

Ecography

**E7438**

de Bello, F., Lavorel, S., Lavergne, S., Albert, C. H., Boulangeat, I., Mazel, F. and Thuiller, W. 2012. Hierarchical effects of environmental filters on the functional structure of plant communities: a case study in the French Alps. – *Ecography* 35: xxx–xxx.

**Supplementary material**

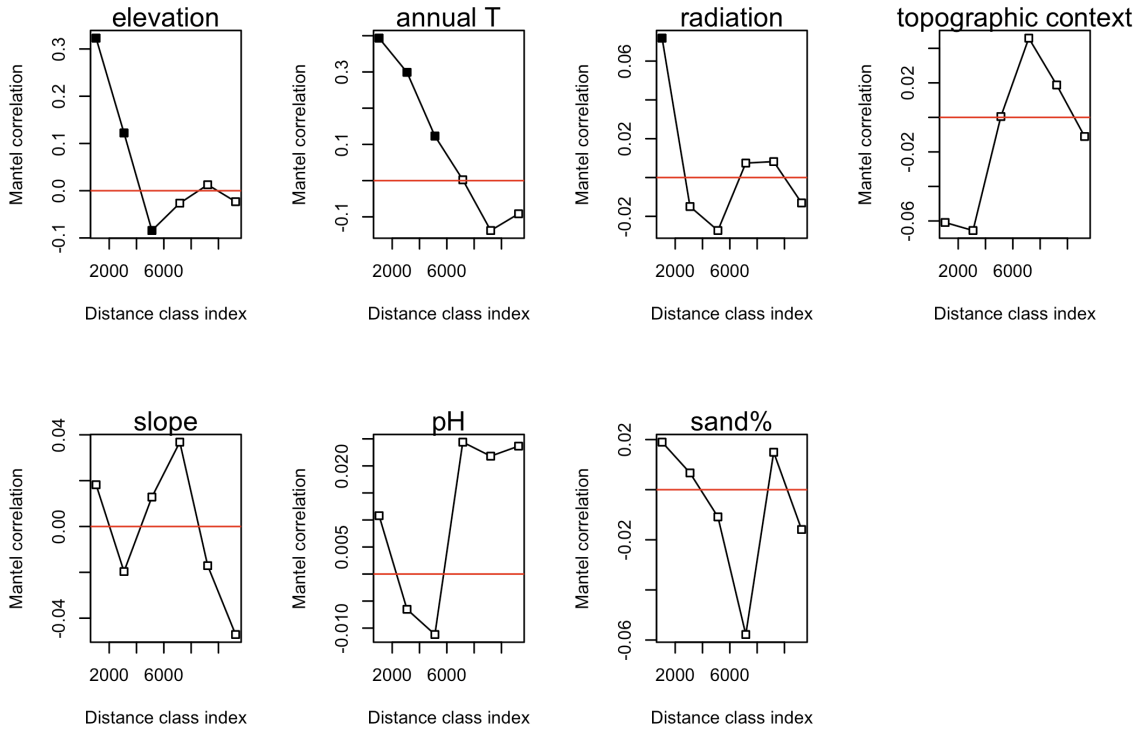
Appendix 1.

(A) Pearson correlation between selected environmental variables. Bold values denote significant ( $p < 0.05$ ) results. \* = removed from the analyses.

	pH	% sand	Altitude*	Pos. topog.	Slope	mean t°	Radiation	Residuals T° on altitude
pH	-	0.101	<b>-0.437</b>	0.089	0.246	<b>0.372</b>	-0.112	-0.235
% sand		-	-0.187	0.041	0.227	0.223	-0.230	-0.023
Altitude*			-	<b>-0.360</b>	-0.001	<b>-0.776</b>	0.109	<b>0.631</b>
Pos. topog.				-	-0.443	0.105	0.082	-0.441
Slope					-	0.161	-0.341	0.197
mean t°						-	-0.079	0.000
Radiation							-	0.075

(B)

Correlation between environmental values as a function of the geographic distance classes (in metres; in the abscissa) for each of the environmental factor considered. Significant points ( $p < 0.05$  as obtained by permutational Mantel tests) are given as black symbols.



Appendix 2. Variation of taxonomic diversity (as number of species and Simpson diversity index) and functional diversity for multiple traits (for functional richness and functional divergence for LHS, see methods for more details) along the different environmental variables considered. The absolute weight of evidence is shown for all significant ( $p < 0.1$ ) environmental variables is shown. The R-square corresponds to the strength of the relationship between the average predictions from the multi-GAM inference and the observed values. No environmental factors affected Functional Evenness significantly ( $R^2 = 0.14$ ). Numbers indicate the relative influence of the more significant environmental variables on the indices (the p-value is expressed by asterisks as \*\*\* =  $p < 0.001$ , \*\* =  $p < 0.01$ , \* =  $p < 0.05$  or by the specific value)..

	Taxonomic diversity		Functional diversity	
	Number of species	Simpson index	Functional richness LHS	Functional divergence LHS
Elevation (resid. t°)	24.9*	23.0*	16.8 <sup>(0.09)</sup>	
t° mean		23.0*	21.6***	22.0***
Radiation				
Topography			19.0*	18.7 <sup>(0.07)</sup>
Slope			20.7**	20.0*
pH				
Sand proportion	28.4***	26.4***		
R <sup>2</sup>	0.32	0.39	0.46	0.47

Appendix 3. Absolute weight of evidence of the different environmental variables to predict the four different indices of trait composition. The R-square corresponds to the strength of the relationship between the average predictions from the multi-GAM inference and the observed values.

Traits and predictors	CWM	Func. richness	Func. evenness	Func. divergence (Rao)
<u>Height</u>				
Elevation (resid. t°)	24.7 ***	17.6 <sup>(0.06)</sup>	19.2 <sup>(0.07)</sup>	11.9 <sup>(0.09)</sup>
t° mean	24.7 ***	20.7 *	14.67 <sup>(0.14)</sup>	19.9 *
	23.4 ***			
Radiation		20.7 *	15.93 <sup>(0.09)</sup>	14.5 <sup>(0.07)</sup>
Topography		22.2 ***	21.3 *	15.1 <sup>(0.06)</sup>
Slope				
pH				
Sand proportion				
R <sup>2</sup>	0.72	0.42	0.31	0.43
<u>SLA</u>				
Elevation (resid. t°)	26.1 ***	26.3 *	-	25.1 ***
t° mean	26.0 ***	22.5 *		29.5 *
Radiation	22.8 *			
Topography		17.1 <sup>(0.09)</sup>		
Slope				18.11 <sup>(0.07)</sup>
pH				
Sand proportion				
R <sup>2</sup>	0.48	0.29	0.16	0.37
<u>LDMC</u>				
elevation (resid. t°)			-	
t° mean	28.6 ***	20.3 ***		20.7 ***
radiation	28.2 ***			
topography		16.4 *		15.3 <sup>(0.06)</sup>
slope		16.6 *		18.5 *
pH				17.7 *
sand proportion				
R <sup>2</sup>	0.26	0.38	0.25	0.41
<u>Leaf N</u>				
Elevation (resid. t°)	20.8 *	23.4 ***	-	
t° mean		23.4 ***		28.4 ***
Radiation	22.3 *	20.6 *		
Topography				
Slope				19.9 <sup>(0.07)</sup>
pH	15.9 <sup>(0.09)</sup>			
Sand proportion	15.8 <sup>(0.10)</sup>			
R <sup>2</sup>	0.31	0.54	0.18	0.37
<u>Seed weight</u>				
Elevation (resid. t°)	26.1 ***		-	
t° mean	26.3 ***	22.5 *		21.7 ***
Radiation		15.8 <sup>(0.10)</sup>		18.0 *
Topography				
Slope		18.2 <sup>(0.09)</sup>		
pH				18.0 *
Sand proportion				
R <sup>2</sup>	0.46	0.29	0.16	0.40

Appendix 4. Response of the proportion of herbs and chamaephytes (subshrubs) and FDiv LHS with slope. Fitted lines show significant ( $p < 0.05$ ) patterns.

