

Supplementary Materials

Horizontal Distribution of Deep Sea Microplankton: A New Point of View for Marine Biogeography

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Table S1. Location of the 27 stations where the collection of microplankton was carried out in summer 2017. In each station are also indicated the two depths where the samples have been collected (S: surface, MD: maximum depth) and the water volume (L) filtered for each sample, and the abiotic parameters obtained from a multiparametric probe: Temperature (°C), Salinity and Chlorophyll a ($\mu\text{g}\cdot\text{L}^{-1}$).

STATION Code	LOCALITY	LAT North	LONG East	WATER column m	SAMPLES				TEMPERATURE		SALINITY		CHLOROPHYLL	
					S m	L	MD m	L	S	MD	S	MD	S	MD
UST	USTICA	38°54.99'	13°17.95'	3438	2	5	/	/	25.7	–	37.9	–	0.01	–
EOL	EOLIE	38°26.46'	15°09.60'	1180	2	5	500	10	25.6	14.3	38.0	38.8	0.01	0.01
CTI	CENT. TYRRHENIAN	39°29.98'	13°33.99'	3301	2	5	500	10	25.4	14.3	38.2	38.8	0.01	0.00
OROS	OROSEI	40°03.63'	10°24.11'	2253	2	5	500	10	25.1	14.2	38.4	38.8	0.00	0.00
OLB	OLBIA	40°51.27'	10°02.85'	1231	2	5	500	10	23.9	14.0	38.2	38.7	0.02	0.00
CAPR	CAPRAIA	43°00.42'	09°40.26'	405	2	5	380	10	24.6	14.1	38.2	38.7	0.03	0.01
GORG	GORGONA	43°26.54'	10°02.10'	128	2	5	123	10	25.3	14.1	38.2	38.4	0.03	0.02
ANZ	ANZIO	41°21.69'	12°10.76'	733	2	5	500	10	26.0	14.1	38.4	38.7	0.01	0.00
NAP	NAPLES-ISCHIA	40°37.72'	13°59.57'	790	2	5	500	10	26.0	14.1	38.4	38.7	0.01	0.00
EGA	EGADI	38°57.79'	12°08.68'	101	4	5	97	10	24.6	15.0	38.0	38.3	0.01	0.09
PANT	PANTELLERIA	36°40.77'	11°49.12'	575	2	5	500	10	25.7	14.2	37.3	38.8	0.00	0.00
PEM	PORTO EMPEDOCLE	37°07.79'	13°20.80'	440	2	5	430	10	26.2	14.2	37.9	38.8	0.01	0.00
GEL	GELA	36°45.52'	14°08.01'	780	2	5	500	10	27.2	14.4	37.9	38.9	0.01	0.00
AUG	AUGUSTA	37°11.14'	15°32.94'	2300	2	5	500	10	25.8	14.2	37.8	38.8	0.01	0.00
TAO	TAORMINA	37°46.09'	15°34.95'	1570	3.5	5	500	10	25.1	14.2	38.8	38.9	0.02	0.00
SOV	SOVERATO	38°27.44'	16°40.33'	206	1.6	5	200	10	26.4	14.4	38.5	38.9	0.01	0.00
AME	AMENDOLARA	39°44.91'	16°46.06'	475	3	5	470	10	24.8	14.0	39.0	38.8	0.03	0.00
CAMA	CAMPOMARINO	40°07.97'	17°24.91'	1000	2	5	500	10	25.9	14.0	39.0	38.8	0.01	0.00
LEU	LEUCA	39°34.11'	18°12.38'	550	2.3	5	500	10	26.6	14.0	39.0	38.8	0.01	0.00
OTR 1	OTRANTO 1	40°05.22'	18°44.36'	94	4	5	90	8.5	26.7	14.7	39.0	38.9	0.00	0.07
OTR 2	OTRANTO 2	40°04.42'	18°45.37'	169	1.8	5	165	10	26.7	15.0	39.0	38.9	0.02	0.18
ADR	ADRIATIC	40°27.29'	18°33.34'	125	2.5	5	120	10	27.1	14.7	39.0	38.9	0.02	0.07
BA	BARI	41°20.25'	17°12.05'	623	2	5	500	10	27.5	13.9	39.1	38.8	0.01	0.01
VIE	VIESTE	42°14.97'	15°50.60'	125	2.6	5	122	10	27.7	13.4	39.0	38.8	0.03	0.07
SEN	SENIGALLIA	43°51.82'	13°25.52'	52	2	5	50	10	27.9	14.6	38.2	38.2	0.04	0.26
DEP	PO RIVER DELTA	44°38.66'	12°36.62'	33	2.2	5	31	10	27.4	13.5	34.4	38.2	0.20	0.66
TRI	TRIESTE	45°39.74'	13°39.85'	25	2	5	23	10	23.9	19.0	36.2	37.8	0.20	0.30

Table S2. Location of the 39 stations interested by collection of microplankton in spring 2013.

STATION Code	LOCALITY	LAT	LONG	WATER			SAMPLES		Deep
		North	East	Column	m	L	Surf	L	
2	GARGANO	42°10.00'	16°10.09'	27	3	5	121	5	
Tre	TREMITI	42°06.41'	15°36.91'	84	3	5	79	5	
3	PELAGOSA	42°10.01'	16°37.99'		179	3	5	174	5
Bud	BUDVA	42°10.81'	18°50.00'		85	3	5	80	5
7	MONTEN. SHELF	42°09.99'	18°31.99'		188	3	5	183	5
10	SOUTH ADRIATIC NE	41°29.99'	18°21.98'		1129	3	5	1120	5
8	ALBANIAN SHELF 1	41°29.97'	18°50.13'		330	3	5	325	5
Ulq	ULQNIJ	41°49.49'	19°12.60'		69	3	5	64	5
Bar	BAR	42°02.23'	19°00.22'	71	3	5	66	5	
15	SOUTH ADRIATIC CE	41°02.30'	18°32.00'		937	3	5	932	10
16c	SOUTH ADRIATIC SE	40°53.07'	18°57.28'		317	3	5	311	10
17	OTRANTO CHANN NE	40°26.97'	19°07.97'		344	3	5	339	10
Saz	SAZAN	40°30.23'	19°13.60'		119	3	5	114	5
Vlo	GIJRI VLORE	40°26.90'	19°21.02'		28	3	5	23	5
KGj	KEPI I GJUEZES	40°25.21'	19°13.87'		147	3	5	142	5
Kar	KARABURUN 1	40°22.11'	19°18.87'		93	3	5	88	5
Ari	PLAZH ARI	40°18.43'	19°20.32'		135	3	5	130	5
Rre	RREZA	40°14.32'	18°23.34'		205	3	5	200	5
Gra	GRAMA	40°10.32'	19°23.60'	238		3	5	233	5
22	OTRANTO CHANN SE	40°07.59'	19°18'51"		978	3	5	969	10
21	OTRANTO CHANN S	40°05.00'	19°08.00'		974	3	5	969	10
KQe	KEPI I QEFALE	39°52.70'	19°52.38'		67	3	5	62	5
Ere	EREIKUSSA	39°52.04'	19°32.18'		94	3	5	89	5
Mat	MATHRAKI	39°44.27'	19°29.09'		122	3	5	117	5
23	IONIAN NE	39°40.00'	19°22.00'		1173	3	5	1168	10
24	IONIAN N	39°39.99'	19°07.93'	1088	3	5	1083	10	
25	IONIAN NW	39°39.99'	18°21.98'		220	3	5	215	5
Leu	LEUCA	39°45.68'	18°24.22'		121	3	5	116	5
And	ANDRANO	39°57.18'	18°27.40'		89	3	5	84	5
20	OTRANTO CHANN SW	40°05.00'	18°50.04'		738	3	5	733	5
Otr	OTRANTO	40°06.00'	18°34.08'	92	3	5	87	10	
San	SAN ANDREA	40°13.87'	18°30.37'		79	3	5	74	5
Bri	BRINDISI	40°42.75'	17°57.90'	93	3	5	88	5	
PnG	PENNA GROSSA	40°45.67'	17°47.00'	67	3	5	62	5	
19	OTRANTO CHANN NW	40°27.03'	18°31.99'		93	3	5	88	5
14	SOUTH ADRIATIC CC	41°02.28'	17°52.01'		595	3	5	590	10
13	SOUTH ADRIATIC CW	41°02.30'	17°35.04'		268	3	5	263	5
12	SOUTH ADRIATIC NW	41°29.97'	16°55.01'		134	3	5	129	5
11	SOUTH ADRIATIC NC	41°30.16'	17°32.93'		1126	3	5	1121	10

Table S3. Location of the 24 stations interested by collection of microplankton in winter 2015. In each station it is indicated the depth (m) where the samples have been collected (at Surface, Surf, and maximum depth, Deep), and the total volume (L) of water filtered per sample.

STATION Code	LOCALITY	LAT		LONG Column m	WATER		SAMPLES	
		North	East		Surf L	Deep m	L	
CaB	CANYON BARI	41°19.55'	17°04.45'	216	2	5	209	5
2	GARGANO	42°10.00'	16°09.99'	120	2	5	115	5
3	PELAGOSA	42°10.00'	16°38.01'	177	2	5	173	5
11	SOUTH ADRIATIC NC	41°30.00'	17°35.02'	1149	2	5	1124	10
12	SOUTH ADRIATIC NW	41°30.01'	16°55.01'	134	3	5	131	5
13	SOUTH ADRIATIC CW	41°02.30'	17°35.01'	259	2	5	255	5
PnG	PENNAGROSSA	40°45.66'	17°46.99'	64	3	5	61	5
14	SOUTH ADRIATIC CC	41°02.31'	17°52.00'	599	3	5	594	10
10	SOUTH ADRIATIC NE	41°30.06'	18°22.64'	1122	3	5	1117	10
Al2	ALBANIAN SHELF 2	41°30.01'	19°18.00'	70	2	5	67	5
8	ALBANIAN SHELF 1	41°26.92'	18°51.43'	284	3	5	280	5
15	SOUTH ADRIATIC CE	41°00.99'	18°40.55'	818	2	5	813	10
Al3	ALBANIAN SHELF 3	41°00.00'	19°18.00'	68	2	5	64	5
17	OTRANTO CHANNEL NE	40°27.02'	19°07.99'	337	2	5	334	10
21	OTRANTO CHANNEL S	40°05.01'	19°08.00'	969	3	5	965	10
22	OTRANTO CHANNEL SE	40°05.01'	19°21.99'	957	2	5	952	10
Rre	RREZA	40°14.41'	19°23.41'	199	2	5	195	5
Kar1	KARABURUN 1	40°22.09'	19°18.84'	87	2	5	84	5
Kar2	KARABURUN 2	40°22.09'	19°14.35'	228	2	5	224	5
Kar3	KARABURUN 3	40°22.07'	19°09.82'	660	2	5	655	10
19	OTRANTO CHANNEL NW	40°27.00'	18°32.01'	120	2	5	115	5
20	OTRANTO CHANNEL S	40°05.01'	18°50.00'	732	2	5	727	10
Otr	OTRANTO	40°05.91'	18°34.07'	87	2	5	84	5
And	ANDRANO	39°57.13'	18°27.35'	84	2	5	80	5

Table S4. Water characteristics at surface (3 m) and bottom (different depths) of 39 stations, for the collection of microplankton samples in South Adriatic Sea. Period of collection: 09–18 May 2013.

STATION	LOCALITY	DEPTH, m	SAL, psu	TEMP, °C
2	GARGANO	3	37.6	18.9
		121	38.7	12.3
Tre	TREMITI	3	37.5	20.2
		79	38.6	12.6
3	PELAGOSA	3	38.6	19.2
		174	38.7	12.6
Bud	BUDVA	3	33.2	21.2
		80	38.9	15.0
7	MONTENEGRO SHELF	3	33.2	21.2
		183	39.0	14.9
10	SOUTH ADRIATIC NE	3	38.8	20.0
		1120	38.7	13.1
8	ALBANIAN SHELF	3	38.0	20.2
		325	38.9	14.6
Ulq	ULQNIJ	3	31.1	20.2
		64	38.9	15.0
Bar	BAR	3	33.7	21.3
		66	38.8	15.0
15	SOUTH ADRIATIC CE	3	31.1	20.2
		932	38.7	19.6
16c	SOUTH ADRIATIC SE	3	38.6	20.2
		311	38.9	14.7
17	OTRANTO CHANNEL NE	3	38.4	19.4
339	38.9 14.8			
Saz	SAZAN	3	38.1	20.6
		114	38.9	15.0
GVL	GIJRI VLORE	3	38.2	20.1
		23	38.8	16.0
KGj	KEPI I GJUEZES	3	38.3	18.9
		142	39.0	15.0
Kar	KARABURUN	3	38.9	15.8
		88	38.9	15.3
Par	PLAZH ARI	3	38.9	16.0
		130	38.9	15.1
Rre	RREZA	3	38.9	15.7
		200	39.0	15.0
Gra	GRAMA	3	38.9	16.6
		233	39.0	15.0
22	OTRANTO CHANNEL SE	3	38.8	16.7
		869	38.8	13.7
21	OTRANTO CHANNEL S	3	38.8	17.9
		968	38.8	13.6
Kqe	KEPI I QEFALE	3	38.5	18.9
		65	38.9	15.3
Ere	EREIKUSSA	3	38.9	18.1
		88	39.0	15.3
Mat	MATHRAKI	3	38.8	18.4
		117	39.0	15.2
23	IONIAN SEA NE	3	38.9	18.5
		1168	38.8	13.5
24	IONIAN SEA N	3	38.9	19.0
		1083	38.8	13.4

24	IONIAN SEA NW	3	38.8	19.0	
		215	38.9	14.3	
Leu	LEUCA	3	38.1	19.0	
		116	38.9	14.6	
And	ANDRANO	3	38.1	19.1	
		84	38.9	14.9	
20	OTRANTO CHANNEL SW	3	38.8	19.0	
		733	38.8	13.5	
Otr	OTRANTO	3	38.2	19.0	
		87	38.9	14.9	
San	SAN ANDREA	3	38.3	18.9	
		74	38.9	14.9	
Bri	BRINDISI	3	38.0	18.6	
		88	38.9	14.7	
PnG	PENNA GROSSA	3	38.3	18.4	
		62	38.9	14.8	
19	OTRANTO CHANNEL NW	3	38.2	18.9	
		121	38.9	14.6	
14	SOUTH ADRIATIC C	3	38.4	19.1	
		590	38.8	13.7	
13	SOUTH ADRIATIC CW	3	37.2	19.7	
		263	38.8	13.9	
12	SOUTH ADRIATIC NW	3	38.6	18.4	
		129	38.7	13.2	
11	SOUTH ADRIATIC CN	3	38.8	18.4	
		1121	38.7	13.2	

Table S5. Water characteristics at surface (2–3 m) and bottom (different depths) of 24 stations for the collection of microplankton samples in South Adriatic Sea. Period of collection: 3–13 March 2015.

STATION	LOCALITY	DEPTH m	SAL	psu	TEMP °C
CaB	CANYON BARI	2	38.8	14.9	
		209	38.7	14.6	
2	GARGANO	2	38.2	13.3	
		117	38.6	14.0	
3	PELAGOSA	2	38.7	14.6	
		173	38.8	14.1	
11	SOUTH ADRIATIC CN	2	38.6	14.2	
		1142	38.7	13.2	
12	SOUTH ADRIATIC NW	3	38.6	14.5	
		131	38.7	14.4	
13	SOUTH ADRIATIC CW	2	38.7	14.5	
		255	38.7	14.6	
PnG	PENNA GROSSA	3	36.3	11.4	
		61	37.6	12.7	
14	SOUTH ADRIATIC CC	3	38.7	14.3	
		595	38.8	14.0	
10	SOUTH ADRIATIC NE	3	38.7	14.3	
		1117	38.7	13.2	
Al2	ALBANIAN SHELF 2	2	38.8	15.2	
		67	38.8	15.2	
8	ALBANIAN SHELF 1	3	38.8	15.2	
		281	38.8	14.5	
15	SOUTH ADRIATIC CE	2	38.7	15.2	
		814	38.7	13.3	
Al3	ALBANIAN SHELF 3	2	38.3	14.6	
		64	38.8	15.4	
17	OTRANTO CHANNEL NE	2	38.8	15.6	
		333	38.9	15.2	
21	OTRANTO CHANNEL S	3	38.8	15.4	
		965	38.8	13.7	
22	OTRANTO CHANNEL SE	2	38.6	15.2	
		953	38.8	13.7	
Rre	RREZA	2	38.4	14.8	
		197	38.8	15.6	
Kar1	KARABURUN 1	2	38.4	14.9	
		83	38.9	15.7	
Kar2	KARABURUN 2	2	38.7	15.3	
		224	38.9	15.8	
Kar3	KARABURUN 3	2	38.9	15.8	
		655	38.8	14.0	
19	OTRANTO CHANNEL NW	2	38.4	13.9	
		115	38.7	14.5	
20	OTRANTO CHANNEL SW	2	38.9	15.5	
		727	38.7	13.8	
Otr	OTRANTO	2	36.5	11.4	
		83	38.5	14.1	
And	ANDRANO	2	36.6	11.6	
		80	38.2	13.6	

Table S6. SIMPER analysis results. Above, taxa contribution of epipelagic community; below, taxa contribution of meso-pelagic community.

Average	Similarity	35.42			
Taxon	Av. Abund.	Av. Sim.	Sim./SD	Contrib. %	Cumul. %
<i>Ceratium furca</i>	6.21	5.75	1.00	16.23	16.23
<i>Ceratium</i> spp	4.60	5.37	1.32	15.17	31.40
<i>Peridinium</i>	3.18	5.10	1.03	14.41	45.81
<i>Podolampas</i>	8.95	3.72	1.26	10.50	56.31
<i>Prorocentrum</i>	5.84	3.05	0.80	8.62	64.93
<i>Oxythoxum</i>	2.69	2.61	0.68	7.38	72.31
<i>Gymnodinium</i>	3.09	2.17	0.73	6.13	78.44
<i>Dinophysis</i>	4.02	1.97	0.87	5.55	84.00
<i>Cladopyxis</i>	0.70	0.88	0.70	2.48	86.48
<i>Eutimninus</i>	0.60	8.88	0.75	2.48	88.95
<i>Ceratocoris</i>	0.56	0.78	0.59	2.19	91.15

Average	Similarity	35.42			
<i>Ceratium</i>	1.82	4.60	0.57	30.41	30.41
<i>Oxythoxum</i>	0.92	3.16	0.43	20.91	51.32
<i>Podolampas</i>	1.10	2.83	0.54	18.71	70.03
<i>Gymnodinium</i>	35.18	0.80	0.27	5.26	75.29
<i>Peridinium</i>	1.76	0.66	0.32	4.38	79.67
<i>Cladopyxis</i>	0.11	0.55	0.25	3.64	83.31
<i>Salpingella</i>	0.27	0.30	0.20	2.00	85.31
<i>Dictyocysta</i>	1.94	0.29	0.20	1.93	87.24
<i>Ciliophora</i> indet.	2.18	0.28	0.26	1.85	89.09
<i>Prorocentrum</i>	0.96	0.23	0.21	1.54	90.63

Table S7. Presence/abundance (ind L⁻¹) of microplankton taxa, collected in 27 stations of Italian Seas, at 2 different depths (see Tab. 1), July 2017.

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