CIESM-SUB1 Cruise

R/V UNIVERSITATIS

Naples to Naples
21 July 30 July

2005

Cruise Report

The ship

The people

CIESM SUB1
21-30 July 2005 - CRUISE REPORT
(local time)

Period:	July 21th – July 30th, 2005	
Area:	Southern Tyrrhenian Sea	
Chief Scientist:	Giorgio BUDILLON	(University "Parthenope")
Principal Invesigator:	Laura GIULIANO	(CNR - IAMC)
Information Coordinator:	Franco DECEMBRINI	(CNR - IAMC)
Research Vessel:	R/V UNIVERSITATIS	(CoNISMa)
Ship Captain:	Angelo BARCA	(SariMed)

The CIESM-SUB1 cruise officially started on July 21th 2005 after leaving the port of Naples. Eighteen people as researchers and technicians, coming from four Mediterranean countries and different research institutes, have been involved (see Table I). The cruise ended officially on July 30th when the ship entered in port of Naples after 10 days of excellent work.

The CIESM-SUB1 cruise is the first 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 between the eastern and western Mediterranean sub-basins.

The CIESM-SUB1 cruise objectives are:

(a) to complete the high resolution deep-sea mapping of the western basin;
(b) to test ongoing hypotheses about the cause of the hydrological transition observed in the deep and intermediate water masses of the Tyrrhenian;
(c) to investigate meta-biodiversity changes and trends in certain compartments of the food-webs from prokaryotes to macrofauna.

CIESM-SUB1 cruise core elements have been: CTD-O_2/Fl, LADCP2, equipped 24 position SBE carousel with standard Niskin bottles and high pressure bottles, photosonde, bongo-zooplankton net, box corer and multicorer, multibeam and chirp.

The field operation (see map on figure 1) started two hours later the departure from the port of Naples when we obtained a CTD station offshore Ischia island in order to verify the CTD-Rosette system [station #0]. Supported by favourable meteo-marine conditions in the earlier morning of the day after we started the first station in the deep Tyrrhenian Sea as scheduled by the cruise program.
This station, located at about 100 nautical miles W-SW from the Gulf of Naples, represents the beginning of a 120 nm long transect (transect "A": expected 7 stations at about 30 nm) crossing the deepest part the Tyrrhenian Basin with a NW-SE orientation. A station [#4] was located in the "Vector" position, namely the central part of the basin.
A double cast (up to 200 m and to the bottom) was obtained in the "Geostar" position [station #8], namely 12 nm NE Ustica Island, along the track to reach transect B (60 nm long in NW direction) close to the Sicily coast in the Sardinia Channel. This transect were obtained across the prime flux of Levantine Intermediate Water (LIW) which comes from the Sicily Channel and flows in the Tyrrhenian Sea. The last station along transect "B" [#15] also represents the first station of the third

(and last) transect, named "C", which is approximately 185 Nm long perpendicularly to transect "A", both transect have a common station in the "Vector" position (performed at different times).
A single cast [#17] in the NW part of the Tyrrhenian basin was obtained at "51" position (39°46.42'N 011°53.23'E) in order to extend the multiyear time series in this location.

Despite some technical problems at the instrumentation, we take advantage from the favourable weather conditions and the exceptional cooperation of the Universitatis crew to increase the planned sampling plan, in particular we:

- extended transect A in the NW direction adding station #18 at 2000 m isobath;
- increased the resolution of transect "B" adding three stations on the basis of the bottom topography;
- repeated the cast in the "Vector" position obtaining station #19, 6 days later station #4.

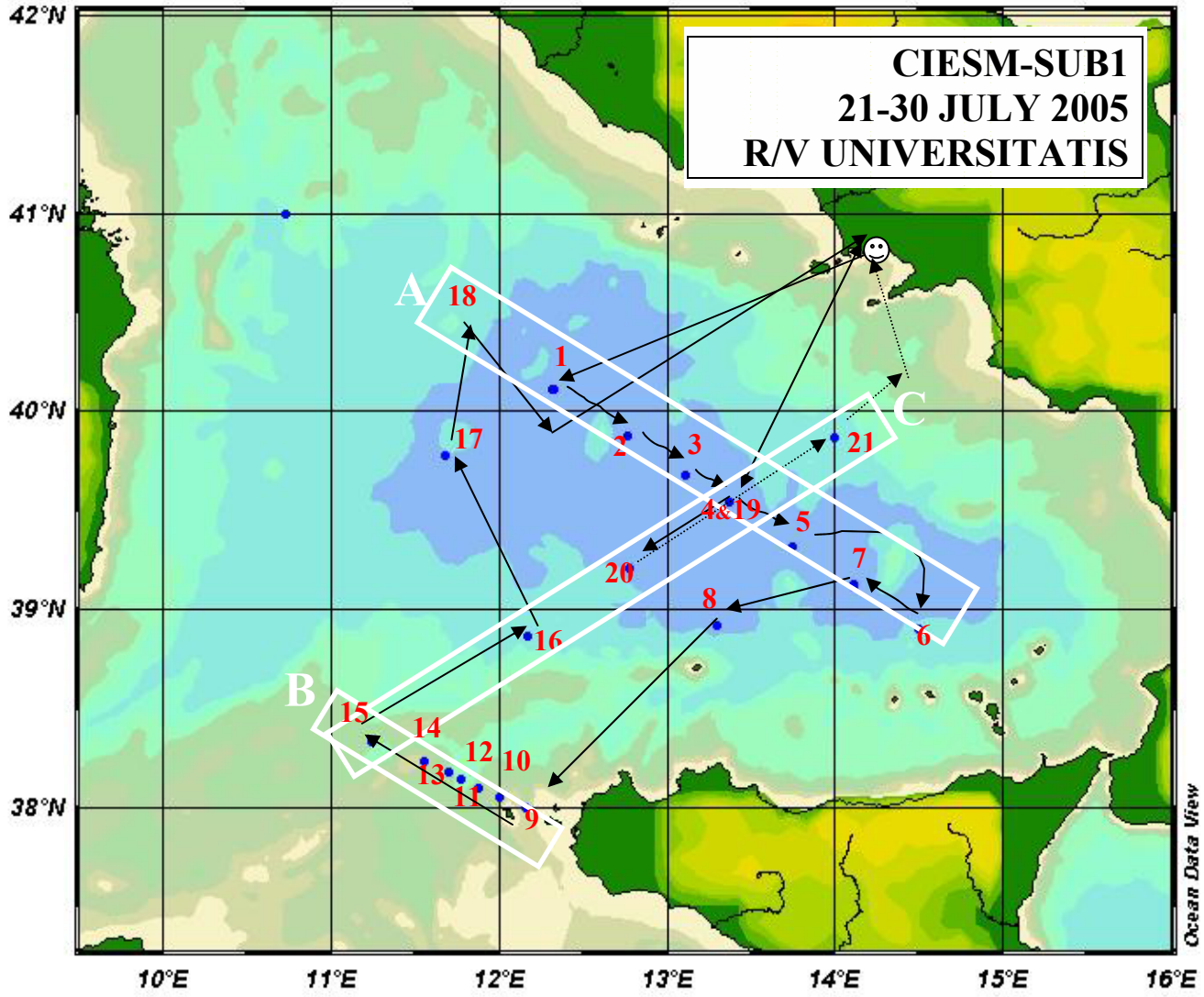

Figure 1 – Cruise Stations.

We were able to take 29 CTD casts (many of them 3500 m deep), more then 300 water samples, 6 sediment samples (all 3500 m deep), and to perform 20 bongo-net casts. This is first and foremost a

consequence of the excellent collaboration (along the 24 hours per day) between ship's crew (Sarimed), CoNISMa technical support and the scientific teams.

SCIENTIFIC-TECHNICAL STAFF

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

	Name	***Affiliation***	***Country***	***activity***
1	Giorgio BUDILLON	Università di Napoli "Parthenope"	ITALY	Chief Scientist Physical Oceanography
2	Siri CAMPBELL	CIESM	MONACO	Press and communications
3	Ameur CHERIF	Université El Manar	TUNIS	Microbiology
4	Franco DECEMBRINI	CNR-IAMC, Messina	ITALY	Biogeochemistry
5	Massimo DE LUCA	Università di Messina	ITALY	Microbial ecology
6	Massimo DE STEFANO	Università di Napoli "Parthenope"	ITALY	Physical Oceanography
7	Marc GAREL	CNRS- *LMGEM*, Marseille	FRANCE	Deep-sea high pressure technology. Microbiology
8	Lionel GUIDI	CNRS, Villefranche	FRANCE	Zooplankton
9	Rosario LAVEZZA	Stazione Zoologica, Napoli	ITALY	Biological Oceanography
10	Mirko MAGAGNINI	Università di Ancona	ITALY	Meiofauna, invertebrate (macro) fauna and benthic bacteria biodiversity, viruses
11	Giovanna MAIMONE	CNR-IAMC, Messina	ITALY	Microbiology
12	Sophie Marie MARTIRANI VON ABERCRON	Stazione Zoologica, Napoli	ITALY	Biological Oceanography
13	Carmela RAFFA	Università di Messina	ITALY	Biological Oceanography
14	Alessandra SAVINI	Università di Milano "Bicocca"	ITALY	Geology & Navigation
15	Simona SCARFÌ	Università di Messina	ITALY	Microbial ecology
16	Giuseppe SIENA	CoNISMa – ULR Napoli	ITALY	Technical assistance
17	Christian TAMBURINI	CNRS- *LMGEM*, Marseille	FRANCE	Deep-sea high pressure technology. Microbiology
18	Francesco TROPEA	CoNISMa - Roma	ITALY	Technical assistance & Navigation

Table I – CIESM-SUB1 personnel.

RESEARCH "BLOCKS"

CIESM-SUB1 cruise activities may be segmented into research blocks, in the Appendix a brief description of the activity concerning each Work Package (WP) is reported.

SEQUENCE OF KEY EVENTS (IN LOCAL TIME)

21 July		Naples - Embarking of people and equipments.
	18.00	All onboard.
	19:00	Safety meeting.
	20:30	Departure.
	21:30	First scientific meeting: overview of the cruise plan, activities, role of researchers, and operational procedures.
	22:15	Station 000: CTD and Rosette check.
22 July	08:00	Station 001: start sampling section "A".
23 July	08:30	Station 04: sampling at "Vector" position.
24 July	09:50	Station 07: end sampling section "A". Geophysical survey.
25 July	08:30	Station 08: sampling at "Geostar" position.
26 July	01:30	Station 009: start sampling section "B".
	12:30	Station 015: end sampling section "B" & start sampling section "C".
27 July	06:00	Station 017: sampling at "51" position.
	18:00	CTD deck unit fails, identification of the breakdown, and useless attempts to repair it. Stand by.
	20:00	Sailing to Naples to recover a new CTD Deck Unit.
28 July	08:00	Bay of Pozzuoli, positive test for the new Deck Unit. Sailing to the work area.
	20:30	Station 019: repeated sampling at "Vector" position.
29 July	20:30	Final scientific meeting: cruise overview and new activities in the CIESM-SUB framework
	20:10	End of the measurements.
30 July	08:00	Port of Naples Disembark people and equipments.

St.	CTD cast	Cast depth	depth	Time		CTD Coordinates		Sample Depth (n°)	PAR	SAL	Chemical and biochemical parameters								
				Date	Hour	Lat. N	Long. E				O2	Nut.	Metals	DOC	POC	HPLC	Chla	PP	ETS
1	01a	3596	3602.2	22/07/2005	6.09	40°06.600'	012°19.180'	15		X	X								X
2	02a	200	3592	22/07/2005	11.54	39°52.710'	012°44.160'	8	X			X		X	X	X	X	X	
	02b	83	3595	22/07/2005	14.12	39°52.820'	012°45.970'	2											
	02c	3581.7	3587.5	22/07/2005	14.20	39°52.820'	012°46.070'	16		X		X		X	X				
3	03a	3465.3	3469.7	23/07/2005	4.18	39°40.790'	013°06.730'	16		X									
4	04a	200	3453	23/07/2005	8.30	39°32.050'	013°22.280'	8	X		X	X	X	X	X	X	X	X	
	04b	3481	3483.2	23/07/2005	13.07	39°32.520'	013°22.140'	12		X	X	X	X	X	X				X
5	05a	3501.5	3507	23/07/2005	20.33	39°19.230'	013°45.010'	16		X									
6	06a	2344.1	2346.6	24/07/2005	4.07	38°54.000'	014°30.110'	16		X									X
7	07a	200	3394	24/07/2005	8.30	39°07.770'	014°06.530'	9	X		X	X		X	X	X	X	X	
	07b	3425.1	3430	24/07/2005	9.53	39°07.470'	014°06.430'	14		X	X	X		X	X				
8	08a	200	3468	25/07/2005	8.37	38°55.390'	013°17.630'	6	X								X	X	
	08b	3460.3	3463.1	25/07/2005	9.57	38°55.900'	013°16.490'	13		X									X
9	09a	470.2	473.9	26/07/2005	1.35	38°03.800'	012°09.300'	9											
10	10a	333.1	335	26/07/2005	3.26	38°03.410'	012°00.180'	4				X					X		
11	11a	775.3	778.1	26/07/2005	4.37	38°05.710'	011°52.340'	10		X									
12	12a	1216.3	1222.6	26/07/2005	5.55	38°08.820'	011°46.460'	0		X									
13	13a	789.2	790.3	26/07/2005	7.34	38°10.570'	011°41.440'	11	X			X					X	X	
14	14a	208.82	211.5	26/07/2005	9.12	38°14.200'	011°32.960'	0		X									
15	15a	761.8	763.9	26/07/2005	12.05	38°19.970'	011°14.520'	11	X	X		X					X	X	X
16	16a	2142.6	2147.7	26/07/2005	18.08	38°52.230'	012°10.300'	6		X							X		
17	17a	3491.8	3495.28	27/07/2005	4.23	39°46.550'	011°53.470'	8	X	X	X	X		X	X		X	X	X
	17b	100	3497	27/07/2005	7.21	39°46.530'	011°54.180'	7			X	X	X	X	X	X			
18	18a	2441.4	2443.3	27/07/2005	12.22	40°25.020'	011°47.970'	7		X		X					X		
19	19a	3469.8	3470.2	28/07/2005	18.38	39°32.200'	013°22.270'	6		X							X		
20	20a	3031.8	3034.6	29/07/2005	3.28	39°12.810'	012°44.690'	12	X	X		X		X	X		X	X	X
	20b	100	3060	29/07/2005	6.04	39°13.450'	012°44.340'	7				X	X	X	X				
21	21a	200	3479	29/07/2005	14.14	39°52.220'	014°00.100'	9	X			X	X	X	X		X	X	X
	21b	2478.2	2480.1	29/07/2005	15.04	39°52.220'	014°00.290'	9		X	X			X	X				

Table II – Chemical and biochemical parameters.

St.	CTD cast	Cast depth	depth	Time		CTD Coordinates		Sample depth (n°)	Biological parameters		Bacteria												Virus	Bongo-NET	Sediment	
				Date	Hour	Lat. N	Long. E		Pico	Fito					RNA										BC	MC
											Auto-trophic	Etero-trophic	Bio lum.	Viable	HP	Nisk	BP	AP	EAA	EPA	ECA				
1	01a	3596	3602.2	22/07/2005	6.09	40°06.600'	012°19.180'	15	X		X	X	X	X								X				
2	02a	200	3592	22/07/2005	11.54	39°52.710'	012°44.160'	8		X			X	X								X	X			
	02b	83	3595	22/07/2005	14.12	39°52.820'	012°45.970'	2																		
	02c	3581.7	3587.5	22/07/2005	14.20	39°52.820'	012°46.070'	16					X	X	X	X	X	X	X	X	X	X		X		
3	03a	3465.3	3469.7	23/07/2005	4.18	39°40.790'	013°06.730'	16					X	X								X				
4	04a	200	3453	23/07/2005	8.30	39°32.050'	013°22.280'	8		X			X	X								X	X			
	04b	3481	3483.2	23/07/2005	13.07	39°32.520'	013°22.140'	12	X		X	X	X	X	X	X	X	X	X	X	X	X		X	X	
5	05a	3501.5	3507	23/07/2005	20.33	39°19.230'	013°45.010'	16					X	X								X	X			
6	06a	2344.1	2346.6	24/07/2005	4.07	38°54.000'	014°30.110'	16	X		X	X	X	X								X				
7	07a	200	3394	24/07/2005	8.30	39°07.770'	014°06.530'	9		X			X	X								X	X			
	07b	3425.1	3430	24/07/2005	9.53	39°07.470'	014°06.430'	14					X	X	X	X						X				X
8	08a	200	3468	25/07/2005	8.37	38°55.390'	013°17.630'	6		X			X	X								X	X			
	08b	3460.3	3463.1	25/07/2005	9.57	38°55.900'	013°16.490'	13	X		X	X	X	X	X	X	X	X	X	X		X		X	X	
9	09a	470.2	473.9	26/07/2005	1.35	38°03.800'	012°09.300'	9					X	X								X	X			
10	10a	333.1	335	26/07/2005	3.26	38°03.410'	012°00.180'	4																		
11	11a	775.3	778.1	26/07/2005	4.37	38°05.710'	011°52.340'	10					X	X								X				
12	12a	1216.3	1222.6	26/07/2005	5.55	38°08.820'	011°46.460'	0																		
13	13a	789.2	790.3	26/07/2005	7.34	38°10.570'	011°41.440'	11		X			X	X								X				
14	14a	208.82	211.5	26/07/2005	9.12	38°14.200'	011°32.960'	0															X			
15	15a	761.8	763.9	26/07/2005	12.05	38°19.970'	011°14.520'	11	X	X	X	X	X	X								X				
16	16a	2142.6	2147.7	26/07/2005	18.08	38°52.230'	012°10.300'	6															X			
17	17a	3491.8	3495.28	27/07/2005	4.23	39°46.550'	011°53.470'	8	X	X	X	X			X	X	X	X	X	X	X					
	17b	100	3497	27/07/2005	7.21	39°46.530'	011°54.180'	7																		
18	18a	2441.4	2443.3	27/07/2005	12.22	40°25.020'	011°47.970'	7															X			
19	19a	3469.8	3470.2	28/07/2005	18.38	39°32.200'	013°22.270'	6							X	X			X	X	X		X			
20	20a	3031.8	3034.6	29/07/2005	3.28	39°12.810'	012°44.690'	12	X	X	X	X	X	X	X	X	X		X	X	X					
	20b	100	3060	29/07/2005	6.04	39°13.450'	012°44.340'	7					X	X												
21	21a	200	3479	29/07/2005	14.14	39°52.220'	014°00.100'	9	X		X	X			X	X										
	21b	2478.2	2480.1	29/07/2005	15.04	39°52.220'	014°00.290'	9																		

Table III – Biological parameters and sediment samples.

DIARY

All scientific operations have been traced in GMT (local time – 2 hours) by the geophysical-navigator group (see Table IV).

Date	Hour	Operation	Description	Stations
21/07/05	18:30	NAV	Departure from Napoli harbour. Start of the oceanographic cruise.	
	20:15	CTD00	Test of winch, frame, and CTD functionality.	
	22:00	Nav	Start navigation to 01Station	
22/07/05	5:56		Arrive on 01Station	
	6:16	CTD01	CTD at sea – depth 3585 m	01
	6:40	CTD01	CTD on board	
	6:45	Nav	Start navigation to 02 Station	
	11:05		Arrive on 02 station	
	11:24	PNF300	PNF300 at sea	02
	11:42	PNF300	Stop log PNF300 data for technical problem – operation failed	
	11:43	PNF300	PNF300 at sea	02
	11:51	PNF300	PNF300 on board – data ok	
	11:52	CTD02a	CTD at sea – (200m depth cast)	02
	12:00	CTD02A	CTD on board	
	13:00	NET01	Plancton NET at sea	02
	13:20	NET02	Plancton NET on board	
	14:11	CTD02B	CTD at sea (83m depth cast)	02
	14:21	CTD02B	CTD on board	
	14:24	CTD02C	CTD at sea	02
	17:03	CTD02C	CTD on board	
	18:14	MB	Start geophysical survey on palinuro seamount	
	19:13	MB	End of geophysical survey on Palinuro seamount	
	20:13	BC01	Box Corer at sea	02
	21:29	BC01	Box – corer on bottom	
	22:40	BC01	Box – corer on board – operation failed	
	22:53	BC02	Box – corer at sea	02
	23:59	BC02	Box – corer on bottom	
23/07/05	1:15	BC02	Box – corer on board	
	1:30	NAV	Navigation to 03 Station	
	4:10		Arrive on 03 Station	
	4:18	CTD03	CTD at sea	03
	6:25	CTD03	CTD on board	
	6:30	NAV	Navigation to 04 Station	
	8:00		Arrive on 04 station	
	8:10	PNF300	PNF300 at sea	04
	8:18	PNF300	PNF300 on board	
	8:29	CTD04A	CTD at sea	04
	9:00	CTD04A	CTD on board	
	9:05	NET	Plancton NET at sea	04
	9:15	NET	Plancton NET on board	

	10:00	BC03	Box – corer at sea	04
	11:16	BC03	Box – corer on bottom	
	12:22	BC03	Box – corer on board	
	13:05	CTD04B	CTD at sea	04
	15:26	CTD04B	CTD on board	
	15:47	MC01	MultiCorer at sea	04
	16:56	MC01	Multicorer on bottom	
	18:00	MC01	Multicorer on board	
	18:15	NAV	Navigation to 05 Station	
	20:25		Arrive on 05 Station	
	20:30	CTD05A	CTD at sea	05
	22:47	CTD05A	CTD on board	
	22:53	NET	Plancton NET at sea	05
	23:18	NET	Plancton NET on board	
	23:23	NAV	Navigation to 06 Station	
24/07/05	4:04	CTD06A	CTD at sea	06
	5:44	CTD06A	CTD on board	
	5:45	NAV	Navigation ti 07 Station	
	8:03		Arrive on 07 Station	
	8:12	PNF300	PNF300 at sea	07
	8:24	PNF300	PNF300 on board	
	8:31	CTD07A	CTD at sea (200m depth)	07
	8:51	CTD07A	CTD on board	
	8:57	NET	Plancton NET at sea	07
	9:17	NET	Plancton NET on board	
	9:53	CTD07B	CTD at sea	07
	12:35	CTD07B	CTD on board	
	12:38	PNF300	PNF300 at sea	07
	12:47	PNF300	PNF300 on board	
	12:51	MC02	Multicorer at sea	07
	13:57	MC02	Multicorer at seafloor	
	15:15	MC02	Multicorer on board – operation failed	
	15:46	MC03	Multicorer at sea	07
	15:49	MC03	Multicorer on board – operation failed	
	16:13	MC04	Multicorer at sea	
	17:10	MC04	Multicorer on seafloor	07
	18:12	MC04	Multicorer on board – ok	
	19:00	MB	Start geophysical survey on Marsili seamount	
25/07/05	3:10	MB	End of geophysical survey on Marsili seamount	
	3:10	NAV	Navigation to 08 station	
	8:00		Arrive on 08 Station	
	8:05	PNF300	PNF300 at sea	08
	8:20	PNF300	PNF on board	
	8:25	CTD08A	CTD at sea (200 m)	08
	8:54	CTD08A	CTD on board	
	8:59	NET	Plancton NET at sea	08
	9:40	NET	Plancton NET on board	
	9:56	CTD08B	CTD at sea	08

	12:05	CTD08B	CTD on board	
	12:11	MC05	Multicorer at sea	08
	13:10	MC05	Multicorer on seafloor	
	14:11	MC05	Multicorer on board	
	14:32	BC04	Box-corer at sea	08
	14:50	NOTE	Surface water sample by Tamburini	08
	15:35	BC04	Box-corer on seafloor	
	16:41	BC04	Box-corer on board	
	16:45	NAV	Navigation to 09 Station	
26/07/05	1:20		Arrive on 09 Station	
	1:36	CTD09A	CTD at sea	09
	1:58	CTD09A	CTD on board	
	2:04	NET	Plancton NET at sea	09
	2:25	NET	Plancton NET on board	
	2:26	NAV	Navigation to 10 Station	
	3:20		Arrive on 10 station	
	3:29	CTD10A	CTD at sea	10
	3:43	CTD10A	CTD on board	
	3:45	NAV	Navigation to 11 Station	
	4:28		Arrive on 11 Station	
	4:33	CTD11A	CTD at sea	11
	5:06	CTD11A	CTD on board	
	5:07	NAV	Navigation to 12 Station	
	5:47		Arrive on 12 Station	
	5:52	CTD12A	CTD at sea	12
	6:36	CTD12A	CTD on board	
	6:38	PNF300	PNF300 at sea	12
	6:55	PNF300	PNF300 on board	
	7:00	NAV	Navigation to 13 Station	
	7:17		Arrive on 13 Station	
	7:20	PNF300	PNF300 at sea	13
	7:30	PNF300	PNF300 on board	
	7:33	CTD13A	CTD at sea	13
	8:03	CTD13A	CTD on board	
	8:08	NAV	Navigation to 14 Station	
	8:58		Arrive on 14 Station	
	9:01	PNF300	PNF300 at sea	14
	9:09	PNF300	PNF300 on board	
	9:11	CTD14A	CTD at sea	14
	9:21	CTD14A	CTD on board	
	9:24	NET	Plancton NET at sea	14
	9:50	NET	Plancton NET on board	
	9:53	NAV	Navigation to 15 Station	
	11:43		Arrive on 15 Station	
	12:04	CTD15A	CTD at sea	15
	12:36	CTD15A	CTD on board	
	12:41	NAV	Navigation to 16 Station	
	18:05		Arrive on 16 Station	

	18:10	CTD16A	CTD at sea	16
	18:16	CTD16A	Stop cast for technical problem with the O2 sensor- Operation failed	
	18:16	CTD16A	CTD at sea	16
	19:29	CTD16A	CTD on board	
	19:33	NET	Plancton NET at sea	16
	20:06	NET	Plancton NET on board	
	20:07	NAV	Navigation to 17 Station	
27/07/05	4:15		Arrive on 17 Station	
	4:19	CTD17A	CTD at sea	17
	6:30	CTD17A	CTD on board	
	6:42	PNF300	PNF300 at sea	17
	6:49	PNF300	PNF300 on board	
	7:21	CTD17B	CTD at sea	17
	7:35	CTD17B	CTD on board	
	7:40	NAV	Navigation to 18 Station	
	12:00		Arrive on 18 station	
	12:07	PNF300	PNF300 at sea	18
	12:17	PNF300	PNF300 on board	
	12:19	CTD18A	CTD at sea	18
	13:45	CTD18A	CTD on board	
	13:50	NET	Plancton NET at sea	18
	14:25	NET	Plancton NET on board	
	14:25	NAV	Navigation to 19 station	
	15:00		Technical problem with the deck unit of SBE911	
	15:30	NAV	Navigation to Pozzuoli harbour (to bring another deck unit)	
28/07/05	5:00		Arrive at Pozzuoli harbour	
	9:00	NAV	Navigation to 19 Station	
	18:24		Arrive on 19 Station	
	18:36	CTD19A	CTD at sea	19
	20:43	CTD19A	CTD on board	
	20:52	NET	Plancton NET at sea	19
	21:32	NET	Plancton Net on board	
	21:34	NAV	Navigation to 20 Station	
29/07/05	1:05	MC	Multicorer at sea	20
“”	1:55	MC	Multicorer on seafloor	
“”	2:45	MC	Multicorer on board – operation failed	
“”	3:08	CTD20A	CTD at sea	20
“”	5:15	CTD20A	CTD on board	
“”	6:05	CTD20B	CTD at sea (200m depth)	20
“”	6:17	CTD20B	CTD on board	
“”	6:21	PNF300	PNF300 at sea	20
“”	6:35	PNF300	PNF300 on board	
“”	6:36	NAV	Navigation to 21 Station	
“”	13:55		Arrive on 21 Station	
“”	14:00	PNF300	PNF300 at sea	21
“”	14:08	PNF300	PNF300 on board	
“”	14:14	CTD21A	CTD at sea (200m)	21
“”	14:28	CTD21A	CTD on board	

“”	14:36	NET	Plancton NET at sea	21
“”	15:00	NET	Plancton NET on board	
“”	15:03	CTD21B	CTD at sea	21
“”	16:30	CTD21B	CTD on board	
“”	16:00	BC	Box-corer at sea	21
“”	17:04	BC	Box-corer on seafloor	
“”	18:00	BC	Box-corer on board – operation failed	
	18:10	NAV	Navigation to the Gulf of Naples	

Table IV – Cruise diary (GMT).

TECHNICAL FAILURES, PROBLEMS AND SUGGESTIONS

The ship ADCP failed after few hours of (probably) excellent work, this system must be restored as soon as possible due its dramatic importance for the oceanographic cruises. A similar failure at the CTD deck unit happens two days later putting at risk the good results of the entire cruise. At this stage is not possible to make any reliable conjecture concerning the possible reasons, however a probable role of the ship power supply could be assumed.

A failure of the container refrigerator thermostat damaged some important samples causing the complete freezing of the water samples.

The GPS-CTD interfacing is still unavailable, and the CTD operator must manually insert the coordinate facilitating the risk of mistakes.

Some modifications to increase and make more comfortable 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 pulley position to facilitate the CTD-Rosette deployment and recovering. Moreover the hydrological winch and frame controls must be accessible at the same position, this is not possible yet and the operator is forced to change his position during the instrument deployment and recovering.

ACKNOWLEDGEMENTS & COMMENTS:

It's been really a great cruise! We have completely achieved (and improved) the objectives of CIESM-SUB1. The R/V UNIVERSITATIS revelaed an efficient ship, staffed with a fine group of capable and congenial people, across the whole spectrum.

My personal appreciation goes to Captain A. Barca (Sarimed) for his capability and competence, and to the crew who greatly improved the cruise activities.

A special and warm thank to Laura Giuliano - which make possible this first exiting experience - hoping to have her soon on board during the next CIESM cruises.

Universitatis, July 30^{h}

Giorgio Budillon

APPENDIX

WP1

HYDROGRAPHIC AND GEOPHYSICAL SURVEY

Alessandra Savini[(1)]

[(1)] *Università di Milano "Bicocca", Dipartimento di Scienze Geologiche e Geotecnologie, Milano - Italy*

The cruise was carried out with R/V Universitatis (Fig 2), a 45m long ship owned by CoNISMa and operated by SariMed .
The instrumental offsets are presented in Fig. 3. The geophysical devices aviable on board and employed during the cruise encompass a singlebeam echosounder SIMRAD EA400 (27 kHz), a medium water depth Multibeam system (Reson8160 – 50kHz) and a Chirp sonar (GeoAcoustic ChirpII). The integrated system used an IXSEA OCTANS 3000 Gyrocompass and Motion Sensor, and a DGPS Satellite link by Skyfix.
The DGPS data were acquired and processed by the navigation software PDS2000. The navigation program was interfaced with all the equipment working during the cruise, to geo-reference all the measured data.
The datum was WGS84 and the UTM projection (fuse 33) was chosen for navigation and display, with:
Scale factor: 0.999600000
False Northing: 0.00
False Easting: 500000.00
Origin Latitude: 0.00
Central Meridian: 15 00 00.00

Fig. 2: R/V Universitatis

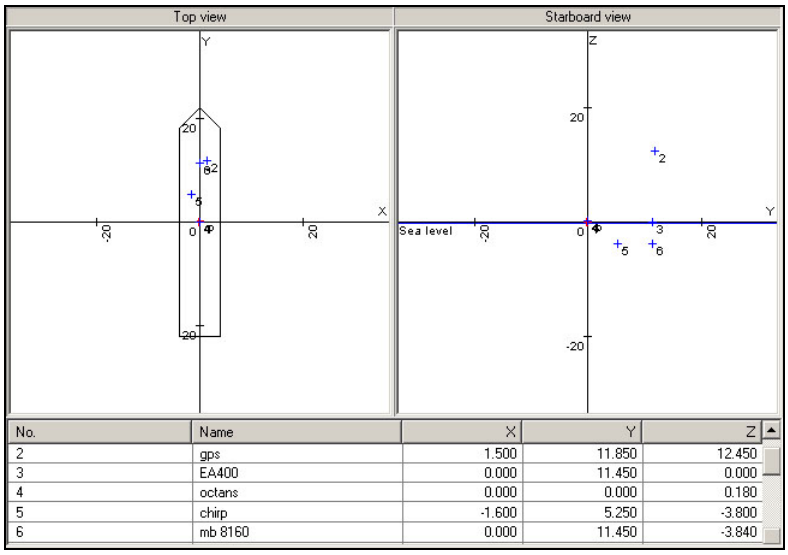

Fig. 3: Instruments offset on R/V Universitatis

The reference cartography used to plan the Cruise operations and survey derive from electronic cartography implemented in Sailplain® electronic cartography.

Geophysical survey

During the Cruise we collected morphobathymetric data and the shallow sismostratigraphy where the deep of the seafloor allow to perform the technical operations of the geophysical devices employed. So that the geophysical data were acquired at water depth less than 2000m and with at a cruise speed no more than 5 Kn. In particular, as in the Tyrrhenian Sea important deep seamounts are presents, we recorded high resolution bathymetric and seismostratrigraphic data on the top of Palinuro seamount and on the south-western side on the Marsili seamount. Both the survey were carried out follow straight line at 5 Kn, ranging from 2000m to 600 m water depth.

All the data provided by the geophysical devices were recorded as digital raw format. They were recorded on HD on the same computer connected with the deck unit system.
The data will been processed in the department of Geological Sciences and Geotechnologies of Milano-Bicocca University using proper software packages.

WP2

PHYSICAL OCEANOGRAPHY (CTD, OX, FL, AND LADCP2)

Giorgio Budillon[(1)], Massimo De Stefano[(1)], Giuseppe Siena[(2)]

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

Hydrology

Profiles of temperature, salinity, florescence, dissolved oxygen, and water samples were obtained using equipment provided by CoNISMa and by University of Naples Parthenope (Dipartimento di Scienze per l'Ambiente – DiSAm). The basic package consisted of a Sea-bird Electronics SBE911+ CTD system fitted with a couple of pumped conductivity-temperature sensor, a SBE YSI dissolved oxygen sensor. A fluorometer and altimeter were also installed, both with 6000 m depth capability.
Data were acquired at the maximum frequency (24 Hz) using a PC running Windows XP and Sea-Bird's Seasave version 5.30a 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-SUB1 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 4-5 m of the bottom. Water samples were collected using a 24-position SBE 32 Carousel sampler with 12 liter water sample bottles. Water samples at different layers and salinity ranges where collected for subsequent analysis with Autosal. Due to the presence of high pressure bottle (by CNRS) only 16 Niskin bottles were possible to installed on the SBE32.

Lowered Acoustic Doppler Current Profiler (LADCP2)

The DiSAm LADCP2 system comprises 2 RDI WH300M ADCPs in deep pressure housings mounted on the CTD frame, one looking up and one down, connected to an external battery housing made by "DeepSea Powerv& Light". The two heads are operated in master/slave mode, with the downlooking head serving as master. The synchronization signal, communications lines, and power lines are served to the heads and battery pack via a specific cable (starcable). The initialisation and the data download was performed at each cast using the RDI software.

Cast procedure: the LADCP2 system was started few minutes before the ship settled on station. The CTD was lowered to a depth of approximately 15 meters where it was allowed to soak until the pump turned on, then for a further period until the oxygen sensor signal stabilized. The soak generally required approximately 4 minutes. The CTD was returned to the surface, the surface readings recorded on the station log sheet, and the cast begun. At the request of the operator, the winch payout and hauling rate was 0.5 m/s from the surface to 60 m, and 1.0 m/s for the remainder of the cast. On approaching the bottom, the winch was slowed to 0.5 m/s, or less.
During the up cast a number of bottles were closed to collect samples for the other groups.

Data have been pre-processing on board obtaining some interesting results as the estimation of the baroclinic circulation in correspondence of the three main section and the identification of the LIW path entering in the Tyrrhenian Sea after crossing the Sardinia-Sicily channel.

WP3

BIOCHEMICAL PARAMETERS

Franco Decembrini[(1)], Giovanna Maimone[(1)], Rosario Cavezza[(2)], Sophie Martirani[(2)], Carmen Raffa[(1)]

[(1)]IAMC - Istituto per l'Ambiente Marino Costiero, Sezione Talassografico - CNR Messina - Italy
[(2)]Stazione Zoologica "A.Dohrn" (SZN), Napoli - Italy

The main objectives of this task are synthesized in the investigation of microplanktonic diversity patterns of the Southern Tyrrhenian area 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 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 different size-fractions.

Methodologies: Water samples have been collected in 13 stations identified in the general sampling strategy for biological sampling (see tab. 2).
For phytoplankton biomass, activity and biodiversity the sampling depths (generally 5-6) 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 (E_0^+).
Measurements of 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 bottles at the same stations, at 13 depths (5 optical levels corresponding to the ones previously described plus 100, 200, 500, 800, 1000, 1200, 1500, 2000m).
Note:
We had some problems with the oxygen determination, probably due reagents used for the titration; moreover the oxygen samples fixed on board will be analyzed at the laboratory of the SZN.

BIOCHEMICAL PARAMETERS IN THE SEDIMENT

Mirko Magagnini[(1)]

[(1)]Università di Ancona, Italy

Sediment samples have been collected in 4 stations in the south Tyrrhenian seafloor between 3400 and 3600 meters depth. Sampling was performed by means of a multiple-corer or a box-corer. For biochemical analyses of organic matter composition, sediment subsamples were stored in Petri dish at -20°C. Samples will be analysed in the laboratory for phytopigment, protein, carbohydrate and lipid contents.

WP4

BIODIVERSITY AND ECOSYSTEM FUNCTIONING – MICROBIOLOGY

Simona Scarfi[(1)], Massimo De Luca[(1)], Giovanna Maimone[(2)]

[(1)]Dipartimento di Biologia Animale ed Ecologia Marina – Università di Messina (CoNISMa)- Italy
[(2)]IAMC- Istituto per l'Ambiente Marino Costiero, Sezione Talassografico - CNR Messina- Italy

At each station (St. 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 15, 20 and 21) we collected sea water samples at different depth, according to the physical and chemical survey, by means of Niskin bottles.
Measurements on picoplanktonic total number and biomass, key hydrolytic ectoenzymes (phosphatase, aminopeptidase) and on bacterial production under in situ and atmospheric pressure conditions were carried out in St. 1, 4, 6, 8,15, 17, 20 and 21.
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 characterised in lab using morpho-physiological and tassonomic approaches.
In 4 different stations (St. 2, 4, 8, 19 e 20) we collected 500 ml of sea water by means of Niskin bottles from deeper depth and 500 ml in parallel, deepsea water samples collected by means of the high-pressure serial sampler (HPSS) at the same depth and we filtered each one in Millipore filters 0,22 µm, that are stored at -20°C after incubation in "RNAlater" storage solution for 24 hours at 4°C.
We will use these filters for molecular based taxonomic and functional diversity analyses after RNA extraction to compare active microbial population collected under pressure with active microbial population collected non-under pressure to have an important information about the influence of pressure on bacteria.

BIODIVERSITY AND ECOSYSTEM FUNCTIONING

Mirko Magagnini[(1)]

[(1)]Università di Ancona, Italy

The main objective was to investigate the principal microbiological parameters of south Tyrrhenian benthic environment, with particular attention to the relationship between viral production and bacterial activity and diversity in deep-sea sediments and in different sediment horizons. The presence of two seamounts allowed to compare sediments of landslides with unperturbed abyssal plain sediments. In addition, in the same areas will be studied meiofauna abundance, nematode diversity and macrofauna abundance.

Methodologies: sediment samples have been collected in 5 stations located in the south Tyrrhenian basin, between 3400 and 3600 meters depth. Sampling sites covered the basis of two seamounts (Palinuro and Marsili) and two control areas at the same depth. Sampling was performed by means of a multiple-corer and a box corer. Estimate of viral and bacterial abundance will be performed in the entire sediment core. Replicate (n=3) sediment sub-samples for viral production and bacterial carbon production were taken from surface sediments (0-1 cm) and in a subsurface layer (1-5 cm), and frozen at -20°C. Analyses will be done in the laboratory. Sub-samples for the estimate of viral production were frozen after variable incubation-times. Sediment subsample of each layer,

supplemented with an aqueous solution of ^{3}H-leucine, were used for the estimate of bacterial carbon production. Samples were fixed by addition of ethanol (80%).
Enzymatic activities (aminopeptidase, alcaline phosphatase and beta-glucosidase) were estimated by fluorometric analysis in the 0-1 cm layer and in the 1-5 cm layer.
For the analysis of the biochemical composition of sedimentary organic matter, three replicate cores were collected at each station, vertically sectioned as described above, placed in sterile Petri dishes, and frozen at -20°C.
For the estimate of meiofauna abundance and nematode diversity, 3 replicate per site of the entire sediment core were frozen at -20°C.
For macrofauna analyses, sediment collected by the box-corer was divided in two layers (0-5 cm and 5-20 cm).

BIODIVERSITY AND ECOSYSTEM FUNCTIONING

Ameur Cherif[(1)]

[(1)]*Laboratoire Micro-organismes & Biomolécules Actives, Département de Biologie, Faculté des Sciences de Tunis, Université Tunis El Manar, 1092, Tunis, Tunisia*

Objectives: To isolate and characterize micro-organisms from deep-sea sediments and to search for active molecules.
Deep-sea sediments are a very reach ecological niches for several bacteria. These micro-organisms are known to produce several molecules of biotechnological interest. The aim of our campaign is to isolate and characterize these bacteria focusing on aerobic sporeforming bacilli which could have a greater metabolic flexibility allowing a relative easier culturing conditions.
Targeted stations were; Station 6, Station4 (Vector), Station 2, Station Geo and Station 9 which have an average depth of 3500 m. Sediment sampling was carried out with Dr. Mirko Maganini by means of a multiple corer and Box corer. For each station, 3 samples of 5g were collected aseptically, from the surface, 10 cm and 20 cm depth. With multiple corer sampler, interface water was also collected (sea water just located on the surface). The samples rests were subsequently stored at –20°C.
Preliminary characterization of the collected samples at the on-board laboratory, consisted of serial dilutions, plating of 100 µl of the 10^{-2} and 10^{-4} dilutions on marine agar and incubation at room temperature (3 to 7 days) for total bacterial counting.
Further experiments will be performed at the laboratory. After isolation of the aerobic sporeforming bacteria (mainly *Bacillus*), several activities will be screened: antibiotic-like and antifungal substances, exopolysaccharides, vitamins production and exo-enzymes with anti-biological futures (lactonases, chitinases and autolysins).
A first report will be released before the second cruise in December (CIESM-SUB 2) dealing with the bacterial isolates, their characterization and molecular identification.

BIODIVERSITY AND ECOSYSTEM FUNCTIONING

Lionel Guidi[(1)]

[(1)]*Laboratoire Océanologique de Villefranche sur Mer - UMR7093/CNRS, France*

Plankton net (double WP_2 with 200µm mesh) sampling prevision was quite respect. The first plan was to sample all stations at mid-day and at mid-night but it was not possible due the sampling grid.

However plankton net was deployed all day around 12h (6 stations) and when it was possible around 24h (4 stations). Unfortunately only few stations have been sampled both day and night, but global cycle variations of the mesozooplankton biodiversity should be analyzed for the Tyrrhenian Sea.
Zooplankton samples were done at two different levels in the water column. The first one was from 200m to the surface; this sample integrated all the zooplankton which lives in the euphotic zone. The second one was from 60m to 0m, in order to isolate and integrate zooplankton over the thermocline.
Table (V) resumes the plankton net activity during the CIESM SUB1 cruise.

Station's Number	Sample's Number	Depth (m)	Time
2	1-2	200-0	15h
2	3-4	20-0	15h20
4	5-6	200-0	11h
4	7-8	20-0	11h20
5	9-10	200-0	0h
5	11-12	60-0	0h20
7	13-14	200-0	12h
7	15-16	60-0	12h20
8	17-18	200-0	11h30
8	19-20	60-0	11h50
9	21-22	200-0	4h
9	23-24	60-0	4h20
14	25-26	200-0	11h
14	27-28	60-0	11h20
16	29-30	200-0	11h
16	31-32	60-0	11h20
18	33-34	200-0	10h
18	35-36	60-0	10h20
19	37-38	200-0	23h
19	39-40	60-0	23h20

Table V – Plankton net activity

Samples will be analyzed at the marine station of Villefranche with classical identification method and automatic identification by the ZOOSCAN. This instrument scans a sub-sample and identifies the objects. The classification is based on the shape properties of hitch object.

BIODIVERSITY AND ECOSYSTEM FUNCTIONING - *PROCARYOTIC DIVERSITY AND ACTIVITY*

Christian Tamburini[(1)], Marc Garel[(1)], Simona Scarfi[(2)], Ameur Cherif[(3)], Laura Giuliano[(4)]*

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[(2)]Dipartimento di Biologia Animale ed Ecologia Marina – Università di Messina (CoNISMa)- Italy

(3)Laboratoire Micro-organismes et Biomolécules Actives, Faculté des Sciences de Tunis,Université Tunis- El Manar, 102, Tunis, Tunisie
(4)IAMC - Istituto per l'Ambiente Marino Costiero, Sezione Talassografico - CNR Messina – Italy
** not on board*

For such an aim, seawater samples will be collected at 10 stations identified in the general sampling strategy of the cruise. The main objectives will be: to optimize 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 collected in 10 stations (Table VI) in the general sampling strategy of the cruise and at 3 depths (20, 500, 2000m or 3000m) by means of Niskin bottles. In parallel, deep-sea water samples will be also collected by means of the high-pressure bottles (HPBs) to maintain deep-sea samples at the *in situ* conditions (pressure, temperature). Measurements on prokaryotic total number and biomass, hydrolytic ectoenzyme activities (phosphatase, aminopeptidase and chitinase), on bacterial and archaeal productions under *in situ* and atmospheric pressure conditions have been carried out in all samples whereas samples for molecular based taxonomic and functional diversity analyses has been sampled at 6 stations, at depths above 2000m. Analysis of richness of marine prokaryotic communities will be performed by using CARD-FISH method and the uptake of specific compounds (^{3}H-Leucine and $^{14}C\text{-}HCO_3^-$) by the prokaryotic communities will be performed by using the Micro-CARD-FISH method.

		RNA	CARD-FISH	BP	AP	EAA	EPA	ECA
St.2	20		x	Nis		Nis	Nis	Nis
	500		x	Nis		Nis	Nis	Nis
	3000	Nis, HP	x	Nis, 2HP	(2HP)	Nis	Nis	Nis, HP
St.4	500		x					
	3000	Nis, HP	x	Nis, HP	Nis, HP	Nis	Nis, HP	Nis
St.7	20		x					
	500		x					
	3000	Nis, HP	x					
St. 8	20		x	Nis	Nis	Nis	Nis	
	500		x	Nis	Nis	Nis	Nis	
	3000	Nis, HP	x	Nis, HP	Nis, HP	Nis, HP	Nis, HP	
St.16	20		x					
	500		x					
	3000		x					
St.17	20		x	Nis	Nis	Nis	Nis	Nis
	500		x	Nis	Nis	Nis	Nis	Nis
	3000		x	Nis, HP	Nis, HP	Nis	Nis, (HP)	Nis, HP
St.18	20		x					
	500		x					
	3000		x					
St.19	20		x			Nis	Nis	Nis
	500		x			Nis	Nis	Nis
	3000	Nis, 2HP	x			Nis	Nis	Nis

St.20	20		x	Nis		Nis	Nis	Nis
	500		x	Nis		Nis	Nis	Nis
	3000	Nis, HP	x	Nis, HP		Nis, HP	Nis, HP	Nis
St.21	20		x					
	500		x					
	3000	Nis, HP	x					

Table VI - Measurements performed at each station.

RNA: RNA analysis after maintaining high-pressure (HP) condition comparatively to decompressed sample obtain with Niskin (Nis) bottles.
CARD-FISH: Catalysed Reporter Deposition coupled to the Fluorescence In Situ Hybridization for prokaryotic structure analysis.
BP: Bacterial production (^{3}H-leucine incorporation)
AP: Archaeal production (^{14}C-HCO_3^- incorporation)
EAA: Ectoenzyme aminopeptidase activity (MCA-Leu degradation)
EPA: Ectoenzyme phosphatase activity (MUF-P degradation)
ECA: Ectoenzyme chitinase activity (MUF-diNAG degradation)
(HP): High-pressure bottle failure

WP5

DATA GATHERING

Not present on board.

WP6

PUBLIC OUTREACH

*Siri Campbell**

**CIESM, Monaco*

I am on board the SUB 1 Cruise, as a journalist reporting a daily log of activities, for transmission to our website www.CIESM.org. I have enjoyed my time and everyone has been very helpful to me in explaining what they are doing, and why they are doing it. I had sent out a press release through AlphaGalieo, which reached some 1,700 science journalists around the world. I also encouraged them to send in their questions, and to follow my progress. I can report that I have received inquiries from around 17 journalists. Some who are also interested in participating in any future cruises. It was my intention to write about the scientific activities, in a non-scientific way, so that other journalists and the general public would be able to understand what was taking place. It is part of CIESM communication strategy, to make journalists, and the public more aware of the importance of marine science.

I intend to continue to follow the progress of the research after the cruise and also post updates on our website. Because this initial phase is mostly for the collection of samples. I decided not to read up on anything of the literature that was available, so that, I would be coming from the point of view of a layperson. However I think it would have been a good idea to read some of the things which have been published, as it may have helped me to ask more specific questions, and get a general overview. I only had part of the proposal to refer to, which was helpful, and I also made that available on the CIESM website. I think it was a good suggestion to link the CIESM website SUB 1 cruise section to our partners sites, and when I get back will try to follow through on that idea.

I have also enjoyed posting my logs in our common room, and the reaction of the participants reading what I have written. It has been good as well, as they can correct any mistakes immediately, so I can be assured of sending sound scientific information.

My only disappointment is that I was unable to e-mail some of the photo's, to illustrate my logs. Even though there is a 115,000 internet transfer speed, it took forever to even attach the photo to an e-mail, I quit after 17 minutes in even trying to attach one. So I would like to see if there is a better way to do this. Perhaps using the ship's e-mail address, rather than using the CIESM web mail server.

Otherwise I have had a very enjoyable and interesting time learning first hand what goes on during a marine research cruise.