

# Darwin model parameters and default values as of checkpoint61

paper	variable	fixed	values		
$\mu_{max_j}$	mu	Big/Smallgrow	1/(0.4 day) (big)	1/(0.7 day) (small)	$\times 1/2$ (diatom)
$m_j^P$	mortphy	Big/Smallmort	1/(10 day)		
$\lambda_{mp_{ij}}$	ExportFracP	Big/Smallexport	0.5 (big)	0.2 (small)	
$w_j^P$	wsink	Big/Smallsink	0.5 m/day (big)	0 (small)	
		phymin	1E-20 $\mu$ M P		
$1/\tau_1$	phytoTempCoeff	tempcoeff1	1/3		
$B$	phytoTempExp2	tempcoeff2_big/small	0.0003 (big)	0.001 (small)	
$A$	phytoTempExp1	tempcoeff3	1.04		
$T_o$	phytoTempOptimum	tempmax	$30 - 32x$		
$\tau_2$		tempnorm	0.3		
$C$	phytoDecayPower	tempdecay	4.0		
$10k_{par}$	ksatPAR	Big/smallksatpar(std)	$0.12 \pm 0.06X$ (big)	$0.12 \pm 0.20X$ (small)	$\text{m}^2 \text{s}/\mu\text{Ein}$
$10^3 k_{inhib}$	kinhib	Big/smallkinhib(std)	$1.0 \pm 0.05X$ (big)	$6.0 \pm 0.10X$ (small)	$\text{m}^2 \text{s}/\mu\text{Ein}$
		parfrac	0.4	W PAR/W sw	
		parconv	$0.2174^{-1}$	uEin W <sup>-1</sup> s <sup>-1</sup>	
$\kappa_{Si_{ij}}$	ksatSi	val_ksatsi	1 $\mu$ M P		
$\kappa_{PO4_{ij}}$	ksatPO4	Big/Small/ProcPsat	$0.035 + 0.02x$ (big)	$0.015 + 0.02x$ (small)	$0.01 + 0.005x$ (Proc)
$\kappa_{Fe_{ij}}$	ksatFe		ksatPO4*R_FeP		
$\kappa_{IN}$	ksatNO3		ksatPO4*R_NP		
$\kappa_{IN}^{\#1}$	ksatNO2		ksatNO3*ksatNO2fac		
$\kappa_{NH4}$	ksatNH4		ksatNO3*ksatNH4fac		
		ksatNO2fac	1.0		
		ksatNH4fac	0.5		
$\psi$		sig1	$4.6 (\mu\text{M P})^{-1}$		
$M_{ij}$	R_SiP	val_R_SiP_diatom	0	16 (diatom)	
$M_{ij}$	R_NP	val_R_NP(_diaz)	16	40 (diaz)	
$M_{ij}$	R_FeP	val_RFeP(_diaz)	1E-3	7.5E-3 (diaz)	
$g_{max}$	grazemax	GrazeFast	$(2 \text{ day})^{-1}$		
$\eta_{jk}$	palat	palathi/lo	1.0 (same sz.)	0.2 (diff. size)	$\times 0.7$ (diatom)
$\zeta_{jk}$	asseff	GrazeEffhi/lo	0.5 (same sz.)	0.7 (sm.phy)	0.2 (lg.phy)
$\kappa_k^P$		kgrazesat	0.1 $\mu$ M P		
		phygrazmin	1E-10 $\mu$ M P		
$m_j^Z$	mortzoo	ZoomortBig/Small	$(30 \text{ day})^{-1}$		
$\lambda_{g_{ijk}}$	ExportFracGraz	ExGrazfracbig/small	0.8		
$\lambda_{m_{zik}}$	ExportFracZ	zooexfacBig/Small	0.7 (big)	0.2 (small)	
$r_{DOP},$	$r_{DON}, r_{DOFe}$	Kdop, Kdon, KdoFe	1/(100 day)		
$r_{POP},$	$r_{PON}, r_{POFe}$	Kpremin_P/N/Fe	1/(50 day)		
$r_{POSi}$		Kpremin_Si	1/(300 day)		
$w_{POP},$	...	wp_sink, ...	10 m/day		
$\alpha$		alpfe	0.04		
$c_{scav}$		scav	$0.4 \text{ y}^{-1}$		
$L_{tot}$		ligand_tot	1E-3 $\mu$ M P		
$L_{stab}$		ligand_stab	$2E5 (\mu\text{M P})^{-1}$		
$Fe'_{max}$		freefemax	$0.4E-3 \mu\text{M P}$		
$\zeta_{NO2}^0$		knita	1/(0.5 day)		
$\zeta_{NO3}^0$		knitb	1/(10 day)		
$I_0$		PAR0	$10 \mu\text{Ein m}^{-2} \text{s}^{-1}$		
$PC_{MAX_j}$	pcmax	Big/Smallgrow	$(0.4 \text{ day})^{-1}$ (big)	$(0.7 \text{ day})^{-1}$ (small)	$\times 2^{-1}$ (diatom) $\times 2^{-1}$ (diaz)
$mQ_j^{\text{yield}}$	mQyield	Big/smallmQyield	$(3 + 4x)E-5$ (big)	$(5 + 10x)E-5$ (small)	$\text{mmol C uEin}^{-1}$
$A_{\text{Chl,ave}}^{\text{phy}}$		aphy_chl_ave	0.02	$\text{m}^2 (\text{mg Chl})^{-1}$	
$\theta_j^{\text{max}}$	chl2cmax	Big/smallchl2cmax	$0.5 + 0.3x$ (big)	$0.2 + 0.3x$ (small)	$\text{mg Chl} (\text{mmol C})^{-1}$
$R_j^{PC}$	R_PC	val_R_PC	120	$\text{mmol C}/\text{mmol P}$	

where  $x$  stands for uniformly distributed random numbers in  $[0, 1[$  and  $X$  for normally distributed ones.

fixed	value	
diver_thresh0	$10^{-12} \mu\text{M P}$	threshold for $P_{\text{tot}}$ for all Diver diagnostics
diver_thresh1	$10^{-8} \mu\text{M P}$	threshold for $P_j$ for Diver1
diver_thresh2	$10^{-3}$	threshold for $P_j/P_{\text{tot}}$ for Diver2
diver_thresh3	0.999	biomass fraction of abundant species for Diver3
diver_thresh4	$10^{-5}$	threshold for $P_j/P_{\text{max}}$ for Diver4