

Supplement to “Seasonal dispersal of fjord meltwaters as an important source of iron to coastal Antarctic phytoplankton”: Figures and Tables

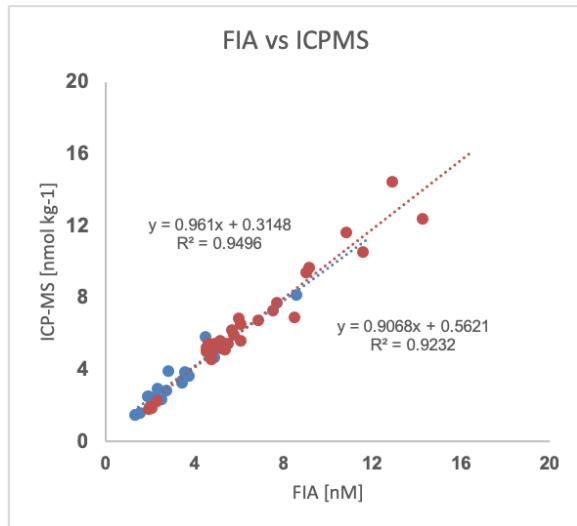


Figure S1. Comparison of analytical detection methods used for the determination of dissolved Fe (FIA versus ICP-MS). The red line denotes the 1:1.

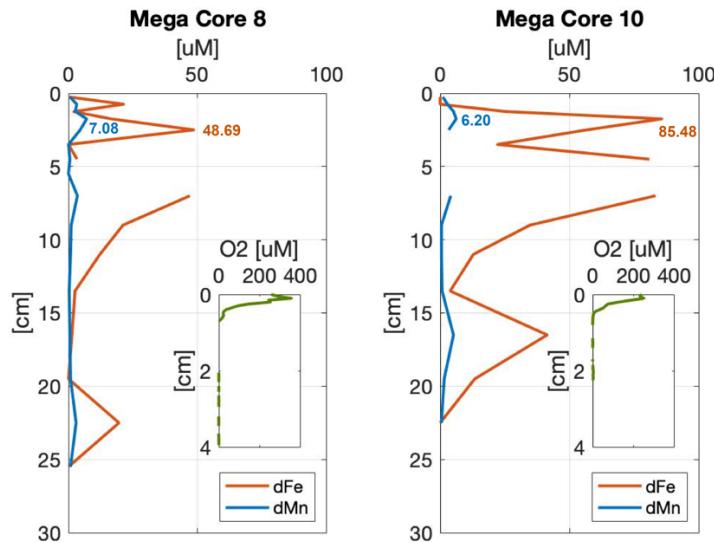


Figure S2. Porewater dissolved metal concentrations for Fe (red), manganese (blue), and oxygen (green) for Mega Core 8 (left) and 10 (right), at the coring station near OB (see Fig. 1).

Date Sampled	Station Name	Latitude (deg N)	Longitude (deg E)	Depth [m]	FIA [nM] [m]	dFe [m]	ICPMS [nM] [m]	dMn [m]	TDFe [m]	TDmN [m]
11/27/15	Sill 5	-64.7498	-62.9844	8	2.29					
					33	1.97				
					134	1.03				
11/28/15	MBA	-64.8582	-62.5832	8	2.12					
					25	1.88				
					134	1.01				
					276	8.44				
11/29/15	Sill 3	-64.8407	-62.6176	5	2.08					
					25	1.97				
					109	2.83				
					273	1.06				
11/30/15	IBA	-64.8635	-62.5434	8	2.32					
					15	2.14				
					109	2.83				
					174	4.83				
12/1/15	Sill 4	-64.8149	-62.7378	7	2.01					
					71	2.70				
					104	1.00				
					294	10.09				
12/2/15	IBA	-64.8937	-62.5724	5	1.85					
					27	1.87	154.91	7.48		
					114	1.01	5.84	3.56	170.74	8.33
					398	10.87			355.82	12.02
12/3/15	IBB	-64.8783	-62.4146	5	2.51					
					43	3.48			239.87	9.38
					174	1.01			230.98	6.88
12/3/15	Sill 3	-64.8180	-62.6281	11	2.49					
					338	11.86				
12/4/15	Sill 3	-64.8180	-62.6281	18	6.05					
12/4/15	Sill 3	-64.8180	-62.6281	11	2.49					
12/4/15	Sill 3	-64.8180	-62.6281	11	2.25					
					330	15.13				
12/5/15	IBA	-64.8915	-62.6025	8	2.48					
					33	2.73	2.81	3.42		
					109	8.60	8.14	4.36		
12/6/15	IBB	-64.8654	-62.4024	6	3.41					
					43	3.28	3.28	3.45		
					76	4.88	4.67	3.39		
					218	16.01	9.19	3.49		
12/7/15	MBB	-64.8252	-62.6492	5	2.78					
					86	1.00				
					240	10.22				
12/8/15	Sill 3	-64.8175	-62.6251	4	2.49					
					50	3.72	3.68	3.80	137.58	6.81
					270	1.01	13.55	3.56	137.58	1.17
12/9/15	OBA	-64.7680	-62.7565	5	1.73					
					37	2.74			104.42	4.62
					109	4.16			90.99	4.42
12/9/15	Gerlache Strait	-64.6607	-62.9274	11	1.14					
					121	1.25			102.24	4.16
12/10/15	MBA	-64.8668	-62.5585	4	1.96					
12/11/15	IBA	-64.8950	-62.5704	5	1.50					
12/11/15	Gerlache Strait	-64.6613	-62.9283	5	1.31					
					36	1.51	1.61	2.60	35.17	3.53
12/12/15	OBB	-64.7738	-62.8963	5	1.53					
					30	2.33	2.81	3.85	42.25	2.77
					110	3.58				
12/12/15	Sill 3	-64.8257	-62.6204	10	3.40					
					109	1.00				
12/13/15	Sill 3	-64.8255	-62.6141	10	3.12					
12/13/15	Sill 3	-64.8248	-62.6155	10	3.29					
12/13/15	Sill 3	-64.8261	-62.6176	10	3.10					
					90	4.53				
12/14/15	Emera Strait	-64.7520	-62.7026	5	1.53					
					36	2.36				
12/16/15	IBA	-64.8936	-62.5737	5	2.01					
					50	3.05				
					344	7.28				
12/17/15	Sill 3	-64.8148	-62.6099	4	2.49					
12/18/15	Sill 4	-64.8209	-62.6908	5	5.52					
12/20/15	Station B	-64.7732	-65.3177	5	2.07					
4/6/16	Sill 4	-64.8072	-62.7027	20	6.16					
					80	8.35				
					150	13.93				
					300	9.03				
4/7/16	IBA	-64.8812	-62.5998	24	1.00					
					80	8.51				
4/8/16	Andvord Front	-64.7996	-62.7525	15	4.69	4.69	4.46			
4/9/16	Emera Strait	-64.7525	-62.6993	15	4.16	5.10	4.24			
4/10/16	MBA	-64.8606	-62.5837	20	6.16					
					80	8.27				
					200	12.45				
4/11/16	IBB	-64.8752	-62.4044	20	6.48	6.89	6.81	383.25	15.34	
					75	5.76	5.87	3.80	131.11	
					250	1.01	6.01	2.27	131.17	
4/11/16	Sill 3	-64.8330	-62.6106	15	4.61	5.41	5.17	313.97	8.69	
					75	4.53	5.20	4.65	141.41	7.97
					250	5.69	6.22	4.49	84.45	6.09
4/11/16	OBA	-64.7657	-62.7057	10	5.41	5.48	5.40	383.05	10.84	
					80	4.51	5.69	4.01	81.36	5.44
					250	6.00	6.82	4.54	138.19	7.14
4/11/16	Gerlache Strait	-64.6590	-62.9255	10	5.14	5.27	3.90	101.23	6.07	
					80	4.00	5.12	3.09	96.21	5.41
					200	7.16	8.78	5.47	194.76	6.70
4/12/16	Andvord Front	-64.8224	-62.6941	15	5.29					
					40	5.43				
					250	1.01				
4/13/16	Sill 1.5	-64.8606	-62.5378	15	8.23					
					125	6.92				
4/14/16	MBB	-64.8258	-62.6472	15	7.83					
					80	8.00				
					200	8.12				
4/14/16	MBA	-64.8734	-62.5605	60	12.69					
4/16/16	Sill 3	-64.8323	-62.6004	15	7.73					
					75	6.00				
					250	7.91				
4/16/16	IBA	-64.8925	-62.5825	20	9.16	9.67	9.54	308.83	13.84	
					100	10.84	11.04	9.89	119.48	13.73
					200	9.45	9.43	8.93	23.46	
4/17/16	IBA	-64.8922	-62.5738	20	6.08	6.54	5.87	248.94	12.72	
					100	9.01	9.40	6.22	538.33	17.28
					280	11.56	10.51	9.18	502.70	18.48
					500	12.45	12.41	15.79	879.48	34.96
4/18/16	IBB	-64.8728	-62.4315	20	8.09					
					75	7.43				
					240	1.01				
4/19/16	OBB	-64.7736	-62.8963	15	6.61					
					100	5.98				
					280	16.34				
4/20/16	Sill 1	-64.8752	-62.4538	15	6.07					
					150	6.07				
					280	11.41				
4/21/16	Sill 5.5	-64.7385	-62.9666	20	10.40					
					80	4.94				
					280	4.51				
4/22/16	IBA	-64.9003	-62.5780	110	7.54	7.28	5.28	277.24	11.63	
					67	6.72	4.79	202.48	10.36	
4/22/16	IBA	-64.8334	-62.5590	110	6.87					
					100	6.71				
4/22/16	Station B	-64.8167	-62.3537	20	10.47					
					150	2.04	1.85	1.27	15.40	1.93
4/26/16					400	1.94	1.79	0.73	28.75	1.82

Table S1. Seawater samples: Fe, Mn determined for the dissolved (dTDM, 0.2 µm) and the total dissolvable (TDTM) determined by FIA and ICPMS methods, and collected during LMG1510 and NBP1604. Additional information covers sampling date, location (station), and latitude and longitude.

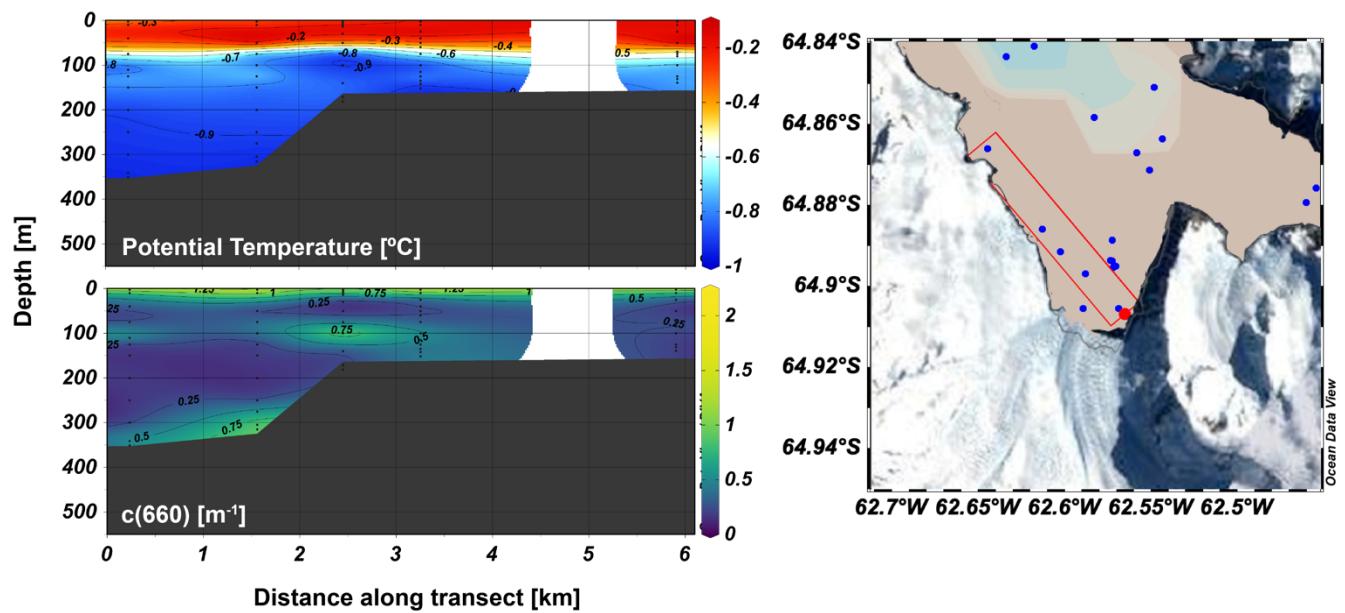


Figure S3. Bagshawe Glacier CTD transect during LMG1510 (late Spring) showing temperature (top panel) and beam attenuation coefficient at 660 nm (bottom panel). Section plots are oriented as if facing the coast. The transect is highlighted by a red box on the map. (Plots were made with Ocean Data View visualization software (Schlitzer, 2002, Ocean Data View, last access: 1 February 2021).

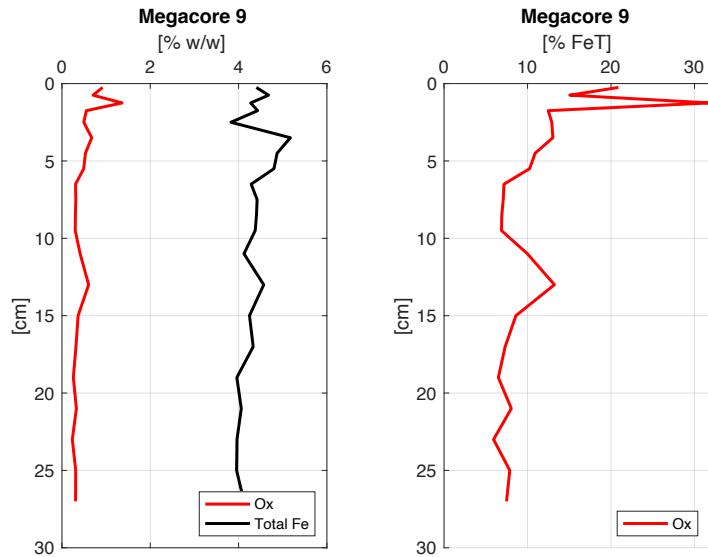


Figure S4. Speciation of Andvord Bay sediments as percent dry sediment weight (left) and percent total Fe (right) for defined fractions based on chemical lability, as in Burdige *et al.* (2020). Ox = oxides.

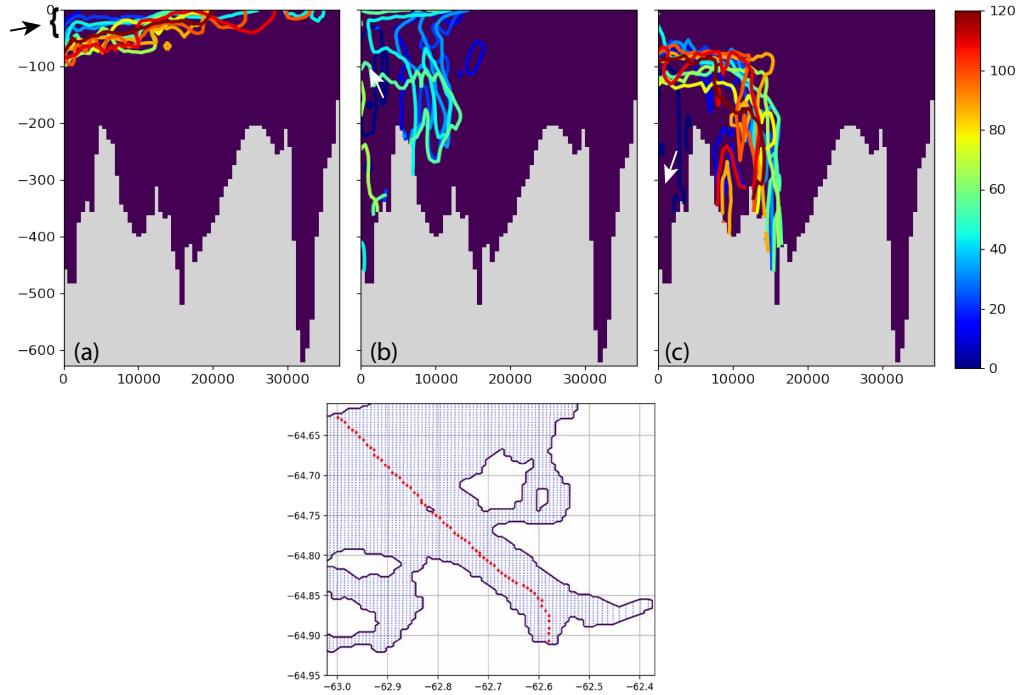


Figure S5. Modeled fate of numerical dyes representing three possible Fe sources. Contours show the 0.1% extent for the (a) meltwater dye and the 0.01% extent of the (b) subsurface, and (c) deep dyes according to the day in the model run (colorbar). Approximate dye release depth and location are highlighted by the arrows. The plots are oriented from the inner basins (0 m) to the Gerlache Strait (~35000 m) as distance from Bagshawe Glacier ([m]).

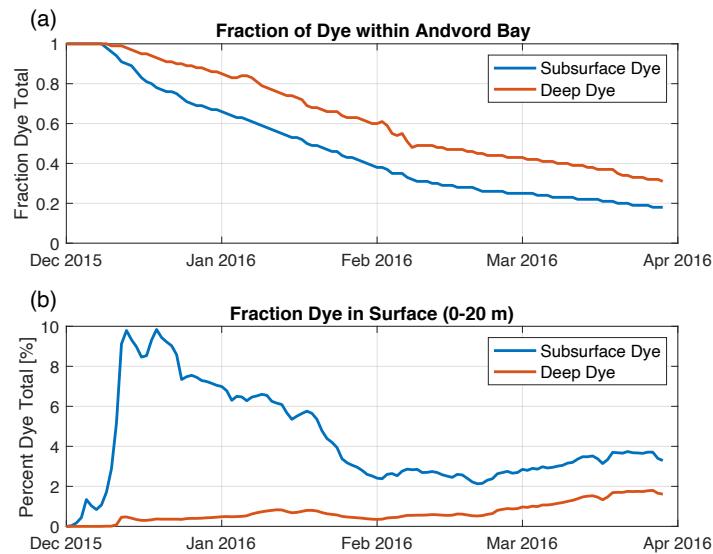


Figure S6. (a) Fraction of initial subsurface (blue) and deep (orange) numerical dye within the fjord domain over the 120-day model run. (b) Percentage of subsurface and deep dye within the surface layer (0-20m) over the 120-day model run.

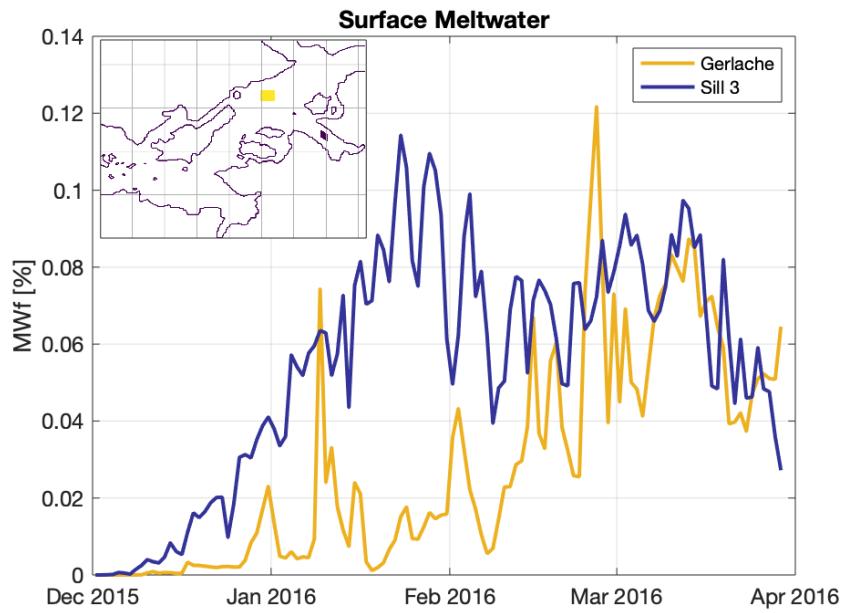


Figure S7. Modeled surface (0-20m) meltwater fraction for Gerlache Strait and Sill 3 (map inset), over the course of the 2015-16 summer season.

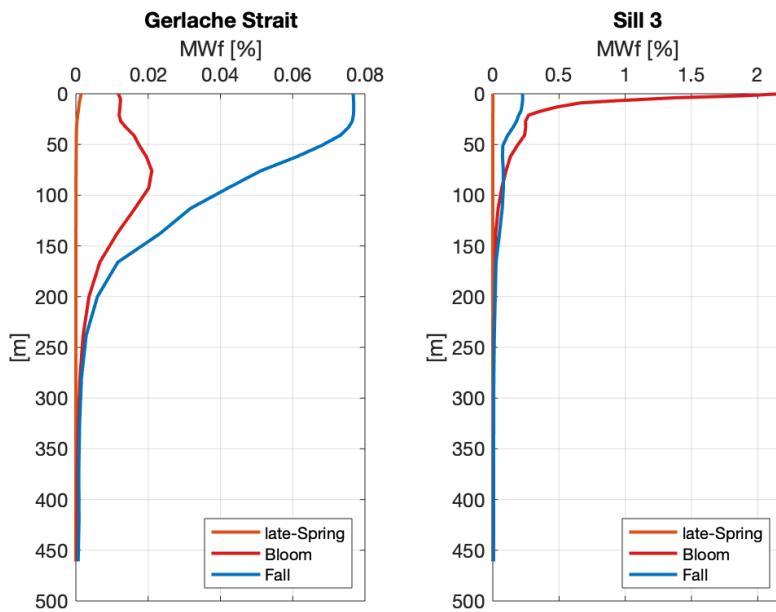


Figure S8. Modeled meltwater dye profiles as a percent of water volume in the (left) Gerlache Strait and (right) Sill 3. Each profile corresponds to a different timepoint: late Spring (December 11, 2015 Gerlache, December 3, 2015 Sill 3), peak bloom period (January 27, 2016), and simulation end (March 29, 2016). Note the different x-scales.