SUPPLEMENTARY INFORMATION
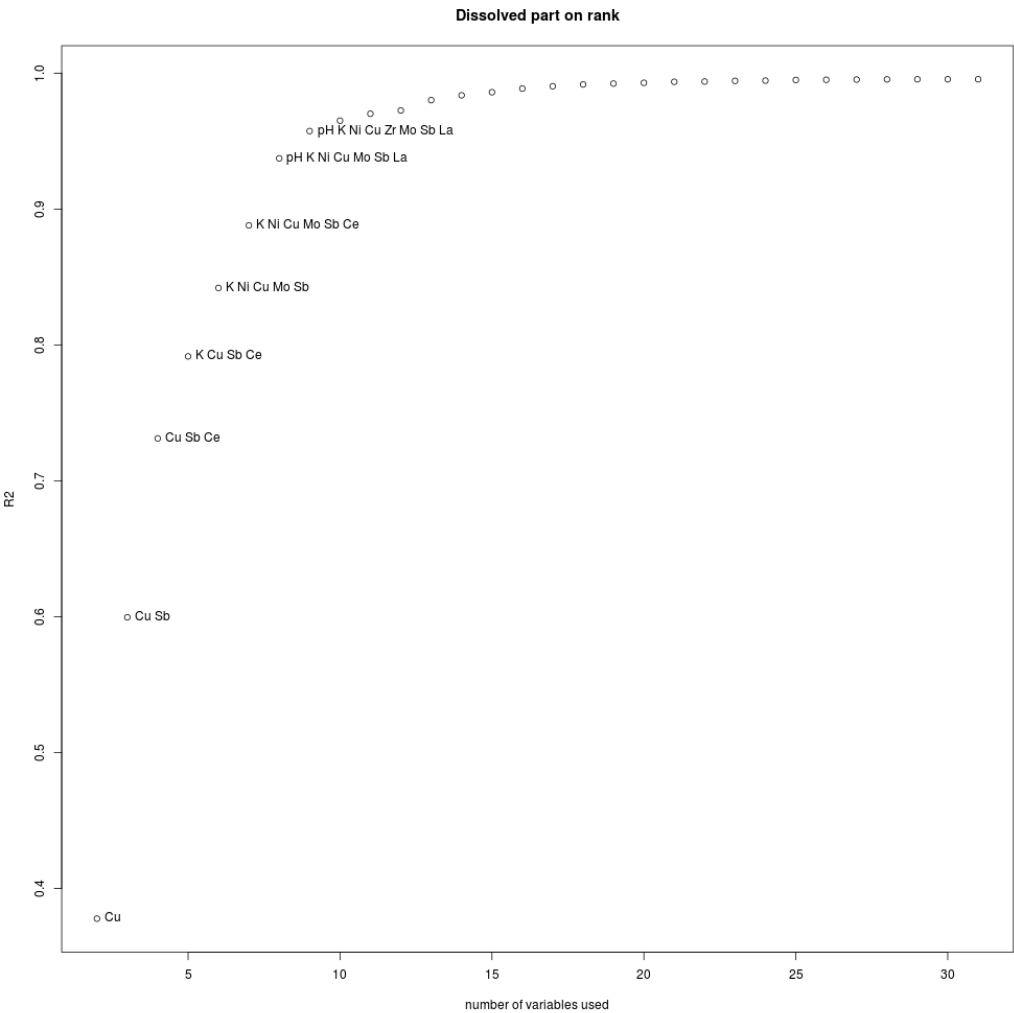

Figure S1. Evolution of correlation coefficient as a function of number of variables (elements) used for multiple linear regression of dissolved fraction of snow water.
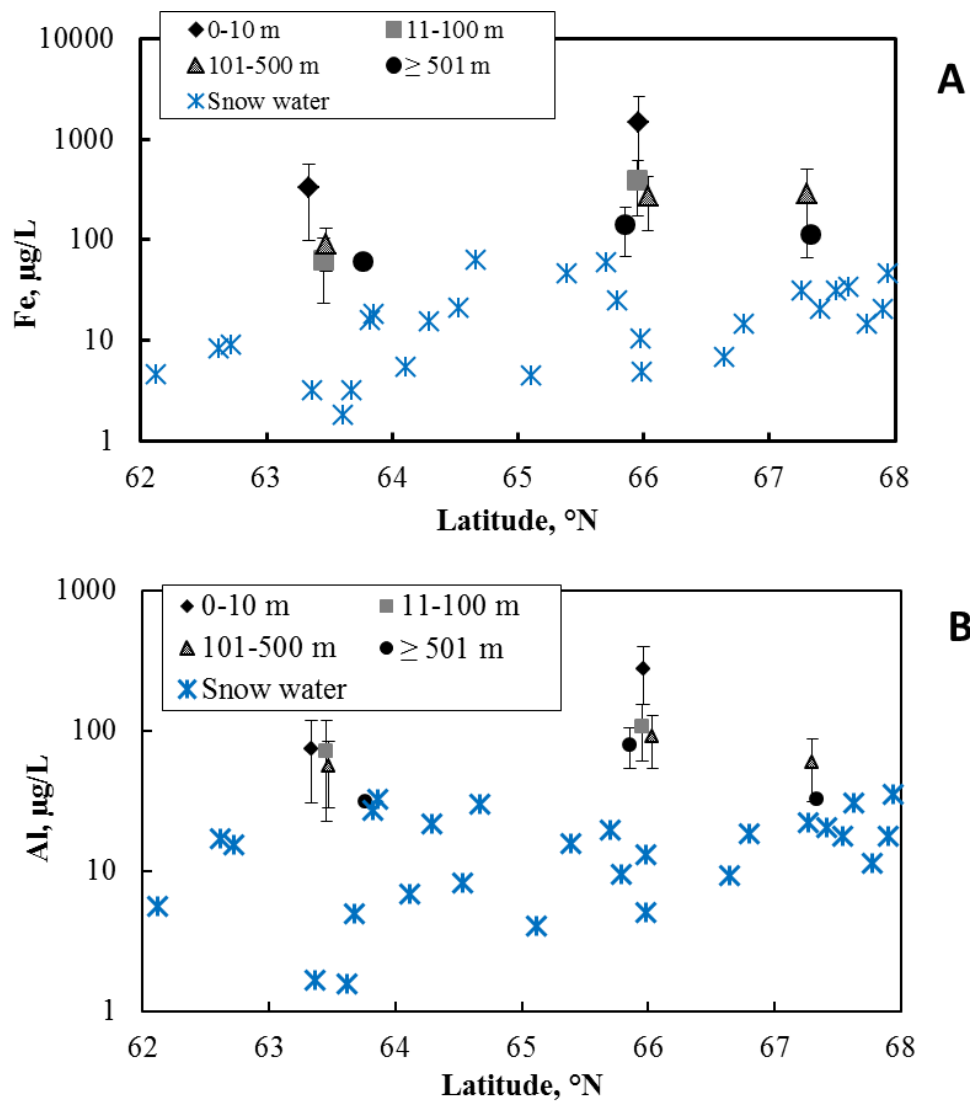
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Figure S2. Snow water soluble (< 0.45 µm) concentration of Fe and Al (blue asterisk) compared with average concentrations in thermokarst lakes of different size in western Siberia (closed symbols) along the latitudinal gradient.
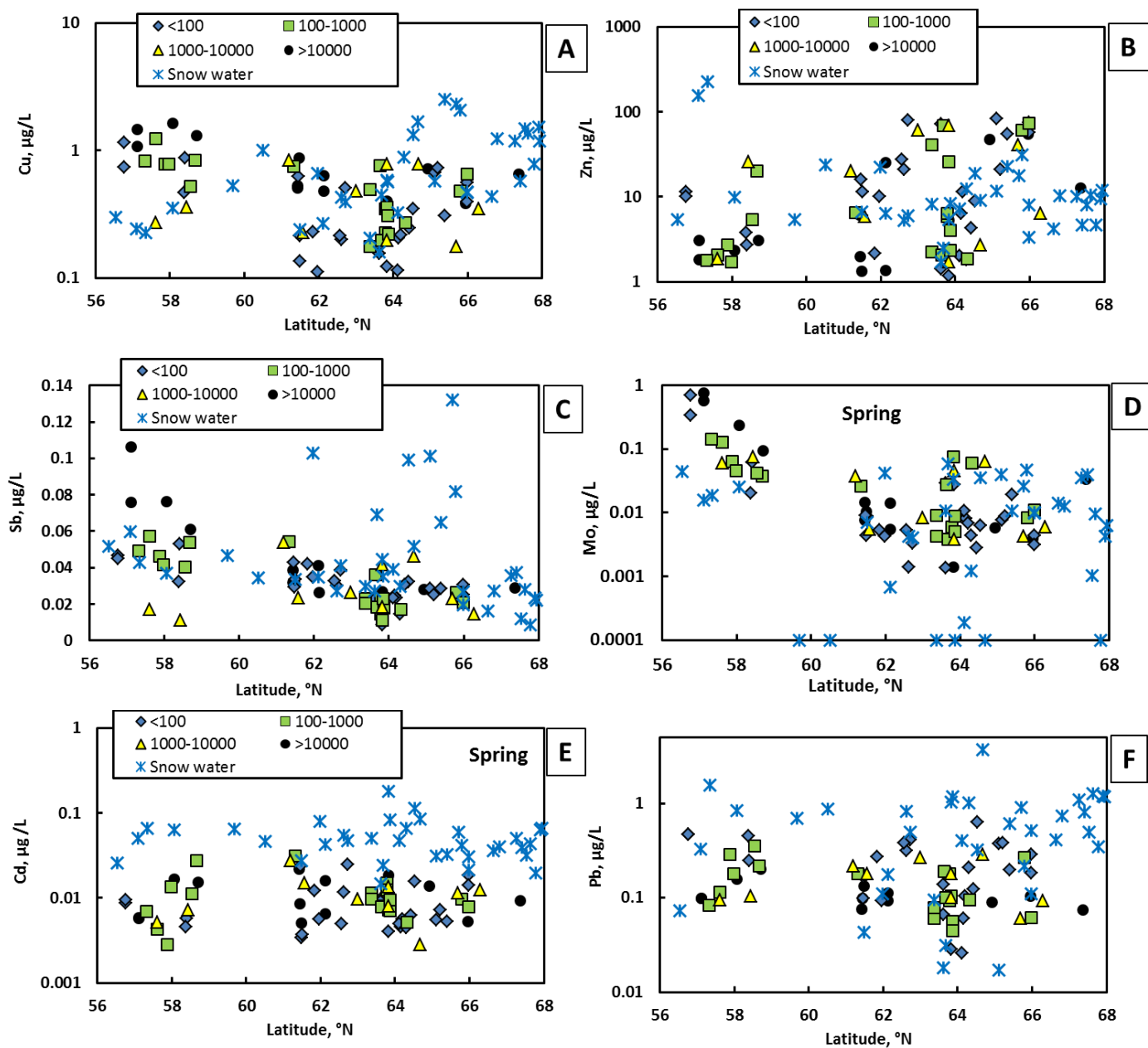
**Figure S3.** Snow water soluble (< 0.45 μm) of Zn (A), Cu (B), Cd (C), Pb (D), Sb (E) and Mo (F) (blue asterisk) compared with actual concentrations in rivers during spring flood (May-June) of different size of the watershed (closed diamonds, squares, triangles and circles correspond to < 100, 100-1000, 1000-10,000 and > 10,000 km² surface area, respectively) in western Siberia along the latitudinal gradient.

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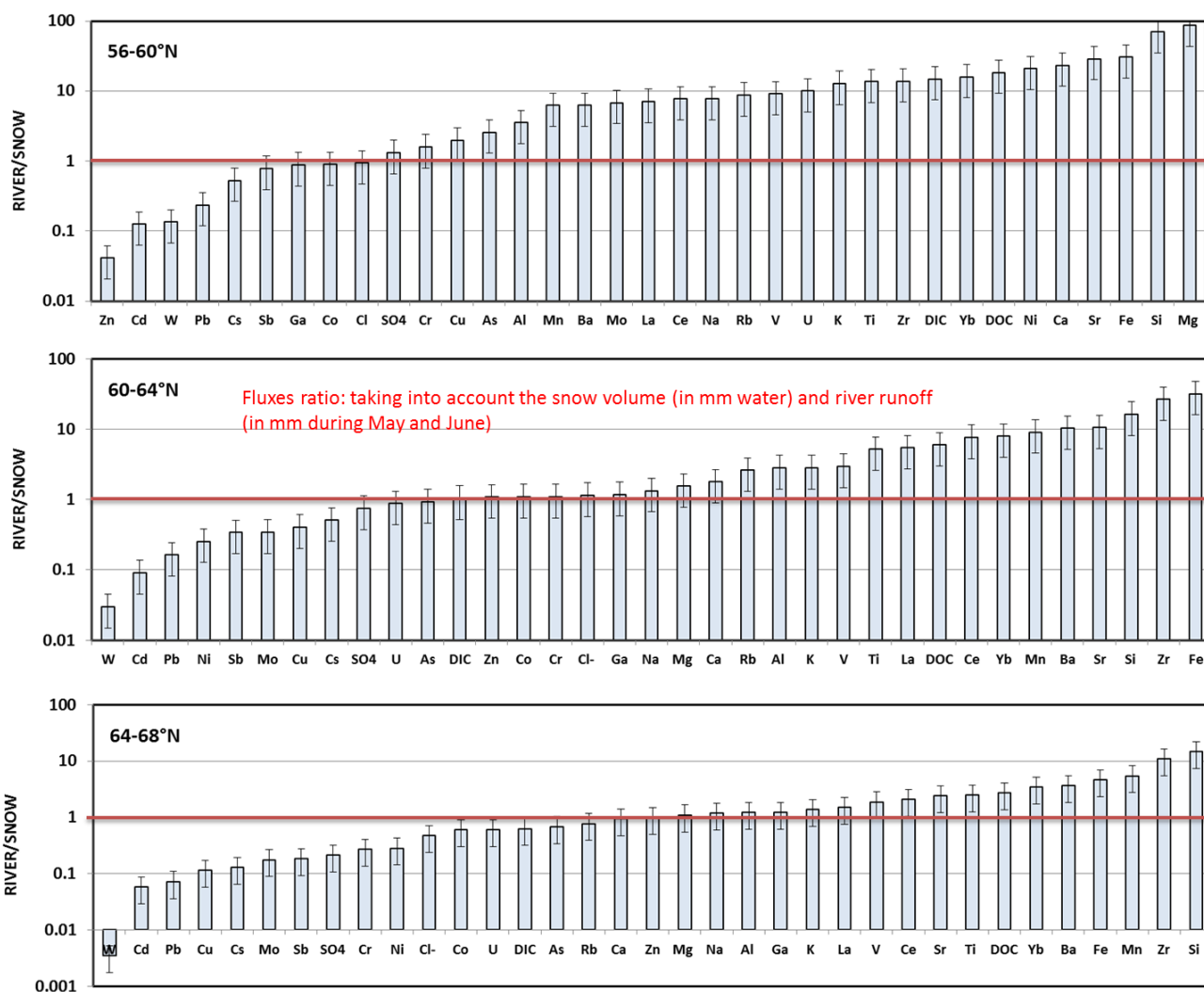
Figure S4. The ratio of mean dissolved flux of rivers in three latitudinal zones (56-60°N, 60-64°N, and 64-68°N) of WSL to the stock of dissolved fraction of snow. For this calculation, the snow volume (in mm of water) accumulated over full winter and mean river runoff in May and June were used.
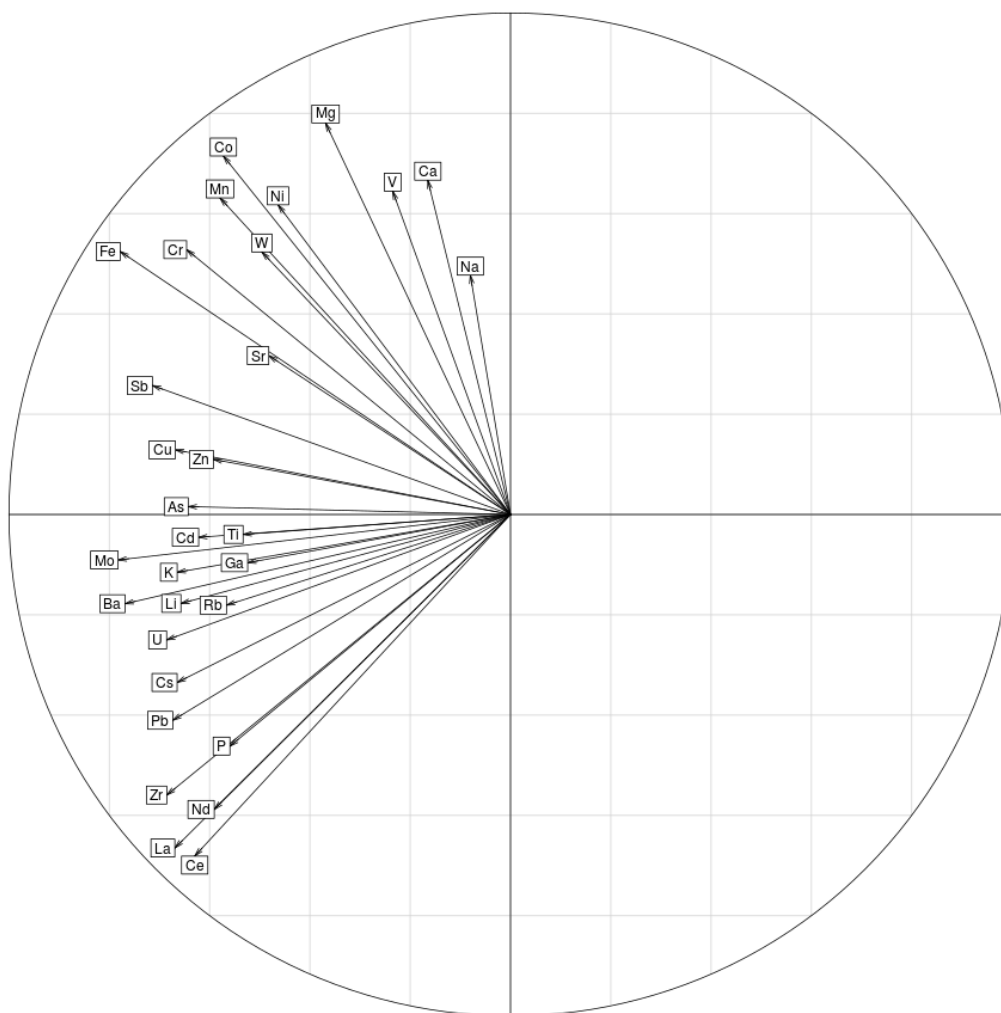
particulate part on rank

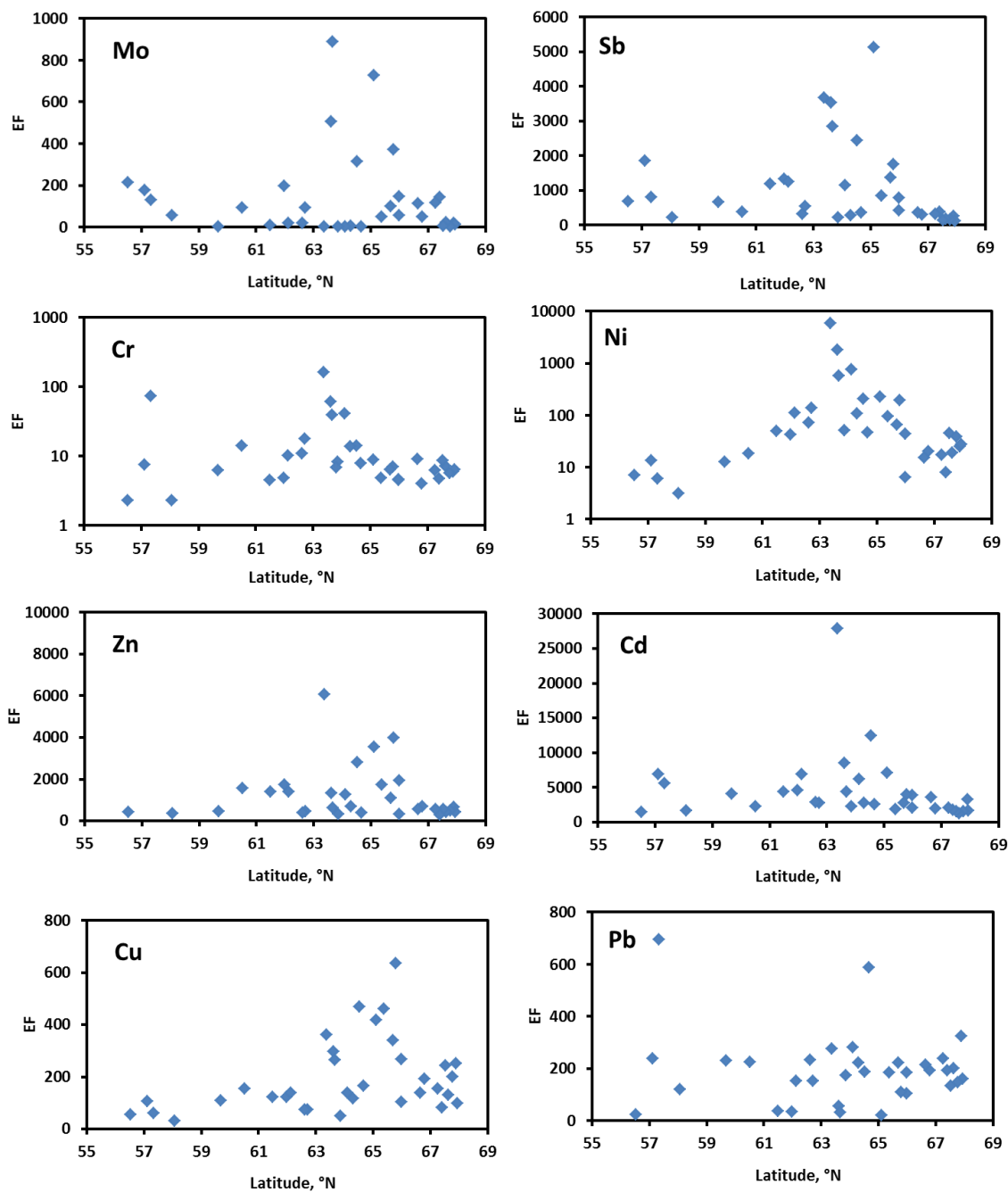5   **Figure S5.** PCA Factorial map F1xF2 of variables (elements) for the particulate fraction

Figure S6. The enrichment factor (relative to the upper part of continental earth crust) of particulate fraction of snow for Mo, Sb, Cr, Ni, Zn, Cd, Cu and Pb as a function of latitude.
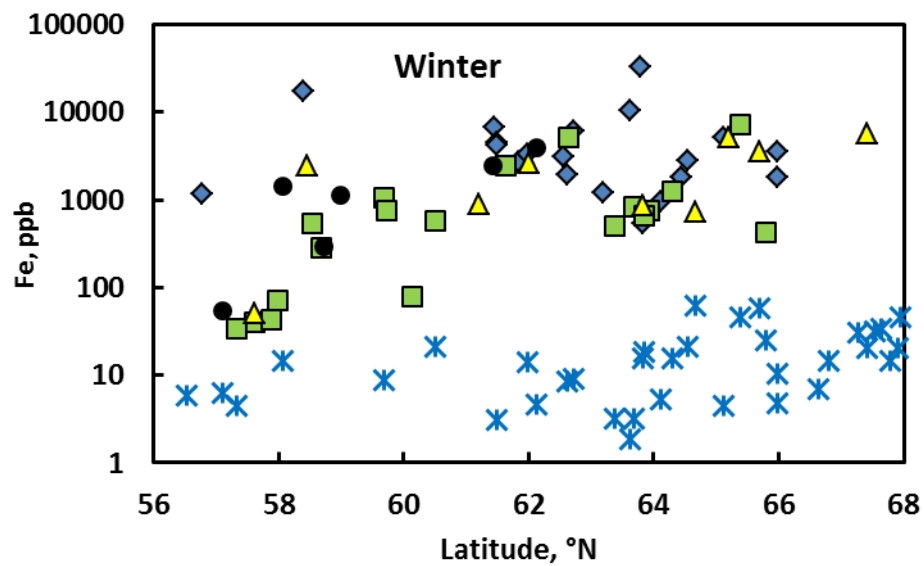
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Figure S7. Comparison of Fe concentrations in rivers of different size watershed in snow water (< 0.45 μm) sampled in February- March 2014 across the WSL. See the legend for symbols in Fig S3. Note an increase in concentration north of 63-64°N, for both rivers and snow water.

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Table S1. Mineralogical composition of selected snow particles.

No	Quartz	Albite	K-Fs	Calcite	Dolomite	Chlorite	Illite	Phlogopite	Amphibole	Pyroxyne	Chrisotyle	Magnesite	Forsterite	Talc	Magnetite
SF-1	37	20	11	19	< 1	4	7		2						
SF-3	38	27	9	3		10	9		3						
SF-14	20	8	6	1	48	5	4		3	1	2			1	
SF-31	30	20	12		8	8		12	6		3				
SF-33	35	16	9		10	3		16	4		3	4			
SF-36	47	7	11		1	4		5	3	3	12		4	3	
SF-38	48	3	6		1	6		4	3		16		6	4	3
SF-39	41	8	6	4	8	5		12	2	2	8		2	2	
SF-40	35	12	9	6	3	4		8	4	3	10		4	2	

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