

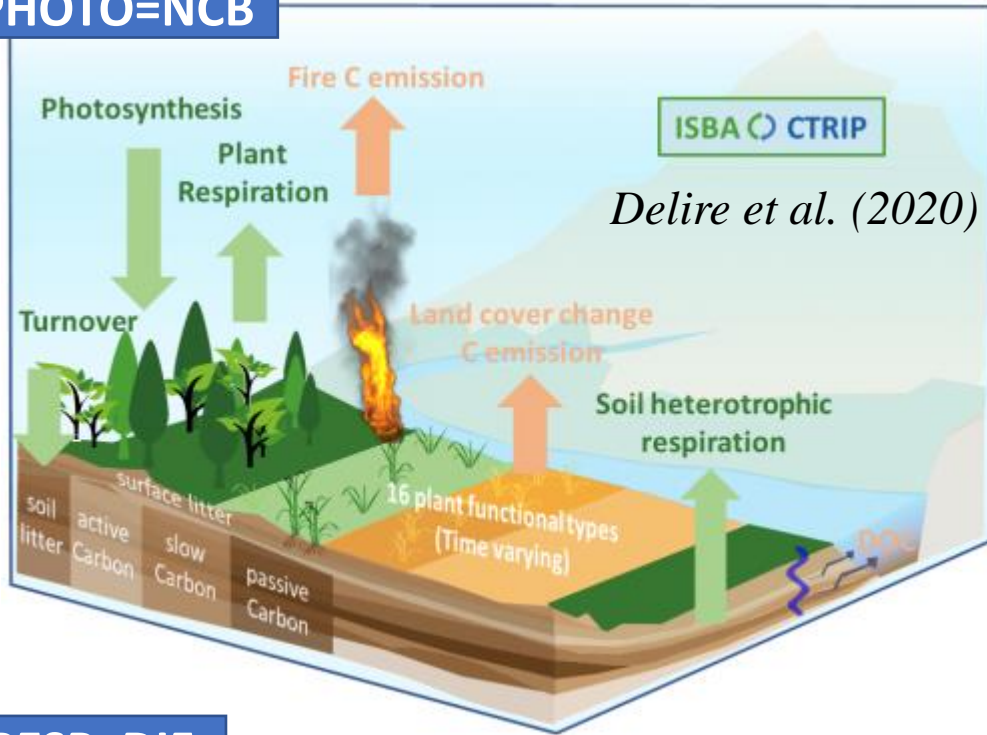
GMGEC : Version CNRM-CM6/ESM (8.0) → Version 9 (since last autumn)

More than 300 routines to phase, adapt, or rewrite

- ✓ New forcing interpolation (optional)
 - ✓ Gaussian PDF allowing to disaggregate precip in time over the forcing interval
 - ✓ Flux average values conservation over the forcing interval
 - ✓ Need fluxes at t+2 (so NETCDF with 2 additional timesteps instead of 1)
- ✓ News schemes for carbon cycle & revised land use
- ✓ Sea / Sea-ice flux tiling for Ocean / Gelato coupling
- ✓ Daily nudging for soil moisture and snow mass
- ✓ Adapt SURFEX for CMIP diags via XIOS (~500 diags)

```
decharme@pxest9:~/SURFEX/SURFEX_v9
albedo_rs14.F90      diag_inline_seafluxn.F90  init_teb_veg_optionsn.F90  modn
allocate_physio.F90  diag_inline_surf_atmn.F90  init_vegn.F90              modn
allocate_teb_veg.F90  diag_isba_initn.F90       init_veg_pgdn.F90         modn
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attribute_closest_vegtype_nudging.F90  diag_seaflux_initn.F90  isba_albedo.F90          nudg
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av_pgd.F90           e_budget_meb.F90         isba_meb.F90             prep
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biomass_to_soil_litter.F90  fapair.F90               isba_snow_agr.F90       prep
biomass_to_surface_litter.F90  fire_carbon.F90          landuse_biomass.F90     prep
carbon_dynamic.F90     fire_disturbance.F90    landuse_carbon_dif.F90  prep
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carbon_soil.F90        get_default_namn.F90    modd_fire_par.F90        prep
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cotwores.F90          hydro_soildif.F90       modd_sfx_oasis.F90       prep
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coupling_seafluxn.F90  ini_csts.F90            modd_soilgas_par.F90     prep
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default_isba_nudging.F90  init_isba_landuse.F90  mode_gridtype_conf_proj.F90  prep
default_seaflux.F90   init_isba_mixpar.F90    mode_gridtype_gauss.F90  prep
default_surf_atm.F90  init_isban.F90          mode_prep_ctl.F90        prep
default_teb_veg.F90   init_naturen.F90        mode_read_extern.F90     prep
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write_surf_atmn.F90
writesurf_flake_conf.F90
writesurf_isba_conf.F90
writesurf_isban.F90
writesurf_pgd_isban.F90
writesurf_seafluxn.F90
writesurf_teb_gardenn.F90
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zoom_pgd_isba_full.F90
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CPHOTO=NCB



➤ Changes in photosynthesis

- Adapt soil stress and some parameters for tropical trees
- Parameterization of light-use efficiency for C assimilation by plant with increasing atmospheric CO₂ (Arora et al. 2009)

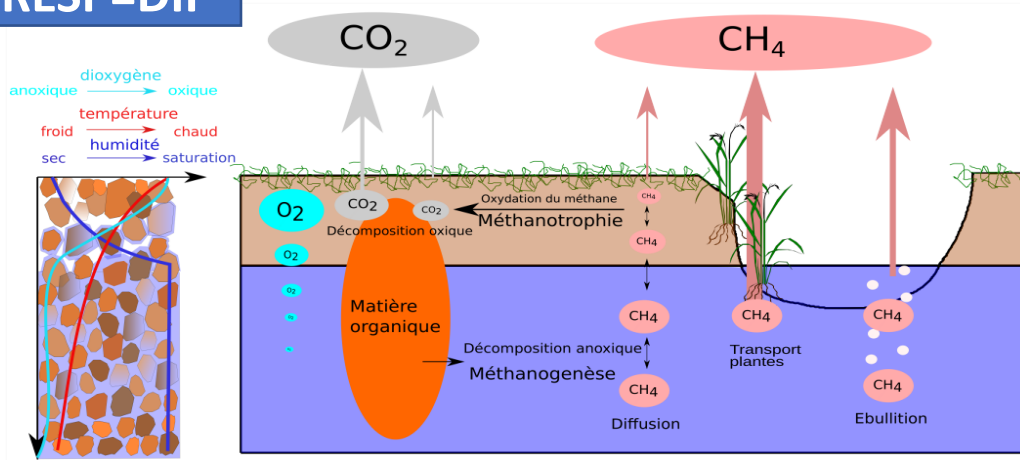
➤ Very simple biomass fire scheme

➤ Soil C lixiviation in ISBA & DOC routing in CTRIP

➤ Revised land use land cover change (LULCC) code

- Close the water and carbon budgets
- Anthropogenic carbon stocks
- Harvesting crops

CRESP=DIF



➤ Multi-layer soil carbon dynamic

- Discretization of soil carbon (as water and temperature)
- Soil carbon profile via accumulation (advection) of dead material
- Soil carbon mixing via bioturbation & cryoturbation in permafrost

➤ Multi-layer soil gas scheme

- O₂, CO₂ & CH₄ soil profiles (as water and temperature)
- CO₂ & CH₄ production/consumption
- Gas transport by diffusion, by plants, and by ebullition

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average_diag_evap_isban.F90  diag_surf_budget_sea.F90  isba.F90                 pgd
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