

## Supplementary Material

Element	Measured	Consensus Wuttig et al., (2019) nmol kg <sup>-1</sup>	Consensus (GEOTRACES) nmol kg <sup>-1</sup>
Ni (nM)	2.53	2.44	2.595
Cu (nM)	0.65	0.58	0.574
Co (pM)	4.3	7	n/a

Supplementary Table 1. Analysis of reference material GSP for trace elements via pre-concentration using a seaFAST system. GEOTRACES values (<https://www.geotraces.org/standards-and-reference-materials>) last accessed October 2023.

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Runoff Location	dSi / $\mu\text{M}$	NO <sub>x</sub> / $\mu\text{M}$	PO <sub>4</sub> / $\mu\text{M}$
Beagle Channel (close to Pia fjord), n=2	38.79	3.57	0.29
Beagle Channel Yendegaia fjord, n=3	44.34	2.82	0.34
Saqqarleq Fjord–Saqqarliup Sermia (close to Jakobshavn Isbræ, west Greenland), n=2	18.83	0.65	0.17
Doumer Island (close to South Bay, Western Antarctic Peninsula)	1.20	0.17	0.02
Kongsfjorden (Svalbard)	4.12	2.50	0.12
Saqqap Sermersua (Nuup Kangerlua, southwest Greenland)	33	2.50	0.30

Supplementary Table 2. Runoff concentrations corresponding to iceberg collection sites. Doumer Island data from Krause et al., (2021). Kongsfjorden data from Cantoni et al., (2020). Nuup Kangerlua data from Meire et al., (2016).

Zone	Ice origin	NO <sub>x</sub> ( $\mu\text{M}$ )	PO <sub>4</sub> ( $\mu\text{M}$ )	dSi ( $\mu\text{M}$ )
Coastal	Equip Sermia (n=43)	0.61 $\pm$ 0.50 (0.57)	0.04 $\pm$ 0.01 (0.03)	0.15 $\pm$ 0.56 (0.03)
	Ilulissat Icefjord (n=14)	1.09 $\pm$ 0.43 (1.14)	0.09 $\pm$ 0.07 (0.09)	0.05 $\pm$ 0.03 (0.04)
Offshore	Iceberg ‘Beluga’ (n=12)	0.97 $\pm$ 0.41 (1.03)	0.09 $\pm$ 0.06 (0.07)	0.16 $\pm$ 0.38 (0.05)
	Iceberg ‘Narwhal’ (n=18)	1.16 $\pm$ 0.31 (1.10)	0.01 $\pm$ 0.01 (0.01)	0.01 $\pm$ 0.04 (0.00)

10 Supplementary Table 3. Nutrient concentrations in ice from four distinct zones within Disko Bay. Zones as per Fig. 3. Summarized as mean  $\pm$  standard deviation (median), ‘n’ number of samples.

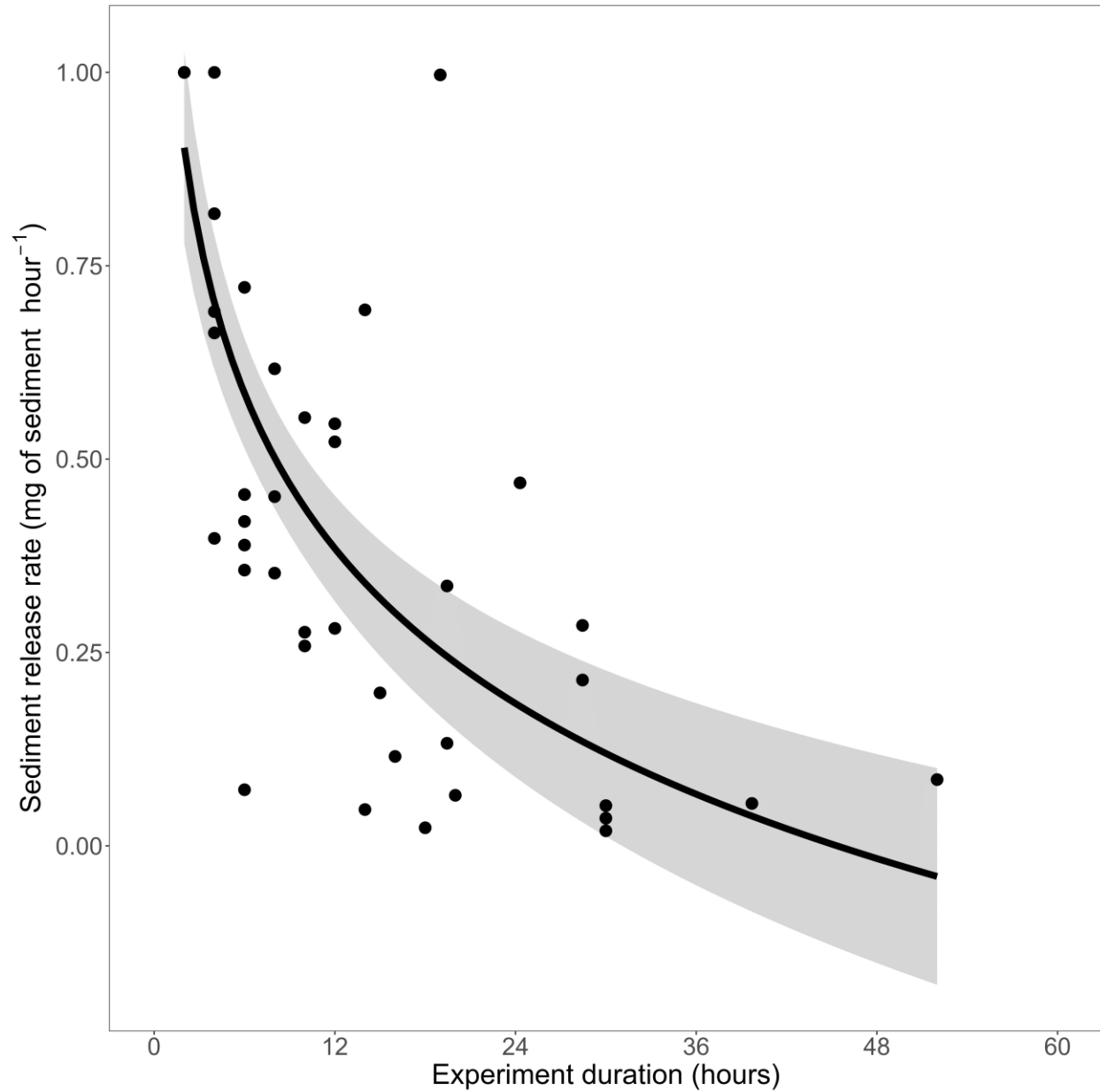
(Micro)Nutrient	May 2014 (n=13)	July 2015 (n=21)	August 2018 (n=9)	May 2019 (n=18)	September 2019 (n=22)
dFe / nM	37.86 ± 88.94 (12.15)	n/d	12.65 ± 9.68 (17.14)	10.82 ± 11.27 (5.32)	6.57 ± 2.58 (6.08)
TdFe / nM	306.78 ± 491.61 (94.82)	520.04 ± 1127.44 (27.54)	47.69 ± 60.33 (27.96)	n/d	32.48 ± 36.22 (20.30)
dMn / nM	n/d	n/d	0.87 ± 0.70 (0.67)	0.82 ± 0.66 (0.71)	n/d
TdMn / nM	n/d	n/d	1.52 ± 1.25 (1.06)	n/d	1.14 ± 0.65 (0.95)
PO <sub>4</sub> / μM	0.03 ± 0.04 (0.02)	0.04 ± 0.02 (0.04)	0.05 ± 0.10 (0.00)	0.02 ± 0.06 0.00	All b/d
NO <sub>x</sub> / μM	1.96 ± 1.68 (1.59)	1.79 ± 0.97 (1.77)	0.79 ± 0.51 (0.69)	0.49 ± 0.63 (0.27)	0.62 ± 0.40 (0.64)
dSi / μM	All b/d	0.25 ± 0.22 (0.19)	0.61 ± 0.73 (0.32)	0.22 ± 0.54 (0.09)	0.57 ± 0.45 (0.64)

15 Supplementary Table 4. (Micro)nutrient concentrations in ice from repeat sampling of ice in Nuup Kangerlua (southwest Greenland), otherwise known as Godthåbsfjorden. Concentrations summarized as mean ± standard deviation (median), ‘n’ is the number of nutrient samples. ‘n/d’ represents no data, ‘All b/d’ means samples were all below the detection limit. 2014 data from Hopwood et al., (2016). 2015 Fe data from Hopwood et al., (2019).

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Trace metal	Icebergs (herein)	Transpolar Drift (European Arctic) (meteoric water regression)	Northeast Greenland shelf (salinity regression)	Leverett Glacier (west Greenland) runoff	West and southwest Greenland (salinity regression)	Doumer Island (Antarctic Peninsula) runoff
Co (nM)	0.021	0.854	1.54	1.53	2.7	0.16
Ni (nM)	0.36	31	22.6	12.5	11	0.30
Cu (nM)	0.39	30	29.2	10.5	7.4	2.64

25 Supplementary Table 5. Concentrations of dissolved trace elements in icebergs and other freshwater sources. A linear regression to 100% meteoric water for the Transpolar Drift was derived by Charette et al., (2020). A regression to zero salinity for the northeast Greenland shelf was derived by Chen et al., (2022). Similar regressions for west Greenland and runoff concentrations from Doumer Island are provided by Krause et al., (2021). Volume-weighted mean runoff concentrations for Leverett Glacier are provided by Hawkings et al., (2020).



Supplementary Figure 1. Sediment released from large (10-45 kg) fragments of ice collected in Maxwell Bay which were specifically targeted as pieces with visible embedded sediment layers and no surface sediment. Ice fragments were boxed in opaque containers and allowed to melt at an ambient temperature of 5-10°C. Total volume loss over 48 hours was ~20% of ice volume.

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## Supplementary References

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