Supplementary material:

Title: Estimates of sediment organic carbon burial and benthic-pelagic nutrient cycling in subarctic fjords (northern Nunatsiavut, eastern Canada)

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1. Supplementary figures

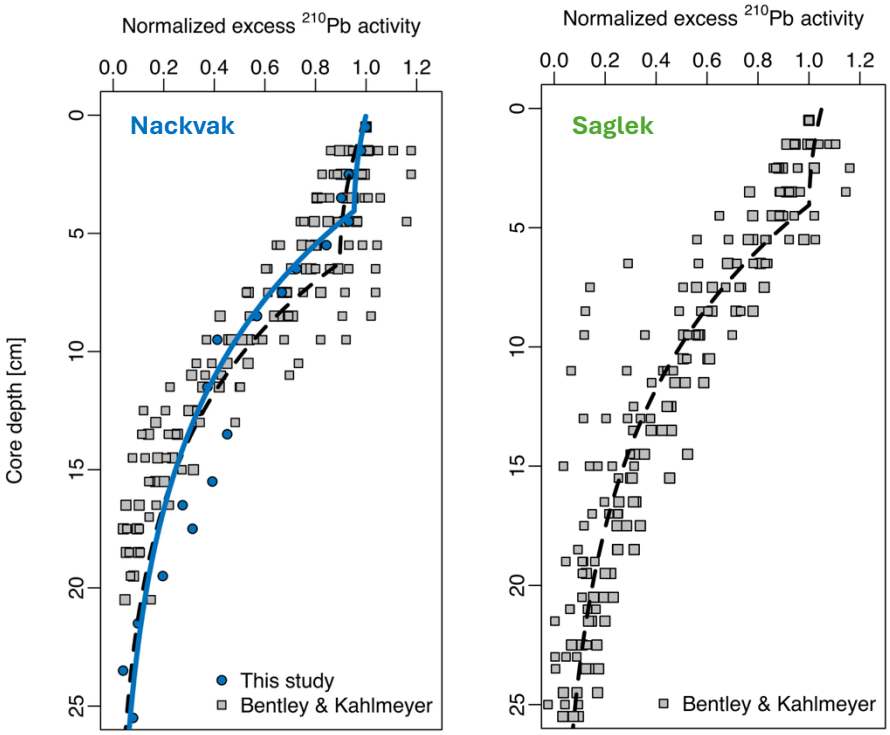

Figure S1. Normalized Excess ^{210}Pb activity distribution in Nachvak Fjord and Saglek Fjord with sediment from this study (blue) compared to data from Bentley & Kahlmeyer, 2012 (gray). A reaction transport model was fit to the data in this study to determine the bioturbation rate (D_b = 5 cm^2 yr^{-1}) and depth of bioturbation zone (= 4 cm).

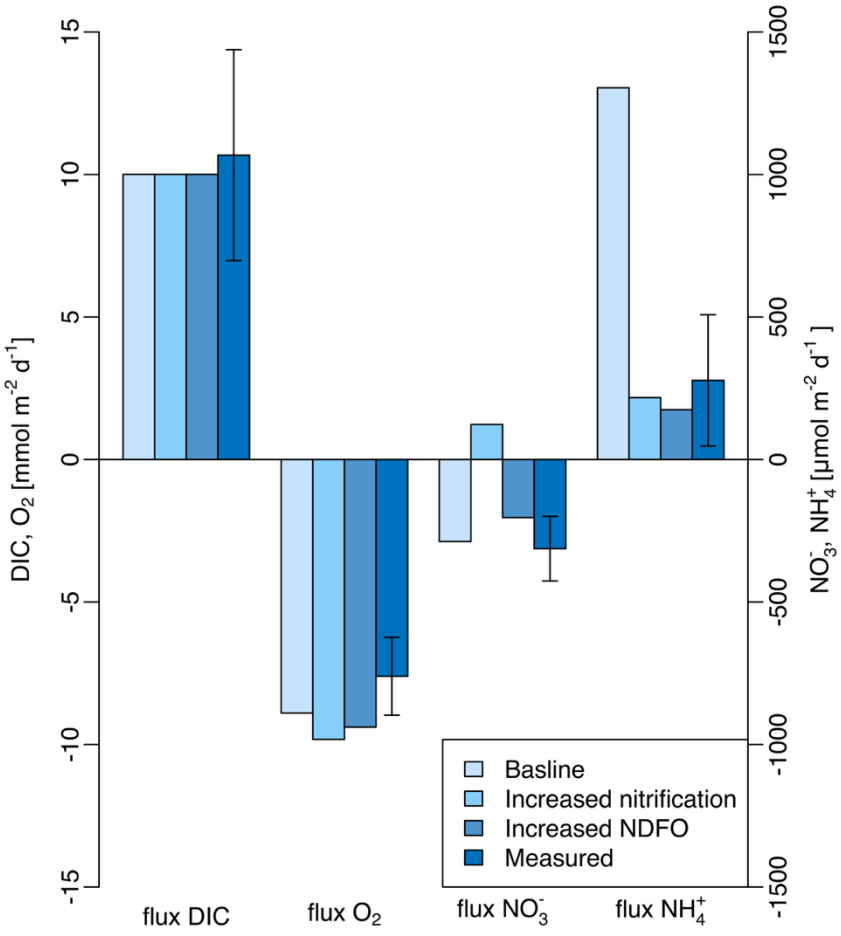

Figure S2. Modelled Nachvak Fjord flux rates before changing nitrogen related rates, after increasing nitrification rate constant and after increasing nitrate dependent iron oxidation rate constant compared to mean measured fluxes (n=3).

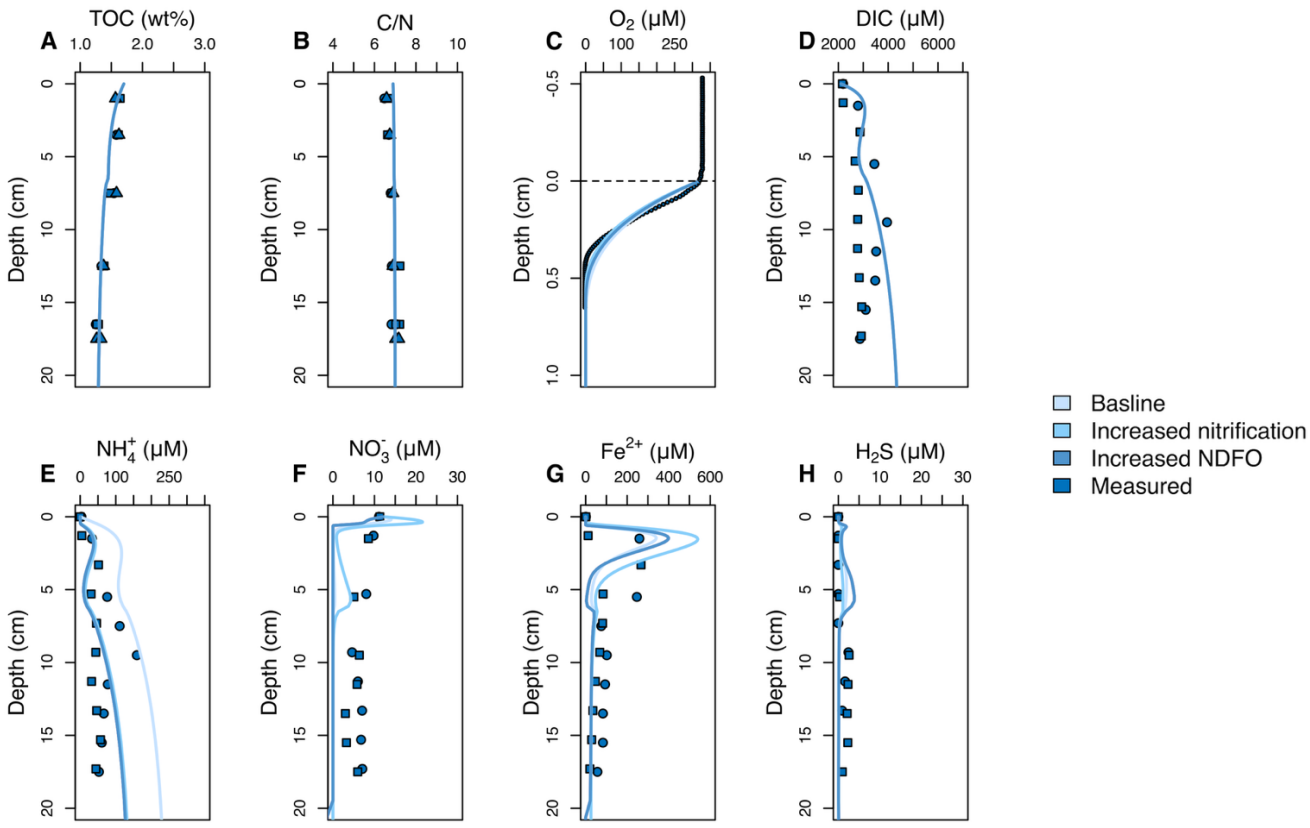

Figure S3. Modelled Nachvak Fjord porewater concentrations before changing nitrogen related rates, after increasing nitrification rate constant and after increasing nitrate dependent iron oxidation rate constant compared to mean measured fluxes (n=2).

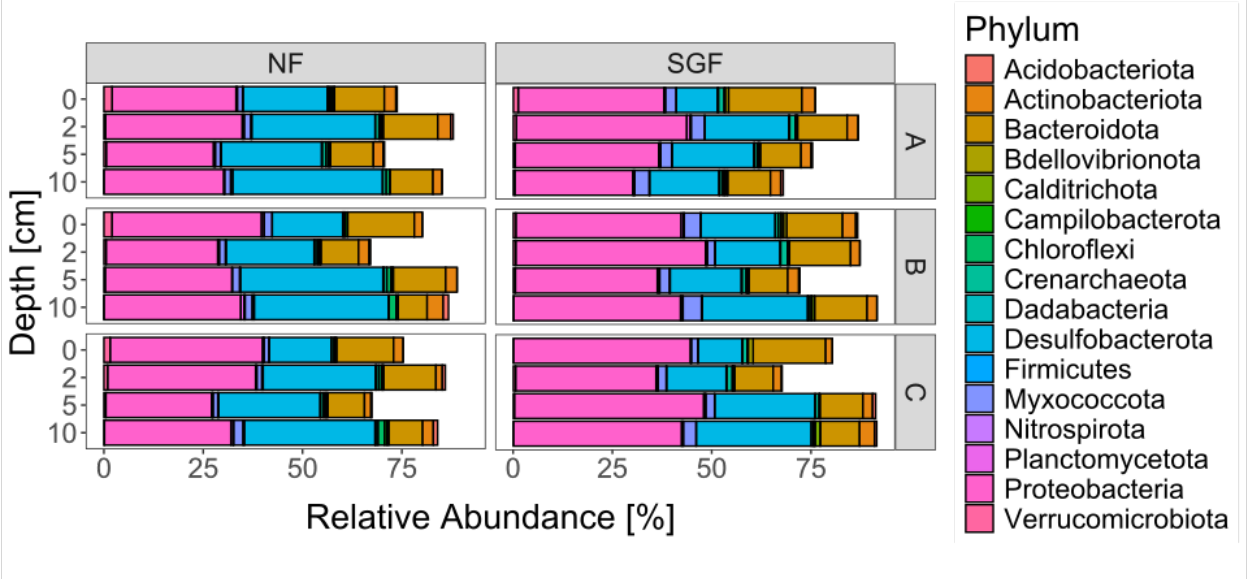

Figure S4. Relative abundance of phylum in Nachvak (NF) and Saglek (SGF) sediment samples.

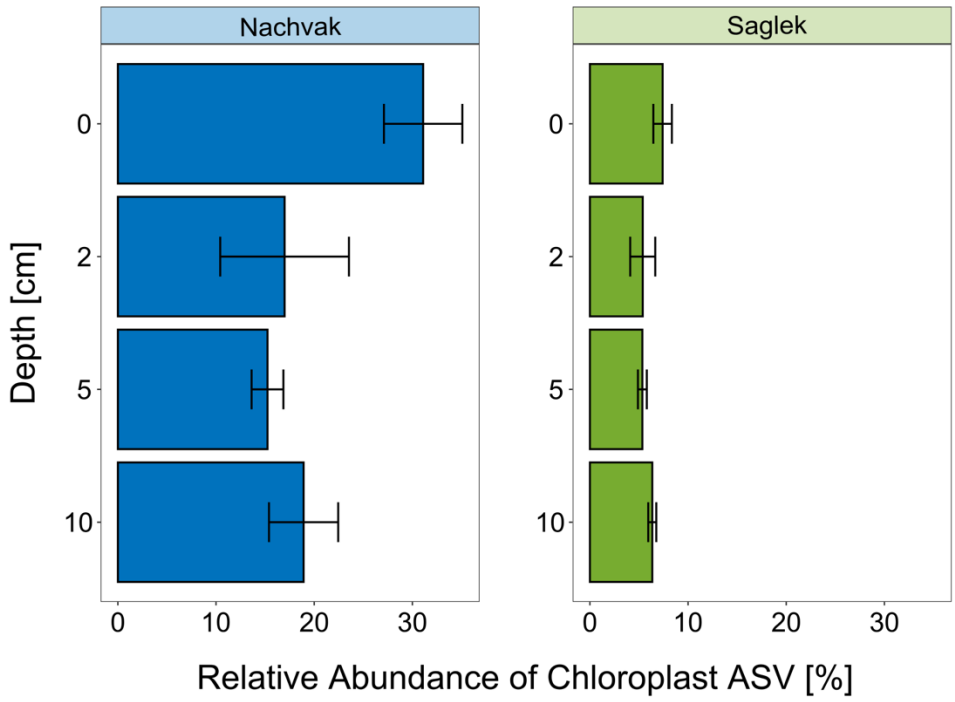

Figure S5. Weighted mean relative abundance (%) of prokaryotic genomes predicted to carry chloroplasts across sediment depth horizons (0, 2, 5, and 10 cm) in Nachvak Fjord (blue) and Saglek Fjord (green). Gene abundance was inferred using the PiCRUST2 functional gene prediction pipeline. Error bars represent ± one standard deviation across three environmental replicates.

2. Supplementary tables

Table S1. Fjords, their areas and corresponding OC burial rates calculated in this study.

Region	**# of fjords considered**	**Estimation of area of fine-grained sediment (km^2)***	**OC burial rate (tonnes OC yr^{-1}) at depth of 50 cm**
Nachvak Fjord	1	57	907 ± 433
Saglek Fjord	1	74	1853 ± 726
Torngat Marine Conservation Fjords	13	477	4,000-17,000
All northern Nunatsiavut fjords	18	850	8,000-33,000

*corrected with Scottish fjord fine-grained sediment estimate (Smeaton & Austin, 2019).

Table S2. Model variables and upper boundary conditions (either fixed concentration or constant flux) adapted from Rakshit et al. (2025).

Variable	**Description**	**Value Nachvak**	**Value Saglek**	**Unit**	**Source***
OM1	Highly reactive organic matter	338	270	µmol C cm^{-2} yr^{-1}	1
OM1	Medium reactive organic matter	28	50	µmol C cm^{-2} yr^{-1}	1
OM3	Low reactive organic matter	130	225	µmol C cm^{-2} yr^{-1}	1
$Fe(OH)_3$	Highly reactive iron oxide	110	110	µmol Fe cm^{-2} yr^{-1}	2
$Fe(OH)_3$.MR	Medium reactive iron oxide	330	330	µmol Fe cm^{-2} yr^{-1}	2
$Fe(OH)_3$.LR	Low reactive iron oxide	220	220	µmol Fe cm^{-2} yr^{-1}	2
MnO_2	High reactive Mn oxide	13.6/2	13.6/2	µmol Mn cm^{-2} yr^{-1}	2
MnO_2.MR	Medium reactive Mn oxide	13.6/2	13.6/2	µmol Mn cm^{-2} yr^{-1}	2

FeS	Iron mono sulphide	0	0	μmol Fe cm^{-2} yr^{-1}	2
FeS_2	Pyrite	0	0	μmol Fe cm^{-2} yr^{-1}	2
O_2	Oxygen	0.319	0.300	mM	3
NH_4^+	Ammonium	0	0	mM	1
NO_3^-	Nitrate	0.0122	0.0145	mM	3
DIC	Dissolved inorganic carbon	2.1	2.1	mM	1
Fe^{2+}	Dissolved ferrous iron	0	0	mM	2
Mn^{2+}	Dissolved manganese	0	0	mM	2
SO_4^{2-}	Sulfate	25	25	mM	2
H_2S	Hydrogen sulfide	0	0	mM	1
CH_4	Methane	0	0	mM	2
H_2	Hydrogen	0	0	mM	2

* 1= this study, 2= assumed, 3= Amundsen Science CTD cast

Table S3. Modeled reaction terms from OMDIA model (Rakshit et al., 2025). Storage of nitrate through foraminifera (for) was turned off as those organisms were not observed in our study. For most secondary reactions: R.X.Y = reaction of X and Y, k.X.Y = rate constant for reaction of X and Y.

Remineralization reaction terms
$\mathrm{R.for.j} = \mathrm{kj} \times [\mathrm{OMj}]$
$\mathrm{R.O_2.j} = \mathrm{kj} \times [\mathrm{OMj}] \times \frac{[\mathrm{O_2}]}{\mathrm{Ks_{O_2}} + [\mathrm{O_2}]}$
$\mathrm{R.NO_3^-.j} = \mathrm{kj} \times [\mathrm{OMj}] \times \frac{[\mathrm{NO_3^-}]}{\mathrm{Ks_{NO_3^-}} + [\mathrm{NO_3^-}]} \times \frac{\mathrm{Ks_{O_2}}}{\mathrm{Ks_{O_2}} + [\mathrm{O_2}]}$
$\mathrm{R.MnO_2.j} = \mathrm{kj} \times [\mathrm{OMj}] \times \frac{[\mathrm{MnO_2}]}{\mathrm{Ks_{MnO_2}} + [\mathrm{MnO_2}]} \times \frac{\mathrm{Ks_{NO_3^-}}}{\mathrm{Ks_{NO_3^-}} + [\mathrm{NO_3^-}]} \times \frac{\mathrm{Ks_{O_2}}}{\mathrm{Ks_{O_2}} + [\mathrm{O_2}]}$

$$R.\,Fe(OH)_3.j = kj \times [OMj] \times \frac{[Fe(OH)_3]}{Ks_{Fe(OH)_3} + [Fe(OH)_3]} \times \frac{Ks_{MnO_2}}{Ks_{MnO_2} + [MnO_2]} \times \frac{Ks_{NO_3^-}}{Ks_{NO_3^-} + [NO_3^-]} \times \frac{Ks_{O_2}}{Ks_{O_2} + [O_2]}$$
$$R.\,SO_4^{2-}.j = kj \times [OMj] \times \frac{SO_4^{2-}}{Ks_{SO_4^{2-}} + SO_4^{2-}} \times \frac{Ks_{Fe(OH)_3}}{Ks_{Fe(OH)_3} + [Fe(OH)_3]} \times \frac{Ks_{MnO_2}}{Ks_{MnO_2} + [MnO_2]} \times \frac{Ks_{NO_3^-}}{Ks_{NO_3^-} + [NO_3^-]} \times \frac{Ks_{O_2}}{Ks_{O_2} + [O_2]}$$
$$R.\,CH_4.j = kj \times [OMj] \times \frac{Ks_{SO_4^{2-}}}{Ks_{SO_4^{2-}} + [SO_4^{2-}]} \times \frac{Ks_{Fe(OH)_3}}{Ks_{Fe(OH)_3} + [Fe(OH)_3]} \times \frac{Ks_{MnO_2}}{Ks_{MnO_2} + [MnO_2]} \times \frac{Ks_{NO_3^-}}{Ks_{NO_3^-} + [NO_3^-]} \times \frac{Ks_{O_2}}{Ks_{O_2} + [O_2]}$$

Secondary reaction terms
$$R.\,nox = k.\,nox \times [NH_4^+] \times [O_2]$$
$$R.\,Fe^{2+}.O_2 = k.\,Fe^{2+}.o2 \times [Fe^{2+}] \times [O_2]$$
$$R.\,Fe^{2+}.NO_3^- = k.\,Fe^{2+}.NO_3^- \times [Fe^{2+}] \times [NO_3^-]$$
$$R.\,H_2Sox = k.\,H2Sox \times [H_2S] \times [O_2]$$
$$R.\,Fe^{2+}.H_2S = k.\,Fe2.H_2S \times [Fe^{2+}] \times [H_2S]$$
$$R.\,FeS.H_2S = k.\,FeS.H_2S \times [FeS] \times [H_2S]$$
$$R.\,H_2.SO_4^{2-} = k.\,H_2.SO_4^{2-} \times [H_2] \times [SO_4^{2-}]$$
$$R.\,FeS.O_2 = k.\,FeS.O_2 \times [FeS] \times [O_2]$$
$$R.\,FeS_2.O_2 = k.\,FeS2.O_2 \times [FeS_2] \times [O_2]$$
$$R.\,Fe(OH)_3.H_2S = k.\,Fe(OH)_3.h2s \times [Fe(OH)_3] \times [H_2S]$$
$$R.\,Fe(OH)_3.MR.H_2S = k.\,Fe(OH)_3.H_2S \times [Fe(OH)_3.MR] \times [H_2S]$$
$$R.\,Fe(OH)_3.LR.H_2S = k.\,Fe(OH)_3.H_2S \times [Fe(OH)_3.LR] \times [H_2S]$$
$$R.\,Cdenit = k.\,Cdenit \times [H_2S] \times [NO_{3.bac}^-]$$
$$R.\,ana.bac = k.\,ana.bac \times [NH_4^+] \times [NO_{3.bac}^-]$$
$$R.\,ana = k.\,ana \times [NH_4^+] \times [NO_3^-]$$
$$R.\,CH_4.SO_4^{2-} = k.\,CH_4.SO_4^{2-} \times [SO_4^{2-}] \times [CH_4]$$
$$R.\,Mn^{2+}.O_2 = k.\,Mn2.O_2 \times [Mn^{2+}] \times [O_2]$$
$$R.\,MnO_2.Fe^{2+} = k.\,MnO_2.Fe^{2+} \times [MnO_2] \times [Fe^{2+}]$$
$$R.\,MnO_2.MR.Fe^{2+} = k.\,MnO_2.MR.Fe^{2+} \times [MnO_2.MR] \times [Fe^{2+}]$$
$$R.\,MnO_2.H_2S = k.\,MnO_2.H_2S \times [MnO_2] \times [H_2S]$$
$$R.\,MnO_2.MR.H_2S = k.\,MnO_2.MR.H_2S \times [MnO_2.MR] \times [H_2S]$$
$$R.\,MnO_2toMR = k.\,MnO_2toMR \times [MnO_2]$$
$$R.\,Fe(OH)_3toMR = k.\,Fe(OH)_3toMR \times [Fe(OH)_3]$$

Table S4. Modelled differential equations from Rakshit et al. (2024). Storage of nitrate through foraminifera (for) was turned off as those organisms were not observed in our study.

tran = appropriate diffusive and advective transport terms for solids or solutes (Section 2.5).

$\frac{\mathrm{dOM}_j}{\mathrm{dt}} = \mathrm{tran} - (\mathrm{R.for}_j + \mathrm{R.O2}_j + \mathrm{R.NO3}_j + \mathrm{R.MnO2}_j + \mathrm{R.Fe(OH)3}_j + \mathrm{R.SO4}_j + \mathrm{R.CH4}_j)$
$\frac{\mathrm{dDIC}}{\mathrm{dt}} = \mathrm{tran} + \left(\frac{1-\varphi}{\varphi}\right)\left(\mathrm{R.for}_j + \mathrm{R.O2}_j + \mathrm{R.NO3}_j + \mathrm{R.MnO2}_j + \mathrm{R.Fe(OH)}_{3\,j} + \mathrm{R.SO4}_j + \mathrm{R.CH4}_j\right) + \mathrm{R.CH_4.SO4} + \alpha \times (\mathrm{[DIC.w]} - \mathrm{[DIC]})$
$\frac{\mathrm{dO2}}{\mathrm{dt}} = \mathrm{tran} - \left(\frac{1-\varphi}{\varphi}\right)\left(\mathrm{R.O2}_j + 3.5 \times \mathrm{R.FeS2.O2} + 2 \times \mathrm{R.FeS2.O2}\right) - 2 \times \mathrm{R.nox} - 0.25 \times \mathrm{R.Fe2.O2} - 2 \times \mathrm{R.H2Sox} - 0.5 \times \mathrm{R.Mn2.O2} + \alpha \times (\mathrm{[O2.w]} - [\mathrm{O_2}])$
$\frac{\mathrm{dNO3}}{\mathrm{dt}} = \mathrm{tran} - \left(\frac{1-\varphi}{\varphi}\right) \times \frac{4}{5} \times \left(\mathrm{R.NO3}_j\right) + \mathrm{R.nox} - \mathrm{R.ana} - 0.2 \times \mathrm{R.Fe2.NO3} + \alpha \times (\mathrm{NO3.w]} - \mathrm{[NO3]})$
$\frac{\mathrm{dNH4}}{\mathrm{dt}} = \mathrm{tran} - \left(\frac{1-\varphi}{\varphi}\right) \times \left(\mathrm{rNC}_j \times \mathrm{R.for}_j + \mathrm{rNC}_j \times \mathrm{R.O2}_j + \mathrm{rNC}_j \times \mathrm{R.NO3}_j + \mathrm{rNC}_j \times \mathrm{R.MnO2} + \mathrm{rNC}_j \times \mathrm{R.Fe(OH)3}_j + \mathrm{rNC}_j \times \mathrm{R.SO4}_j + \mathrm{rNC}_j \times \mathrm{R.CH4}_j\right) - \mathrm{R.nox} + \mathrm{R.NO3.bac} - \mathrm{R.ana.bac} - \mathrm{R.ana} + \alpha \times (\mathrm{[NH4.w]} - \mathrm{[NH4]})$
$\frac{\mathrm{dFe(OH)3}}{\mathrm{dt}} = \mathrm{tran} - 4 * \left(\mathrm{R.Fe(OH)3}_j\right) + \left(\frac{\varphi}{1-\varphi}\right) \times (\mathrm{R.Fe2.O2} + \mathrm{R.Fe2.NO3}) - \mathrm{R.Fe(OH)3.H2S} + 2 * \mathrm{R.MnO2.Fe2} + 2 * \mathrm{R.MnO2.MR.Fe2} - \mathrm{R.Fe(OH)3toMR}$
$\frac{\mathrm{dFe(OH)3.MR}}{\mathrm{dt}} = \mathrm{tran} - \mathrm{R.Fe(OH)3.MR.H2S} + \mathrm{R.Fe(OH)3toMR}$
$\frac{\mathrm{dFe(OH)3.LR}}{\mathrm{dt}} = \mathrm{tran} - \mathrm{R.Fe(OH)3.LR.H2S}$
$\frac{\mathrm{dFe2}}{\mathrm{dt}} = \mathrm{tran} - 4 \times \left(\frac{1-\varphi}{\varphi}\right) \times \left(\mathrm{R.Fe(OH)3}_j\right) - \mathrm{R.Fe2.O2} - \mathrm{R.Fe2.NO3} - \mathrm{R.Fe2.H2S} + \left(\frac{1-\varphi}{\varphi}\right) \times (\mathrm{R.FeS.O2} + \mathrm{R.FeS2.O2} + \mathrm{R.Fe(OH)3.H2S} + \mathrm{R.Fe(OH)3.MR.H2S} + \mathrm{R.Fe(OH)3.LR.H2S} - 2 \times \mathrm{R.Mn}O2\mathrm{.Fe2} - 2 \times \mathrm{R.MnO2.MR.}Fe2) + \alpha/4 \times (0 - \mathrm{Fe2}])$
$\frac{\mathrm{dFeS}}{\mathrm{dt}} = \mathrm{tran} + \left(\frac{\varphi}{1-\varphi}\right) * \mathrm{R.Fe2.H2S} - \mathrm{R.FeS.H2S} - \mathrm{R.FeS.}O2$
$\frac{\mathrm{dFeS2}}{\mathrm{dt}} = \mathrm{tran} + \mathrm{R.FeS.H2S} - \mathrm{R.FeS2.}O2$

$$\frac{\mathrm{dSO4}}{\mathrm{dt}} = \mathrm{tran} - \left(\frac{1-\varphi}{\varphi}\right) \times \left(\mathrm{R.\,SO4}_j\right) + \mathrm{R.\,H2Sox} + 2 \times \left(\frac{1-\varphi}{\varphi}\right) \times \mathrm{R.}\,FeS2\mathrm{.\,O2} + 0.125 \times \left(\frac{1-\varphi}{\varphi}\right) \times (\mathrm{R.\,Fe(OH)3.\,H2S} + \mathrm{R.\,Fe(OH)3.\,MR.\,H2S} + \mathrm{R.\,Fe(OH)3.\,LR.\,H2S}) + 0.25 \times \left(\frac{1-\varphi}{\varphi}\right) (\mathrm{R.\,Mn}O2\mathrm{.\,H2S} + \mathrm{R.\,Mn}O2\mathrm{.\,MR.\,H2S}) + \mathrm{R.\,NO3.\,bac} + \mathrm{R.\,Cdenit} - \mathrm{R.\,CH_4.\,SO4} - \mathrm{R.\,H_2.\,SO4} + \alpha \times ([\mathrm{SO4.\,w}] - [\mathrm{SO4}])$$

$$\frac{\mathrm{dH2S}}{\mathrm{dt}} = \mathrm{tran} - 0.5 \times \left(\frac{1-\varphi}{\varphi}\right) \times \left(\mathrm{R.\,SO4}_j\right) - \mathrm{R.\,H2Sox} - 2 \times \mathrm{R.\,Fe2.\,H2S} - 0.125 \times \left(\frac{1-\varphi}{\varphi}\right) \times (\mathrm{R.\,Fe(OH)3.\,H2S} + \mathrm{R.\,Fe(OH)3.\,MR.\,H2S} + \mathrm{R.\,Fe(OH)3.\,LR.\,H2S}) - \left(\frac{1-\varphi}{\varphi}\right) \times \mathrm{R.\,FeS.\,H2S} - 0.25 \times \left(\frac{1-\varphi}{\varphi}\right) \times (\mathrm{R.\,MnO2.\,H2S} + \mathrm{R.\,MnO2.\,MR.\,H2S}) - \mathrm{R.\,NO3.\,bac} - \mathrm{R.\,Cdenit} + \mathrm{R.\,CH4.\,SO4} + \mathrm{R.\,H2.\,SO4} + \alpha \times ([\mathrm{H2S.\,w}] - [\mathrm{H2S}])$$

$$\frac{\mathrm{dNO3.\,bac}}{\mathrm{dt}} = \mathrm{tran} + \gamma(\mathrm{z}) \times (\mathrm{NO3.\,bac.\,0} - \mathrm{NO3.\,bac}) - \mathrm{R.\,NO3.\,bac} - 2 \times \mathrm{R.\,Cdenit} - \mathrm{R.\,ana.\,bac}$$

$$\frac{\mathrm{dCH4}}{\mathrm{dt}} = \mathrm{tran} - 0.5 \times \left(\frac{1-\varphi}{\varphi}\right) \times \left(\mathrm{R.\,CH_4}_j\right) - \mathrm{R.\,CH4.\,SO4} + \alpha \times ([\mathrm{CH4.\,w}] - [\mathrm{CH4}])$$

$$\frac{\mathrm{dMnO2}}{\mathrm{dt}} = \mathrm{tran} - 2 \times (\mathrm{R.\,MnO2.1} + \mathrm{R.\,MnO2.2} + \mathrm{R.\,MnO2.3}) + \left(\frac{\varphi}{1-\varphi}\right) \times \mathrm{R.\,Mn2.\,O2} - \mathrm{R.\,MnO2.\,Fe2} - \mathrm{R.\,MnO2.\,H2S} - \mathrm{R.\,MnO2toMR}$$

$$\frac{\mathrm{dMnO2.\,MR}}{\mathrm{dt}} = \mathrm{tran} - \mathrm{R.\,MnO2.\,MR.\,Fe2} - \mathrm{R.\,MnO2.\,MR.\,H2S} + \mathrm{R.\,MnO2toMR}$$

$$\frac{\mathrm{dMn2}}{\mathrm{dt}} = \mathrm{tran} + 2 \times \left(\frac{1-\varphi}{\varphi}\right) \times \left(\mathrm{R.\,MnO2}_j\right) - \mathrm{R.\,Mn2.\,O2} + \left(\frac{1-\varphi}{\varphi}\right) \times (\mathrm{R.\,MnO2.\,Fe2} + \mathrm{R.\,MnO2.\,MR.\,Fe2} + \mathrm{R.\,MnO2.\,H2S} + \mathrm{R.\,MnO2.\,MR.\,H2S}) + \alpha \times (0 - [\mathrm{Mn2}])$$

$$\frac{\mathrm{dH2}}{\mathrm{dt}} = \mathrm{tran} + \left(\frac{1-\varphi}{\varphi}\right) \times \mathrm{R.\,FeS.\,H2S} - 4 \times \mathrm{R.\,H2.\,SO4} + \alpha \times (0 - [\mathrm{H2}])$$

Table S5. Model parameter values.

Parameter	Description	Nachvak	Saglek	Unit	Source*
Temp	Bottom water temperature	-1.8	-1.0	°C	12
S	Bottom water salinity	33	32	psu	12
k1	OM1 decay constant	1	1.2	yr^{-1}	11

k2	OM2 decay constant	0.030	0.035	yr^{-1}	11
k3	OM3 decay constant	0.0	0.0001	yr^{-1}	11
k.nox	Rate constant for aerobic oxidation of ammonium	1e7	1e6	$mmol^{-1}$ L yr^{-1}	11
k.Fe2.o2	Rate constant for aerobic oxidation of Fe(II)	5e6	5e6	$mmol^{-1}$ L yr^{-1}	3
k.Fe2.no3	Rate constant for anaerobic oxidation of Fe(II) also known as nitrate reduction iron oxidation (NRFO)	2e9	1e3	$mmol^{-1}$ L yr^{-1}	11
k.H2sox	Rate constant for aerobic oxidation of H_2S	1e6	1e6	$mmol^{-1}$ L yr^{-1}	11
k.Fe2.h2s	Rate constant for FeS precipitation	1e5	1e5	$mmol^{-1}$ L yr^{-1}	5
k.FeS.h2s	Rate constant for pyrite (FeS_2) precipitation	1e2	1e2/150	$mmol^{-1}$ L yr^{-1}	6
k.FeS.o2	Rate constant for aerobic oxidation of FeS	1e3	1e3	$mmol^{-1}$ L yr^{-1}	3
k.FeS2.o2	Rate constant for aerobic oxidation of FeS_2	800	800	$mmol^{-1}$ L yr^{-1}	10
k.FeOH3.h2s	Rate constant for Fe.HR reduction by H_2S	100	100/3	$mmol^{-1}$ L yr^{-1}	7 & 11
k.FeOH3.MR.h2s	Rate constant for Fe.MR reduction by H_2S	1	1/3	$mmol^{-1}$ L yr^{-1}	7
k.FeOH3.LR.h2s	Rate constant for Fe.LR reduction by H_2S	0.0001	0.0001	$mmol^{-1}$ L yr^{-1}	7
k.dnra	Rate constant for DNRA	0	0	$mmol^{-1}$ L yr^{-1}	11
k.Cdenit	Rate constant for chemoautotrophic denitrification	0	0	$mmol^{-1}$ L yr^{-1}	11
k.ana.bac	Rate constant for bacterial anammox	0	0	$mmol^{-1}$ L yr^{-1}	11
k.ana	Rate constant for anammox	0	0	$mmol^{-1}$ L yr^{-1}	11

k.ch4.so4	Rate constant for anerobic oxidation of CH_4	1e4	1e4	$mmol^{-1}$ L yr^{-1}	6
k.Mn2.o2	Rate constant for aerobic oxidation of Mn(II)	5e3	5e3	$mmol^{-1}$ L yr^{-1}	3
k.MnO2.Fe2	Rate constant for Mn(IV).HR reduction by Fe(II)	1e4	1e4	$mmol^{-1}$ L yr^{-1}	8
k.MnO2.MR.Fe2	Rate constant for Mn(IV).MR reduction by Fe(II)	1e2	1e2	$mmol^{-1}$ L yr^{-1}	8
k.MnO2.h2s	Rate constant for Mn(IV).HR reduction by H_2S	1e2	1e2	$mmol^{-1}$ L yr^{-1}	8
k.MnO2.MR.h2s	Rate constant for Mn(IV).MR reduction by H_2S	1	1	$mmol^{-1}$ L yr^{-1}	8
k.h2.so4	Rate constant for hydrogen oxidation	1e5	1e5	$mmol^{-1}$ L yr^{-1}	10
k.Mno2toMR	Rate constant for Mn(IV).HR ageing to Mn(IV).MR	1.7	1.7	yr^{-1}	5
k.FeOH3toMR	Rate constant for Fe(III).HR ageing to Fe(III).MR	0.7	0.7	yr^{-1}	5
ks.o2	Half saturation constant for O_2 for OM degradation	0.001	0.001	mM	10
ks.for	Half saturation constant for nitrate in foraminiferal denitrification of OM degradation	0.001	0.001	mM	10
ks.no3	Half saturation constant for nitrate for OM degradation	0.010	0.001	mM	11
ks.MnO2	Half saturation constant for Mn(IV) for OM degradation	0.1	0.1	wt %	10
ks.FeOH3	Half saturation constant for Fe(III) for OM degradation	0.6	0.6	wt %	10
kanam.nh4	Half saturation constant for annamox?	0.001	0.001	mM	10
ks.SO4	Half saturation	1.0	1.0	mM	10

	constant for SO_4^{2-} for OM degradation				
O2.w	Bottom water oxygen	0.319	0.300	mM	12
NO3.w	Bottom water nitrate	0.0122	0.0145	mM	12
NH4.w	Bottom water ammonium	0.0	0.00	mM	1
SO4.w	Bottom water sulfate	25	25	mM	10
DIC.w	Bottom water DIC	2.1	2.1	mM	1
H2S.w	Bottom water H_sS	0.0	0.0	mM	1
Fe2.w	Bottom water Fe^{2+}	0.0	0.0	mM	1
NO3.for.0	Porewater equivalent of intracellular foraminiferal NO_3^- concentration	0.0	0.0	mM	11
NO3bac.0	Porewater equivalent of intracellular NO_3^- conc in large bacteria	0.0	0.0	mM	11
rNC.1	N/C for OM1	1/6.6	1/6.6		1
rNC.2	N/C for OM2	1/6.6	1/7		1
rNC.3	N/C for OM3	1/7	1/8		1
K.equilNH4	The adsorption coefficient	1.6	1.6	cm^{-3} pw g	5
Db.max	Max bioturbation rate	6	5	cm^{-2} yr^{-1}	11
xb.Db	Bioturbation attenuation	0.05	0.05	cm	11
xL	Bioturbation depth	6.22	5.1	cm	9
alpha.max	Bioirrigation coefficient	65	75	yr^{-1}	11
alpha.max.Fe2	Bioirrigation coefficient for dissolved iron	65/4	75/4	yr^{-1}	11
xL.alpha	Depth bioirrigation constant	6.22	5.1	cm	9
gamma.max	Intracellular non-local nitrate transport coefficient	0	0	yr^{-1}	11
xL.gamma	Depth zone of active intracellular NO3 transport	5	10	cm	10
xb.gamma	Intracellular NO3 attenuation	1	1	cm	10
por.0	Porosity at surface	0.78	0.81	cm^{-3} pw	9
por.inf	Porosity at depth	0.78	0.81	cm^{-3} pw	9
por.att	Porosity attenuation	2	2	cm	9
w	Sedimentation rate	0.21	0.26	cm yr^{-1}	1 & 9
N	Sediment layers in model	100	100		10

L	Length of modelled sediment	50	50	cm	10
ps	Sediment density	2.65	2.65	g cm^{-3}	

* 1 = measured in this study. 2 = (Bohlen et al., 2012); 3 = (Van Cappellen and Wang, 1996); 4 = (Dhakar and Burdige, 1996); 5 = (Berg et al., 2003); 6 = (Dale et al., 2009); 7 = (Canfield et al., 1992); 8 = (Dale et al., 2015), 9 = (Bentley and Kahlmeyer, 2012) ,10 = (Rakshit et al., 2025), 11 = assumption, 12 = Amundsen Science CTD data

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