Supplement of Biogeosciences, 20, 2857–2867, 2023
https://doi.org/10.5194/bg-20-2857-2023-supplement

Biogeosciences Open Access EGU

Supplement of

Maximum respiration rates in hyporheic zone sediments are primarily constrained by organic carbon concentration and secondarily by organic matter chemistry

James C. Stegen et al.

Correspondence to: James C. Stegen (james.stegen@pnnl.gov)

Supplementary Materials

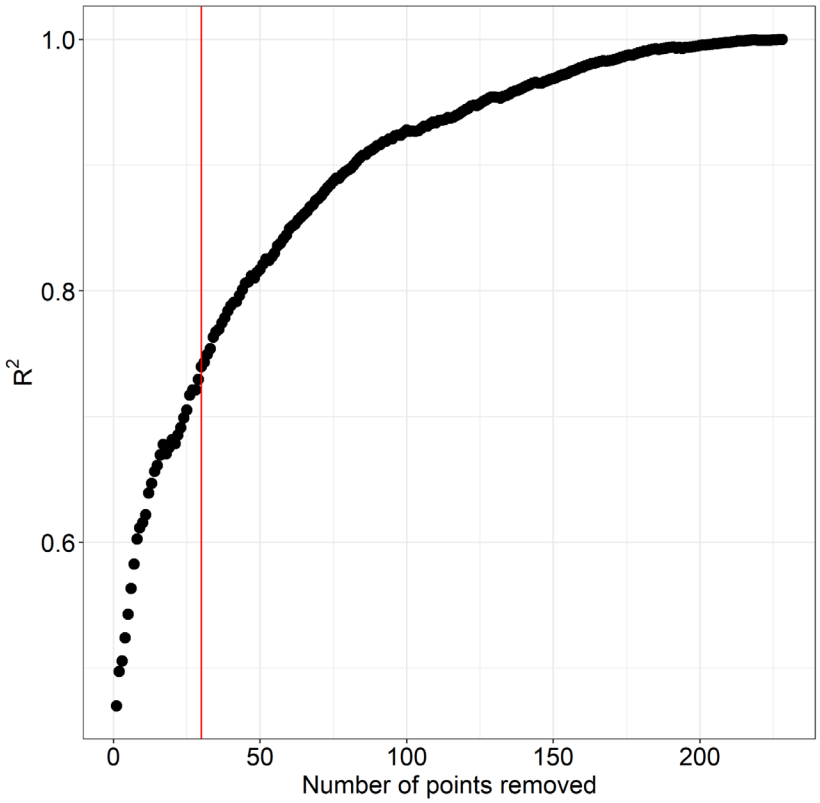

Figure S1: Coefficient of determination (R^2) of the log-transformed Field Non-purgeable organic matter (NPOC) vs. Incubation NPOC regression as a function of the number of sample points removed in the regression analysis. The red line represents the half saturation value and indicates the number of samples to remove to reach an optimal R^2 that balances the number of points (i.e., samples) to remove and the increase in confidence in the NPOC, and thus OM richness, data.

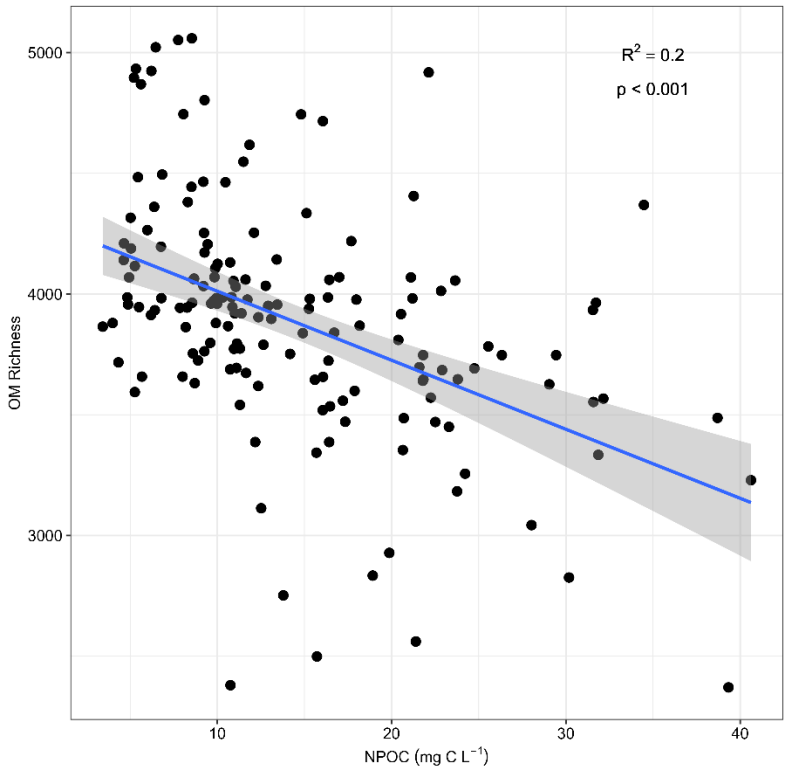

Figure S2: OM richness and Non-purgeable organic matter (NPOC) are weakly but significantly related to each other. Coefficient of determination (R^2) and p-value in the plot were calculated via ordinary least-square regressions. The associated model and its 95% confidence interval are shown as the solid line and gray shading, respectively.

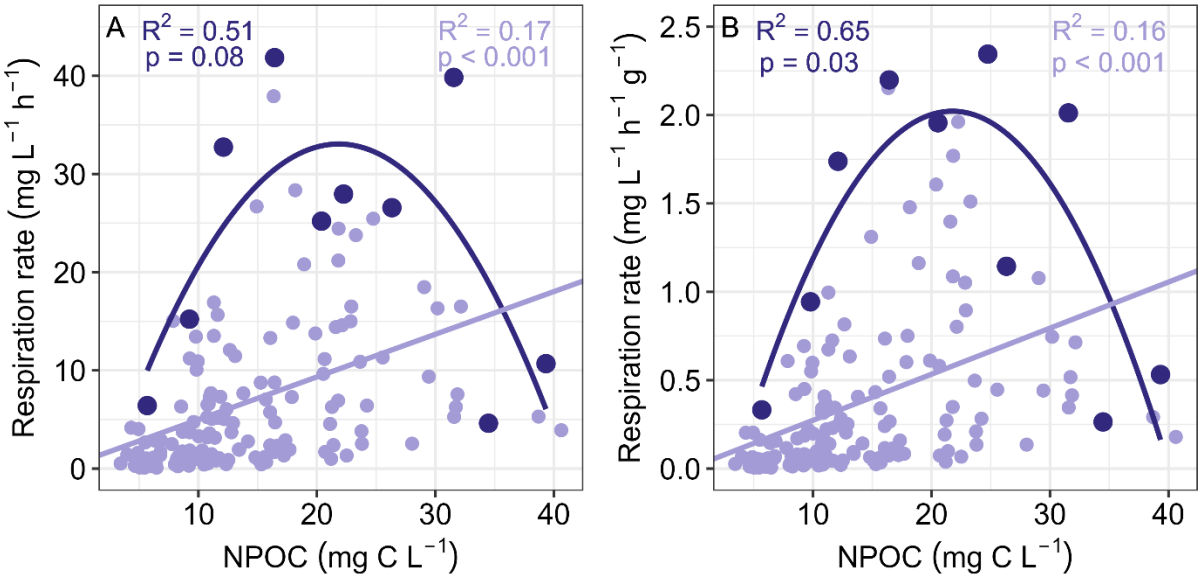

Figure S3. Sediment respiration vs non-purgeable organic carbon concentration (NPOC). Panels A and B are for respiration that was either not normalized or normalized by sediment mass, respectively. Quadratic regression models with maximum respiration rates are shown in dark purple. Linear regression models based on all respiration and NPOC values are shown in light purple.

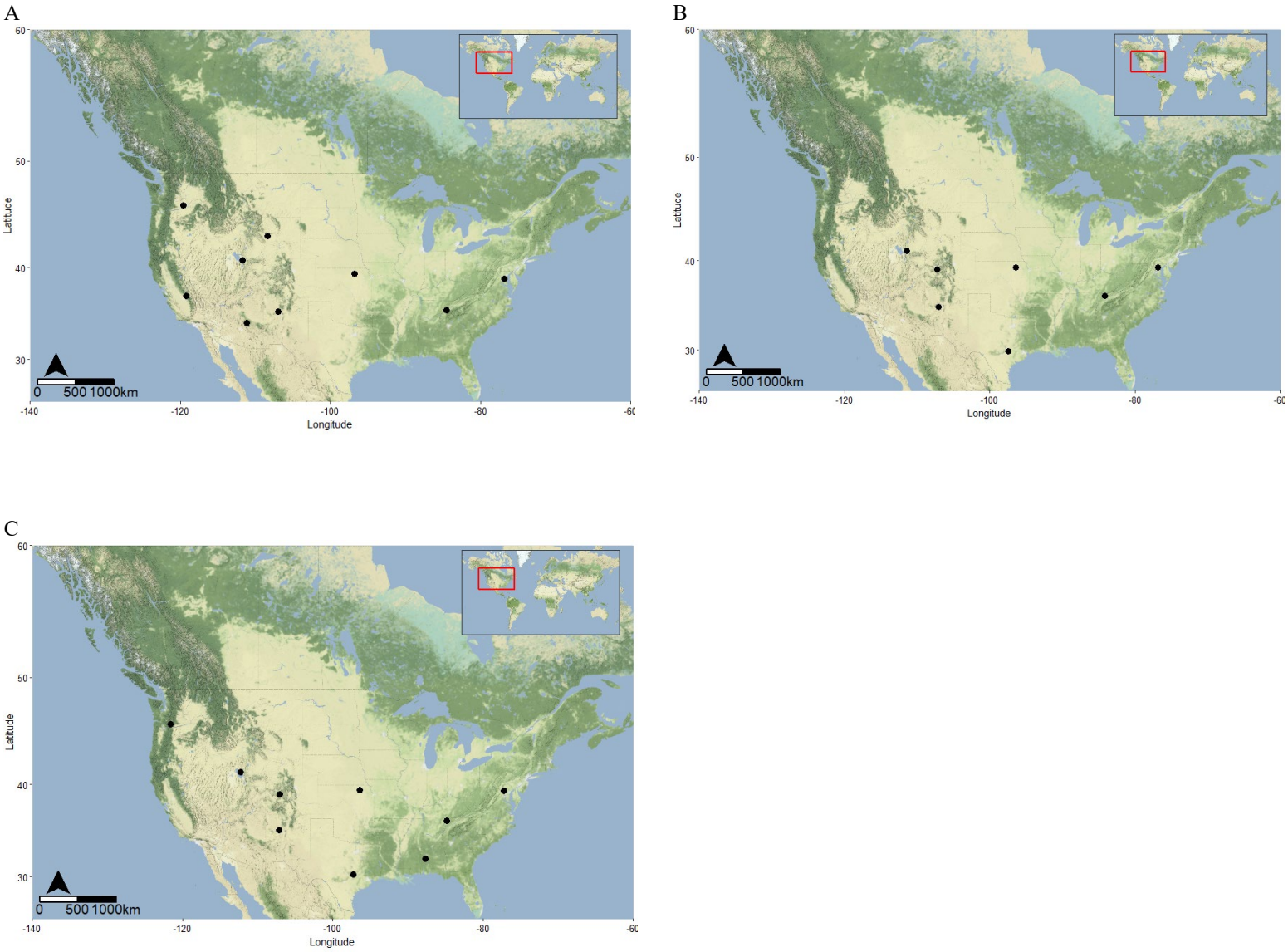

Figure S4. Spatial distribution of sampling locations with samples that defined the constraint space of respiration rates. The values presented in panel A) correspond to Figure 3, B) Figure 4 and C) Figure 5. The maps were generated using R via function get_stamenmap in package ggmap (Kahle et al., 2013). Map tiles by Stamen Design, under CC BY 3.0, and the base map is copyrighted: ©OpenStreetMap contributors 2022. The base map is distributed under the Open Data Commons Open Database 504 License (ODbL) v1.0.

Table S1. Negative exponential regression model statistics based on all respiration values presented on Figure 4 and Figure 5.

Exponential Regression	R^2	p-value
Respiration rate (mg L^{-1} h^{-1}) ~ OM Richness/NPOC (mg C L^{-1})	0.34	<< 0.001
Respiration rate (mg L^{-1} h^{-1} g^{-1}) ~ OM Richness/NPOC (mg C L^{-1})	0.33	<<0.001
Respiration rate (mg L^{-1} h^{-1}) ~ 1/NPOC (mg C L^{-1})	0.32	<<0.001
Respiration rate (mg L^{-1} h^{-1} g^{-1}) ~ 1/NPOC (mg C L^{-1})	0.32	<<0.001