GELA – 05

CRUISE REPORT

R/V URANIA

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The scientific staff of the cruise GELA-05

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R/V URANIA

1. INTRODUCTION

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The objective of the GELA-05 oceanographic cruise was to investigate a set of very recent slides showing markedly distinct morphology on the slope of Gela basin, Strait of Sicily. Box-cores stations formed downslope parallel transects, both within and outside the mass-transport complexes, in order to gather information about the variability of sedimentological parameters (such as grain size and composition) and the benthic ecosystems. Furthermore, a peculiar slope transect of box cores was performed cross-cutting the Malta Escarpment (Ionian Sea), in order to analyse the fauna variability at distinct water depths from the shelf edge to 3000 m water depth.

The cruise involved two main teams: CNR-ISMAR Bologna and Venezia, and the Department of Marine Sciences, Polytechnic University of Marche (ConISMA).

The main operations carried out on the cruise were:

- sediment box coring on 26 stations. On each station, at least 3 replicas were retrieved. On 7 of the sampling stations additional box cores were collected in order to extract pore waters for benthic response and early diagenesis characterization. In total we collected 86 box cores;
- once onboard, each box core was subsampled for macrobenthos, meiofauna, foraminifera, bacteria/viruses, organic matter, enzymes, dissolved oxygen profiles and grain size;
- long piston cores were collected in four sites using ISMAR CP20 piston corer (armed, in this case, with a 10 or 15 m barrel and a maximum core recovery of 11.61 m), and three gravity cores for a total of ca 42 m of sediment section;
- Three benthic traps were deployed in the search for megabenthos and were recoverd after 24-48 hours;
- two stations were made for epibenthic dredging to recover megabenthos;
- a hydrological survey was performed along 6 transects normal to shore for a total of 27 stations. Water sampling was performed on 19 stations for physical and bio-geochemical characterisation of particulate suspended matter; in total, 85 water samples were collected;
- ca. 880 nautical miles of morphobathymetric profiles were collected using a hull-mounted Reson Seabat 8160 multi-beam system simultaneously with high-resolution CHIRP-sonar profiles;
- navigation data were processed onboard on a daily basis and plotted through the new HERMES GIS system against the pre-cruise data and thematic layers. The multi-beam bathymetry data were also pre-processed on board creating grids of variable resolution to allow the best definition of sampling targets.

All the operations were carried out successfully. The geologists and biologists on board worked together on several different activities during the cruise. This co-operation turned out to be really exciting because of an effective exchange of knowledge. Furthermore, apart from the science, the life on board was pleasant and the friendly atmosphere. For the most part of the cruise, the weather was good and the sea smooth.

We are grateful to the Captain of R/V URANIA, Com.te Nicolangelo Lembo, to the officers, to the on board technical staff and to the crew for their assistance in the on board operations.

The chief scientist has assembled this cruise report from individual contributions of the participants.

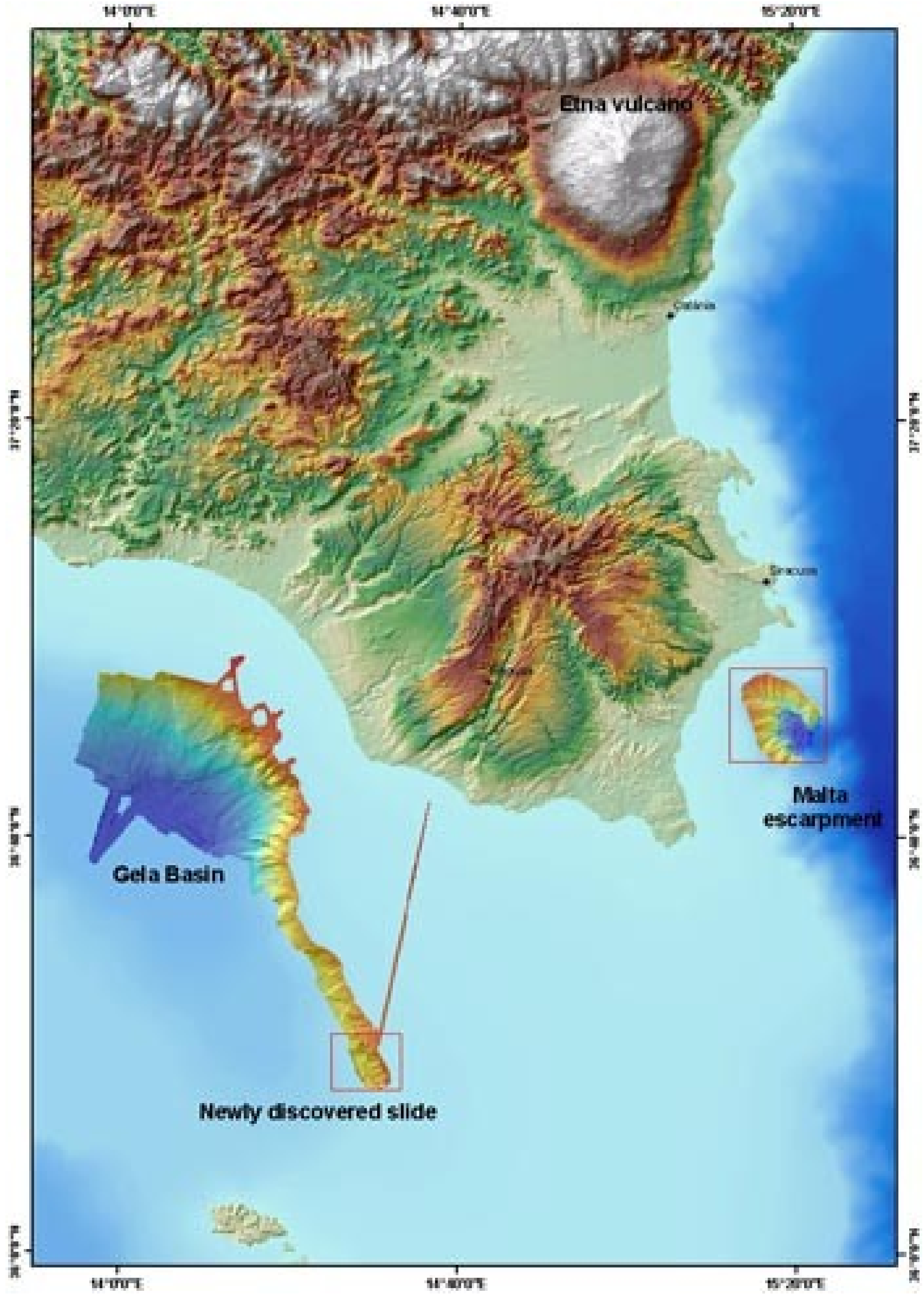

Fig. 1-1. Map showing the two study areas - Gela Basin and Malta Escarpment - of the Gela-05 cruise located SW and SE of the Sicily island, respectively.

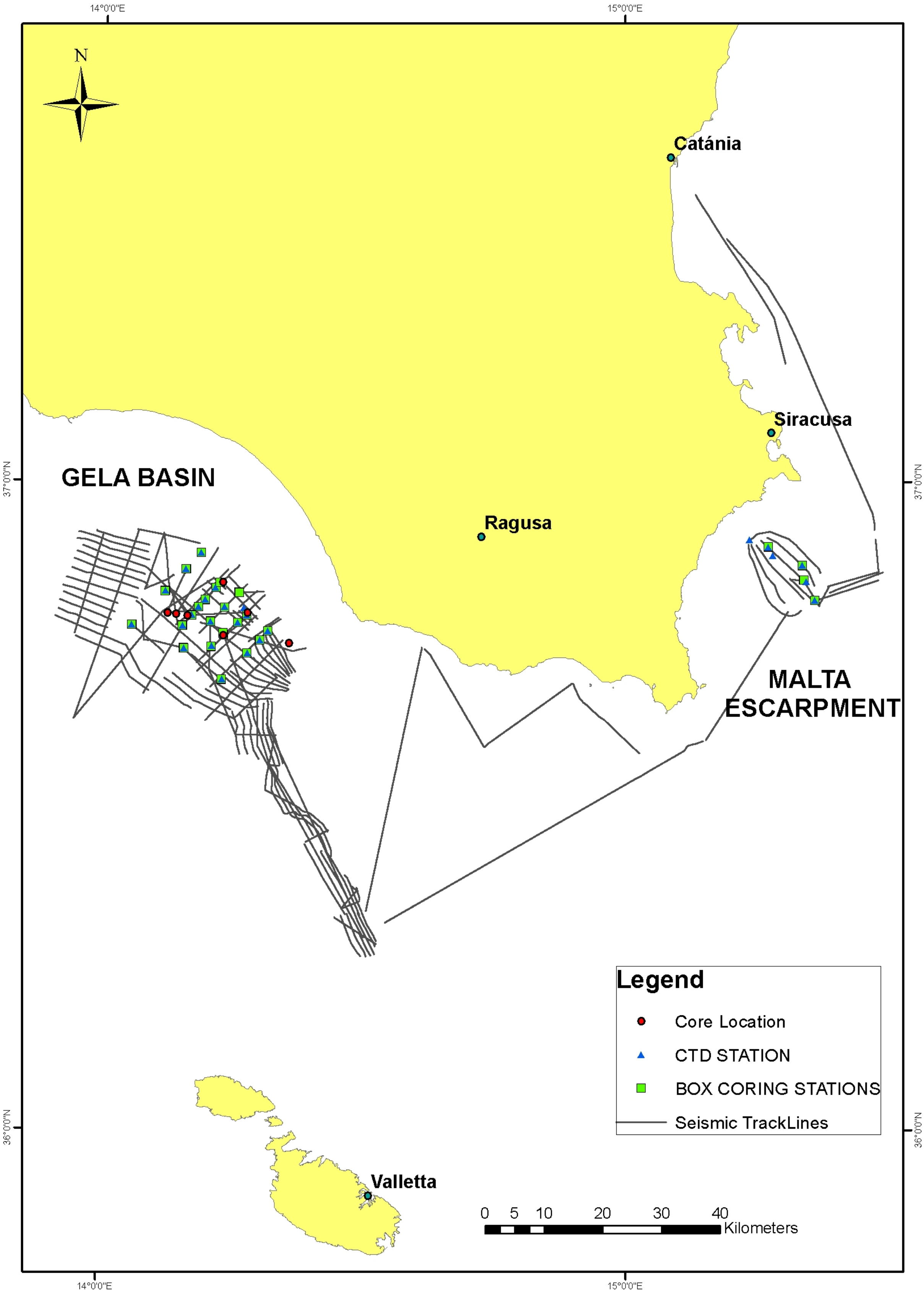

Fig. 1-2. Map of sampled stations and track lines.

2. NAVIGATION AND DATA ACQUISITION

F. Foglini, A. Remia
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The research vessel *Urania* was set-up for data acquisition and navigation with RESON PDS-2000 and Communication Technology NAVPRO softwares.

The Positioning system NAVPRO V5.5 provided by Communication Technology (Cesena, Italy) was used. The integrated system used a Microtecnica Gyrocompass and a Trimble 4000 Differential Locator, with a DGPS Satellite link by FUGRO. Instruments were interfaced by a Digiboard Multi Serial I/O.

The datum WGS84 and the UTM projection Zone 33N were chosen for navigation and display purposes. Timing was set to UTC, whereas the acquisition rate was set to 10 s. The SBP-CHIRP workstation received the 'VESSEL(0,0)' positions by the NAVPRO serial output. The speed of sound for echosounder ATLAS-KRUPP DESO 25 (33 kHz) was set at 1535 m s^{-1}, with a transducer immersion of 3.8 m.

The navigation system PDS-2000 V2.3.4.35 by RESON was used for multi-beam data acquisition. The system interfaced the RESON 8160 Operator's console, an OCTANS gyrocompass and MRU, and the Trimble 4000 DGPS receiver.

The RESON 8160 MBES sonar head was positioned by a sub on the ship's keel using a V-shaped steel frame, and the cable's dry end passed trough a pipe after water-proofness.

The instrumental offsets are presented in Table 2-1.

Table 2-1. Instrumental offsets (in m) on R/V Urania. Point (VESSEL(0,0)) is located on the axis of the mast, just behind the Command Bridge. The main GPS antenna (primary positioning system) is located on point POS1.

POSITION	ALONG	ACROSS	HEIGHT
ANTENNA (POS 1)	5.70	1.40	15.0
VESSEL (POS 2)	0	0	0
MBEAM	3.00	0.0	-5.00
OCTANS	3.35	0.0	-3.40
ECHO SOUNDER 33	5.50	-1.85	-3.80
CHIRP	-5.50	-0.95	-3.80
CORER	-15.10	7.0	
STERN	-47.5	-1.40	

GIS AND DATA PRE-PROCESSING

Track Line charts

Navigation data were processed onboard on a daily basis and plotted through the new HERMES GIS system (ArcInfo 9.1) against the pre-cruise data and thematic layers Figs. 2-1, 2-2.

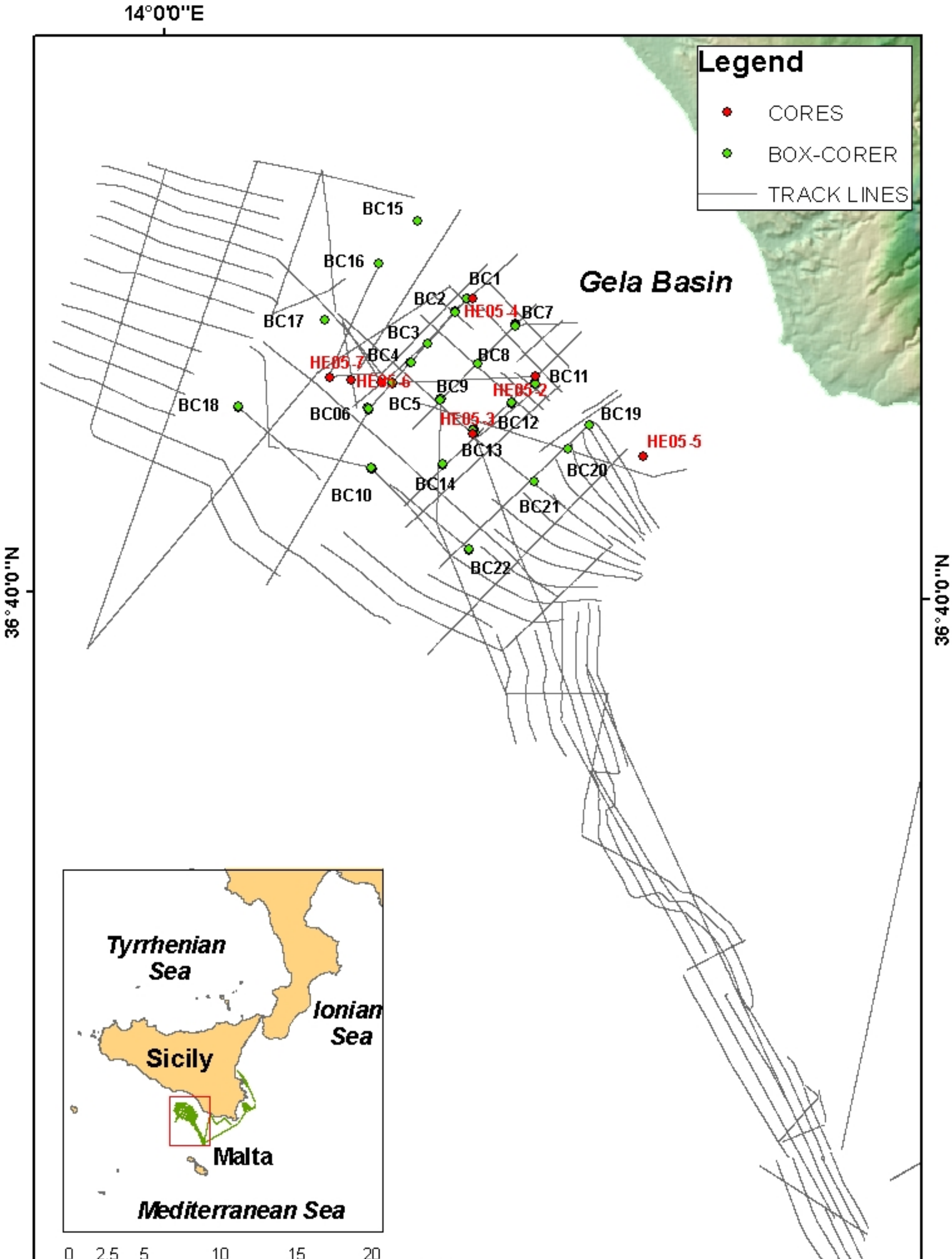

Fig. 2-1. Chart of Track Lines of Gela Basin.

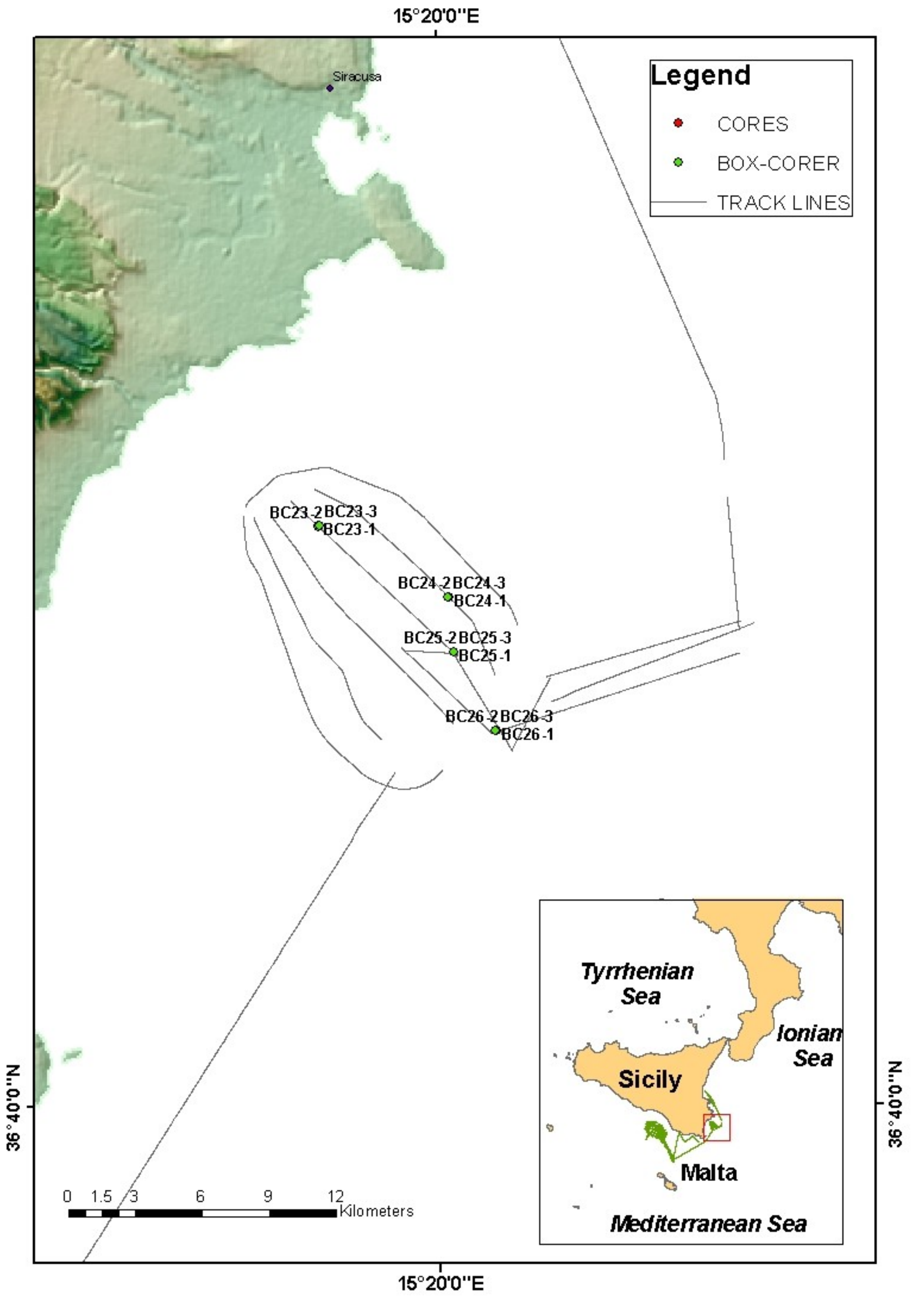

Fig. 2-2. Chart of Track Lines of Malta Escarpment.

The Urania position was displayed and reported by a GPS device in ArcMap using ArcMap GPS Support (Fig. 2-3). The GPS device was connected by an input/output (I/O) interface and by a GPS compatible cable. The GPS connection was extremely useful to make an effective cruise plan in real time and to be aware about the pre-cruise data position.

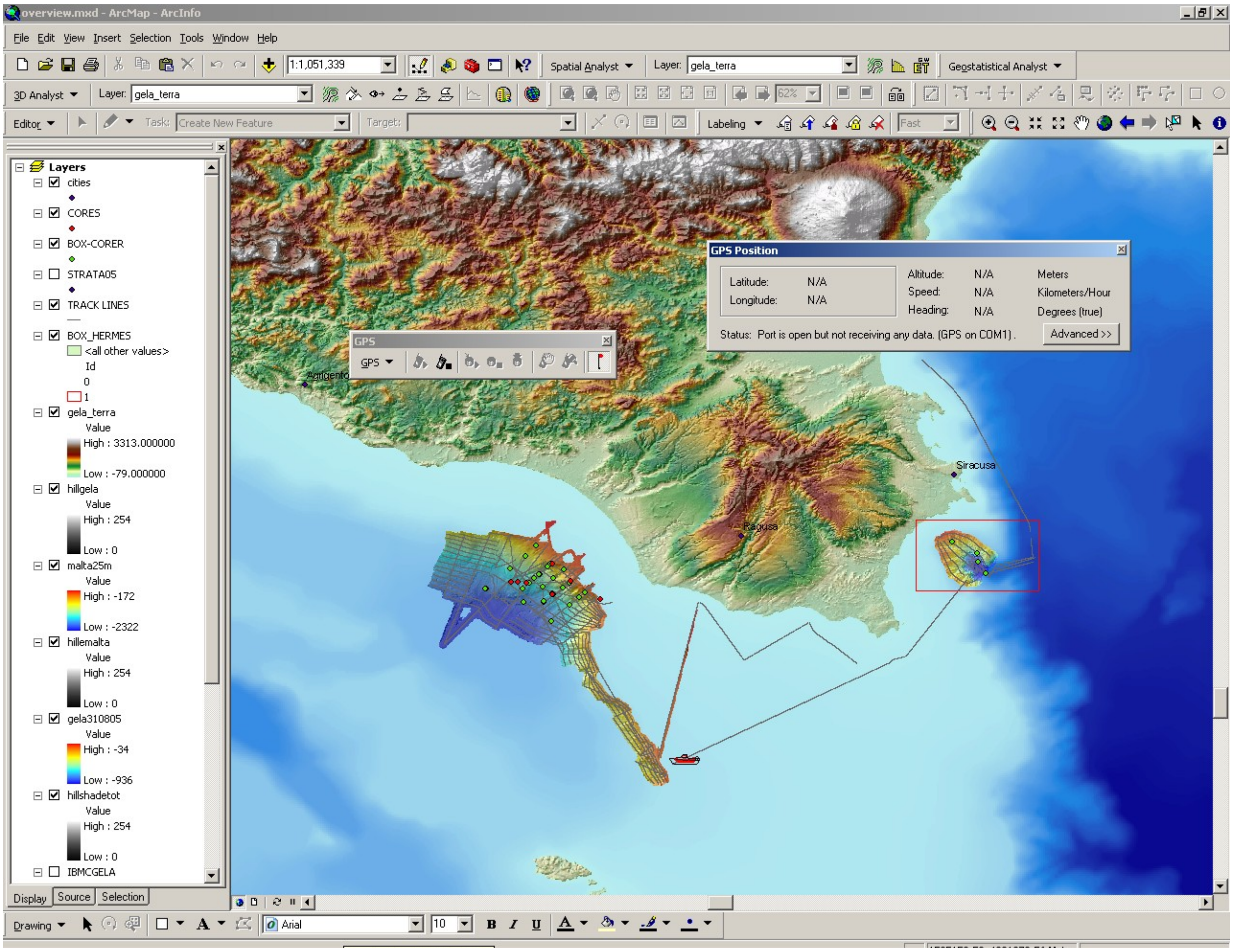

Fig. 2-3. The GPS device in ArcMap. The small red boat represents the actual navigation position.

Multi-beam Bathymetry

About 880 nautical miles of morpho-bathymetric profiles were collected using a hull-mounted multi-beam echosounder (Reson Seabat 8160) covering an area of about 1400 km^2. Deployments of a CTD probe were performed in each subarea in order to calculate sound velocity profiles to calibrate the echosounder.

The multi-beam bathymetry data were pre-processed on board, creating grids of variable resolution to allow the best definition of sampling targets. Swath bathymetry maps were produced on board processing the DTM extracted, on daily basis, from PDS-2000. The DTM was filtered by ISMAR's routine filter_bat, and gridded by ISMAR's nearneighbor routine. The latter grids were converted to raster by ArcInfo Coversion tools.

The ArcInfo Surface analysis tool was used to derive contours, angle of slope and shaded relief (hillshade) maps used for navigation and structural analysis (Figs. 2-4, 2-5, 2-6).

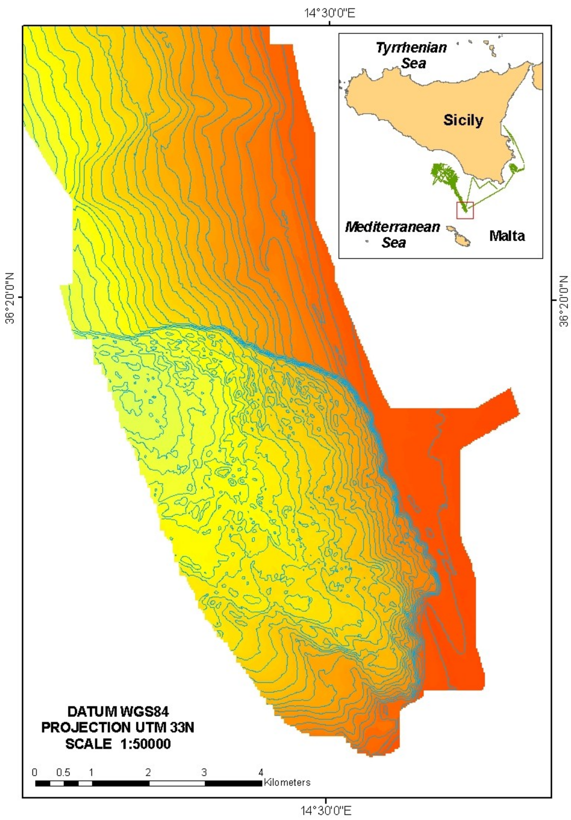

Fig. 2-4. Example of a contour map.

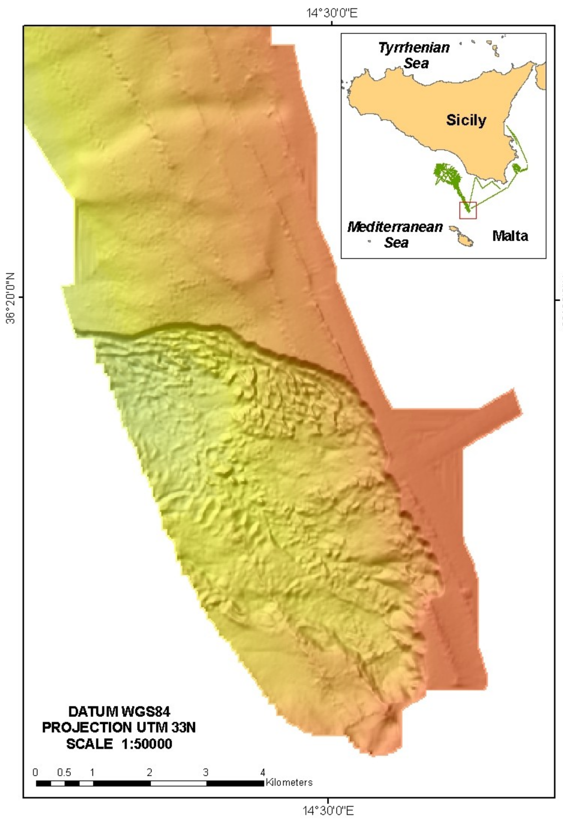

Fig. 2-5. Example of a hillshade map.

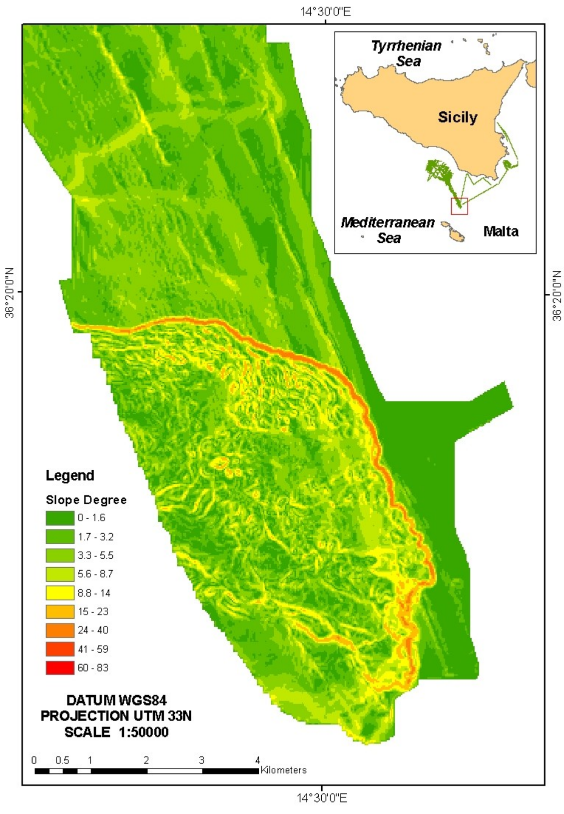

Fig. 2-6. Example of a slope map.

3. HYDROLOGICAL AND BIOCHEMICAL PARAMETERS

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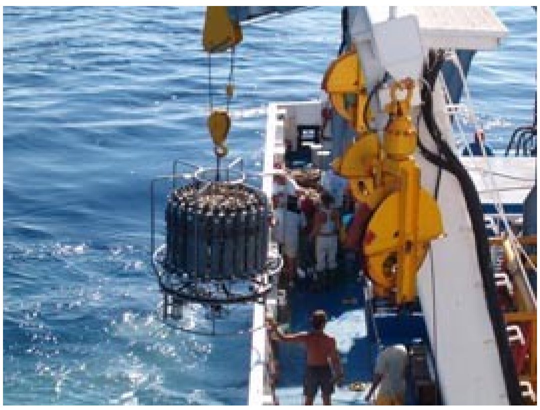
[1]*ISMAR-CNR (Venice-Italy) – [2]ISMAR-CNR (Bologna-Italy)*

During the GELA_05 cruise on board the R/V "Urania", a grid of 22 stations placed along 5 transects in the Gela basin and 6 stations over the Malta Escarpment, were sampled by a rosette with Niskin bottles (10 l), coupled with a SeaBird CTD probe, equipped with a SeaTech fluorometer and a Wetlab 25 cm path length transmissometer. Before the beginning of the multi-beam surveys, additional CTD stations were performed to calculate the sound velocity for multi-beam calibration. At each station vertical continuous profiles of temperature, salinity, dissolved oxygen, fluorescence and light transmittance were performed.

CTD data have been checked, filtered and averaged to 1 m depth; dissolved oxygen data were calibrated with O_2 data determined from water samples by the Winkler method.
At selected stations, water samples were collected at different depths in relation to the hydrological structure, turbidity and fluorescence profiles. Water samples were collected to determine total suspended matter (TSM), particulate organic carbon (POC), particulate nitrogen (PN), organic carbon stable isotopes ($\delta^{13}C_{POC}$).

Samples for TSM, POC, PN and $\delta^{13}C_{POC}$ analyses were filtered onto GF/F Whatman, 25 mm diameter, glass fibre filters. Filters for TSM were pre-weighed and those for POC, PN and $\delta^{13}C_{POC}$ analyses were pre-combusted at 450°C for 4 h to eliminate the organic contaminants.
TSM will be determined gravimetrically. POC and PN will be determined by FISONS NA2000 Elemental Analyser (EA), after removal of inorganic carbon with HCl. Stable isotopic analyses of organic carbon will be carried out using a FINNIGAN Delta Plus mass spectrophotometer directly coupled to the FISONS NA2000 EA by means of a CONFLO interface.

Details of the sampled stations and of the depths sampled for each parameter are reported in Table 3-1 and 3-2, respectively.



Conductivity temperature depth CTD.

Hydrological laboratory on board.

Table 3-1. List of the hydrological stations.

CTD_ID	DATE	TIME	W_DEPTH	LONGITUDE (E) (WGS84)	LATITUDE (N) (WGS84)
		(UTC)	(m)	(DDMM.XXX)	(DDMM.XXX)
CTD_01	16/08/2005	17:51	217	1413.608	3650.598
CTD_02	17/08/2005	23:34	390	1413.023	3650.167
CTD_03	18/08/2005	12:11	544	1411.834	3649.029
CTD_04	18/08/2005	05:41	580	1411.097	3648.352
CTD_05	18/08/2005	01:33	622	1410.284	3647.589
CTD_06	17/08/2005	19:06	672	1409.254	3646.624
CTD_07	18/08/2005	04:25	210	1416.301	3648.286
CTD_08	18/08/2005	03:26	443	1414.056	3648.363
CTD_09	18/08/2005	02:35	605	1412.441	3647.026
CTD_10	17/08/2005	18:06	806	1409.405	3644.532
CTD_11	18/08/2005	04:48	209	1416.627	3647.613
CTD_12	18/08/2005	05:22	498	1415.604	3646.926
CTD_13	18/08/2005	23:30	636	1413.916	3645.789
CTD_14	18/08/2005	22:25	731	1412.602	3644.745
CTD_15	17/08/2005	22:46	184	1411.355	3653.372
CTD_16	17/08/2005	22:10	392	1409.623	3651.854
CTD_17	17/08/2005	21:26	587	1407.269	3649.833
CTD_18	17/08/2005	20:15	786	1403.451	3646.685
CTD_19	18/08/2005	18:55	182	1419.049	3646.160
CTD_20	18/08/2005	19:31	330	1418.111	3645.314
CTD_21	18/08/2005	20:18	598	1416.716	3644.122
CTD_22	18/08/2005	21:24	768	1413.806	3641.671
CTD_23	22/08/2005	11:13	618	1516.415	3653.994
CTD_24	21/08/2005	18:59	1261	1520.330	3652.287
CTD_25	21/08/2005	21:18	2081	1520.792	3650.799
CTD_26	21/08/2005	22:17	2284	1521.742	3649.068
CTD_29	21/08/2005	17:31	1001	1516.949	3653.205
CTD_30	21/08/2005	15:24	300	1514.249	3654.661

Table 3-2. Details of hydrological stations sampled for particulate matter analyses.

CTD_ID	DATE	W_DEPTH	SAMPLE_DEPTH	TSM	TSM	POC-PN	POC-PN
		(m)	(m)	# filter	ml filtered	# filter	ml filtered
CTD_01	16/08/2005	217	0	56	3053	4	3641
CTD_01	16/08/2005	217	60	55	2607	3	3826
CTD_01	16/08/2005	217	90	54	3488	2	3400
CTD_01	16/08/2005	217	208	53	3741	1	3851
CTD_03	17/08/2005	544	0	118	3821	20	3721
CTD_03	17/08/2005	544	65	117	3855	19	3899
CTD_03	17/08/2005	544	125	110	4029	18	3983
CTD_03	17/08/2005	544	250	109	3930	17	4020
CTD_03	17/08/2005	544	538	108	3934	16	4009
CTD_05	18/08/2005	622	0	122	3771	24	3969
CTD_05	18/08/2005	622	84	121	3925	23	3852
CTD_05	18/08/2005	622	300	120	3960	22	3951
CTD_05	18/08/2005	622	619	119	4068	21	3983
CTD_07	18/08/2005	210	0	133	3961	32	4022
CTD_07	18/08/2005	210	83	129	3925	31	3942
CTD_07	18/08/2005	210	126	128	4052	30	3964
CTD_07	18/08/2005	210	225	127	3964	29	3877
CTD_09	18/08/2005	605	0	126	3786	28	3526
CTD_09	18/08/2005	605	88	125	3899	27	4043
CTD_09	18/08/2005	605	300	124	3934	26	4075
CTD_09	18/08/2005	605	600	123	4029	25	3824
CTD_10	17/08/2005	806	0	92	4002	8	3890
CTD_10	17/08/2005	806	78	63	2255	7	3824
CTD_10	17/08/2005	806	400	62	2702	6	3369
CTD_10	17/08/2005	806	802	57	3911	5	3786
CTD_11	18/08/2005	209	0	261	3741	36	3728
CTD_11	18/08/2005	209	88	258	3711	35	4101
CTD_11	18/08/2005	209	170	257	3859	34	3689
CTD_11	18/08/2005	209	208	255	3877	33	3600

CTD_13	18/08/2005	636	0	334	3808	55	2829
CTD_13	18/08/2005	636	86	308	3816	54	4049
CTD_13	18/08/2005	636	300	307	3636	53	3956
CTD_13	18/08/2005	636	621	305	4068	52	3859
CTD_15	17/08/2005	184	0	107	3886	15	3760
CTD_15	17/08/2005	184	54	97	3973	14	3899
CTD_15	17/08/2005	184	183	96	3885	13	4049
CTD_18	17/08/2005	786	0	95	3756	12	3773
CTD_18	17/08/2005	786	83	94	3908	11	3872
CTD_18	17/08/2005	786	400	93	3911	10	4088
CTD_18	17/08/2005	786	782	61	3864	9	3981
CTD_19	18/08/2005	182	0	272	3392	40	3313
CTD_19	18/08/2005	182	27	271	3860	39	3148
CTD_19	18/08/2005	182	75	264	4078	38	3912
CTD_19	18/08/2005	182	178	262	4016	37	2320
CTD_21	18/08/2005	598	0	299	4301	46	3956
CTD_21	18/08/2005	598	24	298	3590	45	3707
CTD_21	18/08/2005	598	75	297	3758	44	3891
CTD_21	18/08/2005	598	250	296	3977	43	3912

CTD_ID	DATE	W_DEPTH	SAMPLE_DEPTH	TSM	TSM	POC-PN	POC-PN
		(m)	(m)	# filter	ml filtered	# filter	ml filtered
CTD_21	18/08/2005	598	528	295	3911	42	4009
CTD_21	18/08/2005	598	587	273	3977	41	4007
CTD_22	18/08/2005	768	0	304	3995	51	3811
CTD_22	18/08/2005	768	23	303	3839	50	3628
CTD_22	18/08/2005	768	70	302	3951	49	3956
CTD_22	18/08/2005	768	300	301	4029	48	3964
CTD_22	18/08/2005	768	751	300	2491	47	3929
CTD_23	21/08/2005	618	0	427	2443	64	3968
CTD_23	21/08/2005	618	57	426	3560	63	2880
CTD_23	21/08/2005	618	233	425	3907	62	3265
CTD_23	21/08/2005	618	603	424	4048	61	3786
CTD_24	21/08/200	1261	0	654	3947	73	3994

	5						
CTD_24	21/08/2005	1261	69	621	3964	72	3641
CTD_24	21/08/2005	1261	513	470	4021	71	4047
CTD_24	21/08/2005	1261	1255	462	3886	70	4007
CTD_25	21/08/2005	2081	0	696	2047	79	3747
CTD_25	21/08/2005	2081	68	693	3950	78	3969
CTD_25	21/08/2005	2081	187	692	3920	77	3977
CTD_25	21/08/2005	2081	500	691	3795	76	3733
CTD_25	21/08/2005	2081	1000	690	4091	75	4035
CTD_25	21/08/2005	2081	2040	685	3606	74	3917
CTD_26	21/08/2005	2284	0	953	3937	85	4034
CTD_26	21/08/2005	2284	83	952	3899	84	4017
CTD_26	21/08/2005	2284	136	951	3921	83	4075
CTD_26	21/08/2005	2284	500	L vi	4042	82	3942
CTD_26	21/08/2005	2284	1000	698	4029	81	3786
CTD_26	21/08/2005	2284	2270	697	3960	80	3925
CTD_29	21/08/2005	1001	0	461	3911	69	4009
CTD_29	21/08/2005	1001	60	460	2098	68	4017
CTD_29	21/08/2005	1001	145	459	4078	67	2082
CTD_29	21/08/2005	1001	300	429	3937	66	4003
CTD_29	21/08/2005	1001	993	428	3930	65	3983
CTD_30	21/08/2005	300	0	339	3907	60	3981
CTD_30	21/08/2005	300	77	338	3912	59	3720
CTD_30	21/08/2005	300	170	337	3632	58	3447
CTD_30	21/08/2005	300	243	336	3780	57	3256
CTD_30	21/08/2005	300	295	335	3911	56	3837

In the Gela basin, temperature at the surface layer ranged from 23.7 to 25.4 °C (Fig. 3-1a), with a mean of 24.7 °C, showing a slight north-south gradient, whereas at depth it dropped to values < 14°C (Fig. 3-2).
Salinity had an average value of 37.73 at surface (Fig. 3-1), increasing with depth, maximum values (> 38.8) typical of the Levantine Intermediate Water (LIW) were observed from 150 to 300 m depth (Fig. 3-2); the bottom layer showed a mean value of 38.79.
A typical Deep Chlorophyll Maximum was recorded at 60-90 m depth, where the highest fluorescence values were measured (Fig. 3-2).

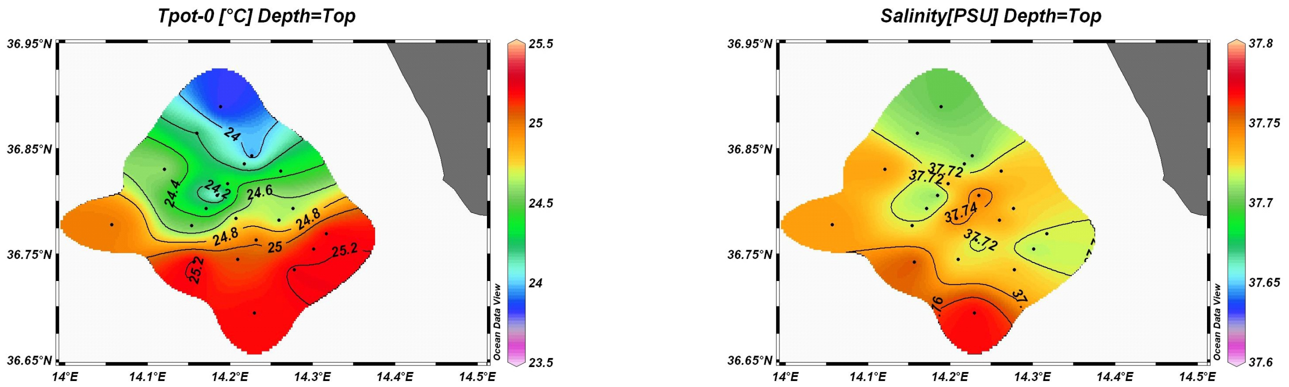


Fig. 3-1a. Surface distribution of potential temperature and salinity in the Gela basin.

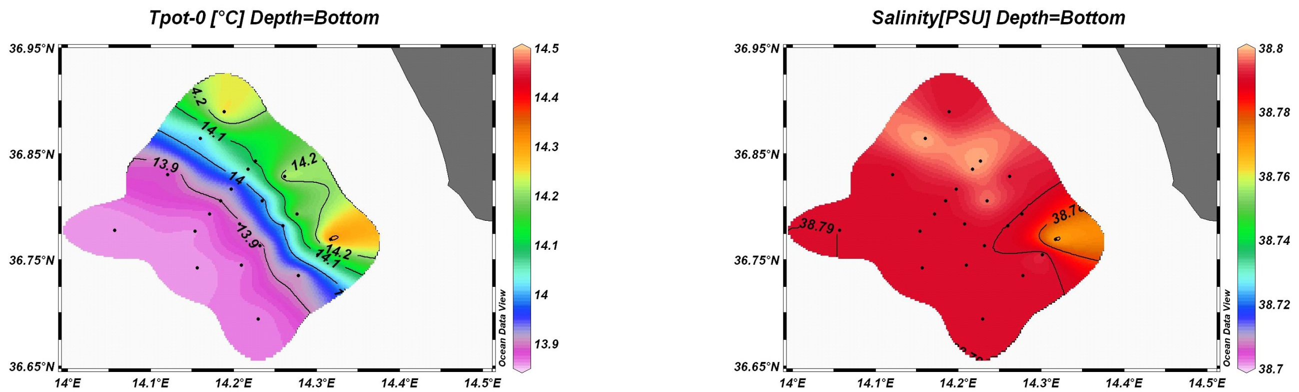


Fig. 3-1b. Bottom distribution of potential temperature and salinity in the Gela basin.

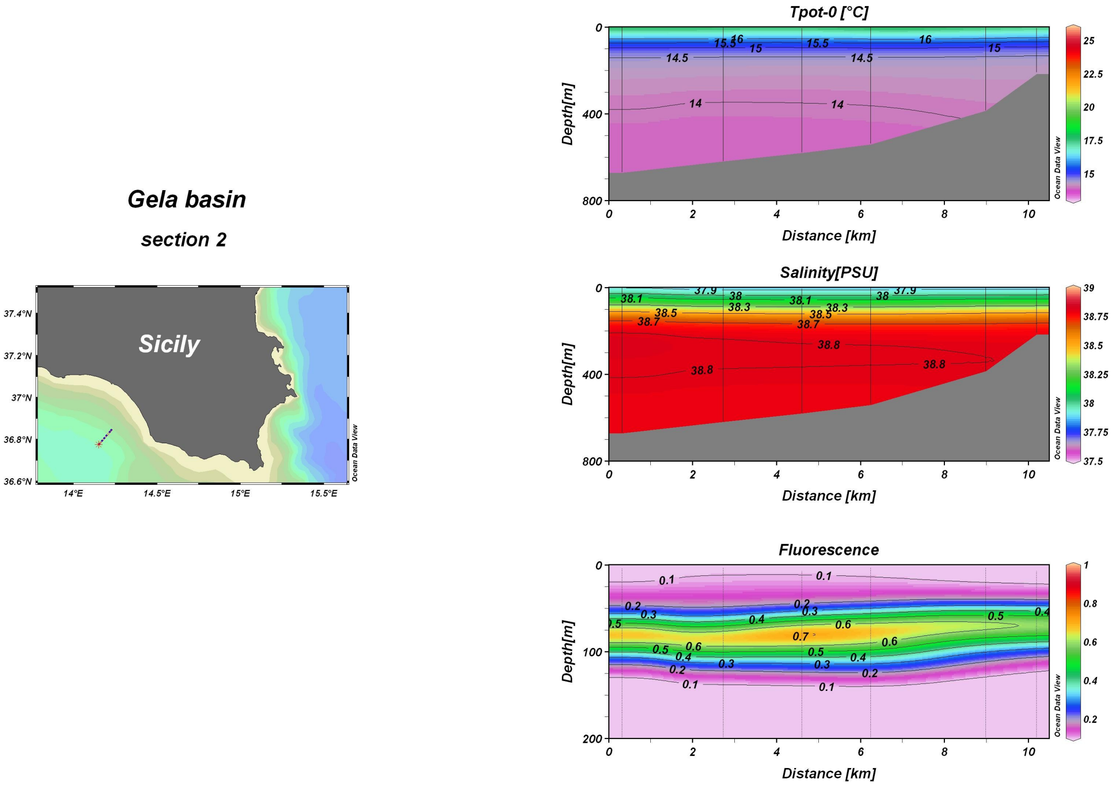


Fig. 3-2. Vertical sections of temperature, salinity and fluorescence in the Gela basin.

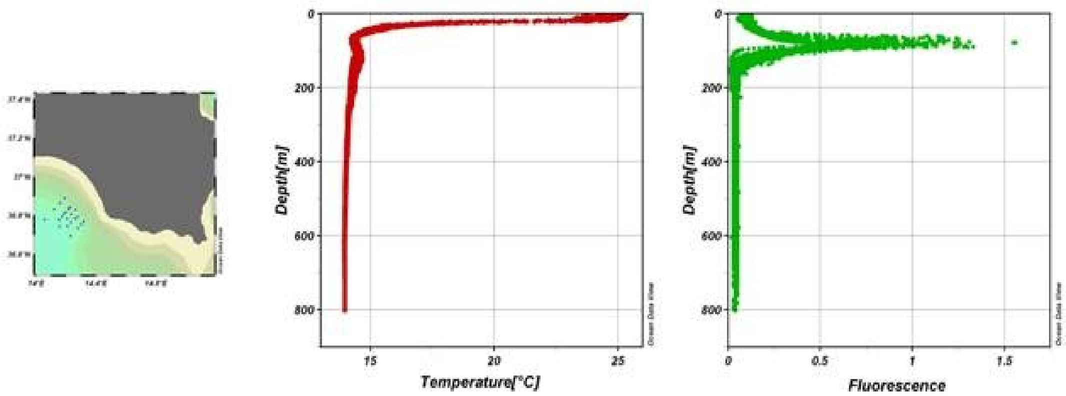


Fig. 3-3. Scatter plots of temperature and fluorescence in the Gela basin.

In the area over the Malta Escarpment the surface temperature ranged from 25.6 to 26.3 °C, whereas the bottom layer showed values < 14°C (Figs. 3-4 and 3-5).
Surface salinity showed a wider range from 37.48 to 38.75. Maxima were measured around 150-250 m depth with values > 38.8 (LIW). At the bottom, salinity varied from 38.8 in the shallower more coastal stations to 38.76 in the deeper (1000-2000 m depth) stations.
A Deep Chlorophyll Maximum (DCM) was found at 60-80 m depth although less pronounced with slightly lower maximum fluorescence values (Fig. 3-4 and 3-5).

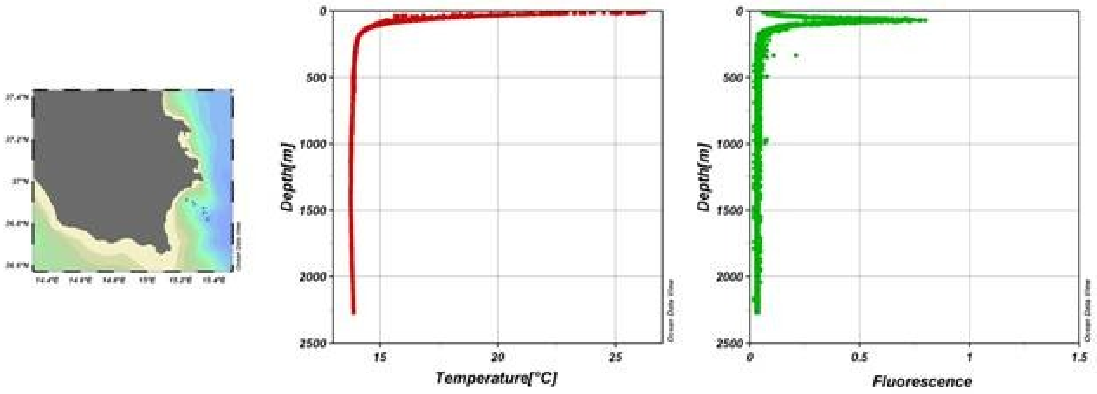


Fig. 3-5. Scatter plots of temperature and fluorescence over the Malta escarpment.

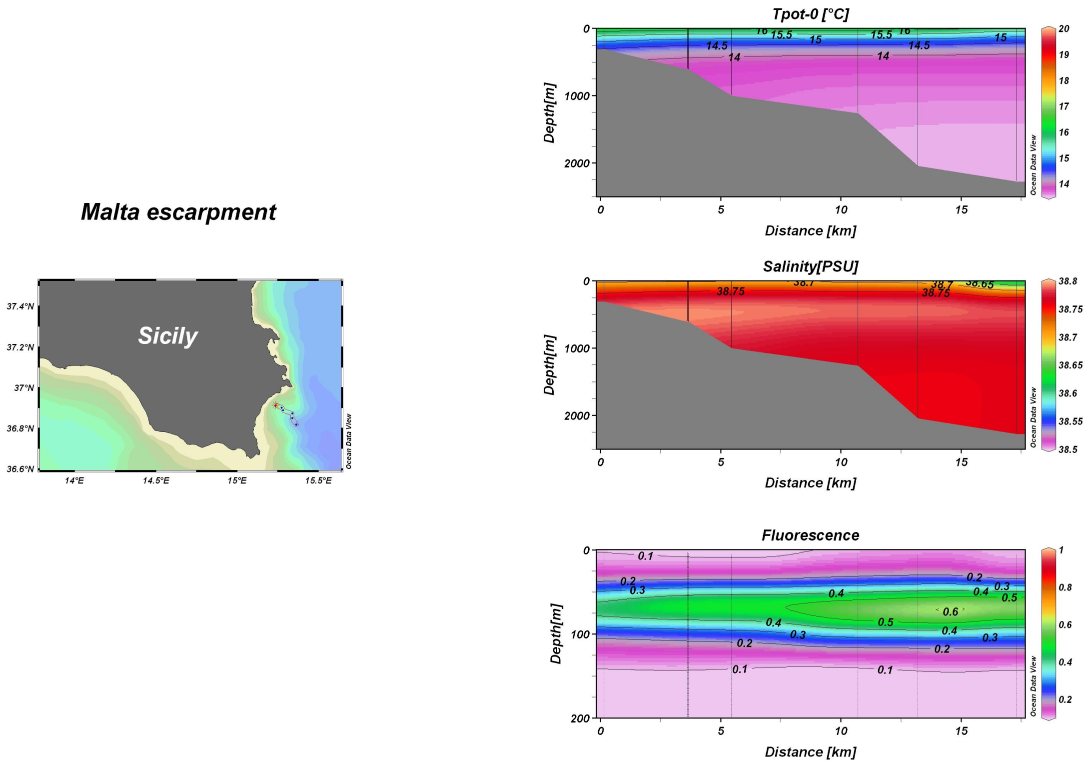


Fig. 3-4. Vertical sections of temperature, salinity and fluorescence over the Malta escarpment.

4. SEISMIC PROFILES, SWATH BATHYMETRY AND SEDIMENT SAMPLES

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A dense network of Chirp-sonar seismic profiles and swath bathymetric data collected during the cruise meant to be useful for the characterisation of geomorphology and stratigraphy of the Gela basin and a sector of the Malta Escarpment.

Chirp-sonar profiles use a 2-7 kHz sweep-modulated band width, equivalent to a 3.5 kHz profiler fired from 16 transducers, and have a 500-2000 ms recording length, depending on water depth. High-resolution swath-bathymetric data were gathered using a 50-kHz EM-300 multi-beam, minor sectors were covered by conventional bathymetric data that were anyhow sufficient to identify the morphologic expression of the seafloor.

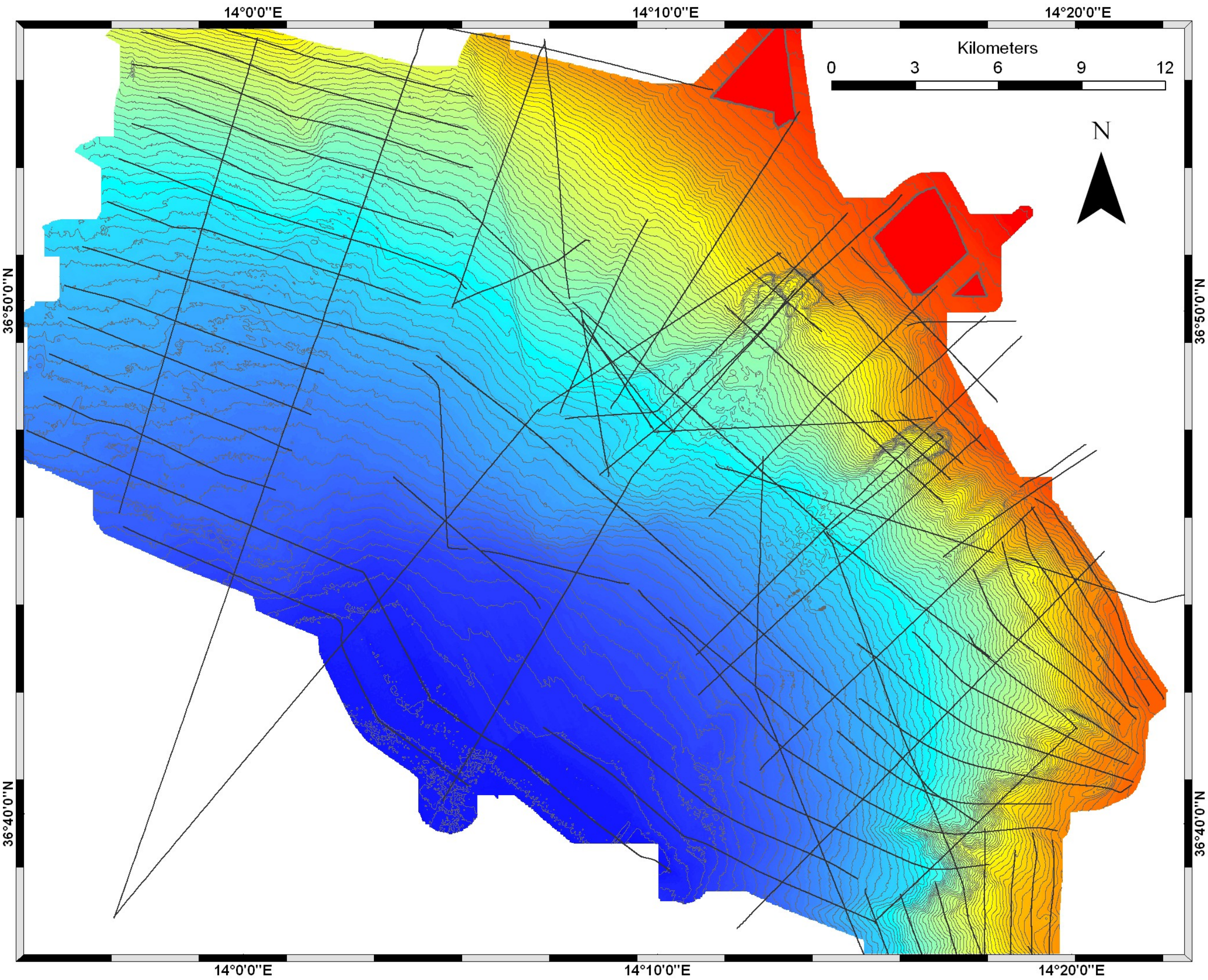


Fig. 4-1. Swath bathymetry and track-lines of seismic profiles of a surveyed area in the Gela basin, Strait of Sicily.

Stratigraphic and geomorphological goals of cruise GELA-05 concerned 3 main themes:

- activity/inactivity of the margins, particularly along the slope of Gela basin;
- location and variability of mass-transport products;
- chronology and time constrain of main mass-transport events.

Seismic profiles

Chirp-sonar profiles collected on the shelf offshore Gela document a regional shallowly-buried erosion unconformity, overlaid by onlapping or draping sediment units that, as in other areas of the Mediterranean, indicates a region affected by the sea-level low stand of the last glacial cycle. Most of the slope and base-of-slope area record stacked deposits with acoustically transparent facies, separated by laterally continuous high-amplitude reflectors, that are interpreted as multiple mass-transport events documenting the recurrence of failures in the area along a stretch of more than 65 km (Fig 2). Seismic profiles show evidence of several exposed, partially overlapping, mass-transport deposits, which emanated from slide scars that are clearly detectable on the slopes of Gela basin. The exposed slide deposits correspond to transparent-chaotic seismo-facies with erosional base and local hyperbolic returns at the seafloor that suggest the presence of sharp reliefs. Slide scars are particularly evident along the northern flank of the Gela basin.

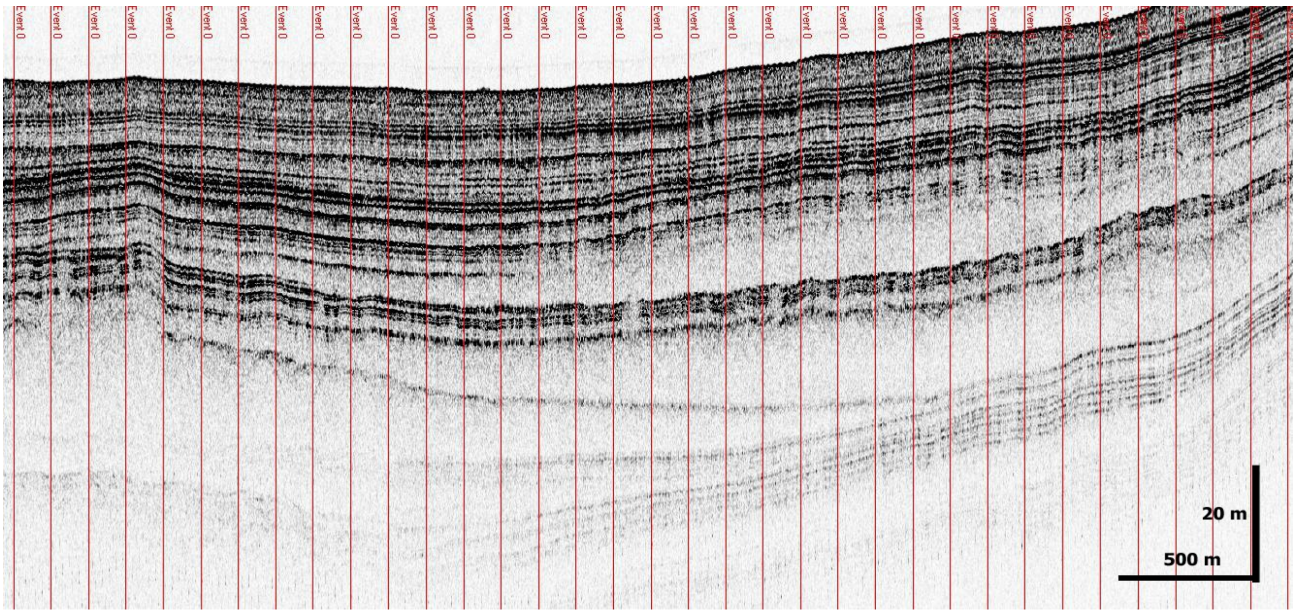


Fig. 4-2. Multiple mass-transport events. Deep penetration of acoustic-signal into the subbottom suggests that these stratigraphic units are dominantly fine-grained sediment, both within and outside mass-transport deposits.

The surveyed sector of the Malta Escarpment documents an extremely high steepness (up to 75°) and irregular geomorphology. A dense network of gullies and minor incisions dissect the walls of the main Escarpament whose high stiffness and coherence do not allow acoustic signal to penetrate. Along less steep slopes, located in the shallowest part of the area, a thin layered sediment unit drapes the basement that crops out in the Malta Escarpment. At the base of the Escarpment several sediment lobes overlap, generating a complex stratigraphy and seafloor morphology.

Swath bathymetry

Two main slide scars appear in water depths deeper than 200 m and reach the base of the slope in 860 m (Fig. 1); the headscarps of these slides are more than 6 km wide, are rounded in plain view, and appear composed of several internal smaller-scale scarps. The slope gradients below the shelf edge are around 16° and become on average 4.5-1.5° at the base of the slope. Within the slide scarps slope gradients are as steep as 27°.
Moving toward south-east, the slope presents smaller headscarps, dense occurrence of gullies and several minor incisions. Proceeding in the same direction, the continental slope reveal evidence of widespread failure products either clearly exposed at the seafloor, or mantled by a sediment drape thin enough to leave morphologic expression at the seafloor (Fig. 3).
Swath bathymetry detected also a field of pockmarks that occurs atop of a distal mass-transport deposit, more precisely, along a pre-existing local bulge that increases the slope from 0.8° to 2.2°. The field of pockmarks is subrounded, 2.5 km large and present 37 pockmarks (in the order of 100 m apart from each other). Chirp-sonar profiles document craters more than 10 meters deep and few hundred meters in diameter without any sediment drape. Fluid escapes at the toe of northern slide may be responsible for this pockmark field.

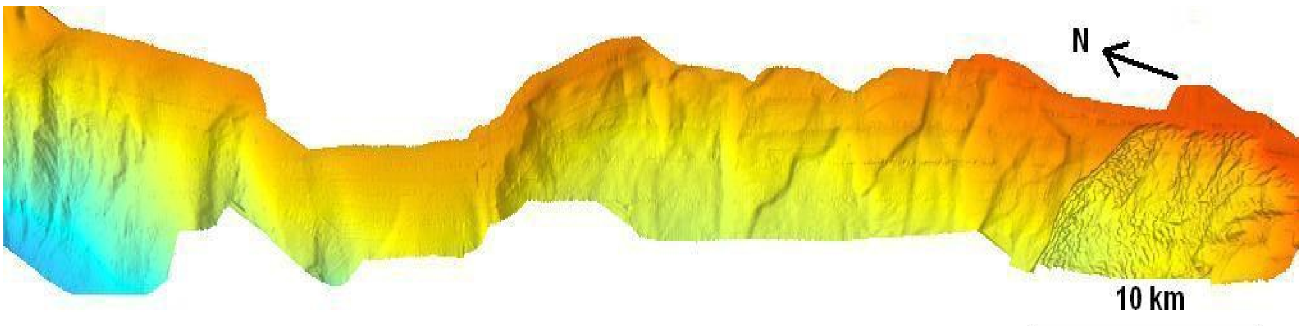


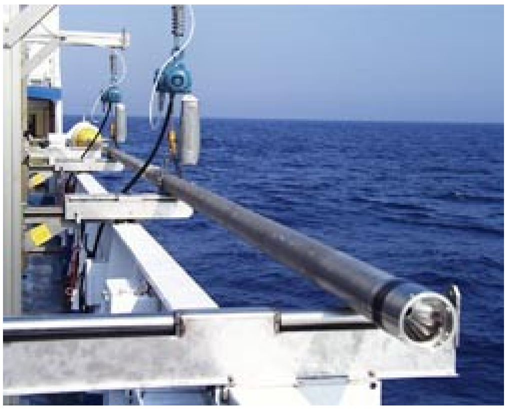
Fig. 4-3. Swath bathymetry showing evidence of widespread failure products along the south-east continental slope of Gela basin.

Swath bathymetry in the Malta Escarpment area reveals 3 main geomorphological features: 1) a suite of valleys and gullies forming a drainage-like pattern, 2) a horseshoe-shaped 500 m-high escarpment, 3) a complex of overlapping sediment lobes at the toe of the escarpment. All together this area ranges between 500 and 2600 m of water depth and includes slopes from 1° to 75°.

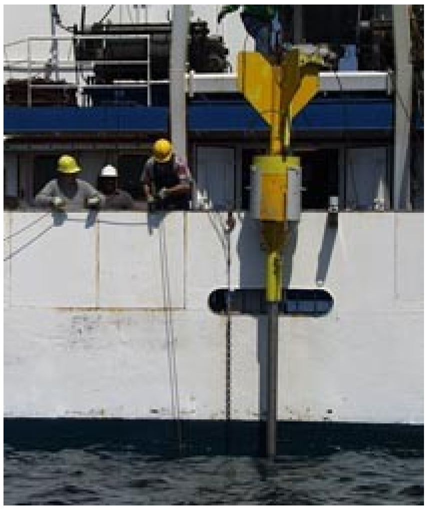
Sediment samples

Seabed sampling location meant to be useful for the dating and the characterisation of sediment features recognized on Chirp-sonar profiles and swath bathymetric data. Two types of samples have been collected: long sediment cores and box-cores.
Six long sediment cores were collected using gravity and piston corers with variable barrel lengths (5-15 m), for a maximum core recovery of 88% and 11.61 m. Long cores in the Gela basin were recovered in key spots decided on the base of seismic

profiles, to reconstruct the stratigraphy of the basin through analyses and correlations of biostratigraphic determinations, sediment facies and magnetic susceptibility. In particular, direct stratigraphic information has been acquire to: 1) establish stratigraphic correlations among slope areas not affected by sediment failure; 2) determine the age of the most recent slide events; 3) reconstruct the stages of failure and the downslope evolution of the mass-transport processes.



Piston corer onboard



Coring operation

In addition, a box-corer was employed to collect 86 large-diameter undisturbed core tops; box-corer was deployed 3-4 times per station in order to recover large amount of sediment for biological, geochemical and radiochemical analyses (see the specific reports).

Box core and recovery of undisturbed top to analyse fauna and sediment.

Table 2. List of box core stations

CRUISE_ID	BC_ID	DATE	TIME	W_DEPTH	LONGITUDE (E) (WGS84)	LATITUDE (N) (WGS84)
			(UTC)	(m)	(DDMM.XXX)	(DDMM.XXX)
GE05	BC01-1	17/08/2005	06:17	216.8	1413.585	3650.641
GE05	BC01-2	17/08/2005	06:43	219.0	1413.575	3650.610
GE05	BC01-3	17/08/2005	07:05	219.6	1413.566	3650.610
GE05	BC01-4	17/08/2005	07:25	219.2	1413.559	3650.630
GE05	BC02-1	16/08/2005	14:25	381.2	1413.079	3650.151
GE05	BC02-2	16/08/2005	14:38	381.2	1413.075	3650.155
GE05	BC02-3	16/08/2005	15:05	401.9	1413.077	3650.149
GE05	BC03-1	16/08/2005	12:07	543.3	1411.864	3649.010
GE05	BC03-2	16/08/2005	12:42	543.5	1411.833	3649.016
GE05	BC03-3	16/08/2005	13:15	543.6	1411.848	3649.011
GE05	BC04-1	16/08/2005	10:09	584.1	1411.096	3648.336
GE05	BC04-2	16/08/2005	10:48	584.7	1411.082	3648.332
GE05	BC04-3	16/08/2005	11:20	584.3	1411.080	3648.331
GE05	BC05-1	16/08/2005	06:18	620.9	1410.280	3647.588
GE05	BC05-2	16/08/2005	06:56	620.0	1410.282	3647.582
GE05	BC05-3	16/08/2005	07:25	622.0	1410.289	3647.559
GE05	BC05-4	16/08/2005	08:10	620.7	1410.270	3647.579
GE05	BC05-5	16/08/2005	09:19	619.1	1410.279	3647.588
GE05	BC06-1	19/08/2005	06:32	672.4	1409.228	3646.638
GE05	BC06-2	19/08/2005	07:18	672.5	1409.273	3646.632
GE05	BC06-3	19/08/2005	07:38	672.5	1409.216	3646.683
GE05	BC07-1	18/08/2005	06:08	221.5	1415.716	3649.727
GE05	BC07-2	18/08/2005	06:31	222.3	1415.735	3649.705
GE05	BC07-3	18/08/2005	06:51	223.8	1415.721	3649.708
GE05	BC07-4	18/08/2005	07:12	228.2	1415.731	3649.670
GE05	BC08-1	12/08/2005	11:49	447.5	1414.051	3648.317
GE05	BC08-2	12/08/2005	12:17	447.3	1414.050	3648.319
GE05	BC08-3	12/08/2005	12:51	447.8	1414.051	3648.318
GE05	BC09-1	12/08/2005	08:55	606.0	1412.439	3647.024

GE05	BC09-2	12/08/2005	09:51	604.5	1412.449	3647.034
GE05	BC09-3	12/08/2005	11:02	606.5	1412.439	3646.996
GE05	BC10-1	13/08/2005	06:26	807.3	1409.412	3644.525
GE05	BC10-2	13/08/2005	07:15	806.4	1409.388	3644.527
GE05	BC10-3	13/08/2005	08:18	806.0	1409.371	3644.549
GE05	BC10-4	13/08/2005	08:48	806.8	1409.405	3644.532
GE05	BC11-1	14/08/2005	08:46	219.7	1416.635	3647.590
GE05	BC11-2	14/08/2005	09:13	221.2	1416.611	3647.587
GE05	BC11-3	14/08/2005	10:24	215.1	1416.622	3647.606
GE05	BC11-4	14/08/2005	10:50	220.0	1416.619	3647.590
GE05	BC12-1	12/08/2005	13:45	499.7	1415.588	3646.892
GE05	BC12-2	12/08/2005	14:14	498.7	1415.590	3646.910
GE05	BC12-3	12/08/2005	14:54	499.6	1415.594	3646.908
GE05	BC13-1	15/08/2005	06:48	619.5	1413.970	3645.826
GE05	BC13-2	15/08/2005	07:35	617.2	1413.921	3645.961
GE05	BC13-3	15/08/2005	09:51	619.8	1413.918	3645.930
GE05	BC13-4	15/08/2005	10:24	614.9	1413.901	3645.945
GE05	BC14-1	17/08/2005	15:31	720.1	1412.568	3644.678
GE05	BC14-2	17/08/2005	16:10	724.8	1412.575	3644.661
GE05	BC14-3	17/08/2005	16:44	718.3	1412.576	3644.695
GE05	BC15-1	19/08/2005	13:52	183.1	1411.345	3653.386
GE05	BC15-2	19/08/2005	14:13	183.2	1411.370	3653.377
GE05	BC15-3	1908/2005	14:33	183.2	1411.351	3653.388
GE05	BC16-1	20/08/2005	06:15	392.5	1409.631	3651.857
GE05	BC16-2	20/08/2005	06:40	391.6	1409.645	3651.849
GE05	BC16-3	20/08/2005	07:03	391.2	1409.650	3651.850
GE05	BC16-4	20/08/2005	07:26	390.0	1409.648	3651.852
GE05	BC17-1	19/08/2005	11:52	588.6	1407.243	3649.813
GE05	BC17-2	19/08/2005	12:23	589.4	1407.260	3649.820
GE05	BC17-3	19/08/2005	12:44	588.6	1407.257	3649.816
GE05	BC18-1	19/08/2005	09:08	786.1	1403.440	3646.681
GE05	BC18-2	19/08/2005	10:01	786.8	1403.461	3646.652

GE05	BC18-3	19/08/2005	10:27	785.7	1403.462	3646.669
GE05	BC19-1	14/08/2005	11:31	183.1	1419.047	3646.138
GE05	BC19-2	14/08/2005	12:04	183.1	1419.042	3646.153
GE05	BC19-3	14/08/2005	12:32	182.7	1419.044	3646.151
GE05	BC20-1	14/08/2005	13:01	337.2	1418.099	3645.298
GE05	BC20-2	14/08/2005	13:33	339.7	1418.098	3645.300
GE05	BC20-3	14/08/2005	14:11	336.0	1418.114	3645.292
GE05	BC21-1	15/08/2005	11:43	603.2	1416.648	3644.104
GE05	BC21-2	15/08/2005	12:19	604.2	1416.626	3644.099
GE05	BC21-3	15/08/2005	12:43	604.2	1416.631	3644.107
GE05	BC22-1	13/08/2005	14:01	760.1	1413.755	3641.659
GE05	BC22-2	13/08/2005	14:40	759.0	1413.758	3641.643
GE05	BC22-3	13/08/2005	15:28	758.5	1413.772	3641.663
GE05	BC23-1	21/08/2005	13:17	607.4	1516.401	3654.009
GE05	BC23-2	21/08/2005	14:01	608.3	1516.399	3654.007
GE05	BC23-3	21/08/2005	14:36	607.1	1516.421	3654.023
GE05	BC24-1	21/08/2005	10:19	1262.8	1520.318	3652.283
GE05	BC24-2	21/08/2005	11:13	1260.6	1520.334	3652.291
GE05	BC24-3	21/08/2005	12:06	1259.2	1520.314	3652.297
GE05	BC25-1	11/08/2005	12:56	2062.3	1520.465	3650.949
GE05	BC25-2	11/08/2005	15:22	2060.9	1520.483	3650.957
GE05	BC25-3	11/08/2005	17:19	2062.5	1520.479	3650.953
GE05	BC26-1	22/08/2005	06:28	2325.1	1521.748	3649.061
GE05	BC26-2	22/08/2005	07:48	3591.8	1521.755	3649.065
GE05	BC26-3	22/08/2005	09:14	2312.1	1521.731	3649.064

Table 3. List of gravity and piston cores

CORE_ID	DATE	TIME	W_DEPTH	LONGITUDE (E) (WGS84)	LATITUDE (N) (WGS84)	DEVICE
		(UTC)	(m)	(DDMM.XXX)	(DDMM.XXX)	
C_1	17/08/2005	11:31	637.5	1409.806	3647.579	Gravity corer
C_2	17/08/2005	13:11	199.6	1416.659	3647.877	Gravity corer

C_3	17/08/2005	14.48	626.8	1413.889	3645.779	Gravity Corer
C_4	18/08/2005	11:39	206.6	1413.830	3650.651	Piston Corer (CP20)
C_5	18/08/2005	16:00	143.7	1421.445	3645.042	Piston Corer (CP20)
C_6	20/08/2005	08:51	670.9	1408.472	3647.693	Piston Corer (CP20)
C_7	20/08/2005	13:49	680.6	1407.486	3647.778	Piston Corer (CP20)

5. BIODIVERSITY AND ECOSYSTEM FUNCTIONING AND EFFICIENCY

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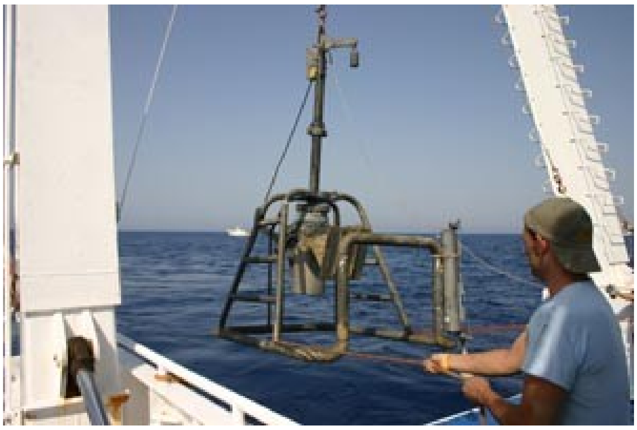
The primary objectives of the seabed sampling were to study and compare the biodiversity of benthic communities and sediment characteristics along two landslides and the adjacent open slopes (which were used as control stations) in the Strait of Sicily and a transect along the Malta Escarpment. Sediment cores were collected for biological and biochemical analyses to understand the relationship between ecosystem functioning and efficiency, and biodiversity in two different systems (landslides and open slopes). Biological analyses included the biochemical composition of organic matter, prokaryotic secondary production, enzymatic activities, bacterial, meio- and macro-faunal abundance, biomass and diversity.

Sediment Cores

Sediment samples were collected using a box corer (box size I.D. 32.4 cm cross-section, 52 cm height) along the axes of two landslides, along three across-shelf transects in the open slope of Gela basin and along one across-shelf transect in the Malta escarpment. The depth of sampling stations ranged between 183 and 807 m for the Gela basin and between 607 and 2325 m for the Malta Escarpment. All stations were successfully sampled and were surveyed prior to collect sample using the *URANIA* seabeam depth sounder, to identify sample locations within the landslides axis and the open slopes. For macro-megafauna samples were deployed benthic traps at stations 5, 10 and 12, respectively, but no organisms were collected. Also a dredge was deployed at stations 9 and 23, without success.



Recovery of the box corer.

Sediment subsamples from a box core.

Processing of cores

Each box core was sub-sampled using thin PVC liners of different internal diameters (10 cm, 5.5 cm and 3.6 cm, respectively). For biological analyses, sediment cores were sliced into different layers: 0-1, 1-3, 3-5, 5-10 and 10-15 cm. For macrofauna analyses an entire box core for each station was sieved using a 500 μm mesh.
Sediment samples will be analyzed for biological analyses (biochemical composition of organic matter, prokaryotic secondary production, enzymatic activities, bacterial, meio- and macro-faunal abundance, biomass and diversity).
Some analyses such as prokaryotic secondary production and enzymatic activities (for the top 1 cm) were immediately performed on board after the samples collection; for all the other analyses sediment samples were processed on board and stored until the analyses in the laboratory.

For living forams, the uppermost 5 cm of the box cores were subsampled by C. Bergami (ISMAR-BO) with short liners and extruded to obtain sediment samples 0.5/1 cm thick. Sediment samples were treated with Bengal Rose to detect the living (=stained) assemblage, then results will be presented as living and total (living + dead foraminifera) assemblage.

Deployment of the benthic trap buoys.

Benthic traps.

Table 5-1. Subsampling of box cores for biological analyses in the Gela Basin (Strait of Sicily) and Malta Escarpment. BC_ID, label of the box core, where the first digit marks the station number, while the second one shows the deployment number; OM, organic matter; EA, enzymatic activity.

BC_ID	OM	Bacteria, virus, EA prokaryotic production	Viral production	Protozoa	Meiofauna	Macrofauna	Forams	Grain-size
BC1-1		1	1		2		1	
BC1-2	1	1			3			
BC1-3						1		
BC1-4	1	2			4			
BC2-1						1		
BC2-2	1	1	1		3		1	
BC2-3	1	3			6			1
BC3-1						1		
BC3-2	1	1	1		3		1	
BC3-3	1				6			1
BC4-1		3	1		3		1	
BC4-2	2				6			
BC4-3						1		
BC5-1		3	1		3		1	
BC5-2		no recovery						
BC5-3	1				3			1
BC5-4						1		
BC5-5	1				3			
BC6-1	1	3	1		4		1	
BC6-2						1		
BC6-3	1				5			
BC7-1		3	1		3		1	
BC7-2	1			1	3			
BC7-3						1		
BC7-4	1				3			
BC8-1	1	3			6			1
BC8-2						1		
BC8-3	1		1	1	3			
BC9-1	1	3		1	5	1		
BC9-2	1		1		4	1		
BC9-3						1		1
BC10-1						1	1	
BC10-2		3			2			
BC10-3	1			3	4			
BC10-4	1				3			
BC11-1						1		
BC11-2			1		3		1	
BC11-3	1	3		1	4			1
BC11-4	1				4			
BC12-1	1	3			4		1	
BC12-2						1		
BC12-3	1				5			1
BC13-1	1	1	1		5		1	
BC13-2	1				3			
BC13-3						1		
BC13-4		3		2	1			
BC14-1	1	3	1	1	3		1	
BC14-2	1				6			1
BC14-3						1		
BC15-1	1	3	1		2		1	
BC15-2						1		
BC15-3	1				6			1
BC16-1						1		
BC16-2	1	1	1		3		1	

BC_ID	OM	Bacteria, virus, EA prokaryotic production	Viral production	Protozoa	Meiofauna	Macrofauna	Forams	Grain-size
BC16-3	1	3			3			
BC16-4					3			1
BC17-1	1	3	1		4		1	
BC17-2						1		
BC17-3	1				5			1
BC18-1	1	3	1		4		1	
BC18-2	1				5			
BC18-3						1		
BC19-1	1	3			4			
BC19-2	1				5			1
BC19-3						1		
BC20-1	1	3			5			
BC20-2	1				5			1
BC20-3						1		
BC21-1	1	3			4			1
BC21-2						1		
BC21-3	1				5			
BC22-1	1	3			3			
BC22-2	1				3			
BC22-3						1		
BC23-1	1	3			2		1	
BC23-2						1		
BC23-3	1				7			1
BC24-1	1	3			4		1	
BC24-2						1		
BC24-3	1				5			1
BC25-1	2	3			6	1		1
BC25-2					3	1	1	
BC25-3						1		
BC26-1	1	3			4		1	1
BC26-2						1		
BC26-3	1				5			

6. BENTHIC RESPONSE AND EARLY DIAGENESIS CHARACTERISATION

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Only a small fraction of the organic carbon produced in surface waters of the ocean reaches the sediment surface, but a close coupling exists between the organic carbon arriving at the seabed and the surface water productivity, because of rapid vertical transport. When the organic carbon settles on the sea floor, may either become permanently buried or provoke a sequence of degradation reactions that remove carbon from the sediment system (by oxidizing it to CO_2). There exists a well defined sequence in the use and exhaustion of terminal electron acceptors, because the energy gained through mineralization differs with the nature of these oxidants and/or they are mutually exclusive. Oxygen (the most powerful oxidant) will be consumed first, followed by nitrate and nitrite, manganese oxide, iron oxides, sulphate, and finally oxygen bound in organic mater. In the deep sea, where organic matter deposition is low, oxygen is by far the major electron acceptor in the mineralization process. The rate of oxidant reduction can be used to estimate carbon mineralization rate, since carbon oxidation and oxidant reduction proceed according to stochiometric ratios. The aim of this contribution is to establish a sediment carbon budget from sediment and pore water properties in the study area taking account of the different sedimentological setting (landslide/no landslide effect).

Field work on the benthic compartment consisted of collection of cores for pore water and solid phase chemical and radiochemical analyses, and oxygen microprofiles in sediment.

Sediment and pore water sampling

Sediment cores were taken with a cylindrical box-corer (i.d. 32.4 cm). The box-corer was equipped with a closing lid by which the original bottom water is retained above the sediment-water interface and disturbance of the sediment water interface is minimized.
On deck 2 sub-cores (Plexiglass liners, i.d. 104 mm) were taken from the box-cores and sectioned in slices of 0.5 cm for the upper 2 cm of the sediment, of 1 cm from 2 to 8 cm depth, and of 2 cm from 8 to 20 cm depth.
In Table 1 is reported the list of the seven stations investigated for benthic response and early diagenesis characterisation.

The extruded sediment slices were pooled, homogenized and pore water was extracted by centrifuging at 5500 rpm for about 12 min; during the extrusion, temperature and pH of sediment was measured at the same depth at which pore water was sampled. Subsamples for solid phase analyses were collected at the same depth as for pore water down to 20 cm, below which 2 cm slices were collected every 4 cm deeper down until the bottom. Samples were stored at -20°C for subsequent analyses. The deck work was performed in thermostated container at the temperature of 20° to minimize the temperature variation from *in situ* bottom temperature.

Solid phase analyses will include analyses of organic carbon, total nitrogen, organic carbon stable isotopes, biogenic silica and mesurements of radionuclides (^{210}Pb, ^{137}Cs and ^{14}C) for determining sediment accumulation rates and biomixing coefficients.

The extracted pore waters were immediately filtered through a 0.2 μm cellulose acetate filter.
Alkalinity was titrated on board using 2 ml aliquots and TCO_2 was calculated from these measurements and pH.
Aliquots for dissolved nutrient (nitrite, nitrate, silicate, phosphate) determinations in pore and bottom waters were frozen at -20°C and stored for following lab analyses.

Table 6-1. Box cores subsampled for pore water and solid phase chemical and radiochemical analyses. BC_ID, label of the box core, where the first digit marks the station number, while the second one shows the deployment number.

CRUISE_ID	BC_ID	DATE	W_DEPTH (m)	LENGTH OF CORES (cm)
GE05	BC01-1	17/08/2005	217	36 and 30
GE05	BC05-3	16/08/2005	625	45 and 44
GE05	BC07-2	18/08/2005	224	45 and 45
GE05	BC10-2	14/08/2005	806	29 and 26
GE05	BC11-2	13/08/2005	212	44 and 45
GE05	BC13-2	15/08/2005	634	43 and 38
GE05	BC16-2	20/08/2005	392	44 and 45

Oxygen microprofile measurements

Two replicate cores with 62 mm internal diameter polycarbonate liners were subsampled from the box core. If the original bottom water was not preserved on the top of the sediment, it was carefully replaced with the bottom water sampled from a Niskin bottle mounted on box core frame.
Immediately after the recovery, cores were stored in a water bath thermostated at the bottom temperature.
Oxygen micro profiles in sediments were measured after retrieval on ship using Clark-type (with guard electrode) microelectrodes controlled from a motorized micromanipulator. The electrodes were characterized with outer tip diameters ranging from 10–15 micron.
All electrodes were tested with the 100% air saturated bottom water oxygen concentration and with 100% N_2 saturated bottom water as zero signal.
In case the oxygen penetration depth exceeded the depth of profiling, the zero signal as determined from electrode test was used for calibration.
Prior and during the profiling, the supernatant bottom water was gently flushed with air to reach the 100% air saturated oxygen concentration. The calibration of the electrodes is done taking account of oxygen solubility at bottom temperatures and salinities data obtained from CTD profiles.
CTD oxygen sensor has been calibrated respect to O_2 Winkler titration of selected samples.
Microprofiles were repeated at least 2 times for each core and recorded at 250-500 mm resolution after 10 seconds of stabilization at each depth.

The Clark-type microelectrodes and the set-up for the measurement were kindly furnished from NIOZ.

After oxygen profiling the undisturbed portion of the core was used to carry out resistivity profiles to calculate sediment porosity.

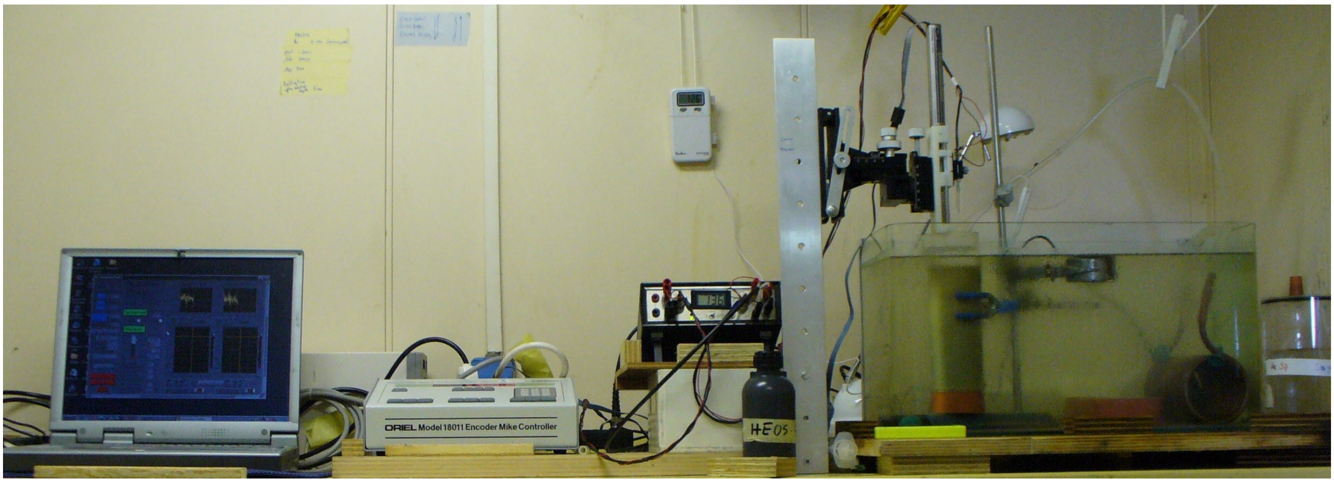

Fig. 6-1. Set-up of the experimental system for measuring oxygen microprofiles in a sediment core. It includes a picoammeter (PA2000) to read the signal, a heavy/stable laboratory stand and a motorized micromanipulator. The analogic signal from the picoammeter is converted to digital from the A/D converter and acquired from specific software. The software controls also the motorized micromanipulator and the penetration of the micro sensor into the sediment. The sediment core is positioned within a thermostated bath kept at the temperature of the sea bottom.

Table 6-2. List of stations investigated for measuring oxygen microprofiles and number of replicas for each subsampling.

BC_ID	W_DEPTH	DATE/TIME OF SAMPLING	DATE/TIME OF PROFILING	REPLICAS	ELECTRODE
	(m)	(Local Time)	(Local Time)		
BC01-1	217	17/08/2005 08:17	17/08/2005 12:45	2	S17
BC02-1	381	16/08/2005 16:25	16/08/2005 21:00	2	S8
BC03-3	544	16/08/2005 15:15	16/08/2005 19:10	2	S8
BC04-1	584	16/08/2005 12:09	16/08/2005 15:20	3	S8
BC05-4	620	16/08/2005 10:10	16/08/2005 12:40	3	S8
BC07-1	221	18/08/2005 08:08	18/08/2005 11:00	3	S17
BC07-2	222	18/08/2005 08:31	18/08/2005 14:00	4	S17
BC08-3	447	12/08/2005 12:51	12/08/2005 18:40	3	S1
BC09-3	606	12/08/2005 11:20	12/08/2005 16:00	3	S1
BC10-3	806	13/08/2005 10:20	13/08/2005 15:50	4+2	S1
BC11-2	221	14/08/2005 11:13	14/08/2005 13:15	6	S10
BC12-3	499	12/08/2005 14:54	12/08/2005 20:52	4	S1
BC13-2	617	15/08/2005 09:35	15/08/2005 12:30	3	S8
BC16-1	392	20/08/2005 08:15	20/08/2005 13:00	4	S8
BC19-3	182	14/08/2005 14:32	14/08/2005 16:47	3	S10, S1
BC20-1	337	14/08/2005 15:01	15/08/2005 15:25	4	S8
BC21-3	604	15/08/2005 14:43	15/08/2005 18:00	3	S8
BC22-3	760	13/08/2005 17:30	13/08/2005 21:05	3	S1
BC23-1	600	21/08/2005 15:30	21/08/2005 16:00	6	S8

BC25-3	2060	11/08/2005 17:20	11/08/2005 20:20	3	S1

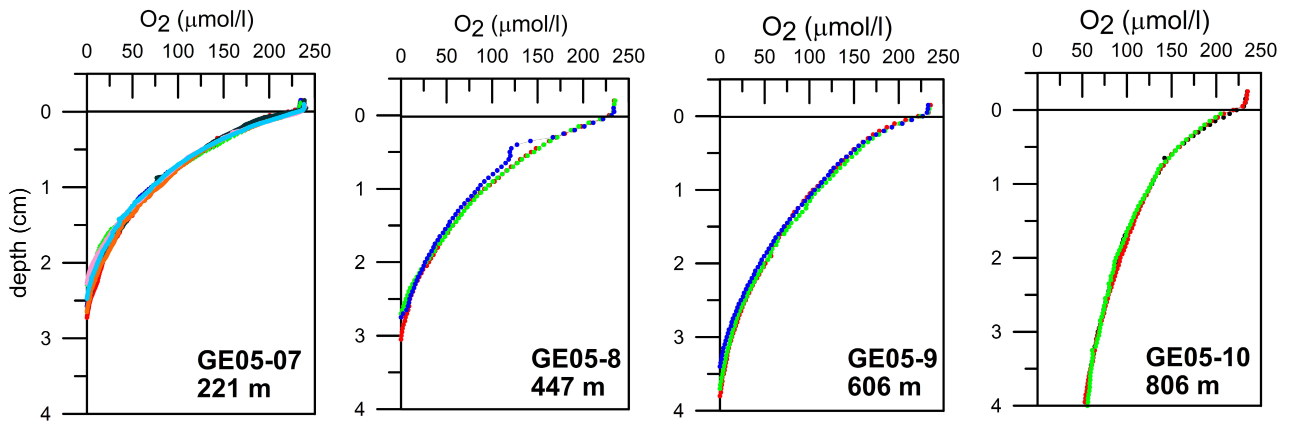

Fig. 6-2. Oxygen microprofiles measured shipboard with guarded Clark-type microelectrodes at stations 7, 8, 9 and 10 during the GE05 cruise. Note the good reproducibility when replicate microprofiles are shown.

ANNEX 1: CRUISE SUMMARY REPORT – ROSCOP REPORT

CRUISE SUMMARY REPORT	***FOR COLLETING CENTRE USE*** **Centre: BODC Ref. No.:** Is data exchange restricted ☐ Yes ☐ In part ☐ No

SHIP enter the full name and international radio call sign of the ship from which the data were collected, and indicate the type of ship, for example, research ship; ship of opportunity, naval survey vessel; etc.

Name: URANIA **Call Sign: IQSU**

Type of ship: research ship

CRUISE NO. / NAME: GELA 05

CRUISE PERIOD start: **10/08/05** end: **23/08/05**

PORT OF DEPARTURE (enter name and country) : **Catania, Italy**

PORT OF RETURN (enter name and country) : **Catania, Italy**

RESPONSIBLE LABORATORY
enter name and address of the laboratory responsible for coodinating the scientific planning of the cruise

Name: ISTITUTO SCIENZE MARINE, SEDE DI BOLOGNA-GEOLOGIA MARINA, CNR (ISMAR-CNR)

Address: Via P. Gobetti, 101 40129 Bologna

Country: Italy

CHIEF SCIENTIST(S)
enter name and laboratory of the person(s) in charge of the scientific work (chief of mission) during the cruise.

Dr. Leonardo Langone ISMAR-CNR Via P. Gobetti,101 40129 Bologna

OBJECTIVES AND BRIEF NARRATIVE OF CRUISE
enter sufficient information about the purpose and nature of the cruise so as to provide the context in which the report data were collected.

The objective of the R/V Urania Cruise was to investigate a set of very recent slides showing markedly distinct morphology on the slope of Gela basin, Strait of Sicily and a slope transect from the shelf edge to 3000 m water depth on the Malta escarpment, Ionian Sea. The cruise involved two main teams – ISMAR Bologna and Venezia, and the Department of Marine Sciences, Polytechnic University of Marche.

The main operations carried out on the cruise:

- sediment sampling with box corer (26 stations) and piston core (armed in this case, with a 10 or 15 m barrel)
- seismic profiles with Chirp sonar and multi-beam
- hydrological survey: water sampling for physics analysis (TSM, Coulter counter) and biogeochemistry (POC,TNP and isotopic composition of organic matter $\delta^{13}C$ and $\delta^{15}N$) of suspended particulate matter.
- benthic-pelagic coupling

PROJECT (IF APPLICABLE) if the cruise is designated as part of a larger scale cooperative project (or expedition), then enter the name of the project, and of organisation responsible for co-ordinating the project.

Project name: HERMES Hotspot Ecosystem Research on the Margins of European Seas

Coordinating body: NERC-National Oceanography Centre Southampton, UK

PRINCIPAL INVESTIGATORS: Enter the name and address of the Principal Investigators responsible for the data collected on the cruise and who may be contacted for furtherinformation about the data. (The letter assigned below against each Principal Investigator is used on pages 2 and 3, under the column heading 'PI', to identify the data sets for which he/she is responsible)

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SUMMARY OF MEASUREMENTS AND SAMPLES TAKEN

Except for the data already described on page 2 under 'Moorings, Bottom Mounted Gear and Drifting Systems', this section should include a summary of all data collected on the cruise, whether they be measurements (e.g. temperature, salinity values) or samples (e.g. cores, net hauls).

Separate entries should be made for each distinct and coherent set of measurements or samples. Different modes of data collection (e.g. vertical profiles as opposed to underway measurements) should be clearly distinguished, as should measurements/sampling techniques that imply distinctly different accuracy's or spatial/temporal resolutions. Thus, for example, separate entries would be created for i) BT drops, ii) water bottle stations, iii) CTD casts, iv) towed CTD, v) towed undulating CTD profiler, vi) surface water intake measurements, etc.

Each data set entry should start on a new line – it's description may extend over several lines if necessary.

NO, UNITS : for each data set, enter the estimated amount of data collected expressed in terms of the number of 'stations'; miles' of track; 'days' of recording; 'cores' taken; net 'hauls'; balloon 'ascents'; or whatever unit is most appropriate to the data. The amount should be entered under 'NO' and the counting unit should be identified in plain text under 'UNITS'.

PI see page 2	NO see above	UNITS see above	DATA TYPE Enter code(s) from list on cover page	DESCRIPTION Identify, as appropriate, the nature of the data and of the instrumentation/sampling gear and list the parameters measured. Include any supplementary information that may be appropriate, e. g. vertical or horizontal profiles, depth horizons, continuous recording or discrete samples, etc. For samples taken for later analysis on shore, an indication should be given of the type of analysis planned, i.e. the purpose for which the samples were taken.
B	**27**	**station**	**H10, H16, H 21**	**CTD profile, dissolved oxygen, trasmittance**
B	**19**	**station**	**PO1, B71,**	**TSM, POC; $\delta^{13}C$**
A	**7**	**cores**	**G04**	**Gravity core;**
A	**872**	**miles**	**G 75 G 74**	**High resolution subbottom seismic profiles, multybeam swath bathimetry**
C	**26**	**cores**	**G 04 B 71 B 72 B 16 B 18 B 90**	**Box corer sediment sampling for biological measurements: biochemical composition of organic matter, prokaryote C production, enzymatic activities, bacterial, meio and macro-faunal abundance, biomass and diversity**
D	**7**	**cores**	**H 22 H 31 H 32 H 75 H 26 H 27 H 28**	**Box corer sediment sampling for pore water chemistry; resistivity; TOC, grain size, radioactive Pb isotopes**
D	**19**	**cores**	**H 21**	**Box corer sediment sampling for vertical oxygen distribution in sediments**
D	**20**	**cores**	**B 18**	**Box corer sediment sampling for benthic foraminifera analysis**

TRACK CHART: You are strongly encouraged to submit, with the completed report, an annotated track chart illustrating the route followed and the points where measurements were taken.	**Insert a tick( ) in this box if a track chart is supplied**	

GENERAL OCEAN AREA(S): Enter the names of the oceans and/or seas in which data were collected during the cruise – please use commonly recognised names (see, for example, International Hydrographic Bureau Special Publication No. 23, 'Limits of Oceans and Seas').

MEDITERRANEAN SEA EASTERN BASIN: Sicily Strait and Ionian Sea

SPECIFIC AREAS: If the cruise activities were concentrated in a specific area(s) of an ocean or sea, then enter a description of the area(s). Such descriptions may include references to local geographic areas, to sea floor features, or to geographic coordinates.

Please insert here the number of each square in which data were collected from the below given chart

143; 1	**143; 2**
E 10 15	**E 15 20**
N 35 40	**N 35 40**

ANNEX 2: SAMPLING EVENT LOG FILE OF THE CRUISE GELA-05

EVENT	DATE	TIME	W_DEPTH	LONGITUDE (E) (WGS84)	LATITUDE (N) (WGS84)	ACTIVITY
		(UTC)	(m)	(DDMM.XXX)	(DDMM.XXX)	
BC25-1	11/08/2005	12:56	2062.3	1520.465	3650.949	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, meiofauna, macrofauna, grain-size
BC25-2	11/08/2005	15:22	2060.9	1520.483	3650.957	Box core for meiofauna, macrofauna, forams
BC25-3	11/08/2005	17:19	2062.5	1520.479	3650.953	Box core for macrofauna, O_2 sediment profiles
BC09-1	12/08/2005	08:55	606.0	1412.439	3647.024	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, protozoa, meiofauna, macrofauna
BC09-2	12/08/2005	09:51	604.5	1412.449	3647.034	Box core for biochemical composition of OM, viral production, meiofauna, macrofauna
BC09-3	12/08/2005	11:02	606.5	1412.439	3646.996	Box core for macrofauna, grain-size, O_2 sediment profiles
BC08-1	12/08/2005	11:49	447.5	1414.051	3648.317	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, meiofauna, grain-size
BC08-2	12/08/2005	12:17	447.3	1414.050	3648.319	Box core for macrofauna
BC08-3	12/08/2005	12:51	447.8	1414.051	3648.318	Box core for biochemical composition of OM, viral production, protozoa, meiofauna, O_2 sediment profiles
BC12-1	12/08/2005	13:45	499.7	1415.588	3646.892	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, meiofauna, forams
BC12-2	12/08/2005	14:14	498.7	1415.590	3646.910	Box core for macrofauna
BC12-3	12/08/2005	14:54	499.6	1415.594	3646.908	Box core for biochemical composition of OM, grain-size, O_2 sediment profiles
BC10-1	13/08/2005	06:26	807.3	1409.412	3644.525	Box core for macrofauna, forams
BC10-2	13/08/2005	07:15	806.4	1409.388	3644.527	Box core for bacteria, virus, EA, prokaryote C production, meiofauna, pore water chemistry, resistivity, TOC, ^{210}Pb isotopes
BC10-3	13/08/2005	08:18	806.0	1409.371	3644.549	Box core for biochemical composition of OM, protozoa, meiofauna, O_2 sediment profiles
BC10-4	13/08/2005	08:48	806.8	1409.405	3644.532	Box core for biochemical composition of OM, meiofauna
BC22-1	13/08/2005	14:01	760.1	1413.755	3641.659	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, meiofauna
BC22-2	13/08/2005	14:40	759.0	1413.758	3641.643	Box core for biochemical composition of OM, meiofauna
BC22-3	13/08/2005	15:28	758.5	1413.772	3641.663	Box core for macrofauna, O_2 sediment profiles
BC11-1	14/08/2005	08:46	219.7	1416.635	3647.590	Box core for macrofauna
BC11-2	14/08/2005	09:13	221.2	1416.611	3647.587	Box core for viral production, forams, pore water chemistry, resistivity, TOC, ^{210}Pb isotopes, O_2 sediment profiles
BC11-3	14/08/2005	10:24	215.1	1416.622	3647.606	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, protozoa, meiofauna, grain-size
BC11-4	14/08/2005	10:50	220.0	1416.619	3647.590	Box core for biochemical composition of OM, meiofauna
BC19-1	14/08/2005	11:31	183.1	1419.047	3646.138	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, meiofauna
BC19-2	14/08/2005	12:04	183.1	1419.042	3646.153	Box core for biochemical composition of OM, meiofauna, grain-size
BC19-3	14/08/2005	12:32	182.7	1419.044	3646.151	Box core for macrofauna, O_2 sediment profiles

BC20-1	14/08/2005	13:01	337.2	1418.099	3645.298	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, meiofauna, O_2 sediment profiles
BC20-2	14/08/2005	13:33	339.7	1418.098	3645.300	Box core for biochemical composition of OM, meiofauna, grain-size
BC20-3	14/08/2005	14:11	336.0	1418.114	3645.292	Box core for macrofauna
EVENT	DATE	TIME	W_DEPTH	LONGITUDE (E) (WGS84)	LATITUDE (N) (WGS84)	ACTIVITY
		(UTC)	(m)	(DDMM.XXX)	(DDMM.XXX)	
BC13-2	15/08/2005	07:35	617.2	1413.921	3645.961	Box core for biochemical composition of OM, meiofauna, pore water chemistry, resistivity, TOC, ^{210}Pb isotopes, O_2 sediment profiles
BC13-3	15/08/2005	09:51	619.8	1413.918	3645.930	Box core for macrofauna
BC13-4	15/08/2005	10:24	614.9	1413.901	3645.945	Box core for bacteria, virus, EA, prokaryote C production, protozoa, meiofauna
BC21-1	15/08/2005	11:43	603.2	1416.648	3644.104	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, meiofauna, grain-size
BC21-2	15/08/2005	12:19	604.2	1416.626	3644.099	Box core for macrofauna
BC21-3	15/08/2005	12:43	604.2	1416.631	3644.107	Box core for biochemical composition of OM, meiofauna, O_2 sediment profiles
BC05-1	16/08/2005	06:18	620.9	1410.280	3647.588	Box core for bacteria, virus, EA, prokaryote C production, viral production, meiofauna, forams
BC05-2	16/08/2005	06:56	620.0	1410.282	3647.582	Box core – NO RECOVERY
BC05-3	16/08/2005	07:25	622.0	1410.289	3647.559	Box core for biochemical composition of OM, meiofauna, grain-size, pore water chemistry, resistivity, TOC, ^{210}Pb isotopes
BC05-4	16/08/2005	08:10	620.7	1410.270	3647.579	Box core for macrofauna, O_2 sediment profiles
BC05-5	16/08/2005	09:19	619.1	1410.279	3647.588	Box core for biochemical composition of OM, meiofauna
BC04-1	16/08/2005	10:09	584.1	1411.096	3648.336	Box core for bacteria, virus, EA, prokaryote C production, viral production, meiofauna, forams, O_2 sediment profiles
BC04-2	16/08/2005	10:48	584.7	1411.082	3648.332	Box core for biochemical composition of OM, meiofauna
BC04-3	16/08/2005	11:20	584.3	1411.080	3648.331	Box core for macrofauna
BC03-1	16/08/2005	12:07	543.3	1411.864	3649.010	Box core for macrofauna
BC03-2	16/08/2005	12:42	543.5	1411.833	3649.016	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, viral production, meiofauna, forams
BC03-3	16/08/2005	13:15	543.6	1411.848	3649.011	Box core for biochemical composition of OM, meiofauna, grain-size, O_2 sediment profiles
BC02-1	16/08/2005	14:25	381.2	1413.079	3650.151	Box core for macrofauna, O_2 sediment profiles
BC02-2	16/08/2005	14:38	381.2	1413.075	3650.155	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, viral production, meiofauna, forams
BC02-3	16/08/2005	15:05	401.9	1413.077	3650.149	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, meiofauna, grain-size
CTD_01	16/08/2005	17:51	217	1413.608	3650.598	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
BC01-1	17/08/2005	06:17	216.8	1413.585	3650.641	Box core for bacteria, virus, EA, prokaryote C production, viral production, meiofauna, forams, pore water chemistry, resistivity, TOC, ^{210}Pb isotopes, O_2 sediment profiles
BC01-2	17/08/2005	06:43	219.0	1413.575	3650.610	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, meiofauna
BC01-3	17/08/2005	07:05	219.6	1413.566	3650.610	Box core for macrofauna

BC01-4	17/08/2005	07:25	219.2	1413.559	3650.630	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production
C_1	17/08/2005	11:31	637.5	1409.806	3647.579	Gravity core, barrel 6 m, penetration 3.7 m, recovery 2.27 m
C_2	17/08/2005	13:11	199.6	1416.659	3647.877	Gravity core, barrel 6 m, penetration 5.35 m, recovery 2.42 m
C_3	17/08/2005	14:48	626.8	1413.889	3645.779	Gravity core, barrel 6 m, penetration 5 m, recovery 2.88 m
BC14-1	17/08/2005	15:31	720.1	1412.568	3644.678	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, viral production, protozoa, meiofauna, forams
BC14-2	17/08/2005	16:10	724.8	1412.575	3644.661	Box core for biochemical composition of OM, meiofauna, grain-size
EVENT	DATE	TIME	W_DEPTH	LONGITUDE (E) (WGS84)	LATITUDE (N) (WGS84)	ACTIVITY
		(UTC)	(m)	(DDMM.XXX)	(DDMM.XXX)	
CTD_10	17/08/2005	18:06	806	1409.405	3644.532	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
CTD_06	17/08/2005	19:06	672	1409.254	3646.624	CTD, O_2, trasmittance
CTD_18	17/08/2005	20:15	786	1403.451	3646.685	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
CTD_17	17/08/2005	21:26	587	1407.269	3649.833	CTD, O_2, trasmittance
CTD_16	17/08/2005	22:10	392	1409.623	3651.854	CTD, O_2, trasmittance
CTD_15	17/08/2005	22:46	184	1411.355	3653.372	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
CTD_02	17/08/2005	23:34	390	1413.023	3650.167	CTD, O_2, trasmittance
CTD_05	18/08/2005	01:33	622	1410.284	3647.589	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
CTD_09	18/08/2005	02:35	605	1412.441	3647.026	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
CTD_08	18/08/2005	03:26	443	1414.056	3648.363	CTD, O_2, trasmittance
CTD_07	18/08/2005	04:25	210	1416.301	3648.286	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
CTD_11	18/08/2005	04:48	209	1416.627	3647.613	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
CTD_12	18/08/2005	05:22	498	1415.604	3646.926	CTD, O_2, trasmittance
CTD_04	18/08/2005	05:41	580	1411.097	3648.352	CTD, O_2, trasmittance
BC07-1	18/08/2005	06:08	221.5	1415.716	3649.727	Box core for bacteria, virus, EA, prokaryote C production, viral production, meiofauna, forams, O_2 sediment profiles
BC07-2	18/08/2005	06:31	222.3	1415.735	3649.705	Box core for biochemical composition of OM, protozoa, meiofauna, pore water chemistry, resistivity, TOC, ^{210}Pb isotopes, O_2 sediment profiles
BC07-3	18/08/2005	06:51	223.8	1415.721	3649.708	Box core for macrofauna
BC07-4	18/08/2005	07:12	228.2	1415.731	3649.670	Box core for biochemical composition of OM, meiofauna
C_4	18/08/2005	11:39	206.6	1413.830	3650.651	Piston core, barrel 10 m, penetration 10.6m, recovery 9.35 m
CTD_03	18/08/2005	12:11	544	1411.834	3649.029	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
C_5	18/08/2005	16:00	143.7	1421.445	3645.042	Piston core, barrel 10 m, penetration 7.10 m, recovery 6.44 m
CTD_19	18/08/2005	18:55	182	1419.049	3646.160	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
CTD_20	18/08/2005	19:31	330	1418.111	3645.314	CTD, O_2, trasmittance
CTD_21	18/08/2005	20:18	598	1416.716	3644.122	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
CTD_22	18/08/2005	21:24	768	1413.806	3641.671	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$

CTD_14	18/08/2005	22:25	731	1412.602	3644.745	CTD, O_2, trasmittance
CTD_13	18/08/2005	23:30	636	1413.916	3645.789	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
BC06-1	19/08/2005	06:32	672.4	1409.228	3646.638	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, viral production, meiofauna, forams
BC06-2	19/08/2005	07:18	672.5	1409.273	3646.632	Box core for macrofauna
BC06-3	19/08/2005	07:38	672.5	1409.216	3646.683	Box core for biochemical composition of OM, meiofauna
BC18-1	19/08/2005	09:08	786.1	1403.440	3646.681	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, viral production, meiofauna, forams
BC18-2	19/08/2005	10:01	786.8	1403.461	3646.652	Box core for biochemical composition of OM, meiofauna
BC18-3	19/08/2005	10:27	785.7	1403.462	3646.669	Box core for macrofauna
BC17-1	19/08/2005	11:52	588.6	1407.243	3649.813	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, viral production, meiofauna, forams
BC17-2	19/08/2005	12:23	589.4	1407.260	3649.820	Box core for macrofauna
EVENT	DATE	TIME	W_DEPTH	LONGITUDE (E) (WGS84)	LATITUDE (N) (WGS84)	ACTIVITY
		(UTC)	(m)	(DDMM.XXX)	(DDMM.XXX)	
BC15-1	19/08/2005	13:52	183.1	1411.345	3653.386	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, viral production, meiofauna, forams
BC15-2	19/08/2005	14:13	183.2	1411.370	3653.377	Box core for macrofauna
BC15-3	1908/2005	14:33	183.2	1411.351	3653.388	Box core for biochemical composition of OM, meiofauna, grain-size
BC16-1	20/08/2005	06:15	392.5	1409.631	3651.857	Box core for macrofauna, O_2 sediment profiles
BC16-2	20/08/2005	06:40	391.6	1409.645	3651.849	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, viral production, meiofauna, forams, pore water chemistry, resistivity, TOC, ^{210}Pb isotopes
BC16-3	20/08/2005	07:03	391.2	1409.650	3651.850	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, meiofauna
BC16-4	20/08/2005	07:26	390.0	1409.648	3651.852	Box core for grain-size, meiofauna
C_6	20/08/2005	08:51	670.9	1408.472	3647.693	Piston core, barrel 10 m, penetration 11 m, recovery 7.72 m
C_7	20/08/2005	13:49	680.6	1407.486	3647.778	Piston Core, barrel 15 m, penetration 15 m, recovery 11.61 m
BC24-1	21/08/2005	10:19	1262.8	1520.318	3652.283	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, meiofauna, forams
BC24-2	21/08/2005	11:13	1260.6	1520.334	3652.291	Box core for macrofauna
BC24-3	21/08/2005	12:06	1259.2	1520.314	3652.297	Box core for biochemical composition of OM, meiofauna, grain-size
BC23-1	21/08/2005	13:17	607.4	1516.401	3654.009	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, meiofauna, forams, O_2 sediment profiles
BC23-2	21/08/2005	14:01	608.3	1516.399	3654.007	Box core for macrofauna
BC23-3	21/08/2005	14:36	607.1	1516.421	3654.023	Box core for biochemical composition of OM, meiofauna, grain-size
CTD_30	21/08/2005	15:24	300	1514.249	3654.661	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
CTD_29	21/08/2005	17:31	1001	1516.949	3653.205	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
CTD_24	21/08/2005	18:59	1261	1520.330	3652.287	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$

CTD_25	21/08/2005	21:18	2081	1520.792	3650.799	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
CTD_26	21/08/2005	22:17	2284	1521.742	3649.068	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$
BC26-1	22/08/2005	06:28	2325.1	1521.748	3649.061	Box core for biochemical composition of OM, bacteria, virus, EA, prokaryote C production, meiofauna, forams, grain-size
BC26-2	22/08/2005	07:48	3591.8	1521.755	3649.065	Box core for macrofauna
BC26-3	22/08/2005	09:14	2312.1	1521.731	3649.064	Box core for biochemical composition of OM, meiofauna
CTD_23	22/08/2005	11:13	618	1516.415	3653.994	CTD, O_2, trasmittance, particulate sampling for TSM, POC, $\delta^{13}C$