

Title: Drying and rewetting of riverbed sediments results in cold to neutral biogeochemical moments

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Table S1. Regression coefficients for LASSO models explaining variation in the effect size of O₂ consumption without removing the Fe²⁺ outlier. All input variables were cube root transformed to reduce the impact of high leverage points in the regression analysis and standardized as z-scores to enable direct comparison of the regression coefficients. The LASSO model was fit over 100 seeds. Reported mean regression coefficients (β) and R² were averaged for the reported values. Normalized regression coefficients were calculated by dividing each β coefficient by the maximum β coefficient in each seed. Standard deviation (sd) was calculated for each coefficient over the 100 seeds. Values of 0 indicate that the variable was included in the model but not assigned a β coefficient

| R ² = 0.43 | β Coefficient | sd |
|---|---------------------|-------|
| Fine Sand (%) ^{1/3} | 1.0000 | 0 |
| Median ATP (picomol g ⁻¹) ^{1/3} | 0.90 | 0.02 |
| Median TN (%) ^{1/3} | 0.27 | 0.1 |
| Median SpC (μ S cm ⁻¹) ^{1/3} | 0.17 | 0.1 |
| Median TOC (%) ^{1/3} | 0.09 | 0.07 |
| Effect Size TOC (%) ^{1/3} | 0.002 | 0.01 |
| Effect Size Fe (mg kg ⁻¹) ^{1/3} | 0.0004 | 0.004 |
| Effect Size ATP (picomol g ⁻¹) ^{1/3} | 0 | 0 |
| Effect Size Extractable TDN (mg kg ⁻¹) ^{1/3} | 0 | 0 |
| Effect Size Temperature (°C) ^{1/3} | 0 | 0 |
| Effect Size TN (%) ^{1/3} | 0 | 0 |
| Total Sand (%) ^{1/3} | 0 | 0 |
| Coarse Sand (%) ^{1/3} | 0 | 0 |

| | | |
|---|---------|-------|
| Clay (%) ^{1/3} | 0 | 0 |
| Median pH ^{1/3} | 0 | 0 |
| Median Temperature (°C) ^{1/3} | 0 | 0 |
| Median Fe (II) (mg kg ⁻¹) ^{1/3} | 0 | 0 |
| Median Extractable NPOC (mg kg ⁻¹) ^{1/3} | 0 | 0 |
| Median Extractable TDN (mg kg ⁻¹) ^{1/3} | 0 | 0 |
| Specific Surface Area (m ² g ⁻¹) ^{1/3} | 0 | 0 |
| Median Initial Dry Gravimetric Moisture (g g ⁻¹) ^{1/3} | 0 | 0 |
| Median Final Dry Gravimetric Moisture (g g ⁻¹) ^{1/3} | 0 | 0 |
| Effect Size pH ^{1/3} | -0.0005 | 0.005 |
| Effect Size Extractable NPOC (mg kg ⁻¹) ^{1/3} | -0.0002 | 0.002 |
| Medium Sand (%) ^{1/3} | -0.019 | 0.045 |
| Effect Size Specific Conductivity (μS cm ⁻¹) ^{1/3} | -0.0146 | 0 |
| Coarse Sand (%) ^{1/3} | -0.23 | 0.017 |