Calculation different carbon balance values

Some output-files display values which were calculated in the cause of the model run or immediately before issued to the output-file. The following describes how the calculations/balancing is done.

File c_bal

This files displays values of the carbon balance as [kg/ha] as well as [mol/m²]. Often following conversion factors are used:

gm2_in_kgha
cpart
Cmass

GPP

Sum of total NPP and total autotrophic respiration of all cohorts and species (autresp) in [kg C/ha]

y_autresp = autresp * cpart * 10000./kpatchsize
Conversion: kg DW / patch --> kg C/ha

y_GPP = y_NPP + y_autresp

NPP

y_NPP= sumNPP * cpart * 10000./kpatchsize
Conversion: kg DW / patch --> kg C / patch --> kg C/ha

C_dead_st

y_C_d_st = C_opm_stem * gm2_in_kgha g/m2 --> kg C/ha

ym_C_d_st = C_opm_stem / Cmass g/m2 --> mol/m2

C_sumvsab

y_sumvsab = sumvsab * cpart! kg DW /ha --> kg C

File comp

cumVs_ab

cumsumvsab = cumsumvsab + sumvsab

if (thin_dead .ne. 0) then

  cumsumvsab = cumsumvsdead

  cumsumvsdead = 0.

end if

cumVs_dead

cumsumvsdead = cumsumvsdead + sumvsdead

C_sum

C_sum = C_tot + C_opm_stem +
(sumbio + cumsumvsab + cumsumvsdead) * cpart / 1000.

C_d_stm

C-amount of all dead and partially digested stems until the end of simulation time

$$C\_opm\_stem = \sum_{i=1}^{n} slit(i)\%C\_opm\_stem$$ n – amount of species

C_tot

C-amount in the entire ground/soil including humus ground cover and litter cover without dead stems at the end of simulation time

$$C\_tot = C\_hum\_tot + \sum_{j=1}^{nlay} C\_opm(j)$$ nlay – amount of soil layers

C_hum_tot

$$C\_hum\_tot = \sum_{j=1}^{nlay} C\_hum(j)$$

File Copm

C_opm(1): organic primary substance of the cover layer without dead stems

C_opm(j) , j = 2,...,nlay: organic primary substance of each mineal soil layer; contains only roots

Initialisation (in s_cn_gener):

$$C\_opm(1) = \sum_{i=1}^{n} \left(slit(i)\%C\_opm\_fol + slit(i)\%C\_opm\_frt + slit(i)\%C\_opm\_tbc \right)$$

n – amount of species

$$C\_opm(j) = \sum_{p} \left(p\%coh\%frtrel(j) \cdot spar(ns)\%psr \cdot p\%coh\%x\_frt \cdot cpart \cdot p\%coh\%ntreea \cdot hconvd \right)$$

p ∈ {Cohorten}, ns = p %coh%species

Annual balancing (in cn_inp)::

$$C\_opm(1) = C\_opm(1) + \sum_{p} \left(p\%coh\%litC\_fol + p\%coh\%litC\_tbc + p\%coh\%litC\_frt \cdot hconvd \cdot p\%coh\%frtrel(1) \right)$$

$$C\_opm(j) = C\_opm(j) + \sum_{p} \left(p\%coh\%litC\_frt \cdot hconvd \cdot p\%coh\%frtrel(j) \right)$$

p ∈ {Cohorts}

hconvd = 1000. / kpatchsize