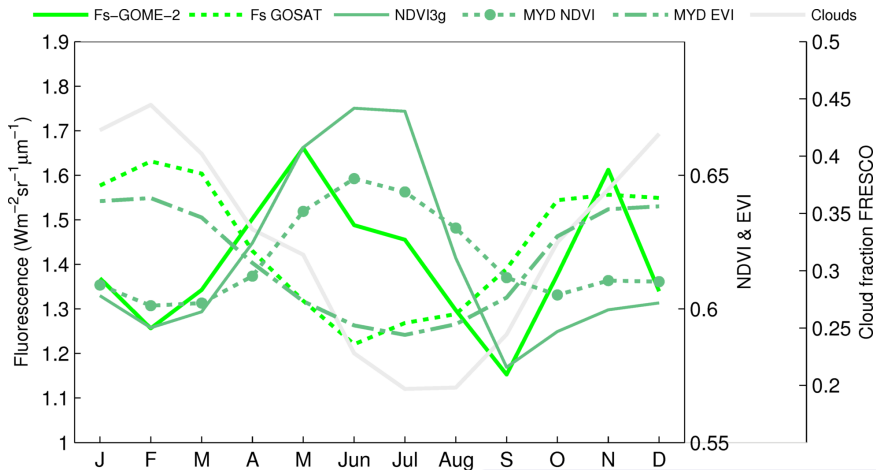
# Evolution of absorbed light profiles with stand growth



- 1 **Parameterise and extend ORCHIDEE-DOFOCO in the tropics**  
⇒ collaboration with DOFOCO team and N. Najdovski (Montana)
  - Introduction of recruitment
  - Improvement of moisture stress
  - Implementation of tree-ring isotopes (with Jina Jeong, Seoul)
- 2 **Data assimilation to optimise ORCHIDEE (PYVOR)**  
⇒ collaboration with Manuel Gloor and Oliver Philipps, ULeeds
  - Fluxnet sites
  - In-situ biomass increment (ULeeds, RAINFOR plot data)
  - Remote sensing products
- 3 **Atmospheric inversion (PYVAR)**  
⇒ collaboration with Luis Molina, LSCE
  - Newly produced CO<sub>2</sub> profiles (Gatti et al., 2013)
  - Methodological challenge (inversion setup)
  - Meso and large-scale transport models (Chimere-Brams, LMDZ-4/5)

## Supplementary slides

# Remote sensing data streams in the Amazon



• Contrasting vegetation dynamics in satellite products

# Tree-ring isotopes in ORCHIDEE

