Supplementary Information for: Decadal biomass increment in early secondary successional woody ecosystems is increased by CO_2 enrichment

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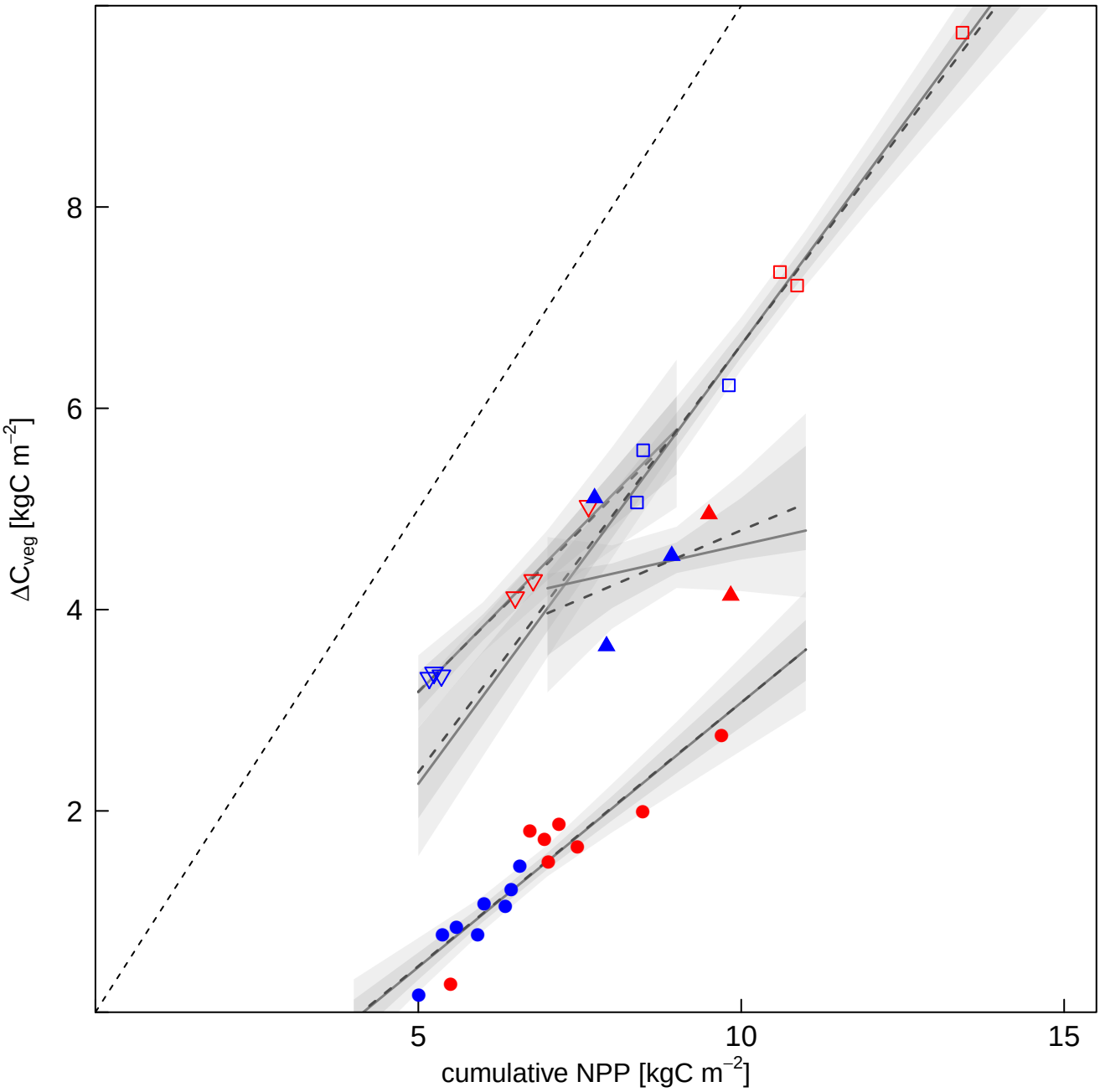
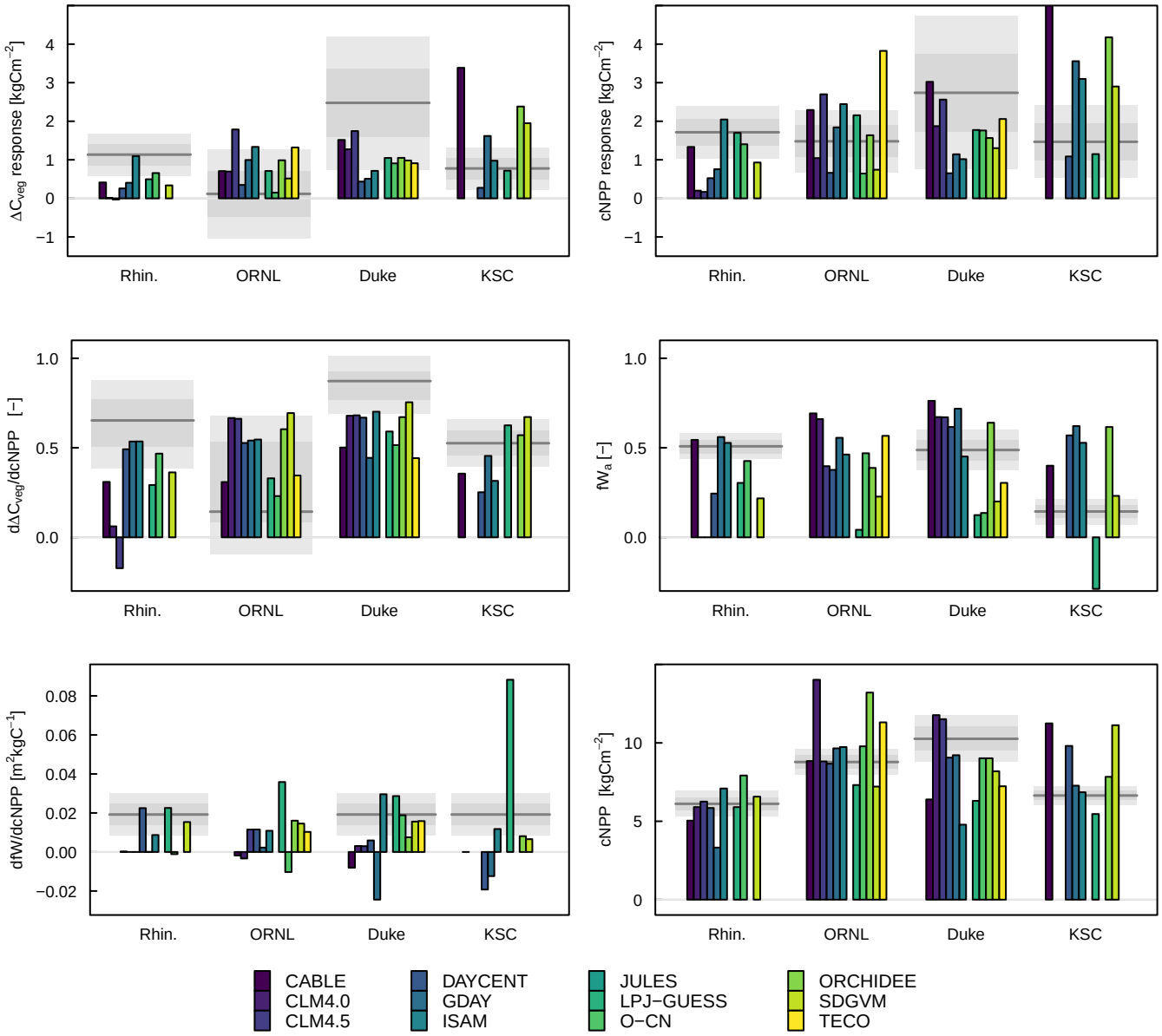
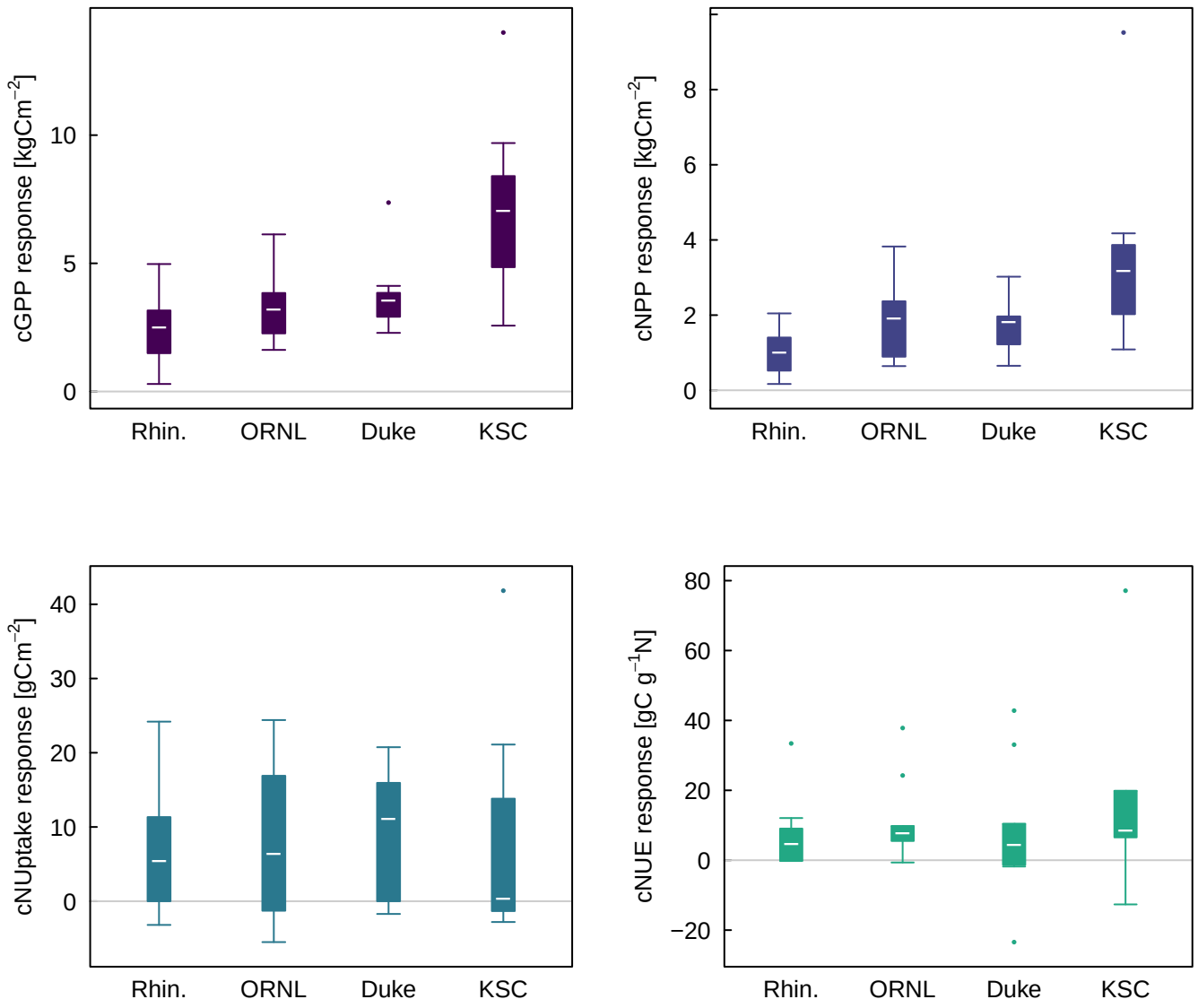
Supplementary Figures



Supplementary Figure 1: Same as Figure 1 but with extended CIs demonstrating strong overlap between Rhinelander and Duke relationships. Also shown are the median values of the boot-strapping which show agreement between the mixed-model fit to the data and the boot-strap median value at Rhinelander, Duke, and KSC, but not at ORNL. This indicates the need for more replicates to be confident in the relationship and ΔC_{veg} response at ORNL.



Supplementary Figure 2: As Figure 3 in the main document but individual model predictions of the ΔC_{veg} response to CO_2 enrichment (upper left); the two variables leading to the response—the cNPP response to CO_2 enrichment (upper right) and $\frac{d\Delta C_{veg}}{dcNPP}$ (middle left); and the three components of $\frac{d\Delta C_{veg}}{dcNPP}$—$fW_a$ (middle right), $\frac{dfW}{dcNPP}$ (bottom left), and cross-treatment mean cNPP (bottom right). Grey shaded areas represent the observations (dark grey lines represent observed means or regression parameters, light grey polygons represent the ± 1 s.e.m. CI and the lighter grey polygons represent the 95 % CI).



Supplementary Figure 3: Model ensemble predictions of the absolute response to CO_2 enrichment of cumulative GPP; cumulative NPP, cumulative nitrogen uptake; and cumulative nitrogen use efficiency calculated as cNPP/cNUP. The white bar is the median, the box the inter-quartile range, whiskers the range of data within four times the IQR, and dots are outliers.

Supplementary Tables

Supplementary Table 1: BiomassCO2 model selection

response	fixed effects	random group	random effects	AICc	method
ΔC_{veg}	(Intercept)	site	(Intercept)	108.8	ML
ΔC_{veg}	(Intercept), co2ELE	site	(Intercept)	98.0	ML
ΔC_{veg}	(Intercept), co2ELE	site	(Intercept), co2ELE	100.0	ML
ΔC_{veg}	(Intercept), co2ELE	site	(Intercept)	97.0	REML
ΔC_{veg}	(Intercept), co2ELE	site	(Intercept), co2ELE	98.7	REML

Supplementary Table 2: meanNPP model selection

response	fixed effects	random group	random effects	AICc	method
NPP	(Intercept)	site	(Intercept)	-24.8	ML
NPP	(Intercept), eCO2	site	(Intercept)	-42.2	ML
NPP	(Intercept), eCO2	site	(Intercept), eCO2	-39.3	ML
NPP	(Intercept), eCO2	site	(Intercept)	-34.7	REML
NPP	(Intercept), eCO2	site	(Intercept), eCO2	-31.7	REML

Supplementary Table 3: Biomass model selection

response	fixed effects	random group	random effects	AICc	method
ΔC_{veg}	(Intercept)	site	(Intercept)	108.8	ML
ΔC_{veg}	(Intercept), cNPP, eCO2, cNPP:eCO2	site	(Intercept)	67.5	ML
ΔC_{veg}	(Intercept), cNPP, eCO2	site	(Intercept)	65.5	ML
ΔC_{veg}	(Intercept), eCO2	site	(Intercept)	98.0	ML
ΔC_{veg}	(Intercept), cNPP, age[1], cNPP:age	site	(Intercept)	63.5	ML
ΔC_{veg}	(Intercept), cNPP, age, cNPP:age	site	(Intercept), cNPP	66.1	ML
ΔC_{veg}	(Intercept), cNPP, age	site	(Intercept)	64.8	ML
ΔC_{veg}	(Intercept), cNPP, age	site	(Intercept), cNPP	62.6	ML
ΔC_{veg}	(Intercept), cNPP	site	(Intercept)	63.2	ML
ΔC_{veg}	(Intercept), cNPP	site	(Intercept), cNPP	60.2	ML
ΔC_{veg}	(Intercept), cNPP	site	(Intercept)	65.9	REML
ΔC_{veg}	(Intercept), cNPP	site	(Intercept), cNPP	61.1	REML

[1] Age since disturbance.

Supplementary Table 4: WoodAllocation model selection

response	fixed effects	random group	random effects	AICc	method
fW	(Intercept)	site	(Intercept)	-73.6	ML
fW	(Intercept), eCO2, cNPP, eCO2:cNPP	site	(Intercept)	-77.0	ML
fW	(Intercept), eCO2, cNPP	site	(Intercept)	-80.2	ML
fW	(Intercept), eCO2	site	(Intercept)	-79.4	ML
fW	(Intercept), cNPP	site	(Intercept)	-82.3	ML
fW	(Intercept), cNPP	site	(Intercept), cNPP	-78.4	ML
fW	(Intercept), cNPP	site	(Intercept)	-70.9	REML
fW	(Intercept), cNPP	site	(Intercept), cNPP	-66.9	REML

Supplementary Table 5: ORNLWoodAllocation model selection

response	fixed effects	parameter	se	t	P(t)		F	dfn	dfd	P(F)	R2	AICc
fW	(Intercept)	0.6	0.0	15.3	0.0	***	0.843	1	3	0.426	0.22 (-0.04)	15.2
	co2ELE	-0.1	0.1	-0.9	0.4							

Supplementary Table 6: ORNLRootAllocation model selection

response	fixed effects	parameter	se	t	P(t)		F	dfn	dfd	P(F)	R2	AICc
fFR	(Intercept)	0.1	0.0	2.6	0.1	.	1.59	1	3	0.296	0.35 (0.13)	15.4
	co2ELE	0.1	0.1	1.3	0.3							