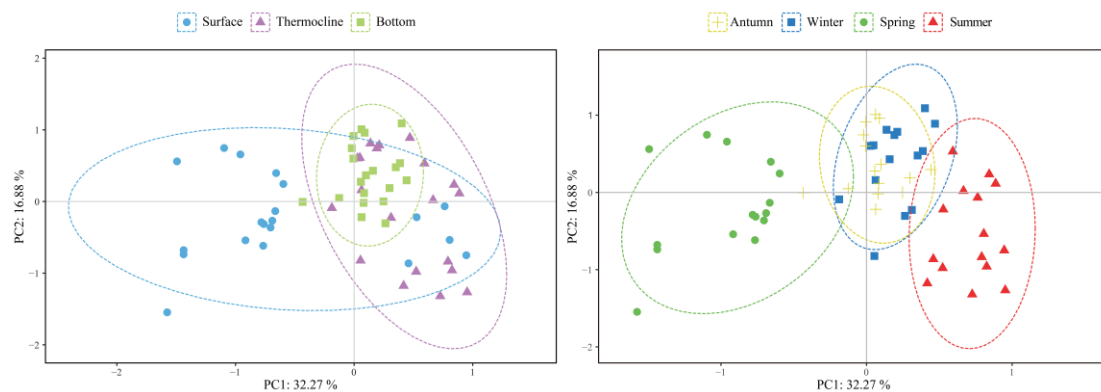


# Phytoplankton Communities' Response to Thermal Stratification and Changing Environmental Conditions in a Deep-Water Reservoir: Stochastic and Deterministic Processes



**Supplementary Figure S1.** Principal component analysis (PCA) of water environmental factors (A) Spatial variation (B) Season variation (Environmental factors include WT (°C), pH, Cond (μS/cm), TDS (mg/L), ORP (mV), DO (mg/L), COD<sub>Mn</sub> (mg/L), TOC (mg/L), TP (mg/L), TN (mg/L), NO<sub>3</sub><sup>-</sup>-N (mg/L) and NH<sub>4</sub><sup>+</sup>-N (mg/L))

**Supplementary Table S1** Depth and transparency (Secchi depth [SD]) at sampling sites.

Sampling point	Autumn 2021		Winter 2022		Spring 2022		Summer 2022	
	Depth (m)	SD (m)	Depth (m)	SD (m)	Depth (m)	SD (m)	Depth (m)	SD (m)
S1	49	4.2	43	4.3	19.5	5.0	37	3.8
S2	40	5.2	27	4.2	20	4.0	27	4.2
S3	34	5.6	19	4.3	35	4.0	19	4.3
S4	31	4.7	26	5.2	49	5.0	28	4.0
S5	40	5.2	53	4.0	40	3.9	46	4.5

**Supplementary Table S2.** Dominant species and dominance degree of phytoplankton.

Phylum	Species	Surface	Thermocline	Bottom
Cyanobacteria	<i>Anabaena</i> sp.	0.051	0.104	0.057
	<i>Chroococcus</i> sp.	-	0.315	0.128
	<i>Merismopedia punctata</i> Meyen	0.114	-	-
	<i>Microcystis</i> sp.	0.157	0.253	0.272
	<i>M. marginata</i> Kützing	0.261	0.039	-
Chlorophyta	<i>Chlamydomonas</i> sp.	0.027	-	0.026
	<i>Chlorella vulgaris</i> Beijerinck	0.067	-	-
	<i>Coelastrum altaicum</i> Skvortzov	0.098	-	-
	<i>Oocystis lacustris</i> Chodat	0.111	0.072	0.024
	<i>O. naegelii</i> A.Braun	-	0.037	0.03
	<i>Pandorina morum</i> (O.F.Müller) Bory	0.055	-	0.033
	<i>Pediastrum duplex</i> Meyen	-	0.034	-
	<i>Scenedesmus</i> sp.	-	-	0.047
	<i>S. bijugus</i> Kützing	0.099	0.024	0.07
	<i>S. quadricauda</i> (Turpin) Brébisson	0.043	-	-
	<i>Staurastrum</i> sp.	-	0.023	-
Bacillariophyta	<i>Asterionella</i> sp.	-	0.092	-
	<i>Aulacoseira granulate</i> (Ehrenberg) Simonsen	0.054	0.155	0.253
	<i>Cocconeis placentula</i> Ehrenberg	0.304	0.097	0.031
	<i>Cyclotella</i> sp.	0.366	0.735	0.980
	<i>C. meneghiniana</i> Kützing	0.464	0.778	0.731
	<i>Cymbella</i> sp.	0.033	0.024	—
	<i>Fragilaria</i> sp.	0.020	0.026	0.275
	<i>Navicula</i> sp.	0.023	-	-
	<i>Navicula cincta</i> (Ehrenberg) Ralfs	0.048	0.085	0.051
	<i>Synedra</i> sp.	0.038	0.035	0.105
Euglenophyta	<i>Trachelomonas</i> sp.	0.026	-	-
Ochrophyta	<i>Dinobryon</i> sp.	0.043	-	-
Dinophyta	<i>Ceratium hirundinella</i> (O.F.Müller) Dujardin	0.113	0.065	0.082
	<i>Peridinium</i> sp.	0.491	0.143	0.039
Cryptophyta	<i>Cryptomonas</i> sp.	0.037	0.096	0.120
	<i>C. ovata</i> Ehrenberg	-	0.027	-

Note: “-” indicates that this species appeared during the study period but was not the dominant species.  
This study defines dominance degree  $\geq 0.02$  as the dominant species

**Supplementary Table S3** Permutational multivariate analysis of variance among phytoplankton communities at different depths.

	<b>R<sup>2</sup></b>	<b><i>p</i></b>		<b>R<sup>2</sup></b>	<b><i>p</i></b>		<b>R<sup>2</sup></b>	<b><i>p</i></b>
S-aut. VS S-win.	0.35084	0.014 *	T-aut. VS	0.19212	0.072	B-aut. VS	0.16779	0.088
S-aut. VS S-spr.	0.60694	0.007 **	T-win. T-aut. VS	0.43165	0.007 **	B-win. B-aut. VS	0.47048	0.009 **
S-aut. VS S-sum.	0.39154	0.009 **	T-spr. T-aut. VS	0.56936	0.007 **	B-spr. B-aut. VS	0.54328	0.006 **
S-win. VS S-spr.	0.65163	0.008 **	T-sum. T- win.VS	0.42995	0.009 **	B-sum. B- win.VS	0.41510	0.008 **
S-win. VS S- sum.	0.53733	0.008 **	T-spr. T- win.VS	0.59675	0.008 **	B-spr. B- win.VS	0.47136	0.009 **
S-spr. VS S-sum.	0.30904	0.019 *	T-sum. T-spr. VS	0.33994	0.005 **	B-sum. B-spr. VS	0.23512	0.027 *
S-aut. VS T-aut.	0.32068	0.011 *	T-sum. T-aut. VS	0.07035	0.785	B-sum. B-aut. VS	0.38030	0.015 *
S-win. VS T- win.	0.31989	0.006 **	B-aut. T- win.VS	0.07539	0.859	S-aut. B- win.VS	0.34702	0.01 *
S-spr. VS T-spr.	0.44399	0.004 **	B-win. T-spr. VS	0.08791	0.651	S-win. B-spr. VS	0.50060	0.008 **
S-sum. VS T- sum.	0.24263	0.037 *	B-spr. T- sum.VS	0.14150	0.221	S-spr. B- sum.VS	0.26767	0.005 **
			B-sum.			S-sum.		

Note: Bolded font indicates significance factor, \* indicates  $p < 0.05$ , \*\* indicates  $p < 0.01$ , S denotes surface layer, T denotes thermocline, B denotes bottom layer, aut. denotes autumn, win. denotes winter, spr. denotes spring, and sum. denotes summer.