A: Model structure

B: Vegetation dynamics

ModelE2.1
GCM

TerraE
(Land surface
energy & water)
Evaporation
Runoff
Soil water
Surface albedo
Roughness length

Ent
Photosynthesis
Respiration

Leaves ($X_{L}$)
Sapwood ($X_{SP}$)
Heartwood ($X_{H}$)
Fine Roots ($X_{FR}$)

Soil BGC

Fine Litter ($X_{L}$)
Coarse Litter ($X_{CL}$)
Microbial ($X_{M}$)
Fast SOM ($X_{F}$)
Slow SOM ($X_{S}$)

Mineral N
NSC
NSN

N uptake
N deposition
N loss

Population dynamics
Reproduction:
$N_{in}(t) = \int_{0}^{\infty} N_{in}(t) F(s_{in}(t), t) \, dt$

Growth:
$\frac{d\theta_{in}(t)}{dt} = g_{in}(s_{in}(t), t)$

Mortality:
$\frac{dN_{in}(t)}{dt} = -\mu_{in}(s_{in}(t), t) N_{in}(t)$

Plant Physiology &
Growth
Photosynthesis
Respiration
Transpiration
Growth
Allocation

Crown layering (PPA)

Social status

1 = \int_{z_{min}}^{z_{max}} N(z) A(z, Z) \, dz