

Supplementary Material

Tab. S1 - Pearson's correlation coefficient (r) between climatic covariates calculated at monthly (above grey diagonal) and seasonal (below grey diagonal) basis. mT: mean temperature, mmT: mean minimum temperature, mMT: mean maximum temperature, RHm: mean relative humidity, RHmm: minimum relative humidity, P: precipitation, MP24: maximum precipitation in 24 hours, PAR: solar PAR radiation, mWS: mean wind speed, and MWS: absolute wind speed.

	mT	mmT	mMT	RHm	RHmm	P	MP24	PAR	mWS	MWS
mT		0.99	0.85	-0.67	-0.64	-0.29	-0.21	0.61	0.20	-0.51
mmT	0.99		0.81	-0.51	-0.72	-0.34	-0.27	0.58	0.23	-0.49
mMT	0.96	0.94		-0.49	-0.30	-0.10	-0.01	0.73	-0.16	-0.23
RHm	-0.69	-0.72	-0.60		0.68	0.10	0.09	-0.54	0.46	-0.41
RHmm	-0.74	-0.78	-0.66	0.98		0.39	0.35	-0.11	-0.43	0.36
P	-0.52	-0.56	-0.40	0.70	0.74		0.93	-0.27	-0.28	-0.06
MP24	-0.35	-0.39	-0.25	0.45	0.46	0.73		-0.21	-0.29	-0.05
PAR	0.66	0.65	0.65	-0.66	-0.62	-0.37	-0.28		-0.02	-0.07
mWS	0.06	0.04	0.03	-0.11	-0.15	-0.24	-0.14	-0.33		-0.67
MWS	-0.58	-0.58	-0.50	0.12	0.17	0.18	0.18	-0.31	0.65	

Tab. S2 - Comparison of different random structures of the Linear Mixed Models to assess the seasonality of leaf fall and litterfall in a monthly and seasonal basis, respectively. All models included the triple interaction between *site*, *year* and *month* or *season* (depend on the set of data). We compared models with different degree of temporal autocorrelation in the random structure using the Akaike’s Information Criteria adjusted for sample size (AICc). Selected model has AICc values in bold.

Evaluated model	<i>Monthly data</i>		<i>Seasonal data</i>	
	Leaf fall AICc	Litterfall AICc	Leaf fall AICc	Litterfall AICc
Non autoregressive structure	1541.6	1332.0	1118.4	951.8
Autoregressive (1)	1347.0	1255.8	1068.9	923.0
Autoregressive (2)	1348.4	1258.3	1071.6	925.0
Autoregressive (3)	1351.0	1258.9	1073.5	927.3
Autoregressive (4)	1352.4	1261.5	1070.9	928.7
Autoregressive (5)	1354.3	1262.9	1069.7	931.2
Autoregressive (6)	1350.1	1259.8	1071.3	929.5

Tab. S3 - Comparison of Linear Mixed Models to assess the effects of the seasonality of leaf fall and litterfall in a monthly and seasonal basis, respectively. The full model included the triple interaction between *site*, *year* and *month* or *season* (depend on the set of data). The model without the triple interaction included the pairwise interaction terms between fixed effects (i.e. interactions between *site* and *year*, between *site* and *month* or *season*, and between *year* and *month* or *season*). Model selection was performed based on the corrected Akaike’s Information Criteria (AICc). Selected model has AICc values in bold.

Evaluated model	<i>Monthly data</i>		<i>Seasonal data</i>	
	Leaf fall AICc	Litterfall AICc	Leaf fall AICc	Litterfall AICc
Full model	1244.6	1142.0	957.2	767.6
(-) triple interaction	1458.2	1288.1	1251.5	1038.5

Tab. S4 - Mean values (\pm SE) for each estimated parameter in the full models for evaluating the effect of climate covariates on seasonal leaf fall and litterfall. For all models, ‘*Hinojos*’ is the reference level for the site factor. mT: mean temperature, P: precipitation, mWS: mean wind speed. Asterisks depict statistically significant parameters ($p < 0.05$).

Parameter	Leaf fall	Litterfall
Intercept [‘ <i>Hinojos</i> ’]	0.13 (0.05)*	0.13 (0.05)*
Site [‘ <i>Montseny</i> ’]	0.60 (0.13)*	0.55 (0.14)*
mT	-8.20 (1.79)*	-5.66 (1.86)*
mT ²	0.40 (1.96)	0.42 (2.04)
P	1.69 (1.48)	2.40 (1.54)
P ²	-0.93 (1.33)	-2.38 (1.39)
mWS	-1.49 (1.08)	-4.29 (1.12)*
mWS ²	0.45 (1.02)	0.42 (1.06)
Site [‘ <i>Montseny</i> ’] \times mT	27.18 (4.84)*	22.90 (5.03)*
Site [‘ <i>Montseny</i> ’] \times mT ²	-2.80 (3.43)	-1.40 (3.57)
Site [‘ <i>Montseny</i> ’] \times P	-5.08 (2.32)*	-7.01 (2.42)*
Site [‘ <i>Montseny</i> ’] \times P ²	8.53 (2.23)*	9.84 (2.31)*
Site [‘ <i>Montseny</i> ’] \times mWS	6.35 (2.23)*	7.87 (2.32)*
Site [‘ <i>Montseny</i> ’] \times mWS ²	3.09 (2.62)	2.83 (2.73)

Fig. S1 - Model predictions and 95% CI for the effect of climatic covariates on seasonal litterfall in the study sites (*Montseny* and *Hinojos*). Litterfall for each covariate was predicted using a fixing mean value for the other two covariates.

