Supplementary material for Stevenson *et al.*, 2020, Transformation of organic matter in a Barents Sea sediment profile: coupled geochemical and microbiological processes, *Phil. Trans. R. Soc. A.* doi: 10.1098/rsta.2020.0223

Transformation of organic matter in a Barents Sea sediment profile: coupled geochemical and microbiological processes

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Supplementary information Table S1

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Table S1: Summary of analyses and purpose for cores from B15

Analysis	Purpose	Core *or* data source
Radiocarbon dating		
^{14}C analysis of benthic and planktonic foraminifera	To enable an age-estimation	B15 E144
Bulk sediment		
TOC	To assess TOC degradation	B15 E144
TOC/N	To assess changes in lability	B15 E144
Stable nitrogen isotopes ($\delta^{15}N$)	To assess OM source changes	B15 E144
Organic geochemistry (GC-MS)		
Total FAMEs	Sum of all fatty acids	B15 E144
C_{15} anteiso: C_{16} FAME	Indicator of microbial activity	B15 E144
Terrigenous to aquatic fatty acid ratio (TAR_{FA}) for *n*-alkanoic acids	Changes in chain-length composition (OM reactivity)	B15 E144
Carbon Preference Index (CPI_T) for total *n*-alkanoic acids	Changes in chain-length composition (OM reactivity)	B15 E144
Cholesterol/brassicasterol	Sterol reactivity	B15 E144
Cholesterol/ β-sitosterol	Sterol reactivity	B15 E144
β-sitosterol/stigmastanol ratio	Sterol reactivity	B15 E144
Stigmasterol/stigmastanol	Sterol reactivity	B15 E144
Carbon Preference Index (CPI) for *n*-alkanes	Changes in chain-length composition (OM reactivity)	B15 E144
Odd-Even Predominance (OEP_{17-21}) for *n*-alkanes	Changes in chain-length composition (OM reactivity)	B15 E144
Odd-Even Predominance (OEP_{21-25}) for *n*-alkanes	Changes in chain-length composition (OM reactivity)	B15 E144
Terrigenous to aquatic (TAR) ratio for *n*-alkanols	Changes in chain-length composition (OM reactivity)	B15 E144
Autochthonous/allochthonous ratio for *n*-alkanols (Aut/All)	Changes in chain-length composition (OM reactivity)	B15 E144
Microbiology (DNA/RNA)		
16S rRNA archaea	Archaeal abundance	B15 E144
16S rRNA bacteria	Bacterial abundance	B15 E144
BD7-8	Cosmopolitan marine benthic aerobic and nitrate reducing mixotrophs relative abundance	B15 E144
Nitrosopumilaceae	Aerobic ammonia oxidizers relative abundance	B15 E144
Shewanellaceae	Iron reducing taxa relative abundance	B15 E144
Desulfuromonadales	Iron reducing taxa relative abundance	B15 E144
Methylomirabilaceae	Methane oxidation coupled to nitrite reducing taxa relative abundance	B15 E144
Brocadiales	Involved in anammox by ammonia oxidation linked to nitrate/nitrite reduction	B15 E144
Desulforbacteraceae	Sulfate reducing taxa relative abundance	B15 E144
Inorganic geochemistry (XRF)		

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Iron (Fe)	Iron percent abundance	B15 E146
Phosphorus (P)	Phosphorus percent abundance	B15 E146
Manganese (Mn)	Manganese percent abundance	B15 E146
Grain size analysis		
Particle size split into 6 size fractions (0.1-1000 μm)	To identify inputs of fine particulates associated with transport/delivery events	B15 E146
Bioturbation data		
Mean and maximum bioturbation depths	To constrain animal mixing depth and particle reworking in sediments at the station	[1]
Pore water measurements		
Down-core O_2 measurements	To identify the position of the oxic interface	[2]
Modelled pore water measurements		
Model-derived oxygen contribution	To identify the position of the oxic interface	[2]
Modelled metabolic pathway contribution to OM heterotrophic degradation		
O_2 – M	Modelled relative aerobic oxygen respiration contribution	[2]
NO_3 – M	Modelled relative denitrification contribution	[2]
MnO_2 – M	Modelled relative manganese contribution	[2]
$Fe(OH)_3$ – M	Modelled relative iron reduction contribution	[2]
SO_4 – M	Modelled relative sulfate reduction contribution	[2]

References

[1] Solan, M., Ward, E. R., Wood, C. L., Reed, A. J., Grange, L. J. & Godbold, J. A. 2020 Climate driven benthic invertebrate activity and biogeochemical functioning across the Barents Sea Polar Front. *Philosophical Transactions of the Royal Society A*. (doi:10.1098/rsta.2019.0365)
[2] Freitas, F. S., Hendry, K. R., Henley, S. F., Faust, J. C., Tessin, A. C., Stevenson, M. A., Abbott, G. D., März, C. & Arndt, S. 2020 Benthic-pelagic coupling in the Barents Sea: an integrated data-model framework. *Philosophical Transactions of the Royal Society A*. (doi:10.1098/rsta.2019.0359)

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