

1 Electronic Supplementary Information (ESI)

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3 Mercury methylation and methylmercury demethylation in boreal  
4 lake sediment with legacy sulphate pollution

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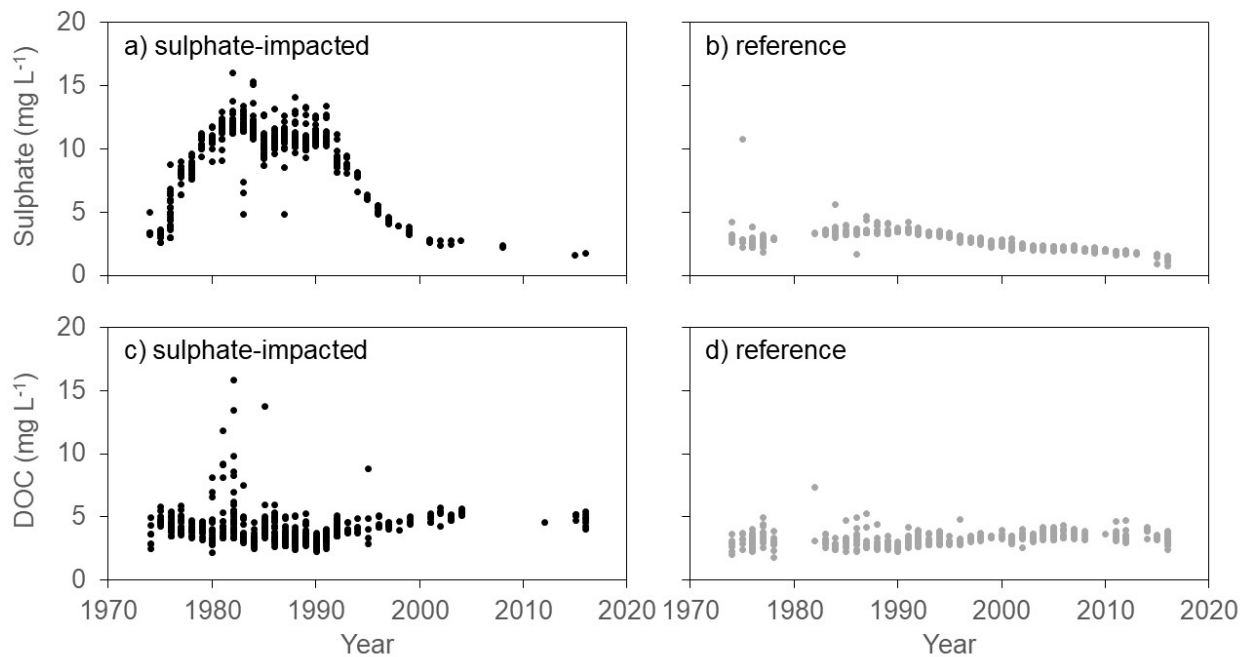
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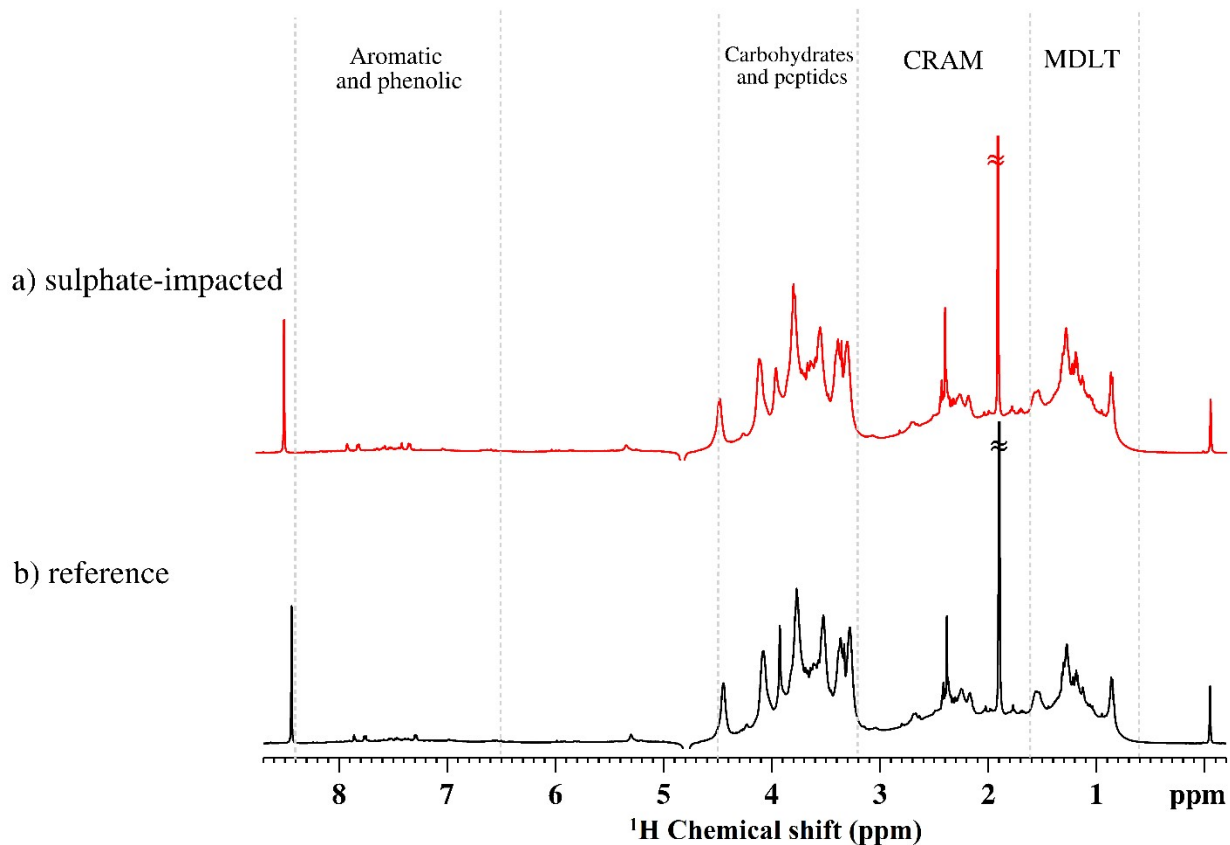
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17 Figure S1. Time series analysis of concentrations of sulphate and DOC in the sulphate-impacted  
 18 lake (a and c, black) and the reference lake (b and d, grey). Each dot represents a measurement in  
 19 the epilimnetic water. Data of the sulphate-impacted lake came from the monitoring programs of  
 20 the historical experimental manipulations; data of the reference lake came from an IISD-ELA  
 21 Long-Term Ecological Research monitoring program.

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24 Figure S2. Analysis of a) sulphate-impacted and b) reference lake water DOM compositions  
 25 using NMR spectroscopy. <sup>1</sup>H NMR spectra integrated into four main classes of DOM  
 26 components based on the chemical shift values: MDLT (materials derived from linear  
 27 terpenoids), 0.6–1.6 ppm; CRAM (carboxyl-rich alicyclic molecules), 1.6–3.2 ppm;  
 28 carbohydrates and peptides, 3.2–4.5 ppm; and aromatic and phenolic components, 6.5–8.4 ppm.

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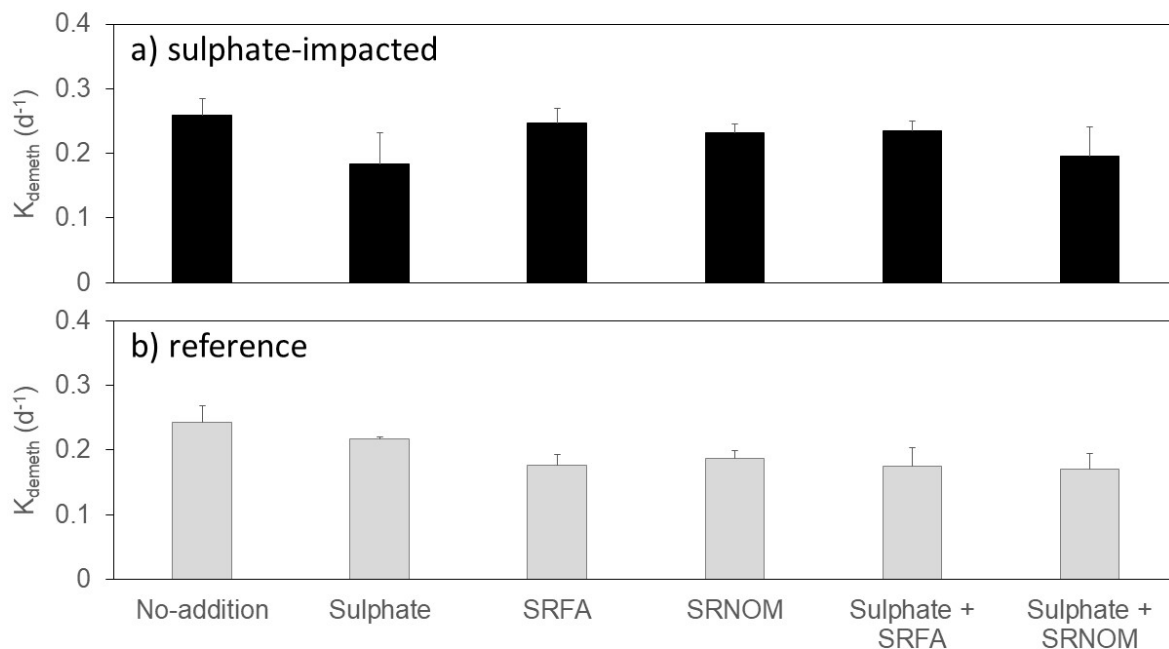
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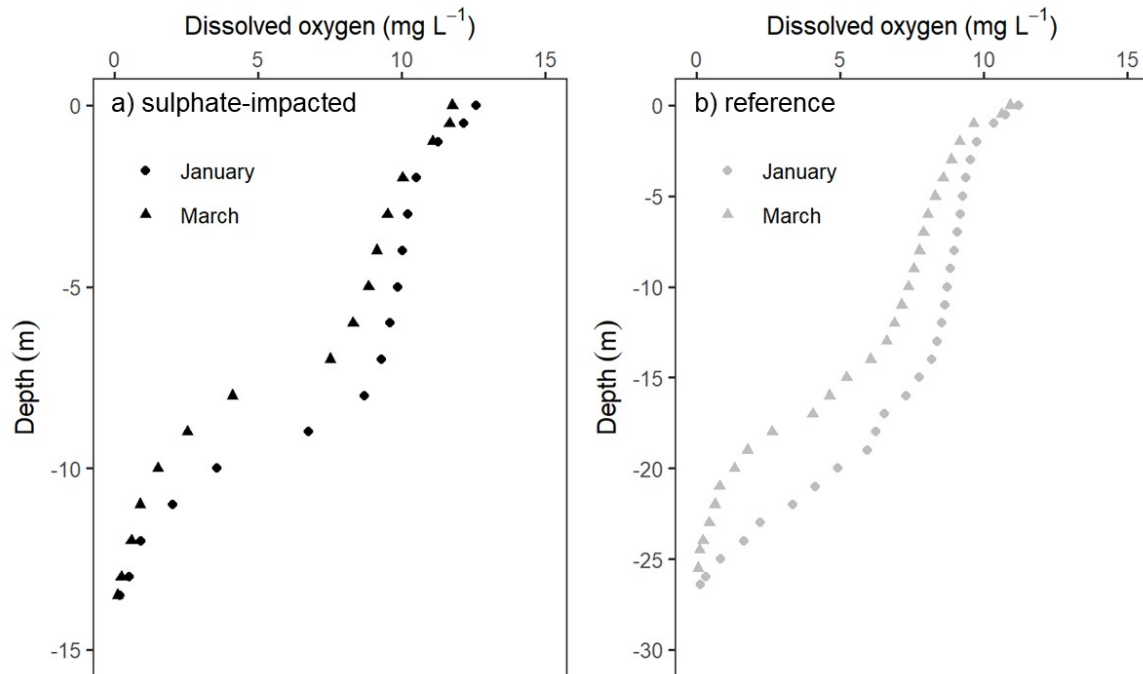


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Figu

37 re S3.  $K_{\text{demeth}}$  in a) sulphate-impacted and b) reference lake sediment with singular additions of  
 38 sulphate ( $\text{Na}_2\text{SO}_4$ ,  $300\mu\text{M}$ ), SRFA (low sulphur content,  $600\mu\text{M}$  carbon), SRNOM (high sulphur  
 39 content,  $600\mu\text{M}$  carbon) and combined additions of sulphate and SRFA or sulphate and SRNOM  
 40 as compared with no-addition control. Error bars represent one standard error of replicate (n=3)  
 41 experiments.

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44 Figure S4. Depth profiles of dissolved oxygen concentrations during winter 2018 in a) sulphate-  
 45 impacted and b) reference lake water. All data are from the IISD-ELA Long-Term Ecological  
 46 Research monitoring program.

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