

Title: Basin-scale connections between reach-scale sediment respiration and point-scale organic-matter decomposition

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Table S1. Regression coefficients for LASSO results explaining variation in K_{dd} and K_{cd}. All predictor 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 regressions were performed over 100 seeds. Reported mean regression coefficients (β) and R² were averaged across the 100 seeds. 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. Coefficient of variation (cv) was calculated as standard deviation divided by the mean.

Response Variable		Predictor	Mean β	sd	cv
K _{dd}	Normalized	Water TDN	1	0	0
		D50	-0.699	0.0867	-0.124
		Calcium	0.46	0.00814	0.018
		Sulfate	0.36	0.094	0.261
		Percent N	-0.125	0.108	-0.868
		Sediment TN	0.0717	0.0632	0.881
		Drainage Area	0.000356	0.00123	3.46
		Iron	0	0	
		Sediment Respiration	0	0	
		Total Ecosystem Respiration	0	0	
		Water Column Respiration	0	0	
		Gross Primary Production	0	0	
		Slope	0	0	
		Discharge	0	0	
		Velocity	0	0	

		Percent Forest Cover	0	0	
		Aridity	0	0	
		Percent Agricultural Cover	0	0	
		Percent Shrub Cover	0	0	
		Minimum Elevation	0	0	
		TSS	0	0	
		Depth	0	0	
		Water NPOC	0	0	
		Sediment NPOC	0	0	
		Percent C	0	0	
		Chloride	0	0	
		Respiration (Lab)	0	0	
		Percent Sand	0	0	
K _{dd}	Not Normalized	Water TDN	0.262	0.00359	0.014
		D50	-0.184	0.0246	-0.134
		Calcium	0.121	0.0026	0.022
		Sulfate	0.0948	0.0254	0.268
		Percent N	-0.0329	0.0285	-0.868
		Sediment TN	0.0189	0.0167	0.882
		Drainage Area	9.41E-05	0.000326	3.46
		Iron	0	0	
		Sediment Respiration	0	0	
		Total Ecosystem Respiration	0	0	
		Water Column Respiration	0	0	
		Gross Primary Production	0	0	
		Slope	0	0	
		Discharge	0	0	
		Velocity	0	0	
		Percent Forest Cover	0	0	
		Aridity	0	0	
		Percent Agricultural Cover	0	0	
		Percent Shrub Cover	0	0	
		Minimum Elevation	0	0	
		TSS	0	0	
		Depth	0	0	
		Water NPOC	0	0	
		Sediment NPOC	0	0	
		Percent C	0	0	

		Chloride	0	0	
		Respiration (Lab)	0	0	
		Percent Sand	0	0	
K _{cd}	Normalized	Aridity	-0.959	0.0645	-0.067
		Water TDN	0.805	0.156	0.193
		Depth	0.385	0.324	0.843
		Calcium	0.362	0.0746	0.206
		Summed Temperature	-0.317	0.256	-0.81
		Sulfate	0.289	0.212	0.733
		Sediment TN	0.194	0.138	0.715
		Iron	-0.169	0.206	-1.22
		Percent N	-0.166	0.124	-0.747
		Slope	0.15	0.207	1.38
		D50	-0.14	0.114	-0.81
		TSS	0.114	0.146	1.28
		Sediment NPOC	-0.0948	0.175	-1.84
		Drainage Area	0.0747	0.073	0.976
		Chloride	-0.0674	0.0714	-1.06
		Gross Primary Production	0.0613	0.139	2.26
		Respiration (Lab)	-0.0552	0.0986	-1.78
		Percent C	-0.0513	0.0828	-1.61
		Sediment Respiration	0.0434	0.0786	1.81
		Water Column Respiration	-0.038	0.0411	-1.08
		Water NPOC	-0.0353	0.0655	-1.85
		Percent Shrub Cover	-0.0314	0.0439	-1.4
		Percent Agricultural Cover	-0.0298	0.0547	-1.83
		Percent Forest Cover	0.00417	0.0142	3.42
		Velocity	-0.00315	0.00737	-2.34
		Total Ecosystem Respiration	-0.00048	0.00167	-3.46
		Discharge	0	0	
		Minimum Elevation	0	0	
		Percent Sand	0	0	
K _{cd}	Not Normalized	Aridity	-0.444	0.196	-0.442
		Water TDN	0.352	0.129	0.367
		Depth	0.228	0.228	0.998
		Summed Temperature	-0.184	0.171	-0.926
		Calcium	0.174	0.105	0.604
		Iron	-0.111	0.145	-1.31
		Sediment TN	0.108	0.106	0.986

Slope	0.101	0.144	1.43
Sulfate	0.0987	0.0684	0.693
TSS	0.0757	0.104	1.37
Percent N	-0.0695	0.046	-0.662
Sediment NPOC	-0.0674	0.125	-1.86
D50	-0.047	0.0242	-0.515
Chloride	-0.0413	0.0448	-1.08
Respiration (Lab)	-0.039	0.0704	-1.8
Percent C	-0.0357	0.0588	-1.65
Sediment Respiration	0.0307	0.0558	1.82
Drainage Area	0.0302	0.0294	0.971
Water NPOC	-0.0251	0.0469	-1.87
Percent Agricultural Cover	-0.0212	0.039	-1.84
Percent Shrub Cover	-0.0204	0.029	-1.42
Water Column Respiration	-0.0184	0.0193	-1.05
Gross Primary Production	0.00604	0.0555	9.18
Percent Forest Cover	0.00306	0.0105	3.42
Velocity	-0.00218	0.00511	-2.34
Total Ecosystem Respiration	-0.00019	0.000649	-3.46
Discharge	0	0	
Minimum Elevation	0	0	
Percent Sand	0	0	

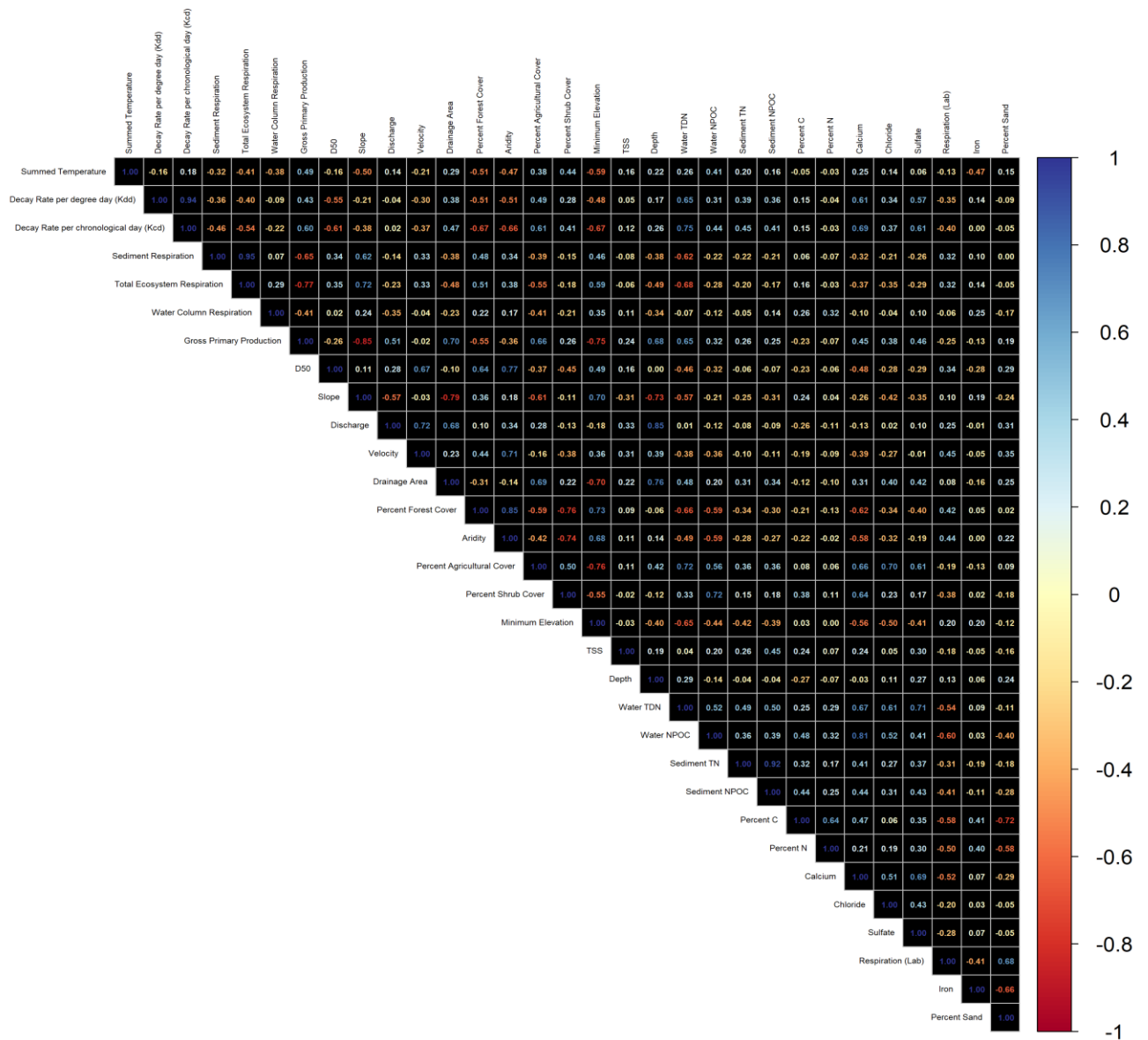


Figure S1. Pearson correlation matrix between cube-root transformed explanatory variables used in the LASSO model.