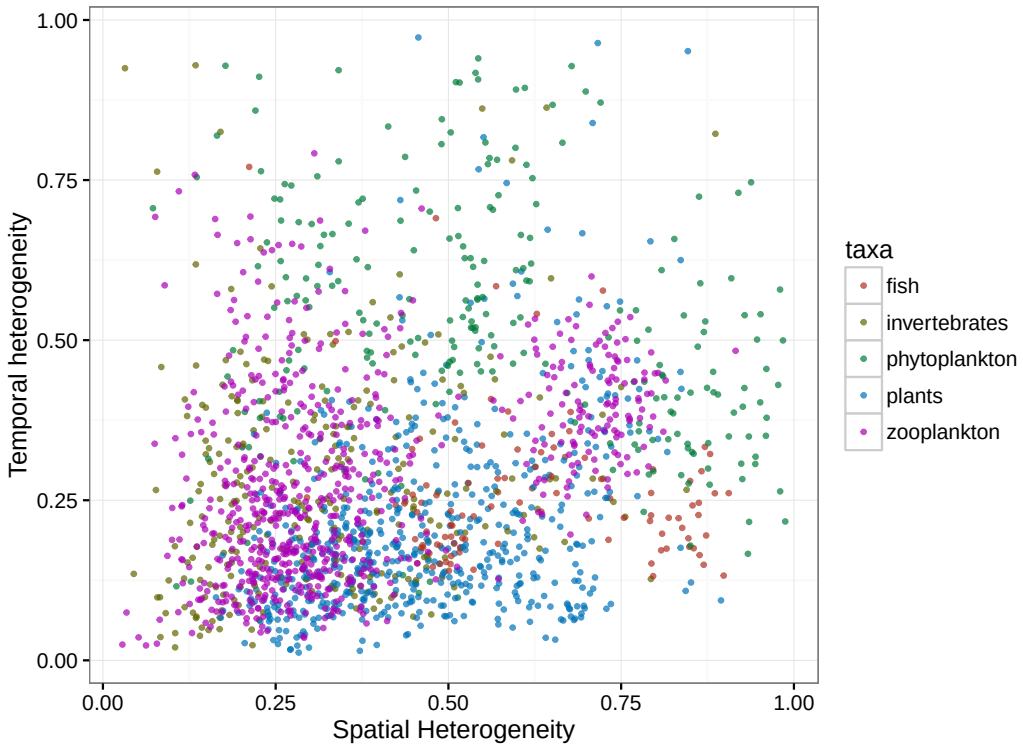
Community Dyanmics meta analysis - Draft

March 7, 2016

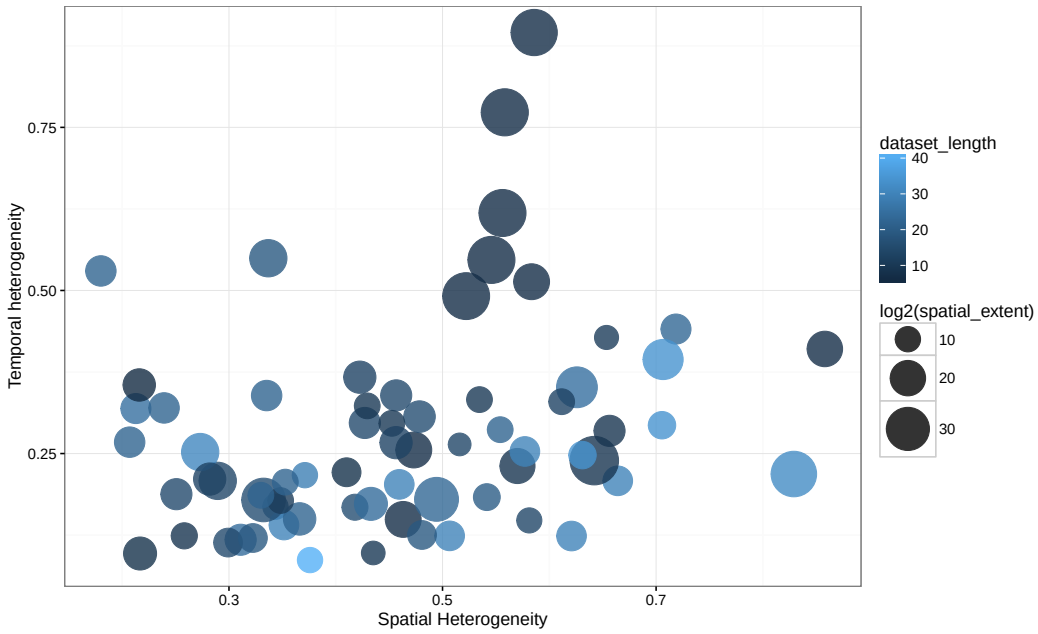
1 Results

Overall relationship between spatial and temporal heterogeneity

Dispersion (spatial heterogeneity) is the single largest factor in driving temporal heterogeneity. Lifespan of organism, spatial extent, time step, biome all exert only weak effects on this relationship. Spatial heterogeneity is related to evenness at site and plot level.


1.00
0.75
0.50
0.25
0.00
Temporal heterogeneity
0.00
0.25
0.50
0.75
1.00
Spatial Heterogeneity
taxa
fish
invertebrates
phytoplankton
plants
zooplankton

Overall relationship, aggregated by study.



Difference between aquatic and terrestrial studies

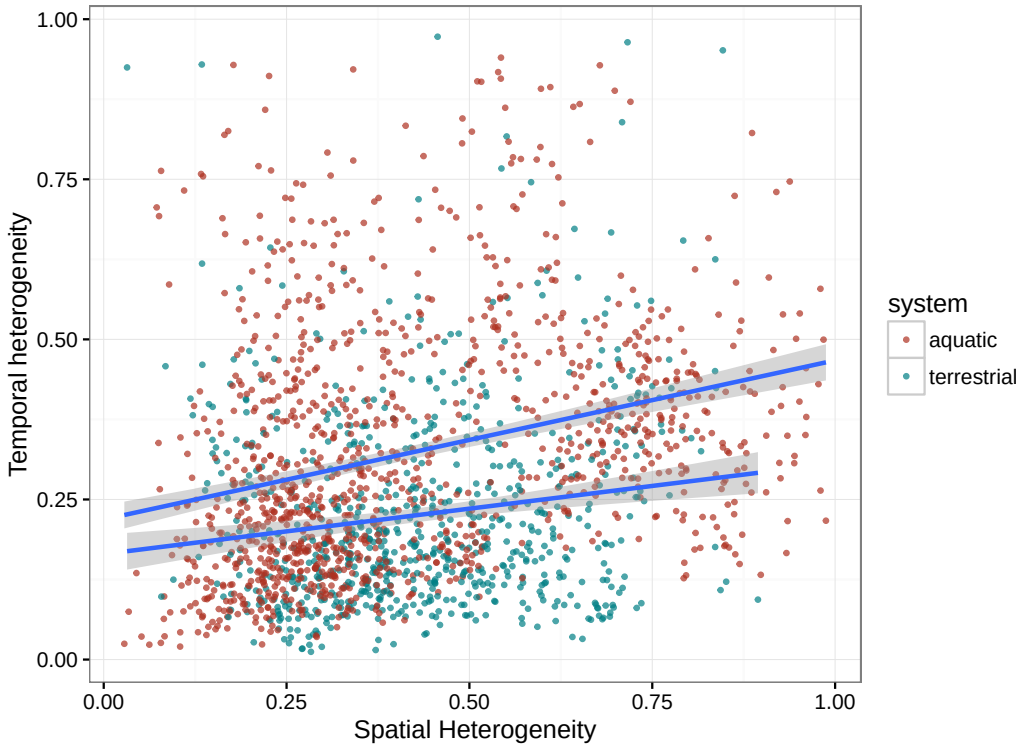


Table 1. Summary of mixed effect model of spatial heterogeneity on temporal heterogeneity, with study design features as covariates

	Estimate	Std. Error	t value
(Intercept)	0.29	0.07	4.00
dispersion	0.23	0.08	3.00
plot_size	-0.00	0.00	-0.66
num_plots	0.00	0.00	0.73
spatial_extent	-0.00	0.00	-0.37
dataset_length	-0.00	0.00	-1.79
time_step	-0.07	0.04	-1.67

Figure 4. Summary of mixed-effect model for study design features

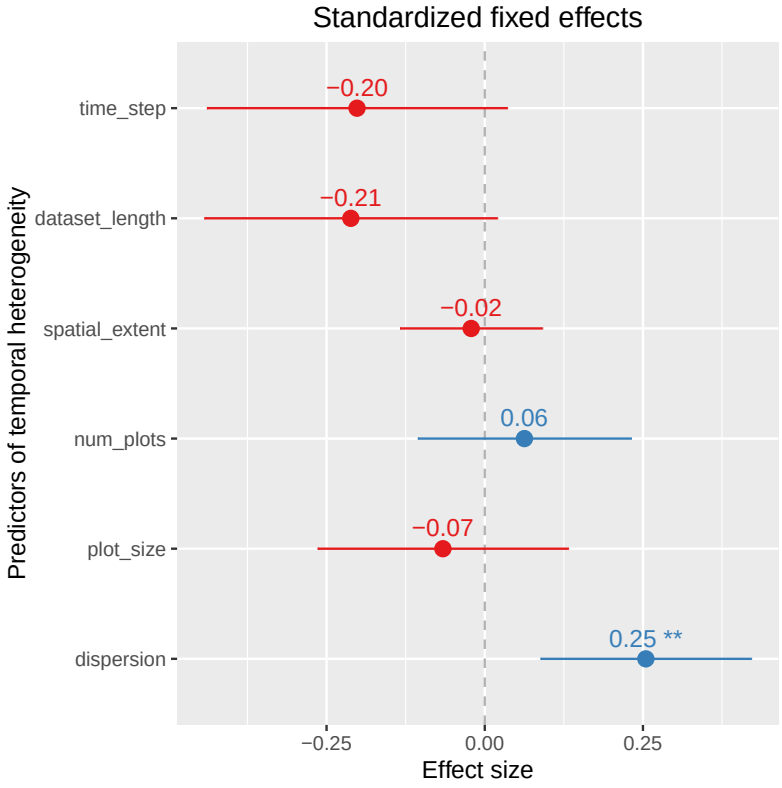


Table 2. System and organism-level features as covariates of effect of spatial heterogeneity on temporal heterogeneity

	Estimate	Std. Error	t value
(Intercept)	0.05	0.15	0.35
dispersion	0.33	0.08	3.99
taxainvertebrates	0.16	0.17	0.95
taxaphytoplankton	0.18	0.17	1.03
taxaplants	0.12	0.17	0.72
taxazooplankton	0.12	0.15	0.78
lifespanlonger	-0.07	0.04	-1.62
S	0.00	0.00	0.64
ANPP	-0.00	0.00	-0.43
successionyes	0.05	0.03	1.84
systemterrestrial	-0.06	0.10	-0.55

Figure 5. Summary of mixed-effect model for taxonomic and ecosystem type system features

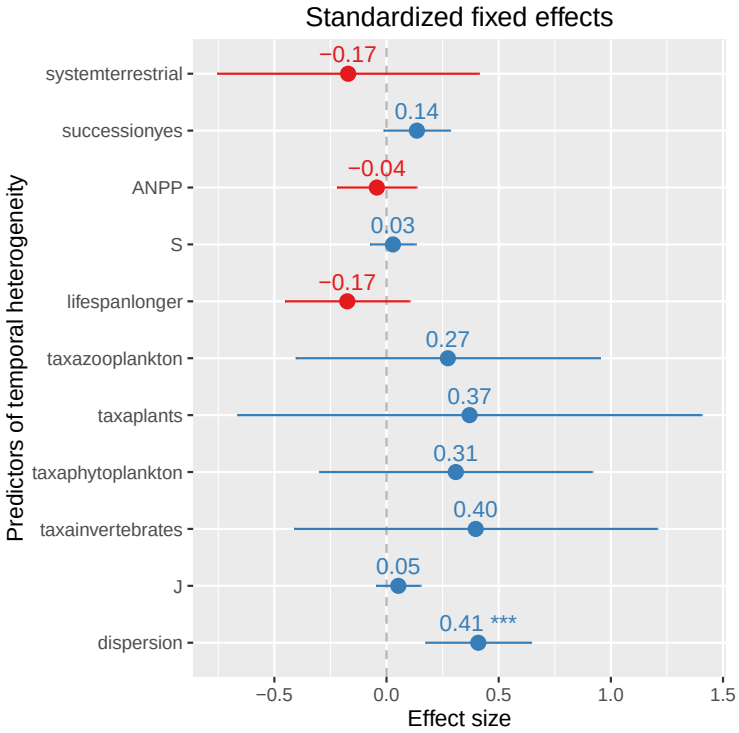
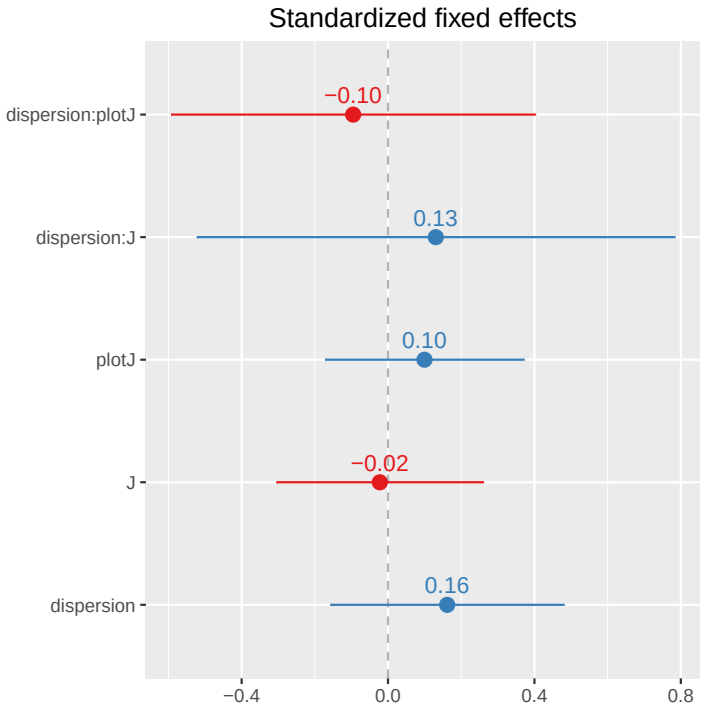


Table 3. Interaction between plot-level evenness, site-level evenness, and dispersion. There is an interaction between dispersion and evenness, such that including effects of plot-level evenness and site-level evenness does reduce the predictive power of dispersion itself, when no other factors are included.

	Estimate	Std. Error	t value
(Intercept)	0.13	0.06	2.05
dispersion	0.14	0.15	0.99
J	-0.03	0.19	-0.16
plotJ	0.13	0.18	0.72
dispersion:J	0.15	0.37	0.39
dispersion:plotJ	-0.12	0.32	-0.38

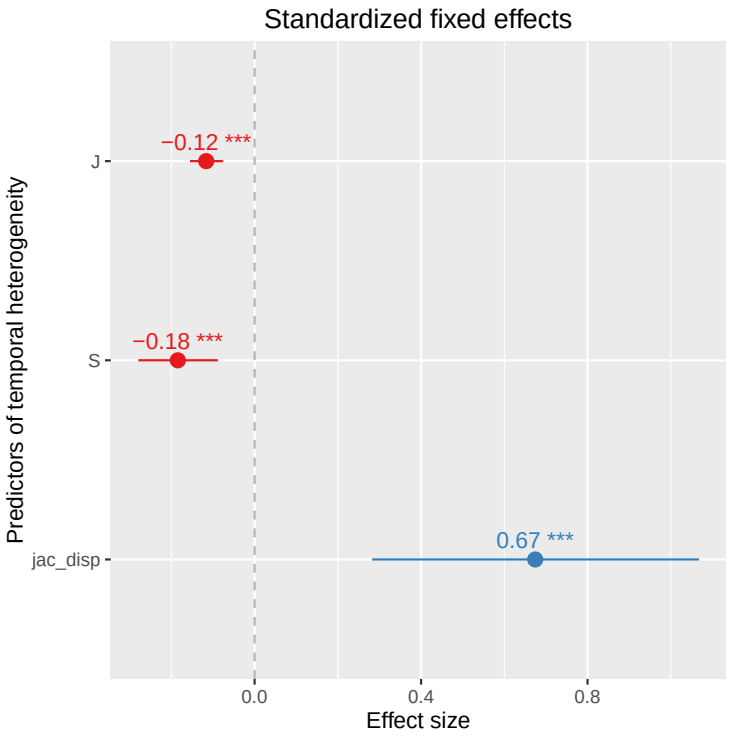
Figure 6. Interaction model



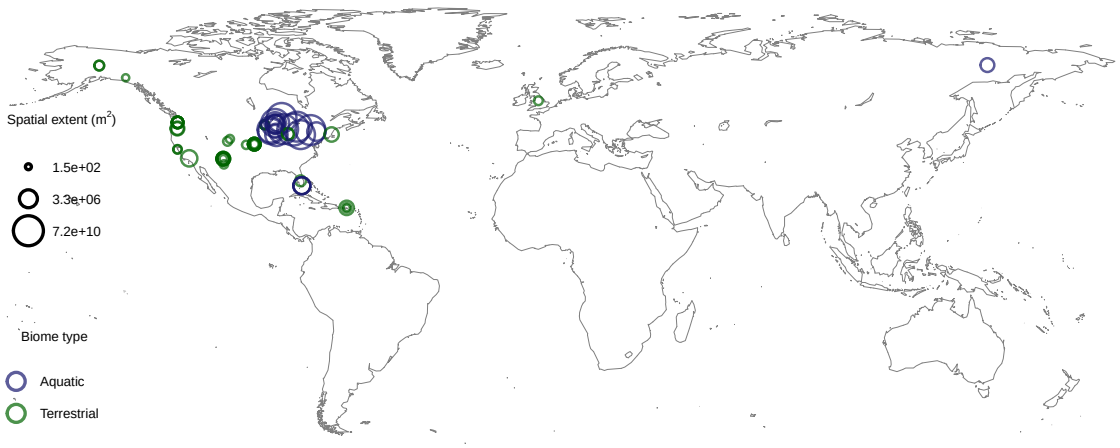
Using presence-absence based measure of both temporal and spatial heterogeneity, results are the same

	Estimate	Std. Error	t value
(Intercept)	0.09	0.12	0.73
jac_disp	0.56	0.16	3.38
S	-0.00	0.00	-3.85
J	-0.15	0.03	-5.88

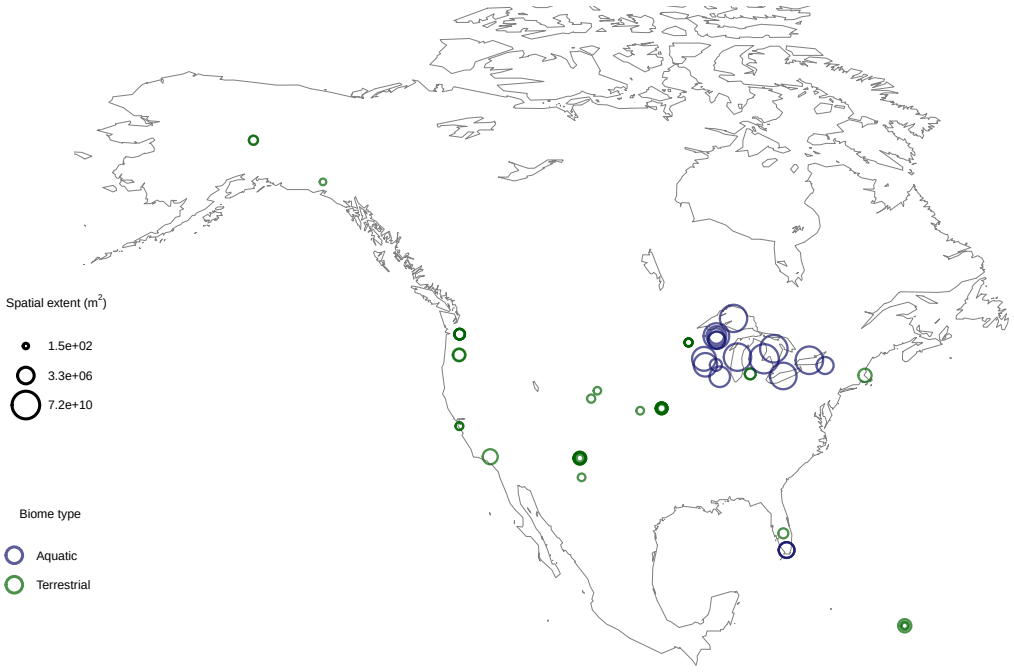
Figure 7. Presence-absence model



Map of data sources: All



Map of data sources: North America only


Spatial extent (m2)
1.5e+02
3.3e+06
7.2e+10
Biome type
Aquatic
Terrestrial