

Spatial distribution of environmental indicators in surface sediments of Lake Bolshoe Toko, Yakutia, Russia

Biskaborn et al.

Supplementary Material

Multivariate statistics on diatom data

Table a Results of DCA, PCA and RDA analysis. RDA is constrained to 5 significant variables.

	Axis 1	Axis 2	Axis 3	Axis 4	
DCA					
Eigenvalues :	0.226	0.081	0.052	0.036	
Lengths of gradient :	2.069	1.487	0.996	1.019	
Cumulative percentage variance of species data	16.4	22.2	26.0	28.6	
Sum of all eigenvalues					1.381
PCA					
Eigenvalues :	0.217	0.180	0.113	0.067	:
Cumulative percentage variance of species data	21.7	39.6	51.0	57.6	
Sum of all eigenvalues					1.000
RDA all variables					
Eigenvalues	0.217	0.180	0.113	0.067	
Taxon -environment correlations	1.000	1.000	1.000	1.00	
Cumulative % variance of taxon data	21.7	39.6	51.0	57.6	
Of taxon-environment relation	21.7	39.6	51.0	57.6	
Sum of all canonical eigenvalues					1.000
RDA with 8 significant variables					
Eigenvalues	0.175	0.106	0.085	0.047	
Taxon -environment correlations	0.918	0.833	0.863	0.951	
Cumulative % variance of taxon data	17.5	28.1	36.6	41.3	
Of taxon-environment relation	34.4	55.3	72.1	81.4	
Sum of all canonical eigenvalues					0.507

Table b Significance of variables as identified by manual forward selection in RDA and the variance they explain. Forward-selected variable was tested by a Monte Carlo permutation test (999 unrestricted permutation, $P \leq 0.05$)

Variable	Added with selection	P value estimates	F value
Vegetation	0.121	0.008	2.900
TOC/N	0.08	0.016	2.032
TC	0.07	0.020	1.892
EM 3	0.07	0.022	1.868
Sand	0.05	0.030	1.457
WD	0.046	0.031	2.196
Distance to the Shore	0.04	0.034	1.907
Distance to the River	0.03	0.046	1.774
Total variance explained by significant variables	0.507		
SmecChlo	0.048	0.106	1.55
Quarz	0.036	0.230	1.238
Clay	0.033	0.264	1.233
EM 1	0.030	0.402	1.052
KoalChlo	0.026	0.690	0.769
Total variance	0.680		

Multivariate statistics on chironomid data

Table c Results of DCA, PCA and RDA analysis. RDA is constrained to 5 significant variables.

	Axis 1	Axis 2	Axis 3	Axis 4
DCA				
Eigenvalues :	0.562	0.329	0.161	0.084
Lengths of gradient :	3.784	3.508	1.890	1.745
Cumulative percentage variance of species data	17.2	27.3	32.2	34.8
Sum of all eigenvalues	3.263			

PCA						
Eigenvalues	:	0.281	0.193	0.129	0.075	:
Cumulative percentage variance of species data		28.1	47.4	60.4	67.9	
Sum of all eigenvalues						1.000
RDA all variables						
Eigenvalues		0.289	0.177	0.134	0.077	
Taxon -environment correlations		1.000	1.000	1.000	1.000	
Cumulative % variance of taxon data		28.9	46.7	60.1	67.8	
Of taxon-environment relation		28.9	46.7	60.1	67.8	
Sum of all canonical eigenvalues						1.000
RDA with 4 significant variables						
Eigenvalues		0.200	0.150	0.062	0.023	
Taxon -environment correlations		0.881	0.932	0.895	0.683	
Cumulative % variance of taxon data		20.0	35.0	41.2	43.4	
Of taxon-environment relation		46.0	80.5	94.8	100.0	
Sum of all canonical eigenvalues						0.435

Table d Significance of variables as identified by manual forward selection in RDA and the variance they explain. Forward-selected variable was tested by a Monte Carlo permutation test (999 unrestricted permutation, $P \leq 0.05$)

Variable	Added with selection	P value estimates	F value
TOC/N	0.172	0.001	3.316
WD	0.106	0.031	2.196
Distance to the River	0.081	0.056	1.774
Vegetation	0.076	0.059	1.738
Total variance explained by significant variables	0.435		
TC	0.053	0.249	1.243
Distance to the Shore	0.049	0.499	0.907
Silt	0.035	0.629	0.795
Clay	0.031	0.774	0.69
Total variance	0.603		

End-member analysis of grain-size data

Figure A End-member modelling results. Mean coefficient of determination r^2 as function of grain size classes (left) and for samples (right).

