

Supplementary Materials for

Phytoplankton dynamics and biogeochemistry of the Black Sea.

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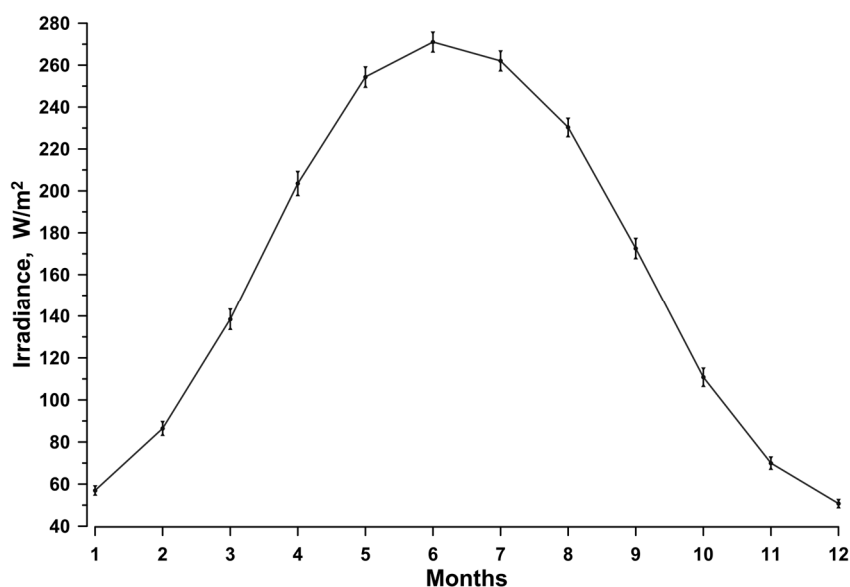


Fig S1. Annual irradiance dynamics on the water surface based on long-term (2006-2021) data.

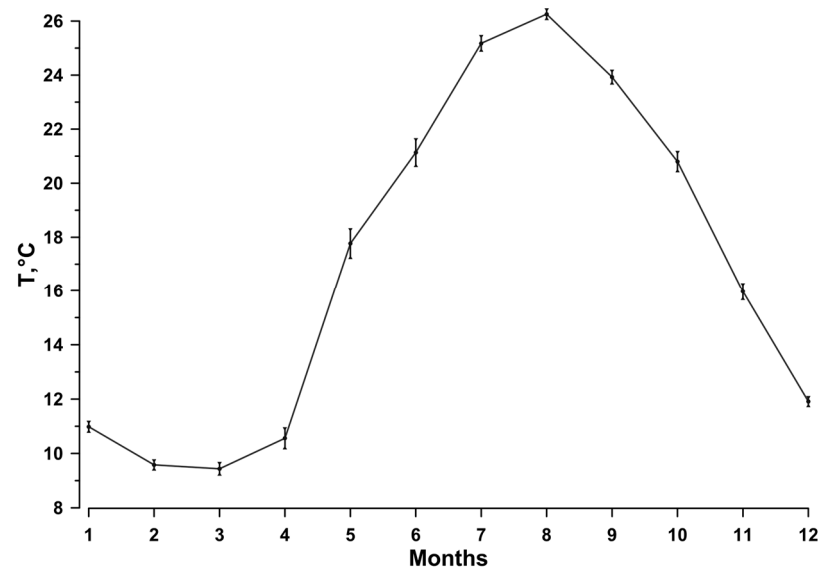


Fig S2. Annual dynamics of water surface temperature based on long-term (2006-2021) data.

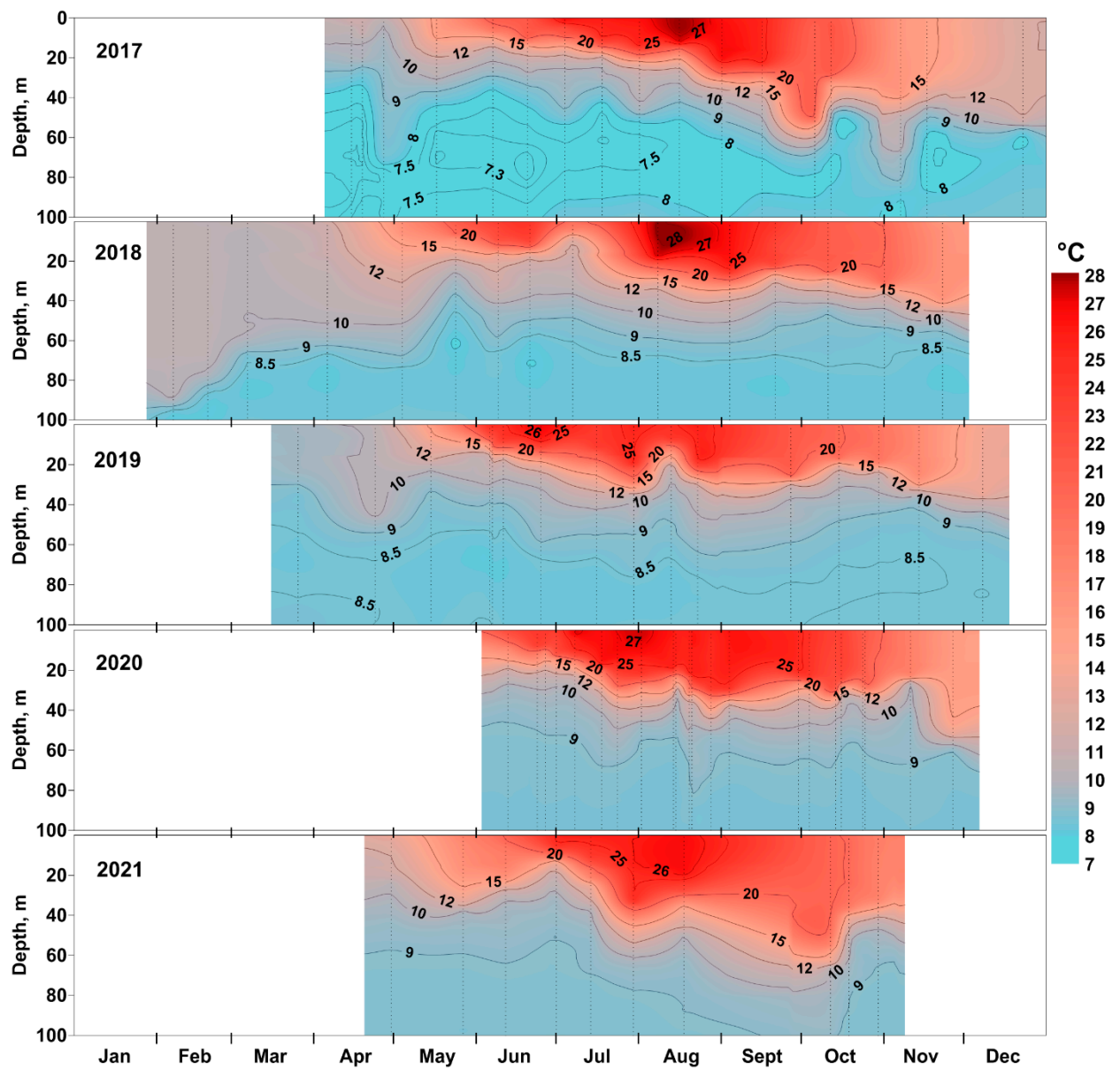


Fig S3. Seasonal dynamic of water temperature at station with depth 500 m from 2017 to 2021.

Table S1. The scheme of experiment for study the influence of nitrates and phosphates supply on phytoplankton growth.

Variant of experiment	Nitrates (N)	Phosphates (P)
1	-	-
2	+	-
3	-	+
4	+	+

Table S2. The phytoplankton composition of the upper mixed layer during the dominance of coccolithophorids in late spring and early summer 2017, 2018 and 2019.

Statistic parameters	Diatoms		Dinoflagellates		Coccolithophores			Small flagellates	
	mg m ⁻³	%	mg m ⁻³	%	10 ⁶ Cells L ⁻¹	mg m ⁻³	%	mg m ⁻³	%
2017									
Max	1427	49	76.73	18	9.65	1737.22	99.00	42.11	12
Min	0	49	3.09	0.26	1.0	188.01	49.35	4.15	0.29
Average	37.96	1.43	19.75	1.96	6.9	1241.29	94.67	16.99	1.49
2018									
Max	23	10.07	78	35.76	1.5	264	74.51	141	41.06
Min	0	0.07	22	7.44	0.16	29	22.73	12	6.46
Average	10	4.54	42	18.29	0.66	119	48.61	58	22.21
2019									
Max	36	13.00	2468	81.47	6.0	1085	87.06	112	17.18
Min	0	0.00	20	4.95	0.19	35	14.35	20	1.83
Average	13	2.12	162	18.68	2.7	488	69.15	54	8.40

Table S3. The composition of phytoplankton of the upper mixed layer during the dominance of large diatoms in the summer of 2017-2021

Stations	Depth	Diatoms		Dinoflagellates		Coccolithophores		Small flagellates	
	m	mg m ⁻³	%	mg m ⁻³	%	mg m ⁻³	%	mg m ⁻³	%
15.08.2017									
500 m	0 m	1451.2	96.86	10.87	0.73	8.64	0.58	25.56	1.71
500 m	5 m	1609.7	98.25	14.48	0.88	4.55	0.28	7.51	0.46
500 m	10 m	439.4	92.08	16.22	3.40	10.94	2.29	5.25	1.10
19.07.2019									
100 m	0 m	71.2	36.74	27.77	14.32	70.50	36.37	24.37	12.57

100 m	10 m	215	67.29	32.30	10.11	53.45	16.73	18.75	5.87
22.07.2020									
500 m	0 m	3619.4	98.48	10.80	0.29	0.00	0.00	40.86	1.11
500 m	15 m	4300.9	95.52	87.15	1.94	17.44	0.39	84.39	1.87
31.07.2020									
500 m	14 m	1462.4	96.54	22.69	1.50	0.00	0.00	29.28	1.93
			16.08.2020						
500 m	0 m	733.9	88.18	2.29	0.28	11.40	1.37	44.14	5.30
26.08.2020									
500 m	0 m	365.3	84.29	2.63	0.61	3.17	0.73	49.63	11.45
500 m	10 m	257.75	77.35	46.46	13.94	10.02	3.01	18.15	5.45
17.08.2021									
500 m	0 m	3914.82	95.32	23.05	0.56	7.26	0.18	137.89	3.36

Table S4. Vertical distribution of nitrogen and phosphorus concentrations during the dominance of coccolithophore *Emiliania huxleyi* (11 June 2020) and large diatoms *Peudosolenia calcar-avis* (26 August 2021) at the station above a depth of 500 m.

<i>E. huxleyi</i>		
m	P	N
1	0.22	0.31
14	0.16	0.36
33	0.18	0.29
50	0.20	0.42
70	0.26	1.19
90	0.32	1.29
107	0.42	2.26
119	0.78	3.73

127	1.23	5.97
131	1.30	5.94
139	1.34	6.19
151	1.38	3.38
154	1.62	3.42
<i>P. calcar-avis</i>		
1	0.06	1.31
10	0.04	1.35
36	0.04	1.56
50	0.07	1.64
70	0.15	2.25
98	1.10	5.00
111	1.13	6.80
122	1.26	4.01
129	1.36	3.91
135	0.36	1.44
138	2.57	1.99
142	6.62	2.23
146	6.90	3.49
150	7.05	5.44