



Supplementary Material for

Iron Redox Reactions Can Drive Microtopographic Variation in Upland Soil Carbon Dioxide and Nitrous Oxide Emissions

Contents of this file

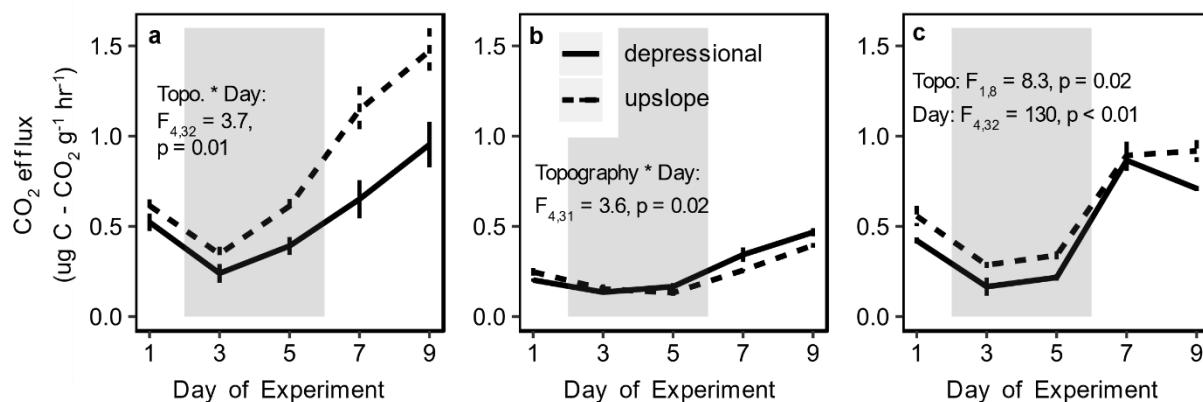
*Figures S1, S2, S3, and S4**Tables S1, and S2*

Figure S1. Soil CO_2 emissions (mean \pm SE, n = 5) from unamended control soils from the South Farms (a), the Energy Farm (b), and Cardinal Road (c) over the course of the early season experiment. Solid lines represent emissions from depressional soils, and dotted lines represent emissions from upslope soils. Shaded areas represent when the soil cores were flooded. Results from ANOVAs run on linear mixed effects models are presented within each panel. Interaction effects are presented when significant interactions were detected. Otherwise, significant main effects are presented.

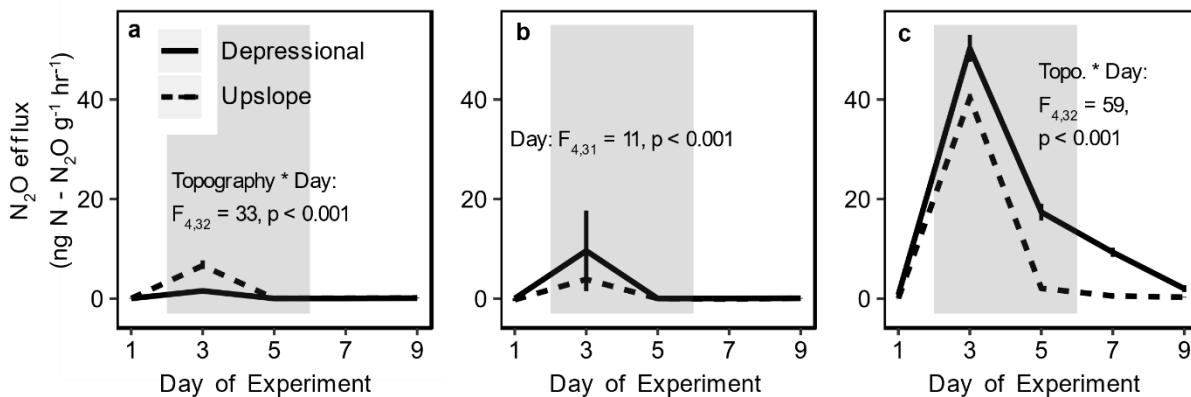


Figure S2. Soil N_2O emissions (mean \pm SE, n = 5) from unamended control soils from the South Farms (a), the Energy Farm (b), and Cardinal Road (c) over the course of the early season experiment. Solid lines represent emissions from depressional soils, and dotted lines represent emissions from upslope soils. Shaded areas represent when the soil cores were flooded. Results from ANOVAs run on linear mixed effects models are presented within each panel. Interaction effects are presented when significant interactions were detected. Otherwise, significant main effects are presented.

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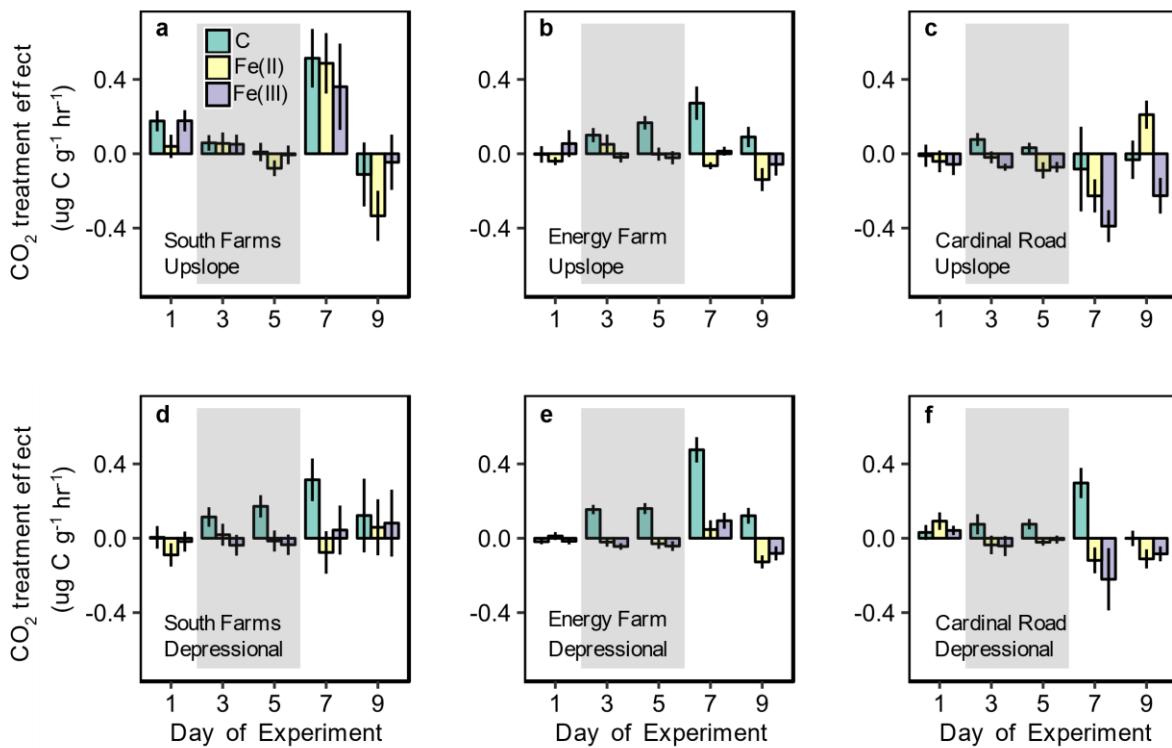


Figure S3. Effect size of treatments on soil CO₂ emissions from upslope (a,b,c) and depressional (d,e,f) soils from the South Farms (a,d), the Energy Farm (b,e), and Cardinal Road (c,f) during the early season experiment. The treatment effect was calculated as the difference between net CO₂ emissions from soil receiving a given treatment amendment compared to unamended control soils.. Error bars represent propagated standard error ($n = 5$) of the difference between the control and treatment means. Colors represent each treatment. Gray shading indicates when soils were flooded.

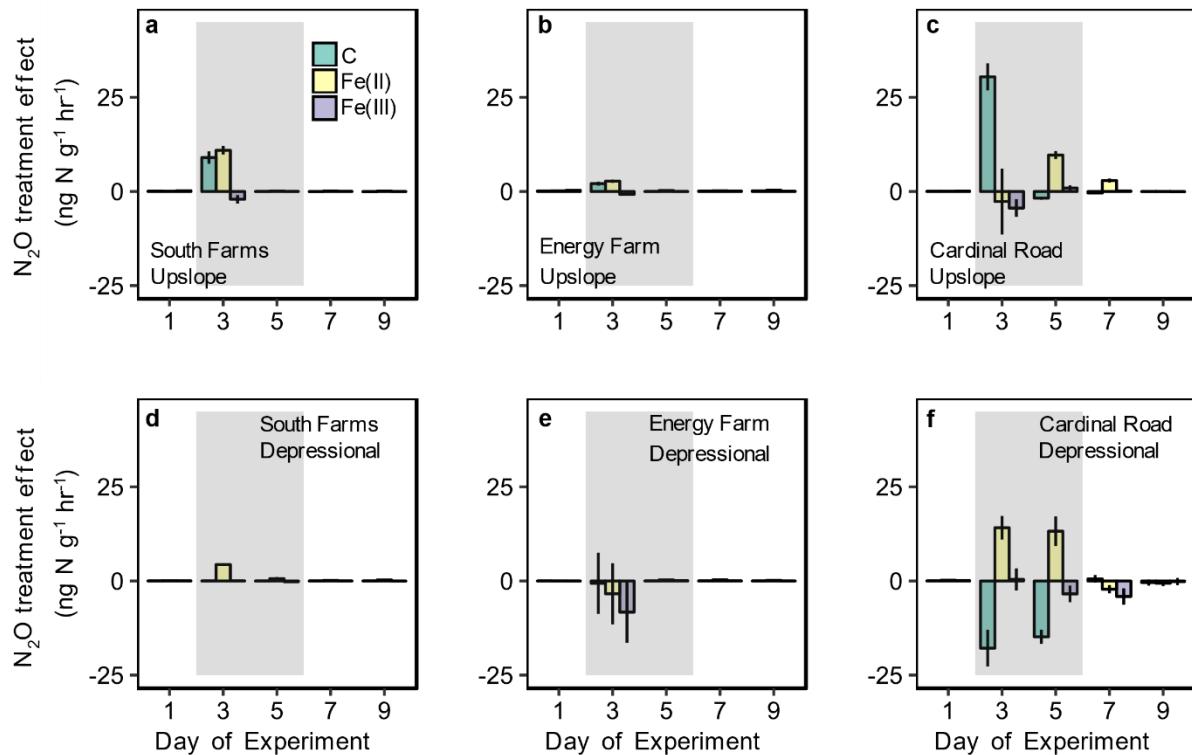


Figure S4. Effect size of treatments on soil N₂O emissions from upslope (a,b,c) and depressional (d,e,f) soils from the South Farms (a,d), the Energy Farm (b,e), and Cardinal Road (c,f) during the early season experiment. The treatment effect was calculated as the difference between net N₂O emissions from soil receiving a given treatment amendment compared to unamended control soils. Error bars represent propagated standard error ($n = 5$) of the difference between the control and treatment means. Colors represent each treatment. Gray shading indicates when soils were flooded.

Table S1. Results from ANOVAs run on mixed effects models examining the treatment effect on soil CO₂ emissions during the early season lab experiment.

Site	Drainage class	Degrees of freedom	F statistic	P value
South Farms	upslope	9,48	2.9	0.007
South Farms	depressional	9,48	1.8	0.1
Energy Farm	upslope	9,47	1.9	0.07
Energy Farm	depressional	9,48	5.1	<0.001
Cardinal Road	upslope	9,48	2.0	0.06
Cardinal Road	depressional	9,48	1.9	0.08

Log transformed CO₂ emissions were included as the dependent variable, treatment was the independent variable, and date was included as a random variable. Significant p-values ($p < 0.05$) are presented in bold.

Table S2. Results from ANOVAs run on mixed effects models examining the treatment effect on soil N₂O emissions during the early season lab experiment.

Site	Drainage class	Degrees of freedom	F statistic	P value
South Farms	upslope	9,48	40	<0.001
South Farms	depressional	9,48	21	<0.001
Energy Farm	upslope	9,47	13	<0.001
Energy Farm	depressional	9,48	3.3	0.003
Cardinal Road	upslope	9,48	12	<0.001
Cardinal Road	depressional	9,48	11	<0.001

Log transformed N₂O emissions were included as the dependent variable, treatment was the independent variable, and date was included as a random variable. Significant p-values ($p < 0.05$) are presented in bold.