

JGR: Biogeosciences

Supporting Information for

Seasonality of Tropical Photosynthesis: A Global Map of Drivers and Comparison to Model Outputs

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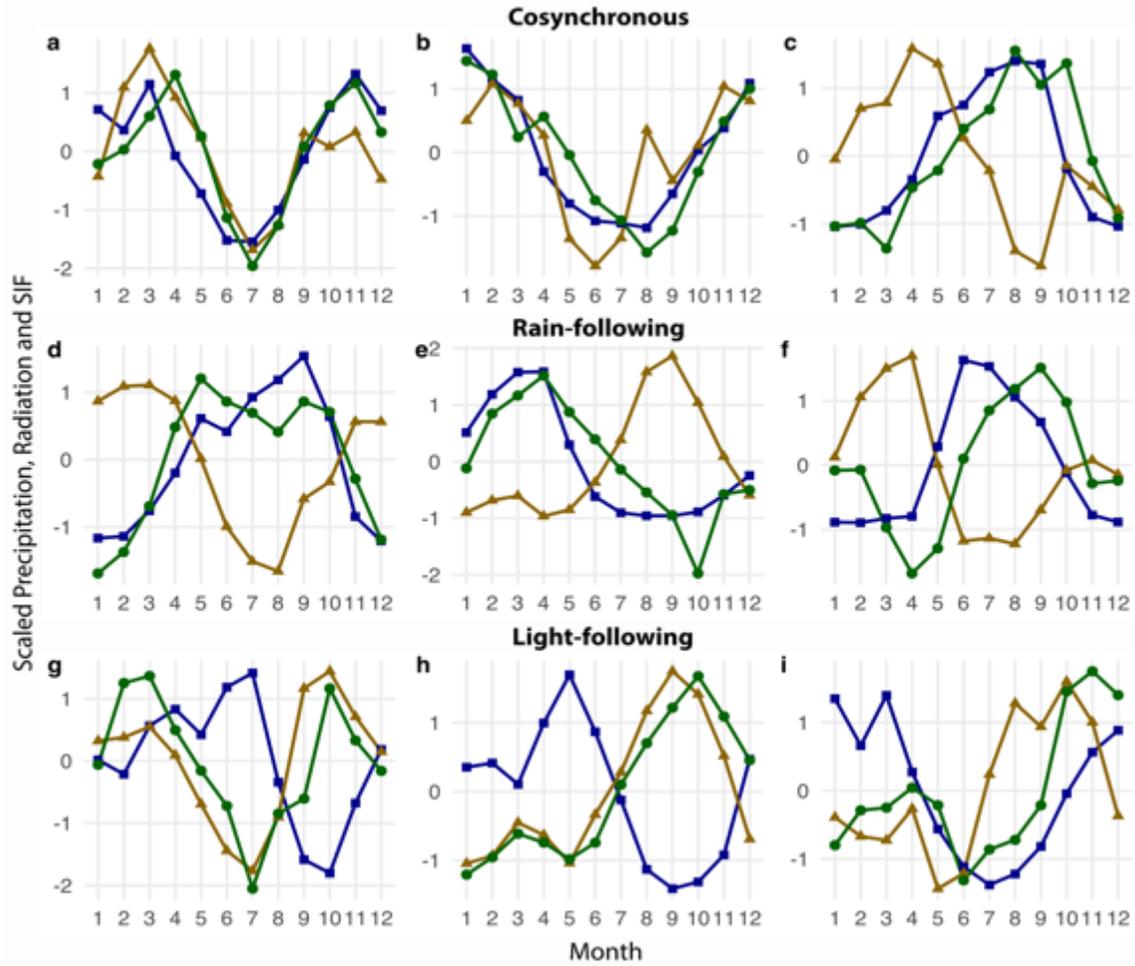
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Relationship type	Plot	Lon	Lat	Biome	Location	Precipitation		Radiation	
						r	Lag	r	Lag
Cosynchronous	a	25.5	-2.5	Rainforest	Africa	0.59	0	0.55	0
	b	-54.5	-16.5	Savanna	S. America	0.58	1	0.48	2
	c	104.5	15.5	Dry Forest	Asia	0.72	1	0.58	4
Rain-following	d	21.5	7.5	Savanna	Africa	0.78	0	-0.66	0
	e	-45.5	-4.5	Xeric	S. America	0.47	1	-0.53	1
	f	95.5	17.5	Rainforest	Asia	0.66	1	-0.22	2
Light-following	g	121.5	-1.5	Rainforest	Asia	-0.29	1	0.54	0
	h	-52.5	4.5	Rainforest	S. America	-0.57	1	0.57	1
	i	-70.5	-8.5	Rainforest	S. America	-0.56	4	0.49	2

Figure S1. Seasonality profiles of Precipitation (blue), Radiation (yellow) and SIF (green) for the three main types of relationships. All data are scaled to fit and be comparable in the same plot. Relevant information of each site is provided in the accompanying table.

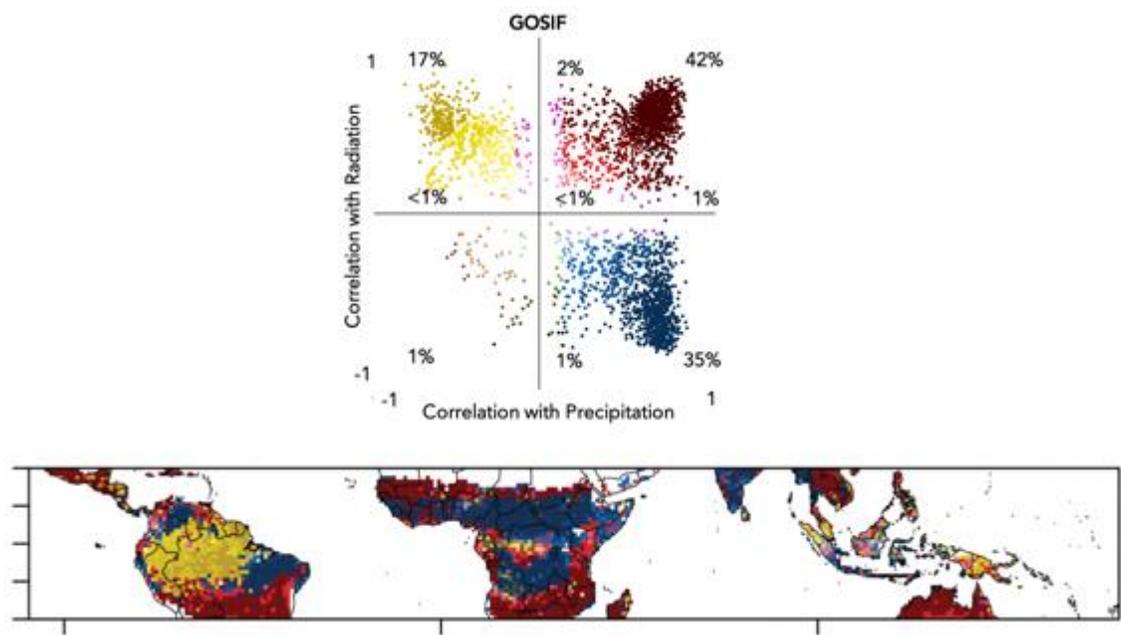


Figure S2. Scatterplot (upper panel) and map (lower panel) for GOSIF data, showing the maximum correlation coefficient from the CCF analysis for vegetation productivity from GOSIF with precipitation (x axis) and radiation (y axis). The numbers in the scatterplot indicate the percentage of pixels corresponding to the type of relationship where the number is located.

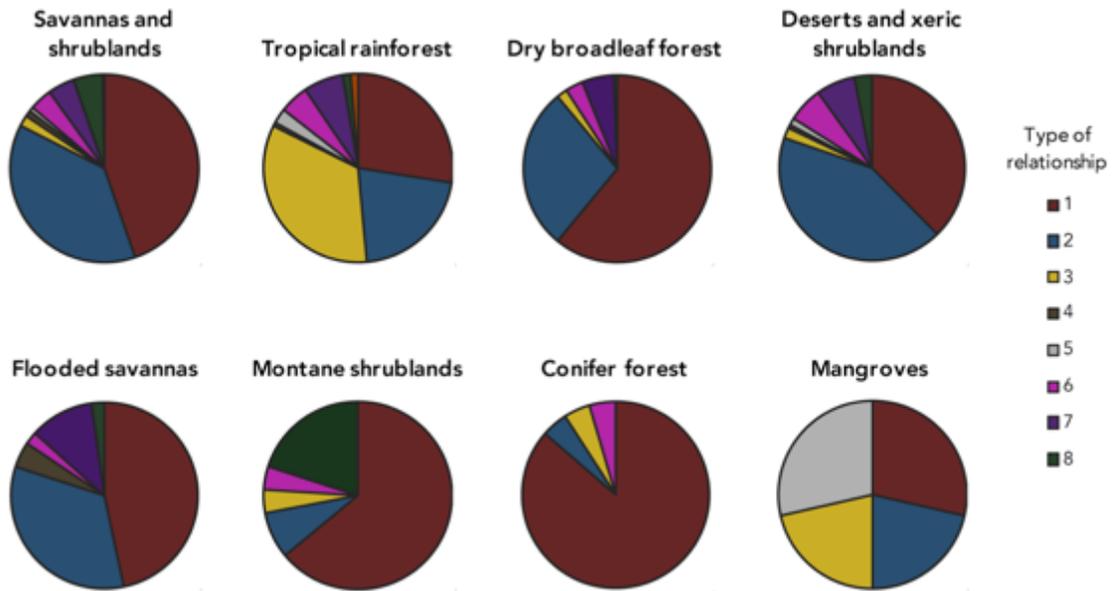


Figure S3. Types of relationships by biome (based on SIF results). The pie charts show the proportion of pixels with each type of relationship in each biome. Colors and numbers of the types of relationships (legend) correspond to the colors and numbers in the reference panel in Fig. 1.

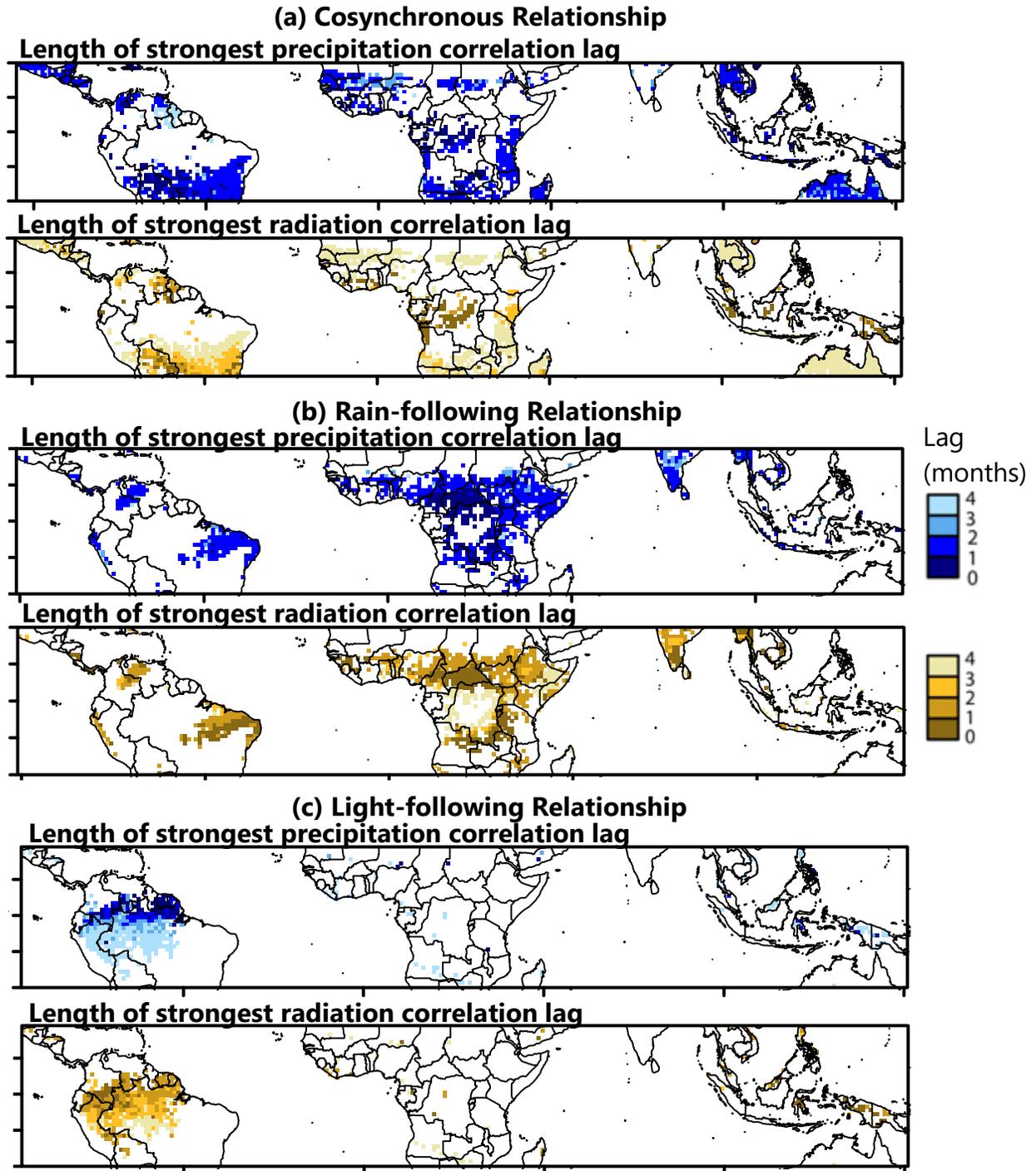


Figure S4. Spatial distribution of the most strongly and significant correlated length of lag between SIF and precipitation and radiation, shown for the three most common types of relationships (cosynchronous, rain-following and light-following). Only lags are shown; that is, lags in which peaks in SIF follow peaks or troughs in the climate variable by 0-4 months. Precipitation and radiation lags are plotted separately for each type of relationship.

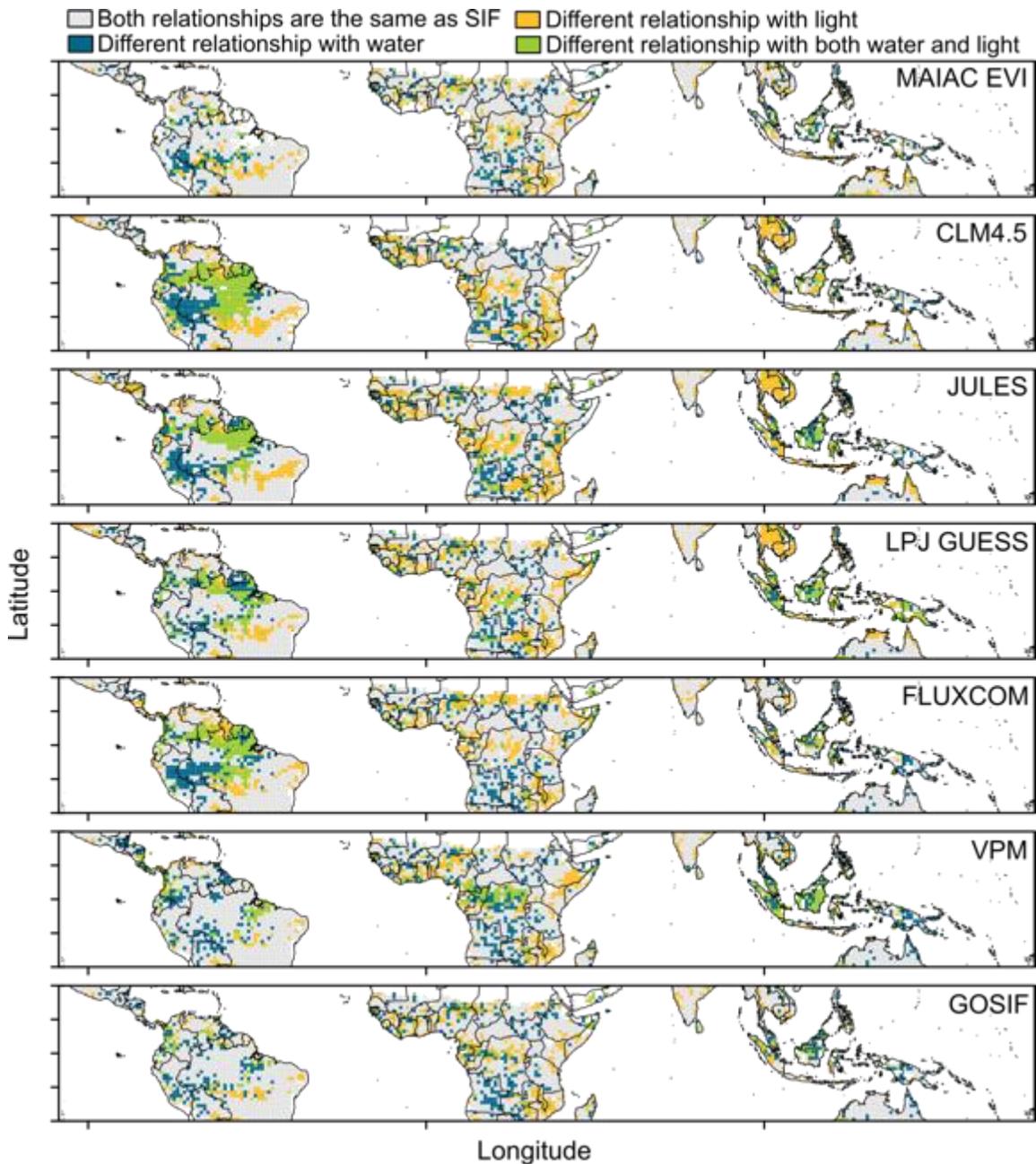


Figure S5. Comparison of correlation of photosynthetic activity with water and light for each dataset against SIF. For each pixel we show if the corresponding dataset or model agrees with SIF in the correlation between each driver and photosynthetic activity and the two drivers combined.

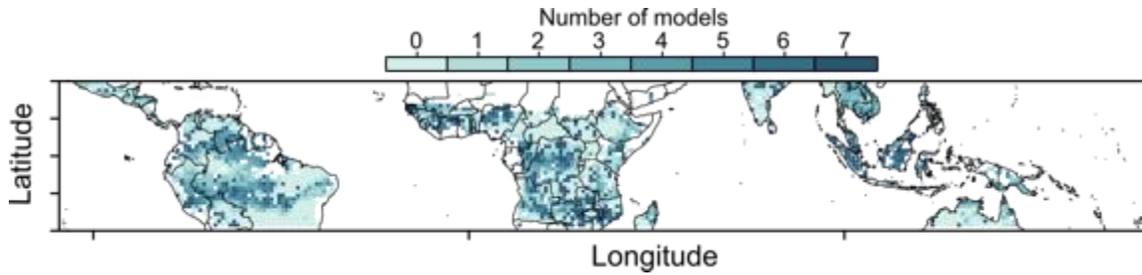


Figure S6. Number of models or datasets showing a different type of relationship than the one shown in SIF for each pixel. Zero indicates that all models or datasets are in agreement with SIF; seven indicates that all models disagree with SIF.

DATASET	ORIGINAL SPATIAL RESOLUTION (DEGREES)
MAIAC EVI	0.05 x 0.05
SIF	0.5 x 0.5
CLM 4.5	1.25 x 0.94
JULES	1.875 x 1.25
LPJ-GUESS	1 x 1
FLUXCOM	0.5 x 0.5
VPM	0.5 x 0.5
GOSIF	0.05 x 0.05

Table S1. Spatial resolutions of the datasets analyzed.

	MAIAC EVI	CLM4.5	JULES	LPJ-GUESS	FLUXCOM	VPM
Rainforest	$\kappa = 0.45$	0.19	0.24	0.30	0.28	0.34
	$D = 41.72$	62.78	58.56	52.62	53.78	45.36
Dry forest	0.53	0.26	0.23	0.33	0.48	0.50
	41.72	45.68	46.63	39.76	22.89	24.26
Grasslands and savannas	0.45	0.35	0.33	0.40	0.46	0.46
	31.64	40.29	41.75	34.91	32.85	30.7
Flooded grasslands and savannas	0.44	0.38	0.52	0.43	0.46	0.44
	28.57	34.15	26.19	30.61	28.57	30.61
Montane grasslands and shrublands	0.53	0.57	0.53	0.48	0.41	0.46
	18.0	23.08	22.45	22.64	25.0	20.75
Deserts and xeric shrublands	0.31	0.33	0.30	0.12	0.29	0.27
	33.75	34.38	41.48	35.63	39.24	31.48
Mangroves	0.31	-0.17	-0.08	0.00	0.28	0.15
	40.0	72.73	70.0	69.57	52.17	60.87

Table S2. Biome specific Kappa coefficients (κ) and overall difference (D , %) between SIF and each of the other photosynthetic activity datasets (Fig. 2). Larger numbers indicate closer agreement between the results of two datasets. Larger D values indicate larger differences between the results of two datasets.