DOFOCO – Do Forest Cool the Earth

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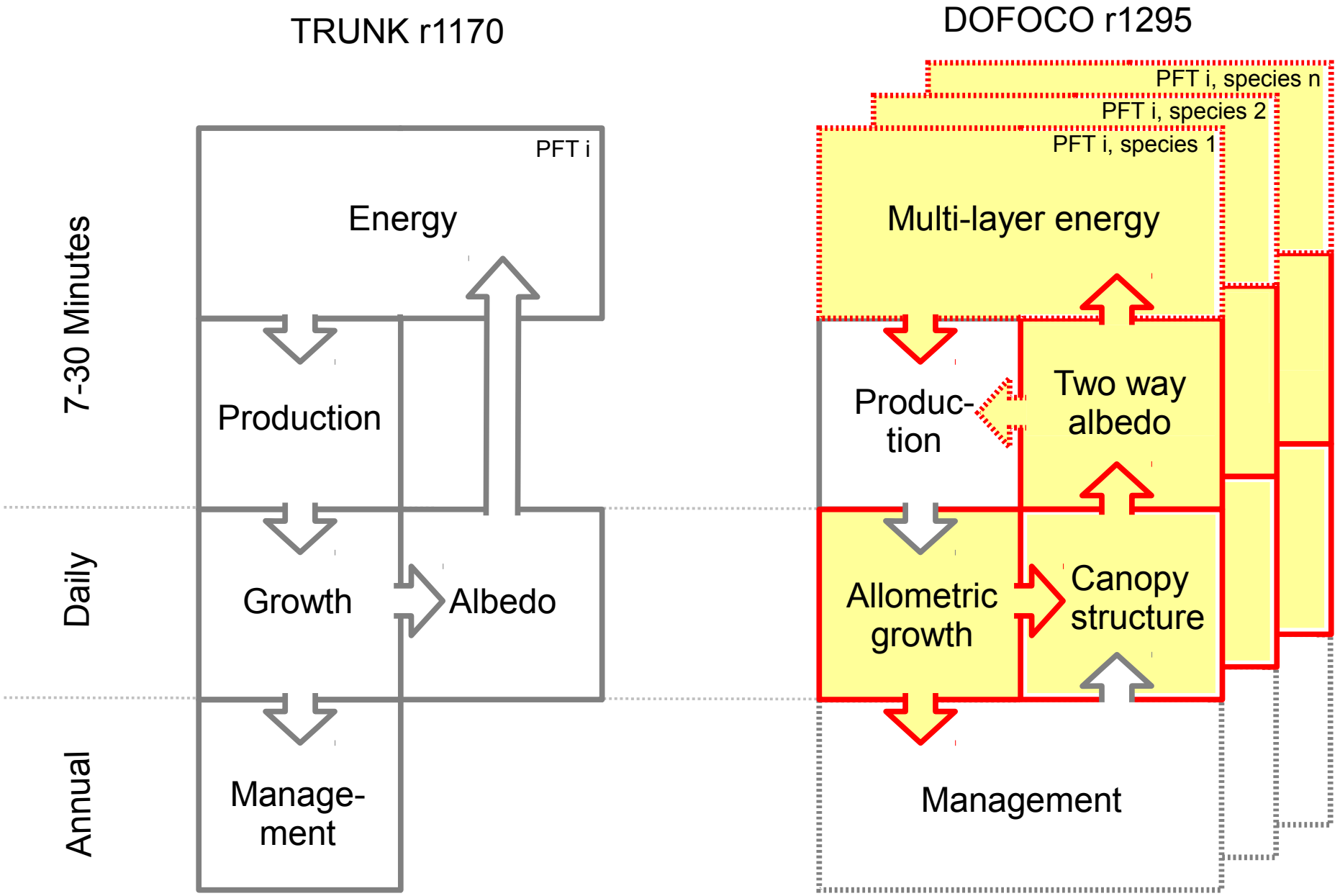
Aim: The ***overall goal of DOFOCO*** is to quantify and understand the role of forest management in mitigating climate change. Specifically, the current focus on the carbon cycle will be replaced with a total climate impact approach.

Conceptual shortcomings to the current version(s):

- land-atmosphere interaction only through LAI
- surface area forest/bare soil is changing but not the forest itself
- no tree diameter (management & canopy) or height (roughness)
- no different management systems
- PFTs instead of species

DOFOCO developments



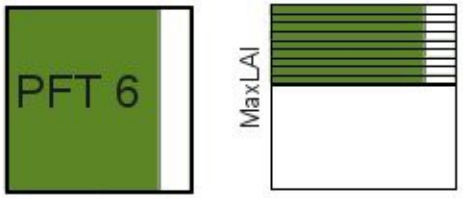
ORCHIDEE DOFOCO branch

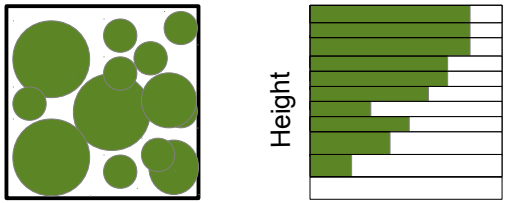
Real world

TRUNK v1170

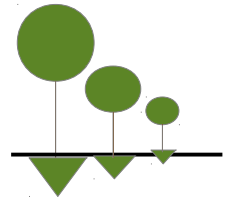
DOFOCO v1295

LAI & GPP

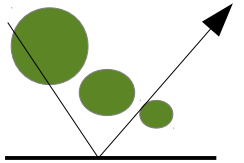




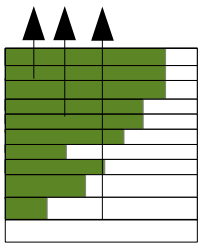
NPP & biomass



Albedo



Energy budget



Key developments

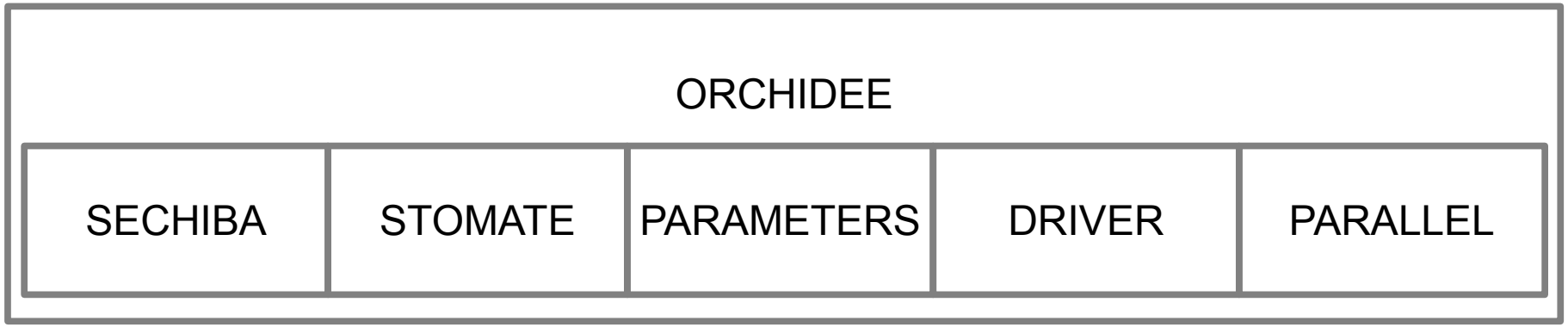
- Discretisation of biophysical (energy budget & albedo) and biogeochemical (allocation) processes

- Integration of Sechiba and Stomate

- Level of interest to stakeholders

The structure of ORCHIDEE's source code

The current structure



The limits of today's structure

Examples:

Canopy structure	→ src_stomate
Canopy albedo	→ src_sechiba
LAI effective	→ ???
Land use	→ src_stomate
P1, P10 & P100	→ ???

Conflicting solutions

(1) Introduce more classes	(2) Every classification will fail
- src_sechiba - src_stomate - src_sapiens - src_inca - src_driver - src_parameters - src_parallel	sechiba_slowproc … stomate_prescribe … lpj_kill … inca_voc ...

From cosmetic to fundamental

One module, one src_class

- stomate.f90 → heterotrophic respiration
- stomate_forestry.f90 → prescribe, allocation, management
- stomate_lcc.f90 → land cover change, product pool

Parameters

Prepare for the next generation of ESM and/or save time:

- Parameters should be traceable (observations, optimized values or SF)
- Mean and uncertainty (priorities and optimize)
- Repository at the MTC, PFT, site-level that is the reference
- Fully documented (individual values + type of uncertainty)
- Repository of the data sources (papers & data)