

Ecography

**ECOG-00237**

Dubuis, A., Rossier, L., Pottier, J., Pellissier, L., Vittoz, P. and Guisan, A. 2013. Predicting current and future spatial community patterns of plant functional traits. – *Ecography* 36: xxx–xxx.

**Supplementary material**

## Appendix 1

**Table A1.** Pearson correlation values between all topo-climatic and edaphic variables used as predictors in the models.

	pH	P	Cl	Sa	Degree day	Slope	Moisture	Radiation	Topo
<b>N</b>	0.05	0.43	0.41	-0.28	-0.17	-0.18	0.05	0.09	0.18
<b>pH</b>		0.07	-0.11	-0.13	0	0.15	0.02	0.06	-0.09
<b>P</b>			0.25	-0.18	-0.09	-0.23	-0.03	0.04	0.1
<b>Cl</b>				-0.7	0.09	-0.1	-0.2	0.23	0.02
<b>Sa</b>					-0.04	0.06	0.1	-0.08	0.04
<b>Degree day</b>						-0.26	-0.83	0.06	-0.57
<b>Slope</b>							0.33	-0.1	0.22
<b>Moisture</b>								-0.43	0.45
<b>Radiation</b>									0.09

**Table A2.** R<sup>2</sup> and p-values resulting from linear regressions between functional indices for each traits and each environmental predictor.

		degree-days		moisture		solar radiation		slope		topographic position		N		pH		P		CI		Sa	
		R2	p-val	R2	p-val	R2	p-val	R2	p-val	R2	p-val	R2	p-val	R2	p-val	R2	p-val	R2	p-val	R2	p-val
log H	Rao	0.021	0.133	0.012	0.308	0.011	0.351	0.040	0.021	0.018	0.170	0.006	0.574	0.011	0.358	0.029	0.061	0.018	0.182	0.002	0.804
	FEve	0.024	0.095	0.015	0.236	0.012	0.330	0.012	0.316	0.023	0.109	0.011	0.338	0.028	0.066	0.003	0.743	0.013	0.274	0.015	0.242
	FRic	0.064	0.002	0.035	0.032	0.002	0.801	0.031	0.047	0.010	0.393	0.019	0.160	0.025	0.085	0.025	0.086	0.017	0.189	0.006	0.561
	CWM	0.412	0.000	0.352	0.000	0.026	0.084	0.005	0.649	0.107	0.000	0.036	0.030	0.100	0.000	0.005	0.609	0.129	0.000	0.030	0.057
	5 <sup>th</sup> qu	0.598	0.000	0.515	0.000	0.033	0.042	0.023	0.110	0.184	0.000	0.010	0.385	0.070	0.001	0.005	0.609	0.112	0.000	0.040	0.019
	95 <sup>th</sup> qu	0.576	0.000	0.439	0.000	0.010	0.368	0.005	0.602	0.149	0.000	0.020	0.144	0.126	0.000	0.000	0.988	0.175	0.000	0.044	0.013
log SLA	Rao	0.266	0.000	0.193	0.000	0.007	0.520	0.015	0.244	0.083	0.000	0.038	0.026	0.100	0.000	0.003	0.748	0.023	0.111	0.001	0.883
	FEve	0.015	0.244	0.011	0.341	0.007	0.494	0.030	0.052	0.046	0.011	0.020	0.146	0.008	0.466	0.005	0.594	0.002	0.810	0.012	0.312
	FRic	0.380	0.000	0.282	0.000	0.004	0.687	0.049	0.008	0.097	0.000	0.059	0.003	0.029	0.059	0.004	0.681	0.026	0.079	0.006	0.580
	CWM	0.435	0.000	0.316	0.000	0.003	0.783	0.033	0.042	0.210	0.000	0.048	0.009	0.107	0.000	0.003	0.784	0.013	0.279	0.012	0.318
	5 <sup>th</sup> qu	0.648	0.000	0.527	0.000	0.019	0.157	0.058	0.003	0.218	0.000	0.029	0.060	0.047	0.010	0.002	0.849	0.016	0.213	0.012	0.317
	95 <sup>th</sup> qu	0.353	0.000	0.223	0.000	0.003	0.749	0.008	0.456	0.134	0.000	0.009	0.440	0.115	0.000	0.004	0.712	0.176	0.000	0.022	0.115
log LDMC	Rao	0.093	0.000	0.057	0.004	0.011	0.347	0.004	0.654	0.041	0.018	0.029	0.058	0.092	0.000	0.006	0.588	0.024	0.099	0.010	0.388
	FEve	0.030	0.053	0.012	0.321	0.039	0.023	0.032	0.042	0.017	0.190	0.029	0.061	0.031	0.047	0.002	0.806	0.001	0.923	0.017	0.197
	FRic	0.078	0.000	0.061	0.002	0.017	0.199	0.008	0.480	0.051	0.007	0.003	0.737	0.064	0.002	0.001	0.890	0.012	0.313	0.033	0.039
	CWM	0.034	0.035	0.038	0.024	0.022	0.121	0.055	0.004	0.079	0.000	0.046	0.012	0.030	0.056	0.023	0.106	0.067	0.001	0.009	0.413
	5 <sup>th</sup> qu	0.008	0.471	0.028	0.066	0.018	0.176	0.016	0.207	0.024	0.095	0.042	0.017	0.015	0.234	0.005	0.651	0.032	0.042	0.001	0.890
	95 <sup>th</sup> qu	0.391	0.000	0.312	0.000	0.016	0.218	0.049	0.008	0.234	0.000	0.031	0.050	0.097	0.000	0.022	0.123	0.019	0.158	0.004	0.685
log LNC	Rao	0.093	0.000	0.049	0.008	0.022	0.124	0.014	0.270	0.045	0.012	0.038	0.025	0.025	0.086	0.002	0.811	0.046	0.011	0.010	0.365
	FEve	0.017	0.187	0.005	0.647	0.020	0.138	0.002	0.793	0.015	0.243	0.016	0.211	0.004	0.654	0.009	0.402	0.000	0.993	0.003	0.742
	FRic	0.186	0.000	0.124	0.000	0.002	0.869	0.024	0.096	0.118	0.000	0.029	0.060	0.005	0.631	0.010	0.379	0.027	0.071	0.014	0.253
	CWM	0.204	0.000	0.180	0.000	0.006	0.547	0.019	0.165	0.123	0.000	0.028	0.064	0.111	0.000	0.003	0.773	0.000	0.979	0.019	0.153
	5 <sup>th</sup> qu	0.229	0.000	0.188	0.000	0.003	0.784	0.062	0.002	0.113	0.000	0.006	0.542	0.037	0.028	0.002	0.820	0.005	0.620	0.015	0.229
	95 <sup>th</sup> qu	0.003	0.762	0.019	0.153	0.032	0.045	0.003	0.752	0.015	0.238	0.064	0.002	0.087	0.000	0.042	0.016	0.153	0.000	0.042	0.016
log SM	Rao	0.025	0.108	0.025	0.109	0.001	0.951	0.060	0.005	0.004	0.715	0.019	0.182	0.028	0.083	0.027	0.093	0.024	0.118	0.007	0.560
	FEve	0.034	0.050	0.028	0.080	0.018	0.201	0.017	0.215	0.010	0.434	0.061	0.004	0.074	0.001	0.004	0.684	0.067	0.002	0.009	0.439
	FRic	0.016	0.235	0.028	0.082	0.005	0.654	0.064	0.003	0.052	0.010	0.031	0.064	0.064	0.003	0.053	0.009	0.041	0.025	0.004	0.708
	CWM	0.135	0.000	0.178	0.000	0.038	0.033	0.005	0.664	0.034	0.048	0.120	0.000	0.081	0.001	0.018	0.214	0.294	0.000	0.011	0.365
	5 <sup>th</sup> qu	0.243	0.000	0.218	0.000	0.006	0.578	0.066	0.003	0.051	0.010	0.040	0.029	0.115	0.000	0.009	0.465	0.184	0.000	0.017	0.230
	95 <sup>th</sup> qu	0.018	0.208	0.011	0.388	0.021	0.150	0.044	0.019	0.023	0.132	0.066	0.003	0.031	0.062	0.015	0.271	0.108	0.000	0.004	0.690

**Table A3:** Correlation coefficients between the functional indices for all traits and species richness

	<b>log (H)</b>	<b>log (SLA)</b>	<b>log (LDMC)</b>	<b>log (LNC)</b>	<b>log (SM)</b>
<b>Rao</b>	0.264	0.316	0.219	0.258	0.051
<b>FEve</b>	-0.117	-0.063	0.007	0.002	-0.267
<b>FRic</b>	0.564	0.471	0.368	0.403	0.517
<b>CWM</b>	0.403	0.120	0.269	-0.003	0.447
<b>5<sup>th</sup> qu</b>	0.165	-0.008	0.019	-0.176	0.145
<b>95<sup>th</sup> qu</b>	0.452	0.383	0.146	0.412	0.394

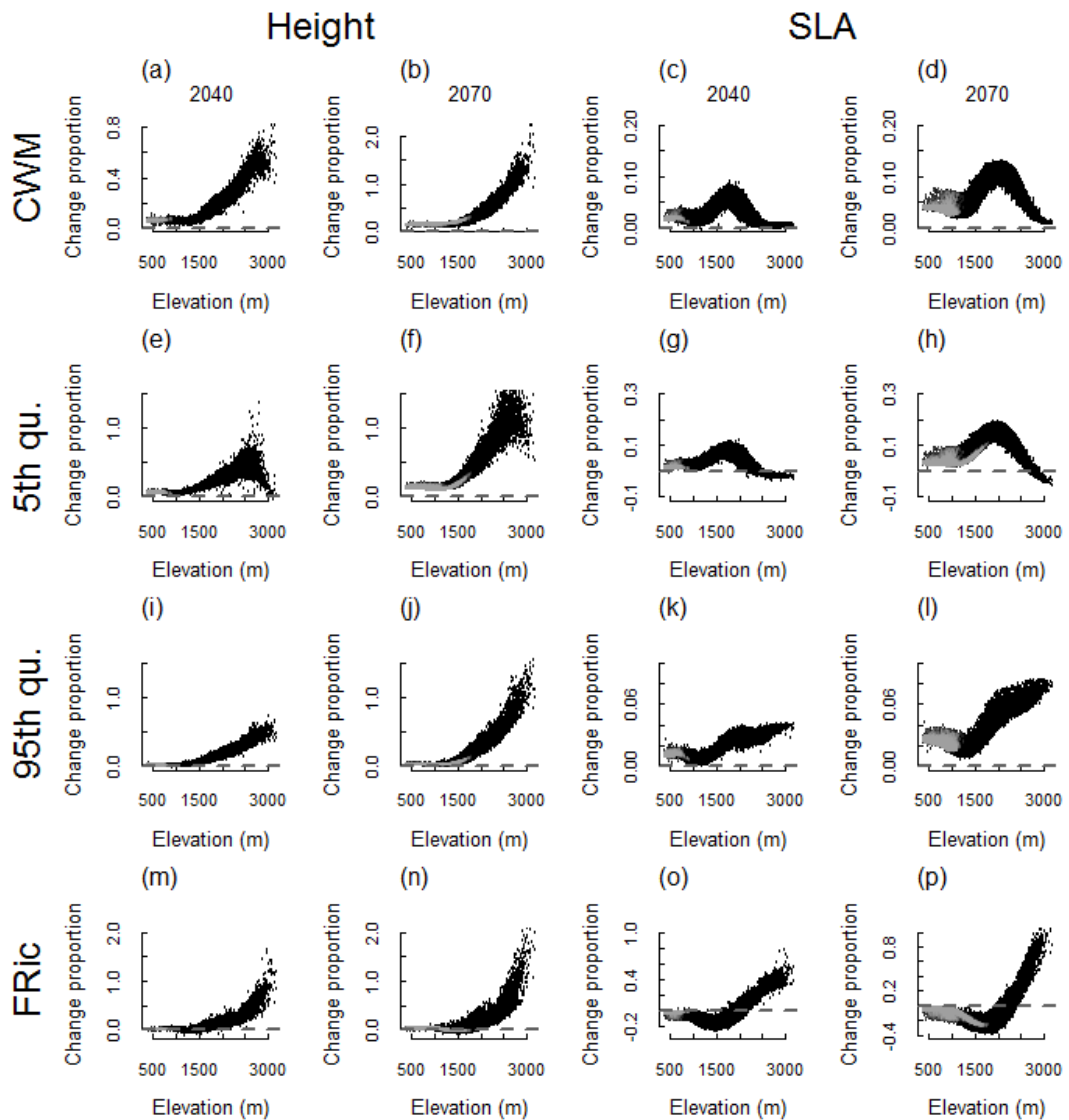
**Table A4:** Results of the variance partitioning analysis for each group of predictors and each combination of these groups predictors (TC = topo-climatic, CH = chemical edaphic and PH = physical edaphic), for the models for each index (FEve = functional evenness, FRic = functional richness, CWM = community weighted mean, 5<sup>th</sup> qu. = 5<sup>th</sup> quantile, 95<sup>th</sup> qu. = 95<sup>th</sup> quantile ) and each trait (H = height, SLA =specific leaf area, LDMC = leaf dry matter content, LNC = leaf nitrogen content, SM=seed mass).

		PH	CH	CL	CH+PH	CL+CH	CL+PH	CL+CH+PH	Unexplained
<b>log (H)</b>	<b>Rao</b>	0.047	0.071	0.126	0.012	0.034	0.014	-0.013	0.710
	<b>FEve</b>	0.048	0.059	0.098	-0.002	0.020	0.003	-0.007	0.781
	<b>FRic</b>	0.038	0.041	0.169	0.029	0.015	0.017	0.004	0.687
	<b>CWM</b>	0.050	0.066	0.358	0.001	0.094	0.044	0.103	0.284
	<b>5<sup>th</sup> qu</b>	0.044	0.031	0.494	0.003	0.066	0.051	0.087	0.223
	<b>95<sup>th</sup> qu</b>	0.035	0.030	0.401	0.041	0.091	0.059	0.122	0.221
<b>log (SLA)</b>	<b>Rao</b>	0.013	0.080	0.338	0.035	0.104	0.021	-0.011	0.420
	<b>FEve</b>	0.060	0.071	0.123	0.003	0.012	0.015	0.000	0.715
	<b>FRic</b>	0.013	0.048	0.410	0.055	0.150	0.052	0.002	0.272
	<b>CWM</b>	0.020	0.117	0.360	0.023	0.158	0.024	0.001	0.297
	<b>5<sup>th</sup> qu</b>	0.011	0.059	0.559	0.007	0.136	0.071	-0.033	0.190
	<b>95<sup>th</sup> qu</b>	0.065	0.056	0.260	0.058	0.092	0.031	0.057	0.380
<b>log (LDMC)</b>	<b>Rao</b>	0.031	0.156	0.136	0.025	0.074	0.014	-0.008	0.572
	<b>FEve</b>	0.038	0.090	0.123	-0.006	0.045	0.010	-0.003	0.705
	<b>FRic</b>	0.053	0.055	0.163	0.028	0.013	0.017	-0.003	0.675
	<b>CWM</b>	0.056	0.163	0.140	0.018	0.069	0.008	0.018	0.528
	<b>5<sup>th</sup> qu</b>	0.040	0.083	0.187	0.046	-0.002	-0.018	0.000	0.663
	<b>95<sup>th</sup> qu</b>	0.025	0.148	0.349	0.005	0.116	0.053	-0.016	0.320
<b>log (LNC)</b>	<b>Rao</b>	0.040	0.076	0.183	0.038	0.066	0.024	-0.007	0.579
	<b>FEve</b>	0.030	0.066	0.094	-0.008	0.012	-0.004	0.000	0.809
	<b>FRic</b>	0.064	0.054	0.302	0.087	0.057	0.060	-0.034	0.410
	<b>CWM</b>	0.041	0.157	0.238	0.023	0.104	-0.002	-0.009	0.449
	<b>5<sup>th</sup> qu</b>	0.037	0.065	0.331	0.022	0.061	0.020	-0.007	0.471
	<b>95<sup>th</sup> qu</b>	0.096	0.048	0.086	0.114	0.016	0.004	0.059	0.577
<b>log (SM)</b>	<b>Rao</b>	0.028	0.118	0.161	0.017	0.025	0.017	0.003	0.632
	<b>FEve</b>	0.062	0.098	0.082	0.050	0.036	0.003	0.018	0.649
	<b>FRic</b>	0.025	0.203	0.166	0.031	0.132	0.021	0.021	0.401
	<b>CWM</b>	0.096	0.082	0.145	0.155	0.011	0.035	0.144	0.333
	<b>5<sup>th</sup> qu</b>	0.062	0.036	0.197	0.063	0.058	0.016	0.096	0.472
	<b>95<sup>th</sup> qu</b>	0.030	0.153	0.212	0.078	0.026	0.032	0.066	0.403

**Table A5:** R<sup>2</sup> and Spearman correlations between the observed and predicted functional indices values for models with topo-climatic predictors only. The lines in bold are the indices used for projections across space and time.

		R <sup>2</sup>	Cor		R <sup>2</sup>	Cor	
<b>log (H)</b>	<b>Rao</b>	0.055	0.263	<b>log (N)</b>	<b>Rao</b>	0.125	0.373
	<b>FEve</b>	0.071	0.266		<b>FEve</b>	0.109	0.346
	<b>FRic</b>	0.174	0.424		<b>FRic</b>	0.126	0.365
	<b>CWM</b>	0.677	0.820		<b>CWM</b>	0.242	0.502
	<b>5<sup>th</sup> qu</b>	0.655	0.812		<b>5<sup>th</sup> qu</b>	0.148	0.394
	<b>95<sup>th</sup> qu</b>	0.719	0.850		<b>95<sup>th</sup> qu</b>	0.221	0.481
<b>log (SLA)</b>	<b>Rao</b>	0.266	0.525	<b>log (SM)</b>	<b>Rao</b>	0.042	0.223
	<b>FEve</b>	0.065	0.264		<b>FEve</b>	0.205	0.472
	<b>FRic</b>	0.408	0.644		<b>FRic</b>	0.132	0.379
	<b>CWM</b>	0.513	0.723		<b>CWM</b>	0.352	0.598
	<b>5<sup>th</sup> qu</b>	0.695	0.832		<b>5<sup>th</sup> qu</b>	0.298	0.546
	<b>95<sup>th</sup> qu</b>	0.506	0.719		<b>95<sup>th</sup> qu</b>	0.176	0.436
<b>log (LDMC)</b>	<b>Rao</b>	0.124	0.359				
	<b>FEve</b>	0.099	0.323				
	<b>FRic</b>	0.086	0.310				
	<b>CWM</b>	0.164	0.412				
	<b>5<sup>th</sup> qu</b>	0.118	0.343				
	<b>95<sup>th</sup> qu</b>	0.297	0.558				

Figure A1



**Figure A1.** The proportions of change in community weighted mean (CWM), 5<sup>th</sup> and 95<sup>th</sup> quantiles and functional richness (FRic) of specific leaf area (SLA) and vegetative height (H) predicted between present conditions and 2040 and current conditions and 2070 according to the A1FI climate change scenario. Data apply to all pixels of the study area and are plotted along elevation. The portion of the study area in which the predicted climate does not currently occur is represented in grey; the dashed line indicates the absence of change.

**Figure A2**

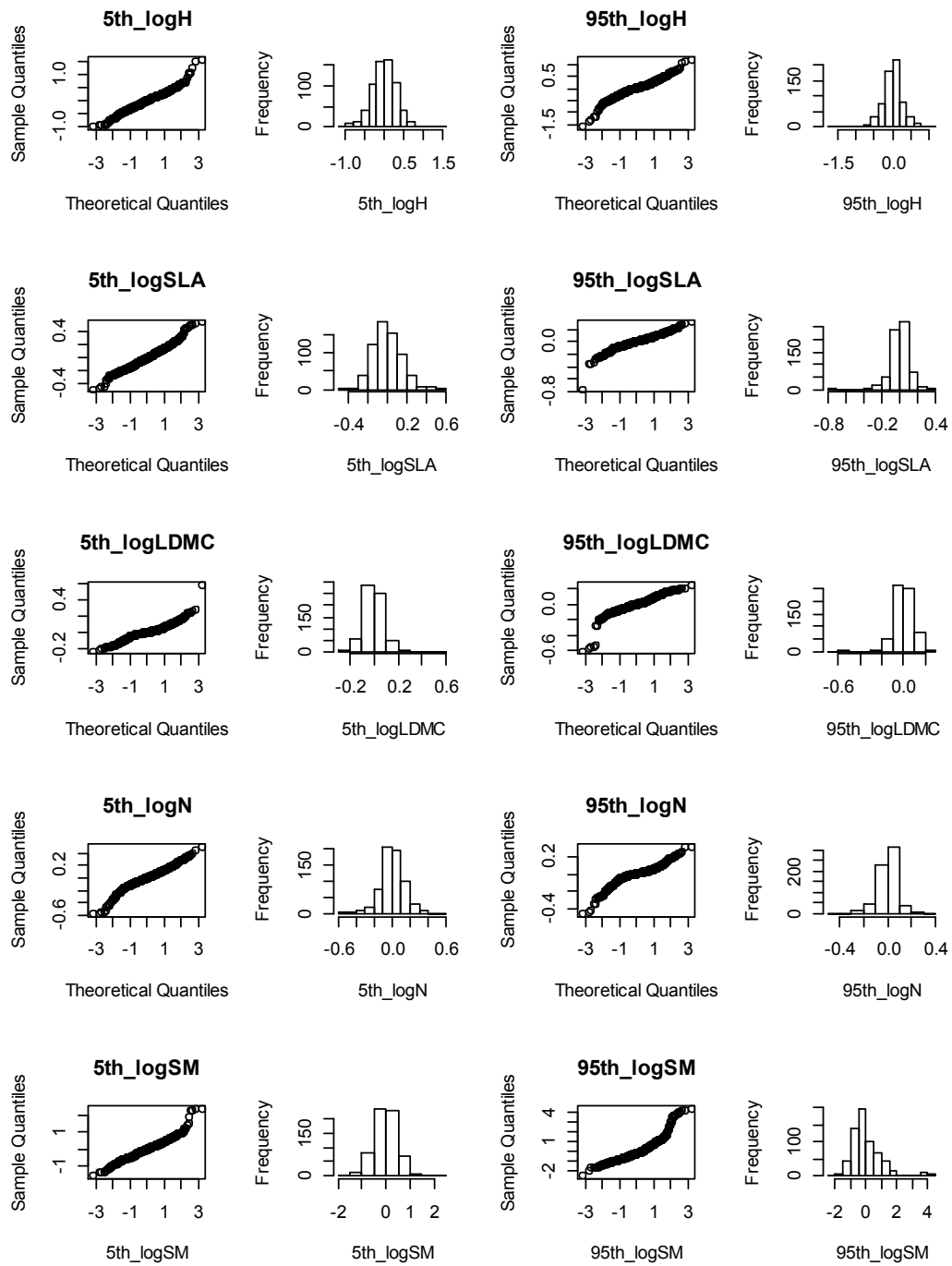
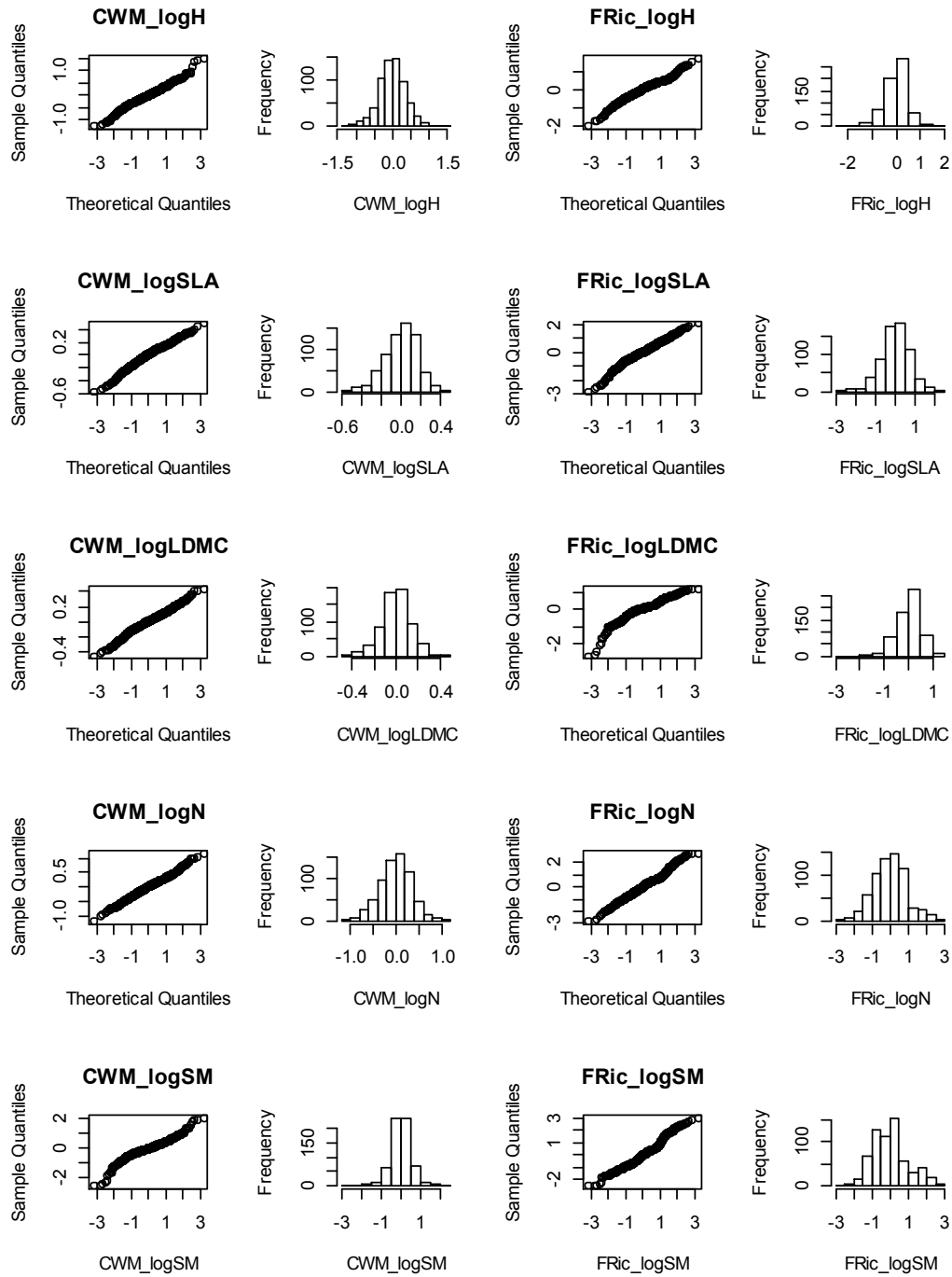
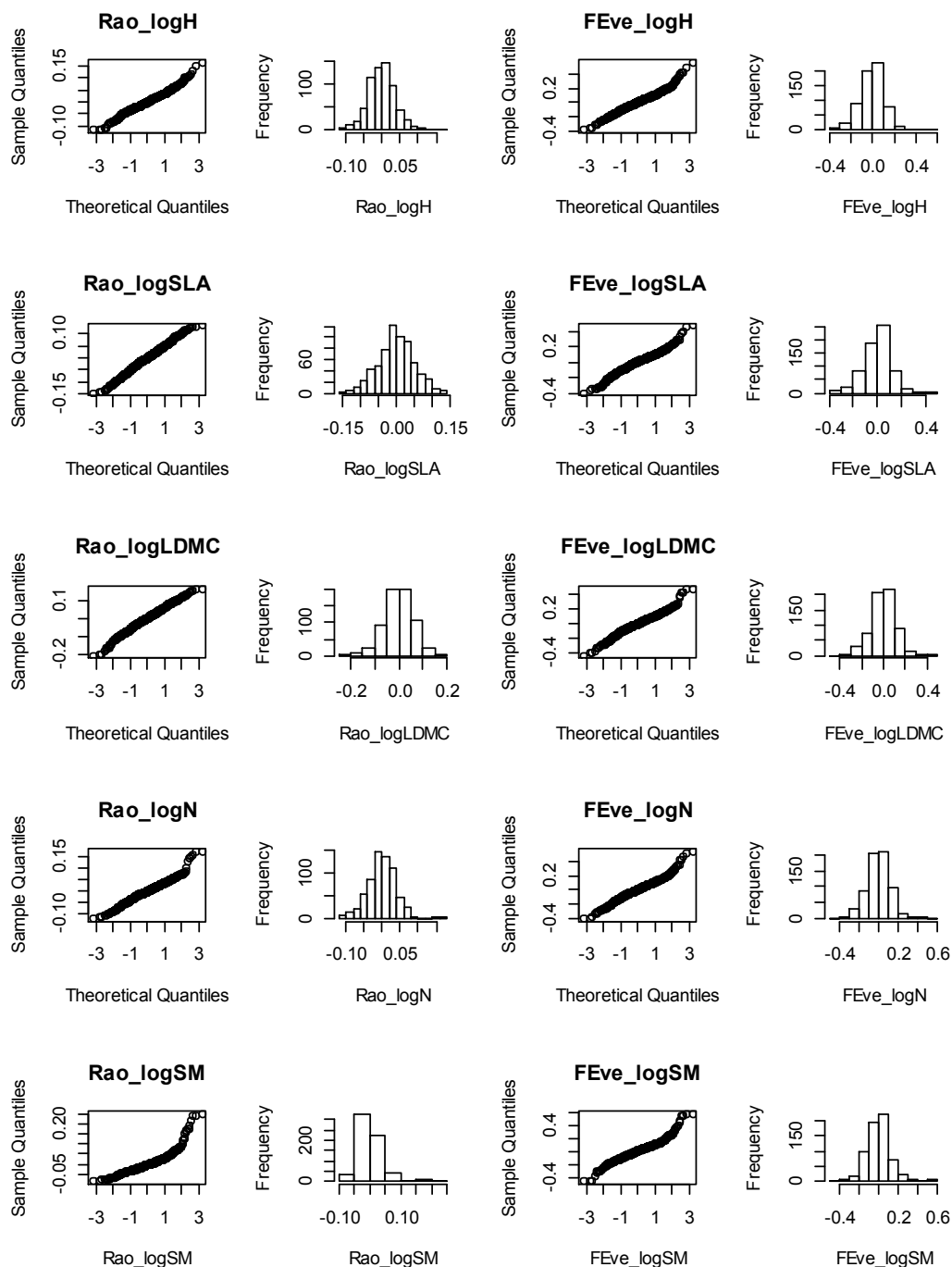




Figure A2 (continued)



**Figure A2 (continued)**



**Figure A2.** Quantile-quantile plots and histograms of the distribution of the residuals resulting of the model build with topo-climatic predictors and used for spatial projections, for each index (FEve = functional evenness, FRic = functional richness, CWM = community wheighted mean, 5<sup>th</sup> qu. = 5<sup>th</sup> quantile, 95<sup>th</sup> qu. = 95<sup>th</sup> quantile ) and each trait (H = height, SLA =specific leaf area, LDMC = leaf dry matter content, LNC = leaf nitrogen content, SM=seed mass).