



Figure S1: Rarefaction curves (a) and Shannon index curves (b) of bacterial OTUs clustered at 97% sequence similarity across surface (S), middle (M) and bottom (B) water samples.

STATION_NAME	NH4+	SiO2-Si	DO	PO43-	NO2-	D	chl a	L
R11_S	0.442	25	917.44603	134	5.31	0	0.02	1
R12_S	0.8	144	821.17523	19.7	0.43	0	0	1
R13_S	8.11	175	869.22234	134	0	0	0.34	1
R16_S	0	142	962.90594	21.2	0	0	3.61	1
P1_07_S	4.87	144	813.58941	27.3	0	0	0.02	1
P2_04_S	2.55	148	840.77098	22.3	0	0	0	1
P2_05_S	0.643	154	805.44645	28.6	0	0	0.01	1
P2_08_S	8.2	124	791.7394	74.9	0	0	0	1
R11_M	1.61	1334	529.81933	43	0.72	100	0.02	0
R12_M	0	1005	612.39843	60.7	0.777	100	0	0
R13_M	0	787	529.17597	43	0.314	150	0.01	0
R16_M	0	250	601.17142	26.9	0	200	0.01	0
P1_07_M	0	725	528.45648	43.3	0.4	200	0	0
P2_04_M	0	154	605.56987	29.4	0	500	0	0
P2_05_M	0	389	537.86067	40.2	0	200	0	0
P2_08_M	0	244	601.97788	28	0	500	0	0
R11_B	1.34	1593.2	514.67	41.4	1.13	162	0	0
R12_B	0.944	750	511.04	43.3	1.74	170	0	0
R13_B	0	736	525.46	41.4	0.864	164	0.01	0
R16_B	0	184	605.11	28.3	0	515	0	0
P1_07_B	0	219	609.23	26.5	0.633	575	0	0
P2_04_B	0	214	604.36	29.9	0	1076	0	0
P2_05_B	0	124	604.16	27.7	0	544	0	0
P2_08_B	1.85	256	617.89	45.4	0	1175	0	0

NO2-: Nitrite; PO4 3-: Phosphate; SiO2-Si: Silicate; NH4+: Ammonium nitrogen;L: Light; D:Depth; DO: dissolved oxygen

Table. S1 Physical and chemical properties in 8 Stations.

Variable	R²	P_value
Depth_m	0.6515	0.001
DO	0.5066	0.003
SiO2	0.4454	0.003
NH4	0.378	0.004
PO4_P	0.1929	0.087
NO2_N	0.1137	0.27
chl_a	0.09	0.404

Table. S2 Screening results of environmental factors using envfit with Monte Carlo permutation tests (n = 999 permutations). R² represents the explanatory power of environmental variables for microbial community structure, and P-values were determined by Monte Carlo permutation tests.