Supplementary Materials for the research article "*Meltwater as a source of potentially bioavailable iron to Antarctica waters*"

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Table S2. Basic calculation parameters (areas, lengths of coastlines) of Potter Cove (PC), King George Island (KGI) and South Shetland Islands (SSI).

		PC	KGI	SSI
Area$_{total}$	km^2	7.1	1,150	3,700
Area$_{ice-free}$	km^2	1.3	115	740
Area$_{ice-capped}$	km^2	12	1,035	2,960
Length$_{coastline}$	km	11	500	1,500
Area$_{sea}$	km^2	7.1	9,700*	2.5 x 10^4*

*after Ardelan *et al.* (2010)

Table S3. Parameters for the calculation of SPM and ascorbate leachable iron (*Fe$_A$*) export from Potter Cove (PC) and Potter Peninsula.

*SPM PC$_{surficial}$***	tonnes	3,000
Average sediment accumulation rate (*SAR*) in PC (^{210}Pb approach)	g m^{-2} yr^{-1}	3,300
*Export rate$_{SPM\ PC}$****	%	15
Fe$_A$ (fraction of ascorbate leachable Fe from total sediment amount)	wt.%	0.03

** this study, *** estimated from sediment trap data (this study).

Table S4. Estimation for the annual export of suspended particulate matter (SPM) from Potter Cove (PC), King George Island (KGI) and the South Shetland Islands (SSI) based on the results of this study.

SPM PC$_{export}$	tonnes	2.3×10^4
SPM KGI$_{export}$	tonnes	2.0×10^6
SPM SSI$_{export}$	tonnes	6.7×10^6

Table S5. Extrapolation of the export of ascorbate leachable iron (Fe$_A$) by surficial SPM transport from King George Island (KGI) and the South Shetland Islands (SSI) using an area based and coastline based approach.

KGI Fe$_{A\ (export)}$ (area based)	mg m^{-2} yr^{-1}	9
SSI Fe$_{A\ (export)}$ (area based)	mg m^{-2} yr^{-1}	12
KGI Fe$_{A\ (export)}$ (coastline based)	mg m^{-2} yr^{-1}	5
SSI Fe$_{A\ (export)}$ (coastline based)	mg m^{-2} yr^{-1}	6

Equations for the extrapolation of the export of suspended particulate matter (SPM) from Potter Cove (PC), King George Island (KGI) and the South Shetland Islands (SSI) based on the island areas:

$$SPM\ PC_{export} = \frac{\left(SPM\ PC_{surficial} + SPM\ PC_{subglacial}\right) \cdot \%Export_{SPM\ PC}}{100} \quad (S1)$$

$$SPM\ KGI_{export} = \frac{\left(SPM\ PC_{surficial} \cdot \dfrac{Area\ KGI_{ice-free}}{Area\ PC_{ice-free}} + SPM\ PC_{subglacial} \cdot \dfrac{Area\ KGI_{ice-capped}}{Area\ PC_{ice-capped}}\right) \cdot \%Export_{SPM\ PC}}{100} \quad (S2)$$

$$SPM\ SSI_{export} = \frac{\left(SPM\ PC_{surficial} \cdot \dfrac{Area\ SSI_{ice-free}}{Area\ PC_{ice-free}} + SPM\ PC_{subglacial} \cdot \dfrac{Area\ SSI_{ice-capped}}{Area\ PC_{ice-capped}}\right) \cdot \%Export_{SPM\ PC}}{100} \quad (S3)$$

Equations for the extrapolation of the export of ascorbate leachable iron (Fe$_A$) from King George Island (KGI) using an area based approach:

$$KGI\ Fe_{A\,(\text{export})} = \left(\frac{\left(SPM\ KGI_{\text{export}} \cdot Fe_A \right)}{Area\ KGI_{sea}} \right) \cdot 1000 \tag{S4}$$

$$SSI\ Fe_{A\,(\text{export})} = \left(\frac{\left(SPM\ SSI_{\text{export}} \cdot Fe_A \right)}{Area\ SSI_{sea}} \right) \cdot 1000 \tag{S5}$$

Equations for the extrapolation of the export of ascorbate leachable (Fe$_A$) from King George Island (KGI) using a coastline approach:

$$KGI\ Fe_{A\,(\text{export})} = \left(\frac{\left(SPM\ PC_{\text{export}} \cdot Fe_A \cdot \dfrac{length_{coastline\ PC}}{length_{coastline\ KGI}} \right)}{Area\ KGI_{sea}} \right) \cdot 1000 \tag{S6}$$

$$SSI\ Fe_{A\,(\text{export})} = \left(\frac{\left(SPM\ PC_{\text{export}} \cdot Fe_A \cdot \dfrac{length_{coastline\ KGI}}{length_{coastline\ SSI}} \right)}{Area\ SSI_{sea}} \right) \cdot 1000 \tag{S7}$$