Supplementary Material

1 Supplementary Material

	CRM (high)	Certified/ Consensus	Measured	CRM (low)	Certified/ Consensus	Measured	Blank
Fe	CASS-6	27.93 ± 2.15	25.3 ± 0.07	NASS-7	6.29 ± 0.47	6.22 ± 0.96	0.251 ± 0.05
Co	CASS-6	1.14 ± 0.09	0.98 ± 0.07	GSP	0.005 ± 0.0007	0.0065 ± 0.0038	0.0024 ± 0.0012
Ni	NASS-7	4.23 ± 0.31	4.06 ± 0.34	GSP	2.60 ± 0.10	2.67 ± 0.37	0.232 ± 0.02
Cu	CASS-6	8.34 ± 0.50	8.26 ± 0.18	NASS-7	3.13 ± 0.22	2.87 ± 0.33	0.035 ± 0.01

Supplementary Table 1. Reference materials analysed alongside samples for dissolved trace elements. All values refer to means ± standard deviation (n > 3). All concentrations are nmol L^{-1}. NASS-7 and CASS-6 values refer to certified National Research Council Canada concentrations. GSP values are GEOTRACES consensus values as of February 2021, except dCo (no value at time of writing) which is from Wuttig et al., (2019) and refers to dCo without UV-treatment. Blank values refer to filtered de-ionized water treated as a sample for dissolved trace element analysis.

Region	Metal concentration / nM			References
	dFe	dNi	dCu	
South	4100	7.1	17	(Aciego et al., 2015)
Central West	3000	8.4	8.2	(Statham et al., 2008; Ryu and Jacobson, 2012; Bhatia et al., 2013; Aciego et al., 2015; Hawkings et al., 2020)
Southwest	280	6.0	5.3	(Aciego et al., 2015)*

Southeast	290	7.2	3.8	(Aciego et al., 2015)
Mean (±SD)	1900 ± 1900	7.2 ± 1.0	8.7 ± 6.1	

Supplementary Table 2. Mean dissolved metal concentrations used to assess the relative significance of freshwater in determining ambient concentrations in glacially modified plumes. *New concentrations were also obtained close to Nuuk (Kobbefjord throughout 2014): 416 nM dFe, 19 nM dNi and 9.5 nM dCu. Regional means are produced from all available literature and then combined to produce a working mean (±SD) for Greenland.

	GEOVIDE (nmol kg^{-1})	PS100 (nmol L^{-1})	D354 (nmol kg^{-1})
dFe	0.49 ± 0.32	1.19 ± 0.33	0.25 ± 0.17
dCo	0.037 ± 0.0035	0.20 ± 0.030	0.067 ± 0.041
dNi	*ND*	5.21 ± 0.68	3.50 ± 0.67
dCu	1.08 ± 0.28	4.15 ± 0.42	1.24 ± 0.26
Salinity	34.67 ± 0.32	31.10 ± 1.05	34.65 ± 0.48
Reference	(Sarthou et al., 2018)	(Krisch et al., 2021)	(Achterberg et al., 2018, 2020)

Supplementary Table 3. For comparison to fjord values reported herein, mean coastal/shelf Greenland shelf concentrations obtained from GEOTRACES cruises GA01/GEOVIDE (S Greenland), GA05/PS100 (NE Greenland), and D354 (E Greenland). '*ND*' not determined.

Dissolved component (unit)	Runoff concentration
dFe (nM)	130 ± 140
dCo (nM)	0.16 ± 0.17
dNi (nM)	0.30 ± 0.29
dCu (nM)	2.64 ± 2.21

PO_4 (µM)	0.02 ± 0.02
NO_3 (µM)	0.14 ± 0.32
Silicic acid (µM)	1.2 ± 2.1

Supplementary Table 4. Runoff concentrations from 10 outflows (mean ± standard deviation) that could be safely accessed around Doumer Island.

MODEL	AIC	R^2 adjusted
Lat Dist	747.49	0.30
Lat Dist * Year	740.39	0.37
Lat Dist * Month	724.88	0.50
Sal * Month	717.09	0.58
Sal	716.23	0.58
Sal * Year	714.6	0.59
Sal + Lat Dist + Month	707.6	0.65
Sal + Lat Dist	704.06	0.66
Sal + Lat Dist + Year	703.51	0.66
(Sal | Lat Dist) + Month	699.75	0.71
(Sal | Lat Dist) + Year	698.83	0.71
(Sal | Lat Dist)	**697.87**	**0.72**

Supplementary Table 5. Fit quality (AIC and R^2) of model selection for GAMs fitted to the concentration of dFe in Nuup Kangerlua during May 2014, August 2014, May 2019, August 2019 and September 2019. The best fitting and more parsimonious GAM (according to its AIC value) is highlighted in bold. + means the addition of separate terms in the GAM structure, * represents an interaction between a variable and a factor, and | depicts an interaction between 2 variables. Salinity (Sal) and the lateral distance to the innermost part of the fjord (Lat Dist) are the explanatory variables used. Sampling month (Month) and year (Year) are seasonal/temporal factors used to test if the relationship between dFe and the explanatory variables varied temporally.

2 Supplementary Note

Runoff data from Mankoff et al., 2020 (Table 1 and Fig. 5) refers to the summed annual RACMO discharge at the following coastal outflows from 2014-2019: Nuup Kangerlua (138312, 138492, 138651, 138712, 138988, 139016, 139038, 137824, 135599, 133786, 134261), Ameralik (140453, 140839), Qasigiannguit (95627, 97768), Kangaatsiaq (101052, 101224, 101438, 102003, 101715, 101733, 101858, 106419, 107087, 107231, 107335, 108115), and Disko Fjord (89386, 90283, 89428, 89632, 89791, 89983, 90294, 90226, 88938, 88908, 89259, 89073, 89334, 89128, 89344).

3 Supplementary References

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