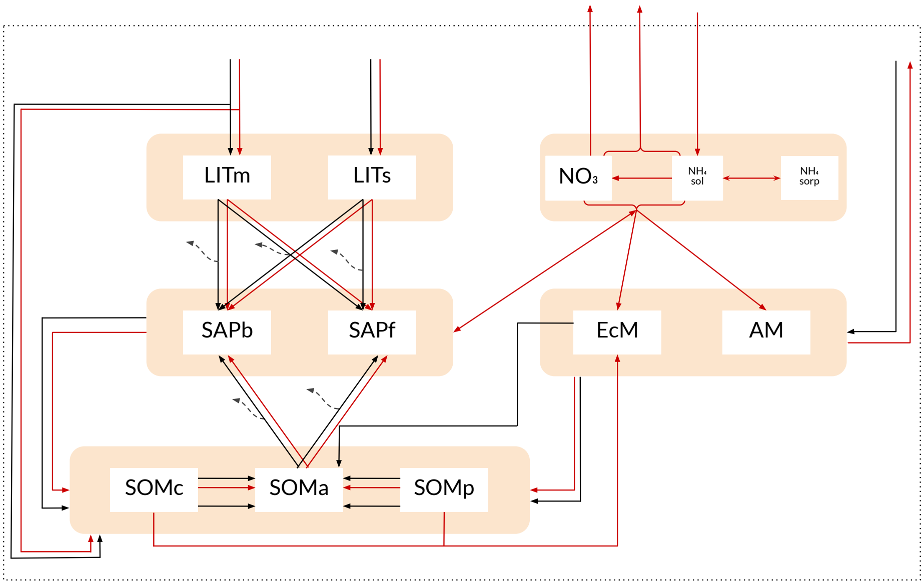


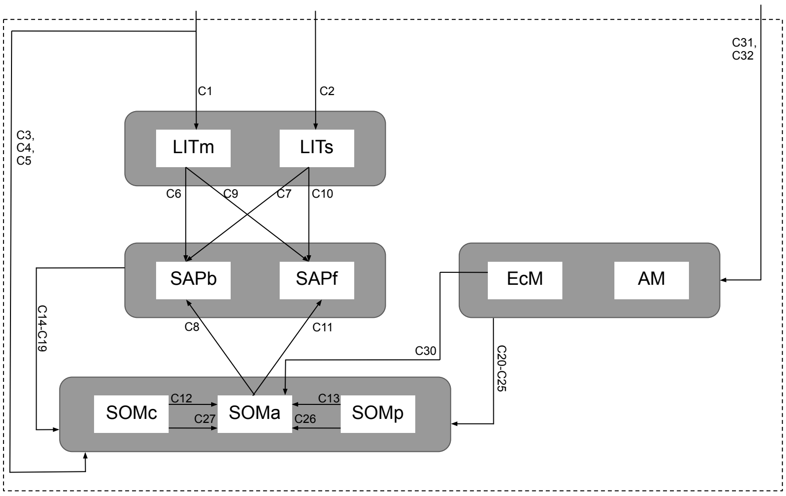
Figure 1: Schematic showing both C and N flows for each layer of the model. Black arrows indicate carbon fluxes ($gCm^{-3}h^{-1}$ while red arrows indicate nitrgen fluxes ($gNm^{-3}h^{-1}$)).

Table 1: Change equations for the carbon pools in the model. These rates are calculated for each vertical layer (subscript dropped from equations for readability). Units for pool C_{pool}: gCm^{-3} and $FC_{donor,reciver}$: $gCm^{-3}h^{-1}$. Details about the fluxes are found in Table 3.

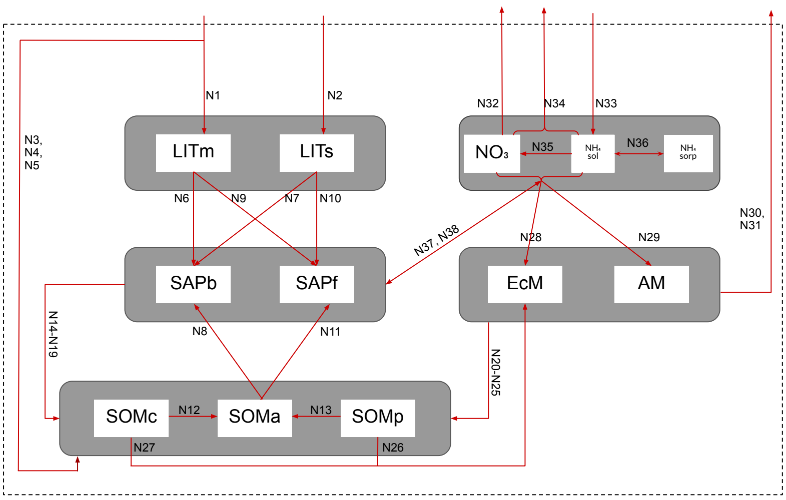
Eqn	Stores	Growth rates	Sources	Sinks
(a)	Metabolic litter	$dC_{LITm}/dt =$	$FC_{Veg,LITm}$	$-FC_{LITm,SAPb} - FC_{LITm,SAPf}$
(b)	Structural litter	$dC_{LITs}/dt =$	$FC_{Veg,LITs}$	$-FC_{LITs,SAPb} - FC_{LITs,SAPf}$
(c)	Saprotrophic bacteria	$dC_{SAPb}/dt =$	$CUE_b(FC_{LITm,SAPb} + FC_{LITs,SAPb} + FC_{SOMa,SAPb})$	$-FC_{SAPb,SOMp} - FC_{SAPb,SOMa} - FC_{SAPb,SOMc}$
(d)	Saprotrophic fungi	$dC_{SAPf}/dt =$	$CUE_f(FC_{LITm,SAPf} + FC_{LITs,SAPf} + FC_{SOMa,SAPf})$	$-FC_{SAPf,SOMp} - FC_{SAPf,SOMa} - FC_{SAPf,SOMc}$
(e)	Ectomycorrhiza biomass	$dC_{EcM}/dt =$	$CUE_m \cdot FC_{Veg,EcM}$	$-FC_{EcM,SOMp} - FC_{EcM,SOMa} - FC_{EcM,SOMc}$ $-FC_{enzEcM,SOMa}$
(f)	Arbuscular mycorrhiza biomass	$dC_{AM}/dt =$	$CUE_m \cdot FC_{Veg,AM}$	$-FC_{AM,SOMp} - FC_{AM,SOMa} - FC_{AM,SOMc}$
(g)	Physically protected SOM	$dC_{SOMp}/dt =$	$FC_{Veg,SOMp} + FC_{SAPb,SOMp} + FC_{SAPf,SOMp}$ $+FC_{EcM,SOMp} + FC_{AM,SOMp}$	$-FC_{SOMp,SOMa} - FC_{EcMdecompSOMp}$
(h)	Chemically protected SOM	$dC_{SOMc}/dt =$	$FC_{Veg,SOMc} + FC_{SAPb,SOMc} + FC_{SAPf,SOMc}$ $+FC_{EcM,SOMc} + FC_{AM,SOMc}$	$-FC_{SOMc,SOMa} - FC_{EcMdecompSOMc}$
(i)	SOM available	$dC_{SOMa}/dt =$	$FC_{Veg,SOMa} + FC_{SAPb,SOMa} + FC_{SAPf,SOMa}$ $+FC_{EcM,SOMa} + FC_{AM,SOMa}$ $+FC_{SOMp,SOMa} + FC_{SOMc,SOMa} + FC_{enzEcM,SOMa}$ $+FC_{EcMdecompSOMc} + FC_{EcMdecompSOMp}$	$-FC_{SOMa,SAPb} - FC_{SOMa,SAPf}$
	Net Carbon change:	$dC/dt =$	$FC_{Veg,LITm} + FC_{Veg,LITs} + FC_{Veg,SOMp} + FC_{Veg,SOMc}$ $+FC_{Veg,SOMa} + CUE_m \cdot (FC_{Veg,EcM} + FC_{Veg,AM})$	$-(1 - CUE_b)(FC_{LITm,SAPb} + FC_{LITs,SAPb} + FC_{SOMa,SAPb})$ $-(1 - CUE_f)(FC_{LITm,SAPf} + FC_{LITs,SAPf} + FC_{SOMa,SAPf})$

Table 2: Change equations for the nitrogen pools in the model. These rates are calculated for each vertical layer (subscript dropped from equations for readability). Units for pool N_{pool}: gNm^{-3} and $FN_{donor,reciver}$: $gNm^{-3}h^{-1}$. Details about the fluxes are found in Table 4.

Eqn	Stores	Growth rates	Sources	Sinks	Exchange
(j)	Metabolic litter	$dN_{LITm}/dt =$	$FN_{Veg,LITm}$	$-FN_{LITm,SAPb} - FN_{LITm,SAPf}$	
(k)	Structural litter	$dN_{LITs}/dt =$	$FN_{Veg,LITs}$	$-FN_{LITs,SAPb} - FN_{LITs,SAPf}$	
(l)	Saprotrophic bacteria	$dN_{SAPb}/dt =$	$NUE(FN_{LITm,SAPb} + FN_{LITs,SAPb} + FN_{SOMa,SAPb})$	$-FN_{SAPb,SOMp} - FN_{SAPb,SOMa} - FN_{SAPb,SOMc}$	$+FN_{IN,SAPb}$
(m)	Saprotrophic fungi	$dN_{SAPf}/dt =$	$NUE(FN_{LITm,SAPf} + FN_{LITs,SAPf} + FN_{SOMa,SAPf})$	$-FN_{SAPf,SOMp} - FN_{SAPf,SOMa} - FN_{SAPf,SOMc}$	$+FN_{IN,SAPf}$
(n)	Ectomycorrhiza	$dN_{EcM}/dt =$	$FN_{IN,EcM} + FN_{SOMp,EcM} + FN_{SOMc,EcM}$	$-FN_{EcM,SOMp} - FN_{EcM,SOMa} - FN_{EcM,SOMc}$ $-FN_{EcM,Veg}$	
(o)	Arbuscular mycorrhiza	$dN_{AM}/dt =$	$FN_{IN,AM}$	$-FN_{AM,SOMp} - FN_{AM,SOMa} - FN_{AM,SOMc}$ $-FN_{AM,Veg}$	
(p)	Physically protected SOM	$dN_{SOMp}/dt =$	$FN_{SAPb,SOMp} + FN_{SAPf,SOMp}$ $+FN_{EcM,SOMp} + FN_{AM,SOMp}$	$-FN_{SOMp,SOMa} - FN_{SOMp,EcM}$	
(q)	Chemically protected SOM	$dN_{SOMc}/dt =$	$FN_{SAPb,SOMc} + FN_{SAPf,SOMc}$ $+FN_{EcM,SOMc} + FN_{AM,SOMc}$	$-FN_{SOMc,SOMa} - FN_{SOMc,EcM}$	
(r)	SOM available	$dN_{SOMa}/dt =$	$FN_{SAPb,SOMa} + FN_{SAPf,SOMa}$ $+FN_{SOMp,SOMa} + FN_{SOMc,SOMa}$ $+FN_{EcM,SOMa} + FN_{AM,SOMa}$	$-FN_{SOMa,SAPb} - FN_{SOMa,SAPf}$	
(s)	Ammonium, solved	$dN_{NH4_{sol}}/dt =$	$DEP + (1 - NUE)(FN_{uptake,sap})^1$	$-f_{NH4}(FN_{IN,EcM} + FN_{IN,AM} + FN_{IN,Veg})$	$-f_{NH4}(FN_{IN,SAPb} + FN_{IN,SAPf})$ $+FN_{sol,sorp}$
(t)	Ammonium, sorbed	$dN_{NH4_{sorp}}/dt =$			$-FN_{sol,sorp}$
(u)	Nitrate	$dN_{NO3}/dt =$	$NITRIF$	$-LEACH-$ $(1 - f_{NH4})(FN_{IN,EcM} + FN_{IN,AM} + FN_{IN,Veg})$	$-(1 - f_{NH4})(FN_{IN,SAPb} + FN_{IN,SAPf})$
	Net Nitrogen change:	$dN/dt =$	$DEP + FN_{Veg,LITm} + FN_{Veg,LITs}$	$-LEACH - FN_{IN,Veg} - FN_{EcM,Veg} - FN_{AM,Veg}$	



(a) Schematic of carbon pools and flows for each layer in the model. The numbers indicated correspond to the expressions in Table 3.



(b) Schematic of nitrogen pools and flows for each layer in the model. The numbers indicated correspond to the expressions in Table 4 in the Appendix.

Figure 2: Illustration of the total system of pools and fluxes in the system, 2a shows the C flows while 2b show the N flows.

Table 3: Details about C fluxes in the model. The flux numbers corresponds to the arrows in Fig. 2a. The equation le
the last column matches with those given in Table 1. All $FC_{donor,reciver}$ has units $gCm^{-3}h^{-1}$. Parameters are desc
Table 5.

Eq.	Description	Flux Name	Rate functions	Used in eqn	Notes
C1	LITm production	$FC_{Veg,LITm} =$	$f_{met} \cdot I_C \cdot (1 - f_{met,SOM})$	(a)	
C2	LITs production	$FC_{Veg,LITs} =$	$(1 - f_{met})I_C + CWD_C$	(b)	
C3	Met. Lit to SOMp	$FC_{Veg,SOMp} =$	$f_{met} \cdot I_C \cdot f_{met,SOM} \cdot f_{SOMp}$	(g)	
C4	Met. Lit to SOMc	$FC_{Veg,SOMc} =$	$f_{met} \cdot I_C \cdot f_{met,SOM} \cdot f_{SOMc}$	(h)	
C5	Met. Lit to SOMa	$FC_{Veg,SOMa} =$	$f_{met} \cdot I_C \cdot f_{met,SOM} \cdot f_{SOMa}$	(i)	
	SAPb decomposition of:				
C6	LITm to SAPb	$FC_{LITm,SAPb} =$	$C_{SAPb} \cdot V_{max1} \frac{C_{LITm}}{K_{m1}+C_{LITm}}$	(a)(c)	Forward MMK
C7	LITs to SAPb	$FC_{LITs,SAPb} =$	$C_{SAPb} \cdot V_{max2} \frac{C_{LITs}}{K_{m2}+C_{LITs}}$	(b)(c)	Forward MMK
C8	SOMa to SAPb	$FC_{SOMa,SAPb} =$	$C_{SAPb} \cdot V_{max3} \frac{C_{SOMa}}{K_{m3}+C_{SOMa}}$	(i)(c)	Forward MMK
	SAPf decomposition of:				
C9	LITm to SAPf	$FC_{LITm,SAPf} =$	$C_{SAPf} \cdot V_{max4} \frac{C_{LITm}}{K_{m4}+C_{LITm}}$	(a)(d)	Forward MMK
C10	LITs to SAPf	$FC_{LITs,SAPf} =$	$C_{SAPf} \cdot V_{max5} \frac{C_{LITs}}{K_{m5}+C_{LITs}}$	(b)(d)	Forward MMK
C11	SOMa to SAPf	$FC_{SOMa,SAPf} =$	$C_{SAPf} \cdot V_{max6} \frac{C_{SOMa}}{K_{m6}+C_{SOMa}}$	(i)(d)	Forward MMK
	Desorption and oxidation:				
C12	Oxidation from SOMc to SOMa	$FC_{SOMc,SOMa} =$	$\frac{C_{SAPf} \cdot V_{max2} \cdot C_{SOMc}}{KO \cdot K_{m2}+C_{SOMc}} + \frac{C_{SAPb} \cdot V_{max5} \cdot C_{SOMc}}{KO \cdot K_{m5}+C_{SOMc}}$	(h)(i)	As in MIMICS
C13	Desorption from SOMp to SOMa	$FC_{SOMp,SOMa} =$	$C_{SOMp} \cdot desorb$	(g)(i)	As in MIMICS
	Saprotrophic bacteria necromass to:				
C14	SOMp	$FC_{SAPb,SOMp} =$	$C_{SAPb} \cdot k_{SAPb,som} \cdot f_{SAPb,SOMp}$	(c)(g)	
C15	SOMc	$FC_{SAPb,SOMc} =$	$C_{SAPb} \cdot k_{SAPb,som} \cdot f_{SAPb,SOMc}$	(c)(h)	

Table 3 – Continued from previous page

Eq.	Description	Flux Name	Rate functions	Used in eqn	Notes
C16	SOMa	$FC_{SAPb,SOMa} =$	$C_{SAPb} \cdot k_{SAPb,som} \cdot f_{SAPb,SOMa}$	(c)(i)	
	<u>Saprotrophic fungi necromass to:</u>				
C17	SOMp	$FC_{SAPf,SOMp} =$	$C_{SAPf} \cdot k_{SAPf,som} \cdot f_{SAPf,SOMp}$	(d)(g)	
C18	SOMc	$FC_{SAPf,SOMc} =$	$C_{SAPf} \cdot k_{SAPf,som} \cdot f_{SAPf,SOMc}$	(d)(h)	
C19	SOMa	$FC_{SAPf,SOMa} =$	$C_{SAPf} \cdot k_{SAPf,som} \cdot f_{SAPf,SOMa}$	(d)(i)	
	<u>Ectomycorrizal necromass to:</u>				
C20	SOMp	$FC_{EcM,SOMp} =$	$C_{EcM} \cdot k_{EcM,som} \cdot f_{EcM,SOMp}$	(e)(g)	
C21	SOMc	$FC_{EcM,SOMc} =$	$C_{EcM} \cdot k_{EcM,som} \cdot f_{EcM,SOMc}$	(e)(h)	
C22	SOMa	$FC_{EcM,SOMa} =$	$C_{EcM} \cdot k_{EcM,som} \cdot f_{EcM,SOMa}$	(e)(i)	
	<u>Arbuscular mycorrizal necromass to:</u>				
C23	SOMp	$FC_{AM,SOMp} =$	$C_{AM} \cdot k_{AM,som} \cdot f_{AM,SOMp}$	(f)(g)	
C24	SOMc	$FC_{AM,SOMc} =$	$C_{AM} \cdot k_{AM,som} \cdot f_{AM,SOMc}$	(f)(h)	
C25	SOMa	$FC_{AM,SOMa} =$	$C_{AM} \cdot k_{AM,som} \cdot f_{AM,SOMa}$	(f)(i)	
	<u>Mycorrhiza related fluxes:</u>				
C26	C made available by mining	$FC_{EcMdecompSOMp} =$	$K_{MO} \cdot H \cdot C_{EcM} \cdot C_{SOMp} \cdot r_{input}$	(g)(i)	Baskaran + mining term
C27	C made available by mining	$FC_{EcMdecompSOMc} =$	$K_{MO} \cdot H \cdot C_{EcM} \cdot C_{SOMc} \cdot r_{input}$	(h)(i)	Baskaran + mining term
C28	EcM enzyme production	$FC_{enzEcM,SOMa} =$	$f_{enz} \cdot CUE_m \cdot FC_{Veg,EcM}$	(e)(i)	Fraction of input goes dir
C29	EcM	$FC_{Veg,EcM} =$	$f_{EcM} \cdot I_{veg,Myc}$	(e)	
C30	AM	$FC_{Veg,AM} =$	$(1 - f_{EcM}) \cdot I_{veg,Myc}$	(f)	

Table 4: Details about N fluxes in the model. The flux numbers corresponds to the arrows in Fig. 2b. The equations in the last column matches with those given in Table 2. Parameters are described in Table 5.

Eq.	Description	Flux Name	Rate functions	Used in eqn	Notes
	Litter input				
N1	LITm production	$FN_{Veg,LITm} =$	$f_{met} \cdot I_N$	(j)	
N2	LITs production	$FN_{Veg,LITm} =$	$(1 - f_{met}) \cdot I_N + CWD_N$	(k)	
N3	Met. Lit to SOMp	$FN_{Veg,SOMp} =$	$f_{met} \cdot I_N \cdot f_{met,SOM} \cdot f_{SOMp}$	(g)	
N4	Met. Lit to SOMc	$FN_{Veg,SOMc} =$	$f_{met} \cdot I_N \cdot f_{met,SOM} \cdot f_{SOMc}$	(h)	
N5	Met. Lit to SOMa	$FN_{Veg,SOMa} =$	$f_{met} \cdot I_N \cdot f_{met,SOM} \cdot f_{SOMa}$	(i)	
	SAPb decomposition of:				
N6	LITm	$FN_{LITm,SAPb} =$	$FC_{LITm,SAPb} \cdot \left(\frac{N_{LITm}}{C_{LITm}}\right)$	(j)(l)	as in MIM
N7	LITs	$FN_{LITs,SAPb} =$	$FC_{LITs,SAPb} \cdot \left(\frac{N_{LITs}}{C_{LITs}}\right)$	(k)(l)	as in MIM
N8	SOMa	$FN_{SOMa,SAPb} =$	$FC_{SOMa,SAPb} \cdot \left(\frac{N_{SOMa}}{C_{SOMa}}\right)$	(r)(l)	as in MIM
	SAPf decomposition of:				
N9	LITm	$FN_{LITm,SAPf} =$	$FC_{LITm,SAPf} \cdot \left(\frac{N_{LITm}}{C_{LITm}}\right)$	(j)(m)	as in MIM
N10	LITs	$FN_{LITs,SAPf} =$	$FC_{LITs,SAPf} \cdot \left(\frac{N_{LITs}}{C_{LITs}}\right)$	(k)(m)	as in MIM
N11	SOMa	$FN_{SOMa,SAPf} =$	$FC_{SOMa,SAPf} \cdot \left(\frac{N_{SOMa}}{C_{SOMa}}\right)$	(r)(m)	as in MIM
	Desorption and oxidation:				
N12	Oxidation	$FN_{SOMc,SOMa} =$	$FC_{SOMc,SOMa} \cdot \left(\frac{N_{SOMc}}{C_{SOMc}}\right)$	(q)(r)	
N13	Desorption	$FN_{SOMp,SOMa} =$	$FC_{SOMp,SOMa} \cdot \left(\frac{N_{SOMp}}{C_{SOMp}}\right)$	(p)(r)	
	Saprotrophic bacteria necromass to:				

Table 4 – Continued from previous page

Eq.	Description	Flux Name	Rate functions	Used in eqn	Notes
N14	SOMp	$FN_{SAPb,SOMp} =$	$FC_{SAPb,SOMp} \cdot \left(\frac{N_{SAPb}}{C_{SAPb}}\right)$	(l)(p)	
N15	SOMc	$FN_{SAPb,SOMc} =$	$FC_{SAPb,SOMc} \cdot \left(\frac{N_{SAPb}}{C_{SAPb}}\right)$	(l)(q)	
N16	SOMa	$FN_{SAPb,SOMa} =$	$FC_{SAPb,SOMa} \cdot \left(\frac{N_{SAPb}}{C_{SAPb}}\right)$	(l)(r)	
	Saprotrophic fungi necromass to:				
N17	SOMp	$FN_{SAPf,SOMp} =$	$FC_{SAPf,SOMp} \cdot \left(\frac{N_{SAPf}}{C_{SAPf}}\right)$	(m)(p)	
N18	SOMc	$FN_{SAPf,SOMc} =$	$FC_{SAPf,SOMc} \cdot \left(\frac{N_{SAPf}}{C_{SAPf}}\right)$	(m)(q)	
N19	SOMa	$FN_{SAPf,SOMa} =$	$FC_{SAPf,SOMa} \cdot \left(\frac{N_{SAPf}}{C_{SAPf}}\right)$	(m)(r)	
	Ectomycorrhizal necromass to:				
N20	SOMp	$FN_{EcM,SOMp} =$	$FC_{EcM,SOMp} \cdot \left(\frac{N_{EcM}}{C_{EcM}}\right)$	(n)(p)	
N21	SOMc	$FN_{EcM,SOMc} =$	$FC_{EcM,SOMc} \cdot \left(\frac{N_{EcM}}{C_{EcM}}\right)$	(n)(q)	
N22	SOMa	$FN_{EcM,SOMa} =$	$FC_{EcM,SOMa} \cdot \left(\frac{N_{EcM}}{C_{EcM}}\right)$	(n)(r)	
	Arbuscular mycorrhizal necromass to:				
N23	SOMp	$FN_{AM,SOMp} =$	$FC_{AM,SOMp} \cdot \left(\frac{N_{AM}}{C_{AM}}\right)$	(o)(p)	
N24	SOMc	$FN_{AM,SOMc} =$	$FC_{AM,SOMc} \cdot \left(\frac{N_{AM}}{C_{AM}}\right)$	(o)(q)	
N25	SOMa	$FN_{AM,SOMa} =$	$FC_{AM,SOMa} \cdot \left(\frac{N_{AM}}{C_{AM}}\right)$	(o)(r)	
	Mycorrhiza related fluxes:				
N26	N aquired from SOMp	$FN_{SOMp,EcM} =$	$FC_{EcMdecompSOMp} \cdot \left(\frac{N_{SOMp}}{C_{SOMp}}\right)$	(g)(e)	

Table 4 – Continued from previous page

Eq.	Description	Flux Name	Rate functions	Used in eqn	Notes
N27	N aquired from SOMc	$FN_{SOMc,EcM} =$	$FC_{EcMdecompSOMc} \cdot \left(\frac{N_{SOMc}}{C_{SOMc}}\right)$	(h)(e)	
N28	N from inorganic to EcM	$FN_{IN,EcM} =$	$V_{max,EcM} \cdot N_{IN} \cdot \left(\frac{C_{EcM}}{(C_{EcM}+K_{m,EcM}/H)}\right)$	(s)(u)(n)	Based on
N29	N from inorganic to AM	$FN_{IN,AM} =$	$V_{max,AM} \cdot N_{IN} \cdot \left(\frac{C_{AM}}{(C_{AM}+K_{m,AM}/H)}\right)$	(s)(u)(o)	
	<u>N from myc. fungi to plant:</u>				
N30	EcM	$FN_{EcM,Veg} =$	$FN_{IN,EcM} + FN_{SOMc,EcM} + FN_{SOMp,EcM}$	(n)	
			$-CUE_m \cdot FC_{Veg,EcM}/CN_m$		
			If positive, otherwise zero.		
N31	AM	$FN_{AM,Veg} =$	$FN_{IN,AM} - CUE_m \cdot FC_{Veg,AM} \cdot \left(\frac{N_{AM}}{C_{AM}}\right)$	(o)	
			If positive, otherwise zero.		
	<u>Inorganic N related:</u>				
N32	Leaching	$LEACH =$	$N_{NO3} \cdot \frac{QDRAI}{H_2O_{tot}}$	(u)	Based on
N32	Deposition	$DEP =$	$NDEP\_TO\_SMINN \cdot NDEP\_PROF_j$	(s)	
N34	Direct plant uptake	$FN_{Inorg,Veg} =$	$(N_{NH4} + N_{NO3})k_{uptake}$	(s)(u)	
N35	Nitrification	$FN_{NH4,NO3} =$	$NH4 \cdot k_{nitr}$	(s)(u)	based on
N36	Equil. kinetics NH4	$FN_{sol,sorp} =$			
<u>Exchange of N between saprotrophic pools and inorg. N[2]:</u>					
	Here $U_{S*} = FC_{LITm,SAP*} + FC_{LITs,SAP*} + FC_{SOMa,SAP*}$, * is B or F.				
N36	SAPb	$FN_{IN,SAPb} =$	$(1 - NUE) \cdot (FN_{LITm,SAPb} + FN_{LITs,SAPb} + FN_{SOMa,SAPb})$		
			$-CUE_b \cdot U_{SB}/CN_b$	(l)(u)(s)	
		or $=$	$f_b \cdot N_{for\_sap}$ if limited N		
N37	SAPf	$FN_{IN,SAPf} =$	$(1 - NUE) \cdot (FN_{LITm,SAPf} + FN_{LITs,SAPf} + FN_{SOMa,SAPf})$		
			$-CUE_f \cdot U_{SF}/CN_f$	(m)(u)(s)	

Table 4 – Continued from previous page

Eq.	Description	Flux Name	Rate functions	Used in eqn	Notes
		or =	$(1-f_b) \cdot N_{for\_sap}$ if limited N		

[2]See text for details of the N exchange between saprotrophs and the inorganic pool.

[for mycorrizal turnover rates, Baskaran refers to Edblad 2013, which gives 0.1/year?]

Table 5: Description of parameters and other relevant sizes used in the model.

Parameter	Description	Value	Units
f_{MET}	Metabolic fraction of plant litter	0.0-1.0	-
f_{CLAY}	Clay fraction in soil	0.0-1.0	-
T	Soil temperature	-	$^{\circ}C$
r_{moist}	Moisture function	0.05-1.0	-
Michaelis Menten kinetics parameters for saprotrophs:			
V_{max}	Max reaction velocity	$exp(V_{slope} \cdot T + V_{int}) \cdot a_V \cdot V_{mod} \cdot r_{moist}$	$mg(mg)^{-1}h^{-1}$
K_m	Half saturation constant	$exp(K_{slope} \cdot T + K_{int}) \cdot a_K \cdot K_{mod}$	$mgCcm^{-3}$
K_{slope}	Regression coefficient	0.017	$ln(mgCcm^{-3})^{\circ}C^{-1}$
V_{slope}	Regression coefficient	0.63	$ln(mg(mg)^{-1}h^{-1})^{\circ}C^{-1}$
K_{int}	Regression intercept	3.19	$ln(mgCcm^{-3})$
V_{int}	Regression intercept	5.47	$ln(mg(mg)^{-1}h^{-1})$
a_K	Tuning coefficient	10^4	-
a_V	Tuning coefficient	$8 \cdot 10^{-6}$	-
P_{scalar}	Physical protection scalar used in K_{mod}	$1/(2.0 \cdot exp(-2\sqrt{f_{CLAY}}))$	-
K_{mod}	Modifies K_m	$0.125, 0.5, 0.25 \cdot P_{scalar}, 0.5, 0.25, 0.167 \cdot P_{scalar}$	-
V_{mod}	Modifies V_{max}	$10.0, 2.0, 10.0, 3.0, 3.0, 2.0$	-
KO	Increase Km in eq. C19	4	-
$k_{myc,som}$	Turnover rate	$1.14 \cdot 10^{-4}$	h^{-1}
$k_{SAPb,som}$	Turnover rate of SAPb	$5 \cdot 10^{-4} \cdot exp(0.3 \cdot f_{MET}) \cdot r_{moist}$	h^{-1}
$k_{SAPf,som}$	Turnover rate of SAPf	$5 \cdot 10^{-4} \cdot exp(0.1 \cdot f_{MET}) \cdot r_{moist}$	h^{-1}

Table 5 – Continued from previous page

Parameter	Description	Value	Units
$desorb$	desorption rate	$1.5 \cdot 10^{-5} \cdot exp(-1.5 \cdot f_{clay})$	h^{-1}
K_{MO}	Mycorrhizal decay rate constant for oxidizable store	$3.42 \cdot 10^{-7}$ or $3.42 \cdot 10^{-8}$	$m^2/(gC \cdot hr)$
$V_{max,myc}$	Max. ectomycorrhizal uptake of inorg N	$2.05 \cdot 10^{-4}$	$g/(g \cdot hr)$
$K_{m,myc}$	Half saturation constant of ectomycorrhizal uptake of inorg N	0.08	gN/m^2
CUE_{EcM}	Growth efficiency of mycorrhiza	0.25	-
CUE_{AM}	Growth efficiency of mycorrhiza	0.25	-
CUE_b	Growth efficiency of sap. bacteria	0.0-0.5	-
CUE_f	Growth efficiency of sap. fungi	0.0-0.5	-
NUE	Nitrogen use efficiency of saprotrophs	0.7	-
f_{SOMp}	Fraction of sap. or input into SOMp	$0.3 \cdot exp(fCLAY)$	-
		$0.2 \cdot exp(0.8 \cdot fCLAY)$	-
f_{SOMc}	Fraction of sap. or input into SOMc	$0.1 \cdot exp(-3 \cdot fCLAY)$	-
		$0.3 \cdot exp(-3 \cdot fCLAY)$	-
f_{SOMa}	Fraction of sap. or input into SOMa	$1 - (f_{SOMp} + f_{SOMc})$	-
$f_{m,s}$	Fraction of mycorrhizal pool m to SOM pool s	0.2-0.4	-
f_{enz}	Fraction of EcM C uptake used for enzyme prod.	0.10	-
f_{use}	Fraction C released by mining taken up by EcM.	0.10	-
$f_{met,SOM}$	Fraction of metabolic litter prod. going directly to SOM	0.05	-
H	Soil depth (column height)		m
I_C, I_N	Litter and fine root C and N input	$FROOT * \_TO\_LIT \cdot froot\_prof +$	
		$LEAF * \_TO\_LIT \cdot litter\_prof$	$g*/m3h$
CWD_C, CWD_N	Coarse woody debris C and N input	CWD*_TO_LITR2, CWD*_TO_LITR3	$g*/m3h$
D	Diffusion coefficient	$1.14e^{-8}$	$m2/h$

Table 5 – Continued from previous page

Parameter	Description	Value	Units
CN_b	Optimal CN ratio for bacteria	5	-
CN_f	Optimal CN ratio for sap. fungi	8	-
CN_m	Optimal CN ratio for mycorrhizal fungi	20	-

Table 6

CLM-BGC variable	Units	Long name	Notes
LEAFC_TO_LITTER	$gCm^{-2}s^{-1}$	leaf C litterfall	Partitioned between the two litter pools base
FROOTC_TO_LITTER	$gCm^{-2}s^{-1}$	fine root C litterfall	Partitioned between the two litter pools base
CWDC_TO_LITR2C_vr	$gCm^{-3}s^{-1}$	decomp. of coarse woody debris C to litter 2 C	Input to structural litter (LITs)
CWDC_TO_LITR3C_vr	$gCm^{-3}s^{-1}$	decomp. of coarse woody debris C to litter 3 C	Input to structural litter (LITs)
LEAFN_TO_LITTER	$gNm^{-2}s^{-1}$	leaf N litterfall	Partitioned between the two litter pools base
FROOTN_TO_LITTER	$gNm^{-2}s^{-1}$	fine root N litterfall	Partitioned between the two litter pools base
CWDN_TO_LITR2N_vr	$gNm^{-3}s^{-1}$	decomp. of coarse woody debris N to litter 2 N	Input to structural litter (LITs)
CWDN_TO_LITR3N_vr	$gNm^{-3}s^{-1}$	decomp. of coarse woody debris N to litter 3 N	Input to structural litter (LITs)
NPP_NACTIVE	$gCm^{-2}s^{-1}$	Mycorrhizal N uptake used C (WRONG??)	First subtract NPP_NNONMYC, then partition between EcM and AM based o
NPP_NNONMYC	$gCm^{-2}s^{-1}$	Non-mycorrhizal N uptake used C	Subtracted from NPP_NACTIVE
NDEP_TO_SMINN	$gNm^{-2}s^{-1}$	atmospheric N deposition to soil mineral N	N deposition to NH4 pool
LEAF_PROF	m^{-1}	profile for litter C and N inputs from leaves	Multiplied with LEAF_TO_LITTER to get ra
FROOT_PROF	m^{-1}	profile for litter C and N inputs from fine roots	Multiplied with FROOT_TO_LITTER to get
NDEP_PROF	m^{-1}	profile for atmospheric N deposition	Multiplied with NDEP_TO_SMINN to get de
Environmental variables:			
TSOI	K	soil temperature	Converted to $^{\circ}C$
WATSAT	mm^3mm^{-3}	saturated soil water content (porosity)	Used for calculating r_{moist}, see **??**
SOILLIQ	kgm^{-2}	soil liquid water	Used for calculating r_{moist}, see **??** and leachi
SOILICE	kgm^{-2}	soil ice water	Used for calculating r_{moist}, see **??**
W_SCALAR	-	Moisture (dryness) inhibition of decomposition	Used in nitrification algorithm
T_SCALAR	-	temperature inhibition of decomposition	Used in nitrification algorithm
QDRAI	mms^{-1}	sub-surface drainage	Used for calculating leaching
nbedrock	mm^3mm^{-3}	index of shallowest bedrock layer	for determining how many layers to use in th

Read from surface data file:		
PCT_CLAY	-	percent CLAY
PCT_NAT_PFT	-	percent plant functional type on the natural veg landunit

Table 7 gives the mycorrhizal assiciation of each PFT according to the CLM parameter file[Elin:] [Sett inn kilde her.]. So for example, if a site has 50% needleleaf evergreen boreal tree, 20% broadleaf evergreen shrub and 30% c4 grass, 70% of the incoming carbon is directed to EcM, while 30% is directed to AM.

Table 7: List over the possible Plant Functional Types (PFTs) and their mycorrhizal associations according to CLM parameter file.

PFT	Mycorrhizal associations	Notes
not vegetated	EcM	
needleleaf evergreen temperate tree	EcM	
needleleaf evergreen boreal tree	EcM	
needleleaf deciduous boreal tree	EcM	
broadleaf evergreen tropical tree	AM	
broadleaf evergreen temperate tree	AM	
broadleaf deciduous tropical tree	AM	
broadleaf deciduous temperate tree	50% EcM 50% AM	
broadleaf deciduous boreal tree	EcM	
broadleaf evergreen shrub	EcM	
broadleaf deciduous temperate shrub	EcM	
broadleaf deciduous boreal shrub	EcM	
c3 arctic grass	EcM	
c3 non-arctic grass	AM	
c4 grass	AM	