Contents

Appendix 1

Warning this is a DRAFT document. The parameter ranges in the tables have not been reviewed.

Appendix 1.1 Crop/grass parameters (crop.100)

These crop.100 parameters are read for the initial crop/grass specified in the schedule file header, and for each subsequent crop/grass introduced in the schedule file with a CROP event.

prdx(1)	Coefficient for calculating total monthly potential production as a function of solar radiation outside the atmosphere. It functions as a radiation use efficiency scalar on potential production. It reflects the relative genetic potential of the plant; larger PRDX(1) values indicate greater growth potential.	scaling factor, (gC production) $*m^{-2}$ $*month^{-1}$ $*Langley^{-1}$	0.1 – 5.0
ppdf(1)	Optimum temperature for production for parameterization of a Poisson Density Function curve to simulate temperature effect on growth.	°C	10.0 – 40.0
ppdf(2)	Maximum temperature for production for parameterization of a Poisson Density Function curve to simulate temperature effect on growth.	°C	20.0 – 50.0
ppdf(3)	Right curve shape for parameterization of a Poisson Density Function curve to simulate temperature effect on growth.		0.0 – 1.0

ppdf(4)	Right curve shape for parameterization of a Poisson Density Function curve to simulate temperature effect on growth.		0.0 – 10.0
bioflg	Flag indicating whether production should be reduced by physical obstruction; 0=production should not be reduced; 1=production should be reduced.	index	0, 1
biok5	Level of aboveground standing dead + 10% strucc(1) C at which production is reduced to half maximum due to physical obstruction by dead material. Used only when ***bioflag*** = 1.	g C m^{-2}	0.0 – 2000.0
pltmrf	Planting month reduction factor to limit seedling growth; set to 1.0 for grass.	fraction	0.0 – 1.0
fulcan	Value of above ground live C (aglivc) at full canopy cover, above which potential production is not reduced. (Above which there is no restriction on seedling growth).	g C m^{-2}	50.0 – 200.0
frtcindx	**0** - use Great Plains equation to compute root to shoot ratio (fixed carbon allocation based on rainfall, perennial plant); **1** - perennial plant; **2** - annual plant; **3** - perennial plant, growing degree day; **4** - non-grain filling annual plant, growing degree day implementation; **5** - grain filling annual plant, growing degree day implementation; **6** - grain filling annual plant that requires a vernalization period (i.e. winter wheat), growing degree day implementation	index	0, 1, 2, 3, 4, 5, 6
frtc(1)	Fraction of C allocated to roots at planting, with no water or nutrient stress, used when FRTCINDX = 2, 4, 5, or 6.	fraction	0.0 – 1.0

frtc(2)	Fraction of C allocated to roots at time FRTC(3), with no water or nutrient stress, used when FRTCINDX = 2, 4, 5, or 6.	fraction	0.0 – 1.0
frtc(3)	Time after planting (days with soil temperature greater than RTDTMP) at which the FRTC(2) value is reached, used when FRTCINDX = 2, 4, 5, or 6.	number of days	
frtc(4)	Maximum increase in the fraction of C going to the roots due to water stress, used when FRTCINDX = 2, 4, 5, or 6.	fraction	0.0 – 1.0
frtc(5)	Maximum increase in the fraction of C going to the roots due to nutrient stress, used when FRTCINDX = 2, 4, 5, or 6.	fraction	0.0 – 1.0
cfrtcn(1)	Maximum fraction of C allocated to roots under maximum nutrient stress, used when FRTCINDX = 1 or 3.	fraction	0.0 – 1.0
cfrtcn(2)	Minimum fraction of C allocated to roots with no nutrient stress, used when FRTCINDX = 1 or 3.	fraction	0.0 – 1.0
cfrtcw(1)	Maximum fraction of C allocated to roots under maximum water stress, used when FRTCINDX = 1 or 3.	fraction	0.0 – 1.0
cfrtcw(2)	Minimum fraction of C allocated to roots with no water stress, used when FRTCINDX = 1 or 3.	fraction	0.0 – 1.0
biomax	Aboveground biomass level above which the minimum and maximum C/E ratios of new shoot increments equal pramn(*,2) and pramx(*,2) respectively.	g biomass m^{-2}	0 – 1000
pramn(1,1)	Minimum aboveground C/N ratio with zero biomass.	C/N ratio	1.0 – 100.0

pramn(2,1)	Minimum aboveground C/P ratio with zero biomass.	C/P ratio	1.0 – 9999.0
pramn(3,1)	Minimum aboveground C/S ratio with zero biomass.	C/S ratio	1.0 – 9999.0
pramn(1,2)	Minimum aboveground C/N ratio with biomass > biomax.	C/N ratio	1.0 – 200.0
pramn(2,2)	Minimum aboveground C/P ratio with biomass > biomax.	C/P ratio	1.0 – 9999.0
pramn(3,2)	Minimum aboveground C/S ratio with biomass > biomax.	C/S ratio	1.0 – 9999.0
pramx(1,1)	Maximum aboveground C/N ratio with zero biomass.	C/N ratio	1.0 – 200.0
pramx(2,1)	Maximum aboveground C/P ratio with zero biomass.	C/P ratio	1.0 – 9999.0
pramx(3,1)	Maximum aboveground C/S ratio with zero biomass.	C/S ratio	1.0 – 9999.0
pramx(1,2)	Maximum aboveground C/N ratio with biomass > biomax.	C/N ratio	1.0 – 400.0
pramx(2,2)	Maximum aboveground C/P ratio with biomass > biomax.	C/P ratio	1.0 – 9999.0
pramx(3,2)	Maximum aboveground C/S ratio with biomass > biomax.	C/S ratio	1.0 – 9999.0
prbmn(1,1)	(N, intercept) parameter for computing minimum C/N ratio for belowground matter as a linear function of annual precipitation.	C/N ratio	1.0 – 150.0
prbmn(2,1)	(P, intercept) parameter for computing minimum C/P ratio for belowground matter as a linear function of annual precipitation.	C/P ratio	0.0 – 9999.0
prbmn(3,1)	(S, intercept) parameter for computing minimum C/S ratio for belowground matter as a linear function of annual precipitation.	C/S ratio	0.0 – 9999.0

prbmn(1,2)	(N, slope) parameter for computing minimum C/N ratio for belowground matter as a linear function of annual precipitation.	change in C/N ratio per cm precipitation	0.0 – 1.0
prbmn(2,2)	(P, slope) parameter for computing minimum C/P ratio for belowground matter as a linear function of annual precipitation.	change in C/P ratio per cm precipitation	0.0 – 9999.0
prbmn(3,2)	(S, slope) parameter for computing minimum C/S ratio for belowground matter as a linear function of annual precipitation.	change in C/S ratio per cm precipitation	0.0 – 9999.0
prbmx(1,1)	(N, intercept) parameter for computing maximum C/N ratio for belowground matter as a linear function of annual precipitation.	C/N ratio	0.0 – 300.0
prbmx(2,1)	(P, intercept) parameter for computing maximum C/P ratio for belowground matter as a linear function of annual precipitation.	C/P ratio	0.0 – 9999.0
prbmx(3,1)	(S, intercept) parameter for computing maximum C/S ratio for belowground matter as a linear function of annual precipitation.	C/S ratio	0.0 – 9999.0
prbmx(1,2)	(N, slope) parameter for computing maximum C/N ratio for belowground matter as a linear function of annual precipitation.	change in C/N ratio per cm precipitation	0.0 – 1.0
prbmx(2,2)	(P, slope) parameter for computing maximum C/P ratio for belowground matter as a linear function of annual precipitation.	change in C/P ratio per cm precipitation	0.0 – 1.0

prbmx(3,2)	(S, slope) parameter for computing maximum C/S ratio for belowground matter as a linear function of annual precipitation.	change in C/S ratio per cm precipitation	0.0 – 1.0
fligni(1,1)	Intercept for equation to predict lignin content fraction based on annual rainfall for aboveground material.	g lignin C / g C	0.0 – 1.0
fligni(2,1)	Slope for equation to predict lignin content fraction based on annual rainfall for aboveground material. For crops, set to 0.	change in lignin fraction per cm precipitation	0.0 – 1.0
fligni(1,2)	Intercept for equation to predict lignin content fraction based on annual rainfall for juvenile fine root material.	g lignin C / g C	0.0 – 1.0
fligni(2,2)	Slope for equation to predict lignin content fraction based on annual rainfall for juvenile fine root material. For crops, set to 0.	change in lignin fraction per cm precipitation	0.0 – 1.0
fligni(1,3)	Intercept for equation to predict lignin content fraction based on annual rainfall for mature live fine root material	g lignin C / g C	0.0 – 1.0
fligni(2,3)	Slope for equation to predict lignin content fraction based on annual rainfall for mature live fine root material. For crops, set to 0.	change in lignin fraction per cm precipitation	0.0 – 1.0
himax	Maximum harvest index maximum, the fraction of aboveground live C (aglivc) allocated to grain at the time of harvest.	fraction	0.0 – 1.0
hiwsf	Harvest index water stress factor: 0=no effect of water stress; 1= no grain yield with maximum water stress.	fraction	0 – 1

himon(1)	Number of months prior to harvest in which to begin accumulating water stress effect on harvest index.	number of months	1 – 12
himon(2)	Number of months prior to harvest in which to stop accumulating water stress effect on harvest index.	number of months	1 – 12
efrgrn(1)	Fraction of above ground N which goes to grain.	fraction	0.0 – 1.0
efrgrn(2)	Fraction of above ground P which goes to grain.	fraction	0.0 – 1.0
efrgrn(3)	Fraction of above ground S which goes to grain.	fraction	0.0 – 1.0
vlossp	Fraction of above ground plant N which is volatilized (occurs during harvest and death).	fraction	0.0 – 1.0
fsdeth(1)	Maximum shoot death rate at very dry soil conditions (fraction/month); to get the monthly shoot death rate, this fraction is multiplied by a reduction factor depending on the soil water status.	fraction	0.0 – 1.0
fsdeth(2)	Fraction of shoots which die during senescence month; must be ≥ 0.4.	fraction	0.4 – 1.0
fsdeth(3)	Additional fraction of shoots which die when aboveground live C is greater than fsdeth(4).	fraction	0.0 – 1.0
fsdeth(4)	Level of aboveground C above which shading occurs and shoot senescence increases.	g C m^{-2}	0.0 – 500.0
fallrt	Fall rate (fraction of standing dead which falls each month).	fraction	0.0 – 1.0

rdrj	Maximum juvenile fine root death rate at very dry soil conditions (fraction/month); to get the monthly root death rate, this fraction is multiplied by a reduction fraction depending on the soil water status.	fraction	0.0 – 1.0
rdrm	Maximum mature fine root death rate at very dry soil conditions (fraction/month); to get the monthly root death rate, this fraction is multiplied by a reduction fraction depending on the soil water status.	fraction	0.0 – 1.0
rdsrfc	Fraction of the fine roots that are transferred into the surface litter layer (SRTUCC(1) and METABC(1)) upon root death, the remainder of the roots will go to the soil litter layer (STRUCC(2) and METABC(2))	fraction	0.0 – 1.0
rtdtmp	This parameter is used to determine the number of days since planting (number of days where soil temperature >= rtdtmp). In turn, the number of days since planting is used to determine fine root allocation for annual plants. See frtc(3).	°C	-5.0 – 5.0
crprtf(1)	Fraction of N retranslocated from grass/crop leaves at death.	fraction	0.0 – 1.0
crprtf(2)	Fraction of P retranslocated from grass/crop leaves at death.	fraction	0.0 – 1.0
crprtf(3)	Fraction of S retranslocated from grass/crop leaves at death.	fraction	0.0 – 1.0
mrtfrac	Fraction of fine root production that goes into mature roots.	fraction	0.0 – 1.0
snfxmx(1)	Symbiotic N fixation maximum for grass/crop.	g N fixed/g C new growth	0.0 – 1.0

del13c	Delta 13C value for stable isotope labeling		-30.0 – 0.0
co2ipr(1)	In a grass/crop system, the effect on plant production ratio of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm.		0.5 – 1.5
co2itr(1)	In a grass/crop system, the effect on transpiration rate of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm.		0.5 – 1.5
co2ice(1,*,*)	**In a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm**		
co2ice(1,1,1)	(1,1,1) = minimum C/N; in a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm.	C/N ratio	0.5 – 1.5
co2ice(1,1,2)	(1,1,2) = minimum C/P; in a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm.	C/P ratio	0.5 – 1.5
co2ice(1,1,3)	(1,1,3) = minimum C/S; in a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm.	C/S ratio	0.5 – 1.5
co2ice(1,2,1)	(1,2,1) = maximum C/N; in a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm.	C/N ratio	0.5 – 1.5

co2ice(1,2,2)	(1,2,2) = maximum C/P; in a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm.	C/P ratio	0.5 – 1.5
co2ice(1,2,3)	(1,2,3) = maximum C/S; in a grass/crop system, the effect on C/E ratios of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm.	C/S ratio	0.5 – 1.5
co2irs(1)	In a grass/crop system, the effect on root/shoot ratio of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm.		0.5 – 1.5
ckmrspmx(1)	Maximum fraction of aboveground live C that goes to maintenance respiration for crops.	fraction	0.0 – 1.0
ckmrspmx(2)	Maximum fraction of belowground juvenile root C that goes to maintenance respiration for crops.	fraction	0.0 – 1.0
ckmrspmx(3)	Maximum fraction of belowground mature root C that goes to maintenance respiration for crops.	fraction	0.0 – 1.0
cmrspnpp(1)	X1 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is less than (CMRSPNPP(3) * predicted aboveground production) for a grass/crop system		
cmrspnpp(2)	Y1 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is less than (CMRSPNPP(3) * predicted aboveground production) for a grass/crop system		

cmrspnpp(3)	X2 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is less than (CMRSPNPP(3) * predicted aboveground production) for a grass/crop system -OR- X1 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is between (CMRSPNPP(3) * predicted aboveground production) and (CMRSPNPP(5) * predicted aboveground production) for a grass/crop system		
cmrspnpp(4)	Y2 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is less than (CMRSPNPP(3) * predicted aboveground production) for a grass/crop system -OR- Y1 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is between (CMRSPNPP(3) * predicted aboveground production) and (CMRSPNPP(5) * predicted aboveground production) for a grass/crop system		
cmrspnpp(5)	X2 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is between (CMRSPNPP(3) * predicted aboveground production)and (CMRSPNPP(5) * predicted aboveground production) for a grass/crop system		

cmrspnpp(6)	Y2 value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is between (CMRSPNPP(3) * predicted aboveground production) and (CMRSPNPP(5) * predicted aboveground production) for a grass/crop system -OR- Y value for line function that decreases maintenance respiration based on predicted aboveground production when the amount of carbon in the carbohydrate storage pool is greater than (CMRSPNPP(5)*predicted aboveground production) for a grass/crop system		
cgresp(1)	Maximum fraction of aboveground live C that goes to growth respiration for crops.	fraction	0.0 – 1.0
cgresp(2)	Maximum fraction of juvenile fine root live C that goes to growth respiration for crops.	fraction	0.0 – 1.0
cgresp(3)	Maximum fraction of mature fine root live C that goes to growth respiration for crops.	fraction	0.0 – 1.0
no3pref(1)	Maximum fraction of plant N uptake from NO_3-N. The remaining N uptake comes from NH_4-N. THIS PARAMETER IS NO LONGER USED IN THE MODEL!	fraction	0.0 – 1.0
claypg	Number of soil layers that crop roots can occupy. The value used as CLAYPG for annual plants will vary from 1 on the day that plant growth starts to CLAYPG as read from the CROP option on day FRTC(3) of plant growth	number of soil layers	1 - 9

cmix	Annual rate of mixing of surface SOM2C and soil SOM2C for grass/crop system, this value will also be used when running a savanna.	yr^{-1}	0.0 – 1.0
ddemerge	Number of growing degree days that need to accumulate after the PLTM event in order for plant emergence to occur when FRTCINDX = 4, 5, or 6.	number of degree days	
ddbase	Number of degree days required to trigger a senescence (SENM) event for a perennial (FRTCINDX = 3), maturity and harvest (HARV) for a non-grain filling annual (FRTCINDX = 4), or to reach anthesis (flowering) for a grain filling annual (FRTCINDX = 5 or 6).	number of degree days	
tmpkill	Temperature at which growth will stop when using the growing degree day submodel, will cause a SENM and LAST event when FRTCINDX = 3 or a HARV and LAST event if FRTCINDX = 4, 5, or 6, if the required number of thermal units have not been accumulated prior to trigger a SENM or a HARV event.	°C	
basetemp(1)	Base temperature for crop growth, growing degree days will accumulate only on days when the average temperature (a weighted average of the minimum and maximum daily temperature) is greater than the base temperature for the crop.	°C	
basetemp(2)	Ceiling on the maximum temperature used to compute the average temperature (a weighted average of the minimum and maximum daily temperature) for the growing degree day accumulation.	°C	

mnddhrv	Minimum number of degree days from anthesis (flowering) to harvest for grain filling annuals (FRTCINDX = 5 or 6) when there is full water stress.	number of degree days (°C)	
mxddhrv	Maximum number of degree days from anthesis (flowering) to harvest for grain filling annuals (FRTCINDX = 5 or 6) (no water stress).	number of degree days (°C)	
curgdys	Number of days of unrestricted growth in a grass/crop system.	number of days	
clsgres	Grass/crop late season growth restriction factor.		0.0 – 1.0
cmxturn	Maximum turnover rate per month of juvenile fine roots to mature fine roots through aging	fraction	0.0 – 1.0
wscoeff(1,1)	Water Stress Coefficient used to calculate the water stress multiplier on potential growth based on the relative water content of the wettest soil layer in the rooting zone (*maxrwcf, 0-1*). $\frac{1.0}{1.0+\exp\left(wscoeff\left(1,2\right)*\left(wscoeff\left(1,1\right)-maxrwcf\right)\right)}$	See h2ogef_calc.xlsx	0.2 – 0.5
wscoeff(1,2)	Water Stress Coefficient used to calculate the water stress multiplier on potential growth based on the relative water content of the wettest soil layer in the rooting zone. See comments above	See h2ogef_calc.xlsx	6.0 – 30.0
ps2mrsp(1)	Fraction of photosynthesis that goes to maintenance respiration.	fraction	0.0 – 1.0

sfavail(1)	Fraction of N available per day to plants. Formerly FAVAIL(1) in fix.100.		0.0 – 1.0
	Photosynthesis parameters only		
amax(1)	Maximum net CO_2 assimilation rate assuming maximum possible PAR, all intercepted, no temperature, water or vapor pressure deficit stress.	nmol CO_2 g^{-1} (leaf biomass) sec^{-1}	
amaxfrac(1)	Average daily maximum photosynthesis as a fraction of amax.	fraction	0.0 – 1.0
amaxscalar1(1)	Multiplier used to adjust aMax based on growthDays1 days since germination	scalar	
amaxscalar2(1)	Multiplier used to adjust aMax based on growthDays2 days since germination.	scalar	0.8 – 1.6
amaxscalar3(1)	Multiplier used to adjust aMax based on growthDays3 days since germination.	scalar	0.7 – 1.5
amaxscalar4(1)	Multiplier used to adjust aMax based on growthDays4 days since germination.	scalar	0.3 – 0.8
attenuation(1)	Light attenuation coefficient.		
basefolrespfrac(1)	Basal foliage respiration rate, as percentage of maximum net photosynthesis rate.		
cfracleaf(1)	Factor for converting leaf biomass to carbon (leaf biomass * cFracLeaf = leaf carbon).	g C / g biomass	

dvpdexp(1)	Exponential value in vapor pressure deficit effect on photosynthesis equation. dVpd = dVpdSlope * exp(vpd*dVpdExp)		
dvpdslope(1)	Slope value in vapor pressure deficit effect on photosynthesis equation. dVpd = dVpdSlope * exp(vpd*dVpdExp)		
growthdays1(1)	Number of days after germination to start using aMaxScalar1.	number of days	
growthdays2(1)	Number of days after germination to start using aMaxScalar2.	number of days	
growthdays3(1)	Number of days after germination to start using aMaxScalar3.	number of days	
growthdays4(1)	Number of days after germination to start using aMaxScalar4.	number of days	
halfsatpar(1)	Photosynthetically active radiation (PAR) at which photosynthesis occurs at 1/2 of theoretical maximum.	Einsteins * m^{-2} ground area * day^{-1}	
leafcspwt(1)	Grams of carbon in a square meter of leaf area.	g C m^{-2} leaf area	
psntmin(1)	Minimum temperature at which net photosynthesis occurs.	°C	
psntopt(1)	Optimal temperature at which net photosynthesis occurs.	°C	

Appendix 1.2 Cultivation parameters (cult.100)

These cult.100 parameters apply to CULT events in the schedule file.

cultra(1)	Fraction of aboveground live transferred to standing dead	fraction	0.0 – 1.0
cultra(2)	Fraction of aboveground live transferred to surface litter	fraction	0.0 – 1.0
cultra(3)	Fraction of aboveground live transferred to the top soil layer	fraction	0.0 – 1.0
cultra(4)	Fraction of standing dead transferred to surface litter	fraction	0.0 – 1.0
cultra(5)	Fraction of standing dead transferred to top soil layer	fraction	0.0 – 1.0
cultra(6)	Fraction of surface litter transferred to top soil layer	fraction	0.0 – 1.0
cultra(7)	Fraction of roots transferred to top soil layer	fraction	0.0 – 1.0
clteff(1)	Cultivation effect on soil som1 (active pool) decomposition; functions as a multiplier on the decomposition rate to increase decomposition in the *month* of cultivation	fraction	1.0 – 15.0
clteff(2)	Cultivation effect on soil som2 (slow pool) decomposition; functions as a multiplier on the decomposition rate to increase decomposition in the *month* of cultivation	fraction	1.0 – 15.0
clteff(3)	Cultivation effect on soil som3 (passive pool) decomposition; functions as a multiplier on the decomposition rate to increase decomposition in the *month* of cultivation	fraction	1.0 – 15.0

clteff(4)	Cultivation effect on soil structural litter decomposition; functions as a multiplier on the decomposition rate to increase decomposition in the *month* of cultivation	fraction	1.0 – 15.0

The multipliers for increased decomposition will be used for one month.

Appendix 1.3 Fertilization parameters (fert.100)

These fert.100 parameters apply to FERT events in the schedule file.

feramt(1)	Amount of N to be added	g N m^{-2}	0.0 - 9999
feramt(2)	Amount of P to be added	g P m^{-2}	0.0 - 9999
feramt(3)	Amount of S to be added	g S m^{-2}	0.0 - 9999
aufert	Key for automatic fertilization aufert = 0: no automatic fertilization aufert < 1.0: automatic fertilizer may be applied to remove some nutrient stress without increasing nutrient concentration above the minimum level; the value of aufert is the fraction of potential C production (temperature and moisture limited) which will be maintained aufert > 1.0: automatic fertilizer may be applied to remove nutrient stress and increase nutrient concentrations above the minimum level; a value of aufert between 1.0 and 2.0 determines the extent to which nutrient concentration is maintained between the minimum and maximum levels aufert = 2.0 automatic fertilizer may be applied to remove nutrient stress and increase nutrient concentrations to the maximum level		Do not use this option
ninhib	Reduction factor on nitrification rates due to nitrification inhibitors added to the site with the fertilizer. This parameter value is used as a multiplier in the calculation of the nitrification rate. A value of 1.0 for this parameter will have no effect on the nitrification rate.	fraction	0.0-1.0

ninhtm	How long, in number of simulation weeks, to simulate the effect of the nitrogen inhibitor from the fertilizer addition.	Number of weeks	
frac_no3	Fraction of N fertilizer that is nitrate (frac_no3 + frac_nh4 = 1.0).	fraction	0.0-1.0
frac_nh4	Fraction of N fertilizer that is ammonium (frac_no3 + frac_nh4 = 1.0).	fraction	0.0-1.0

A new parameter, NINHIB, added to the FERT.100 file represents a reduction factor on nitrification rates due to nitrification inhibitors added to the site with the fertilizer. This parameter value is used as a multiplier in the calculation of the nitrification rate. A value of 1.0 for this parameter will have no effect on the nitrification rate.

Additionally the NINHTM parameter added to the FERT.100 file determines how long, in number of simulation weeks, to simulate the effect of the nitrogen inhibitor from the fertilizer addition.

Appendix 1.4 Fire parameters for crops and grasses (fire.100)

These fire.100 parameters apply to FIRE events in the schedule file. To remove live tree parts, one must schedule a TREM event (see trem.100).

flfrem	Fraction of live shoots removed by a fire event.	fraction	0.0 – 1.0
fdfrem(1)	Fraction of standing dead plant material removed by a fire event.	fraction	0.0 – 1.0
fdfrem(2)	Fraction of surface litter removed by a fire event.	fraction	0.0 – 1.0
fdfrem(3)	Fraction of dead fine branches removed by a fire event.	fraction	0.0 – 1.0
fdfrem(4)	Fraction of dead large wood removed by a fire event.	fraction	0.0 – 1.0
fret(1,1)	Fraction of C in the burned aboveground material (live shoots, standing dead, and litter) returned to the system following a fire event as charcoal in the passive SOM pool.	fraction	0.0 – 1.0
fret(1,2)	Fraction of N in the burned aboveground material (live shoots, standing dead, and litter) returned to the system following a fire event.	fraction	0.0 – 1.0
fret(1,3)	Fraction of P in the burned aboveground material live shoots, standing dead, and litter) returned to the system following a fire event.	fraction	0.0 – 1.0
fret(1,4)	Fraction of S in the burned aboveground material (live shoots, standing dead, and litter) returned to the system following a fire event.	fraction	0.0 – 1.0
fret(2,1)	Fraction of C in the burned dead fine branch material returned to the system following a fire event as charcoal in the passive SOM pool.	fraction	0.0 – 1.0
fret(2,2)	Fraction of N in the burned dead fine branch material returned to the system following a fire event.	fraction	0.0 – 1.0
fret(2,3)	Fraction of P in the burned dead fine branch material returned to the system following a fire event.	fraction	0.0 – 1.0
fret(2,4)	Fraction of S in the burned dead fine branch material returned to the system following a fire event.	fraction	0.0 – 1.0

fret(3,1)	Fraction of C in the burned dead large wood material returned to the system following a fire event as charcoal in the passive SOM pool.	fraction	0.0 – 1.0
fret(3,2)	Fraction of N in the burned dead large wood material returned to the system following a fire event.	fraction	0.0 – 1.0
fret(3,3)	Fraction of P in the burned dead large wood material returned to the system following a fire event.	fraction	0.0 – 1.0
fret(3,4)	Fraction of S in the burned dead large wood material returned to the system following a fire event.	fraction	0.0 – 1.0
frtsh	Additive effect of burning on root/shoot ratio.	fraction	0.0 – 1.0
fnue(1)	Increase in maximum C/N ratio of shoots due to fire.	C/N ratio increment	0.0 – 10.0
fnue(2)	Increase in maximum C/N ratio of roots due to fire	C/N ratio increment	0.0 – 10.0

Fire code changes for charcoal:

There have been changes to fire code so that removal, by burning, of dead fine branches and dead large wood will occur as the result of a FIRE event rather than of a TREM event. A TREM fire event will burn only live leaves, live fine branches, and live large wood. A TREM cutting, windstorm or other non-fire event will allow the removal of dead fine branches and dead large wood in the same manner as Century 4.0. When burning dead fine branches and dead large through a FIRE event the burned carbon in the dead wood can be returned to the system as charcoal in the passive SOM pool.

Appendix 1.5 General parameters that are common (fixed) for all types of biomes (fix.100).

These fix.100 parameters are required for each simulation and are not related to any one specific event in the schedule file.

adep(1)	thickness of soil layer 1	cm	0 – 20
adep(2)	thickness of soil layer 2	cm	0 – 60
adep(3)	thickness of soil layer 3	cm	0 – 60
adep(4)	thickness of soil layer 4	cm	0 – 60
adep(5)	thickness of soil layer 5	cm	0 – 60
adep(6)	thickness of soil layer 6	cm	0 – 60
adep(7)	thickness of soil layer 7	cm	0 – 60
adep(8)	thickness of soil layer 8	cm	0 – 60
adep(9)	thickness of soil layer 9	cm	0 – 60
adep(10)	thickness of soil layer 10	cm	0 – 60
agppa	*Intercept* parameter in the equation estimating potential aboveground biomass production for calculation of root/shoot ratio of crops and grasses (used only if crop.100 parameter frtc(1) = 0)	g biomass m^{-2} yr^{-1}	

agppb	*Slope* parameter in the equation estimating potential aboveground biomass production for calculation of root/shoot ratio of crops and grasses (used only if crop.100 parameter frtc(1) = 0) . NOTE - agppb is multiplied by annual precipitation (cm).	g biomass m^{-2} yr^{-1} cm^{-1}	
aneref(1)	Ratio of rain/potential evapotranspiration below which there is no negative impact of soil anaerobic conditions on decomposition.	cm/cm	0.0 – 10.0
aneref(2)	Ratio of rain/potential evapotranspiration below which there is maximum negative impact of soil anaerobic conditions on decomposition.	cm/cm	0.0 – 10.0 aneref(2) > aneref(1)
aneref(3)	Minimum value of the impact of soil anaerobic conditions on decomposition; functions as a multiplier for the maximum decomposition rate.	fraction	0.0 – 1.0 0=no decomposition under anaerobic conditions, 1=no anaerobic effect

animpt	Slope term used to vary the impact of soil anaerobic conditions on decomposition flows to the passive soil organic matter pool. See somdec.f. cflow from som1c(2) to som3c cfs1s3 = tcflow * fps1s3 * (1.0 + animpt * (1.0 - anerb)) cflow from som2c(2) to som3c cfs2s3 = tcflow * fps2s3 * (1.0 + animpt * (1.0 - anerb))		
awtl(1-10)	**Weighing factors for transpiration loss for soil layers 1-10 (only nlayer+1 values used; nlayer is a site.100 parameter); indicates which fraction of the available water can be extracted by the roots**		
awtl(1)	Weighing factor for transpiration loss for layer 1		
awtl(2)	Weighing factor for transpiration loss for layer 2		
awtl(3)	Weighing factor for transpiration loss for layer 3		
awtl(4)	Weighing factor for transpiration loss for layer 4		
awtl(5)	Weighing factor for transpiration loss for layer 5		
awtl(6)	Weighing factor for transpiration loss for layer 6		
awtl(7)	Weighing factor for transpiration loss for layer 7		
awtl(8)	Weighing factor for transpiration loss for layer 8		
awtl(9)	Weighing factor for transpiration loss for layer 9		

awtl(10)	Weighing factor for transpiration loss for layer 10		
bgppa	*Intercept* parameter in the equation estimating potential belowground biomass production for calculation of root/shoot ratio for crops and grasses (used only if crop.100 parameter frtc(1) = 0)	g biomass m^{-2} yr^{-1}	
bgppb	*Slope* parameter in the equation estimating potential belowground biomass production for calculation of root/shoot ratio ofr crops and grasses (used only if crop.100 parameter frtc(1) = 0) . NOTE: bgppb is multiplied by annual precipitation (cm)	g biomass m^{-2} yr^{-1} cm^{-1}	
co2ppm(1)	Initial parts per million for CO_2 effect.	ppm	294 – 1000
co2ppm(2)	Final parts per million for CO_2 effect.	ppm	294 – 1000
co2rmp	Flag indicating whether CO_2 effect should be: = 0 step function = 1 ramp function	index	0, 1
damr(1,1)	Fraction of surface N absorbed by residue.	fraction	0 – 0.10
damr(1,2)	Fraction of surface P absorbed by residue.	fraction	0 – 0.10
damr(1,3)	Fraction of surface S absorbed by residue.	fraction	0 – 0.10
damr(2,1)	Fraction of soil N absorbed by residue.	fraction	0 – 0.10
damr(2,2)	Fraction of soil P absorbed by residue.	fraction	0 – 0.10
damr(2,3)	Fraction of soil S absorbed by residue.	fraction	0 – 0.10

damrmn(1)	Minimum C/N ratio allowed in residue after direct absorption.	C/N ratio	
damrmn(2)	Minimum C/P ratio allowed in residue after direct absorption.	C/P ratio	
damrmn(3)	Minimum C/S ratio allowed in residue after direct absorption.	C/S ratio	
dec1(1)	Maximum decomposition rate of surface structural litter, strucc(1).	yr^{-1}	
dec1(2)	Maximum decomposition rate of soil structural litter, strucc(2).	yr^{-1}	
dec2(1)	Maximum decomposition rate of surface metabolic litter, metabc(1).	yr^{-1}	
dec2(2)	Maximum decomposition rate of soil metabolic litter, metabc(2).	yr^{-1}	
dec3(1)	Maximum decomposition rate of surface active organic matter, som1c(1).	yr^{-1}	
dec3(2)	Maximum decomposition rate of soil active organic matter, som1c(2).	yr^{-1}	
dec4	Maximum decomposition rate of soil passive organic matter, som3c	yr^{-1}	
dec5(1)	Maximum decomposition rate of surface slow organic matter, somc2(1).	yr^{-1}	
dec5(2)	Maximum decomposition rate of soil slow organic matter; som2c(2).	yr^{-1}	
deck5	Available soil water content at which shoot and root death rates are half maximum.	cm	

dligdf	Difference in delta 13C for lignin compared to whole plant delta 13C. See partit.f.		
dresp	Discrimination factor for 13C during decomposition of organic matter due to microbial respiration.		
edepth	Depth of the single soil layer where C, N, P, and S dynamics are calculated (only affects C, N, P, S loss by erosion).	meters	
elitst	Fraction of total surface litter that contributes to the biomass insulation effect on soil surface temperature relative to live and standing dead biomass.	fraction	0.0 – 1.0
enrich	Enrichment factor for SOM losses due to erosion. This factor reflects the variation in SOM with depth through the simulation layer. It is common for SOM density (g cm^{-3}) to decrease with depth below the surface organic horizons.		
favail(1)	fraction of N available per day to plants. NOTE: THIS PARAMETER HAS BEEN MOVED TO CROP.100 AND TREE.100 IN PHOTOSYNTHESIS VERSION	fraction	0.0 – 1.0
	Note: There is no favail(2) in the fix.100 parameter file. This value, the fraction of labile (non-sorbed) P in the surface layer available to plants, is calculated in the model.		
favail(3)	Fraction of S available per day to plants.	fraction	0.0 – 1.0
favail(4)	Minimum fraction of P available per day to plants.	fraction	0.0 – 1.0
favail(5)	Maximum fraction of P available per day to plants.	fraction	0.0 – 1.0

favail(6)	Mineral N in surface layer corresponding to maximum fraction of P available.	gN m^{-2}	
fleach(1-5)	**texeff = fleach(1) + fleach(2) * sand** **frlech(iel) = texeff * fleach(iel+2) * fsol** **where iel = 1,2,3. See simsom.f**		
fleach(1)	Intercept value for a normal day to compute the fraction of mineral N, P, and S which will leach to the next layer when there is a saturated water flow; normal leaching is a function of sand content	fraction	0.0 – 1.0
fleach(2)	Slope value for a normal day to compute the fraction of mineral N, P, and S which will leach to the next layer when there is a saturated water flow; normal leaching is a function of sand content.		0.0 – 1.0
fleach(3)	Leaching fraction multiplier for N to compute the fraction of mineral N which leaches to the next layer when there is a saturated water flow; normal leaching is a function of sand content.	fraction	0.0 – 1.0
fleach(4)	Leaching fraction multiplier for P to compute the fraction of mineral P which leaches to the next layer when there is a saturated water flow; normal leaching is a function of sand content.	fraction	0.0 – 1.0
fleach(5)	Leaching fraction multiplier for S to compute the fraction of mineral S which leaches to the next layer when there is a saturated water flow; normal leaching is a function of sand content.	fraction	0.0 – 1.0

fwloss(1)	Scaling factor for interception and evaporation of precipitation by live and standing dead biomass.	scaling factor	0.0 – 1.0
fwloss(2)	Scaling factor for bare soil evaporation of precipitation.	scaling factor	0.0 – 1.0
fwloss(3)	Scaling factor for transpiration water loss.	scaling factor	0.0 – 1.0
fwloss(4)	Scaling factor for potential evapotranspiration.	scaling factor	0.0 – 1.0
fxmca	*Intercept* for effect of biomass on non-symbiotic soil N fixation; used only when ***nsnfix*** = 1		
fxmcb	*Slope* control for effect of biomass on non-symbiotic soil N fixation; used only when ***nsnfix*** = 1		
fxmxs	Maximum *monthly* (not daily) non-symbiotic soil N-fixation rate (reduced by effect of N:P ratio, used when ***nsnfix*** = 1)		
fxnpb	N/P control for N-fixation based on availability of top soil layer (used when ***nsnfix*** = 1)		

gremb	Grazing effect reduction on root:shoot ratio for grzeff types 4, 5, 6 (grzeff is a graz.100 parameter) root:shoot = 1.0 – FLGREM * GREMB Restrict production due to grazing (grzeff): = 0 grazing has no direct effect on production = 1 linear impact on above-ground production (agp) = 2 quadratic impact on agp and root/shoot ratio = 3 quadratic impact on root/shoot ratio = 4 linear impact on root/shoot ratio = 5 quadratic impact on agp and linear impact on root/shoot ratio = 6 linear impact on agp and root/shoot ratio	index	0, 1, 2, 3, 4, 5, 6
idef	Flag for method of computing water effect on decomposition. See calcdefac.c. = 1 option using the relative water content of top 3 “daycent” soil layers. Strictly increasing function. = 2 ratio option (rainfall/potential evaporation rate). Strictly increasing function. = 3 option using soil texture and water-filled pore space (wfps) in top 3 “daycent” soil layers. Bell-shaped curve. Increases to optimal value of wfps, then decreases as soil wfps approaches 1 (soil saturation).	index	1, 2, 3
lhzf(1)	Lower horizon factor for active pool; = fraction of active pool (SOM1CI(2,*)) used in computation of lower horizon pool sizes for soil erosion routines.	fraction	0.0 – 1.0

lhzf(2)	Lower horizon factor for slow pool; = fraction of slow pool (SOM2CI(*) used in computation of lower horizon pool sizes for soil erosion routines.	fraction	0.0 – 1.0
lhzf(3)	Lower horizon factor for passive pool; = fraction of passive pool (SOM3CI(*) used in computation of lower horizon pool sizes for soil erosion routines.	fraction	0.0 – 1.0
minlch	Critical water flow for leaching of minerals (cm of H_2O leached per day below 30 cm soil depth).	cm of H_2O per day	
nsnfix	Equals 1 if non-symbiotic N fixation should be based on N:P ratio in mineral pool, otherwise non-symbiotic N fixation is based on annual precipitation.	index	0, 1
ntspm	Number of time steps per **day** (not month) for the decomposition submodel	integer	1 (formerly 4 times a month) DO NOT CHANGE!
omlech(1)	*Intercept* for the effect of sand on leaching of organic compounds.		
omlech(2)	*Slope* for the effect of sand on leaching of organic compounds.		
omlech(3)	*Amount* of water that needs to flow out of water layer 2 to produce leaching of organics.	cm of H_2O per day	
p1co2a(1) or p1co2a(SRFC)	*Intercept* parameter which controls flow from *surface* organic matter with fast turnover, som1c(1), to CO_2 (fraction of C lost to CO_2 when there is no sand in the soil)	fraction	0.0 – 1.0

p1co2a(2) or p1co2a(SOIL)	*Intercept* parameter which controls flow from *soil* organic matter with fast turnover, som1c(2), to CO_2 (fraction of C lost to CO_2 when there is no sand in the soil)	fraction	0.0 – 1.0
p1co2b(1) or p1co2b(SRFC)	*Slope* parameter which controls flow from *surface* organic matter with fast turnover rate, som1c(1), to CO_2 (slope is multiplied by the fraction sand content of the soil)	fraction	0.0 – 1.0
p1co2b(2) or p1co2b(SOIL)	*Slope* parameter which controls flow from *soil* organic matter with fast turnover rate, som1c(2), to CO_2 (slope is multiplied by the fraction sand content of the soil)	fraction	0.0 – 1.0
p2co2(1) or p2co2(SRFC)	Fraction of C lost as CO_2 when the slow surface organic matter pool (som2c(1)) decomposes.	fraction	0.0 – 1.0
p2co2(2) or p2co2(SOIL)	Fraction of C lost as CO_2 when the slow soil organic matter pool (som2c(2)) decomposes.	fraction	0.0 – 1.0
p3co2	Fraction of C lost as CO_2 when the passive soil organic matter pool (som3c) decomposes.	fraction	0.0 – 1.0
pabres	Amount of residue which will give maximum direct absorption of N. See partit.f.	gC m^{-2}	

peftxa	*Intercept* parameter for regression equation to compute the effect of soil texture on the microbe decomposition rate (the effect of texture when there is no sand in the soil). See eftext calculation in prelim.f. The factor eftext is used in somdec.f and affects the flow out of som1c(2). eftext = peftxa + peftxb * sand	fraction	0.0 – 1.0, such that eftext ≤ 1
peftxb	*Slope* parameter for regression equation to compute the effect of soil texture on microbe decomposition rate; the slope is multiplied by the sand content fraction. See eftext calculation in prelim.f. The factor eftext is used in somdec.f and affects the flow out of som1c(2). eftext = peftxa + peftxb * sand	fraction	0 – 1, such that eftext ≤ 1
phesp(1)	Minimum pH for determining the effect of pH on the solubility of secondary P (flow of secondary P to mineral P) (for texesp(2) = m * (pH input) + b, m and b calculated using these phesp values).		
phesp(2)	Value of texesp(2), the solubility of secondary P, corresponding to minimum pH.	yr^{-1}	

phesp(3)	Maximum pH for determining effect on solubility of secondary P (flow of secondary P to mineral P) (for texesp(2) = m * (pH input) + b, m and b calculated using these phesp values).		
phesp(4)	Value of texesp(2), the solubility of secondary P, corresponding to maximum pH.	yr^{-1}	
pligst(1) or pligst(SRFC)	Effect of lignin fraction (g lignin C / g C) on *surface* structural or fine branch and large wood decomposition. See litdec.f and woodec.f. exp(-pligst(SRFC) * lignin_fraction)		
pligst(2) or pligst(SOIL)	Effect of lignin_fraction (g lignin C / g C) on *soil* structural or coarse root decomposition. See litdec.f and woodec.f. exp(-pligst(SOIL) * lignin_fraction)		
pmco2(1) or pmco2(SRFC)	Fraction of C lost as CO_2 when *surface* metabolic litter (metabc(1)) decomposes.	fraction	0.0 – 1.0
pmco2(2) or pmco2(SOIL)	Fraction of C lost as CO_2 when *soil* metabolic litter (metabc(2)) decomposes.	fraction	0.0 – 1.0
pmnsec(1)	Slope for N; controls the flow from mineral to secondary N.	yr^{-1}	
pmnsec(2)	Slope for P; controls the flow from mineral to secondary P.	yr^{-1}	
pmnsec(3)	Slope for S; controls the flow from mineral to secondary S.	yr^{-1}	

pmntmp	Effect of biomass on minimum surface temperature.		
pmxbio	Maximum live+dead biomass (leaves + standing dead + elitst*litter) level for insulation effect in soil surface temperature calculation. Maximum dead biomass (standing dead + 10%*litter) level for calculation of the potential negative effect on plant (crop and grass) growth of physical obstruction by standing dead and surface litter.		
pmxtmp	Effect of biomass on maximum surface temperature.		
pparmn(1)	Controls the flow from parent material to mineral compartment (fraction of parent material that flows to mineral N).	yr^{-1}	0.0 – 1.0
pparmn(2)	Controls the flow from parent material to mineral compartment (fraction of parent material that flows to mineral P).	yr^{-1}	0.0 – 1.0
pparmn(3)	Controls the flow from parent material to mineral compartment (fraction of parent material that flows to mineral S).	yr^{-1}	0.0 – 1.0
pprpts(1)	Minimum ratio of available water to PET which would completely limit production assuming water content = 0		**Not used in photosynthesis model?**
pprpts(2)	Effect of water content on the intercept.		**Not used in photosynthesis model?**

pprpts(3)	Lowest ratio of available water to PET at which there is no restriction on production.	cm/cm	**Not used in photosynthesis model?**
ps1co2(1) or ps1co2(SRFC)	The fraction of C lost as CO_2 when *surface* structural litter decomposes to active *surface* organic matter pool strucc(1) → som1c(1)	fraction	0.0 – 1.0
ps1co2(2) or ps1co2(SOIL)	The fraction of C lost as CO_2 when *soil* structural litter decomposes to the active *soil* organic matter pool. strucc(2) → som1c(2)	fraction	0.0 – 1.0
ps1s3(1)	*Intercept* value for the effect of clay on the flow from active soil organic matter to passive soil organic matter; the fraction of decomposed som1c(2) (after accounting for respiration losses) that goes to som3c. som1c(2) → som3c fps1s3 = ps1s3(1) + ps1s3(2) * clay	fraction	0.0 – 1.0, such that fps1s3 ≤ 1.0
ps1s3(2)	*Slope* value for the effect of clay on the flow from active soil organic matter to passive soil organic matter; the fraction of decomposed som1c(2) (after accounting for respiration losses) that goes to som3c. som1c(2) → som3c fps1s3 = ps1s3(1) + ps1s3(2) * clay	fraction	0.0 – 1.0, such that fps2s3 ≤ 1.0

ps2s3(1)	*Intercept* value for the effect of clay on the flow from slow soil organic matter to passive soil organic matter; the fraction of decomposed som2c(2) (after accounting for respiration losses) that goes to som3c. som2c(2) → som3c fps2s3 = ps2s3(1) + ps2s3(2) * clay	fraction	0.0 – 1.0, such that fps2s3 ≤ 1.0
ps2s3(2)	*Slope* value for the effect of clay on the flow from slow soil organic matter to passive soil organic matter; the fraction of decomposed som2c(2) (after accounting for respiration losses) that goes to som3c. som2c(2) → som3c fps2s3 = ps2s3(1) + ps2s3(2) * clay	fraction	0.0 – 1.0, such that fps2s3 ≤ 1.0
psecmn(1)	Controls the flow from secondary to mineral N	yr^{-1}	0.0 – 1.0
psecmn(2)	controls the flow from secondary to mineral P. May be reset in code! See pschem.f. psecmn(2) = 12.0 * (***texesp***(2) + ***texesp***(3) * sand)	yr^{-1}	0.0 – 1.0
psecmn(3)	Controls the flow from secondary to mineral S.	yr^{-1}	0.0 – 1.0
psecoc1	Controls the flow from secondary to occluded P.	yr^{-1}	0.0 – 1.0
psecoc2	Controls the back flow from occluded to secondary P.	yr^{-1}	0.0 – 1.0

rad1p(1,1)	Intercept used to calculate addition term for C/N ratio of slow SOM formed from surface active pool		**Not used?**
rad1p(2,1)	Slope used to calculate addition term for C/N ratio of slow SOM formed from surface active pool		**Not used?**
rad1p(3,1)	Minimum allowable C/N used to calculate addition term for C/N ratio of slow SOM formed from surface active pool		**Not used?**
rad1p(1,2)	Intercept used to calculate addition term for C/P ratio of slow SOM formed from surface active pool		**Not used?**
rad1p(2,2)	Slope used to calculate addition term for C/P ratio of slow SOM formed from surface active pool		**Not used?**
rad1p(3,2)	Minimum allowable C/P used to calculate addition term for C/P ratio of slow SOM formed from surface active pool		**Not used?**
rad1p(1,3)	Intercept used to calculate addition term for C/S ratio of slow SOM formed from surface active pool		**Not used?**
rad1p(2,3)	Slope used to calculate addition term for C/S ratio of slow SOM formed from surface active pool		**Not used?**
rad1p(3,3)	Minimum allowable C/S used to calculate addition term for C/S ratio of slow SOM formed from surface active pool		**Not used?**
rcestr(1)	C/N ratio for structural material, strucc(1) and strucc(2). See partit.f.	C/N ratio	

rcestr(2)	C/P ratio for structural material, strucc(1) and strucc(2). See partit.f.	C/P ratio	
rcestr(3)	C/S ratio for structural material, strucc(1) and strucc(2). See partit.f.	C/S ratio	
rictrl	Root impact control term used by rtimp; used for calculating the impact of root biomass on nutrient availability.		
riint	Root impact intercept used by rtimp; used for calculating the impact of root biomass on nutrient availability.		
rsplig	Fraction of lignin flow (in structural decomposition) lost as CO_2. See declig.f.	fraction	0.0 – 1.0
seed	Random number generator seed value.		**Not used?**
spl(1) or spl(INTCPT)	*Intercept* parameter for metabolic litter (vs. structural litter) split		
spl(2) or spl(SLOPE)	*Slope* parameter for metabolic split (fraction metabolic is a function of lignin to N ratio). Note: this value should be entered as a positive number, but in the code it is negated so it becomes a *negative* slope (meaning that the fraction of residue going to metabolic litter (vs. structural litter) *decreases* with an increasing lignin to N ratio).		
strmax(1) or strmax(SRFC)	Maximum amount of *surface* structural material that will decompose. See litdec.f.	g C m^{-2}	
strmax(2) or strmax(SOIL)	Maximum amount of *soil* structural material that will decompose. See litdec.f.	g C m^{-2}	

texepp(1)	Texture effect on parent P mineralization: = 1 include the effect of texture using the remaining texepp values with the arctangent function = 0 use pparmn(2) in the weathering equation		
texepp(2)	x location of inflection point used in determining texture effect on parent P mineralization		
texepp(3)	y location of inflection point used in determining texture effect on parent P mineralization		
texepp(4)	Step size (distance from the maximum point to the minimum point) used in determining texture effect on parent P mineralization		
texepp(5)	Slope of the line at the inflection point used in determining texture effect on parent P mineralization		
texesp(1)	Texture effect on secondary P flow to mineral P = 1 include the effect of pH and sand content using the equation specified by texesp(2) (a function of pH and phesp(1-4)) and texesp(3) = 0 to use psecmn(2) in the weathering equation		
	Note: texesp(2) is not included in the fix.100 file.		
texesp(3)	Slope value used in determining effect of sand content on secondary P flow to mineral P		

teff(1-4)	**Coefficients in the equation for computing the temperature effect on decomposition**		
teff(1)	"x" location of inflection point	ºC	
teff(2)	"y" location of inflection point		
teff(3)	step size (distance from the maximum point to the minimum point)		
teff(4)	slope of line at inflection point		
tmelt(1)	Snow melt parameter (*tmax* is maximum daily air temperature °C) $melt = tmelt(2) * (tmax - tmelt(1)) * srad_{langleys}$	°C	If tmax – tmelt(1) < 0 then melt=0
tmelt(2)	Snow melt parameter $melt = tmelt(2) * (tmax - tmelt(1)) * srad_{langleys}$	cm SWE (°C langleys)$^{-1}$	
varatAB(*,*)	**Variable C/E ratios for material entering SOM pools. 'A' refers to the SOM pool (1,2,3). 'B' refers to the location; =1 for surface and =2 for soil. For the first subscript 1=Maximum, 2=Minimum, 3=Amount). The second subscript refers to the element (N=1, P=2, S=3).**		
varat11(1,1)	Maximum C/N ratio for material entering surface som1, som1c(1).	C/N ratio	
varat11(2,1)	Minimum C/N ratio for material entering surface som1, som1c(1).	C/N ratio	

varat11(3,1)	Amount of N present when minimum ratio applies.	g N m^{-2}	
varat11(1,2)	Maximum C/P ratio for material entering surface som1, som1c(1).	C/P ratio	
varat11(2,2)	Minimum C/P ratio for material entering surface som1, som1c(1).	C/P ratio	
varat11(3,2)	Amount of P present when minimum ratio applies.	g P m^{-2}	
varat11(1,3)	Maximum C/S ratio for material entering surface som1, som1c(1).	C/S ratio	
varat11(2,3)	Minimum C/S ratio for material entering surface som1, som1c(1).	C/S ratio	
varat11(3,3)	Amount of S present when minimum ratio applies.	g S m^{-2}	
varat12(1,1)	Maximum C/N ratio for material entering soil som1, som1c(2).	C/N ratio	
varat12(2,1)	Minimum C/N ratio for material entering soil som1, som1c(2).	C/N ratio	
varat12(3,1)	Amount of N present when minimum ratio applies.	g N m^{-2}	
varat12(1,2)	Maximum C/P ratio for material entering soil som1, som1c(2).	C/P ratio	
varat12(2,2)	Minimum C/P ratio for material entering soil som1, som1c(2).	C/P ratio	
varat12(1,3)	Maximum C/S ratio for material entering soil som1, som1c(2).	C/S ratio	

varat12(2,3)	Minimum C/S ratio for material entering soil som1, som1c(2).	C/S ratio	
varat12(3,3)	Amount of S present when minimum ratio applies.	g S m^{-2}	
varat21(1,1)	Maximum C/N ratio for material entering surface som2, som2c(1).	C/N ratio	
varat21(2,1)	Minimum C/N ratio for material entering surface som2, som2c(1).	C/N ratio	
varat21(3,1)	Amount of N present when minimum ratio applies.	g N m^{-2}	
varat21(1,2)	Maximum C/P ratio for material entering surface som2, som2c(1).	C/P ratio	
varat21(2,2)	Minimum C/P ratio for material entering surface som2, som2c(1).	C/P ratio	
varat21(3,2)	Amount of P present when minimum ratio applies.	g P m^{-2}	
varat21(1,3)	Maximum C/S ratio for material entering surface som2, som2c(1).	C/S ratio	
varat21(2,3)	Minimum C/S ratio for material entering surface som2, som2c(1).	C/S ratio	
varat21(3,3)	Amount of S present when minimum ratio applies.	g S m^{-2}	
varat22(1,1)	Maximum C/N ratio for material entering soil som2, som2c(2).	C/N ratio	
varat22(2,1)	Minimum C/N ratio for material entering soil som2, som2c(2).	C/N ratio	

varat22(3,1)	Amount of N present when minimum ratio applies.	g N m^{-2}	
varat22(1,2)	Maximum C/P ratio for material entering soil som2, som2c(2).	C/P ratio	
varat22(2,2)	Minimum C/P ratio for material entering soil som2, som2c(2).	C/P ratio	
varat22(3,2)	Amount of P present when minimum ratio applies.	g P m^{-2}	
varat22(1,3)	Maximum C/S ratio for material entering soil som2, som2c(2).	C/S ratio	
varat22(2,3)	Minimum C/S ratio for material entering soil som2, som2c(2).	C/S ratio	
varat22(3,3)	Amount of S present when minimum ratio applies.	g S m^{-2}	
varat3(1,1)	Maximum C/N ratio for material entering som3, som3c	C/N ratio	
varat3(2,1)	Minimum C/N ratio for material entering som3, som3c	C/N ratio	
varat3(3,1)	Amount of N present when minimum ratio applies.	g N m^{-2}	
varat3(1,2)	Maximum C/P ratio for material entering som3, som3c.	C/P ratio	
varat3(2,2)	Minimum C/P ratio for material entering som3, som3c.	C/P ratio	
varat3(3,2)	Amount of P present when minimum ratio applies.	g P m^{-2}	
varat3(1,3)	Maximum C/S ratio for material entering som3, som3c.	C/S ratio	
varat3(2,3)	Minimum C/S ratio for material entering som3, som3c.	C/S ratio	

varat3(3,3)	Amount of S present when minimum ratio applies.	g S m^{-2}	
vlosse	Fraction per day of excess N (i.e. N left in the soil after nutrient uptake by the plant) which is volatilized.	fraction	Obsolete parameter, set to 0.0 in simsom.f, replaced by trace gas model.
vlossg	Fraction per day of gross mineralization which is volatilized.	fraction	Obsolete parameter, set to 0.0 in simsom.f, replaced by trace gas model.

For DDCentEVI the following parameters regulating some cultivation effects and methane flux calculations are optional parameters in the fix.100 file. They were moved from sitepar.in to fix.100, but at a later time may be moved to crop.100 so they can be crop-specific. If they are not specified in fix.100 they will be set to the default values specified below.

Fix.100 Cultivation Effects (optional)	Description	Units	Range	Default value
XEFCLTEF	Duration of Cultivation Effect	# x months days=x*30.4375	??	??
MAXCLTEF	Maximum Cultivation Effect		??	??
Fix.100 Methane parameters (optional)				
FLDN2D (a.k.a. floodN2delay)	FLooDed N2/N2O ratio Days (7)	# days	0 - 7	7
FLN2OR (a.k.a. flood_N2toN2O)	N2/N2O ratio for flooded state	ratio	100 – 1000 -1 disable	100

CO2CH4 (a.k.a. CO2_to_CH4)	fraction of CO_2 from soil respiration used to produce CH_4	fraction	0.0 – 1.0	0.50
MXCH4F (a.k.a. frCH4emit)	MaXimum Fraction of CH_4 production emitted by plants.	fraction	0.0 – 1.0	0.55
FREXUD (formerly frac_to_exudates)	FRaction EXUDates; root production fraction released as exudate	fraction	0.35 – 0.60 as described in Cao et al. 1995	0.45
AEH	differential coefficient (Aeh)			0.23
DEH	differential coefficient (Deh)			0.16
BEHFL (a.k.a. Beh_flood)	lower-limit value for Eh during flooding course	mv		-250.0
BEHDR (a.k.a. Beh_drain)	upper-limit value of Eh during drainage course	mv		300
METHZR (formerly zero_root_frac)	fraction CH_4 emitted via bubbles when zero root biomass	fraction	0.0 – 1.0	0.7
MRTBLM (a.k.a. ch4rootlim)	Root biomass that when exceeded starts to reduce CH_4 bubble formation (crops)	g biomass m^{-2}		1.0

Appendix 1.6 Grazing parameters (graz.100)

These graz.100 parameters apply to GRAZ events in the schedule file.

flgrem	Fraction of live shoots (aglivc) removed by a grazing event over a one month period. The daily removal rate is approximately flgrem/30.	fraction	0.0 – 1.0
fdgrem	Fraction of standing dead (stdedc) removed by a grazing event over a one month period. The daily removal rate is approximately fdgrem/30.	fraction	0.0 – 1.0
gfcret	Fraction of consumed C which is excreted in feces and urine	fraction	0.0 – 1.0
gret(1)	Fraction of consumed N which is excreted in feces and urine (should take into account N losses due to leaching or volatilization from the manure)	fraction	0.0 – 1.0
gret(2)	Fraction of consumed P which is excreted in feces and urine (should take into account P losses due to leaching or volatilization from the manure)	fraction	0.0 – 1.0
gret(3)	Fraction of consumed S which is excreted in feces and urine (should take into account S losses due to leaching or volatilization from the manure)	fraction	0.0 – 1.0

grzeff	Effect of grazing on production = 0 no direct effect = 1 moderate effect (linear decrease in above-ground production, below-ground production determined by root:shoot ratio) = 2 intensively grazed production effect (quadratic effect on above- and below-ground production) = 3 intensively grazed production effect (quadratic effect on below-ground production) = 4 moderate effect (linear decrease in below-ground production) = 5 intensively grazed production effect (quadratic effect on above-ground production, linear decrease on above ground production) = 6 moderate effect (linear decrease in above- and below-ground production)	index	0, 1, 2, 3, 4, 5, 6
fecf(1)	Fraction of excreted N which goes into feces (rest goes into urine)	fraction	0.0 – 1.0
fecf(2)	Fraction of excreted P which goes into feces (rest goes into urine)	fraction	0.0 – 1.0
fecf(3)	Fraction of excreted S which goes into feces (rest goes into urine)	fraction	0.0 – 1.0
feclig	Lignin fraction of feces	g lignin / g feces	0.0 – 1.0

Grazing change:

The GRET(1) parameter from the GRAZ.100 file is no longer being used. The value for GRET(1) now being used in the model equations is calculated based on soil texture so that the fraction of consumed N that is returned is now a function of clay content.

Grazing events will continue for a month and restrictions on production due to grazing will be effect for one month.

Appendix 1.7 Harvest parameters for crops/grasses (harv.100)

These harv.100 parameters apply to HARV events in the schedule file and apply to crop/grass harvests only. To harvest tree biomass, one must schedule a TREM event (see trem.100).

aglrem	Fraction of aboveground live which will not be affected by harvest operations.	fraction	0.0 – 1.0
bglrem	Fraction of belowground live which will not be affected by harvest operations.	fraction	0.0 – 1.0
flghrv	Flag indicating if grain is to be harvested = 0 if grain is not to be harvested = 1 if the grain is to be harvested	index	0, 1
rmvstr	Fraction of the aboveground residue that will be removed. Does not apply when grain is not harvested.	fraction	0.0 – 1.0
remwsd	Fraction of the remaining residue that will be left standing. Does not apply when grain is not harvested.	fraction	0.0 – 1.0
hibg	Fraction of roots that will be harvested.	fraction	0.0 – 1.0

Appendix 1.8 Irrigation parameters (irri.100)

These irri.100 parameters apply to month-long IRRI events in the schedule file. For some versions of DayCent that implement the daily irrigation event, IRIG, these parameters also apply?

auirri	controls application of automatic irrigation = 0 automatic irrigation is off = 1 irrigate to field capacity = 2 irrigate with a specified amount of water applied = 3 irrigate to field capacity plus PET = 4 irrigate entire rooting zone to field capacity (option 4 is not available for all versions of DayCent)	index	0, 1, 2, 3, 4
fawhc	fraction of available water holding capacity below which automatic irrigation will be used when auirri = 1 or 2	fraction	0.0 – 1.0
irraut	amount of water to apply automatically when auirri = 2	cm	0.0 - 1000
irramt	amount of water to apply regardless of soil water status	cm	0.0 - 1000

Appendix 1.9 Organic matter addition including mulch, manure, and compost (omad.100)

These omad.100 parameters apply to OMAD events in the schedule file.

omadtyp**	Organic matter addition type. =1,3 add organic matter to surface litter pool. =2,4 add organic matter to surface slow pool (som2 pool) because it is partially decomposed, like compost.	index	1, 2, 3, 4
astgc	amount of C added with the addition of organic matter	g C m^{-2}	0.0 - 9999
astlbl	omadtyp=1,2 (or 1.0 – 2.0)**: **concentration** of the added organic matter C which is labeled omadtyp=3,4 (or 3.0 – 4.0)**: **fraction** of the added organic matter C which is labeled	fraction	0.0 – 1.0
astlig	lignin fraction content of organic matter	g lignin C / g C	0.0 – 1.0
astrec(1)	C/N ratio of added organic matter	C/N ratio	1.0 - 500
astrec(2)	C/P ratio of added organic matter	C/P ratio	1.0 - 9999
astrec(3)	C/S ratio of added organic matter	C/S ratio	1.0 - 9999

*****Note: some versions of DayCent allow omadtyp to be a floating point number to mixed types of OMAD additions in a single event.***

1.0 ≤ OMAPTYP ≤ 2.0: The fraction that goes to surface som2 is OMADTYP – 1.0. The remaining goes to the surface litter pools.
3.0 ≤ OMAPTYP ≤ 4.0: The fraction that goes to surface som2 is OMADTYP – 3.0. The remaining goes to the surface litter pools.

Appendix 1.10 Site specific parameters (<site>.100)

These <site>.100 parameters are site-specific. A <site>.100 file is required for each simulation. The name of the <site>.100 file to read is specified near the top of the schedule file.

precip(1)	Mean precipitation for January	cm mo^{-1}	
precip(2)	Mean precipitation for February	cm mo^{-1}	
precip(3)	Mean precipitation for March	cm mo^{-1}	
precip(4)	Mean precipitation for April	cm mo^{-1}	
precip(5)	Mean precipitation for May	cm mo^{-1}	
precip(6)	Mean precipitation for June	cm mo^{-1}	
precip(7)	Mean precipitation for July	cm mo^{-1}	
precip(8)	Mean precipitation for August	cm mo^{-1}	
precip(9)	Mean precipitation for September	cm mo^{-1}	
precip(10)	Mean precipitation for October	cm mo^{-1}	
precip(11)	Mean precipitation for November	cm mo^{-1}	
precip(12)	Mean precipitation for December	cm mo^{-1}	
prcstd(1)	Standard deviation for January precipitation	cm mo^{-1}	

prcstd(2)	Standard deviation for February precipitation	cm mo^{-1}	
prcstd(3)	Standard deviation for March precipitation	cm mo^{-1}	
prcstd(4)	Standard deviation for April precipitation	cm mo^{-1}	
prcstd(5)	Standard deviation for May precipitation	cm mo^{-1}	
prcstd(6)	Standard deviation for June precipitation	cm mo^{-1}	
prcstd(7)	Standard deviation for July precipitation	cm mo^{-1}	
prcstd(8)	Standard deviation for August precipitation	cm mo^{-1}	
prcstd(9)	Standard deviation for September precipitation	cm mo^{-1}	
prcstd(10)	Standard deviation for October precipitation	cm mo^{-1}	
prcstd(11)	Standard deviation for November precipitation	cm mo^{-1}	
prcstd(12)	Standard deviation for December precipitation	cm mo^{-1}	
prcskw(1)	skewness value for January precipitation		
prcskw(2)	skewness value for February precipitation		
prcskw(3)	skewness value for March precipitation		
prcskw(4)	skewness value for April precipitation		
prcskw(5)	skewness value for May precipitation		

prcskw(6)	skewness value for June precipitation		
prcskw(7)	skewness value for July precipitation		
prcskw(8)	skewness value for August precipitation		
prcskw(9)	skewness value for September precipitation		
prcskw(10)	skewness value for October precipitation		
prcskw(11)	skewness value for November precipitation		
prcskw(12)	skewness value for December precipitation		
tmn2m(1)	Mean minimum daily temperature at 2 meters for January	ºC	
tmn2m(2)	Mean minimum daily temperature at 2 meters for February	ºC	
tmn2m(3)	Mean minimum daily temperature at 2 meters for March	ºC	
tmn2m(4)	Mean minimum daily temperature at 2 meters for April	ºC	
tmn2m(5)	Mean minimum daily temperature at 2 meters for May	ºC	
tmn2m(6)	Mean minimum daily temperature at 2 meters for June	ºC	
tmn2m(7)	Mean minimum daily temperature at 2 meters for July	ºC	
tmn2m(8)	Mean minimum daily temperature at 2 meters for August	ºC	

tmn2m(9)	Mean minimum daily temperature at 2 meters for September	ºC	
tmn2m(10)	Mean minimum daily temperature at 2 meters for October	ºC	
tmn2m(11)	Mean minimum daily temperature at 2 meters for November	ºC	
tmn2m(12)	Mean minimum daily temperature at 2 meters for December	ºC	
tmx2m(1)	Mean maximum daily temperature at 2 meters for January	ºC	
tmx2m(2)	Mean maximum daily temperature at 2 meters for February	ºC	
tmx2m(3)	Mean maximum daily temperature at 2 meters for March	ºC	
tmx2m(4)	Mean maximum daily temperature at 2 meters for April	ºC	
tmx2m(5)	Mean maximum daily temperature at 2 meters for May	ºC	
tmx2m(6)	Mean maximum daily temperature at 2 meters for June	ºC	
tmx2m(7)	Mean maximum daily temperature at 2 meters for July	ºC	
tmx2m(8)	Mean maximum daily temperature at 2 meters for August	ºC	
tmx2m(9)	Mean maximum daily temperature at 2 meters for September	ºC	
tmx2m(10)	Mean maximum daily temperature at 2 meters for October	ºC	

tmx2m(11)	Mean maximum daily temperature at 2 meters for November	ºC	
tmx2m(12)	Mean maximum daily temperature at 2 meters for December	ºC	
SRADJ(1)	Solar radiation adjustment for cloud cover & transmission coefficient for January	0.1 – 1.0	DDcentEVI only sradadj(1) in sitepar.in
SRADJ(2)	Solar radiation adjustment for cloud cover & transmission coefficient for February	0.1 – 1.0	DDcentEVI only sradadj(2) in sitepar.in
SRADJ(3)	Solar radiation adjustment for cloud cover & transmission coefficient for March	0.1 – 1.0	DDcentEVI only sradadj(3) in sitepar.in
SRADJ(4)	Solar radiation adjustment for cloud cover & transmission coefficient for April	0.1 – 1.0	DDcentEVI only sradadj(4) in sitepar.in
SRADJ(5)	Solar radiation adjustment for cloud cover & transmission coefficient for May	0.1 – 1.0	DDcentEVI only sradadj(5) in sitepar.in
SRADJ(6)	Solar radiation adjustment for cloud cover & transmission coefficient for June	0.1 – 1.0	DDcentEVI only sradadj(6) in sitepar.in
SRADJ(7)	Solar radiation adjustment for cloud cover & transmission coefficient for July	0.1 – 1.0	DDcentEVI only sradadj(7) in sitepar.in
SRADJ(8)	Solar radiation adjustment for cloud cover & transmission coefficient for August	0.1 – 1.0	DDcentEVI only sradadj(8) in sitepar.in
SRADJ(9)	Solar radiation adjustment for cloud cover & transmission coefficient for September	0.1 – 1.0	DDcentEVI only sradadj(9) in sitepar.in
SRADJ(10)	Solar radiation adjustment for cloud cover & transmission coefficient for October	0.1 – 1.0	DDcentEVI only sradadj(10) in sitepar.in
SRADJ(11)	Solar radiation adjustment for cloud cover & transmission coefficient for November	0.1 – 1.0	DDcentEVI only sradadj(11) in sitepar.in
SRADJ(12)	Solar radiation adjustment for cloud cover & transmission coefficient for December	0.1 – 1.0	DDcentEVI only sradadj(12) in sitepar.in
RAINHR	Duration of each rain event	hours	DDcentEVI only hours_rain in sitepar.in

	Site Specific Parameters		
ivauto	Use Burke's equations to initialize soil C pools = 0 the user has supplied the initial values = 1 initialize using the grass soil parameters = 2 initialize using the crop soil parameters = 3 initialize using the forest soil parameters	index	1, 2, 3
nelem	Number of elements (besides C) to be simulated: 1 = simulate N only 2 = simulate N, P 3 = simulate N, P, S	index	1, 2, 3
sitlat	Latitude	decimal degrees	
sitlng	Longitude	decimal degrees	
ELEV	elevation	meters	DDcentEVI only Elevation in sitepar.in
SITSLP	site slope,	degrees	DDcentEVI only Site slope in sitepar.in
ASPECT	site aspect	degrees	DDcentEVI only Aspect in sitepar.in

EHORIZ	site east horizon	degrees	DDcentEVI only Ehoriz in sitepar.in
WHORIZ	site west horizon	degrees	DDcentEVI only Whoriz in sitepar.in
sand	Fraction of sand in soil.	fraction	0.0 – 1.0 Overwritten by values in the file soils.in Removed from DDcentEVI
silt	Fraction of silt in soil.	fraction	0.0 – 1.0 Overwritten by values in the file soils.in Removed from DDcentEVI
clay	Fraction of clay in soil.	fraction	0.0 – 1.0 Overwritten by values in the file soils.in Removed from DDcentEVI

rock	Fraction of rock in soil.	fraction	0.0 – 1.0 Overwritten by values in the file soils.in Removed from DDcentEVI
bulkd	Soil bulk density.	g cm^{-3} or kg $liter^{-1}$	0.0 – 2.0 Overwritten by values in the file soils.in Removed from DDcentEVI
nlayer	Number of soil layers in water model (maximum of 9); used only to calculated the amount of water available for survival of the plant.	count	1 – 9
nlaypg	Number of soil layers in the top level of the water model; determines avh2o(1), used for plant growth and root death.	count	1 – ***nlayer*** Overwritten by values of claypg or tlaypg in the crop.100 or tree.100 files.

drain	The fraction of excess water lost by drainage; indicates whether a soil is sensitive for anaerobiosis (drain=0) or not (drain=1). Anaerobic conditions (high soil water content) cause decomposition to decrease.	fraction	0 – 1 (DRAIN=1 for well drained sandy soils and DRAIN=0 for a poorly drained clay soil)
basef	Fraction of the soil water content of layer ***nlayer*** + 1 which is lost via base flow.	fraction	0.0 – 1.0
stormf	This parameter is not used by DayCent since the runoff calculation (infiltration excess) replaces the stormflow calculation used by monthly Century.	fraction	0.0 – 1.0
precro	Amount of monthly rainfall required in order for runoff to occur.	cm	Used by monthly Century only
fracro	Fraction of the monthly rainfall, over PRECRO, which is lost via runoff.	fraction	0.0 – 1.0 Used by monthly Century only

swflag	**SWFLAG is always 0 in DayCent regardless of the value set in <site>.100. Values of field capacity and wilting point are always read from soils.in.** In monthly Century this flag indicates the source of the values for AWILT and AFIEL, either from actual data from the site.100 file or from equations from Gupta and Larson (1979) or Rawls et al. (1982). = 0 use actual data from the site.100 file = 1 use G & L for both awilt (-15 bar) and afiel (-0.33 bar) = 2 use G & L for both awilt (-15 bar) and afiel (-0.10 bar) = 3 use Rawls for both awilt (-15 bar) and afiel (-0.33 bar) = 4 use Rawls for both awilt (-15 bar) and afiel (-0.10 bar) = 5 use Rawls for afiel (-0.33 bar) with actual data for awilt = 6 use Rawls for afiel (-0.10 bar) with actual data for awilt	index	0 , 1, 2, 3, 4, 5, 6
awilt(1)	Wilting point of soil layer 1; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI

awilt(2)	Wilting point of soil layer 2; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
awilt(3)	Wilting point of soil layer 3; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
awilt(4)	Wilting point of soil layer 4; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
awilt(5)	Wilting point of soil layer 5; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI

awilt(6)	Wilting point of soil layer 6; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
awilt(7)	Wilting point of soil layer 7; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
awilt(8)	Wilting point of soil layer 8; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
awilt(9)	Wilting point of soil layer 9; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI

awilt(10)	Wilting point of soil layer 10; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
afiel(1)	Field capacity of soil layer 1; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
afiel(2)	Field capacity of soil layer 2; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
afiel(3)	Field capacity of soil layer 3; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI

afiel(4)	Field capacity of soil layer 4; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
afiel(5)	Field capacity of soil layer 5; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
afiel(6)	Field capacity of soil layer 6; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
afiel(7)	Field capacity of soil layer 7; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI

afiel(8)	Field capacity of soil layer 8; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
afiel(9)	Field capacity of soil layer 9; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
afiel(10)	Field capacity of soil layer 10; used only if swflag = 0, 5, or 6	fraction	0.0 – 1.0 Recalculated from values in the file soils.in Removed from DDcentEVI
PH	Soil pH		1.0 – 14.0
pslsrb	Slope term which controls the fraction of mineral P that is labile	?	
sorpmx	Maximum P sorption potential for a soil	?	

SUBLIM	Multiplier on sublimation	Scaling factor	DDcentEVI only sublimscale in sitepar.in
REFLEC	vegetation reflectivity/albedo	fraction	DDcentEVI only reflec in sitepar.in
ALBEDO	snow albedo	fraction	DDcentEVI only albedo in sitepar.in
DMPFLUX	Dampens strong fluxes of water between soil layers	In h2oflux routine (0.000001 = original value)	DDcentEVI only dmpflux in sitepar.in
HPOTD	hydraulic water potential of deep storage layer	cm (?)	DDcentEVI only hpotdeep in sitepar.in
KSATD	saturated hydraulic conductivity of deep storage layer	cm sec^{-1}	DDcentEVI only ksatdeep in sitepar.in
TBMIN	minimum temperature for bottom soil layer	ºC	DDcentEVI only tbotmn in sitepar.in
TBMAX	maximum temperature for bottom soil layer	ºC	DDcentEVI only tbotmx in sitepar.in

DMPFCT	damping factor for calculating soil temperature by layer	Scaling factor	DDcentEVI only dmp in sitepar.in
TIMLAG	days from Jan 1 to coolest temp at bottom of soil (days)	Number of days	DDcentEVI only timlag in sitepar.in
NCOEFF	minimum water/temperature limitation coefficient for nitrify	Scaling factor	DDcentEVI only Ncoeff in sitepar.in
DNSTRT	turn off respiration restraint on denitrification starting on this day days	day of year	DDcentEVI only jdayStart in sitepar.in
DNEND	turn off respiration restraint on denitrification ends on this day	day of year	DDcentEVI only jdayEnd in sitepar.in
NADJFC	maximum proportion of nitrified N lost as N_2O @ field capacity	fraction	DDcentEVI only N2Oadjust_fc in sitepar.in
NADJWP	minimum proportion of nitrified N lost as N_2O @ wilting point	fraction	DDcentEVI only N2Oadjust_wp in sitepar.in

MAXNIT	maximum daily nitrification amount	g N m^{-2} day^{-1}	DDcentEVI only MaxNitAmt in sitepar.in
MINO3	fraction of new net mineralization that goes to NO3 (0.0-1.0)	0.0 – 1.0	DDcentEVI only netmn_to_no3 in sitepar.in
WFPSNIP	adjustment on inflection point for the water filled pore space effect on denitrification curve	< 1.0 allow denitrification to occur at lower soil water content > 1.0 require wetter conditions for denitrification	DDcentEVI only wfpsdnitadj in sitepar.in
N2N2OA	N_2/N_2O ratio adjustment factor for computing the N_2/N_2O ratio during non-flooded conditions. Values > 1.0 increase this ratio, values (0.0-1.0) decrease this ratio. For flooded conditions see FLN2OR in fix.100.	scalar	DDcentEVI only N2N2Oadj in sitepar.in
	External Inputs		
epnfa(1) or epnfa(INCPT)	*Intercept* value for determining the effect of annual precipitation on atmospheric N fixation (wet and dry deposition)	g N m^{-2} yr^{-1}	
epnfa(2) or epnfa(SLOPE)	*Slope* values for determining the effect of annual precipitation on atmospheric N fixation (wet and dry deposition)	g N m^{-2} yr^{-1}	0.0 – 1.0
epnfs(1) or epnfs(INCPT)	*Intercept* value for determining the effect of annual precipitation on non-symbiotic soil N fixation; not used if fix.100 value nsnfix = 1	g N m^{-2} yr^{-1}	

epnfs(2) or epnfs(SLOPE)	*Slope* value for determining the effect of annual precipitation on non-symbiotic soil N fixation; not used if fix.100 value nsnfix = 1	g N m^{-2} yr^{-1}	0.0 – 1.0
satmos(1) or satmos(INCPT)	*Intercept* value for atmospheric S inputs as a linear function of annual precipitation	g S m^{-2} yr^{-1} cm^{-1}	
satmos(2) or satmos(SLOPE)	*Slope* value for atmospheric S inputs as a linear function of annual precipitation	g S m^{-2} yr^{-1} cm^{-1}	0.0 – 1.0
sirri	S concentration in irrigation water	mg S L^{-1}	0.0 – 1000.0
	Initial Soil Organic Matter Pools		
som1ci(1,1)	Initial value of the active surface organic matter pool (UNLABL)	g C m^{-2}	0.0 – 99,999
som1ci(1,2)	Initial value of the active surface organic matter pool (LABELD)	g C m^{-2}	0.0 – 99,999
som1ci(2,1)	Initial value of the active soil organic matter pool (UNLABL)	g C m^{-2}	0.0 – 99,99
som1ci(2,2)	Initial value of the active soil organic matter pool (LABELD)	g C m^{-2}	0.0 – 99,99
som2ci(1,1)	Initial value of the slow surface organic matter pool (UNLABL)	g C m^{-2}	0.0 – 99,99
som2ci(1,2)	Initial value of the slow surface organic matter pool (LABELD)	g C m^{-2}	0.0 – 99,99
som2ci(2,1)	Initial value of the slow soil organic matter pool (UNLABL)	g C m^{-2}	0.0 – 99,99

som2ci(2,2)	Initial value of the slow soil organic matter pool (LABELD)	g C m^{-2}	0.0 – 99,99
som3ci(1)	Initial value of the passive soil organic matter pool (UNLABL)	g C m^{-2}	0.0 – 99,99
som3ci(2)	Initial value of the passive soil organic matter pool (LABELD)	g C m^{-2}	0.0 – 99,99
rcesA(*,*)	**A = the SOM pool (1, 2, 3); the first subscript = SRFC, SOIL; the second subscript = N, P, S.**		
rces1(1,1)	Initial C/N ratio for surface som1	C/N ratio	1.0 – 1000
rces1(1,2)	Initial C/P ratio for surface som1	C/P ratio	1.0 – 1000
rces1(1,3)	Initial C/S ratio for surface som1	C/S ratio	1.0 – 1000
rces1(2,1)	Initial C/N ratio for soil som1	C/N ratio	1.0 – 1000
rces1(2,2)	Initial C/P ratio for soil som1	C/P ratio	1.0 – 1000
rces1(2,3)	Initial C/S ratio for soil som1	C/S ratio	1.0 – 1000
rces2(1,1)	Initial C/N ratio for surface som2	C/N ratio	1.0 – 1000
rces2(1,2)	Initial C/P ratio for surface som2	C/P ratio	1.0 – 1000
rces2(1,3)	Initial C/S ratio for surface som2	C/S ratio	1.0 – 1000
rces2(2,1)	Initial C/N ratio for soil som2	C/N ratio	1.0 – 1000
rces2(2,2)	Initial C/P ratio for soil som2	C/P ratio	1.0 – 1000

rces2(2,3)	Initial C/S ratio for soil som2	C/S ratio	1.0 – 1000
rces3(1)	Initial C/N ratio for som3	C/N ratio	1.0 – 1000
rces3(2)	Initial C/P ratio for som3	C/P ratio	1.0 – 1000
rces3(3)	Initial C/S ratio for som3	C/S ratio	1.0 – 1000
clittr(1,1)	Initial *surface* litter pool (UNLABL) Structural + Metabolic	g C m^{-2}	0.0 – 9999
clittr(1,2)	Initial *surface* litter pool (LABELD) Structural + Metabolic	g C m^{-2}	0.0 – 9999
clittr(2,1)	Initial *soil* litter pool (UNLABL) Structural + Metabolic	g C m^{-2}	0.0 – 9999
clittr(2,2)	Initial *soil* litter pool (LABELD) Structural + Metabolic	g C m^{-2}	0.0 – 9999
rcelit(1,1)	Initial C/N ratio of *surface* litter Structural + Metabolic	g N m^{-2}	1.0 – 1000
rcelit(1,2)	Initial C/P ratio of *surface* litter Structural + Metabolic	g P m^{-2}	1.0 – 1000
rcelit(1,3)	Initial C/S ratio of *surface* litter Structural + Metabolic	g S m^{-2}	1.0 – 1000

rcelit(2,1)	Initial C/N ratio of *soil* litter Structural + Metabolic	g N m^{-2}	1.0 – 1000
rcelit(2,2)	Initial C/P ratio of *soil* litter Structural + Metabolic	g P m^{-2}	1.0 – 1000
rcelit(2,3)	Initial C/S ratio of *soil* litter Structural + Metabolic	g S m^{-2}	1.0 – 1000
aglcis(1) or aglcis(UNLABL)	Initial value of the above ground live C pool for crops/grasses (UNLABL)	g C m^{-2}	1.0 – 9999
aglcis(2) or aglcis(LABELD)	Initial value of the above ground live C pool for crops/grasses (LABELD)	g C m^{-2}	1.0 – 9999
aglive(1)	Initial value of the above ground live N pool for crops/grasses	g N m^{-2}	1.0 – 9999
aglive(2)	Initial value of the above ground live P pool for crops/grasses	g P m^{-2}	1.0 – 9999
aglive(3)	Initial value of the above ground live S pool for crops/grasses	g S m^{-2}	1.0 – 9999
bglcis(1) or bglcis(UNLABL)	Initial value of the below ground live C pool for crops/grasses (UNLABL)	g C m^{-2}	1.0 – 9999
bglcis(2) or bglcis(LABELD)	Initial value of the below ground live C pool for crops/grasses (LABELD)	g C m^{-2}	1.0 – 9999
bglive(1)	Initial value of the below ground live P pool for crops/grasses	g N m^{-2}	1.0 – 9999

bglive(2)	Initial value of the below ground live S pool for crops/grasses	g P m^{-2}	1.0 – 9999
bglive(3)	Initial value of the below ground live P pool for crops/grasses	g S m^{-2}	1.0 – 9999
stdcis(1) or stdcis(UNLABL)	Initial value of the standing dead C pool for crops/grasses (UNLABL)	g C m^{-2}	1.0 – 9999
stdcis(2) or stdcis(LABELD)	Initial value of the standing dead C pool for crops/grasses (LABELD)	g C m^{-2}	1.0 – 9999
stdede(1)	Initial value of the standing dead N pool for crops/grasses	g N m^{-2}	1.0 – 9999
stdede(2)	Initial value of the standing dead P pool for crops/grasses	g P m^{-2}	1.0 – 9999
stdede(3)	Initial value of the standing dead S pool for crops/grasses	g S m^{-2}	1.0 – 9999
	Initial Forest pools		
rlvcis(1) or rlvcis(UNLABL)	Initial value of the live leaf C pool for trees/shrubs (UNLABL)	g C m^{-2}	1.0 – 9999
rlvcis(2) or rlvcis(LABELD)	Initial value of the live leaf C pool for trees/shrubs (LABELD)	g C m^{-2}	1.0 – 9999
rleave(1)	Initial value of the live leaf N pool for trees/shrubs	g N m^{-2}	1.0 – 9999
rleave(2)	Initial value of the live leaf P pool for trees/shrubs	g P m^{-2}	1.0 – 9999
rleave(3)	Initial value of the live leaf S pool for trees/shrubs	g S m^{-2}	1.0 – 9999
fbrcis(1) or fbrcis(UNLABL)	Initial value of the live fine branch C pool for trees/shrubs (UNLABL)	g C m^{-2}	1.0 – 9999
fbrcis(2) or fbrcis(LABELD)	Initial value of the live fine branch C pool for trees/shrubs (LABELD)	g C m^{-2}	1.0 – 9999

fbrche(1)	Initial value of the live fine branch N pool for trees/shrubs	g N m^{-2}	1.0 – 9999
fbrche(2)	Initial value of the live fine branch P pool for trees/shrubs	g P m^{-2}	1.0 – 9999
fbrche(3)	Initial value of the live fine branch S pool for trees/shrubs	g S m^{-2}	1.0 – 9999
rlwcis(1) or rlwcis(UNLABL)	Initial value of the live large wood C pool for trees/shrubs (UNLABL)	g C m^{-2}	1.0 – 99,999
rlwcis(2) or rlwcis(LABELD)	Initial value of the live large wood C pool for trees/shrubs (LABELD)	g C m^{-2}	1.0 – 99,999
rlwode(1)	Initial value of the live large wood N pool for trees/shrubs	g N m^{-2}	1.0 – 9999
rlwode(2)	Initial value of the live large wood P pool for trees/shrubs	g P m^{-2}	1.0 – 9999
rlwode(3)	Initial value of the live large wood S pool for trees/shrubs	g S m^{-2}	1.0 – 9999
frtcis(1) or frtcis(UNLABL)	Initial value of the live fine root C pool for trees/shrubs (UNLABL)	g C m^{-2}	1.0 – 9999
frtcis(2) or frtcis(LABELD)	Initial value of the live fine root C pool for trees/shrubs (LABELD)	g C m^{-2}	1.0 – 9999
froote(1)	Initial value of the live fine root N pool for trees/shrubs	g N m^{-2}	1.0 – 9999
froote(2)	Initial value of the live fine root P pool for trees/shrubs	g P m^{-2}	1.0 – 9999
froote(3)	Initial value of the live fine root S pool for trees/shrubs	g S m^{-2}	1.0 – 9999
crtcis(1) or crtcis(UNLABL)	Initial value of the live coarse root C pool for trees/shrubs (UNLABL)	g C m^{-2}	1.0 – 99,999
crtcis(2) or crtcis(LABELD)	Initial value of the live coarse root C pool for trees/shrubs (LABELD)	g C m^{-2}	1.0 – 99,999
croote(1)	Initial value of the live coarse root N pool for trees/shrubs	g N m^{-2}	1.0 – 9999

croote(2)	Initial value of the live coarse root P pool for trees/shrubs	g P m^{-2}	1.0 – 9999
croote(3)	Initial value of the live coarse root S pool for trees/shrubs	g S m^{-2}	1.0 – 9999
wd1cis(1) or wd1cis(UNLABL)	Initial value of the dead fine branch C pool for trees/shrubs (UNLABL)	g C m^{-2}	1.0 – 99,999
wd1cis(2) or wd1cis(LABELD)	Initial value of the dead fine branch C pool for trees/shrubs (LABELD)	g C m^{-2}	1.0 – 99,999
wd2cis(1) or wd2cis(UNLABL)	Initial value of the dead large wood C pool for trees/shrubs (UNLABL)	g C m^{-2}	1.0 – 99,999
wd2cis(2) or wd2cis(LABELD)	Initial value of the dead large wood C pool for trees/shrubs (LABELD)	g C m^{-2}	1.0 – 99,999
wd3cis(1) or wd3cis(UNLABL)	Initial value of the dead coarse root C pool for trees/shrubs (UNLABL)	g C m^{-2}	1.0 – 99,999
wd3cis(2) or wd3cis(LABELD)	Initial value of the dead coarse root C pool for trees/shrubs (LABELD)	g C m^{-2}	1.0 – 99,999
	Initial Soil Mineral pools		
minerl(1,1)	Mineral N in soil layer 1	g N m^{-2}	0.0 – 1000
minerl(2,1)	Mineral N in soil layer 2	g N m^{-2}	0.0 – 1000
minerl(3,1)	Mineral N in soil layer 3	g N m^{-2}	0.0 – 1000
minerl(4,1)	Mineral N in soil layer 4	g N m^{-2}	0.0 – 1000
minerl(5,1)	Mineral N in soil layer 5	g N m^{-2}	0.0 – 1000
minerl(6,1)	Mineral N in soil layer 6	g N m^{-2}	0.0 – 1000
minerl(7,1)	Mineral N in soil layer 7	g N m^{-2}	0.0 – 1000

minerl(8,1)	Mineral N in soil layer 8	g N m^{-2}	0.0 – 1000
minerl(9,1)	Mineral N in soil layer 9	g N m^{-2}	0.0 – 1000
minerl(10,1)	Mineral N in soil layer 10	g N m^{-2}	0.0 – 1000
minerl(1,2)	Mineral P in soil layer 1	g P m^{-2}	0.0 – 1000
minerl(2,2)	Mineral P in soil layer 2	g P m^{-2}	0.0 – 1000
minerl(3,2)	Mineral P in soil layer 3	g P m^{-2}	0.0 – 1000
minerl(4,2)	Mineral P in soil layer 4	g P m^{-2}	0.0 – 1000
minerl(5,2)	Mineral P in soil layer 5	g P m^{-2}	0.0 – 1000
minerl(6,2)	Mineral P in soil layer 6	g P m^{-2}	0.0 – 1000
minerl(7,2)	Mineral P in soil layer 7	g P m^{-2}	0.0 – 1000
minerl(8,2)	Mineral P in soil layer 8	g P m^{-2}	0.0 – 1000
minerl(9,2)	Mineral P in soil layer 9	g P m^{-2}	0.0 – 1000
minerl(10,2)	Mineral P in soil layer 10	g P m^{-2}	0.0 – 1000
minerl(1,3)	Mineral S in soil layer 1	g S m^{-2}	0.0 – 1000
minerl(2,3)	Mineral S in soil layer 2	g S m^{-2}	0.0 – 1000
minerl(3,3)	Mineral S in soil layer 3	g S m^{-2}	0.0 – 1000

minerl(4,3)	Mineral S in soil layer 4	g S m^{-2}	0.0 – 1000
minerl(5,3)	Mineral S in soil layer 5	g S m^{-2}	0.0 – 1000
minerl(6,3)	Mineral S in soil layer 6	g S m^{-2}	0.0 – 1000
minerl(7,3)	Mineral S in soil layer 7	g S m^{-2}	0.0 – 1000
minerl(8,3)	Mineral S in soil layer 8	g S m^{-2}	0.0 – 1000
minerl(9,3)	Mineral S in soil layer 9	g S m^{-2}	0.0 – 1000
minerl(10,3)	Mineral S in soil layer 10	g S m^{-2}	0.0 – 1000
parent(1)	Mineral N in parent material	g N m^{-2}	0.0 – 9999
parent(2)	Mineral P in parent material	g P m^{-2}	0.0 – 9999
parent(3)	Mineral S in parent material	g S m^{-2}	0.0 – 9999
secndy(1)	Secondary Mineral N	g N m^{-2}	0.0 – 9999
secndy(2)	Secondary Mineral P	g P m^{-2}	0.0 – 9999
secndy(3)	Secondary Mineral S	g S m^{-2}	0.0 – 9999
occlud	P in occluded pool	g P m^{-2}	0.0 – 9999

	Initial Water parameters rwcf = (vswc-vswcmin) / (fieldc-vswcmin) Note: this parameter is no longer used to initialize soil water content (swc) for a new run. (Use ***fswcinit*** in sitepar.in to initialize swc). RWCF may be used to initialize swc when the site file is used in an extend.		
rwcf(1)	Relative water content fraction for CENTURY soil layer 1	fraction	0.0 – 1.0
rwcf(2)	Relative water content fraction for CENTURY soil layer 2	fraction	0.0 – 1.0
rwcf(3)	Relative water content fraction for CENTURY soil layer 3	fraction	0.0 – 1.0
rwcf(4)	Relative water content fraction for CENTURY soil layer 4	fraction	0.0 – 1.0
rwcf(5)	Relative water content fraction for CENTURY soil layer 5	fraction	0.0 – 1.0
rwcf(6)	Relative water content fraction for CENTURY soil layer 6	fraction	0.0 – 1.0
rwcf(7)	Relative water content fraction for CENTURY soil layer 7	fraction	0.0 – 1.0
rwcf(8)	Relative water content fraction for CENTURY soil layer 8	fraction	0.0 – 1.0
rwcf(9)	Relative water content fraction for CENTURY soil layer 9	fraction	0.0 – 1.0
rwcf(10)	Relative water content fraction for CENTURY soil layer 10	fraction	0.0 – 1.0
snlq	Initial amount of liquid water in snow.	cm	0.0 - 1000
snow	Initial amount of snow (as snow water equivalents).	cm	0.0 - 1000

SNWINS	snow effect on soil surface temp 0 = not insulating, 1 = insulating There might be additional options for DDcentEVI	index	DDcentEVI only SnowFlag in sitepar.in

Appendix 1.11 Tree/Forest parameters (tree.100)

These tree.100 parameters are read for the initial tree specified in the schedule file header, and for each subsequent tree introduced in the schedule file with a TREE event.

decid	= 0 if forest is evergreen = 1 if forest is deciduous = 2 if forest is drought deciduous	index	0, 1, 2
prdx(2)	Coefficient for calculating total monthly potential production as a function of solar radiation outside the atmosphere. It functions as a radiation use efficiency scalar on potential production. It reflects the relative genetic potential of the plant; larger PRDX(2) values indicate greater growth potential.	scaling factor, (gC production) $*m^{-2}$ $*month^{-1}$ $*Langley^{-1}$	0.1 – 5.0
ppdf(1)	Optimum temperature for production for parameterization of a Poisson Density Function curve to simulate temperature effect on growth	ºC	10.0 – 40.0
ppdf(2)	Maximum temperature for production for parameterization of a Poisson Density Function curve to simulate temperature effect on growth	ºC	20.0 – 50.0
ppdf(3)	left curve shape for parameterization of a Poisson Density Function curve to simulate temperature effect on growth		0.0 – 1.0
ppdf(4)	right curve shape for parameterization of a Poisson Density Function curve to simulate temperature effect on growth		0.0 – 10.0
cerfor(1,*,*)	***minimum* C/E ratio for forest compartments**		
cerfor(1,1,1)	(1,1,1) = N, leaf	C/N ratio	1.0 – 200.0
cerfor(1,1,2)	(1,1,2) = P, leaf	C/P ratio	1.0 – 9999.0

cerfor(1,1,3)	(1,1,3) = S, leaf	C/S ratio	1.0 – 9999.0
cerfor(1,2,1)	(1,2,1) = N, fine root	C/N ratio	1.0 – 200.0
cerfor(1,2,2)	(1,2,2) = P, fine root	C/P ratio	1.0 – 9999.0
cerfor(1,2,3)	(1,2,3) = S, fine root	C/S ratio	1.0 – 9999.0
cerfor(1,3,1)	(1,3,1) = N, fine branch	C/N ratio	1.0 – 1000.0
cerfor(1,3,2)	(1,3,2) = P, fine branch	C/P ratio	1.0 – 9999.0
cerfor(1,3,3)	(1,3,3) = S, fine branch	C/S ratio	1.0 – 9999.0
cerfor(1,4,1)	(1,4,1) = N, large wood	C/N ratio	1.0 – 1500.0
cerfor(1,4,2)	(1,4,2) = P, large wood	C/P ratio	1.0 – 9999.0
cerfor(1,4,3)	(1,4,3) = S, large wood	C/S ratio	1.0 – 9999.0
cerfor(1,5,1)	(1,5,1) = N, coarse root	C/N ratio	1.0 – 1500.0
cerfor(1,5,2)	(1,5,2) = P, coarse root	C/P ratio	1.0 – 9999.0
cerfor(1,5,3)	(1,5,3) = S, coarse root	C/S ratio	1.0 – 9999.0
cerfor(2,*,*)	***maximum* C/E ratio for forest compartments**		
cerfor(2,1,1)	(2,1,1) = N, leaf	C/N ratio	1.0 – 200.0
cerfor(2,1,2)	(2,1,2) = P, leaf	C/P ratio	1.0 – 9999.0

cerfor(2,1,3)	(2,1,3) = S, leaf	C/S ratio	1.0 – 9999.0
cerfor(2,2,1)	(2,2,1) = N, fine root	C/N ratio	1.0 – 200.0
cerfor(2,2,2)	(2,2,2) = P, fine root	C/P ratio	1.0 – 9999.0
cerfor(2,2,3)	(2,2,3) = S, fine root	C/S ratio	1.0 – 9999.0
cerfor(2,3,1)	(2,3,1) = N, fine branch	C/N ratio	1.0 – 1000.0
cerfor(2,3,2)	(2,3,2) = P, fine branch	C/P ratio	1.0 – 9999.0
cerfor(2,3,3)	(2,3,3) = S, fine branch	C/S ratio	1.0 – 9999.0
cerfor(2,4,1)	(2,4,1) = N, large wood	C/N ratio	1.0 – 1500.0
cerfor(2,4,2)	(2,4,2) = P, large wood	C/P ratio	1.0 – 9999.0
cerfor(2,4,3)	(2,4,3) = S, large wood	C/S ratio	1.0 – 9999.0
cerfor(2,5,1)	(2,5,1) = N, coarse root	C/N ratio	1.0 – 1500.0
cerfor(2,5,2)	(2,5,2) = P, coarse root	C/P ratio	1.0 – 9999.0
cerfor(2,5,3)	(2,5,3) = S, coarse root	C/S ratio	1.0 – 9999.0
cerfor(3,*,*)	***initial* C/E ratio for forest compartments**		
cerfor(3,1,1)	(3,1,1) = N, leaf	C/N ratio	1.0 – 200.0
cerfor(3,1,2)	(3,1,2) = P, leaf	C/P ratio	1.0 – 9999.0

cerfor(3,1,3)	(3,1,3) = S, leaf	C/S ratio	1.0 – 9999.0
cerfor(3,2,1)	(3,2,1) = N, fine root	C/N ratio	1.0 – 200.0
cerfor(3,2,2)	(3,2,2) = P, fine root	C/P ratio	1.0 – 9999.0
cerfor(3,2,3)	(3,2,3) = S, fine root	C/S ratio	1.0 – 9999.0
cerfor(3,3,1)	(3,3,1) = N, fine branch	C/N ratio	1.0 – 1000.0
cerfor(3,3,2)	(3,3,2) = P, fine branch	C/P ratio	1.0 – 9999.0
cerfor(3,3,3)	(3,3,3) = S, fine branch	C/S ratio	1.0 – 9999.0
cerfor(3,4,1)	(3,4,1) = N, large wood	C/N ratio	1.0 – 1500.0
cerfor(3,4,2)	(3,4,2) = P, large wood	C/P ratio	1.0 – 9999.0
cerfor(3,4,3)	(3,4,3) = S, large wood	C/S ratio	1.0 – 9999.0
cerfor(3,5,1)	(3,5,1) = N, coarse root	C/N ratio	1.0 – 1500.0
cerfor(3,5,2)	(3,5,2) = P, coarse root	C/P ratio	1.0 – 9999.0
cerfor(3,5,3)	(3,5,3) = S, coarse root	C/S ratio	1.0 – 9999.0
decw1	Maximum decomposition rate constant for wood1 (dead fine branch) per year before temperature and moisture and pH effects are applied. (See woodec.f)	yr^{-1}	0.0 – 5.0
decw2	Maximum decomposition rate constant for wood2 (dead large wood) per year before temperature and moisture and pH effects are applied. (See woodec.f)	yr^{-1}	0.0 – 5.0

decw3	Maximum decomposition rate constant for wood3 (dead coarse root) per year before temperature and moisture and pH effects are applied. (See woodec.f)	yr^{-1}	0.0 – 5.0
fcfrac(*,1)	**C allocation fraction of new production for juvenile forest (time < swold) .** **Fractions of C allocated to woody parts are internally normalized to 1.0 after C allocation to leaves and fine roots occurs.		
fcfrac(1,1)	(1,1) = leaves Obsolete parameter – C allocation to leaves is determine dynamically and is regulated by the amount of wood biomass that can support the leaf biomass.	fraction	0.0 – 1.0
fcfrac(2,1)	(2,1) = fine roots Obsolete parameter – C allocation to fine roots is determined dynamically according to soil nutrient and moisture status. See tfrtcn(*) and tfrtcw(*) parameters.	fraction	0.0 – 1.0
fcfrac(3,1)**	(3,1) = relative fraction of C allocated to fine branches	fraction	0.0 – 1.0
fcfrac(4,1)**	(4,1) = relative fraction of C allocated to large wood	fraction	0.0 – 1.0
fcfrac(5,1)**	(5,1) = relative fraction of C allocated to coarse roots	fraction	0.0 – 1.0
fcfrac(*,2)	**C allocation fraction of new production for mature forest (time ≥ swold) .** **Fractions of C allocated to woody parts are internally normalized to 1.0 after C allocation to leaves and fine roots occurs.		
fcfrac(1,2)	(1,2) = leaves Obsolete parameter – C allocation to leaves is determine dynamically and is regulated by the amount of wood biomass that can support the leaf biomass.	fraction	0.0 – 1.0

fcfrac(2,2)	(2,2) = fine roots Obsolete parameter – C allocation to fine roots is determined dynamically according to soil nutrient and moisture status. See tfrtcn(*) and tfrtcw(*) parameters.	fraction	0.0 – 1.0
fcfrac(3,2)**	(3,2) = relative fraction of C allocated to fine branches	fraction	0.0 – 1.0
fcfrac(4,2)**	(4,2) = relative fraction of C allocated to large wood	fraction	0.0 – 1.0
fcfrac(5,2)**	(5,2) = relative fraction of C allocated to coarse roots	fraction	0.0 – 1.0
tfrtcn(1)	Maximum fraction of C allocated to fine roots under maximum nutrient stress.	fraction	0.0 – 1.0
tfrtcn(2)	Minimum fraction of C allocated to fine roots with no nutrient stress.	fraction	0.0 – 1.0
tfrtcw(1)	Maximum fraction of C allocated to fine roots under maximum water stress.	fraction	0.0 – 1.0
tfrtcw(2)	Minimum fraction of C allocated to fine roots with no water stress.	fraction	0.0 – 1.0
leafdr(*)	***Monthly* death rate fractions for leaves for each month 1-12**		**0.0 – 1.0**
leafdr(1)	Death rate fractions for leaves for January.	fraction	0.0 – 1.0
leafdr(2)	Death rate fractions for leaves for February.	fraction	0.0 – 1.0
leafdr(3)	Death rate fractions for leaves for March.	fraction	0.0 – 1.0
leafdr(4)	Death rate fractions for leaves for April.	fraction	0.0 – 1.0
leafdr(5)	Death rate fractions for leaves for May.	fraction	0.0 – 1.0
leafdr(6)	Death rate fractions for leaves for June.	fraction	0.0 – 1.0

leafdr(7)	Death rate fractions for leaves for July.	fraction	0.0 – 1.0
leafdr(8)	Death rate fractions for leaves for August.	fraction	0.0 – 1.0
leafdr(9)	Death rate fractions for leaves for September.	fraction	0.0 – 1.0
leafdr(10)	Death rate fractions for leaves for October.	fraction	0.0 – 1.0
leafdr(11)	Death rate fractions for leaves for November.	fraction	0.0 – 1.0
leafdr(12)	Death rate fractions for leaves for December.	fraction	0.0 – 1.0
btolai	Biomass to leaf area index (LAI) conversion factor for trees.	units LAI / g biomass	Biome specific 0.001 – 0.02 (see below)
klai	Large wood mass at which half of theoretical maximum leaf area (***maxlai***) is achieved.	g C m^{-2}	
laitop	Parameter determining the relationship between LAI and forest production: LAI effect = 1 - exp(***laitop*** * LAI).		
maxlai	Theoretical maximum leaf area index achieved in a mature forest.		0.0 – 50.0
maxldr	Multiplier for effect of N availability on leaf death rates (evergreen forest only); ratio between death rate at unlimited vs. severely limited N status.		0.0 – 1.0
forrtf(1)	Fraction of N retranslocated from green forest leaves before litterfall	fraction	0.0 – 1.0

forrtf(2)	Fraction of P retranslocated from green forest leaves before litterfall	fraction	0.0 – 1.0
forrtf(3)	Fraction of S retranslocated from green forest leaves before litterfall		
sapk	controls the ratio of sapwood to total stem wood; it is equal to both the large wood mass (rlwodc) at which half of large wood is sapwood, and the theoretical maximum sapwood mass achieved in a mature forest. This parameter is no longer used in DayCent calculations but is needed as a placeholder in the tree.100 file.	g C m^{-2}	NO LONGER USED
swold	Year at which to switch from juvenile to mature forest C allocation fractions for production	simulation year	Within the simulation period
wdlig(1)	Lignin fraction of leaves	g lignin C/ g C	0.0 – 1.0
wdlig(2)	Lignin fraction of juvenile fine roots.	g lignin C / g C	0.0 – 1.0
wdlig(3)	Lignin fraction of fine branches. (See woodec.f)	g lignin C / g C	0.0 – 1.0
wdlig(4)	Lignin fraction of large wood. (See woodec.f)	g lignin C / g C	0.0 – 1.0

wdlig(5)	Lignin fraction of coarse roots. (See woodec.f)	g lignin C / g C	0.0 – 1.0
wdlig(6)	Lignin fraction of mature fine roots.	g lignin C / g C	0.0 – 1.0
wooddr(*)	***Monthly* death rate fractions for forest components:**		
wooddr(1)	Controls the proportion of *leaves* that drop during senescence month or at the end of the growing season when ***decid*** = 1 or 2. This is especially useful for drought-deciduous systems where only a portion of the leaves drop. Also useful when you are attempting to simulate a deciduous/coniferous mixed system of forest.	yr^{-1}	0.0 – 1.0
wooddr(2)	Maximum monthly death rate of juvenile fine roots in dry or hot conditions.	fraction	0.0 – 1.0
wooddr(3)	Monthly death rate fine branches.	fraction	0.0 – 1.0
wooddr(4)	Monthly death rate of large wood.	fraction	0.0 – 1.0
wooddr(5)	Monthly death rate of coarse roots.	fraction	0.0 – 1.0
wooddr(6)	Maximum monthly death rate of mature fine roots in dry or hot conditions.	fraction	0.0 – 1.0
wrdsrfc	Fraction of the fine roots that are transferred into the surface litter layer (STRUCC(1) and METABC(1)) upon fine root death, the remainder of the roots will go to the soil litter layer (STRUCC(2) and METABC(2))	fraction	0.0 – 1.0

wmrtfrac	Fraction of fine root production that goes to mature roots	fraction	0.0 – 1.0
snfxmx(2)	Maximum symbiotic N fixation for forest (actual symbiotic N fixation will be less if available mineral N is sufficient for growth)	g N fixed / g C net production	0.0 – 1.0
del13c	Delta 13C value for stable isotope labeling		-30.0 – 0.0
co2ipr(2)	In a forest system, the effect on plant production (ratio) of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm	scaling factor	0.5 – 1.5
co2itr(2)	In a forest system, the effect on transpiration rate (ratio) of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm	scaling factor	0.5 – 1.5
co2ice(2,*,*)	**In a forest system, the effect on C/E ratios of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm**		
co2ice(2,1,1)	(2,1,1) = minimum C/N	scaling factor	0.5 – 1.5
co2ice(2,1,2)	(2,1,2) = minimum C/P	scaling factor	0.5 – 1.5
co2ice(2,1,3)	(2,1,3) = minimum C/S	scaling factor	0.5 – 1.5
co2ice(2,2,1)	(2,2,1) = maximum C/N	scaling factor	0.5 – 1.5
co2ice(2,2,2)	(2,2,2) = maximum C/P	scaling factor	0.5 – 1.5
co2ice(2,2,3)	(2,2,3) = maximum C/S	scaling factor	0.5 – 1.5
co2irs(2)	In a forest system, the effect on root-shoot ratio of doubling the atmospheric CO_2 concentration from 350 ppm to 700 ppm	scaling factor	0.5 – 1.5
basfc2	(savanna only) relates tree basal area to grass N fraction; higher value gives more N to trees; if not running savanna, set to 1.0		

basfct	(savanna only) ratio between basal area and wood biomass (cm2/g); it is equal to (form factor * wood density * tree height); if not running savanna, set to 1.0		The equation for computing tree basal area has been changed therefore ***basfct*** is given a a default value of 1.0.
sitpot	Site Potential multiplier. Savannas Only. Site Potential determines the relative competiveness of grasses and trees for available mineral N; the larger the site potential, the greater the fraction of mineral N available to grasses as opposed to trees. Site potential is a dynamic function of average annual precipitation, and SITPOT is a multiplier of site potential. Increasing SITPOT increases the competiveness of grasses, decreasing it increases the competiveness of tress. A value of the 1.0 indicates no multiplicative effect.		0.1 – 2.0 (1.0)
maxnp		N:P ratio	currently not being used?
fkmrspmx(1)	Maximum fraction of live leaf C that goes to maintenance respiration for trees	fraction	0.0 – 1.0
fkmrspmx(2)	Maximum fraction of live juvenile fine root C that goes to maintenance respiration for trees	fraction	0.0 – 1.0
fkmrspmx(3)	Maximum fraction of live fine branch C that goes to maintenance respiration for trees	fraction	0.0 – 1.0
fkmrspmx(4)	Maximum fraction of live large wood C that goes to maintenance respiration for trees	fraction	0.0 – 1.0

fkmrspmx(5)	Maximum fraction of live coarse root C that goes to maintenance respiration for trees	fraction	0.0 – 1.0
fkmrspmx(6)	Maximum fraction of live mature fine root C that goes to maintenance respiration for trees	fraction	0.0 – 1.0
fmrsplai(1)	X1 value for line function that decreases maintenance respiration based on optimal leaf carbon when the amount of carbon in the carbohydrate storage pool is less than (***fmrsplai*** (3) * optimal leaf carbon) for a forest system		
fmrsplai(2)	Y1 value for line function that decreases maintenance respiration based on optimal leaf carbon when the amount of carbon in the carbohydrate storage pool is less than (***fmrsplai*** (3) * optimal leaf carbon) for a forest system		
fmrsplai(3)	X2 value for line function that decreases maintenance respiration based on optimal leaf carbon when the amount of carbon in the carbohydrate storage pool is less than (***fmrsplai***(3) * optimal leaf carbon) for a forest system OR X1 value for line function that decreases maintenance respiration based on optimal leaf carbon when the amount of carbon in the carbohydrate storage pool is between (***fmrsplai*** (3) * optimal leaf carbon) and (***fmrsplai*** (5) * optimal leaf carbon) for a forest system		

fmrsplai(4)	Y2 value for line function that decreases maintenance respiration based on optimal leaf carbon when the amount of carbon in the carbohydrate storage pool is less than (***fmrsplai*** (3) * optimal leaf carbon) for a forest system OR Y1 value for line function that decreases maintenance respiration based on optimal leaf carbon when the amount of carbon in the carbohydrate storage pool is between (***fmrsplai*** (3) * optimal leaf carbon) and (***fmrsplai*** (5) * optimal leaf carbon) for a forest system		
fmrsplai(5)	X2 value for line function that decreases maintenance respiration based on optimal leaf carbon when the amount of carbon in the carbohydrate storage pool is between (***fmrsplai*** (3) * optimal leaf carbon) and (***fmrsplai*** (5) * optimal leaf carbon) for a forest system		
fmrsplai(6)	Y2 value for line function that decreases maintenance respiration based on optimal leaf carbon when the amount of carbon in the carbohydrate storage pool is between (***fmrsplai*** (3) * optimal leaf carbon) and (***fmrsplai*** (5) * optimal leaf carbon) for a forest system OR Y value for line function that decreases maintenance respiration based on optimal leaf carbon when the amount of carbon in the carbohydrate storage pool is greater than (***fmrsplai*** (5) * optimal leaf carbon) for a forest system		
fgresp(1)	Maximum fraction of live leaf C that goes to growth respiration for trees	fraction	0.0 – 1.0

fgresp(2)	Maximum fraction of live juvenile fine root C that goes to growth respiration for trees	fraction	0.0 – 1.0
fgresp(3)	Maximum fraction of live fine branch C that goes to growth respiration for trees	fraction	0.0 – 1.0
fgresp(4)	Maximum fraction of live large wood C that goes to growth respiration for trees	fraction	0.0 – 1.0
fgresp(5)	Maximum fraction of live coarse root C that goes to growth respiration for trees	fraction	0.0 – 1.0
fgresp(6)	Maximum fraction of live mature fine root C that goes to growth respiration for trees	fraction	0.0 – 1.0
no3pref(2)	Fraction of N uptake that is nitrate for trees. NO LONGER USED IN THE MODEL!	fraction	0.0 – 1.0
tlaypg	number of soil layers used to determine water and mineral N, P, and S that are available for tree growth	Number of soil layers	1 – 9
tmix	Annual rate that surface SOM2C that is mixed into (transferred to) soil SOM2C in a forest system	yr^{-1}	0.0 – 1.0
tmplff	Temperature at which leaf drop will occur in a deciduous tree type	ºC	

tmplfs	Temperature at which leaf out will occur in a deciduous tree type.	ºC	
furgdys	Number of days of unrestricted wood growth in a deciduous forest system	number of days	
flsgres	Deciduous forest late season growth restriction factor.		
tmxturn	Maximum turnover rate per month of juvenile fine roots to mature fine roots through aging	?	
wscoeff(2,1)	Water Stress Coefficient used to calculate the water stress multiplier on potential growth based on the relative water content of the wettest soil layer in the rooting zone (*maxrwcf, 0-1*). $\frac{1.0}{1.0+\exp\left(wscoeff\left(2,2\right)*\left(wscoeff\left(2,1\right)-maxrwcf\right)\right)}$	See wscoeff.xlsx	0.2 – 0.5
wscoeff(2,2)	Water Stress Coefficient used to calculate the water stress multiplier on potential growth based on the relative water content of the wettest soil layer in the rooting zone. See comments above	See wscoeff.xlsx	6.0 – 30.0
ps2mrsp(2)	Fraction of photosynthesis that goes to maintenance respiration	fraction	0.0 – 1.0
sfavail(2)	Fraction of N available per day to plants. Formerly FAVAIL(1) in fix.100.		0.0 – 1.0

amax(2)	Maximum net CO_2 assimilation rate assuming maximum possible PAR, all intercepted, no temperature, water or vapor pressure deficit stress.	nmol CO_2 g^{-1} (leaf biomass) sec^{-1}	
amaxfrac(2)	Average daily maximum photosynthesis as a fraction of amax.	fraction	0.0 – 1.0
amaxscalar1(2)	Multiplier used to adjust aMax based on growthDays1 days since germination	scalar	
amaxscalar2(2)	Multiplier used to adjust aMax based on growthDays2 days since germination.	scalar	0.8 – 1.6
amaxscalar3(2)	Multiplier used to adjust aMax based on growthDays3 days since germination.	scalar	0.7 – 1.5
amaxscalar4(2)	Multiplier used to adjust aMax based on growthDays4 days since germination.	scalar	0.3 – 0.8
attenuation(2)	Light attenuation coefficient.		
basefolrespfrac(2)	Basal foliage respiration rate, as percentage of maximum net photosynthesis rate		
cfracleaf(2)	factor for converting leaf biomass to carbon (leaf biomass * cFracLeaf = leaf carbon)	g C / g biomass	

dvpdexp(2)	Exponential value in vapor pressure deficit effect on photosynthesis equation. dVpd = dVpdSlope * exp(vpd*dVpdExp)		
dvpdslope(2)	Slope value in vapor pressure deficit effect on photosynthesis equation. dVpd = dVpdSlope * exp(vpd*dVpdExp)		
growthdays1(2)	Number of days after germination to start using aMaxScalar1.	number of days	
growthdays2(2)	Number of days after germination to start using aMaxScalar2.	number of days	
growthdays3(2)	Number of days after germination to start using aMaxScalar3.	number of days	
growthdays4(2)	Number of days after germination to start using aMaxScalar4.	number of days	
halfsatpar(2)	Photosynthetically active radiation (PAR) at which photosynthesis occurs at 1/2 of theoretical maximum.	Einsteins * m^{-2} ground area * day^{-1}	
leafcspwt(2)	Grams of carbon in a square meter of leaf area	g C m^{-2} leaf area	
psntmin(2)	minimum temperature at which net photosynthesis occurs	ºC	
psntopt(2)	optimal temperature at which net photosynthesis occurs	ºC	

btolai by biome	units LAI / g biomass
arctic tundra	0.008
arid savanna/shrubland	0.007
boreal forest	0.004
coniferous/deciduous mix forest	0.007
grassland	0.008
maritime coniferous forest	0.004
temperate coniferous forest	0.004
temperate coniferous savanna	0.004
temperate deciduous savanna	0.010
temperate mixed savanna	0.007
tropical evergreen forest	0.010
tropical savanna	0.006

warm temperate deciduous forest	0.010

Appendix 1.12 Tree removal parameters (trem.100)

These trem.100 parameters apply to TREM events and include live tree removal by fire and non-burning events. Grass/crop, surface litter, and dead wood burning parameters are scheduled with FIRE events (see in fire.100).

evntyp	Event type flag = 0 for cutting, pruning, windstorm, or other non-fire event = 1 for fire	index	0,1
remf(1)	Fraction of material component removed from live leaves.	fraction	0.0 – 1.0
remf(2)	Fraction of material component removed from live fine branches.	fraction	0.0 – 1.0
remf(3)	Fraction of material component removed from live large wood.	fraction	0.0 – 1.0
remf(4)	Fraction of material component removed from dead fine branches. This parameter applies to non-fire events only. To burn dead fine branches one must schedule a FIRE event; see fire.100 parameters.	fraction	0.0 – 1.0
remf(5)	Fraction of material component removed from dead large wood. This parameter applies to non-fire events only. To burn dead large wood one must schedule a FIRE event; see fire.100 parameters.	fraction	0.0 – 1.0
fd(1)	Fraction of fine root components that die.	fraction	0.0 – 1.0
fd(2)	Fraction of coarse root components that die.	fraction	0.0 – 1.0
retf(1,1)	Fraction of C in killed live leaves that is returned to the system (ash or litter).	fraction	0.0 – 1.0
retf(1,2)	Fraction of N in killed live leaves that is returned to the system (ash or litter).	fraction	0.0 – 1.0
retf(1,3)	Fraction of P in killed live leaves that is returned to the system (ash or litter).	fraction	0.0 – 1.0
retf(1,4)	Fraction of S in killed live leaves that is returned to the system (ash or litter).	fraction	0.0 – 1.0
retf(2,1)	Fraction of C in killed fine branches that is returned to the system (ash or dead fine branches).	fraction	0.0 – 1.0

retf(2,2)	Fraction of N in killed fine branches that is returned to the system (ash or dead fine branches).	fraction	0.0 – 1.0
retf(2,3)	Fraction of P in killed fine branches that is returned to the system (ash or dead fine branches).	fraction	0.0 – 1.0
retf(2,4)	Fraction of S in killed fine branches that is returned to the system (ash or dead fine branches).	fraction	0.0 – 1.0
retf(3,1)	Fraction of C in killed large wood that is returned to the system (ash or dead large wood).	fraction	0.0 – 1.0
retf(3,2)	Fraction of N in killed large wood that is returned to the system (ash or dead large wood).	fraction	0.0 – 1.0
retf(3,3)	Fraction of P in killed large wood that is returned to the system (ash or dead large wood).	fraction	0.0 – 1.0
retf(3,4)	Fraction of S in killed large wood that is returned to the system (ash or dead large wood).	fraction	0.0 – 1.0

Fire code changes for charcoal:

There have been changes to fire code so that removal, by burning, of dead fine branches and dead large wood will occur as the result of a FIRE event rather than of a TREM event. A TREM fire event will burn only live leaves, live fine branches, and live large wood. A TREM cutting, windstorm or other non-fire event will allow the removal of dead fine branches and dead large wood in the same manner as Century 4.0. When burning dead fine branches and dead large through a FIRE event the burned carbon in the dead wood can be returned to the system as charcoal in the passive SOM pool. (See the changes in the FIRE.100 input parameters for more information on how the charcoal return is parameterized.)

Appendix 1.13 Additional site information needed by DDcentEVI with methanogenisis (sitepar.in).

These are sitepar.in parameters formerly used with DDcentEVI. Recent versions of DDcentEVI no longer read the sitepar.in file, and include these parameters in the <site>.100 file instead. See next sections for sitepar.in format for DailyDayCent and DayCent_Photosyn_UV.

Parameter Name	Description	Units	Comments or Valid Range
usexdrvrs	Use extra weather drivers. Designates the format of the weather file 0 = no extra drivers 1 = PET drivers 2 = psyn drivers (N/A)* 3 = both PET and psyn (N/A)* 4 = EVI Note: 2, 3 are not implemented in DayCentEVI version since these options are available to DDcent_Photosysn_UV only	index	0, 1, 4 See details about weather file formats below
sublimscale	Multiplier on sublimation	Scaling factor	0.0 – 1.0 Updating not recommended
reflec	vegetation reflectivity/albedo	fraction	0.0 – 1.0
albedo	Snow albedo	fraction	0.0 – 1.0
fswcinit	initial swc as fraction of field capacity	fraction	0.0 – 1.0
dmpflux	Dampens strong fluxes of water between soil layers	In h2oflux routine (0.000001 = original value)	0.000001 - 0.000008 Updating not recommended

hours_rain	duration of each rain event	hours	2 – 24 (valid values must be a multiple of 2)
drainlag	# of days between rainfall event and drainage of soil (-1=computed)	number of days	-1, 0, 1, 2, 3, 4, 5
hpotdeep	hydraulic water potential of deep storage layer	-cm	
ksatdeep	saturated hydraulic conductivity of deep storage layer	cm sec^{-1}	
tbotmn tbotmx	min and max temperature for bottom soil layer	°C	
dmp	Soil time step damping factor for calculating soil temperature by layer. Relates to how fast the heat gets into/out of the soil.	Scaling factor	
timlag	days from Jan 1 to coolest temp at bottom of soil (days)	Number of days	
Ncoeff	minimum water/temperature reduction on nitrification	Scaling factor	
jdayStart jdayEnd	turn off respiration restraint on denitrification between these days	days of year	
N2Oadjust_fc	maximum proportion of nitrified N lost as N_2O @ field capacity	fraction	0.0 – 1.0
N2Oadjust_wp	minimum proportion of nitrified N lost as N_2O @ wilting point	fraction	0.0 – 1.0
MaxNitAmt	maximum daily nitrification rate	g N m^{-2} day^{-1}	

SnowFlag	snow effect on soil surface temp: 0 = not insulating, 1 = insulating	boolean	0,1
netmn_to_no3	fraction of new net mineralization automatically converted to nitrate each day. The remaining fraction is added to the ammonium pool.	fraction	0.0-1.0
wfpsdnitadj	adjustment on inflection point for the water filled pore space effect on denitrification curve	< 1.0 allows denitrification to occur at lower soil water content > 1.0 requires wetter conditions for denitrification	0.1 – 2.0
n2n2oadj	N_2/N_2O ratio adjustment coefficient		0.1 – 2.0
elevation	elevation	meters	0 - 5000
slope	site slope	degrees	0 - 60
aspect	site aspect	degrees	0 - 360
ehoriz	site east horizon	degrees	0 - 180
whoriz	site west horizon	degrees	0 - 180

1 sradadj[1]	Srad adjust for cloud cover & transmission coeff for January. Multiplies incoming solar radiation when it is calculated from air temperature, not when srad is read from weather file.	fraction	0.0 – 1.0
2 sradadj[2]	Srad adjust for cloud cover & transmission coeff for February	fraction	0.0 – 1.0
3 sradadj[3]	Srad adjust for cloud cover & transmission coeff for March	fraction	0.0 – 1.0
4 sradadj[4]	Srad adjust for cloud cover & transmission coeff for April	fraction	0.0 – 1.0
5 sradadj[5]	Srad adjust for cloud cover & transmission coeff for May	fraction	0.0 – 1.0
6 sradadj[6]	Srad adjust for cloud cover & transmission coeff for June	fraction	0.0 – 1.0
7 sradadj[7]	Srad adjust for cloud cover & transmission coeff for July	fraction	0.0 – 1.0
8 sradadj[8]	Srad adjust for cloud cover & transmission coeff for August	fraction	0.0 – 1.0

9 sradadj[9]	Srad adjust for cloud cover & transmission coeff for September	fraction	0.0 – 1.0
10 sradadj[10]	Srad adjust for cloud cover & transmission coeff for October	fraction	0.0 – 1.0
11 sradadj[11]	Srad adjust for cloud cover & transmission coeff for November	fraction	0.0 – 1.0
12 sradadj[12]	Srad adjust for cloud cover & transmission coeff for December	fraction	0.0 – 1.0

sitepar.in example of DDCentEVI (methane parameters highlighted in yellow have been moved to the fix.100 file or are no longer used) :

0 / usexdrvrs - 0 = no extra drivers, 1 = PET drivers, 4 - EVI (not implemented 2 = psyn drivers, 3 = both)
1 / sublimscale
0.18 / reflec - vegetation reflectivity (frac) hardwoods = 0.20 spruce = 0.10
0.65 / albedo - snow albedo (frac)
0.000008 / dmpflux - in h2oflux routine (0.000001 = original value)
10 / hours_rain - duration of each rain event
0 / drainlag - # of days between rainfall event and drainage of soil (-1=computed)
-200 / hpotdeep - hydraulic water potential of deep storage layer (units?)
0.0003 / ksatdeep - saturated hydraulic conductivity of deep storage layer (cm/sec)
0.0 12.4 / tbotmn tbotmx - min and max temperature for bottom soil layer (degrees C)
0.003 / dmp - damping factor for calculating soil temperature by layer
30.0 / timlag - days from Jan 1 to coolest temp at bottom of soil (days)
0.03 / Ncoeff - min water/temperature limitation coefficient for nitrify
0 0 / jdayStart jdayEnd - turn off respiration restraint on denit between these Julian dates

0.012 / N2Oadjust_fc - maximum proportion of nitrified N lost as N2O @ field capacity 1) 0.010 2) 0.015 3) 0.012
0.012 / N2Oadjust_wp - minimum proportion of nitrified N lost as N2O @ wilting point 1) 0.002 2) 0.010 3) 0.012
1.0 / MaxNitAmt - maximum daily nitrification amount (gN/m^2) (0.4) 1.0 is value suggested by delgrosso Apr 19, 2012
1 / SnowFlag - snow insulation effect on soil surface temp: 0 = not insulating, 1 = insulating
0.2 / netmn_to_no3 - fraction of new net mineralization that goes to NO3 (0.0-1.0)
1.0 / wfpsdnitadj - adjustment on inflection point for WFPS effect on denit
1.0 / N2N2Oadj - N2/N2O ratio adjustment coefficient
-1.0 / flood_N2toN2O - N2/N2O ratio for flooded state (100.0) (moved to FLN2OR in fix.100)
0.15 / CO2_to_CH4 - fraction of CO2 from soil respiration used to produce CH4 (moved to CO2CH4 in fix.100)
0.5 / C6H12O6_to_CH4 - reaction of anaerobic carbohydrate fermentation with methanogenesis (mole weight C6H12O6 to CH4)
0.45 / frac_to_exudates - fraction of root production that is root exudates (moved to FREXUD in fix.100)
0.23 / Aeh - differential coefficient (Aeh) (moved to AEH in fix.100)
0.16 / Deh - differential coefficient (Deh) (moved to DEH in fix.100)
-250.0 / Beh_flood - low-limit value for Eh during flooding course (mv) (moved to BEHFL in fix.100)
300.0 / Beh_drain - upper-limit value of Eh during drainage course (mv) (moved to BEHDR in fix.100)
0.7 / zero_root_frac - fraction CH4 emitted via bubbles when zero root biomass (0.0-1.0)
62.0 / elevation - elevation, meters Crowley
0.0 / slope - site slope, degrees
0.0 / aspect - site aspect, degrees
0.0 / ehoriz - site east horizon, degrees
0.0 / whoriz - site west horizon, degrees
0.42 / sradadj[1] - solar radiation surface transmission
0.50 / sradadj[2] - solar radiation surface transmission
0.53 / sradadj[3] - solar radiation surface transmission
0.57 / sradadj[4] - solar radiation surface transmission
0.62 / sradadj[5] - solar radiation surface transmission
0.69 / sradadj[6] - solar radiation surface transmission
0.71 / sradadj[7] - solar radiation surface transmission
0.66 / sradadj[8] - solar radiation surface transmission
0.58 / sradadj[9] - solar radiation surface transmission
0.52 / sradadj[10] - solar radiation surface transmission
0.46 / sradadj[11] - solar radiation surface transmission

0.45 / sradadj[12] - solar radiation surface transmission

Appendix 1.14 Additional site information needed by DailyDayCent (sitepar.in).

See previous section for sitepar.in format for DDcentEVI and next section for DayCent_Photosyn_UV.

usexdrvrs	Use extra weather drivers. Designates the format of the weather file. (See **Weather Drivers** section at the end of this document). 0 = no extra drivers 1 = PET drivers		0, 1, 2, 3 See details about weather file formats below
sublimscale	Multiplier on sublimation	Scaling factor	0.0 – 1.0 Updating not recommended
reflec	vegetation reflectivity/albedo	fraction	0.0 – 1.0
albedo	snow albedo	fraction	0.0 – 1.0
fswcinit	initial soil water content, fraction of field capacity	fraction	0.5 – 1.0
dmpflux	Dampens strong fluxes of water between soil layers	In h2oflux routine (0.000001 = original value)	0.000001 - 0.000008 Updating not recommended
hours_rain	duration of each rain event	hours	2 – 24 (valid values must be a multiple of 2)
drainlag	# of days between rainfall event and drainage of soil (-1=computed)	number of days	-1, 0, 1, 2, 3, 4, 5
1 <ws> watertable	January (0=no water table , 1=water table)	index	0, 1
2 <ws> watertable	February (0=no water table , 1=water table)	index	0, 1
3 <ws> watertable	March (0=no water table , 1=water table)	index	0, 1
4 <ws> watertable	April (0=no water table , 1=water table)	index	0, 1
5 <ws> watertable	May (0=no water table , 1=water table)	index	0, 1
6 <ws> watertable	June (0=no water table , 1=water table)	index	0, 1
7 <ws> watertable	July (0=no water table , 1=water table)	index	0, 1

8 <ws> watertable	August (0=no water table , 1=water table)	index	0, 1
9 <ws> watertable	September (0=no water table , 1=water table)	index	0, 1
10 <ws> watertable	October (0=no water table , 1=water table)	index	0, 1
11 <ws> watertable	November (0=no water table , 1=water table)	index	0, 1
12 <ws> watertable	December (0=no water table , 1=water table)	index	0, 1
hpotdeep	hydraulic water potential of deep storage layer	cm (?)	
ksatdeep	saturated hydraulic conductivity of deep storage layer	cm sec^{-1}	
1 <ws> cldcov	Average cloud cover for January	%	0 - 100
2 <ws> cldcov	Average cloud cover for February	%	0 - 100
3 <ws> cldcov	Average cloud cover for March	%	0 - 100
4 <ws> cldcov	Average cloud cover for April	%	0 - 100
5 <ws> cldcov	Average cloud cover for May	%	0 - 100
6 <ws> cldcov	Average cloud cover for June	%	0 - 100
7 <ws> cldcov	Average cloud cover for July	%	0 - 100
8 <ws> cldcov	Average cloud cover for August	%	0 - 100
9 <ws> cldcov	Average cloud cover for September	%	0 - 100
10 <ws> cldcov	Average cloud cover for October	%	0 - 100
11 <ws> cldcov	Average cloud cover for November	%	0 - 100
12 <ws> cldcov	Average cloud cover for December	%	0 - 100
tbotmn <ws> tbotmx	minimum and maximum temperature for bottom soil layer	ºC	
dmp	damping factor for calculating soil temperature by layer	Scaling factor	
timlag	days from Jan 1 to coolest temp at bottom of soil (days)	Number of days	
Ncoeff	minimum water/temperature limitation coefficient for nitrify	Scaling factor	
jdayStart <ws> jdayEnd	turn off respiration restraint on denitrification between these days	days of year	

N2Oadjust_fc	maximum proportion of nitrified N lost as N_2O @ field capacity	fraction	0.0 – 1.0
N2Oadjust_wp	minimum proportion of nitrified N lost as N_2O @ wilting point	fraction	0.0 – 1.0
MaxNitAmt	maximum daily nitrification amount	g N m^{-2} day^{-1}	0.2 – 2.0
SnowFlag	flag to turn on/off the insulating effect of snow on soil surface temperature. 0 = not insulating, 1 = insulating	Index	0, 1
netmn_to_no3	coefficient to control the fraction of new net mineralization that goes to nitrate	fraction	0.0 – 1.0
wfpsdnitadj	adjustment on inflection point for the water filled pore space effect on denitrification curve	< 1.0 allows denitrification to occur at lower soil water content > 1.0 requires wetter conditions for denitrification	0.1 – 2.0
n2n2oadj	N_2/N_2O ratio adjustment coefficient		0.1 – 2.0

<ws> = white space

Appendix 1.15 Additional site information needed by DayCent_Photosyn_UV (sitepar.in).

See previous sections for sitepar.in format for DDcentEVI and DailyDayCent

usexdrvrs	Use extra weather drivers. Designates the format of the weather file. (See **Weather Drivers** section at the end of this document). 0 = no extra drivers 1 = PET drivers 2 = photosynthesis drivers 3 = photosynthesis and PET drivers		0, 1, 2, 3 See details about weather file formats below
sublimscale	Multiplier on sublimation	Scaling factor	0.0 – 1.0 Updating not recommended
reflec	vegetation reflectivity/albedo	fraction	0.0 – 1.0
albedo	Snow albedo	fraction	0.0 – 1.0
fswcinit	initial swc, fraction of field capacity	fraction	0.5 – 1.0
dmpflux	Dampens strong fluxes of water between soil layers	In h2oflux routine (0.000001 = original value)	0.000001 - 0.000008 Updating not recommended
hours_rain	duration of each rain event	hours	2 – 24 (valid values must be a multiple of 2)
drainlag	# of days between rainfall event and drainage of soil (-1=computed)	number of days	-1, 0, 1, 2, 3, 4, 5
1 <ws> watertable	January (0=no water table , 1=water table)	index	0, 1
2 <ws> watertable	February (0=no water table , 1=water table)	index	0, 1
3 <ws> watertable	March (0=no water table , 1=water table)	index	0, 1
4 <ws> watertable	April (0=no water table , 1=water table)	index	0, 1
5 <ws> watertable	May (0=no water table , 1=water table)	index	0, 1
6 <ws> watertable	June (0=no water table , 1=water table)	index	0, 1

7 <ws> watertable	July (0=no water table , 1=water table)	index	0, 1
8 <ws> watertable	August (0=no water table , 1=water table)	index	0, 1
9 <ws> watertable	September (0=no water table , 1=water table)	index	0, 1
10 <ws> watertable	October (0=no water table , 1=water table)	index	0, 1
11 <ws> watertable	November (0=no water table , 1=water table)	index	0, 1
12 <ws> watertable	December (0=no water table , 1=water table)	index	0, 1
hpotdeep	hydraulic water potential of deep storage layer	cm (?)	
ksatdeep	saturated hydraulic conductivity of deep storage layer	cm sec^{-1}	
1 <ws> cldcov	Average cloud cover for January	%	0 - 100
2 <ws> cldcov	Average cloud cover for February	%	0 - 100
3 <ws> cldcov	Average cloud cover for March	%	0 - 100
4 <ws> cldcov	Average cloud cover for April	%	0 - 100
5 <ws> cldcov	Average cloud cover for May	%	0 - 100
6 <ws> cldcov	Average cloud cover for June	%	0 - 100
7 <ws> cldcov	Average cloud cover for July	%	0 - 100
8 <ws> cldcov	Average cloud cover for August	%	0 - 100
9 <ws> cldcov	Average cloud cover for September	%	0 - 100
10 <ws> cldcov	Average cloud cover for October	%	0 - 100
11 <ws> cldcov	Average cloud cover for November	%	0 - 100
12 <ws> cldcov	Average cloud cover for December	%	0 - 100
tbotmn <ws> tbotmx	min and max temperature for bottom soil layer	ºC	
dmp	damping factor for calculating soil temperature by layer	Scaling factor	
timlag	days from Jan 1 to coolest temp at bottom of soil (days)	Number of days	
Ncoeff	min water/temperature limitation coefficient for nitrify	Scaling factor	
jdayStart <ws> jdayEnd	turn off respiration restraint on denitrification between these days	days of year	

N2Oadjust_fc	maximum proportion of nitrified N lost as N_2O @ field capacity	fraction	0.0 – 1.0
N2Oadjust_wp	minimum proportion of nitrified N lost as N_2O @ wilting point	fraction	0.0 – 1.0
MaxNitAmt	maximum daily nitrification amount	g N m^{-2} day^{-1}	0.2 – 2.0
SnowFlag	snow effect on soil surface temp 0 = not insulating, 1 = insulating	index	0, 1
netmn_to_no3	fraction of new net mineralization that goes to NO3	fraction	0.0 – 1.0
wfpsdnitadj	adjustment on inflection point for the water filled pore space effect on denitrification curve	< 1.0 allows denitrification to occur at lower soil water content > 1.0 requires wetter conditions for denitrification	0.0 – 2.0
N2N2Oadj	N_2/N_2O ratio adjustment coefficient		1.0
elevation	elevation	meters	0 - 5000
slope	site slope,	degrees	0 - 60
aspect	site aspect	degrees	0 - 360
ehoriz	site east horizon	degrees	0 - 180
whoriz	site west horizon	degrees	0 - 180
1 <ws> sradadj	srad adjust for cloud cover & transmission coeff for January	fraction	0.0 – 1.0
2 <ws> sradadj	Srad adjust for cloud cover & transmission coeff for February	fraction	0.0 – 1.0

3 <ws> sradadj	Srad adjust for cloud cover & transmission coeff for March	fraction	0.0 – 1.0
4 <ws> sradadj	Srad adjust for cloud cover & transmission coeff for April	fraction	0.0 – 1.0
5 <ws> sradadj	Srad adjust for cloud cover & transmission coeff for May	fraction	0.0 – 1.0
6 <ws> sradadj	Srad adjust for cloud cover & transmission coeff for June	fraction	0.0 – 1.0
7 <ws> sradadj	Srad adjust for cloud cover & transmission coeff for July	fraction	0.0 – 1.0
8 <ws> sradadj	Srad adjust for cloud cover & transmission coeff for August	fraction	0.0 – 1.0
9 <ws> sradadj	Srad adjust for cloud cover & transmission coeff for September	fraction	0.0 – 1.0
10 <ws> sradadj	Srad adjust for cloud cover & transmission coeff for October	fraction	0.0 – 1.0
11 <ws> sradadj	Srad adjust for cloud cover & transmission coeff for November	fraction	0.0 – 1.0
12 <ws> sradadj	Srad adjust for cloud cover & transmission coeff for December	fraction	0.0 – 1.0
tminintercept	slope for adjusting minimum temperature for VPD dewpoint calc		
tminslope	intercept for adjusting minimum temperature for VPD dewpoint calc		
maxphoto	maximum carbon loss due to photodecomposition	µg C/KJ srad	0.0 - ??
bioabsorp	litter biomass for full absorption of solar radiation	g biomass	200
mti_mx_incr_r	MTI max increase ratio	unitless	1.0
mti_mn_sr	MTI min effective solar radiation	KJ srad	0.0
mti_mx_sr	MTI max effective solar radiation	KJ srad	30000
mdr_mn_redc_r	MDR min reduce ratio	unitless	1.0
mdr_mn_sr	MDR min effective solar radiation	KJ srad	0.0

mdr_mx_sr	MDR max effective solar radiation	KJ srad	30000
photo_co2_fraction	Fraction of C flow loss due to photodecomp	fraction	0.0 – 1.0
maxphoto_lig_slp	maxphoto init. lignin slope	ug C / KJ srad / unit lignin fraction	0.0 - ??

<ws> = white space

Example sitepar.in for DayCent_Photosyn_UV:

```
0          / 1 = Use extra weather drivers (solrad, rhumid, windsp), 0 = don't use (for PET)
1.0        / sublimscale - multiplier on sublimation (1.0 no effect)
0.18     / reflec - vegetation reflectivity (frac) /
0.65     / albedo of snow (frac) */
0.90     / fswcinit - initial swc, fraction of field capacity
0.000001 / dmpflux - in h2oflux routine (0.000001 = original value)
10       / hours_rain - duration of each rain event
0        / drainlag - # of days between rainfall event and drainage of soil (-1=computed)
1  0     / watertable[month] - 0 = no water table, 1 = water table
2  0
3  0
4  0
5  0
6  0
7  0
8  0
9  0
10 0
11 0
12 0
-200     / hpotdeep - hydraulic water potential of deep storage layer (units?)
0.0003   / ksatdeep - saturated hydraulic conductivity of deep storage layer (cm/sec)
1  58    / cldcov[month] - cloud cover (%)
2  58
3  58
```

```
4  58
5  58
6  58
7  58
8  58
9  58
10 58
11 58
12 58
0.0 12.4 / tbotmn, tbotmx:  min and max temperature for bottom soil layer (degrees C)
0.003   / dmp: damping factor for calculating soil temperature by layer
30.0      / timlag: days from Jan 1 to coolest temp at bottom of soil (days)
0.03     / Ncoeff: min water/temperature limitation coefficient for nitrify
0 0      / jdayStart jdayEnd: turn off respiration restraint on denit between these Julian dates
0.014   / N2Oadjust_fc: maximum proportion of nitrified N lost as N2O at field capacity
0.003    / N2Oadjust_wp: minimum proportion of nitrified N lost as N2O at wilting point
0.4      / MaxNitAmt: maximum daily nitrification amount (gN/m^2)
1        / SnowFlag: snow effect on soil surface temp: 0 = not insulating, 1 = insulating
0.2      / netmn_to_no3: fraction of new net mineralization that goes to NO3 (0.0-1.0)
1.34             / wfpsadjdnit: adjustment on inflection point for WFPS effect on denit
0.94             / n2n2oadj: N2/N2O ratio adjustment coefficient
129.0    / ELEV: elevation, meters
0.0      / SITSLP: site slope, degrees
0.0      / ASPECT: site aspect, degrees
0.0      / ehoriz: site east horizon, degrees
0.0      / whoriz: site west horizon, degrees
1   0.5          / sradadj[month]: solar radiation adjust for cloud cover & transmission coeff
2   0.5
3   0.5
4   0.5
5   0.5
6   0.5
7   0.5
8   0.5
```

9   0.5
10 0.5
11 0.5
12 0.5
1.0   / tminslope – slope for adjusting minimum temperature for VPD dewpoint calc
0.0   / tminintercept – intercept for adjusting minimum temperature for VPD dewpoint calc
0   / maximum carbon loss due to photodecomposition (ug C/KJ srad)
200.0   / litter biomass for full absorption of solar radiation (g biomass)
1.0   / MTI max increase ratio (unitless)
0.0   / MTI min effective solar radiation (KJ srad)
30000.0 / MTI max effective solar radiation (KJ srad)
1.0   / MDR min reduce ratio (unitless)
0.0   / MDR min effective solar radiation (KJ srad)
30000.0 / MDR max effective solar radiation (KJ srad)
0.70   / Fraction of C flow loss due to photodecomp (0.0-1.0): photo_co2_fraction
0.0   / maxphoto init. lignin slope (ug C / KJ srad / unit lignin fraction)

Weather Drivers

The “use extra weather drivers” parameter designates the format of the weather file. The minimum requirements are those columns 1 – 7, common to all formats.

Use extra weather drivers = 0

Column 1 - Day of month, 1-31
Column 2 - Month of year, 1-12
Column 3 - Year (4 digits)
Column 4 - Day of the year, 1-366
Column 5 - Maximum temperature for day, ºC
Column 6 - Minimum temperature for day, ºC
Column 7 - Precipitation for day, cm

Use extra weather drivers = 1

Column 1 - Day of month, 1-31
Column 2 - Month of year, 1-12
Column 3 - Year (4 digits)
Column 4 - Day of the year, 1-366
Column 5 - Maximum temperature for day, ºC
Column 6 - Minimum temperature for day, ºC
Column 7 - Precipitation for day, cm
Column 8 - Solar radiation, langleys day^{-1}
Column 9 - Relative humidity, %, 1-100
Column 10 - Wind speed, miles per hour

Use extra weather drivers = 2

Column 1 - Day of month, 1-31
Column 2 - Month of year, 1-12
Column 3 - Year (4 digits)

Column 4 - Day of the year, 1-366
Column 5 - Maximum temperature for day, ºC
Column 6 - Minimum temperature for day, ºC
Column 7 - Precipitation for day, cm
Column 8 - Solar radiation, W m^{-2} day^{-1}
Column 9 - vapor pressure deficit, kPa day^{-1}

Use extra weather drivers = 3 (DayCent Photosyn UV only)

Column 1 - Day of month, 1-31
Column 2 - Month of year, 1-12
Column 3 - Year (4 digits)
Column 4 - Day of the year, 1-366
Column 5 - Maximum temperature for day, ºC
Column 6 - Minimum temperature for day, ºC
Column 7 - Precipitation for day, cm
Column 8 - Solar radiation, langleys day^{-1}
Column 9 - Relative humidity, %, 1-100
Column 10 - Wind speed, miles per hour
Column 11 - Solar radiation, mean W m^{-2} day^{-1}
Column 12 - vapor pressure deficit, kPa day^{-1}

Use extra weather drivers = 4 (DDcentEVI only)

Column 1 - Day of month, 1-31
Column 2 - Month of year, 1-12
Column 3 - Year (4 digits)
Column 4 - Day of the year, 1-366
Column 5 - Maximum temperature for day, ºC
Column 6 - Minimum temperature for day, ºC
Column 7 - Precipitation for day, cm
Column 8 - Solar radiation, mean W m^{-2} day^{-1}
Column 9 - EVI (units??)

Appendix 1.16 Soils Data (soils.in)

A soils.in file is required for each simulation and is not associated with any one specific event.

Column 1 – Upper depth of soil layer (cm)
Column 2 – Lower depth of soil layer (cm)
Column 3 – Bulk density of soil layer (g cm^{-3})
Column 4 – Field capacity of soil layer, volumetric fraction
Column 5 – Wilting point of soil layer, volumetric fraction
Column 6 – Evaporation coefficient for soil layer (currently not being used)
Column 7 – Fraction of roots in soil layer, these values must sum to 1.0 but if they don't the model will normalize the values to 1.0
Column 8 – Fraction of sand in soil layer, 0.0 - 1.0
Column 9 – Fraction of clay in soil layer, 0.0 - 1.0
Column 10 – Organic matter in soil layer, fraction 0.0 - 1.0
Column 11 – The amount that volumetric soil water content can drop below wilting point for soil layer (*deltamin*, volumetric fraction). The minimum soil water content of a layer = wilting point – deltamin.
Column 12 – Saturated hydraulic conductivity of soil layer (ksat, cm sec^{-1})
Column 13 – pH of soil layer

NOTES:
Fraction of silt for soil layer is computed as follows:
silt = 1.0 - (sand + clay)

For the trace gas subroutines it is currently recommended to use the following layering structure for the top 3 soil layers in your soils.in file:

layer 1 - 0.0 cm to 2.0 cm
layer 2 - 2.0 cm to 5.0 cm
layer 3 - 5.0 cm to 10.0 cm

The depth structure in this file should match the ADEP(*) values in the fix.100 file in such a way that the boundaries for the soil layer depths can be matched with the ADEP(*) values. For example, using the file above and ADEP(1-10) values of 10, 20, 15, 15, 30, 30, 30, 30, 30, and 30:

<u>ADEP(*) parameters in fix.100:</u>

10.00000	'ADEP(1)'
20.00000	'ADEP(2)'
15.00000	'ADEP(3)'
15.00000	'ADEP(4)'
30.00000	'ADEP(5)'
30.00000	'ADEP(6)'
30.00000	'ADEP(7)'
30.00000	'ADEP(8)'
30.00000	'ADEP(9)'
30.00000	'ADEP(10)'

layers 1, 2 and 3 match the first 10 centimeter ADEP(1) value
layers 4 and 5 match the second 20 centimeter ADEP(2) value
layer 6 matches the third 15 centimeter ADEP(3) value
layer 7 matches the fourth 15 centimeter ADEP(4) value
layers 8 and 9 match the first 30 centimeter ADEP(5) value
layers 10 and 11 match the second 30 centimeter ADEP(6) value
layer 12 matches the third 30 centimeter ADEP(7) value
ADEP(8-10) are not used.

The value for NLAYER in the <site>.100 file should be set to match the number of ADEP values that you are using when you match the layering to the soils.in file. For the example above NLAYER should be set to 7.

layer #	thickness (cm)	upper depth (cm)	lower depth (cm)	bulk density (g cm^{-3})	field capacity (volu-metric)	wilting point (volu-metric)	evap. coef-ficient	frac. of roots	sand frac-tion	clay frac-tion.	organic matter frac-tion	deltamim (volu-metric)	ksat (cm sec^{-1})	pH
1	2	0	2	0.83	0.1212	0.0345	0.8	0.01	0.9	0.02	0.02	0.008	0.042	4.5
2	3	2	5	0.83	0.1212	0.0345	0.2	0.04	0.9	0.02	0.02	0.008	0.042	4.5
3	5	5	10	0.83	0.1212	0.0345	0	0.25	0.9	0.01	0.02	0.006	0.042	4.5
4	10	10	20	0.83	0.1212	0.0345	0	0.3	0.9	0.01	0.02	0.004	0.042	4.5
5	10	20	30	1.01	0.1212	0.0345	0	0.1	0.9	0.02	0.02	0.002	0.042	4.5
6	15	30	45	1.01	0.125	0.0345	0	0.05	0.9	0.02	0.02	0.000	0.042	4.5
7	15	45	60	1.01	0.065	0.0345	0	0.04	0.9	0.03	0.01	0.000	0.042	4.5
8	15	60	75	1.01	0.065	0.0345	0	0.03	0.96	0.03	0.01	0.000	0.042	4.5
9	15	75	90	1.01	0.065	0.0345	0	0.02	0.96	0.03	0.01	0.000	0.042	4.5
10	15	90	105	1.23	0.065	0.0345	0	0.01	0.96	0.03	0.01	0.000	0.042	4.5
11	15	105	120	1.23	0.065	0.0345	0	0	0.96	0.03	0.01	0.000	0.042	4.5
12	30	120	150	1.23	0.065	0.0345	0	0	0.96	0.03	0.01	0.000	0.042	4.5

Table soils.in. An example *soils.in* parameter file for defining DayCent soil layers. (Note: the actual soils.in file does not have a row with column names, nor does have the first column layer #). The minimum volumetric soil water content of a layer (*swclimit*) is calculated from two columns, *swclimit* = *wilting point – deltamin*. The value *ksat* is the saturated hydraulic conductivity (cm sec^{-1}). The *sand* and *clay* weight fractions used by the decomposition model are computed as the weighted average their corresponding values in top 3 soil layers of this file. The organic matter weight fraction (*org*) in *soils.in* is only used in the soil temperature model. The value of *silt = 1.0 – sand – clay*, except in the soil temperature model *silt = 1.0 – sand – clay – org*. The SAND, SILT, CLAY, values in the *<site>.100* file are ignored. Likewise, the values BULKD, PH, AFIEL(*), and AWILT(*) in the *<site>.100* file are recalculated from values in the *soils.in* file. The bands of colors are to illustrate that multiple DayCent soil layers may comprise a single CENTURY soil layer