Dynamics of Oxygen and the Physicochemical Response in Two Comparative Hypoxia Regions

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Table S1. Sampling depths for determining physicochemical indicators in the two comparative research areas.

Sampling station	Salinity, DO, Temperature, Turbidity, *Chl-a*	NH_4^+, NO_3^-, NO_2^-, TP	Maximum depth
BP1	0~18m	2, 10, 18 m	19 m
BP2	0~24m	2, 10, 20, 24 m	25 m
BP3	0~46m	2, 10, 20, 30, 35, 40, 46 m	48 m
BP4	0~46m	2, 10, 20, 40, 46 m	49 m
BP5	0~88m	2, 10, 20, 30, 40, 50, 60, 70, 80, 88 m	91 m
BP6	0~190m	2, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 125, 150, 175, 190 m	193 m
SR1	0~25m	0.5, 2, 5, 10, 20, 40 m	55 m
SR2	0~25m	0.5, 2, 5, 10, 20 m	33 m
SR3	0~35m	0.5, 2, 5, 10, 20, 35 m	47 m
SR4	0~40m	0.5, 2, 5, 10, 20, 40 m	55 m
SR5	0~55m	0.5, 2, 5, 10, 20, 40, 55 m	66 m
SR6	0~60m	0.5, 2, 5, 10, 20, 40, 55 m	60 m

Table S2. Rates of oxygen change in the whole volume and the deepest layers in the two comparative research areas. Unit: mg L^{-1} d^{-1}

	Whole volume				Deepest layer			
	Jul-Nov	Nov-Feb	Feb-Mar	Mar-May	Jul-Nov	Nov-Feb	Feb-Mar	Mar-May
BP1	-0.001	-0.015	-0.020	0.021	0.011	-0.029	-0.017	0.027
BP2	-0.011	-0.012	-0.017	0.021	-0.022	-0.032	0.019	0.012
BP3	-0.004	-0.017	-0.020	0.027	-0.027	-0.019	0.001	0.036
BP4	-0.006	-0.015	-0.011	0.016	-0.017	-0.018	0.014	0.011
BP5	0.003	-0.011	-0.020	0.001	0.000	-0.001	-0.004	0.005
BP6	0.005	-0.007	-0.007	-0.003	0.000	0.000	0.000	0.001
Average	-0.002	-0.013	-0.016	0.014	-0.009	-0.016	0.002	0.015
	Sep-Nov	Nov-Jan	Jan-May	May-Jul	Sep-Nov	Nov-Jan	Jan-May	May-Jul
SR1	-0.026	-0.003	-0.011	0.028	-0.029	0.003	-0.016	0.028
SR2	0.002	-0.022	-0.013	0.019	-0.038	0.024	-0.032	0.028
SR3	-0.032	-0.012	-0.021	0.021	-0.076	0.007	-0.024	0.024
SR4	-0.030	-0.006	-0.023	0.019	-0.068	0.002	-0.024	0.022
SR5	-0.017	-0.020	-0.020	0.012	-0.041	-0.018	-0.021	0.012
SR6	-0.027	-0.018	-0.022	0.009	-0.033	-0.021	-0.022	0.010
Average	-0.022	-0.014	-0.018	0.018	-0.048	0.000	-0.023	0.021

Table S3. Variations of water quality parameters under hypoxic conditions in the two comparative research areas. The minimum and maximum values are given. The numbers in bold indicate the number of samples. Italic numbers indicate the sampling depth. DO(a) is based on the vertical continuous profiles. DO(b) is the specific DO concentration at a given depth. and was derived from DO(a).

Research area	Salinity	DO(a)/ (mg/L)	T/ (℃)	Turbidity (NTU)	Chl-a/ (μg/L)	DO(b)/ (mg/L)	NH_4^+/ (μmol/L)	NO_3^- /(μmol/L)	NO_2^- /(μmol/L)	TP/ (μmol/L)
BP	9.04~15.63, **2056** *(63~190 m)*	0.0071~1.9977, **2056**	5.37~10.14, **2056**	LD~1.21, **2056**	0.17~4.05, **2056**	0.0097~1.0766, **38** *(70, 80, 88, 90, 100, 110, 125, 150, 175, 190 m)*	0.0002~0.0230, **38**	LD~0.0102, **38**	LD~0.0004, **38**	3.27~9.21, **16**
SR	-	0.23~2.00, **560** *(11.5~55m)*	25.52~31.80, **560**	0.07~6.02, **560**	0.30~2.80, **560**	0.2~0.92, **10** *(20, 40, 55m)*	2.14~28.08, **10**	71.29~82.98, **10**	0.33~10.15, **10**	0.41~1.19, **10**

LD is limit of detection

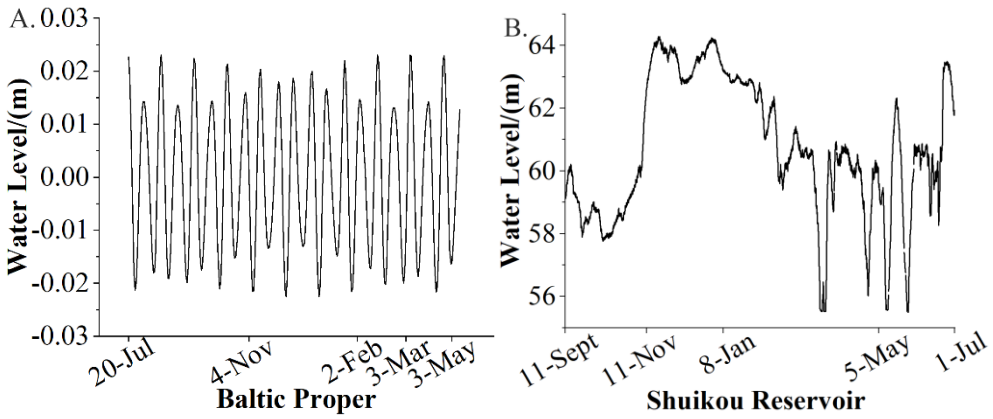


Figure S1. Variations of water levels in the two research areas: (A) Baltic Proper, Europe (B) Shuikou Reservoir, China. The data for BP and SR was provided via OSU TPXO Tidal Models (https://www.tpxo.net/ accessed on 5 July 2023) and the flood information system in Fujian Province (http://27.156.118.74:18800/web/html/index.html?module=sqxx accessed on 15 July 2023), respectively.

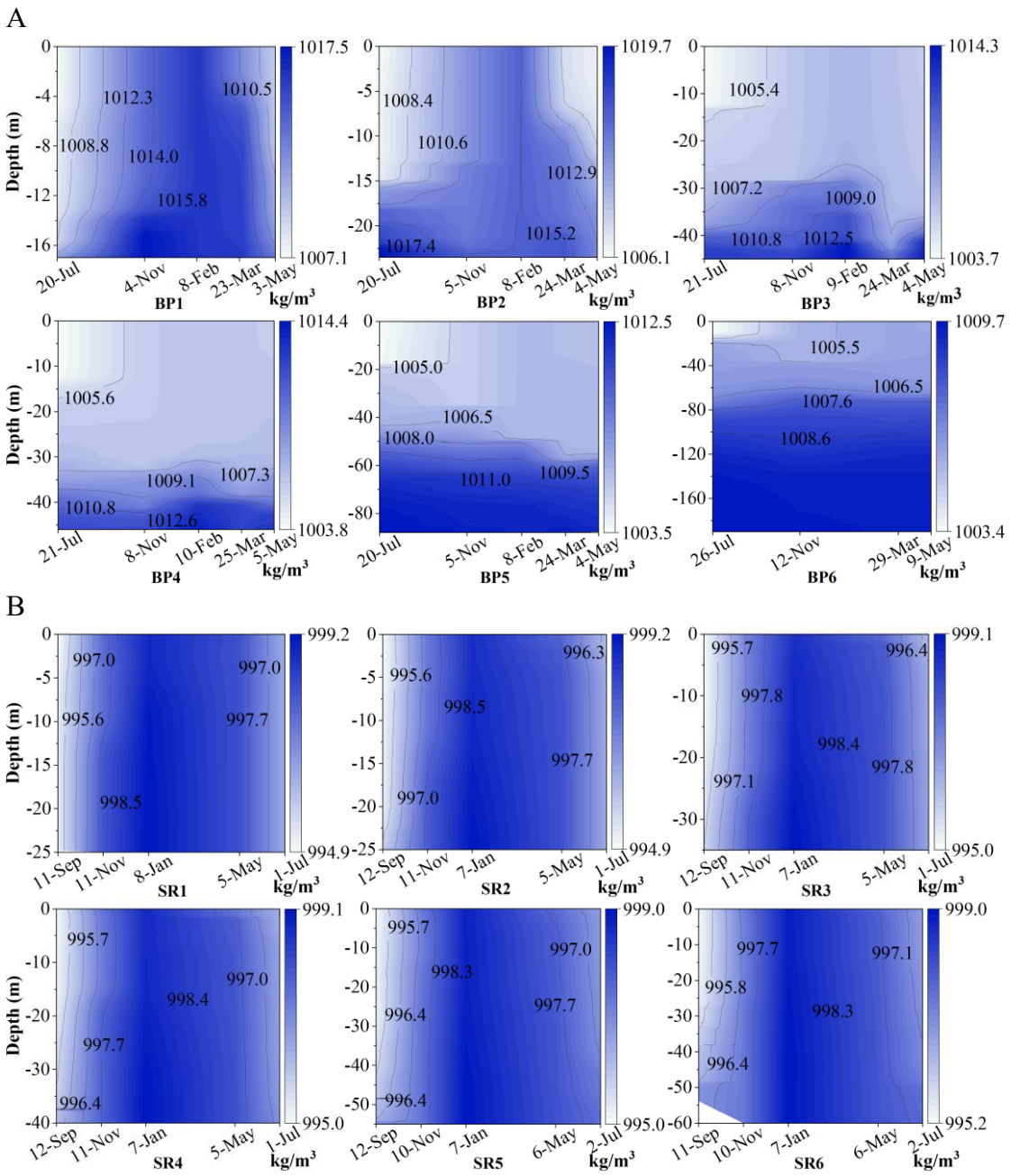
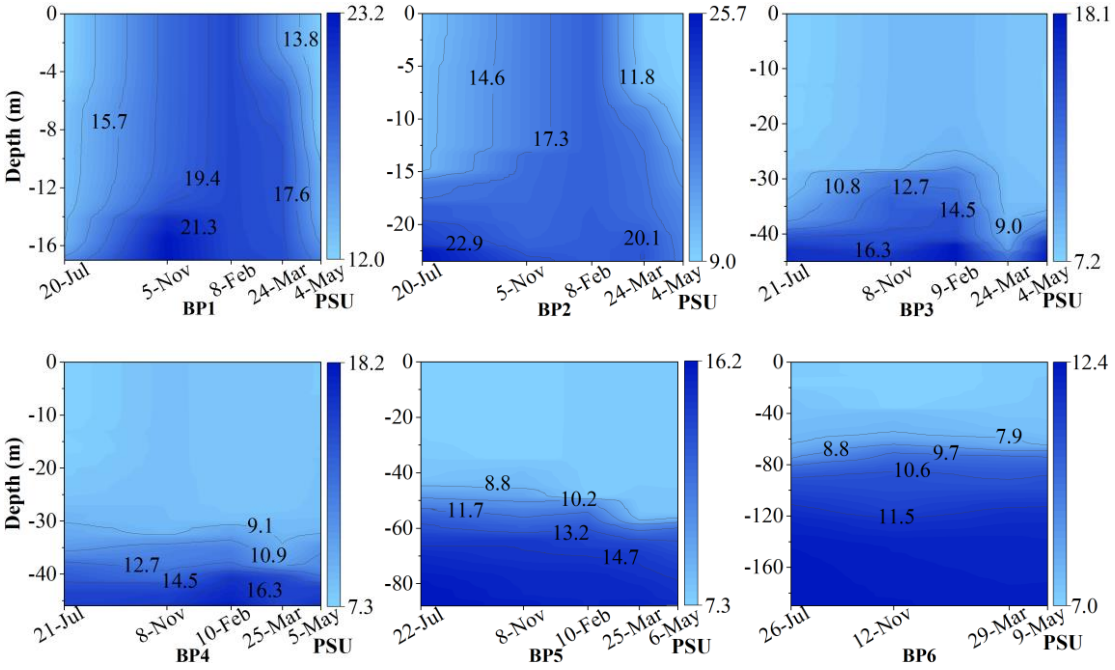
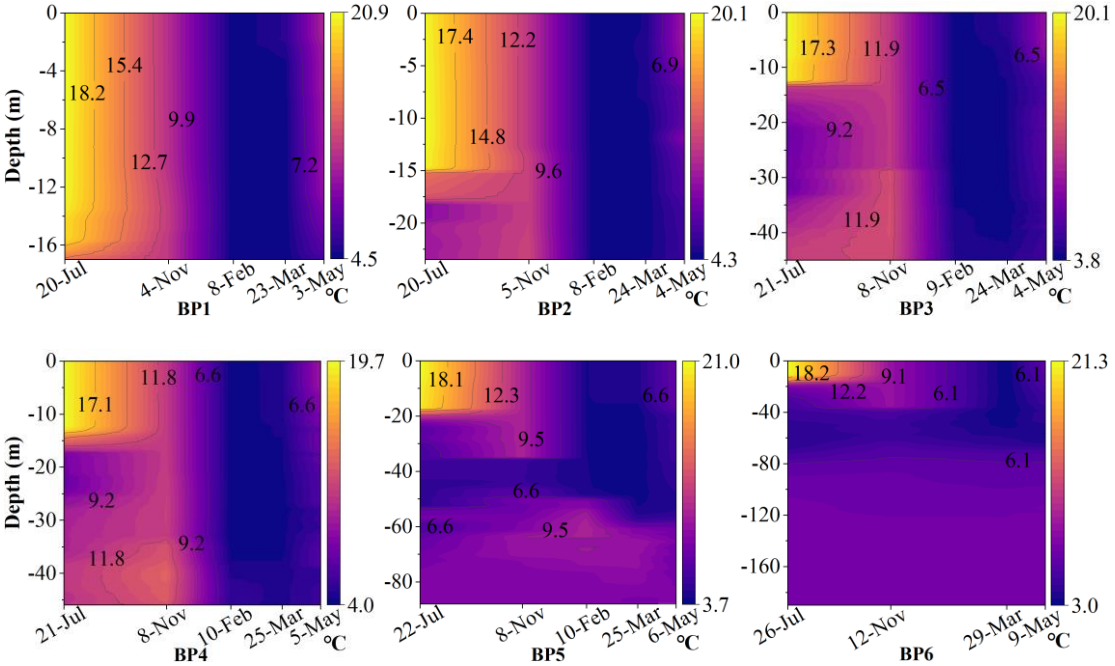


Fig. S2. Spatiotemporal distribution of density in the two research areas: A) Baltic Proper, Europe (B) Shuikou Reservoir, China.

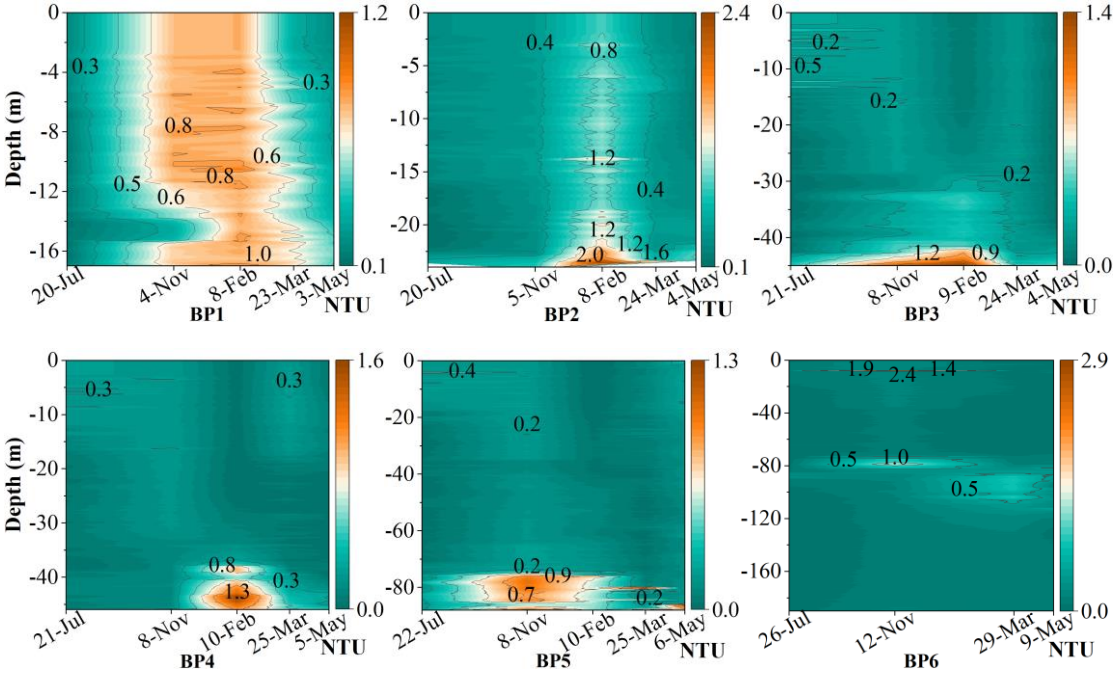
A. Salinity



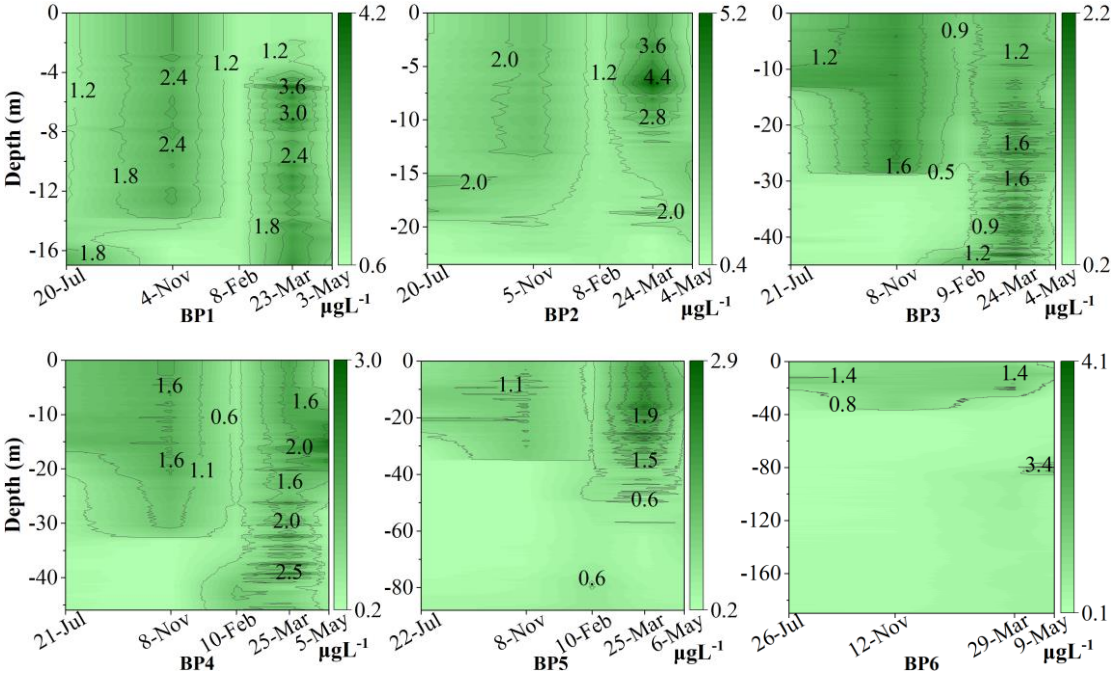
B. Temperature



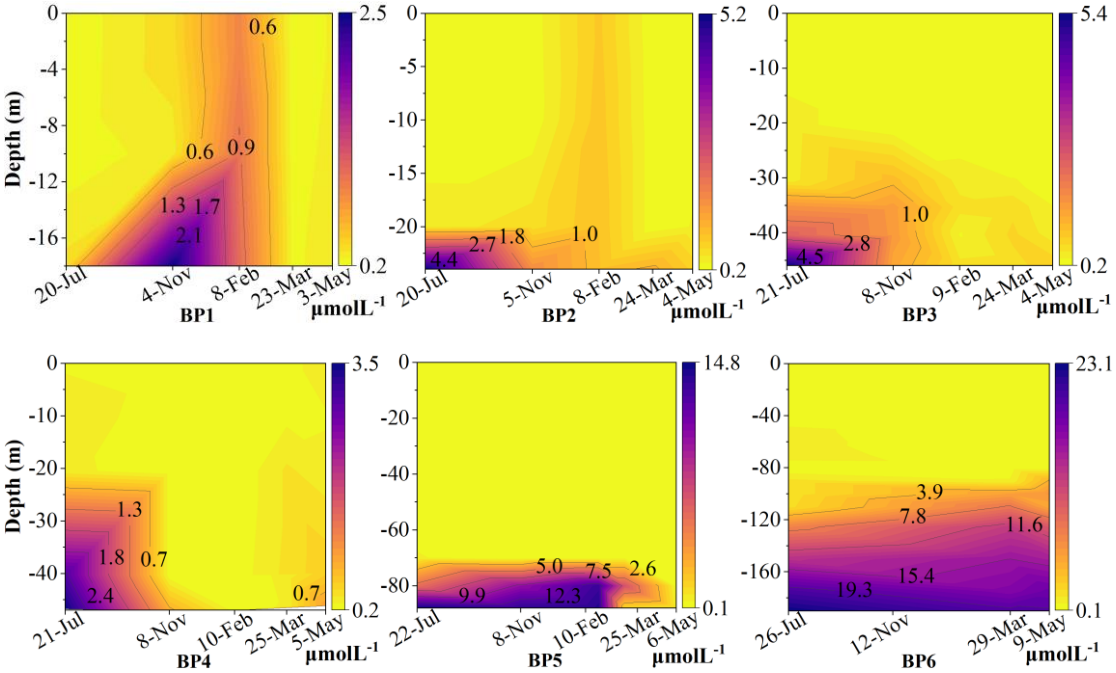
C. Turbidity



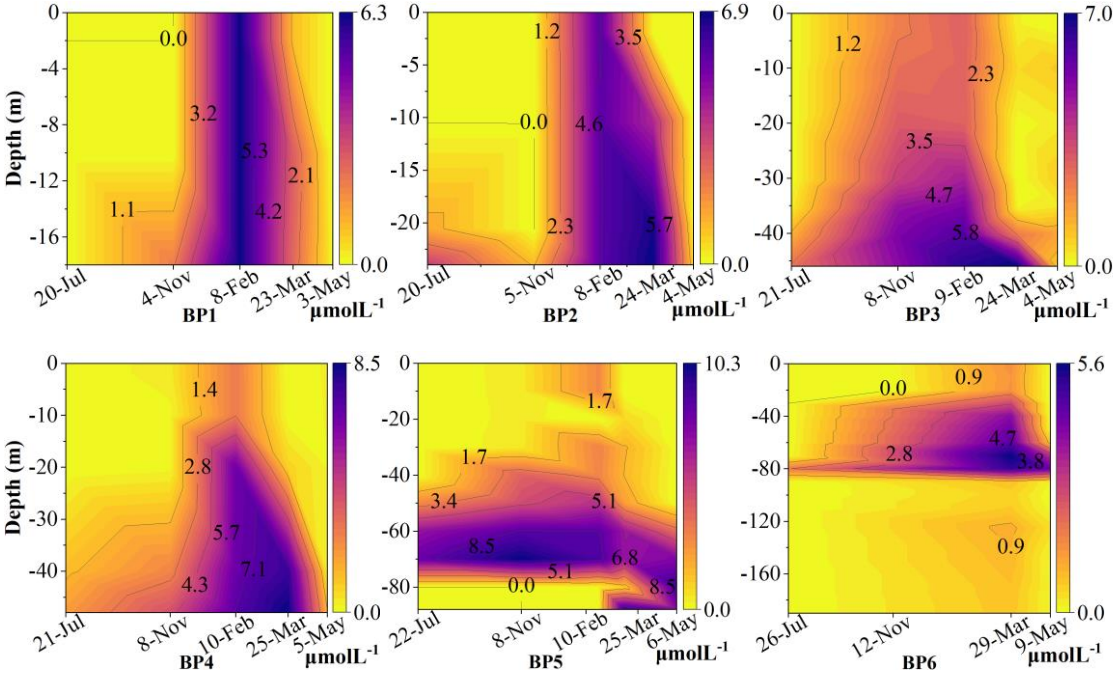
D. Chl-a



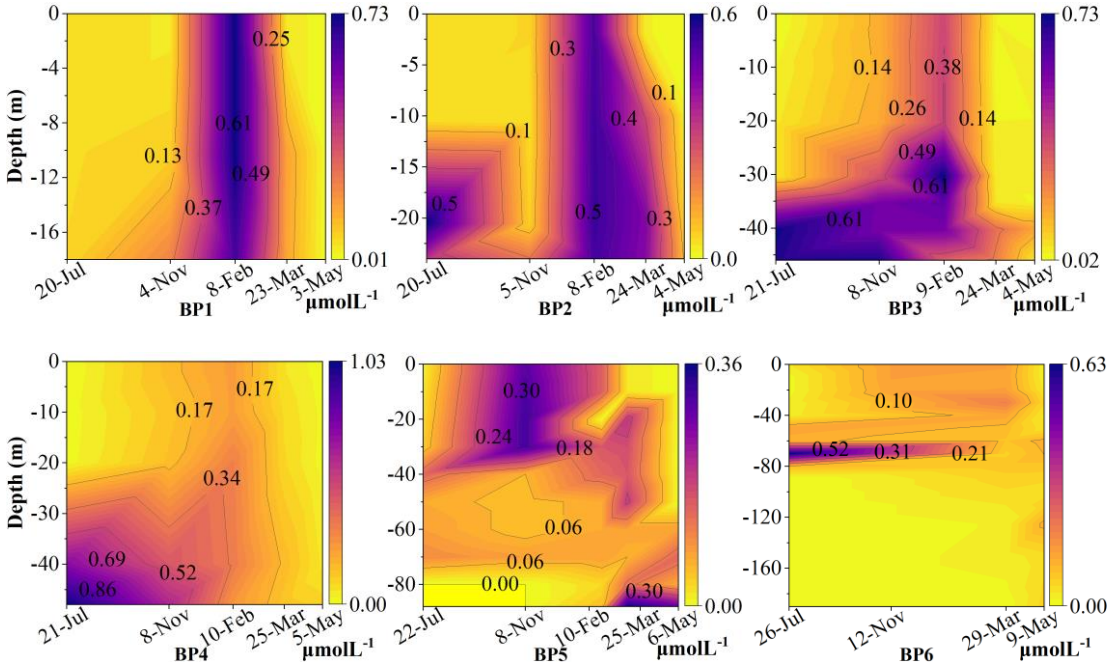
E. Ammonium



F. Nitrate



G. Nitrite



H. Total phosphorus

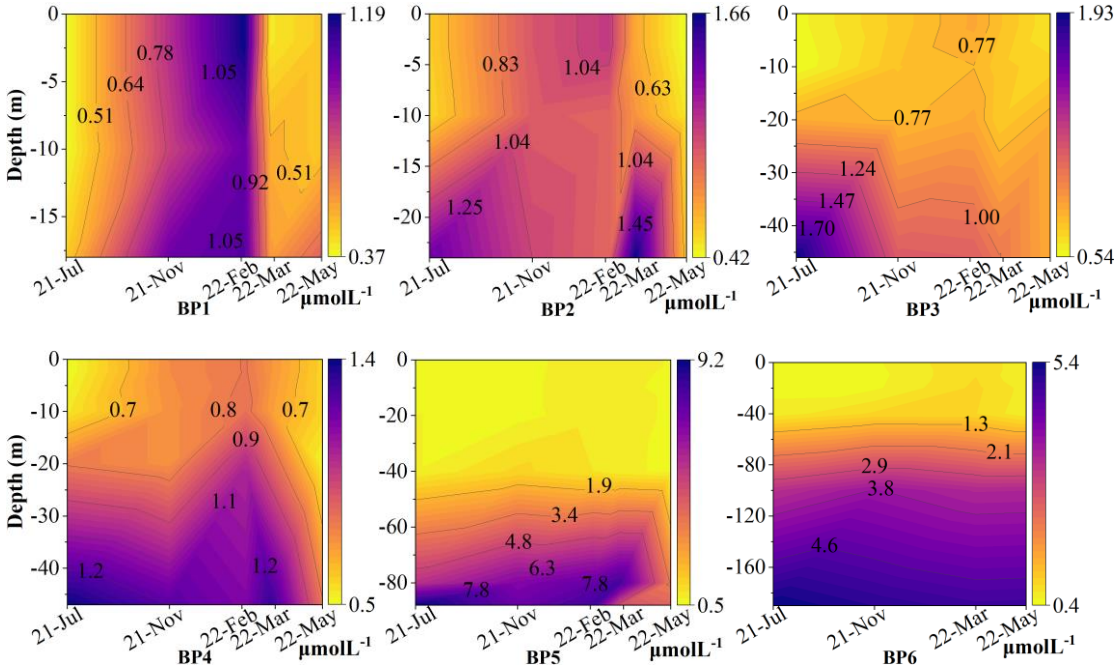
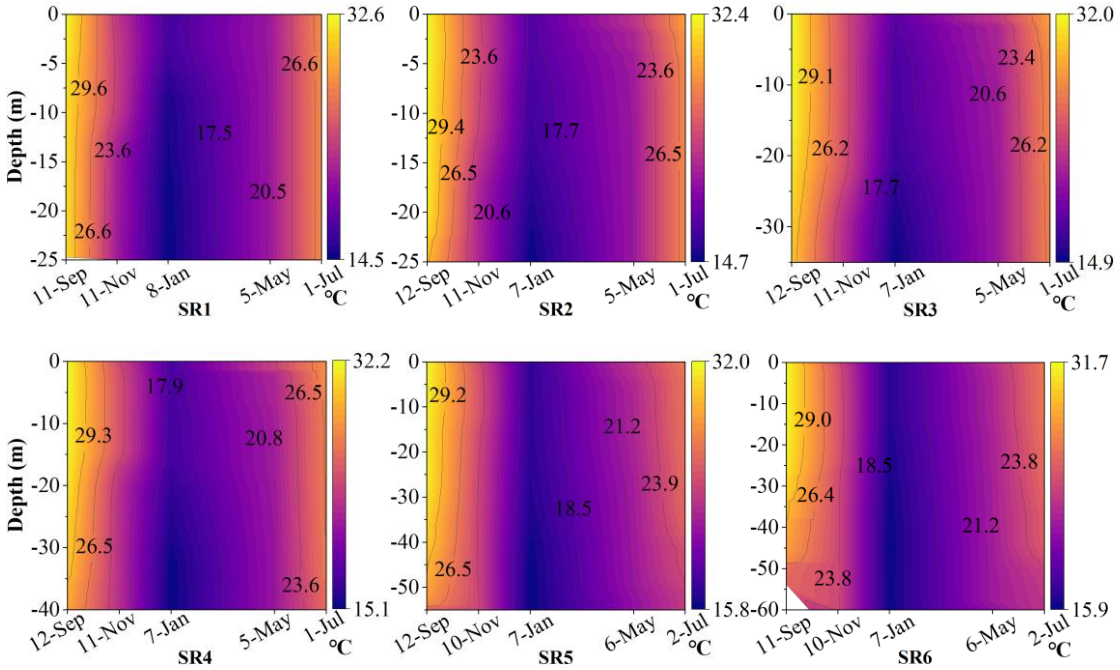
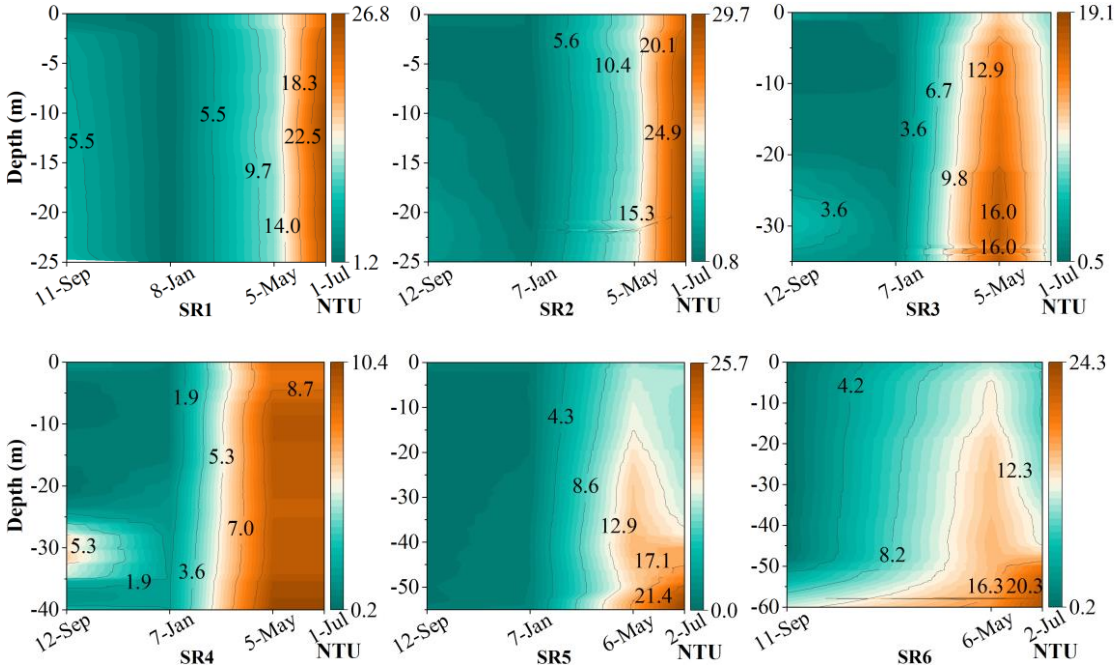


Fig. S3. Spatiotemporal distribution of water quality indices in the Baltic Proper, Europe.

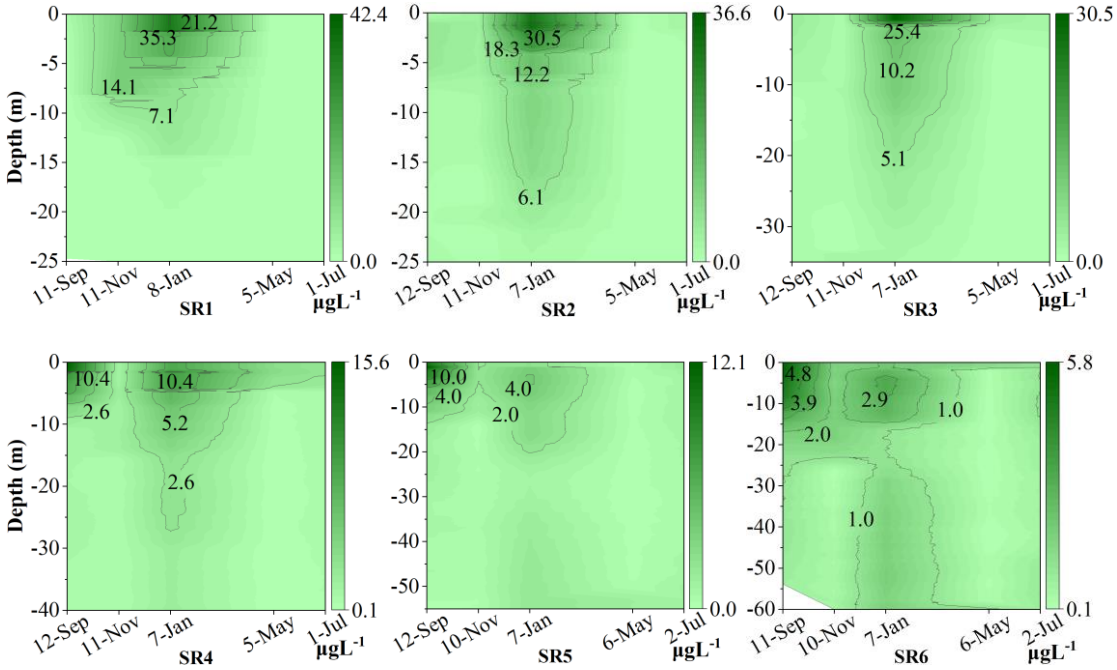
A. Temperature



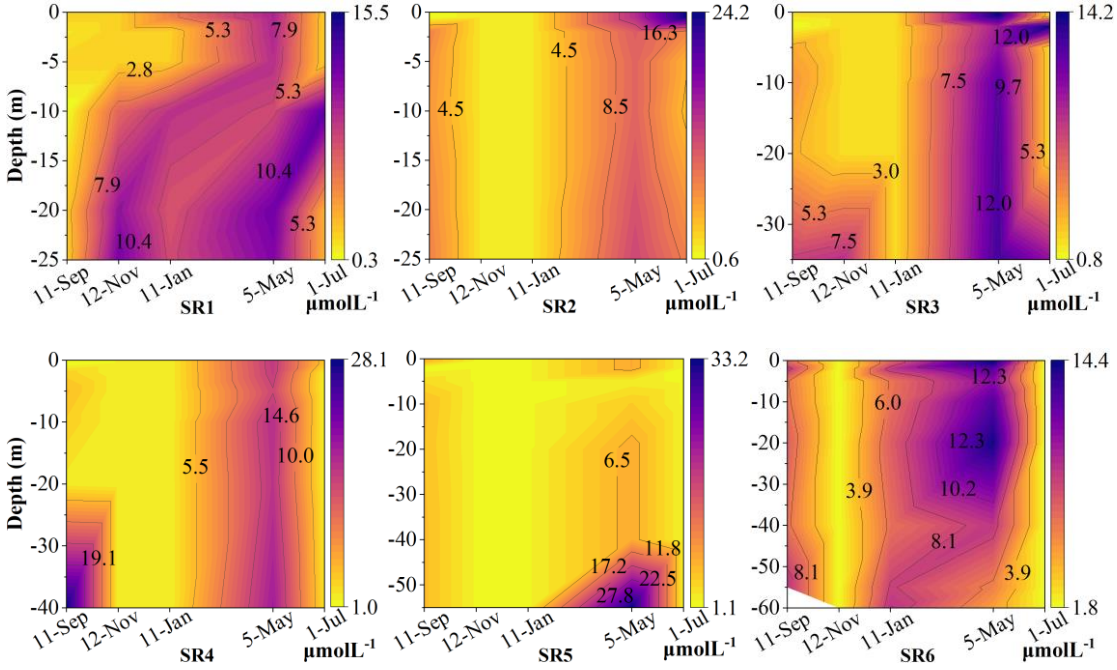
B. Turbidity



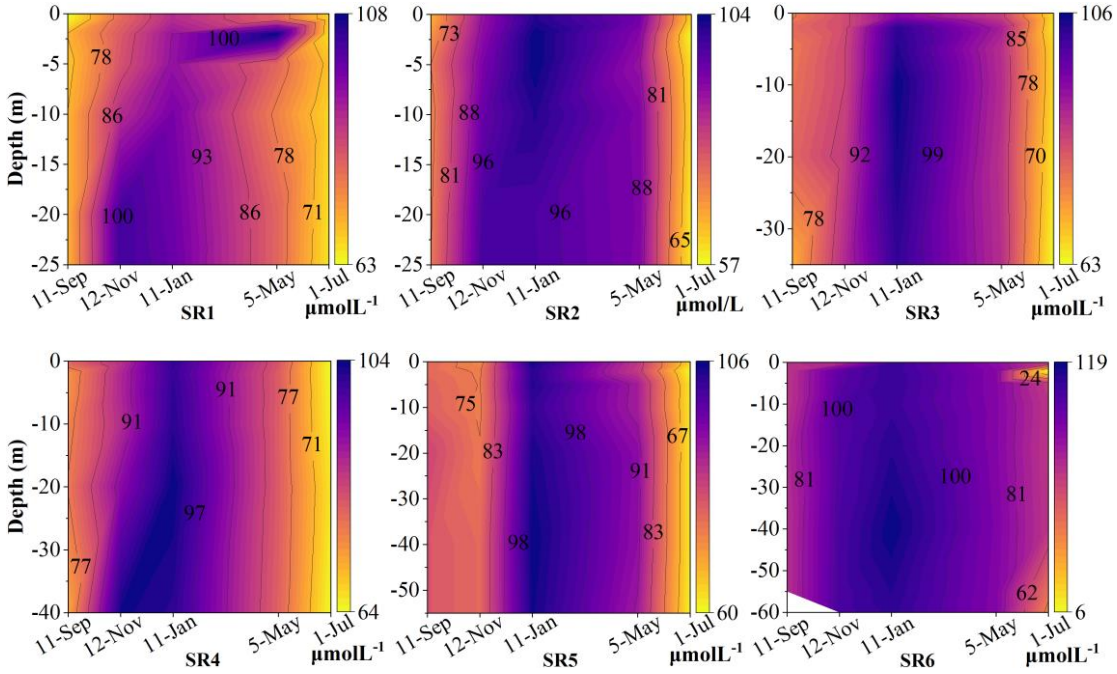
C. Chl-a



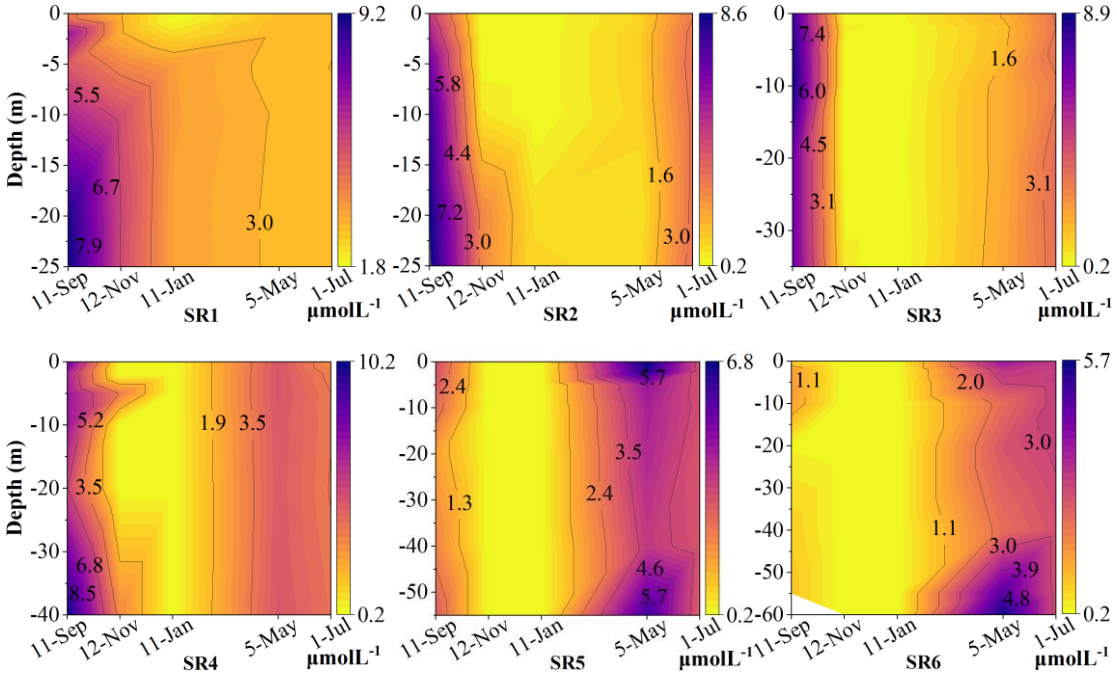
D. Ammonium



E. Nitrate



F. Nitrite



G. Total phosphorus

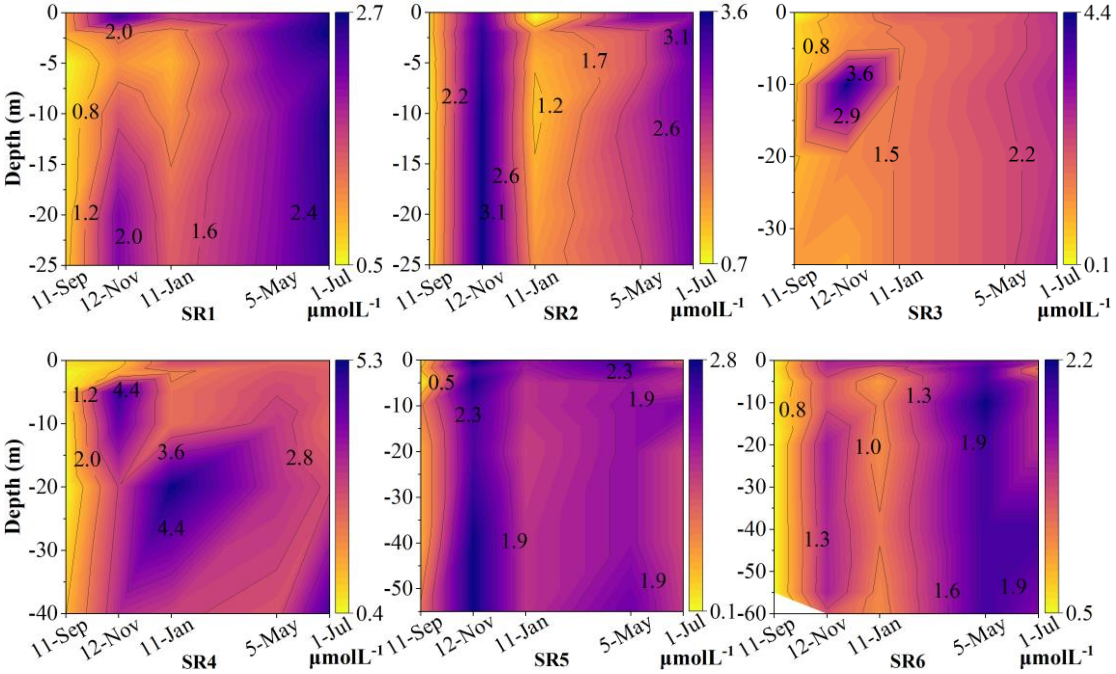


Fig. S4. Spatiotemporal distribution of water quality indices in the Shuikou Reservoir, China.

Reserch area	Layers	Salinity	T	Turbidity	CHL-a	NH_4^+	NO_3^-	NO_2^-	TP
Baltic Proper	Surface(0~11.5m)	-0.306**	-0.693**	-0.268**	0.082**	-0.291*	-0.201	-0.140	-0.118
	Middle(11.5~63m)	-0.517**	-0.576**	-0.275**	0.339**	-0.222*	-.208*	-0.149	-0.175
	Bottom(>63m)	-0.735**	-0.151**	0.056**	0.055**	-0.281	0.107	-0.007	0.521*
Shuikou Reservoir, China	Surface(0~11.5m)		-0.318**	0.592**	-0.259**	-0.105	-0.216*	0.194	-0.018
	Middle(11.5~30m)		-0.247**	0.496**	-0.356**	0.257*	-0.062	0.472**	-0.045
	Bottom(>30m)		-0.289**	0.566**	-0.109**	-0.035	0.163	-0.038	-0.197



Figure S5. Spearman correlation analysis for DO and water quality indices in different layers of the research areas. The symbols * and ** indicate parameters with a significant correlation at the 0.05 and 0.01 levels, respectively. Numbers with yellow background correspond to parameters with a positive relationship while numbers with blue background are associated with negatively correlated parameters.