Supplementary Information: Global patterns of forest autotrophic carbon fluxes

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Table S1. Climate variable definitions and sources

Table 1

Climate variable	Units	Definition	Abbreviation	Source
Mean annual temperature (MAT)	°C		MAT	Primary literature; WorldClim[1]
Mean annual precipitation (MAP)	mm yr^{-1}		MAP	Primary literature; WorldClim[1]
Temperature seasonality		Standard deviation of MAT *100	T Seas	WorldClim[1]
Precipitation seasonality		Coefficient of variation of MAP	P Seas	WorldClim[1]
Annual temperature range	°C	Maximum temperature of warmest month - minimum temperature of coldest month	ART	WorldClim[1]
Solar radiation	kJ $m^{-2}yr^{-1}$		Solar R	WorldClim2[2]
Cloud cover	percentage	Cloud percentage cover	Cloud	CRU time-series dataset v 4.03[3]
Annual frost days	days yr^{-1}	Number of freeze days annually	AFD	CRU time-series dataset v 4.03[3]
Annual wet days	days yr^{-1}	Number of days with precipitation >0.1 mm annually	AWD	CRU time-series dataset v 4.03[3]
Potential evapotranspiration (PET)	mm yr^{-1}	Mean annual potential evapotranspiration	PET	Global Aridity Index and Potential Evapotranspiration Climate Database[4]
Aridity		MAP/mean annual PET	AI	Global Aridity Index and Potential Evapotranspiration Climate Database[4]
Vapour pressure deficit (VPD)	kPa		VPD	TerraClimate[5]
Maximum vapour pressure deficit (Max VPD)	kPa		Max VPD	Derived
Water stress months	months yr^{-1}	Number of months annually with MAP < PET	WSM	Derived
Length of growing season	months yr^{-1}	Number of months annually with mean minimum temperature > 0.5°C	LGS	Derived

Table S2. Comparison of growing season length and mean annual temperature as predictors of FACF.

Table 2

Fixed effect	AIC value	Delta AICc	Marginal R squared
GPP			
MAT	126.42617	0.000000	0.6196780
Growing season length	140.80589	14.379717	0.5411935
None	178.96179	52.535617	0.0000000
NPP			
MAT	174.88249	0.000000	0.5156614
Growing season length	191.53714	16.654650	0.4006999
None	216.16976	41.287265	0.0000000
ANPP			
MAT	249.50512	0.000000	0.2925950
Growing season length	254.20763	4.702509	0.2612187
None	268.94008	19.434966	0.0000000
ANPP woody stem			
MAT	235.95797	0.000000	0.1548800
Growing season length	237.28992	1.331943	0.1370243
None	243.13700	7.179027	0.0000000
ANPP foliage			
MAT	484.87610	0.000000	0.4462629
Growing season length	520.96482	36.088722	0.3497750
None	560.34915	75.473049	0.0000000
BNPP root			
MAT	184.54480	0.000000	0.5921282
Growing season length	204.92685	20.382054	0.4644116
None	237.46554	52.920743	0.0000000
BNPP fine root			
MAT	540.19217	0.000000	0.2429540
Growing season length	566.36955	26.177388	0.1060029
None	578.65529	38.463119	0.0000000
Autotrophic respiration			
MAT	45.25818	0.000000	0.6271133
Growing season length	50.35515	5.096972	0.5041004
None	56.16877	10.910597	0.0000000
Root respiration			
MAT	133.53500	0.000000	0.2507631
Growing season length	135.92632	2.391311	0.1990489
None	141.78719	8.252190	0.0000000

Figure S1. Maps showing distribution of samples for the nine FACF analyzed here.
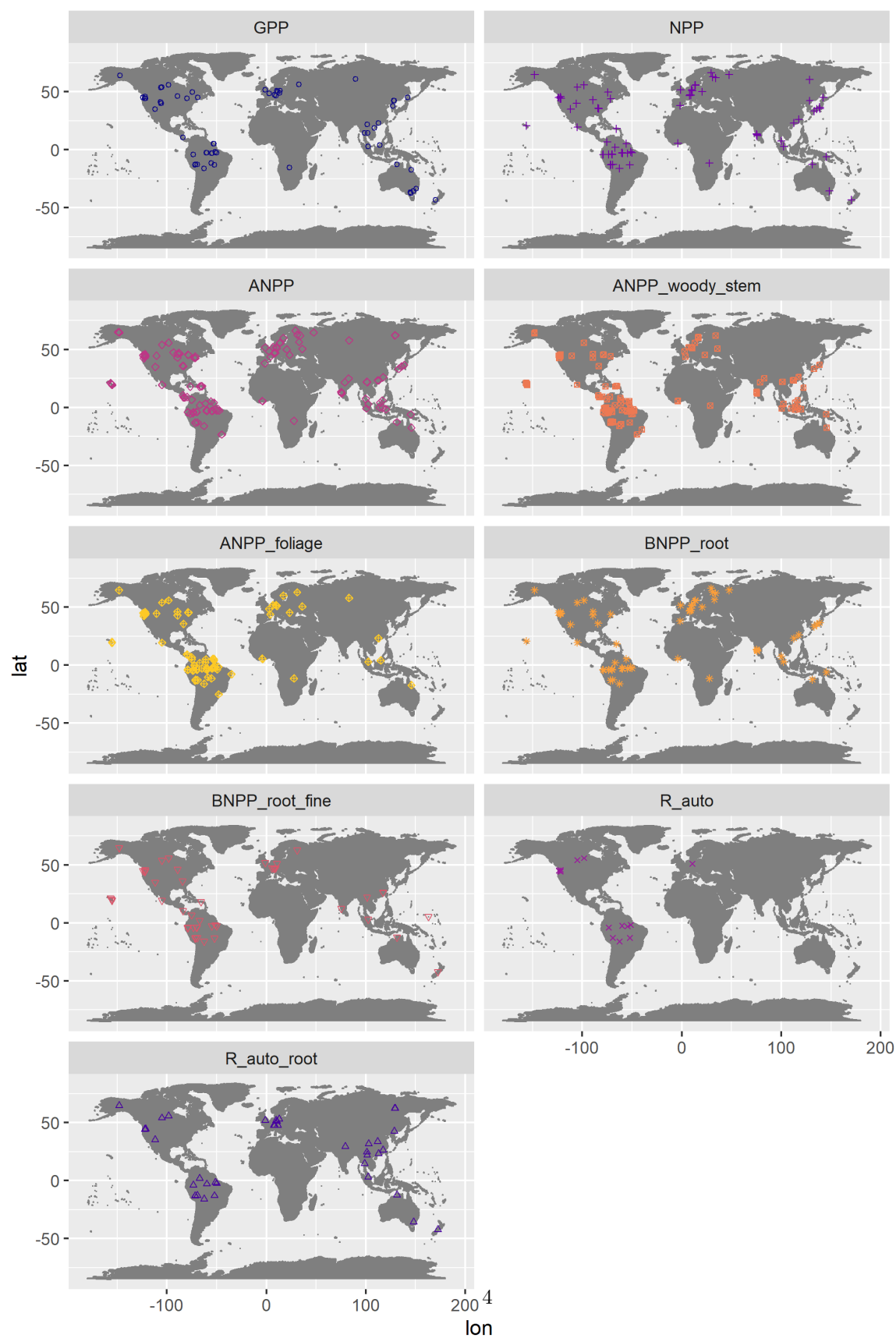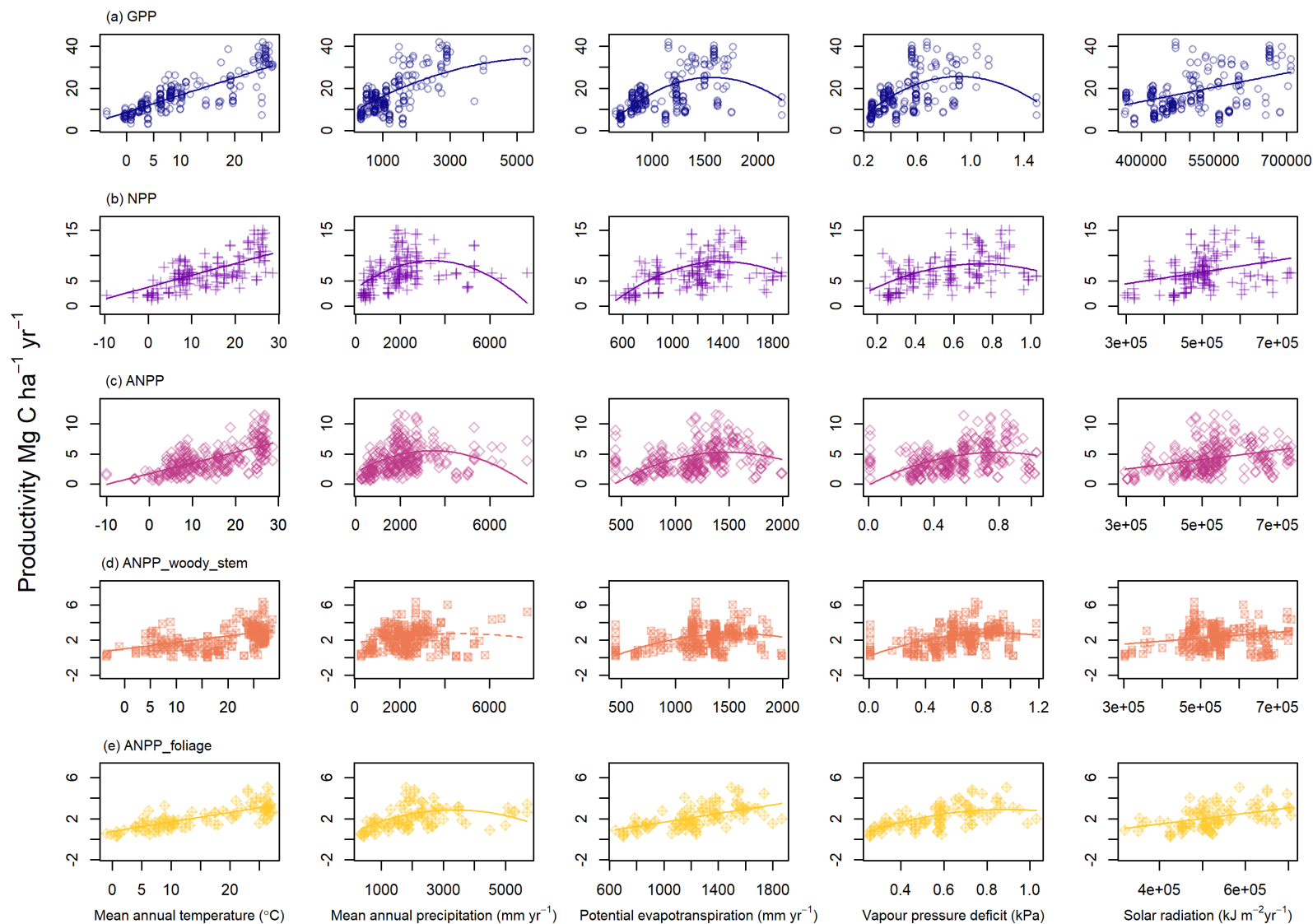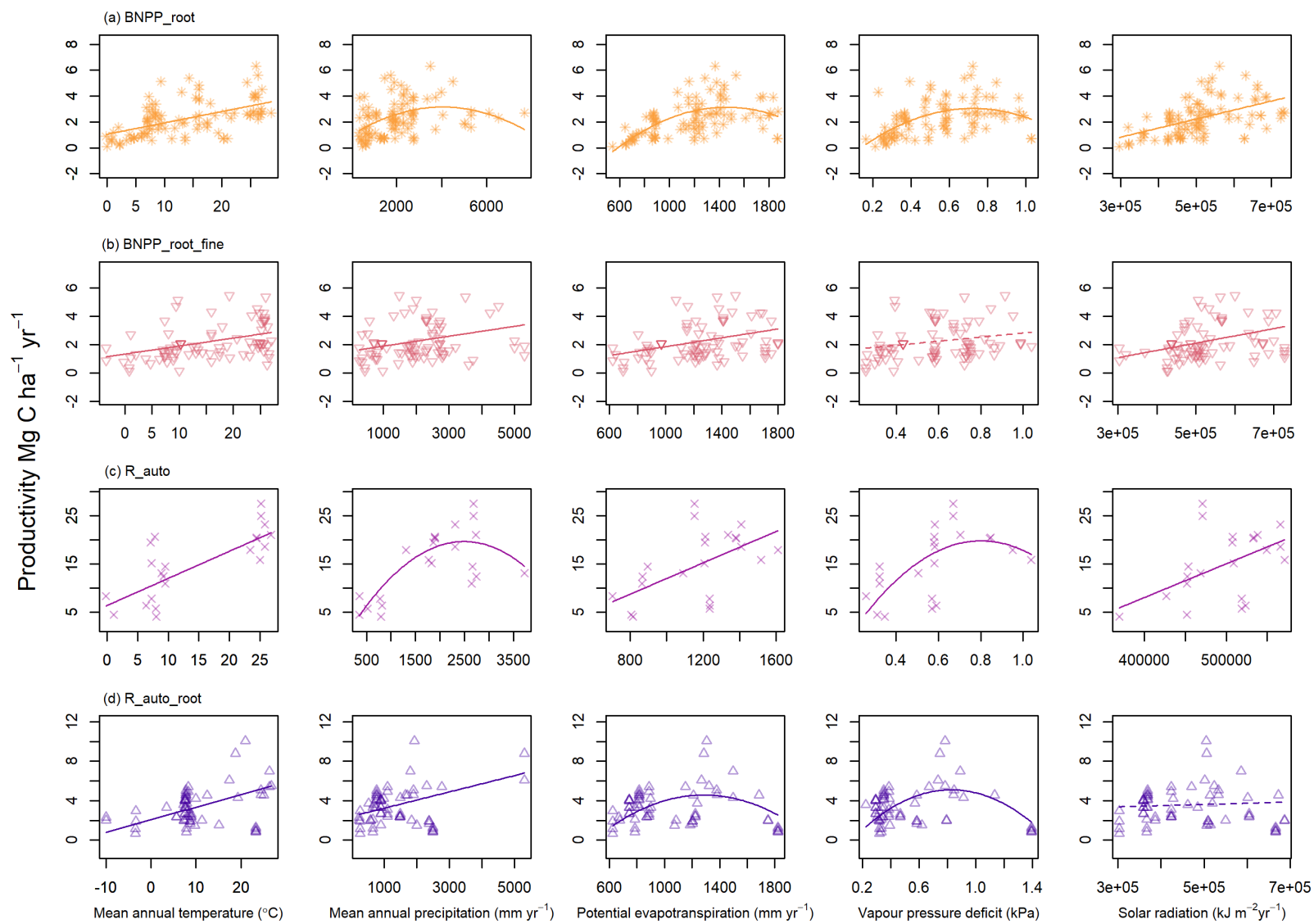

Figure S1: Maps showing distribution of samples for the nine FACF analyzed here.

Figure S2.

(a) GPP

(b) NPP

(c) ANPP

(d) ANPP_woody_stem

(e) ANPP_foliage

Productivity Mg C ha^{-1} yr^{-1}

Mean annual temperature (°C)   Mean annual precipitation (mm yr^{-1})   Potential evapotranspiration (mm yr^{-1})   Vapour pressure deficit (kPa)   Solar radiation (kJ m^{-2}yr^{-1})
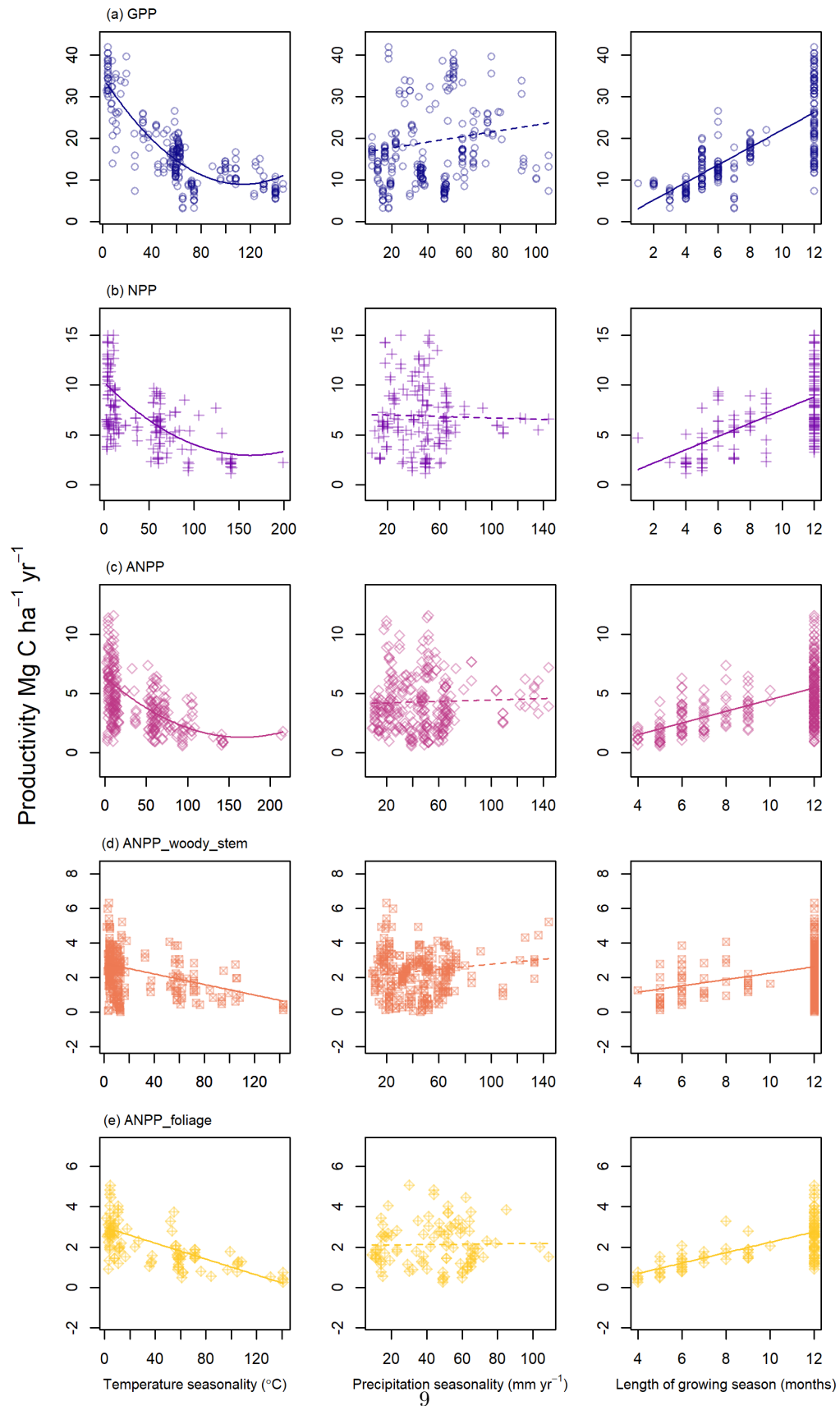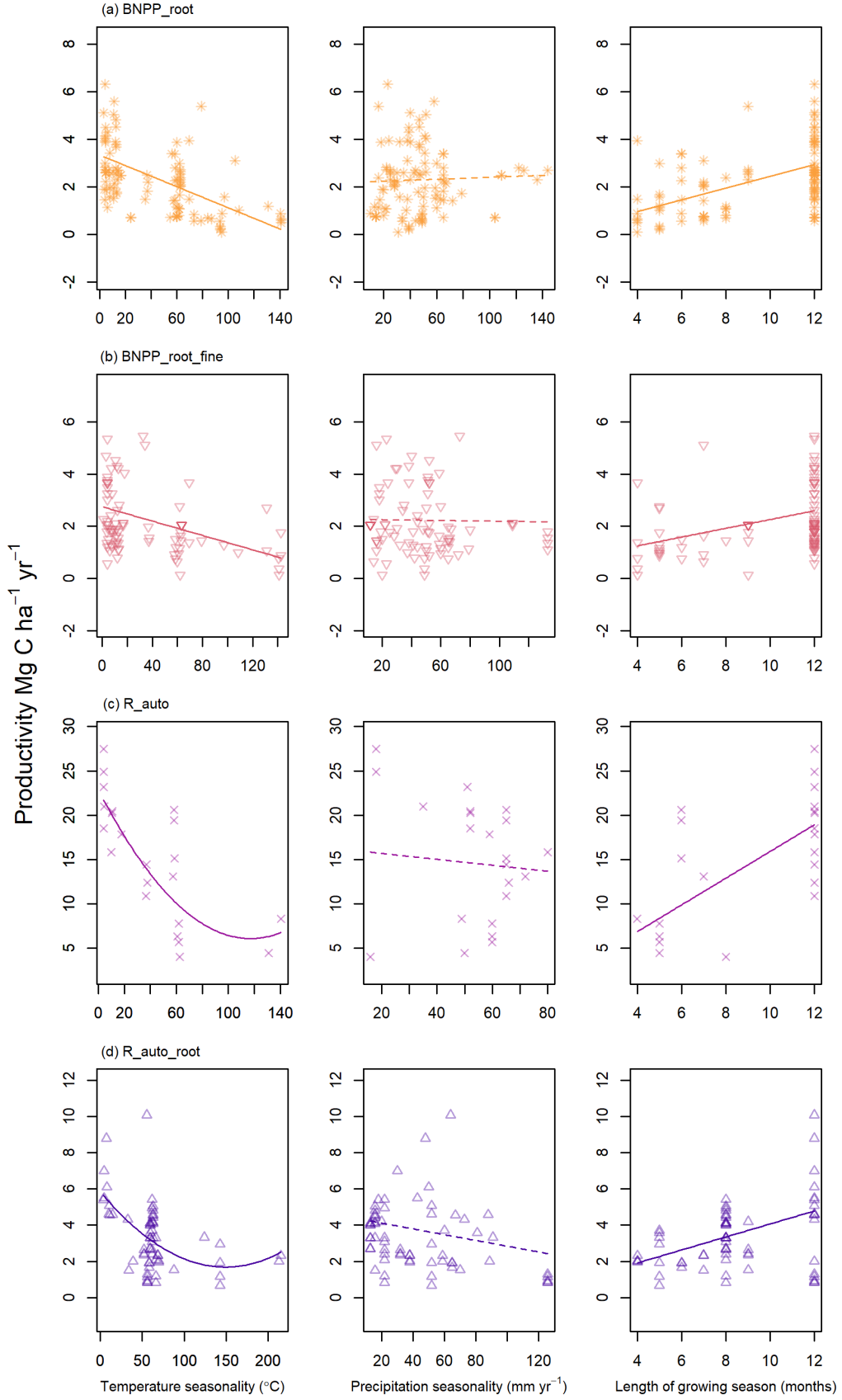
Individual plots of FACF in relation to mean annual climate, part 1.

Individual plots of FACF in relation to mean annual climate, part 2.

Figure S3.

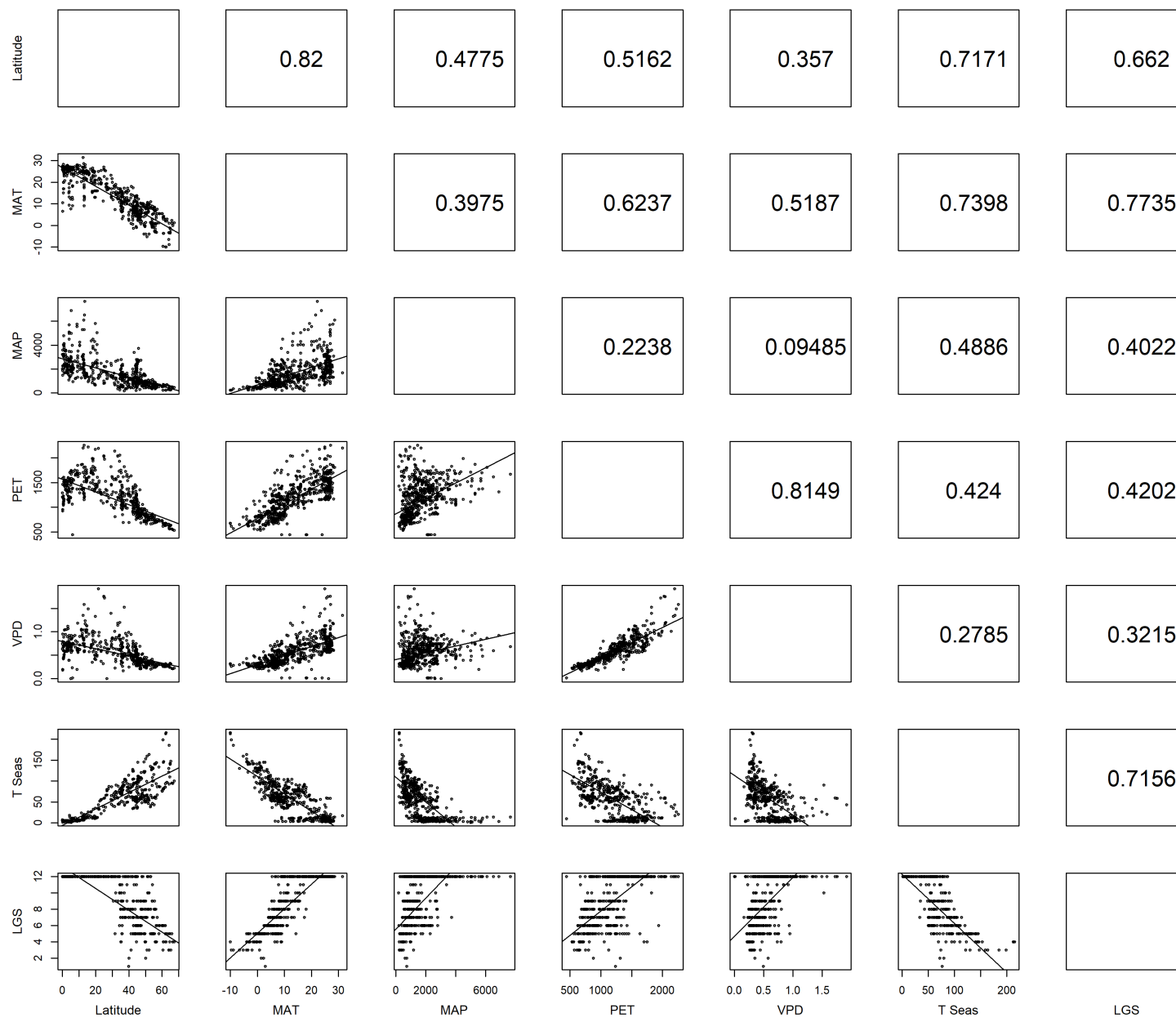Individual plots of FACF in relation to mean climate seasonality, part 1.

Individual plots of FACF in relation to mean climate seasonality, part 2.

Figure S__. Correlations among latitude and climate variables

Correlations among latitude and climate variables. Variable names and units given in Table S1