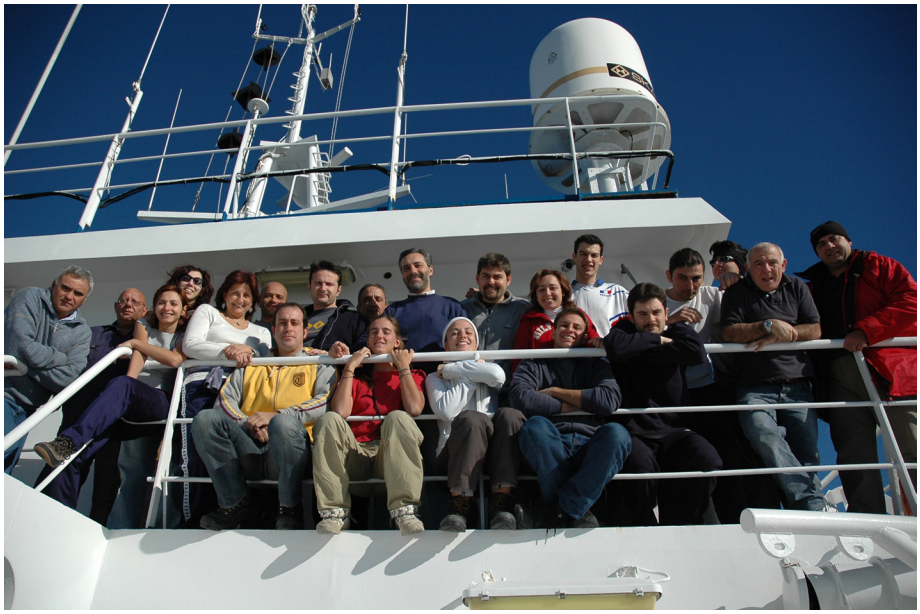
CIESM-SUB2 Cruise 2nd Leg

R/V URANIA

Messina
13 - 22 December 2005

Cruise Report

R/V Urania



The staff

CIESM SUB2 Cruise, 2nd Leg

CRUISE REPORT

Period:	December 13th – December 22th, 2005
Area:	Mediterranean Sea, Southern Tyrrhenian Sea
Chief Scientist:	Franco DECEMBRINI (CNR - IAMC)
Principal Investigator:	Laura GIULIANO (CNR - IAMC)
Research Vessel:	R/V URANIA (CNR)
Ship Captain:	Vincenzo LUBRANO DI LAVADERA (So.pro.mar)

The CIESM-SUB2 cruise was divided in two Leg: the "geomorphological survey" (1st Leg) started from Messina on December 06th 2005 and edded at the same port on 13th December.

The CIESM-SUB2 cruise (2nd Leg, "hydrobiological survey") started on December 14th 2005 from the port of Messina and ended on 22th December at the same port after 8 days of very well work. Nineteen researchers and two technicians, coming from four Mediterranean countries and different research institutes, have been involved (Table 1).

The CIESM_SUB2-2nd Leg winter cruise is the second survey of project aimed to studying, through a multidisciplinary approach, the main diversity patterns of a poorly investigated area of the Mediterranean Sea, namely the Southern Tyrrhenian area up to the Sardinia-Sicily Channels. This area plays a key role to study the complex dynamics of water exchanges and biological fluxes and biodiversity between the eastern and western Mediterranean sub-basins.

During the second cruise, to define the mesoscale gyre structure, a new sampling strategy was done. The number of stations per transect was increased; in this way, the distance between the station was reduced with a length of 10 - 15 nautical miles as required to evidenced the hydrodynamics structures.

The CIESM-SUB2 cruise objectives are:

(a) to test ongoing hypotheses about the cause of the hydrological transition and the gyre structure derived by mathematical model in the deep and intermediate water masses of the Southern Tyrrhenian Sea;

(b) to investigate the biodiversity changes and trends in many compartments of the food-chains of microbial components studying different biological processes in the eupthotic and deep waters of the Tyrrhenian Sea;

(c) to optimise the retrieval of intact deep sea samples for various purposes (technological constraints), to understand how physical attributes influence biodiversity;

(d) to provide new insights on the relationships between ecosystems functioning and biodiversity in one of the less explored deep-sea regions of the Mediterranean.

CIESM-SUB2 cruise core elements have been: CTD-O_2/Fl, equipped 24 position SBE carousel with Niskin-GO bottles and high pressure bottles (FGP), Profiling Natural Fluorescence (PNF), Bongo-zooplankton net.

The activity in the sampling area (Figure 1) started 20 hours later the departure from the port of Messina due to unfavourable weather conditions. Supported by favourable sea-weather conditions in the earlier morning of the day after we started the first station in the southern side of the Tyrrhenian Sea as scheduled by the cruise program.

This station, located at about 90 nautical miles W-SW from the Straits of Messina, represents one of a 120 nm long transect (transect "A" with SE-NW orientation: expected 10 stations at about 15 nm) crossing the deepest part the South Tyrrhenian Basin. A station [#4] was located in the "Vector" position, namely the central part of the basin. In particular, were sampled the same stations already carried out in July during the first cruise, adding intermediate station to increase the spatial resolution.

A double cast (up to 200 m and to the bottom) was obtained in the all the stations due to the high number of the sampled depths. Another transect with NE-SW and 90 nm long ("B"), centred on the St.4 (Vector, performed at different times) and composed by 6 stations was carried out.

Two casts [#17 and #8] the first in the NW part of the Tyrrhenian basin was obtained at "51" position (39°46.42'N 011°53.23'E) and the second ten miles at NE of Ustica Island (38°51'N 013°20'E) were sampled in order to extend the multiyear time series in these locations.

Despite of the unfavourable weather conditions (since the stand bay for 48 hrs) and the exceptional cooperation of the Urania crew the main transects were sampled increasing from 7 to 10 the transect with SE-NW orientation and adding two station at the other transect.

We carried out 18 CTD casts (mostly 3500 m deep), more then 340 water samples, and to perform 34 bongo-net casts. This is first and foremost a consequence of the excellent collaboration (along the 24 hours per day) between ship's crew (Sopromar), CNR technical support and the scientific teams.

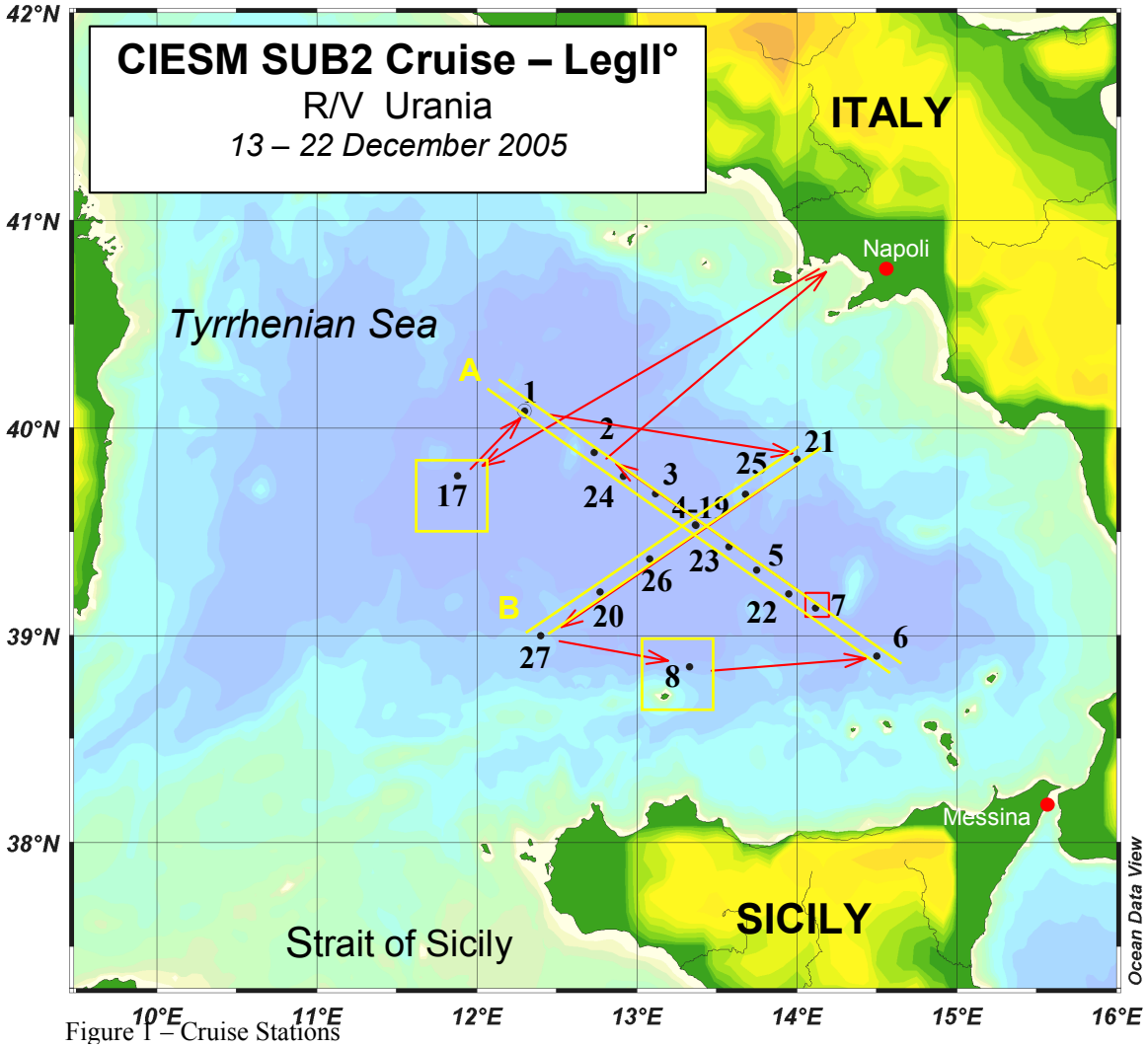


Figure 1 – Cruise Stations

date	time	station	event	lat	long	depth	notes
d, m	*local*	*n°*				*m*	
15 Dec	11.08	07 - PNF	BE	39°08.000N	014°07.006E	3361	0-80 m
	11.12		BO	39°08.0109'N	14°06.995'E		
	11.16		END	39°08.016'N	14°06.988'E		
	11.36	07a-CTD	BE	39°08.014'N	14°06.984'E	3361	0-200 m
	11.41		BO	39°08.010'N	14°06.994'E		
	11.55		END	39°08.006'N	14°07.002'E		
	12.08	07a-NET	BE	39°08.009'N	14°07.004'E	3361	0-200 m
	12.18		END	39°08.014'N	14°07.023'E		
	12.29	07b-NET	BE	39°08.002'N	14°06.991'E	3361	0-70 m
	12.35		END	39°08.136'N	14°07.004'E		
	13.53	07b-CTD	BE	39°08.000'N	14°06.990'E	3361	0-3348
	14.53		BO	39°08.004'N	14°07.006'E		
	16.29		END	39°07.996'N	14°06.997'E		
	17.45	22a-CTD	BE	39°11.995'N	13°57.028'E	3518	0-3504
	18.39		BO	39°12.000'N	13°57.021'E		
	19.47		END	39°11.998'N	13°56.988'E		
	19.49	22a-NET	BE	39°11.960'N	13°57.001'E	1518	0-200 m
	20.01		END	39°11.965'N	13°57.010'E		
	20.08	22b-NET	BE	39°11.980'N	13°57.002'E	3516	0-70 m
	20.15		END	39°11.964'N	13°57.018'E		
	20.37	22b-CTD	BE	39°11.976'N	13°57.018'E	3515	0-200 m
	21.35			39°11.980'N	13°57.020'E		
	20.46		END	39°11.985'N	13°57.028'E		
	22.13	5a-CTD	BE	39°18.973'N	13°45.012'E	3527	0-200
	22.17		BO	39°18.967'N	13°44.980'E		
	22.27		END	39°18.946'N	13°45.028'E		
	22.30	5a-NET	BE	39°18.957'N	13°45.014'E	3527	0-200 m
	22.41		END	39°18.861'N	13°44.939'E		
	22.48	5b-NET	BE	39°18.968'N	13°45.007'E	3527	0-70 m
	22.53		END	39°18.942'N	13°44.932'E		
	23.33	5b-CTD	BE	39°18.965'N	13°44.944'E	3526	0-3500
16 Dec	1.06		BO	39°19.001'N	13°44.992'E		
	2.30		END	39°19.002'N	13°44.969'E		
	3.03	23-CTD	BE	39°25.69'N	13°34.49'E	3317	0-3308
	3.56		BO	39°25.71'N	13°34.51'E		
	5.01		END	39°25.70'N	13°34.50'E		
	5.02	23a-NET	BE				
	5.13		END				
	5.20	23b-NET	BE				
	5.27		END				
	7.04	4a-CTD	BE	39°31.981'N	13°21.993'E	3485	0-3470
	8.00		BO	39°31.998'N	13°21.994'E		
	9.06		END	39°31.988'N	13°21.985'E		
	9.10	4a-NET	BE	39°32.017'N	13°22.035'E	3481	0-200 m
	9.20		END	39°31.971'N	13°22.040'E		
	9.30	4b-NET	BE	39°31.980'N	13°21.981'E	3486	0-70 m
	9.34		END	39°31.979'N	13°21.962'E		
	9.45	4-PNF	BE	39°31.969'N	13°22.050'E	3486	0-80 m
	9.56		END	39°32.000'N	13°22.099'E		
	10.07	4b-CTD	BE	39°31.993'N	13°21.986'E	3484	aborted
	10.11		END	problems with fluorometer			

date	time	station	event	lat	long	depth	notes
d, m	*local*	*n°*				*m*	
16 Dec	10.14	4b-CTD	BE	39°31.991'N	13°21.980'E	3484	0-200 m
	10.19		BO	39°31.990'N	13°21.970'E		
	10.24		END	39°31.981'N	13°21.963'E		
	12.06	3a-CTD	BE	39°41.001'N	13°06.982'E	3471	0-200 m
	12.16		BO	39°41.002'N	13°06.990'E		
	12.24		END	39°40.997'E	13°06.981'E		
	12.38	3a-Net	BE	39°40.997'N	13°06.982'E	3471	0-200 m
	12.45		END	39°40.986'N	13°06.994'E		
	12.46	3b-Net	BE	39°40.974'N	13°06.997'E	3471	0-70 m
	12.49		END	39°40.965'N	13°06.989'E		
	12.55	3-NFP	BE	39°40.955'N	13°07.021'E	3469	0-80 m
	13.01		END	39°40.932'N	13°06.991'E		
	13.22	3b-CTD	BE	39°40.98'N	13°06.99'E	3470	0-3500
	14.16		BO	39°40.992'N	13°06.983'E		
	15.21		END	39°41.003'N	13°06.982'E		
	16.40	24-CTD	BE	39°45.986'N	13°54.997'E	3592	aborted
	16.48		END	problem with oxygen sensor			
	17.12	24a-Net	BE	39°46.005'N	12°55.000'E	3589	aborted
	17.18		END	problems with winch			
	17.20	24a-Net	BE	39°46.012'N	12°55.018'E	3592	0-200 m
	17.30		END	39°45.974'N	12°55.182'E		
	17.36	24b-Net	BE	39°45.930'N	12°55.231'E	3597	0-70 m
	17.41		END	39°45.948'N	12°55.325'E		
	17.57	24-CTD	BE	39°46.008'N	12°55.000'E	3591	0-3454
	18.45		BO	39°46.020'N	12°55.049'E		
	19.50		END	39°45.985'N	12°55.003'E		
		Change of oxygen sensor during transfer					
	21.37	2-CTD	BE	39°53.000'N	12°44.068'E	3590	0-3568
	22.28		BO	39°53.009'N	12°44.071'E		
	23.43		END	39°53.021'N	12°44.068'E		
18 Dec	0.30	Transfer toward NE, due to bad wind and sea conditions					
	7.30	arrival in the Ischia-Procida channel					
	8.30	stop at anchor in front of Baia					
	21.30	Change of anchor place, in front of Pozzuoli					
19 Dec	9.00	Departure for sea condition checking					
	12.50	stop at anchor in front of Procida					
	17.30	Departure for station st17					
	4.45	17a-CTD	BE	39°45.711'N	11°52.980'E	3514	0-3480 m
	5.41		BO	39°45.693'N	11°53.004'E		
	6.52		END	39°47.708'N	11°53.008'E		
	7.02	17a-Net	BE	39°45.694'N	11°52.980'E	3503	0-200 m
	7.11		END	39°45.701'N	11°52.915'E		
	7.19	17b-Net	BE	39°45.703'N	11°52.850'E	3502	0-70 m
	7.25		END	39°45.690'N	11°52.825'E		
	7.45	17b-CTD	problems with transmissometer				failed
	8.10	17b-CTD	problems with transmissometer				failed
	8.17	17b-CTD	BE	39°45.729'N	11°52.958'E	3502	0-200 m
	8.20		BO	39°45.756'N	11°52.967'E		
	8.32		END	39°45.705'N	11°52.946'E		
	8.38	17-NFP	BE	39°45.668'N	11°52.961'E	3501	0-80 m
	8.49		END	39°45.737'N	11°52.940'E		

date	time	station	event	lat	long	depth	notes
d, m	*local*	*n°*				*m*	
	13.44	26-NFP	BE	39°22.181'N	13°04.649'E	3565	0-80 m
	13.54		END	39°22.205'N	13°04.545'E		
	14.06	26a-CTD	BE	39°22.173'N	13°04.691'E	3577	0-200 m
	14.10		BO	39°22.179'N	13°04.644'E		
	14.22		END	39°22.244'N	13°04.637'E		
	14.27	26a-Net	BE	39°22.221'N	13°04.660'E	3577	0-200 m
	14.38		END	39°22.158'N	13°04.606'E		
	14.48	26b-Net	BE	39°22.178'N	13°04.632'E	3578	0-70 m
	14.52		END	39°22.179'N	13°04.623'E		
	15.00	26b-CTD	BE	39°22.189'N	13°04.709'E	3577	0-3557
	15.51		BO	39°22.185'N	13°04.713'E		
	17.02		END	39°22.199'N	13°04.727'E		
20 Dec	19.04	20a-CTD	BE	39°12.002'N	12°45.001'E	2967	0-2950
	19.47		BO	39°12.00'N	12°44.77'E		
	20.32		END	39°12.032'N	12°44.994'E		
	20.37	20a-Net	BE	39°12.032'N	12°44.954'E	2961	0-200 m
	20.49		END	39°12.091'N	12°44.960'E		
	20.55	20b-Net	BE	39°12.125'N	12°44.945'E	2967	0-70 m
	21.00		END	39°12.153'N	12°44.956'E		
	21.14	20b-CTD	BE	39°12.012'N	12°45.048'E	2965	0-200 m
	21.19		BO	39°12.038'N	12°44.987'E		
	21.26		END	39°12.073'N	12°44.949'E		
	23.36	27a-CTD	BE	39°00.049'N	12°24.098'E	2341	0-200 m
	23.39		BO	39°00.061'N	12°24.094'E		
	23.46		END	39°00.023'N	12°24.130'E		
	23.51	27a-Net	BE	39°00.015'N	12°24.019'E	2342	0-200 m
	0.02		END	39°00.085'N	12°24.070'E		
	0.08	27b-Net	BE	39°00.004'N	12°24.013'E	2343	0-70 m
	0.13		END	39°00.038'N	12°24.004'E		
	0.18	27b-CTD	BE	39°00.000'N	12°24.040'E	2342	0-2317
	1.30		BO	39?00.001'N	12°21.011'E		
	2.40		END	39°00.020'N	12°24.000'E		
	6.00	8a-CTD	BE	38°57.003'N	13°18.995'E	3474	0-3451
	7.00		BO	38°57.002'N	13°18.996'E		
	7.50		END	38°56.994'N	13°18.991'E		
	7.58	8a-Net	BE	38°56.981'N	13°18.982'E	3474	0-200 m
	8.11		END	39°57.013'N	13°18.974'E		
21 Dec	8.22	8b-Net	BE	39°56.990'N	13°18.947'E	3473	0-70 m
	8.27		END	39°57.010'N	13°18.928'E		
	8.38	8a-NFP	BE	39°56.958'N	13°18.804'E	3471	0-80 m
	8.48		END	39°56.951'N	13°18.695'E		
	9.08	8b-CTD	BE	39°57.158'N	13°18.671'E	3471	0-200 m
	9.11		BO	39°57.147'N	13°18.698'E		
	9.25		END	39°57.199'N	13°18.732'E		
	9.29	8b-NFP	BE	39°57.192'N	13°18.682'E	3472	0-80 m
	9.39		END	38°57.257'N	13°18.622'E		
	11.03	8c-NFP	BE	38°57.035'N	13°19.068'ìE	3475	0-80 m
	11.13		END	38°57.049'N	13°19.055'E		
	11.45	28-NFP	BE	38°53.924'N	13°17.348'E	3470	0-80 m
	11.55		END	38°53.929'N	13°17.268'E		

date	time	station	event	lat	long	depth	notes
d, m	*local*	*n°*				*m*	
21 Dec	20.00	6a-CTD	BE	39°53.97'N	14°29.98'E	2401	0-200 m
	19.53		BO	39°55.98'N	14°29.88'E		
	20.30		END	39°55.98'N	14°29.88'E		
	20.04	6a-Net	BE	38°53.997'N	14°30.008'E	2401	0-200 m
	20.25		END	38°54.007'N	14°29.994'E		
	20.21	6b-Net	BE	38°54.001'N	14°29.997'E	2401	0-70 m
	20.26		END	38°54.007'N	14°29.995'E		
	20.34	6b-CTD	BE	38°53.998'N	14°30.003'E	2377	0-2370
	21.06		BO	38°54.030'N	14°30.139'E		
	21.40		END	38°53.955'N	14°30.121'E		

PARTICIPANTS INSTITUTES

1. Institute for the Coastal Marine Environment (IAMC) sect. Messina - Italian National Research Council (CNR), Messina, Italy
2. Polytechnic University of Marche - Faculty of Sciences, Ancona, Italy
3. Stazione Zoologica “Anton Dohrn”, Napoli, Italy
4. University “Parthenope” of Naples, Italy
5. Observatoire Oceanologique CNRS - Villefranche/mer, France
6. Milano-Bicocca University - Department of Geological Sciences and Geotechnologies
7. Department of Animal Ecology and Marine Biology, University of Messina, Italy
8. Laboratoire de Microbiologie, Geochimie et Ecologie Marines (LMGEM) - Centre d'Océanologie de Marseille, CNRS
9. University 7 November at Carthage – Faculty of Sciences of Bizerte – Department of Life Sciences – Oceanography and Planctology Research Group – Tunisia.

SCIENTIFIC STAFF

The names and identities of the embarked personnel and main activity field are given in the Table I.

	Name	*Affiliation*	*Country*	*Activity*
1	Franco DECEMBRINI	CNR-IAMC	Italy	Chief Scientist
2	Giovanna MAIMONE	CNR-IAMC	Italy	Microbial respiration
3	Carmen RAFFA	CNR-IAMC	Italy	Chla, primary production
4	Fabrice JAINE	CNRS_Villefranche	France	Zooplankton
5	Christian TAMBURINI	CNRS_Marseille	France	Deep-sea high pressure
6	Jean CHARRIERE	CNRS_Marseille	France	Deep-sea high pressure
7	Rosario LAVEZZA	STZ-NA,	Italy	Biological Oceanography
8	Maurizio AZZARO	CNR-IAMC	Italy	Biological Oceanography
9	Elisa MALINVERNO	UNI-MI_Bicocca	Italy	Navigation - nanoplankton
10	Francesco SMEDILE	UNI-ME	Italy	Microbial ecology
11	Massimo DE LUCA	UNI-ME	Italy	Microbial diversity
12	Violetta LACONO	CNR-IAMC	Italy	Molecular microbial
13	M N. DALY YAHIA	Faculté des Sciences de Bizerte	Tunis	Zooplankton
14	Giuseppe SIENA	UNI-NA_Partenope	Italy	Physical Oceanography
15	Yuri COTRONEI	UNI-NA_Partenope	Italy	Physical Oceanography
16	Daniela ZEPPILLI	UNI-AN	Italy	Bacteria biodiversity, viruses
17	Giocchino RUGGERI	UNI-ME	Italy	Microbial ecology
18	Tiziana CAPPELLO	UNI-ME	Italy	Student
19				

Table I – CIESM-SUB1 personnel.

DIARY (Time = local time: UTC+1h)

Dec. 14th

08.00	Departure from Messina port
12.10	stop at Lipari for shelter from the wind

Dec. 15th

05.15	Departure from Lipari towards station 07	
11.08 – 11.16	Station 07	PNF (0-200 m)
11.36 – 11.55	Station 07a	CTD (0-200 m)
12.08 – 12.18	Station 07a	Net (0-200 m)
12.29 – 12.35	Station 07b	Net (0-70 m)
13.53 – 16.29	Station 07b	CTD (0-3348)
17.45 – 19.47	Station 22a	CTD (0-3504)
19.49 – 20.01	Station 22	Net (0-200 m)
20.08 – 20.15	Station 22	Net (0-70 m)
20.37 – 20.46	Station 22b	CTD (0-200 m)
22.12 – 22.27	Station 5a	CTD (0-200 m)
22.30 – 22.41	Station 5a	Net (0-200 m)
22.48 – 22.53	Station 5b	Net (0-70 m)

Dec. 16th

23.33 – 02.30	Station 5b	CTD (0-3500)
03.03 – 05.01	Station 23	CTD (0-3308)
05.02 – 05.13	Station 23a	Net (0-200 m)
05.20 – 05.27	Station 23b	Net (0-70 m)
07.04 – 09.06	Station 4a	CTD (0-3470)
09.10 – 09.20	Station 4a	Net (0-200 m)
09.30 – 09.34	Station 4b	Net (0-70 m)
09.45 – 09.56	Station 4	PNF (0-80 m)
10.07 – 10.11	Station 4b	CTD (aborted) – problems with fluorometer
10.14 – 10.24	Station 4b	CTD (0-200 m)
12.06 – 12.24	Station 3a	CTD (0-200 m)
12.38 – 12.45	Station 3a	Net (0-200 m)
12.46 – 12.49	Station 3b	Net (0-70 m)
12.55 – 13.01	Station 3	NFP (0-80 m)
13.22 – 15.21	Station 3b	CTD (0-3500)
16.40 – 16.48	Station 24a	CTD (aborted) – problems with the oxygen sensor
17.12 – 17.18	Station 24a	Net (aborted) – problems with the winch
17.20 – 17.30	Station 24a	Net (0-200 m)
17.36 – 17.41	Station 24b	Net (0-70 m)
17-57 – 19.50	Station 24a	CTD (0-3454)
Change of oxygen sensor during transfer		
21.37 – 23.43	Station 2a	CTD (0-3568)

Dec 17th

00.30	Transfer towards NE for bad weather and sea conditions
07.30	Arrival in the Ischia-Procida channel
08.30	Stop at anchor in front of Baia
21.30	Change of anchor place, in front of Pozzuoli

Dec 18th

09.00	Departure for sea condition checking
12.50	Stop at anchor in front of Procida
17.30	Departure for station st17

Dec 19th

04.45 – 06-52	Station 17a	CTD (0-3480)
07.02 – 07.19	Station17a	Net (0-200 m)
07.19 – 07.25	Station 17b	Net (0-70 m)
07.45	Station 17b	CTD (aborted for problems with transmissometer)
08.10	Station 17b	CTD (aborted for problems with transmissometer)
08.17 – 08.32	Station 17b	CTD (0-200 m)
08.38 – 08.49	Station 17	PNF (0-80 m)
11.58 – 12.10	Station 1	PNF (0-80 m)
12.16 – 12.28	Station 1a	CTD (0-200 m)
12.30 – 12.44	Station 1a	Net (0-200 m)
12.48 – 12.54	Station 1b	Net (0-70 m)
13.24 – 15.32	Station 1b	CTD (0-3592) – changes into 1c during recovery
15.36 – 15.50	Station 1b	PNF (0-80 m)

Dec 20th

23.36 – 01.01	Station 21a	CTD (0-2438)
01.05 – 01.16	Station 21a	Net (0-200 m)
01.21 – 01.26	Station 21b	Net (0-70 m)
02.13 – 02.31	Station 21b	CTD (0-200 m)
04.30 – 04.35	Station 25a	CTD (0-200 m)
04.47 – 04.57	Station 25a	Net (0-200 m)
05.03 – 05.07	Station 25b	Net (0-70 m)
05.29 – 06.55	Station 25b	CTD (0-2538)
08.55	Station 19a	CTD
09.30	Common whale seen at 39°31.961'N / 13°22.003'E	
10.38 – 10.46	Station 19a	PNF (0-3470)
10.51 – 11.02	Station 19a	Net (0-200 m)
11.11 – 11.16	Station 19b	Net (0-70 m)
11.20 – 11.29	Station 19b	PNF (0-80 m)
11.35 – 11.49	Station 19b	CTD (0-200 m)
11.51 – 12.00	Station 19c	PNF (0-80 m)
13.44 – 13.54	Station 26	PNF (0-80 m)
14.06 – 14.22	Station 26a	CTD (0-200 m)
14.27 – 14.38	Station 26a	Net (0-200 m)
14.48 – 14.52	Station 26b	Net (0-80 m)
15.00 – 17.02	Station 26b	CTD (0-200 m)
19.04 – 19.47	Station 20a	CTD (0-2950)
20.37 – 20.49	Station 20a	Net (0-200 m)
20.55 – 21.00	Station 20b	Net (0-70 m)
21.14 – 21.26	Station 20b	CTD (0-200 m)
23.36 – 23.46	Station 27a	CTD (0-200 m)
23.51 – 00.02	Station 27a	Net (0-200 m)

Dec. 21st

00.08 – 00.13	Station 27b	Net (0-70 m)
00.18 – 02.40	Station 27b	CTD (0-2317)
06.00 – 07.50	Station 8a	CTD (0-3451)
07.58 – 08.11	Station 8a	Net (0-200 m)
08.22 – 08.27	Station 8b	Net (0-70 m)
08.38 – 08.48	Station 8a	PNF (0-80 m)
09.08 – 09.25	Station 8b	CTD (0-200 m)
09.29 – 09.39	Station 8b	PNF (0-80 m)
11.03 – 11.13	Station 8c	PNF (0-80 m)
11.45 – 11.55	Station 28	PNF (0-80 m)
20.00 – 20.10	Station 6a	CTD (0-200 m)
20.11 – 20 25	Station 6a	Net (0-200 m)
20.30 – 20.37	Station 6b	Net (0-70 m)
20.45 – 23.05	Station 6b	CTD (0-bottom)

TECHNICAL FAILURES, PROBLEMS AND SUGGESTIONS

The ship CTD SBE YSI-43 dissolved oxygen sensor failed after seven station (13 casts), this sensor was immediately replaced (using the same sensor of CNR-IAMC) due its dramatic importance for the oceanographic cruise.
Some modifications to increase and make more efficient the CTD operations could be considered in the future, some suggestions have been already given on board to the technician staff. In particular I suggest to change the fluorometer (Sea Teach) with only 3000 depth range and old electronic.
A failure of the refrigerator damaged some important samples causing both the freezing and the heating of the water samples; I suggest to check all the refrigerator.

ACKNOWLEDGEMENTS & COMMENTS:

We have completely achieved (and improved) the objectives of CIESM-SUB programme. Because of the stop due to adverse the marine-weather conditions the Sicily Channel transect has not been executed.
My personal appreciation goes to Captain Vincenzo Lubrano (Sopromar) for his competence and availability, and to the crew who greatly improved the cruise activities.
A special thanks goes to my friend Laura Giuliano who gave me the opportunity to work in the realization of this international and multidisciplinary programme.

Urania, December 22th 2005

Franco Decembrini

st	CTD cast	Cast depth (m)	Depth (m)	Time		CTD coordinates		Sample depths			Chemical and biochemical parameters										
				Date (DD/MM/YYYY)	Hour	Lat. N	Long. E		PAR	SAL	O2	Nut.	Metals	N_{14}/N_{15}	POC/N	HPLC	FCM	DOC	Chla	PP	ETS
1	07a	200	3361	15/12/2005	10.36	39°08.014'N	14°06.984'E	6	x		x	x						x	x	x	x
	07b	3348	3361		12.53	39°08.000'N	14°06.990'E	12			x	x						x			x
2	22a	3504	3518		16.45	39°11.995'N	13°57.028'E	16			x	x						x			
	22b	200	3516		19.37	39°11.976'N	13°57.018'E	-										x	x		
3	5a	200	3527		21.13	39°18.973'N	13°45.012'E	10			x	x						x	x		
	5b	3500	3526		22.33	39°18.965'N	13°44.944'E	12			x	x						x			
4	23	3308	3317		2.03	39°25.69'N	13°34.49'E	16			x	x									
5	4a	3470	3485	16/12/2005	6.04	39°31.981'N	13°21.993'E	12			x	x		x	x			x			x
	4b	200	3484		9.14	39°31.991'N	13°21.980'E	8	x		x	x		x	x	x	x	x	x	x	x
6	3a	200	3471		11.06	39°41.001'N	13°06.982'E	10											x		
	3b	3500	3470		12.22	39°40.98'N	13°06.99'E	11													
7	24	3454	3591	17/12/2005	17.57	39°46.008'N	12°55.000'E	18			x	x						x			x
8	2	3568	3590		21.37	39°53.000'N	12°44.068'E	16										x			
9	17a	3480	3504	19/12/2005	4.45	39°45.711'N	11°52.980'E	12			x	x						x			x
	17b	200	3502		8.17	39°45.729'N	11°52.958'E	10			x	x						x	x		x
10	1a	200	3608		12.16	40°05.99'N	12°19.00'E	10	x		x	x						x	x	x	x
	1b	3592	3608		13.24	40°06.011'N	12°19.026'E	14			x	x						x			x
11	21a	3438	3474	20/12/2005	23.36	39°52.038'N	14°00.016'E	11			x	x						x			x
	21b	200	3469		2.13	39°52.008'N	14°00.015'E	10			x	x				x	x	x	x		x
12	25a	200	3541		4.30	39°41.214'N	13°41.282'E	10										x	x		
	25b	2538	2539		5.29	39°41.200'N	13°41.300'E	14										x			
13	19a	3470	3464		8.55	39°31.943'N	13°22.015'E	13			x	x									
	19b	200	3465		11.35	39°31.972'N	13°21.996'E	10	x		x	x							x	x	x
14	26a	200	3577		14.06	39°22.173'N	13°04.691'E	10	x										x		
	26b	3557	3577		15.00	39°22.189'N	13°04.709'E	15													
15	20a	2950	2967		19.04	39°12.002'N	12°45.001'E	12													
	20b	200	2965		21.14	39°12.012'N	12°45.048'E	10											x		x
16	27a	200	2341		23.36	39°00.049'N	12°24.098'E	10											x		
	27b	2317	2342	21/12/2005	0.18	39°00.000'N	12°24.040'E	-													
17	8a	3451	3474		6.00	38°57.003'N	13°18.995'E	13			x	x									x
	8b	200	3471		9.08	39°57.158'N	13°18.671'E	10	x		x	x							x	x	x
18	6a																				
	6b																				

st	CTD cast	Cast depth (m)	Depth (m)	Time		CTD coordinates		Sample depths (n°)	Biological			Bacteria														DNA extr.	VP	Bongo-NET
																		RNA										
				Date	Hour	Lat. N	Long. E		Pico	Fito tot	cocco	Auto-trophic	Etero-trophic	Bio lum	LPS	FISH	Viable	HP	Nisk	BP	card-fish	EAA	EPA	ECA			
1	07a	200	3361		10.36	39°08.014'N	14°06.984'E	6	x	x	x	x	x	x	x	x	x	x				x	x	x	x			x
	07b	3348	3361		12.53	39°08.000'N	14°06.990'E	12	x			x	x	x	x	x	x				x	x	x	x			
2	22a	3504	3518		16.45	39°11.995'N	13°57.028'E	16			x										x						x
	22b	200	3516	15/12/2005	19.37	39°11.976'N	13°57.018'E	-													x						
3	5a	200	3527		21.13	39°18.973'N	13°45.012'E	10						x			x				x						x
	5b	3500	3526		22.33	39°18.965'N	13°44.944'E	12						x			x	x	x	x	x				x	x	
4	23	3308	3317		2.03	39°25.69'N	13°34.49'E	16																			x
5	4a	3470	3485		6.04	39°31.981'N	13°21.993'E	12	x		x	x	x	x	x	x	x		x		x	x	x	x	x		x
	4b	200	3484	16/12/2005	9.14	39°31.991'N	13°21.980'E	8	x	x	x	x	x	x	x	x	x				x	x	x	x			
6	3a	200	3471		11.06	39°41.001'N	13°06.982'E	10			x			x			x										x
	3b	3500	3470		12.22	39°40.98'N	13°06.99'E	11						x			x		x						x		
7	24	3454	3591	17/12/2005	17.57	39°46.008'N	12°55.000'E	18			x										x						x
8	2	3568	3590		21.37	39°53.000'N	12°44.068'E	16			x			x			x		x		x	x	x	x	x		
9	17a	3480	3504	19/12/2005	4.45	39°45.711'N	11°52.980'E	12	x			x	x	x	x	x	x	x	x		x	x	x	x	x		x
	17b	200	3502		8.17	39°45.729'N	11°52.958'E	10	x		x	x	x	x	x	x	x				x	x	x	x			
10	1a	200	3608		12.16	40°05.99'N	12°19.00'E	10	x	x	x	x	x	x			x				x	x	x	x	x		x
	1b	3592	3608		13.24	40°06.011'N	12°19.026'E	14	x			x	x	x			x				x	x	x	x	x		
11	21a	3438	3474		23.36	39°52.038'N	14°00.016'E	11	x			x	x	x			x								x		x
	21b	200	3469		2.13	39°52.008'N	14°00.015'E	10	x		x	x	x	x			x								x		
12	25a	200	3541		4.30	39°41.214'N	13°41.282'E	10			x			x			x				x						x
	25b	2538	2539		5.29	39°41.200'N	13°41.300'E	14						x			x				x						
13	19a	3470	3464		8.55	39°31.943'N	13°22.015'E	13																	x		x
	19b	200	3465	20/12/2005	11.35	39°31.972'N	13°21.996'E	10		x	x														x		
14	26a	200	3577		14.06	39°22.173'N	13°04.691'E	10			x			x			x										x
	26b	3557	3577		15.00	39°22.189'N	13°04.709'E	15						x			x										
15	20a	2950	2967		19.04	39°12.002'N	12°45.001'E	12						x			x								x		x
	20b	200	2965		21.14	39°12.012'N	12°45.048'E	10			x			x			x								x		
16	27a	200	2341		23.36	39°00.049'N	12°24.098'E	10			x																x
	27b	2317	2342	21/12/2005	0.18	39°00.000'N	12°24.040'E	-																			
17	8a	3451	3474		6.00	38°57.003'N	13°18.995'E	13	x			x	x	x			x	x	x						x		x
	8b	200	3471		9.08	39°57.158'N	13°18.671'E	10	x	x	x	x	x	x			x										
18	6a								x		x			x			x								x		x
	6b								x					x			x								x		

RESEARCH "BLOCKS"
CIESM-SUB2 2nd Cruise activities may be segmented into research blocks, a brief description of the activity concerning each Work Package (WP) is reported:

WP1

GEOPHYSICAL SURVEY
Not present on board, executed in the 1st Leg.

WP2

PHYSICAL OCEANOGRAPHY (CTD, OX, FL)
Giuseppe Siena [(1)], Yuri Cotroneo [(2,3)], Giorgio Budillon[(1)]

[(1)]Consorzio Nazionale Interuniversitario per le Scienze del Mare–ULR"Parthenope" Napoli - Italy
[(2)]Università di Napoli "Parthenope" – Dipartimento di Scienze per l'Ambiente - Italy
[(3)]ENEA – Progetto Speciale Clima Globale - Italy

Hydrology
Profiles of temperature, salinity, florescence, dissolved oxygen, and water samples were obtained using equipment consisted of a Sea-bird Electronics SBE911+ CTD system fitted with a couple of pumped conductivity-temperature sensor, a SBE 43 dissolved oxygen sensor. A fluorometer Seatech (3000 m) and altimeter were also installed.
Data were acquired at the maximum frequency (24 Hz) using a PC running Windows XP and Sea-Bird's Seasave version 5.33 for Windows software. Preliminary post-processing was carried out using batch files and scripts prepared by DiSAm to provide a variety of CTD products to the CIESM-SUB2 science party. The processed data was copied to a backup disk drive, plots and logs of each cast were available for the scientific teams within few minutes after the conclusion of a station (plots, files, and tables).
All profiles were planned to reach within 10 m of the bottom. Water samples were collected using a 24-position SBE 32 Carousel sampler with 12 l water sample bottles. Due to the presence of high pressure bottle (by CNRS) it was possible to install only 18 Niskin bottles on the SBE32.

Acoustic Doppler Current Profiling
Data from two hull mounted RDI-ADCP transducers (75-300 KHz) giving currents direction and intensity for the first 1000 m depth, were also collected continously during the transfers between the stations of the sampling plan, to obtain important complementary informations for the estimation of the baroclinic structures detected with hydrological data set.

WP3

BIOCHEMICAL PARAMETERS

Franco Decembrini[(1)], Maurizio Azzaro[(1)], Giovanna Maimone[(1)], ElisaMalinverno[(2)], Rosario Lavezza[(3)], Carmen Raffa[(1)]

[(1)] Italian National Research Council (CNR)- Institute for the Coastal Marine Environment (IAMC) Sect. of Messina - Italy
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The main objectives of this task are synthesized in the investigation of the chemical, biochemical and biologic proprieties of water column and microbial community, its diversity patterns in the Southern Tyrrhenian Sea. This zone up to the Sardinia Channel that is a key area for investigating the effects of large-scale atmospheric systems on the western Mediterranean basin.
We need to identify same processes as well as the gradients of phytoplankton productivity in the size-fractions of micro- nano- and pico- and its biodiversity, and of microbial respiration; and many chemical and biochemical factors such as, gradient of dissolved oxygen, nutrients of N and P availability, concentration of Dissolved Organic Carbon (DOC) and Particulate Organic Carbon (POC), concentration of photosynthetic pigments (such as chlorophyll *a*, by HPLC and fluorescence, pheo-pigments, …). In relation to the phytoplankton biodiversity (composition and abundance) was to assess the distribution of coccolithophorid assemblages within the Tyrrhenian Sea, also as a function of the hydrology of the area.

Methodologies: Water samples have been collected in 18 stations identified in the general sampling strategy for biological sampling (see tab. 2).
For phytoplankton biomass, activity and biodiversity the sampling depths (generally 4-5) have been selected mainly the fluorescence by chlorophyll a (using induced fluorescence to the CTD downcast profiles and natural fluorescence profiling by PNF-300) correspond to the maximum natural fluorescence and to the Deep Chlorophyll Maximum (DCM) and to the physical and chemical discontinuities that have been detected according to the CTD downcast profiles. Optical depth are detected measuring the scalar underwater and surface PAR by the PNF-300.
The carbon assimilation capacity measurements were carried out on deck by incubators (with sun light and temperature of surface sea water) during the middle hours of day (11.00 -15.00) using "stop screen" to simulate light attenuation (generally by 10.0 % – 0.1 % of surface PAR of E_0^+).
Measurements of total picoplancton, cell volume, lipopolysaccharides (LPS), fish, microbial respiration activity (ETS), nutrients concentration and the pool of carbon and nitrogen both in dissolved and particulate forms (DOC-N and POC-N) have been carried out on samples collected by means of Niskin-GO bottles at the same stations, at 15 depths (4 optical levels corresponding to the ones previously described plus 100, 200, 350, 500, 750, 1000, 1500, 2000, 2500, 3000m, and bottom). The physiological rate of oxygen consumption in the near-surface and in the deep water, was calculated from oxygen changes in sample incubated in dark bottles at *in situ* temperature and pressure.

WP4

BIODIVERSITY AND ECOSYSTEM FUNCTIONING – MICROBIOLOGY

Massimo De Luca[1,3], Violetta La Cono[1,2] , Francesco Smedile[1], Gioacchino Ruggeri[2]

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[3]Dip.Te.Ris.- Dipartimento per lo studio del Territorio e delle sue Risorse – Università di Genova-Italy

At each station (St. 1, 2, 3, 4, 5, 6, 7, 8, 17, 20, 21, 25 and 26) we collected sea water samples at different depth, according to the physical and chemical survey, by means of Niskin-GO bottles.
We filtered in 5 stations (1, 6, 19, 20 and 21), at 6 depths (bottom, 2000 m, 1000 m, 500 m, 200 m and surface), different sea water volumes to study microbial diversity using the CARD-FISH technique.
We treated sea water samples from Niskin on board to study viable eterotrophic bacteria on Marine Agar medium and to count and isolate luminescent bacteria on SWC (Sea Water Complete) medium, that will characterized in lab using morpho-physiological and tassonomic approaches.
To study the active microbial population collected non-under pressure, to have an important information about the influence of pressure on bacteria and to research the functional diversity, 3 different stations (St. 5, 8, and 17) were sampled. We collected 500-1000 ml of deep sea water samples from deeper depth by means of the high-pressure serial sampler (HPSS) and in parallel 500-1000 ml of sea water by means of Niskin bottles in triplicate at the same depth were collected.
Moreover we apply an artificial decompression of 500-1000 ml of HPSS samples to simulate the effects obtained during the transfer from depht to the surface, comparing to the Niskin bottles.
Samples are filtered each one in Millipore filters 0,22 µm and stored in "RNAlater".
In the stations 1, 4, 6, 20 and 21 we collected 5 l of sea water by means of Niskin bottles from 3 depths (surface, intermediate and deep water) and filtered each one in Millipore filters 0,22 µm.
We will use these filters for molecular based taxonomic after DNA-RNA extraction to compare active microbial population coming from different water mass. The filters are stored at -20°C after incubation in "RNAlater" storage solution for 24 hours at 4°C.

BIODIVERSITY AND ECOSYSTEM FUNCTIONING

By Fabrice Jaine[1] and Mohamed Néjib Daly Yahia [2]

[1]Laboratory of Oceanology at Villefranche sur Mer - UMR7093/CNRS, France
[2] Laboratory of Oceanography and Planktology, University 7 November at Carthage, Faculty of Science of Bizerte, Tunisia

Net plankton sampling, done with a double WP_2 net of 200µm mesh, was well accomplished during this CIESM-SUB2 cruise. Our first intention was to sample all previewed stations at mid-day and mid-night, in order to avoid zooplankton's vertical migration hours, but it was not possible due to the bad weather which has been an important factor in our sampling grid. However, plankton net was deployed almost each day around 12h (5 stations) and 24h (4 stations). Unfortunately the bad forecast led us to leave the deep sea during 2 days in order to avoid the tempest. Only few stations have been sampled both day and night, but global cycle variations of the mesozooplankton biodiversity of the Tyrrhenian Sea should be possible to analyze.

Zooplankton samples were done at two different levels in the water column. The first one was from 200m depth to the surface; this sample integrated all the zooplankton being in the

euphotic zone at the time samples were done. The second one was from 70m depth to 0m, in order to isolate and integrate zooplankton over the thermocline. Table (V) resumes the net plankton sampling activities during the CIESM SUB2 cruise.

Station's Number	Samples' Number	Depth (m)	Time
7	1-2	200-0	11h45
7	3-4	70-0	12h00
22	5-6	200-0	20h50
22	7-8	70-0	21h00
5	9-10	200-0	23h00
5	11-12	70-0	23h20
23	13-14	200-0	05h45
23	15-16	70-0	06h00
4	17-18	200-0	08h30
4	19-20	70-0	08h45
3	21-22	200-0	12h30
3	23-24	70-0	12h45
24	25-26	200-0	17h30
24	27-28	70-0	17h45
17	29-30	200-0	06h45
17	31-32	60-0	07h00
1	33-34	200-0	12h00
1	35-36	70-0	10h20
21	37-38	200-0	01h45
21	39-40	70-0	02h00
25	41-42	200-0	05h00
25	43-44	70-0	05h15
19	45-46	200-0	11h00
19	47-48	70-0	11h15
26	49-50	200-0	14h45
26	51-52	70-0	15h00
20	53-54	200-0	21h15
20	55-56	70-0	21h30
27	57-58	200-0	00h30
27	59-60	70-0	00h45
8	61-62	200-0	08h00
8	63-64	70-0	08h15
6	65-66	200-0	20h45
6	67-68	70-0	21h00

Table V – Net plankton sampling activities

These samples will be analyzed at the marine station of Villefranche-sur-mer by a classical identification method but also by a new automatic identification tool : the ZOOSCAN. This

informatic tool is a quite new scanning process which permits to analyze a sub-sample very rapidly (in comparison with classical methods) and to count, measure and even pre-classify each object contained in the sample. To explain a little bit, this classification is based on the shape properties of each object, then by calculating its ESD, identifying its shape and other parameters, the software is able to pre-classify each organism into a taxonomic group.

Moreover, one part of the 0-70meters samples will be analyzed at the Faculty of Science of Bizerte, Laboratory of Oceanography and Planctology in Tunisia. By this way, we attempt to complete taxonomic and biomass investigations.

BIODIVERSITY AND ECOSYSTEM FUNCTIONING - *PROCARYOTIC DIVERSITY AND ACTIVITY*

Christian Tamburini[(1)], Bruno Charrière[(1)], Daniella Zeppilli[(2)], Violetta Lo Cono[(3)] & Maurizio Azzaro [(3)]

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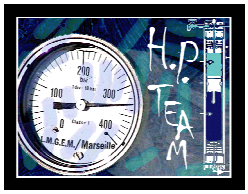
(3) Institute for the Coastal Marine Environment (IAMC) sect. Messina. Italian National Research Council (CNR), Messina, Italy



For such an aim, seawater samples will be collected at 13 stations identified in the general sampling strategy of the cruise. The main objectives will be: to optimise the retrieval of intact deep sea samples for various purposes (technological constraints), to understand how physical attributes influence biodiversity; to provide new insights on the relationships between ecosystems functioning and biodiversity in one of the less explored deep-sea regions of the Mediterranean.

Samples were carried out in 13 stations (Table 1) in the general sampling strategy of the cruise and at 4 depths (20, 500, 3000, 3500 m) by means of Niskin-GO bottles for measurements on prokaryotic total number and biomass, hydrolytic ectoenzyme activities (phosphatase, aminopeptidase and chitinase). In parallel, some samples were carried out maintaining *in situ* conditions (pressure and temperature) for ectoenzymatic activity measurements.

This cruise was also the opportunity to test new sampling strategy using high-pressure systems. Also, new topics were explored:

- effect of pressure on viral production,
- sampling for extracellular DNA,
- sampling for RNA diversity.

Table 1. Measurements performed at each station.

Date		Depth (m)	DOC	CARD-FISH	EAA	EPA	ECA
15/12/05	St.7	20	x	x	Nis	Nis	Nis
		100	x				
		500	x	x	Nis	Nis	Nis
		1000	x				
		3000	x	x	Nis	Nis, HP	Nis
15/12/05	St.7	3400	Effect of pressure on bacterial production, viral production, extracellular DNA → failed				
15/12/05	St. 22	20		x			
		500		x			
		3000		x			
		3500		x			
15/12/05	St. 22	3500	2 HPBs to study effect of pressure on bacterial production, viral production and extracellular DNA				
15/12/05	St. 22	3500	2 HPBs to study effect of pressure on RNA diversity				
15/12/05	St. 5	20		x			
		500		x			
		3000		x			
16/12/05	St. 4	surface	x				
		20	x	x	Nis	Nis	Nis
		50	x				
		80	x				
		500	x	x	Nis	Nis	Nis
		3000	x	x	Nis	Nis	Nis
16/12/05	St. 24	20		x			
		500		x			
		3000		x			
16/12/05	St. 2	20	x	x	Nis	Nis	Nis
		500	x	x	Nis	Nis	Nis
		3000	x	x	Nis	Nis	Nis
		3500	x				
16/12/05	St. 2	3500	4 HPBs to study effect of pressure on RNA diversity → failed				
19/12/05	St. 17	20	x	x	Nis	Nis	Nis
		500	x	x	Nis	Nis	Nis
		3000	x	x	Nis	Nis	Nis
		3500	x	x			
19/12/05	St. 17	3500	Effect of pressure on heterotrophic respiration				
19/12/05	St. 17	3500	4 HPBs to study effect of pressure on RNA diversity				
19/12/05	St. 1	20	x	x	Nis	Nis	Nis
		30	x				
		60	x				
		80	x				
		500	x	x	Nis	Nis	Nis
		3000	x	x	Nis	Nis	Nis
		3500	x	x	Nis, HP	Nis	Nis, HP
19/12/05	St. 1	3500	1 HPB to study effect of pressure on heterotrophic respiration				

19/12/05	St. 1	20 500 2500	 x	x x x	Nis Nis Nis	Nis Nis Nis	Nis Nis Nis
20/12/05	St. 21	2500	1 HPB to study effect of pressure on heterotrophic respiration				
20/12/05	St. 21	2500	2 HPBs to study effect of pressure on bacterial production & viral production				
20/12/05	St. 25	20 500 2400		x x x			
20/12/05	St. 26	20 500 3000		x x x			
20/12/05	St. 20	20 500 3000	 x	x x x	x x x	x x x	x x x
21/12/05	St. 8	20 500 3000	 x	x x x	x x x	x x x	x x x
21/12/05	St. 8	3000	4 HPBs to study effect of pressure on RNA diversity				

Table VI - Measurements performed at each station.

RNA: RNA analysis after maintaining high-pressure (HP) condition comparatively to decompressed sample obtain with Niskin-GO (Nis) bottles.
CARD-FISH: Catalysed Reporter Deposition coupled to the Fluorescence In Situ Hybridization for prokaryotic structure analysis.
EAA: Ectoenzyme aminopeptidase activity (MCA-Leu degradation).
EPA: Ectoenzyme phosphatase activity (MUF-P degradation).
ECA: Ectoenzyme chitinase activity (MUF-diNAG degradation).

WP5

DATA GATHERING

Not present on board.

WP6

PUBLIC OUTREACH

Not present on board.