Supplementary Material
Distribution of Fe isotopes in particles and colloids in the salinity gradient along the Lena River plume, Laptev Sea

Sarah Conrad[1,*], Johan Ingri[1], Johan Gelting[1], Fredrik Nordblad[1], Emma Engström[1,2], Ilia Rodushkin[1,2], Per S. Andersson[3], Don Porcelli[4], Örjan Gustafsson[5], Igor Semiletov[6,7,8], and Björn Öhlander[1]

[1]Department of Chemical Engineering and Geosciences, Luleå University of Technology, Luleå, Sweden
[2]ALS Laboratory Group, ALS Scandinavia AB, Aurorum 10, Luleå, Sweden
Department of Geosciences, Swedish Museum of Natural History, Stockholm, Sweden
[4]Department of Earth Sciences, Oxford University, Oxford, United Kingdom
[5]Department of Environmental Science and Analytical Chemistry, Stockholm University, Stockholm, Sweden
[6]International Arctic Research Center (IARC), University of Alaska, Fairbanks, AK, USA
[7]Pacific Oceanological Institute (POI), Far Eastern Branch of the Russian Academy of Sciences (FEBRAS), Vladivostok, Russia
[8]Tomsk National Research Politechnical University, Tomsk, Russia

Correspondence to: Sarah Conrad (sarah.conrad@ltu.se)

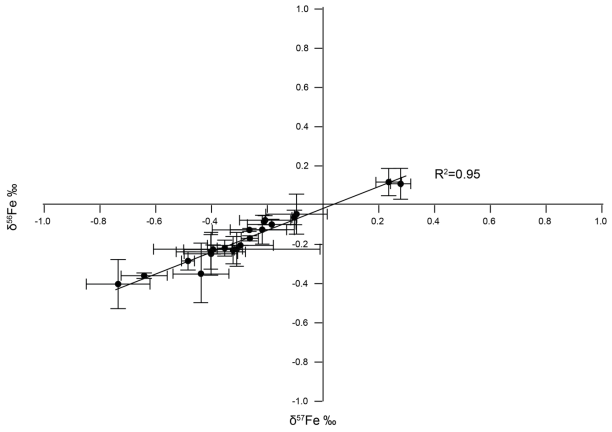

Figure S1: Three-isotope plot of all analyzed samples normalized to IRMM-14. The correlation between δ^{56}Fe and δ^{57}Fe is consistent and shows the mass-dependent fractionation between Fe isotopes. Uncertainties are reported in 2σ.

Table S2: Sampling station information and organic carbon concentrations.

Station	Location	Latitude	Longitude	Date	Station depth	Salinity	Pot.Temp	POC	DOC	TOC
		dec.	dec.		m	CTD	DegC	µM	µM	µM
YS-128	Lena transect; Laptev Sea	76.987	130.356	2008-09-17	51	20.66	-1.43	-	-	-
YS-4	Lena transect	75.987	129.984	2008-08-23	44	11.45	-1.54	8	320	-
YS-5	Lena transect	75.266	130.017	2008-08-24	42	7.03	-1.56	12	430	500
YS-6	Lena transect	74.724	130.016	2008-08-24	32	5.23	-1.61	13	440	540
YS-7	Lena transect	74.132	130.000	2008-08-24	16	6.32	-1.26	11	430	450
YS-8	Lena transect	73.566	130.008	2008-08-24	13	5.34	-0.78	15	390	-
YS-9	Lena transect	73.366	129.997	2008-08-25	23	8.47	-1.13	11	400	440
YS-10	Lena transect	73.184	129.996	2008-08-25	20	3.78	-0.89	36	410	440
YS-11	Lena transect	73.019	129.989	2008-08-25	11	2.67	-0.32	53	430	470
YS-14	Lena transect; Mohtaba Island	71.630	130.050	2008-08-27	8	1.28	11.14	89	440	480
YS-2	Mouth of Ob estuary	73.405	72.995	2008-08-19	30	7.85	-1.09	20	540	-
YS-3	Mouth of Yenisey, close to Dikson	73.492	79.885	2008-08-19	35	5.54	-1.06	-	-	-
YS-13	Borkaya Gulf Transect	71.968	131.701	2008-08-26	21	3.79	-1.03	10	450	-
YS-26	Erosion macro station	72.460	150.596	2008-08-31	16	19.18	-0.72	5	180	-
YS-28	Erosion station-towards Indigirka	72.651	154.185	2008-09-01	28	19.73	-0.86	4	94	-
YS-30	Indigirka plume	71.358	152.153	2008-09-01	9	19.31	1.19	13	200	-
YS-39	Kolyma transect-coring, grab, CTD	71.217	169.347	2008-09-04	44	27.56	-1.64	5	46	-

Table S3: Iron concentrations of the different fractions for the Lena River freshwater plume.

Station	Location	Particulate μM	Colloidal μM	Truly dissolved nM	Total μM	pFe/cFe mol ratio
YS-128	Lena transect; Laptev Sea	0.1	0.1	8	0.2	1
YS-4	Lena transect	0.5	0.3	7	0.8	2
YS-5	Lena transect	-	-	-	-	-
YS-6	Lena transect	0.7	0.6	-	1.3	1
YS-7	Lena transect	-	-	-	-	-
YS-8	Lena transect	0.9	0.8	-	1.7	1
YS-9	Lena transect	-	-	-	-	-
YS-10	Lena transect	-	-	-	-	-
YS-11	Lena transect	34.0	0.6	9	35.0	56
YS-14	Lena transect; Mohtaba Island	56.0	0.6	1	57.0	90

Total Fe is calculated as a sum of particulate, colloidal, and truly dissolved Fe

Table S4: Iron isotope values for the different fractions.

Particulate >0.22µm						
Station	**$\delta^{56/54}$Fe**	**2σ**	**$\delta^{57/54}$Fe**	**2σ**	**$\delta^{57/56}$Fe**	**2σ**
	‰	‰	‰	‰	‰	‰
YS-128	-0.289	0.050	-0.487	0.024	-0.168	0.058
YS-4	-0.406	0.126	-0.735	0.114	-0.196	0.170
YS-6	-0.360	0.014	-0.644	0.082	-0.191	0.078
YS-8	-0.130	0.008	-0.266	0.136	-0.094	0.140
YS-11	-0.067	0.040	-0.106	0.008	-0.035	0.050
YS-14	-0.048	0.106	-0.097	0.114	-0.051	0.098

Colloidal 1kDa-0.22µm						
Station	**$\delta^{56/54}$Fe**	**2σ**	**$\delta^{57/54}$Fe**	**2σ**	**$\delta^{57/56}$Fe**	**2σ**
	‰	‰	‰	‰	‰	‰
YS-128	0.112	0.069	0.233	0.050	0.106	0.094
YS-4	0.102	0.079	0.277	0.038	0.098	0.136
YS-11	-0.227	0.089	-0.312	0.298	-0.084	0.204
YS-14	-0.171	0.015	-0.267	0.030	-0.120	0.084

Surface Sediment						
Station	**$\delta^{56/54}$Fe**	**2σ**	**$\delta^{57/54}$Fe**	**2σ**	**$\delta^{57/56}$Fe**	**2σ**
	‰	‰	‰	‰	‰	‰
YS-13	-0.233	0.070	-0.324	0.006	-0.093	0.006
YS-4	-0.220	0.040	-0.355	0.028	-0.125	0.028
YS-26	-0.209	0.002	-0.298	0.116	-0.082	0.156
YS-14	-0.250	0.110	-0.404	0.100	-0.014	0.100
YS-2	-0.351	0.150	-0.439	0.102	-0.177	0.098
YS-3	-0.230	0.024	-0.396	0.106	-0.152	0.106
YS-11	-0.083	0.022	-0.209	0.094	-0.067	0.078
YS-28	-0.131	0.074	-0.220	0.118	-0.071	0.082
YS-30	-0.102	0.028	-0.185	0.088	-0.073	0.084
YS-39	-0.241	0.086	-0.403	0.124	-0.138	0.064