PIPELINE RECONNAISSANCE SURVEY

Gas Pipeline Interconnection

Malta-Italy Project

FINAL REPORT

Environmental Campaigns

Co-financed by the European Union
Connecting Europe Facility

GAS PIPELINE INTERCONNECTION MALTA-ITALY

PRELIMINARY MARINE ROUTE SURVEY

Produced by : Lighthouse S.p.A. - Bologna - Italy

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0.0 **DEFINITIONS AND ABBREVIATIONS**

1.1.0 Definitions

CLIENT: Maltese Ministry for Energy and Water Management

CONTRACTOR: LIGHTHOUSE S.p.A.

1.2.0 Abbreviations

Table 1.1 – Acronyms and definitions

m b.s.l.	Metres Below Sea Level
BC	Box Core
BTEX	Benzene, Ethylbenzene, Styrene, Toluene, Xylene
°C	Degree Celsius
CM	Central Meridian
CTD	Conductivity, Temperature, Depth
DCC	Distance Cross Course
µg/mg/g	Microgram/Milligram/Gram
GWP	Work Procedure(s)
HSE	Health, Safety and Environment
ICPC	International Cable Protection Commitee
IDP	Identifier of Project
KP	Kilometre Post
l	Liter
LoD	Limit of Detection
m	Metre
MPN	Most Probable Number
M.T.B.E.	metil-*t*-butil etere
nm	Nautical Mile
NTU	Nephelometric Turbidity Units
PAHs	Polyaromatic hydrocarbons
PCB	Polychlorobyphenils
PEP	Project Execution Plan
ppt	Parts per Thousand
R/V	Research Vessel
ROV	Remote Operating Vehicle
THMs	Trihalomethanes
UTM	Universal Transverse Mercator
w.d./wd	Water Depth

2.0.0 **GENERAL CONSIDERATIONS**

The company **Lighthouse S.p.A** of Bologna – was entrusted by **Maltese Ministry for Energy and Water Management** to perform a reconnaissance geophysical investigation in the Sicily Strait area, located between Italy and Malta.

2.1.0 Introduction

The scope of this phase of the Pipeline Reconnaissance Marine Survey (PRMS) is to collect a total of 60 environmental samples and to show the results within the present report, in order to examine the suitability and feasibility of a 22" gas pipeline between Italy (Gela) and Malta (Delimara) (Figure 2.1).

Overview of the survey corridor is presented in Figure 2.1.

The environmental campaign was carried out with two different Vessels. Odin Finder for the offshore section and Bellatrix for Gela nearshore. The latter was performed following obtainment of permits from Italian authorities, specifically from Ente Gestore Riserva Naturale Biviere di Gela.

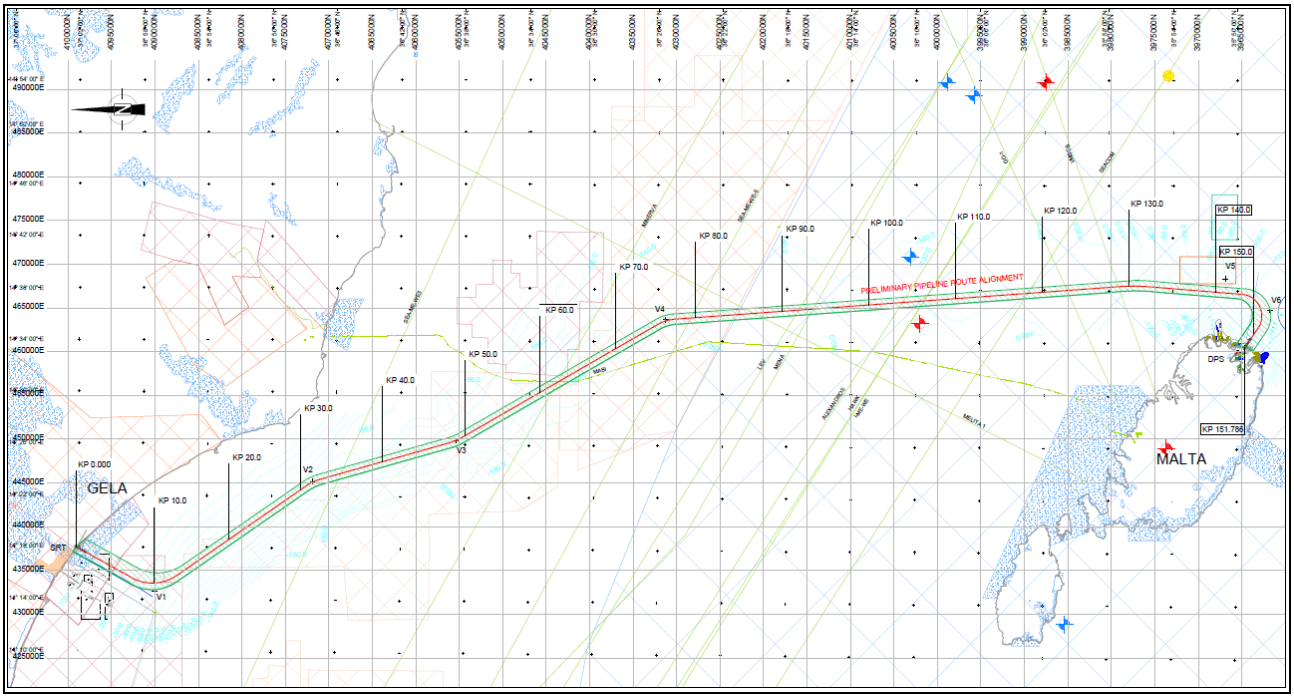


Figure 2.1 - Overview of reconnaissance survey route

2.2.0 Scope of Work

This report summarises the data collected during the environmental campaign, describing the methodologies and providing an assessment of the results obtained after laboratory analyses.

The main scope of this report includes an assessment of the physical, biological and chemical characteristics of sediments and water samples collected within the route corridor and analysed in laboratory. The purpose of this phase is also to collect data to aid successive phases of the project, such as environmental permitting and FEED.

The information presented within this report is related to the sediment and water samples collected at the locations summarised in section 2.3.0.

2.3.0 Environmental sampling locations

The exact coordinates of the sediment and water sampling locations are defined in Table 2.1 and Table 2.2 for the Italian side of the route and in Table 2.3 and Table 2.4 for the Maltese side.

In Figure 4.1 and Figure 4.2 all real sampling locations are shown.

(doc. Ref. MEW001b_GEOTECHNICAL_ENVIRONMENTAL_PEP_REV.06)

The blocks division has been defined based upon the following boundaries:

- Block 1 Maltese nearshore
- Block 2 Maltese 12nm limit
- Block 3 Maltese Territorial waters
- Block 4 Italian Territorial waters
- Block 5 Italian 12nm limit
- Block 6 Italian nearshore

As shown in Figure 2.2 below.

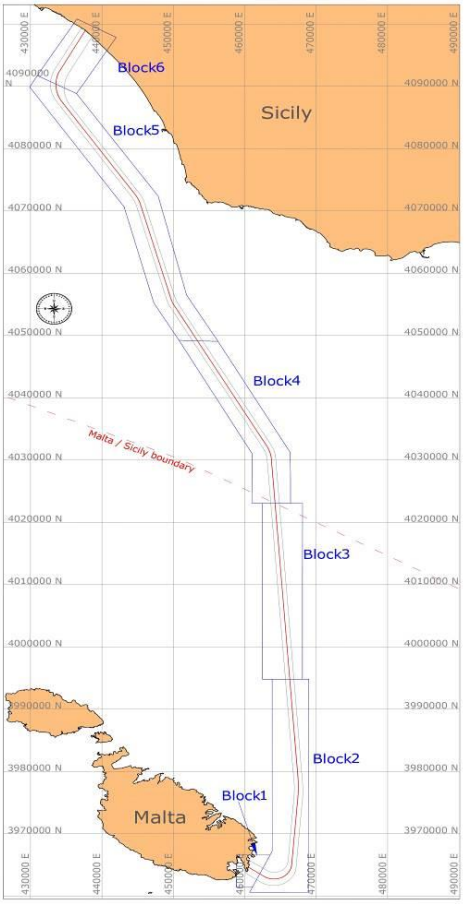


Figure 2.2 – Block division along survey route

Table 2.1 – Real coordinates of Italian sediment locations

BLOCK	AREA	EASTING	NORTHING	SEDIMENT SAMPLING	DATE
BLOCK 6	AREA 2	437399.58	4098463.35	MEW001d_R00	17/08/2019
		437116.30	4098594.42	MEW001d_R01	17/08/2019
		437053.87	4098195.68	MEW001d_R02	17/08/2019
		436896.39	4098588.71	MEW001d_S21	12/08/2019
		437176.64	4098066.94	MEW001d_S22	16/08/2019
		437479.18	4097565.19	MEW001d_S23	13/08/2019
		438057.04	4097592.55	MEW001d_S24	13/08/2019
		436750.45	4098326.81	MEW001d_S25	14/08/2019
		437043.75	4097813.17	MEW001d_S26	16/08/2019
		437352.18	4097324.02	MEW001d_S27	13/08/2019
		437914.28	4097335.79	MEW001d_S28	13/08/2019
		436621.56	4098087.99	MEW001d_S29	14/08/2019
		436886.35	4097544.14	MEW001d_S30	16/08/2019
		437200.26	4097093.24	MEW001d_S31	13/08/2019
		437758.83	4097065.96	MEW001d_S32	13/08/2019
		436458.81	4097800.62	MEW001d_S33	12/08/2019
		436736.58	4097291.07	MEW001d_S34	15/08/2019
		437047.04	4096768.1	MEW001d_S35	13/08/2019
		437620.39	4096807.35	MEW001d_S36	12/08/2019
	AREA 3	435553.90	4095405.27	MEW001d_S37	14/08/2019
		436457.90	4096636.74	MEW001d_S38	15/08/2019
		436835.83	4096427.33	MEW001d_S39	15/08/2019
		435903.15	4094732.02	MEW001d_S40	14/08/2019
	AREA 4	433768.77	4091732.06	MEW001b_S01	08/03/2019
BLOCK 5		436171.28	4084948.47	MEW001b_S02	08/03/2019
		441837.7	4076707.02	MEW001b_S03	08/03/2019
		444673.43	4072588.95	MEW001b_S04	09/03/2019
		447422.56	4063864.66	MEW001b_S05	09/03/2019
		448764.5	4059059	MEW001b_S06	09/03/2019
		450803.83	4053626.7	MEW001b_S07	09/03/2019
BLOCK 4		455781.9	4044954.08	MEW001b_S08	09/03/2019
		460760.94	4036281.48	MEW001b_S09	09/03/2019
		463954.85	4027024.4	MEW001b_S10	09/03/2019

Table 2.2 - Real coordinates of Italian water locations

BLOCK	AREA	EASTING	NORTHING	SEDIMENT SAMPLING	DATE
BLOCK 6	AREA 2	436891.4	4098578.33	MEW001d_W21	12/08/2019
		437180.01	4098080.50	MEW001d_W22	13/08/2019
		437467.67	4097571.25	MEW001d_W23	12/08/2019
		438061.34	4097596.27	MEW001d_W24	13/08/2019
		436748.59	4098316.87	MEW001d_W25	13/08/2019
		437029.14	4097820.93	MEW001d_W26	12/08/2019
		437358.45	4097318.02	MEW001d_W27	12/08/2019
		437918.53	4097331.68	MEW001d_W28	12/08/2019
		436613.96	4098081.86	MEW001d_W29	13/08/2019
		436887.14	4097549.74	MEW001d_W30	12/08/2019
		437200.29	4097086.71	MEW001d_W31	11/08/2019
		437769.09	4097060.92	MEW001d_W32	12/08/2019
		436461.74	4097800.33	MEW001d_W33	12/08/2019
		436738.32	4097283.85	MEW001d_W34	11/08/2019
		437039.05	4096766.81	MEW001d_W35	11/08/2019
		437610.15	4096801.3	MEW001d_W36	12/08/2019
	AREA 3	435552.44	4095413.99	MEW001d_W37	11/08/2019
		436467.95	4096626.04	MEW001d_W38	11/08/2019
		436838.62	4096429.55	MEW001d_W39	11/08/2019
		435903.81	4094738.14	MEW001d_W40	11/08/2019
	AREA 4	433769.90	4091732.12	MEW001b_W01	08/03/2019
BLOCK 5		436170.11	4084948.85	MEW001b_W02	08/03/2019
		441839.18	4076710.02	MEW001b_W03	08/03/2019
		444671.47	4072590.15	MEW001b_W04	09/03/2019
		448764.93	4059058.31	MEW001b_W05	09/03/2019
		448962.43	4058358.81	MEW001b_W06	09/03/2019
		450803.50	4053626.67	MEW001b_W07	09/03/2019
BLOCK 4		455781.80	4044954.69	MEW001b_W08	09/03/2019
		460759.75	4036281.29	MEW001b_W09	09/03/2019
		463955.73	4027024.05	MEW001b_W10	09/03/2019

Table 2.3 – Real coordinates of Maltese sediment locations

BLOCK	AREA	EASTING	NORTHING	SEDIMENT SAMPLING	DATE
BLOCK 3		464680.46	4017049.03	MEW001b_S11	09/03/2019
		465404.24	4007076.4	MEW001b_S12	09/03/2019
		466096.11	3997550.51	MEW001b_S13	09/03/2019
BLOCK 2		466469.82	3992403.05	MEW001b_S14	09/03/2019
		467052.43	3984397.35	MEW001b_S15	01/05/2019
		467387.28	3979856.43	MEW001b_S16	01/05/2019
		467329.20	3974499.16	MEW001b_S17	01/05/2019
		466947.12	3969777.70	MEW001b_S18	30/04/2019
		466520.38	3964718.12	MEW001b_S19	30/04/2019
BLOCK 1	AREA 2	461203.77	3964163.10	MEW001b_S20	29/04/2019

Table 2.4 - Real coordinates of Maltese water locations

BLOCK	AREA	EASTING	NORTHING	WATER SAMPLING	DATE
BLOCK 3		466097.30	3997549.43	MEW001b_W11	10/03/2019
BLOCK 2		467051.68	3984396.58	MEW001b_W12	01/05/2019
		467387.58	3979856.47	MEW001b_W13	01/05/2019
		466947.61	3969776.94	MEW001b_W14	30/04/2019
BLOCK 1	AREA 2	461202.96	3964162.68	MEW001b_W15	29/04/2019

2.4.0 Survey Geodetic System

The work was conducted, processed and reduced using the following geodetic parameters (Table 2.5).

Table 2.5– Geodetic data and projection parameters

GEODETIC PARAMETERS	
Datum	World Geodetic System 1984 (WGS84)
Reference Ellipsoid	World Geodetic System 1984 (WGS84)
Semi-major Axis (a)	6 378 137.000m
Semi-minor Axis (b)	6 356 752.314m
Inverse Flattening (1/f)	298.2572236
First eccentricity squared (e2)	6.69437999014x10−3
PROJECTION PARAMETERS	
Projection method	UTM 33N
Latitude Origin	0
Central Meridian (CM)	15°E
False East	500000m
False North	0m
Scale factor	0.9996
Units	metres

2.5.0 Personnel

Table 2.6 – Project management team

PROJECT DIRECTOR	S. SANDRONI
PROJECT MANAGER	E. LOZZA
HSE MANAGER	G. CALVISI
PROCESSING DEPARTMENT MANAGER	M. BERNARDI

Table 2.7 – R/V ODIN FINDER and Bellatrix - onboard personnel

PARTY CHIEF	B. TRANQUILLO A.RICCI
SURVEYORS	M. BASCIANO M. MADDALENA
ENV SPECIALISTS/GEOLOGISTS	M. CARLUCCI/ C.PANI C. CORREALE/H. NAJJAR
CLIENT REPRESENTATIVE	B. FABBRI

Table 2.8 – Onshore personnel

DATA INTERPRETATION, PROCESSING AND FINAL REPORT PRODUCTION	M. BOVE C. CORREALE H. NAJJAR F. PECCIARINI A. RICCHI C.PANI
PROCESSING SUPERINTENDENT	M. BOVE

2.6.0 Time Schedule

The main survey activities performed during the environmental survey are summarised in the table below (Table 2.9).

Table 2.9 – Time schedule

OFFSHORE CORRIDOR and MALTA / ODIN FINDER	
Date	Activity
05/03/2019-07/03/2019	Vessel at Licata harbour - Mobilization Environmental equipment
08/03/2019	Vessel sails to work area and starts working
12/03/2019-15/03/2019	Stand by weather
16/03/2019	Restart working – Stand by weather
17/03/2019	Restart working – Moving to Marsaxlokk harbour
17/03/2019-18/03/2019	Stand by waiting permit work
19/03/2019	Stand by waiting permit work – Moving to Licata harbour – Stand by weather
20/03/2019-23/03/2019	Stand by weather
24/03/2019	Arriving to Marsaxlokk port - Restart working – Moving to Licata port
25/03/2019-28/03/2019	Arriving to Licata port – Demobilization CPT
29/03/2019-16/04/2019	Vessel moored at Licata port - Waiting to resume operations
17/04/2019	Mobilization ROV – Moving to working area
18/04/2019	Restart working – Move to Licata port
19/04/2019	Stand by weather in Licata port
20/04/2019-27/04/2019	Stand by weather – Transit to Marsaxlokk
28/04/2019-01/05/2019	Restart working
01/05/2019	Survey completed – Transit to Licata port
02/05/2019	Demobilization Environmental equipment
NEARSHORE GELA / BELLATRIX	
08/08/2019	Vessel Bellatrix available in Licata port. All equipment embarked on board from shipyard
09/08/2019	Installation of survey equipment on M/V Bellatrix and dry test.
10/08/2019	MOB activities
11/08/2019	Vessel moves to location 40 Samples W40, W37, W39, W38, W35, W34 and W31 with Niskin and CTD probe Bellatrix moves to pier. Daily operation completed
12/08/2019	ARPA Rep. o/b M/N Vessel moves to working area, location 33. Samples 33, 21 and 36 with Niskin CTD probe and Van Veen grab Samples 30, 27, 32, 28, 23 and 26 with Niskin and CTD probe End of daily operation.
13/08/2019	Vessel moves to working area, location 29. Samples 29, 25, and 22 with Niskin and CTD probe Sample 24 with Niskin CTD probe and Van Veen grab Samples 28, 23, 27, 32, 31 and 35 with Van Veen grab Vessel moored at Gela pier for weather standby.
14/08/2019	Vessel moves to working area, location 37 Samples 37, 40, 29 and 25 with Van Veen grab

	Vessel moored at Gela pier for weather standby
15/08/2019	Vessel moves to working area, location 39 Samples 39, 38 and 34 with Van Veen grab Vessel moored at Gela pier for weather standby
16/08/2019	Vessel moves to working area, location 30 Samples 30, 26 and 22 with Van Veen grab Samples 21, 25, 29, 33, 30, 26, 22, 23, 24, 28, 27, 32, 36, 40, 37, 38, 39, 35, 31 and 34 sampling with plankton net. Vessel moored at Gela pier for weather standby
17/08/2019	Vessel moves to working area, location 00 coastal sampling Samples R00, R01 and R02 with Van Veen grab Environmental survey completed, vessel heading to Licata port for DEMOB. Start DEMOB at Licata port.
18/08/2019 – 20/08/2019	DEMOB

3.0.0 **EQUIPMENTS AND METHODS**

The following sections describe how the operations for the collection of both sediments and waters have been planned in the different sections of the corridor.

The characteristics of the equipment used are described, as well as the on board inspections carried out.

Further details can be found in APPENDIX 1: Daily Reports, detailing the on-board operations, while APPENDIX 5: SEDIMENT SAMPLING REGISTER TABLE and APPENDIX 6: WATER SAMPLING REGISTER TABLE report the "Sample Register Notes", where code of the sample, kind of the sample, preparation and storage conditions are reported.

3.1.0 Equipment

Physical profiling of the water column has been achieved by means of the multi-parametric probe YSI 6600V2 (Figure 3.1):

Figure 3.1 – Multi parametric probe YSI 6600V2

Transparency was measured by means of a Secchi's Disk (Figure 3.2):

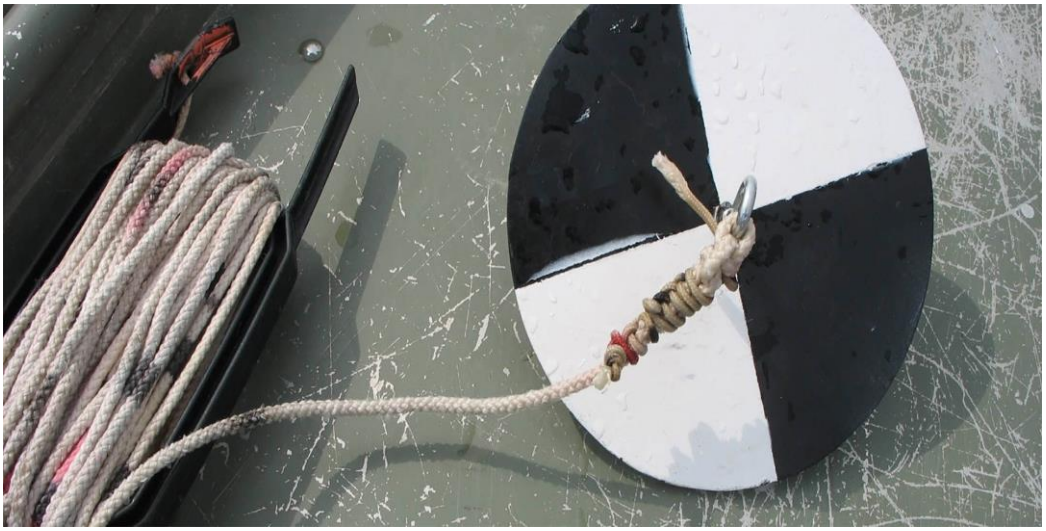


Figure 3.2 – Secchi Disk

Water samples have been collected with 4 Niskin bottles, 5 litres each one, set up in series of individual bottles (Figure 3.3). Every bottle has been dedicated to a sampling depth according to SOW.

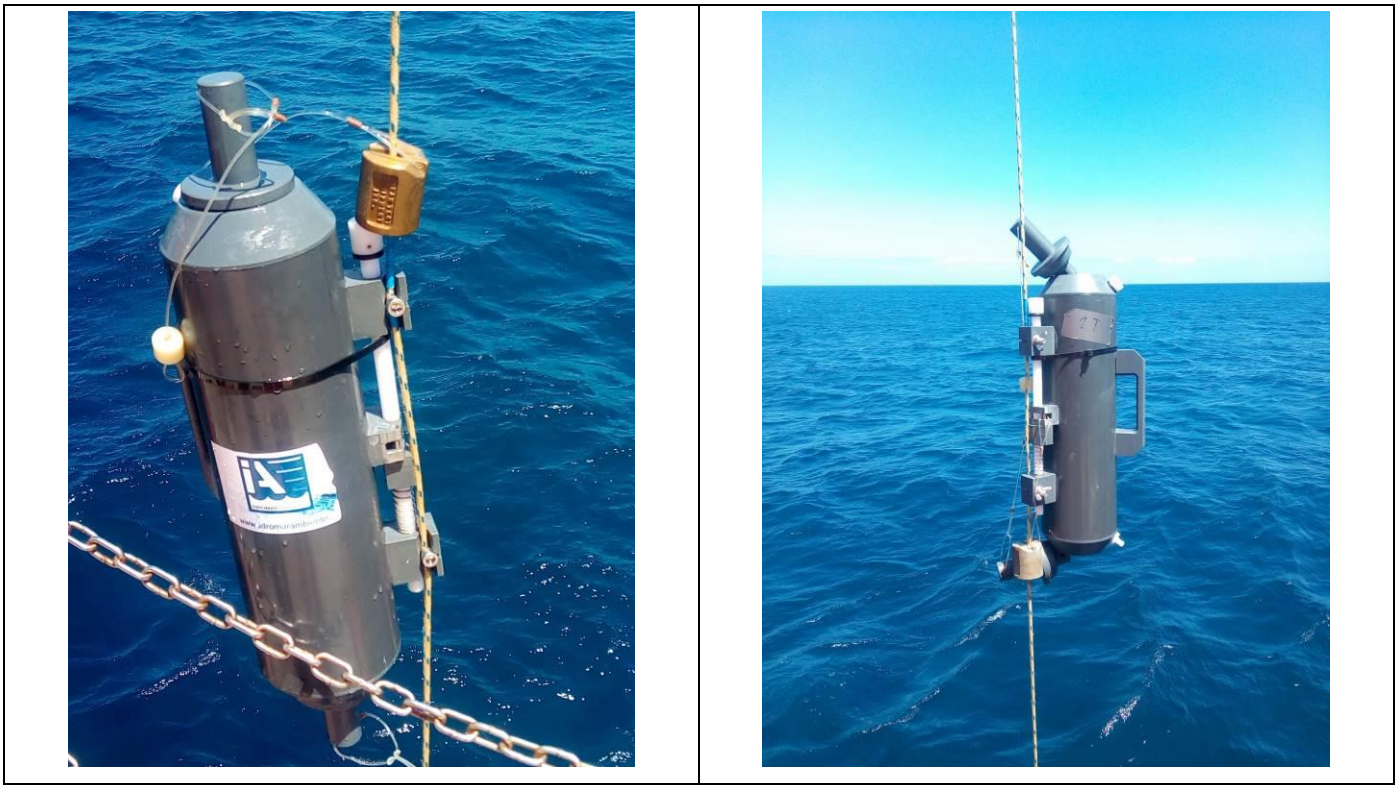


Figure 3.3 – Niskin bottles set up in series

Zooplankton samples were collected by means of a WP2 plankton net, with a mesh size of 200µm and mouth opening of 57cm.

Phytoplankton were collected in Maltese waters by means of a WP2 plankton net (Figure 3.4), with a mesh size of 20µm and mouth opening of 40cm.

Figure 3.4 – WP2 Plankton net

Sediment sampling has been performed by means of a box-corer type RENO Box Corer (box sampling: 32cm x 32cm x 50cm) (Figure 3.5) and Van Veen Grab for the nearshore Gela sampling (Figure 3.6).

Figure 3.5 - RENO Box Corer

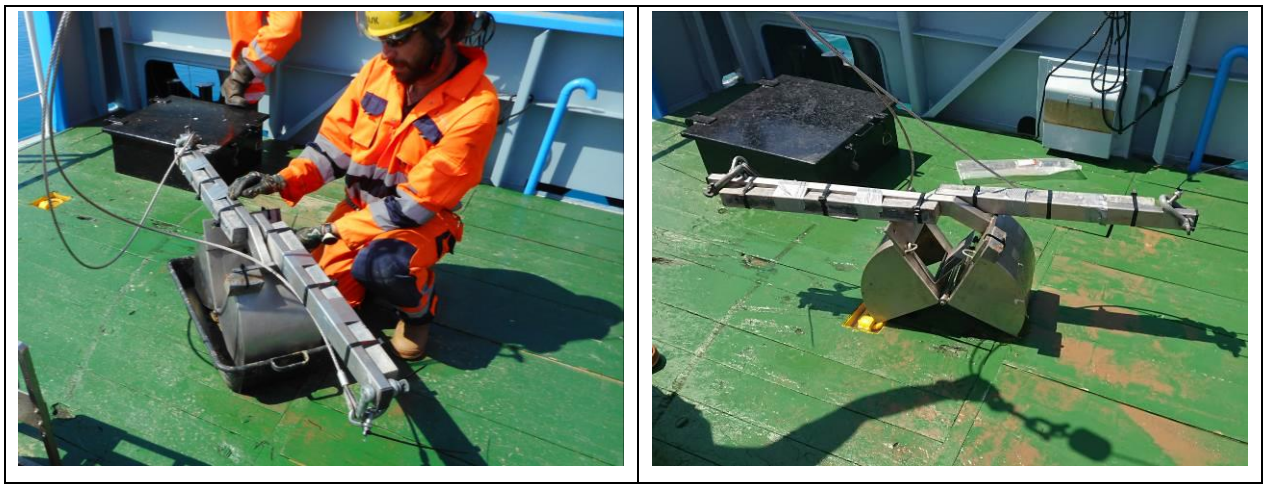


Figure 3.6 – Van Veen Grab

Measures of pH and Temperature have been obtained by means of a portable meter (Eutech PC650) (Figure 3.7):

Figure 3.7 – Portable meter (Eutech PC650)

It is to be noted that a sieve was used to isolate the Benthos, in accordance with the standard ISO 16665:2014. A sieve with a mesh opening of 0.5mm has been used (Figure 3.8).

Figure 3.8 – Sieve for benthos washing

3.2.0 Italy (Territorial waters) Sediment Stations

At stations MEW001b_S1-S10 the samplings have been performed, inspected and labelled as follows:

Sediment samples collected by means of RENO Box corer (sampling volume: 32 x 32 x 50cm), for the determination of physical and chemical parameters.

For each station, after the recovery of the box, an inspection of the sample has been performed to verify its quality. Then the below operations have been made:

- ✓ picture of the sample;
- ✓ measures of pH (pH unit) and T (°C);
- ✓ description of the sediments (textural description, colour, presence or absence of shell fragments/organic matter/macrofauna).

The labels of each sediment sample have been organized as explained below:

- ✓ MEW001b_#_A_#Q1;
- ✓ MEW001b_#_A_#Q2a/b;
- ✓ MEW001b_#_A_#SB;

in which:

- MEW001b: code of the project;
- #: locations (from S1 to S10);
- A: replicate (only one);
- Q: sub-sample for sediment quality analysis;
- SB: sub-sample for SRB (sulfate reducing bacteria) analysis;
- 1: container type (glass vial);
- 2: container type (glass jar);
- a: first container;
- b: second container.

Measurements of pH and Temperature were performed at each station, by means of a portable meter (Eutech PC650) at a depth of 6cm from the top of the sediment surface.

3.3.0 Maltese waters – Sediment Stations

At stations MEW001b_S11-S20 the samplings have been performed, inspected and labelled as follows:

Sediment samples were collected by means of RENO Box corer (sampling volume: 32 x 32 x 50cm), for the determination of physical, chemical and biological features. In particular the macro-benthos has been separated using a mesh with 0.5mm opening and the retained organisms have been fixed with a 10% of formalin solution.

For each station, after the recovery of the box, an inspection of the sample has been performed to verify its quality. Then the below operations have been made:

- ✓ picture of the sample;
- ✓ measures of pH (pH unit) and T (°C);
- ✓ description of the sediments (textural description, colour, presence or absence of shell fragments/organic matter/macrofauna).

The labels of each sediment sample have been organized as explained below:

- ✓ MEW001b_A/B/C_#_#G;
- ✓ MEW001b_A/B/C_#_#Q1;
- ✓ MEW001b_A/B/C_#_#Q2a/b;
- ✓ MEW001b_A_#_#SB;

in which:

- MEW001b: code of the project;
- #: locations (from S11 to S20);
- G: sub-samples for macro benthos analyses;
- A/B/C: replicates;
- Q: sub-sample for sediment quality analysis;
- SB: sub-sample for SRB (sulfate reducing bacteria) analysis;
- 1: container type (glass vial);
- 2: container type (glass jar);
- a: first container;
- b: second container.

Measurements of pH and Temperature were performed at each station, by means of a portable meter (Eutech PC650) at a depth of 6cm from the top of the sediment surface.

3.4.0 Nearshore Gela (Sediment Stations)

At stations MEW001d_S21-S40 and at MEW001d_R00-R02 (added stations for benthos analyses) the samplings have been performed, inspected and labelled as follows:

Sediment samples collected by means of Van Veen Grabs, for the determination of physical and chemical parameters.

For each station, after the recovery of the box, an inspection of the sample has been performed to verify its quality. Then the below operations have been made:

- ✓ picture of the sample;
- ✓ measures of pH (pH unit) and T (°C);
- ✓ description of the sediments (textural description, colour, presence or absence of shell fragments/organic matter/macrofauna – only in 10 stations).

The labels of each sediment sample have been organized as explained below:

- ✓ MEW001d_#_A_#Q1;
- ✓ MEW001d_#_A_#Q2a/b;
- ✓ MEW001d_#_A_#S;
- ✓ MEW001d_#_A_#M
- ✓ MEW001d_#_A_#Rc
- ✓ MEW001d_#_A_#G
- ✓ MEW001d_#_B_#G
- ✓ MEW001d_#_A_#CH3Hg

in which:

- MEW001d: code of the project;
- #: locations (from S21 to S40 – R00-R02);
- A: replicate (only one);
- B: second replicate (only for benthic analysis);
- Q: sub-sample for sediment quality analysis;
- S: sub-sample for Grain size analysis;
- M: sub-sample for Microbiological analysis;
- Rc: sub-sample for Radioactive compounds analysis;
- G: sub-sample for Benthic analysis;
- CH3Hg: sub-sample for Methylmercury;
- 1: container type (glass vial);
- 2: container type (glass jar);
- a: first container;

- b: second container.

Measurements of pH and Temperature were performed at each station, by means of a portable meter (Eutech PC650) at a depth of 6cm from the top of the sediment surface.

3.5.0 Italy (Territorial waters) - Water Stations

At stations MEW001b_W01-W10 the samplings have been performed, inspected and labelled as follows:

Water samples were collected by means of 5L Niskin bottles. The system consists of a Niskin bottle installed over a line, connected with a messenger line able to trigger the closure of the bottle at the required depth. The water samples collected have undergone both chemical and biological analyses.

Physical measurements along the water column have been carried out by means of CTD multiparametric probe in order to obtain composite depth profiles of the main physical parameters, such as pH, temperature, salinity, electrical conductivity, dissolved oxygen, chlorophyll.

Transparency measures have been acquired by means of Secchi's disk.

The labels of each water sample have been organized as explained below:

- ✓ MEW001b_A_#_#Cf;
- ✓ MEW001b_A/A2/A3_#_#Qa/b/c;
- ✓ MEW001b_A/A2/A3_#_#Q1a/b/c;
- ✓ MEW001b_A_#_#Q2a/b/c;
- ✓ MEW001b_A_#_#C;
- ✓ MEW001b_A_#_#F/Fb;

in which:

- MEW001b: code of the project;
- #: locations (from W01 to W10);
- Cf: sub-samples for chlorophyll analyses (Glass Fiber Filter);
- Q: sub-sample for sediment quality analysis;
- C: sub-sample for chlorophyll analysis (glass dark bottles);
- F/Fb: sub-samples for phytoplankton analysis (b: second container);
- A/A2/A3: replicates;
- 1: container type (glass dark bottle);
- 2: container type (Plastic container);
- a: first sampling depth (0.5m from surface);
- b: second sampling depth (mid depth);
- c: third sampling depth (0.5m from seabottom).

3.6.0 Offshore Malta – Water Stations

At the stations MEW001b_W11-W15 the samplings have been performed, inspected and labelled as follows:

Water samples were collected by means of 5L Niskin bottles. The system consists of a Niskin bottle installed over a line, connected with a messenger line able to trigger the closure of the bottle at the required depth. The water samples collected have undergone both chemical and biological analyses.

Physical measurements along the water column have been carried out by means of CTD multiparametric probe in order to obtain composite depth profiles of the main physical parameters, such as pH, temperature, salinity, electrical conductivity, dissolved oxygen, chlorophyll.

Transparency measures have been acquired by means of Secchi's disk.

The labels of each water sample have been organized as explained below:

- ✓ MEW001b_A_#_#Cf;
- ✓ MEW001b_A1/A2_#_#A;
- ✓ MEW001b_B1/B2_#_#A;
- ✓ MEW001b_C1/C2_#_#A;
- ✓ MEW001b_A1/A2_#_#Fa/b;
- ✓ MEW001b_B1/B2_#_#Fa/b;
- ✓ MEW001b_C1/C2_#_#Fa/b;
- ✓ MEW001b_A_#_#C;
- ✓ MEW001b_A_#_#Z;

in which:

- MEW001b: code of the project;
- #: locations (from W11 to W15);
- Cf: sub-samples for chlorophyll analyses (Glass Fiber Filter);
- A: sub-sample for Nutrients analysis;
- C: sub-sample for chlorophyll analysis (glass dark bottles);
- Z: sub-sample for zooplankton analysis;
- F: sub-samples for phytoplankton analysis;
- A/B/C: replicates;
- 1: for water quality: first sampling depth (0.5m from sea surface);
  for phytoplankton: depth from seabottom to half water column;
- 2: for water quality: second sampling depth (0.5m from seabottom);
  for phytoplankton: depth from half water column (or chlorophyll peak) to sea surface;
- a: formaldehyde solution container;
- b: lugol solution container.

3.7.0 Nearshore Gela – Water Stations

At stations MEW001d_W21-W40 the samplings have been performed, inspected and labelled as follows:

Water samples were collected by means of 5L Niskin bottles. The system consists of a Niskin bottle installed over a line, connected with a messenger line able to trigger the closure of the bottle at the required depth. The water samples collected have undergone both chemical and biological analyses.

Physical measurements along the water column have been carried out by means of CTD multiparametric probe in order to obtain composite depth profiles of the main physical parameters, such as pH, temperature, salinity, electrical conductivity, dissolved oxygen, chlorophyll.

Transparency measures have been acquired by means of Secchi's disk.

The labels of each water sample have been organized as explained below:

- ✓ MEW001d_A_#_#Cf;
- ✓ MEW001d_A/A1_#_#Q/Q1/Q2;
- ✓ MEW001d_A_#_#Z;
- ✓ MEW001d_A_#_#Fa/Fb;

in which:

- MEW001d: code of the project;
- #: locations (from W21 to W40);
- Cf: sub-samples for chlorophyll analyses (Glass Fiber Filter);
- Q: sub-sample for sediment quality analysis;
- Z: sub-sample for zooplankton analysis;
- F: sub-samples for phytoplankton analysis;
- A: first sampling depth (0.5 from sea surface);
- A1:second sampling depth (0.5 from seabottom)
- 1: container type (glass dark bottle);
- 2: container type (Plastic container);
- a: formaldehyde solution container;
- b: lugol solution container;

3.8.0 Laboratory analyses

The chemical analyses performed on water samples comply with the analytical methodologies reported in the following tables (Table 3.1 and Table 3.2):

Table 3.1 - Analytical methodologies for water analyses (Malta and Italy)

Parameter (or Determinant)	U. M.	LoD	Method
Aluminum	µg/l	16	EPA6020
Antimony	µg/l	0.4	EPA6020
Silver	µg/l	0.8	EPA6020
Arsenic	µg/l	0.8	EPA6020
Beryllium	µg/l	0.32	EPA6020
Cadmium	µg/l	0.4	EPA6020
Cobalt	µg/l	4.0	EPA6020
Chromium	µg/l	4	EPA6020
Chromium (VI)	µg/l	2.5	EPA7199
Iron	µg/l	16	EPA6020
Mercury	µg/l	0.1	EPA6020
Nickel	µg/l	1.6	EPA6020
Lead	µg/l	0.8	EPA6020
Copper	µg/l	4	EPA6020
Selenium	µg/l	0.8	EPA6020
Manganese	µg/l	4	EPA6020
Thallium	µg/l	0.16	EPA6020
Zinc	µg/l	16	EPA6020
Silica (SiO2)	mg/l	0.2	EPA6010
	mg/l	1.1	
Nitrate	µg/l	5000	APAT4020
Nitrite	µg/l	500	APAT4020
	µg/l	50	APAT4050
Phosphorus	µg/l	5	APAT4110 A2
orthophosphate	mg/l	1	APAT4020
Ammonium	µg/l	10	APAT4030 A1
Benzene	µg/l	0.01	EPA5030 8260
Ethylbenzene	µg/l	0.01	EPA5030 8260
Styrene	µg/l	0.01	EPA5030 8260
Toluene	µg/l	0.1	EPA5030 8260
meta - Xylene + para - Xylene	µg/l	0.02	EPA5030 8260
Benzo (a) anthracene	µg/l	0.00056	EPA3510 8270
Benzo (a) pyrene	µg/l	0.00014	EPA3510 8270
Benzo (b) fluoranthene	µg/l	0.00056	EPA3510 8270
Benzo (k) fluoranthene	µg/l	0.00056	EPA3510 8270
Benzo (g,h,i) perylene	µg/l	0.00014	EPA3510 8270
chrysene	µg/l	0.00056	EPA3510 8270
Dibenzo (a,h) anthracene	µg/l	0.00056	EPA3510 8270
Indeno (1,2,3 - c,d) pyrene	µg/l	0.00056	EPA3510 8270
Pyrene	µg/l	0.00056	EPA3510 8270
M.T.B.E.	µg/l	0.05	EPA5030 8260
chloromethane	µg/l	0.05	EPA5030 8260
Trichloromethane (Chloroform)	µg/l	0.01	EPA5030 8260
Vinyl chloride	µg/l	0.01	EPA5030 8260
1,2 - Dichloroethane	µg/l	0.005	EPA5030 8260
1,1 - Dichloroethylene	µg/l	0.005	EPA5030 8260
trichlorethylene	µg/l	0.01	EPA5030 8260
tetrachlorethylene (PCE)	µg/l	0.05	EPA5030 8260
hexachlorobutadiene	µg/l	0.01	EPA5030 8260
Sum organoalogenated	µg/l	0.05	EPA5030 8260
1,1 - dichloroethane	µg/l	0.01	EPA5030 8260
1,2 - Dichloroethylene	µg/l	0.01	EPA5030 8260
1,2 - Dichloropropane	µg/l	0.005	EPA5030 8260
1,1,2 - Trichloroethane	µg/l	0.01	EPA5030 8260
1,2,3 - Trichloropropane	µg/l	0.0005	EPA5030 8260
1,1,2,2 - Tetrachloroethane	µg/l	0.005	EPA5030 8260
Tribromomethane (bromoform)	µg/l	0.005	EPA5030 8260
1,2 - Dibromoethane	µg/l	0.0005	EPA5030 8260
dibromochloromethane	µg/l	0.01	EPA5030 8260

Parameter (or Determinant)	U. M.	LoD	Method
bromodichloromethane	µg/l	0.01	EPA5030 8260
Alachlor	µg/l	0.00056	EPA3510 8270
Aldrin	µg/l	0.00056	EPA3510 8270
Atrazine	µg/l	0.00056	EPA3510 8270
2,4' - DDD	µg/l	0.00056	EPA3510 8270
2,4' - DDE	µg/l	0.00056	EPA3510 8270
2,4' - DDT	µg/l	0.00056	EPA3510 8270
4,4' - DDD	µg/l	0.00056	EPA3510 8270
4,4' - DDE	µg/l	0.00056	EPA3510 8270
4,4' - DDT	µg/l	0.00056	EPA3510 8270
DDD, DDT, DDE	µg/l	0.00056	EPA3510 8270
Dieldrin	µg/l	0.00056	EPA3510 8270
Isodrin	µg/l	0.00056	EPA3510 8270
Endosulfan	µg/l	0.00056	EPA3510 8270
Endrin	µg/l	0.00056	EPA3510 8270
Chlorfenvinphos	µg/l	0.00056	EPA3510 8270
Chlorpyrifos ethyl	µg/l	0.00056	EPA3510 8270
Chlorpyrifos methyl	µg/l	0.00056	EPA3510 8270
Diuron	µg/l	0.05	EPA3535 8321
Hydrocarbons C<= 10	µg/l	18	EPA5021 8015
Total hydrocarbons (expressed as n-hexane) Calculation	µg/l	31	EPA5021 8015 UNI 9377
Chlorophyll "a"	µg/l	0.01	APAT CNR IRSA 29/2003 Met. 9020
Phytoplankton			ISPRA Manual
Zooplankton			

Table 3.2 - Analytical methodologies for water analyses (nearshore Gela)

Parameter (or Determinant)	U. M.	LoD	Method
Aluminum	µg/l	4	EPA6020
Antimony	µg/l	0.1	EPA6020
Silver	µg/l	0.2	EPA6020
Arsenic	µg/l	0.2	EPA6020
Beryllium	µg/l	0.08	EPA6020
Tin	µg/l	10	EPA6020
Cadmium	µg/l	0.1	EPA6020
Cobalt	µg/l	1	EPA6020
Chromium	µg/l	1	EPA6020
Chromium (VI)	µg/l	2.5	EPA7199
Iron	µg/l	4	EPA6020
Mercury	µg/l	0.02	EPA6020
Nickel	µg/l	0.4	EPA6020
Lead	µg/l	0.2	EPA6020
Copper	µg/l	1	EPA6020
Selenium	µg/l	0.2	EPA6020
Manganese	µg/l	1	EPA6020
Thallium	µg/l	0.04	EPA6020
Vanadium	µg/l	1	EPA6020
Zinc	µg/l	4	EPA6020
Silica (SiO2)	mg/l	2.1	EPA6010
Nitrate	µg/l	5000	APAT4020
Nitrite	µg/l	500	APAT4020
Total Phosphorus	µg/l	5	APAT4110 A2
Orthophosphate	mg/l	1	APAT4020
Phosphate	mg/l	1	APAT4020
Ammonium	µg/l	10	APAT4030 A1
Benzene	µg/l	0.01	EPA5030 8260
Ethylbenzene	µg/l	0.01	EPA5030 8260
Styrene	µg/l	0.01	EPA5030 8260
Toluene	µg/l	0.1	EPA5030 8260
meta - Xylene + para - Xylene	µg/l	0.02	EPA5030 8260
Benzo (a) anthracene	µg/l	0.0005	EPA3510 8270
Benzo (a) pyrene	µg/l	0.00013	EPA3510 8270
Benzo (b) fluoranthene	µg/l	0.0005	EPA3510 8270
Benzo (k) fluoranthene	µg/l	0.0005	EPA3510 8270
Benzo (g,h,i) perylene	µg/l	0.00013	EPA3510 8270
chrysene	µg/l	0.0005	EPA3510 8270
Dibenzo (a,h) anthracene	µg/l	0.0005	EPA3510 8270
Indeno (1,2,3 - c,d) pyrene	µg/l	0.0005	EPA3510 8270

Parameter (or Determinant)	U. M.	LoD	Method
Pyrene	µg/l	0.0005	EPA3510 8270
M.T.B.E.	µg/l	0.05	EPA5030 8260
chloromethane	µg/l	0.05	EPA5030 8260
Trichloromethane (Chloroform)	µg/l	0.01	EPA5030 8260
Vinyl chloride	µg/l	0.01	EPA5030 8260
1,2 - Dichloroethane	µg/l	0.005	EPA5030 8260
1,1 - Dichloroethylene	µg/l	0.005	EPA5030 8260
trichlorethylene	µg/l	0.01	EPA5030 8260
tetrachlorethylene (PCE)	µg/l	0.05	EPA5030 8260
hexachlorobutadiene	µg/l	0.01	EPA5030 8260
Sum organoalogenated	µg/l	0.05	EPA5030 8260
1,1 - dichloroethane	µg/l	0.01	EPA5030 8260
1,2 - Dichloroethylene	µg/l	0.01	EPA5030 8260
1,2 - Dichloropropane	µg/l	0.005	EPA5030 8260
1,1,2 - Trichloroethane	µg/l	0.01	EPA5030 8260
1,2,3 - Trichloropropane	µg/l	0.0005	EPA5030 8260
1,1,2,2 - Tetrachloroethane	µg/l	0.005	EPA5030 8260
Tribromomethane (bromoform)	µg/l	0.005	EPA5030 8260
1,2 - Dibromoethane	µg/l	0.0005	EPA5030 8260
dibromochloromethane	µg/l	0.01	EPA5030 8260
bromodichloromethane	µg/l	0.01	EPA5030 8260
Alachlor	µg/l	0.0005	EPA3510 8270
Aldrin	µg/l	0.0005	EPA3510 8270
Atrazine	µg/l	0.0005	EPA3510 8270
2,4' - DDD	µg/l	0.0005	EPA3510 8270
2,4' - DDE	µg/l	0.0005	EPA3510 8270
2,4' - DDT	µg/l	0.0005	EPA3510 8270
4,4' - DDD	µg/l	0.0005	EPA3510 8270
4,4' - DDE	µg/l	0.0005	EPA3510 8270
4,4' - DDT	µg/l	0.0005	EPA3510 8270
DDD, DDT, DDE	µg/l	0.0005	EPA3510 8270
Dieldrin	µg/l	0.0005	EPA3510 8270
Isodrin	µg/l	0.0005	EPA3510 8270
Endosulfan	µg/l	0.0025	EPA3510 8270
Endrin	µg/l	0.0005	EPA3510 8270
Diuron		0.05	EPA3535 8321
Chlorfenvinphos	µg/l	0.0005	EPA3510 8270
Chlorpyrifos ethyl	µg/l	0.0005	EPA3510 8270
Chlorpyrifos methyl	µg/l	0.0005	EPA3510 8270
Hydrocarbons C<= 10	µg/l	19	EPA5021 8015
Total hydrocarbons (expressed as n-hexane) Calculation	µg/l	28	EPA5021 8015 UNI 9377
TBT	µg/l	24	calcolo
Chlorophyll "a"	µg/l	0.01	APAT CNR IRSA 29/2003 Met. 9020
Phytoplankton			ISPRA Manual
Zooplankton			

The chemical analyses performed on sediment samples comply with the analytical methodologies reported in the following table (Table 3.3, Table 3.4, Table 3.5, Table 3.6, Table 3.7, Table 3.8).

Table 3.3 - Analytical methodologies for sediment analyses in Malta and Italy (S1-S10)

Parameter (or Determinant)	U. M.	Method	Test Certificate Code									
			19LA 0014366	19LA 0014368	19LA 0014370	19LA 0014372	19LA 0014374	19LA 0014376	19LA 0014378	19LA 0014380	19LA 0014382	19LA 0014384
			Stations									
			S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
			LoD									
Antimony	mg/kg	EPA3051 6020	0.55	0.56	0.51	0.56	0.55	0.53	0.58	0.56	0.57	0.55
Arsenic	mg/kg	EPA3051 6020	0.22	0.22	0.21	0.23	0.22	0.21	0.23	0.22	0.23	0.22
Beryllium	mg/kg	EPA3051 6020	0.11	0.11	0.1	0.11	0.11	0.11	0.12	0.11	0.11	0.11
Cadmium	mg/kg	EPA3051 6020	0.022	0.022	0.021	0.023	0.022	0.021	0.023	0.022	0.023	0.022
Cobalt	mg/kg	EPA3051 6020	1.1	1.1	1	1.1	1.1	1.1	1.2	1.1	1.1	1.1
Chromium	mg/kg	EPA3051 6020	1.1	1.1	1	1.1	1.1	1.1	1.2	1.1	1.1	1.1
Mercury	mg/kg	EPA3051 6020	0.011	0.011	0.01	0.011	0.011	0.011	0.012	0.011	0.011	0.011
Nickel	mg/kg	EPA3051 6020	0.22	0.22	0.21	0.23	0.22	0.21	0.23	0.22	0.23	0.22
Lead	mg/kg	EPA3051 6020	1.1	1.1	1	1.1	1.1	1.1	1.2	1.1	1.1	1.1
Copper	mg/kg	EPA3051 6020	1.1	1.1	1	1.1	1.1	1.1	1.2	1.1	1.1	1.1
Selenium	mg/kg	EPA3051 6020	0.11	0.11	0.1	0.11	0.11	0.11	0.12	0.11	0.11	0.11
Tin	mg/kg	EPA3051 6020	1.1	1.1	1	1.1	1.1	1.1	1.2	1.1	1.1	1.1
Thallium	mg/kg	EPA3051 6020	0.055	0.056	0.051	0.056	0.055	0.053	0.058	0.056	0.057	0.055
Vanadium	mg/kg	EPA3051 6020	1.1	1.1	1	1.1	1.1	1.1	1.2	1.1	1.1	1.1
Zinc	mg/kg	EPA3051 6020	1.1	1.1	1	1.1	1.1	1.1	1.2	1.1	1.1	1.1
Benzene	mg/kg	EPA5021 8260	0.001	0.0011	0.0011	0.0014	0.00086	0.0011	0.0011	0.001	0.0011	0.00098
Ethylbenzene	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
Styrene	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
Toluene	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
m, p - xylene	mg/kg	EPA5021	0.01	0.011	0.011	0.014	0.0086	0.011	0.011	0.01	0.011	0.0098

Parameter (or Determinant)	U. M.	Method	Test Certificate Code									
			19LA 0014366	19LA 0014368	19LA 0014370	19LA 0014372	19LA 0014374	19LA 0014376	19LA 0014378	19LA 0014380	19LA 0014382	19LA 0014384
			Stations									
			S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
			LoD									
		8260										
o - Xylene	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
Xylene	mg/kg	EPA5021 8260	0.01	0.011	0.011	0.014	0.0086	0.011	0.011	0.01	0.011	0.0098
BTEX (aromatic hydrocarbons)	mg/kg	EPA5021 8260	0.01		0.011	0.014	0.0086	0.011	0.011	0.01	0.011	0.0098
Benzo (a) anthracene	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
Benzo (a) pyrene	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
Benzo (b) fluoranthene	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
Benzo (g,h,i) perylene	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
Benzo (k) fluoranthene	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
chrysene	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
Dibenzo (a, h) anthracene	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
Indeno (1,2,3-c, d) pyrene	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
Pyrene	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
Anthracene	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
Fluoranthene	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
Naphthalene	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
Chloromethane	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
Dichloromethane	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
Trichloromethane (Chloroform)	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
Vinyl chloride	mg/kg	EPA5021 8260	0.001	0.0011	0.0011	0.0014	0.00086	0.0011	0.0011	0.001	0.0011	0.00098
1,2 - Dichloroethane	mg/kg	EPA5021 8260	0.001	0.0011	0.0011	0.0014	0.00086	0.0011	0.0011	0.001	0.0011	0.00098

Parameter (or Determinant)	U. M.	Method	Test Certificate Code									
			19LA 0014366	19LA 0014368	19LA 0014370	19LA 0014372	19LA 0014374	19LA 0014376	19LA 0014378	19LA 0014380	19LA 0014382	19LA 0014384
			Stations									
			S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
			LoD									
1,1 - Dichloroethylene	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
Trichlorethylene	mg/kg	EPA5021 8260	0.001	0.0011	0.0011	0.0014	0.00086	0.0011	0.0011	0.001	0.0011	0.00098
Tetrachlorethylene (PCE)	mg/kg	EPA5021 8260	0.001	0.0011	0.0011	0.0014	0.00086	0.0011	0.0011	0.001	0.0011	0.00098
1,1 - Dichloroethane	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
1,2 - Dichloroethylene	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
1,1,1 - Trichloroethane	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
1,2 - Dichloropropane	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
1,1,2 - Trichloroethane	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
1,2,3 - Trichloropropane	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
1,1,2,2 - Tetrachloroethane	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
Tribromomethane	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
1,2 - Dibromoethane	mg/kg	EPA5021 8260	0.001	0.0011	0.0011	0.0014	0.00086	0.0011	0.0011	0.001	0.0011	0.00098
Dibromochloromethane	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
Bromodichloromethane	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
Monochlorobenzene	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
1,2 - Dichlorobenzene	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
1,4 - Dichlorobenzene	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
1,2,4 - Trichlorobenzene	mg/kg	EPA5021 8260	0.0052	0.0054	0.0054	0.0068	0.0043	0.0055	0.0057	0.0051	0.0053	0.0049
(1,2,3,5 + 1,2,4,5) - Tetrachlorobenzene	mg/kg	EPA3545 8270	0.0026	0.0026	0.005	0.0027	0.0021	0.002	0.0022	0.00054	0.00054	0.00051
Pentachlorobenzene	mg/kg	EPA3545 8270	0.0013	0.0013	0.0025	0.0014	0.001	0.00099	0.0011	0.00027	0.00027	0.00025
Hexachlorobenzene	mg/kg	EPA3545	0.0013	0.0013	0.0025	0.0014	0.001	0.00099	0.0011	0.00027	0.00027	0.00025

Parameter (or Determinant)	U. M.	Method	Test Certificate Code									
			19LA 0014366	19LA 0014368	19LA 0014370	19LA 0014372	19LA 0014374	19LA 0014376	19LA 0014378	19LA 0014380	19LA 0014382	19LA 0014384
			Stations									
			S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
			LoD									
		8270										
M.T.B.E.	mg/kg	EPA5021 8260	0.052	0.054	0.054	0.068	0.043	0.055	0.057	0.051	0.053	0.049
Aldrin	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
alpha - hexachlorocyclohexane	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
beta - hexachlorocyclohexane	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
gamma - hexachlorocyclohexane (Lindane)	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
2,4' - DDD	µg/kg	EPA3545 8270	2.6	2.6	5	2.7	2.1	2	2.2	0.54	0.54	0.51
2,4' - DDE	µg/kg	EPA3545 8270	2.6	2.6	5	2.7	2.1	2	2.2	0.54	0.54	0.51
2,4 DDT + 4,4 DDD	µg/kg	EPA3545 8270	2.6	2.6	5	2.7	2.1	2	2.2	0.54	0.54	0.51
4,4 - DDE	µg/kg	EPA3545 8270	2.6	2.6	5	2.7	2.1	2	2.2	0.54	0.54	0.51
4,4 - DDT	µg/kg	EPA3545 8270	2.6	2.6	5	2.7	2.1	2	2.2	0.54	0.54	0.51
DDD, DDT, DDE	µg/kg	EPA3545 8270	2.6	2.6	5	2.7	2.1	2	2.2	0.54	0.54	0.51
Dieldrin	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
Hexachlorobenzene	µg/kg	EPA3545 8270	1.3	1.3	2.5	1.4	1	0.99	1.1	0.27	0.27	0.25
Total PCB (Aroclor 1242,1248,1254,1260)	mg/kg	EPA3545 8270	0.013	0.013	0.025	0.014	0.01	0.0099	0.011	0.0027	0.0027	0.0025
Total PCBs (Aroclor 1242)	mg/kg	EPA3545 8270	0.013	0.013	0.025	0.014	0.01	0.0099	0.011	0.0027	0.0027	0.0025
Total PCBs (Aroclor 1248)	mg/kg	EPA3545 8270	0.013	0.013	0.025	0.014	0.01	0.0099	0.011	0.0027	0.0027	0.0025
Total PCBs (Aroclor 1254)	mg/kg	EPA3545 8270	0.013	0.013	0.025	0.014	0.01	0.0099	0.011	0.0027	0.0027	0.0025
Total PCBs (Aroclor 1260)	mg/kg	EPA3545 8270	0.013	0.013	0.025	0.014	0.01	0.0099	0.011	0.0027	0.0027	0.0025
Hydrocarbons C<=12	mg/kg	EPA5021 8015	0.25	0.26	0.26	0.33	0.21	0.26	0.27	0.25	0.26	0.24
Hydrocarbons C>12	µg/kg	UNI14039	2300	2400	2300	2400	2300	2300	2400	2400	2400	2300

Table 3.4 - Analytical methodologies for sediment analyses in Malta and Italy (S11, S12, S13, S14)

Parameter (or Determinant)	U. M.	Method	Test Certificate Code											
			19LA 0014284	19LA 0014343	19LA 0014344	19LA 0014348	19LA 0014349	19LA 0014350	19LA 0014355	19LA 0014356	19LA 0014357	19LA 0014362	19LA 0014363	19LA 0014364
			Stations											
			S11	S11	S11	S12	S12	S12	S13	S13	S13	S14	S14	S14
			LoD											
Antimony	mg/kg	EPA3051 6020	0.56	0.52	0.59	0.53	0.59	0.58	0.52	0.56	0.53	0.54	0.52	0.59
Arsenic	mg/kg	EPA3051 6020	0.22	0.21	0.23	0.21	0.24	0.23	0.21	0.22	0.21	0.21	0.21	0.24
Beryllium	mg/kg	EPA3051 6020	0.11	0.1	0.12	0.11	0.12	0.12	0.1	0.11	0.11	0.11	0.1	0.12
Cadmium	mg/kg	EPA3051 6020	0.022	0.021	0.023	0.021	0.024	0.023	0.021	0.022	0.021	0.021	0.021	0.024
Cobalt	mg/kg	EPA3051 6020	1.1	1	1.2	1.1	1.2	1.2	1	1.1	1.1	1.1	1	1.2
Chromium	mg/kg	EPA3051 6020	1.1	1	1.2	1.1	1.2	1.2	1	1.1	1.1	1.1	1	1.2
Mercury	mg/kg	EPA3051 6020	0.011	0.01	0.012	0.011	0.012	0.012	0.01	0.011	0.011	0.011	0.01	0.012
Nickel	mg/kg	EPA3051 6020	0.22	0.21	0.23	0.21	0.24	0.23	0.21	0.22	0.21	0.21	0.21	0.24
Lead	mg/kg	EPA3051 6020	1.1	1	1.2	1.1	1.2	1.2	1	1.1	1.1	1.1	1	1.2
Copper	mg/kg	EPA3051 6020	1.1	1	1.2	1.1	1.2	1.2	1	1.1	1.1	1.1	1	1.2
Selenium	mg/kg	EPA3051 6020	0.11	0.1	0.12	0.11	0.12	0.12	0.1	0.11	0.11	0.11	0.1	0.12
Tin	mg/kg	EPA3051 6020	1.1	1	1.2	1.1	1.2	1.2	1	1.1	1.1	1.1	1	1.2
Thallium	mg/kg	EPA3051 6020	0.056	0.052	0.059	0.053	0.059	0.058	0.052	0.056	0.053	0.054	0.052	0.059
Vanadium	mg/kg	EPA3051 6020	1.1	1	1.2	1.1	1.2	1.2	1	1.1	1.1	1.1	1	1.2
Zinc	mg/kg	EPA3051 6020	1.1	1	1.2	1.1	1.2	1.2	1	1.1	1.1	1.1	1	1.2
Benzene	mg/kg	EPA5021 8260	0.00085	0.00083	0.00095	0.0012	0.00092	0.0012	0.00079	0.0012	0.0011	0.0011	0.0011	0.0011
Ethylbenzene	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
Styrene	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
Toluene	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
m, p - xylene	mg/kg	EPA5021	0.0085	0.0083	0.0095	0.012	0.0092	0.012	0.0079	0.012	0.011	0.011	0.011	0.011

Parameter (or Determinant)	U. M.	Method	Test Certificate Code										
			19LA 0014284	19LA 0014343	19LA 0014344	19LA 0014348	19LA 0014349	19LA 0014350	19LA 0014355	19LA 0014356	19LA 0014357	19LA 0014362	19LA 0014363	19LA 0014364
			Stations											
			S11	S11	S11	S12	S12	S12	S13	S13	S13	S14	S14	S14
			LoD											
		8260												
o - Xylene	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
Xylene	mg/kg	EPA5021 8260	0.0085	0.0083	0.0095	0.012	0.0092	0.012	0.0079	0.012	0.011	0.011	0.011	0.011
BTEX (aromatic hydrocarbons)	mg/kg	EPA5021 8260	0.0085	0.0083		0.012	0.0092	0.012	0.0079			0.011	0.011	0.011
Benzo (a) anthracene	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
Benzo (a) pyrene	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
Benzo (b) fluoranthene	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
Benzo (g,h,i) perylene	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
Benzo (k) fluoranthene	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
chrysene	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
Dibenzo (a, h) anthracene	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
Indeno (1,2,3-c, d) pyrene	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
Pyrene	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
Anthracene	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
Fluoranthene	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
Naphthalene	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
Chloromethane	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
Dichloromethane	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
Trichloromethane (Chloroform)	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
Vinyl chloride	mg/kg	EPA5021 8260	0.00085	0.00083	0.00095	0.0012	0.00092	0.0012	0.00079	0.0012	0.0011	0.0011	0.0011	0.0011
1,2 - Dichloroethane	mg/kg	EPA5021 8260	0.00085	0.00083	0.00095	0.0012	0.00092	0.0012	0.00079	0.0012	0.0011	0.0011	0.0011	0.0011

Parameter (or Determinant)	U. M.	Method	Test Certificate Code											
			19LA 0014284	19LA 0014343	19LA 0014344	19LA 0014348	19LA 0014349	19LA 0014350	19LA 0014355	19LA 0014356	19LA 0014357	19LA 0014362	19LA 0014363	19LA 0014364
			Stations											
			S11	S11	S11	S12	S12	S12	S13	S13	S13	S14	S14	S14
			LoD											
1,1 - Dichloroethylene	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
Trichlorethylene	mg/kg	EPA5021 8260	0.00085	0.00083	0.00095	0.0012	0.00092	0.0012	0.00079	0.0012	0.0011	0.0011	0.0011	0.0011
Tetrachlorethylene (PCE)	mg/kg	EPA5021 8260	0.00085	0.00083	0.00095	0.0012	0.00092	0.0012	0.00079	0.0012	0.0011	0.0011	0.0011	0.0011
1,1 - Dichloroethane	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
1,2 - Dichloroethylene	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
1,1,1 - Trichloroethane	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
1,2 - Dichloropropane	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
1,1,2 - Trichloroethane	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
1,2,3 - Trichloropropane	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
1,1,2,2 - Tetrachloroethane	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
Tribromomethane	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
1,2 - Dibromoethane	mg/kg	EPA5021 8260	0.00085	0.00083	0.00095	0.0012	0.00092	0.0012	0.00079	0.0012	0.0011	0.0011	0.0011	0.0011
Dibromochloromethane	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
Bromodichloromethane	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
Monochlorobenzene	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
1,2 - Dichlorobenzene	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
1,4 - Dichlorobenzene	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
1,2,4 - Trichlorobenzene	mg/kg	EPA5021 8260	0.0043	0.0042	0.0047	0.0059	0.0046	0.0061	0.004	0.0058	0.0053	0.0053	0.0056	0.0057
(1,2,3,5 + 1,2,4,5) - Tetrachlorobenzene	mg/kg	EPA3545 8270	0.00054	0.0005	0.00054	0.0005	0.00054	0.00056	0.00049	0.00052	0.0019	0.00051	0.002	0.00057
Pentachlorobenzene	mg/kg	EPA3545 8270	0.00027	0.00025	0.00027	0.00025	0.00027	0.00028	0.00024	0.00026	0.00097	0.00026	0.00098	0.00028
Hexachlorobenzene	mg/kg	EPA3545	0.00027	0.00025	0.00027	0.00025	0.00027	0.00028	0.00024	0.00026	0.00097	0.00026	0.00098	0.00028

Parameter (or Determinant)	U. M.	Method	Test Certificate Code										
			19LA 0014284	19LA 0014343	19LA 0014344	19LA 0014348	19LA 0014349	19LA 0014350	19LA 0014355	19LA 0014356	19LA 0014357	19LA 0014362	19LA 0014363	19LA 0014364
			Stations											
			S11	S11	S11	S12	S12	S12	S13	S13	S13	S14	S14	S14
			LoD											
		8270												
M.T.B.E.	mg/kg	EPA5021 8260	0.043	0.042	0.047	0.059	0.046	0.061	0.04	0.058	0.053	0.053	0.056	0.057
Aldrin	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
alpha - hexachlorocyclohexane	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
beta - hexachlorocyclohexane	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
gamma - hexachlorocyclohexane (Lindane)	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
2,4' - DDD	µg/kg	EPA3545 8270	0.54	0.5	0.54	0.5	0.54	0.56	0.49	0.52	1.9	0.51	2	0.56
2,4' - DDE	µg/kg	EPA3545 8270	0.54	0.5	0.54	0.5	0.54	0.56	0.49	0.52	1.9	0.51	2	0.56
2,4 DDT + 4,4 DDD	µg/kg	EPA3545 8270	0.54	0.5	0.54	0.5	0.54	0.56	0.49	0.52	1.9	0.51	2	0.56
4,4 - DDE	µg/kg	EPA3545 8270	0.54	0.5	0.54	0.5	0.54	0.56	0.49	0.52	1.9	0.51	2	0.56
4,4 - DDT	µg/kg	EPA3545 8270	0.54	0.5	0.54	0.5	0.54	0.56	0.49	0.52	1.9	0.51	2	0.56
DDD, DDT, DDE	µg/kg	EPA3545 8270	0.54	0.5	0.54	0.5	0.54	0.56	0.49	0.52	1.9	0.51	2	0.56
Dieldrin	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
Hexachlorobenzene	µg/kg	EPA3545 8270	0.27	0.25	0.27	0.25	0.27	0.28	0.24	0.26	0.97	0.26	0.98	0.28
Total PCB (Aroclor 1242,1248,1254,1260)	mg/kg	EPA3545 8270	0.0027	0.0025	0.0027	0.0025	0.0027	0.0028	0.0024	0.0026	0.0097	0.0026	0.0098	0.0028
Total PCBs (Aroclor 1242)	mg/kg	EPA3545 8270	0.0027	0.0025	0.0027	0.0025	0.0027	0.0028	0.0024	0.0026	0.0097	0.0026	0.0098	0.0028
Total PCBs (Aroclor 1248)	mg/kg	EPA3545 8270	0.0027	0.0025	0.0027	0.0025	0.0027	0.0028	0.0024	0.0026	0.0097	0.0026	0.0098	0.0028
Total PCBs (Aroclor 1254)	mg/kg	EPA3545 8270	0.0027	0.0025	0.0027	0.0025	0.0027	0.0028	0.0024	0.0026	0.0097	0.0026	0.0098	0.0028
Total PCBs (Aroclor 1260)	mg/kg	EPA3545 8270	0.0027	0.0025	0.0027	0.0025	0.0027	0.0028	0.0024	0.0026	0.0097	0.0026	0.0098	0.0028
Hydrocarbons C<=12	mg/kg	EPA5021 8015	0.21	0.2	0.23	0.28	0.22	0.29	0.19	0.28	0.26	0.26	0.27	0.27
Hydrocarbons C>12	µg/kg	UNI14039	2400	2200	2400	2200	2500	2500	2200	2300	2200	2300	2200	2500

Table 3.5 - Analytical methodologies for sediment analyses in Malta and Italy (S15, S16, S17)

Parameter (or Determinant)	U. M.	Method	Test Certificate Code								
			19LA 0023723	19LA 0023724	19LA 0023725	19LA 0023729	19LA 0023730	19LA 0023731	19LA 0023736	19LA 0023737	19LA 0023738
			Stations								
			S15	S15	S15	S16	S16	S16	S17	S17	S17
			LoD								
Antimony	mg/kg	EPA3051 6020	0.58	0.59	0.58	0.6	0.55	0.59	0.59	0.55	0.57
Arsenic	mg/kg	EPA3051 6020	0.23	0.24	0.23	0.24	0.22	0.24	0.24	0.22	0.23
Beryllium	mg/kg	EPA3051 6020	0.12	0.12	0.12	0.12	0.11	0.12	0.12	0.11	0.11
Cadmium	mg/kg	EPA3051 6020	0.023	0.024	0.023	0.024	0.022	0.024	0.024	0.022	0.023
Cobalt	mg/kg	EPA3051 6020	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.1	1.1
Chromium	mg/kg	EPA3051 6020	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.1	1.1
Mercury	mg/kg	EPA3051 6020	0.0053	0.012	0.012	0.012	0.011	0.012	0.012	0.011	0.011
Nickel	mg/kg	EPA3051 6020	0.0053	0.24	0.23	0.24	0.22	0.24	0.24	0.22	0.23
Lead	mg/kg	EPA3051 6020	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.1	1.1
Copper	mg/kg	EPA3051 6020	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.1	1.1
Selenium	mg/kg	EPA3051 6020	0.12	0.12	0.12	0.12	0.11	0.12	0.12	0.11	0.11
Tin	mg/kg	EPA3051 6020	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.1	1.1
Thallium	mg/kg	EPA3051 6020	0.058	0.059	0.058	0.06	0.055	0.059	0.059	0.055	0.057
Vanadium	mg/kg	EPA3051 6020	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.1	1.1
Zinc	mg/kg	EPA3051 6020	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.1	1.1
Benzene	mg/kg	EPA5021 8260	0.0011	0.0012	0.0012	0.00086	0.001	0.0011	0.0011	0.0011	0.0011
Ethylbenzene	mg/kg	EPA5021 8260	0.29	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
Styrene	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
Toluene	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
m, p - xylene	mg/kg	EPA5021	0.053	0.012	0.012	0.0086	0.01	0.011	0.011	0.011	0.011

Parameter (or Determinant)	U. M.	Method	Test Certificate Code								
			19LA 0023723	19LA 0023724	19LA 0023725	19LA 0023729	19LA 0023730	19LA 0023731	19LA 0023736	19LA 0023737	19LA 0023738
			Stations								
			S15	S15	S15	S16	S16	S16	S17	S17	S17
			LoD								
		8260									
o - Xylene	mg/kg	EPA5021 8260	0.0029	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
Xylene	mg/kg	EPA5021 8260	0.011	0.012	0.012	0.0086	0.01	0.011	0.011	0.011	0.011
BTEX (aromatic hydrocarbons)	mg/kg	EPA5021 8260	0.011	0.012	0.012	0.0086	0.01		0.011	0.011	0.011
Benzo (a) anthracene	µg/kg	EPA3545 8270	0.29	0.29	0.28	0.3	0.27	0.28	0.29	0.26	0.28
Benzo (a) pyrene	µg/kg	EPA3545 8270	0.29	0.29	0.28	0.3	0.27	0.28	0.29	0.26	0.28
Benzo (b) fluoranthene	µg/kg	EPA3545 8270	0.29	0.29	0.28	0.3	0.27	0.28	0.29	0.26	0.28
Benzo (g,h,i) perylene	µg/kg	EPA3545 8270	0.29	0.29	0.28	0.3	0.27	0.28	0.29	0.26	0.28
Benzo (k) fluoranthene	µg/kg	EPA3545 8270	0.29	0.29	0.28	0.3	0.27	0.28	0.29	0.26	0.28
chrysene	µg/kg	EPA3545 8270	0.29	0.29	0.28	0.3	0.27	0.28	0.29	0.26	0.28
Dibenzo (a, h) anthracene	µg/kg	EPA3545 8270	0.0053	0.29	0.28	0.3	0.27	0.28	0.29	0.26	0.28
Indeno (1,2,3-c, d) pyrene	µg/kg	EPA3545 8270	0.011	0.29	0.28	0.3	0.27	0.28	0.29	0.26	0.28
Pyrene	µg/kg	EPA3545 8270	0.29	0.29	0.28	0.3	0.27	0.28	0.29	0.26	0.28
Anthracene	µg/kg	EPA3545 8270	0.29	0.29	0.28	0.3	0.27	0.28	0.29	0.26	0.28
Fluoranthene	µg/kg	EPA3545 8270	0.057	0.29	0.28	0.3	0.27	0.28	0.29	0.26	0.28
Naphthalene	µg/kg	EPA3545 8270	0.23	0.29	0.28	0.3	0.27	0.28	0.29	0.26	0.28
Chloromethane	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
Dichloromethane	mg/kg	EPA5021 8260	0.057	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
Trichloromethane (Chloroform)	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
Vinyl chloride	mg/kg	EPA5021 8260	0.0011	0.0012	0.0012	0.00086	0.001	0.0011	0.0011	0.0011	0.0011
1,2 - Dichloroethane	mg/kg	EPA5021 8260	0.0011	0.0012	0.0012	0.00086	0.001	0.0011	0.0011	0.0011	0.0011

Parameter (or Determinant)	U. M.	Method	Test Certificate Code								
			19LA 0023723	19LA 0023724	19LA 0023725	19LA 0023729	19LA 0023730	19LA 0023731	19LA 0023736	19LA 0023737	19LA 0023738
			Stations								
			S15	S15	S15	S16	S16	S16	S17	S17	S17
			LoD								
1,1 - Dichloroethylene	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
Trichlorethylene	mg/kg	EPA5021 8260	0.0011	0.0012	0.0012	0.00086	0.001	0.0011	0.0011	0.0011	0.0011
Tetrachlorethylene (PCE)	mg/kg	EPA5021 8260	0.0011	0.0012	0.0012	0.00086	0.001	0.0011	0.0011	0.0011	0.0011
1,1 - Dichloroethane	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
1,2 - Dichloroethylene	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
1,1,1 - Trichloroethane	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
1,2 - Dichloropropane	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
1,1,2 - Trichloroethane	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
1,2,3 - Trichloropropane	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
1,1,2,2 - Tetrachloroethane	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
Tribromomethane	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
1,2 - Dibromoethane	mg/kg	EPA5021 8260	0.0011	0.0012	0.0012	0.00086	0.001	0.0011	0.0011	0.0011	0.0011
Dibromochloromethane	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
Bromodichloromethane	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
Monochlorobenzene	mg/kg	EPA5021 8260	0.29	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
1,2 - Dichlorobenzene	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
1,4 - Dichlorobenzene	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
1,2,4 - Trichlorobenzene	mg/kg	EPA5021 8260	0.0053	0.0058	0.006	0.0043	0.0051	0.0057	0.0057	0.0057	0.0054
(1,2,3,5 + 1,2,4,5) - Tetrachlorobenzene	mg/kg	EPA3545 8270	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Pentachlorobenzene	mg/kg	EPA3545 8270	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Hexachlorobenzene	mg/kg	EPA3545	0.0053	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005

Parameter (or Determinant)	U. M.	Method	Test Certificate Code								
			19LA 0023723	19LA 0023724	19LA 0023725	19LA 0023729	19LA 0023730	19LA 0023731	19LA 0023736	19LA 0023737	19LA 0023738
			Stations								
			S15	S15	S15	S16	S16	S16	S17	S17	S17
			LoD								
		8270									
M.T.B.E.	mg/kg	EPA5021 8260	0.012	0.058	0.06	0.043	0.051	0.057	0.057	0.057	0.054
Aldrin	µg/kg	EPA3545 8270	0.057	0.057	0.055	0.059	0.054	0.055	0.058	0.051	0.055
alpha - hexachlorocyclohexane	µg/kg	EPA3545 8270	0.057	0.057	0.055	0.059	0.054	0.055	0.058	0.051	0.055
beta - hexachlorocyclohexane	µg/kg	EPA3545 8270	0.057	0.057	0.055	0.059	0.054	0.055	0.058	0.051	0.055
gamma - hexachlorocyclohexane (Lindane)	µg/kg	EPA3545 8270	0.25	0.057	0.055	0.059	0.054	0.055	0.058	0.051	0.055
2,4' - DDD	µg/kg	EPA3545 8270	0.29	1	1	1	1	1	1	1	1
2,4' - DDE	µg/kg	EPA3545 8270	0.29	1	1	1	1	1	1	1	1
2,4 DDT + 4,4 DDD	µg/kg	EPA3545 8270	0.29	1	1	1	1	1	1	1	1
4,4 - DDE	µg/kg	EPA3545 8270	0.29	1	1	1	1	1	1	1	1
4,4 - DDT	µg/kg	EPA3545 8270	0.29	1	1	1	1	1	1	1	1
DDD, DDT, DDE	µg/kg	EPA3545 8270	0.29	1	1	1	1	1	1	1	1
Dieldrin	µg/kg	EPA3545 8270	0.057	0.057	0.055	0.059	0.054	0.055	0.058	0.051	0.055
Hexachlorobenzene	µg/kg	EPA3545 8270	0.005	0.057	0.055	0.059	0.054	0.055	0.058	0.051	0.055
Total PCB (Aroclor 1242,1248,1254,1260)	mg/kg	EPA3545 8270	0.01	0.0029	0.0028	0.003	0.0027	0.0028	0.0029	0.0026	0.0028
Total PCBs (Aroclor 1242)	mg/kg	EPA3545 8270	0.01	0.0029	0.0028	0.003	0.0027	0.0028	0.0029	0.0026	0.0028
Total PCBs (Aroclor 1248)	mg/kg	EPA3545 8270	0.01	0.0029	0.0028	0.003	0.0027	0.0028	0.0029	0.0026	0.0028
Total PCBs (Aroclor 1254)	mg/kg	EPA3545 8270	0.01	0.0029	0.0028	0.003	0.0027	0.0028	0.0029	0.0026	0.0028
Total PCBs (Aroclor 1260)	mg/kg	EPA3545 8270	0.01	0.0029	0.0028	0.003	0.0027	0.0028	0.0029	0.0026	0.0028
Hydrocarbons C<=12	mg/kg	EPA5021 8015	2600	0.28	0.29	0.21	0.25	0.28	0.28	0.28	0.26
Hydrocarbons C>12	µg/kg	UNI14039	0.29	2500	2400	2700	2400	2400	2600	2300	2500

Table 3.6 - Analytical methodologies for sediment analyses in Malta and Italy (S18-S20)

Parameter (or Determinant)	U. M.	Method	Test Certificate Code								
			19LA 0023743	19LA 0023744	19LA 0023745	19LA 0023750	19LA 0023751	19LA 0023752	19LA 0023757	19LA 0023758	19LA 0023759
			Stations								
			S18	S18	S18	S19	S19	S19	S20	S20	S20
			LoD								
Antimony	mg/kg	EPA3051 6020	0.55	0.57	0.56	0.59	0.57	0.51	0.54	0.55	0.56
Arsenic	mg/kg	EPA3051 6020	0.22	0.23	0.22	0.24	0.23	0.2	0.22	0.22	0.23
Beryllium	mg/kg	EPA3051 6020	0.11	0.11	0.11	0.12	0.11	0.1	0.11	0.11	0.11
Cadmium	mg/kg	EPA3051 6020	0.022	0.023	0.022	0.024	0.023	0.02	0.022	0.022	0.023
Cobalt	mg/kg	EPA3051 6020	1.1	1.1	1.1	1.2	1.1	1	1.1	1.1	1.1
Chromium	mg/kg	EPA3051 6020	1.1	1.1	1.1	1.2	1.1	1	1.1	1.1	1.1
Mercury	mg/kg	EPA3051 6020	0.011	0.011	0.011	0.012	0.011	0.01	0.011	0.011	0.011
Nickel	mg/kg	EPA3051 6020	0.22	0.23	0.22	0.24	0.23	0.2	0.22	0.22	0.23
Lead	mg/kg	EPA3051 6020	1.1	1.1	1.1	1.2	1.1	1	1.1	1.1	1.1
Copper	mg/kg	EPA3051 6020	1.1	1.1	1.1	1.2	1.1	1	1.1	1.1	1.1
Selenium	mg/kg	EPA3051 6020	0.11	0.11	0.11	0.12	0.11	0.1	0.11	0.11	0.11
Tin	mg/kg	EPA3051 6020	1.1	1.1	1.1	1.2	1.1	1	1.1	1.1	1.1
Thallium	mg/kg	EPA3051 6020	0.055	0.057	0.056	0.059	0.057	0.051	0.054	0.055	0.056
Vanadium	mg/kg	EPA3051 6020	1.1	1.1	1.1	1.2	1.1	1	1.1	1.1	1.1
Zinc	mg/kg	EPA3051 6020	1.1	1.1	1.1	1.2	1.1	1	1.1	1.1	1.1
Benzene	mg/kg	EPA5021 8260	0.0012	0.00091	0.00099	0.0012	0.0012	0.0011	0.001	0.0011	0.0011
Ethylbenzene	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
Styrene	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
Toluene	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
m, p - xylene	mg/kg	EPA5021	0.012	0.0091	0.0099	0.012	0.012	0.011	0.01	0.011	0.011

Parameter (or Determinant)	U. M.	Method	Test Certificate Code								
			19LA 0023743	19LA 0023744	19LA 0023745	19LA 0023750	19LA 0023751	19LA 0023752	19LA 0023757	19LA 0023758	19LA 0023759
			Stations								
			S18	S18	S18	S19	S19	S19	S20	S20	S20
			LoD								
		8260									
o - Xylene	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
Xylene	mg/kg	EPA5021 8260	0.012	0.0091	0.0099	0.012	0.012	0.011	0.01	0.011	0.011
BTEX (aromatic hydrocarbons)	mg/kg	EPA5021 8260	0.012	0.0091	0.0099	0.012	0.012	0.011	0.01	0.011	0.011
Benzo (a) anthracene	µg/kg	EPA3545 8270	1.1	1.1	1	0.28	0.26	0.5	1	0.5	1
Benzo (a) pyrene	µg/kg	EPA3545 8270	1.1	1.1	1	0.28	0.26	0.5	1	0.5	1
Benzo (b) fluoranthene	µg/kg	EPA3545 8270	1.1	1.1	1	0.28	0.26	0.5	1	0.5	1
Benzo (g,h,i) perylene	µg/kg	EPA3545 8270	1.1	1.1	1	0.28	0.26	0.5	1	0.5	1
Benzo (k) fluoranthene	µg/kg	EPA3545 8270	1.1	1.1	1	0.28	0.26	0.5	1	0.5	1
chrysene	µg/kg	EPA3545 8270	1.1	1.1	1	0.28	0.26	0.5	1	0.5	1
Dibenzo (a, h) anthracene	µg/kg	EPA3545 8270	1.1	1.1	1	0.28	0.26	0.5	1	0.5	1
Indeno (1,2,3-c, d) pyrene	µg/kg	EPA3545 8270	1.1	1.1	1	0.28	0.26	0.5	1	0.5	1
Pyrene	µg/kg	EPA3545 8270	1.1	1.1	1	0.28	0.26	0.5	1	0.5	1
Anthracene	µg/kg	EPA3545 8270	1.1	1.1	1	0.28	0.26	1	1	1	1
Fluoranthene	µg/kg	EPA3545 8270	1.1	1.1	1	0.28	0.26	1	1	1	1
Naphthalene	µg/kg	EPA3545 8270	1.1	1.1	1	0.28	0.26	1	1	1	1
Chloromethane	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
Dichloromethane	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
Trichloromethane (Chloroform)	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
Vinyl chloride	mg/kg	EPA5021 8260	0.0012	0.00091	0.00099	0.0012	0.0012	0.0011	0.001	0.0011	0.0011
1,2 - Dichloroethane	mg/kg	EPA5021 8260	0.0012	0.00091	0.00099	0.0012	0.0012	0.0011	0.001	0.0011	0.0011

Parameter (or Determinant)	U. M.	Method	Test Certificate Code								
			19LA 0023743	19LA 0023744	19LA 0023745	19LA 0023750	19LA 0023751	19LA 0023752	19LA 0023757	19LA 0023758	19LA 0023759
			Stations								
			S18	S18	S18	S19	S19	S19	S20	S20	S20
			LoD								
1,1 - Dichloroethylene	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
Trichlorethylene	mg/kg	EPA5021 8260	0.0012	0.00091	0.00099	0.0012	0.0012	0.0011	0.001	0.0011	0.0011
Tetrachlorethylene (PCE)	mg/kg	EPA5021 8260	0.0012	0.00091	0.00099	0.0012	0.0012	0.0011	0.001	0.0011	0.0011
1,1 - Dichloroethane	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
1,2 - Dichloroethylene	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
1,1,1 - Trichloroethane	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
1,2 - Dichloropropane	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
1,1,2 - Trichloroethane	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
1,2,3 - Trichloropropane	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
1,1,2,2 - Tetrachloroethane	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
Tribromomethane	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
1,2 - Dibromoethane	mg/kg	EPA5021 8260	0.0012	0.00091	0.00099	0.0012	0.0012	0.0011	0.001	0.0011	0.0011
Dibromochloromethane	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
Bromodichloromethane	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
Monochlorobenzene	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
1,2 - Dichlorobenzene	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
1,4 - Dichlorobenzene	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
1,2,4 - Trichlorobenzene	mg/kg	EPA5021 8260	0.0059	0.0046	0.005	0.0058	0.0058	0.0054	0.0052	0.0056	0.0055
(1,2,3,5 + 1,2,4,5) - Tetrachlorobenzene	mg/kg	EPA3545 8270	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Pentachlorobenzene	mg/kg	EPA3545 8270	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Hexachlorobenzene	mg/kg	EPA3545	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005

Parameter (or Determinant)	U. M.	Method	Test Certificate Code								
			19LA 0023743	19LA 0023744	19LA 0023745	19LA 0023750	19LA 0023751	19LA 0023752	19LA 0023757	19LA 0023758	19LA 0023759
			Stations								
			S18	S18	S18	S19	S19	S19	S20	S20	S20
			LoD								
		8270									
M.T.B.E.	mg/kg	EPA5021 8260	0.059	0.046	0.05	0.058	0.058	0.054	0.052	0.056	0.055
Aldrin	µg/kg	EPA3545 8270	0.053	0.053	0.051	0.055	0.053	0.048	0.051	0.052	0.051
alpha - hexachlorocyclohexane	µg/kg	EPA3545 8270	0.053	0.053	0.051	0.055	0.053	0.048	0.051	0.052	0.051
beta - hexachlorocyclohexane	µg/kg	EPA3545 8270	0.053	0.053	0.051	0.055	0.053	0.048	0.051	0.052	0.051
gamma - hexachlorocyclohexane (Lindane)	µg/kg	EPA3545 8270	0.053	0.053	0.051	0.055	0.053	0.048	0.051	0.052	0.051
2,4' - DDD	µg/kg	EPA3545 8270	1	1	1	1	1	1	1	1	1
2,4' - DDE	µg/kg	EPA3545 8270	1	1	1	1	1	1	1	1	1
2,4 DDT + 4,4 DDD	µg/kg	EPA3545 8270	1	1	1	1	1	1	1	1	1
4,4 - DDE	µg/kg	EPA3545 8270	1	1	1	1	1	1	1	1	1
4,4 - DDT	µg/kg	EPA3545 8270	1	1	1	1	1	1	1	1	1
DDD, DDT, DDE	µg/kg	EPA3545 8270	1	1	1	1	1	1	1	1	1
Dieldrin	µg/kg	EPA3545 8270	0.053	0.053	0.051	0.055	0.053	0.048	0.051	0.052	0.051
Hexachlorobenzene	µg/kg	EPA3545 8270	0.053	0.053	0.051	0.055	0.053	0.048	0.051	0.052	0.051
Total PCB (Aroclor 1242,1248,1254,1260)	mg/kg	EPA3545 8270	0.011	0.011	0.01	0.0028	0.0026	0.0024	0.01	0.01	0.01
Total PCBs (Aroclor 1242)	mg/kg	EPA3545 8270	0.011	0.011	0.01	0.0028	0.0026	0.0024	0.01	0.01	0.01
Total PCBs (Aroclor 1248)	mg/kg	EPA3545 8270	0.011	0.011	0.01	0.0028	0.0026	0.0024	0.01	0.01	0.01
Total PCBs (Aroclor 1254)	mg/kg	EPA3545 8270	0.011	0.011	0.01	0.0028	0.0026	0.0024	0.01	0.01	0.01
Total PCBs (Aroclor 1260)	mg/kg	EPA3545 8270	0.011	0.011	0.01	0.0028	0.0026	0.0024	0.01	0.01	0.01
Hydrocarbons C<=12	mg/kg	EPA5021 8015	0.28	0.22	0.24	0.28	0.28	0.26	0.25	0.27	0.26
Hydrocarbons C>12	µg/kg	UNI14039	2400	2400	2300	2500	2300	2100	2200	2300	2500

Table 3.7 - Analytical methodologies for sediment analyses in Nearshore Gela (S21-S30)

Parameter (or Determinant)	U. M.	Method	Test Certificate Code									
			19LA 0046165	19LA 0046352	19LA 0046179	19LA 0046185	19LA 0046319	19LA 0046358	19LA 0046189	19LA 0046191	19LA 0046323	19LA 0046364
			Stations									
			S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
			LoD									
Alumium	mg/kg	EPA3051 6020	11	11	11	10	11	11	11	10	11	11
Antimony	mg/kg	EPA3051 6020	0.54	0.53	0.53	0.52	0.53	0.54	0.55	0.51	0.55	0.57
Beryllium	mg/kg	EPA3051 6020	0.11	0.11	0.11	0.1	0.11	0.11	0.11	0.1	0.11	0.11
Cadmium	mg/kg	EPA3051 6020	0.022	0.021	0.021	0.021	0.021	0.022	0.022	0.021	0.022	0.023
Arsenic	mg/kg	EPA3051 6020	0.22	0.21	0.21	0.21	0.21	0.22	0.22	0.21	0.22	0.23
Cobalt	mg/kg	EPA3051 6020	1.1	1.1	1.1	1	1.1	1.1	1.1	1	1.1	1.1
Chromium (VI)	mg/kg	EPA3060 7196	3.8	3.8	3.8	4.2	3.9	3.9	3.9	4.2	3.8	4
Chromium	mg/kg	EPA3051 6020	1.1	1.1	1.1	1	1.1	1.1	1.1	1	1.1	1.1
Nickel	mg/kg	EPA3051 6020	0.22	0.21	0.21	0.21	0.21	0.22	0.22	0.21	0.22	0.23
Mercury	mg/kg	EPA3051 6020	0.011	0.011	0.011	0.01	0.011	0.011	0.011	0.01	0.011	0.011
Lead	mg/kg	EPA3051 6020	1.1	1.1	1.1	1	1.1	1.1	1.1	1	1.1	1.1
Copper	mg/kg	EPA3051 6020	1.1	1.1	1.1	1	1.1	1.1	1.1	1	1.1	1.1
Selenium	mg/kg	EPA3051 6020	0.11	0.11	0.11	0.1	0.11	0.11	0.11	0.1	0.11	0.11
Tin	mg/kg	EPA3051 6020	1.1	1.1	1.1	1	1.1	1.1	1.1	1	1.1	1.1
Thallium	mg/kg	EPA3051 6020	0.054	0.053	0.053	0.052	0.053	0.054	0.055	0.051	0.055	0.057
Vanadium	mg/kg	EPA3051 6020	1.1	1.1	1.1	1	1.1	1.1	1.1	1	1.1	1.1
Zinc	mg/kg	EPA3051 6020	1.1	1.1	1.1	1	1.1	1.1	1.1	1	1.1	1.1
Iron	mg/kg	EPA3051 6020	11	11	11	10	11	11	11	10	11	11
TBT	µg/kg	ICRAMApp 1	0.89	0.91	0.93	1.1	1	1.1	0.98	1.1	1	1.1
Benzene	mg/kg	EPA5021 8260	0.00079	0.001	0.00072	0.00077	0.00079	0.0009	0.00081	0.00093	0.00087	0.00091
Ethylbenzene	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
Styrene	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
Toluene	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
m, p - xylene	mg/kg	EPA5021 8260	0.0079	0.01	0.0072	0.0077	0.0079	0.009	0.0081	0.0093	0.0087	0.0091
o - Xylene	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
Xylene	mg/kg	EPA5021 8260	0.0079	0.01	0.0072	0.0077	0.0079	0.009	0.0081	0.0093	0.0087	0.0091
BTEX (aromatic hydrocarbons)	mg/kg	EPA5021 8260	0.0079	0.01	0.0072	0.0077	0.0079	0.009	0.0081	0.0093	0.0087	0.0091
Pyrene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
Indeno (1,2,3-c, d) pyrene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
Dibenzo (a, h) anthracene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
chrysene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
Benzo (a) anthracene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
Benzo (a) pyrene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
Benzo (b) fluoranthene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
Benzo (e) pyrene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
Benzo (g,h,i) perylene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
Benzo (j) fluoranthene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
Benzo (k) fluoranthene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27

Parameter (or Determinant)	U. M.	Method	Test Certificate Code									
			19LA 0046165	19LA 0046352	19LA 0046179	19LA 0046185	19LA 0046319	19LA 0046358	19LA 0046189	19LA 0046191	19LA 0046323	19LA 0046364
			Stations									
			S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
			LoD									
Anthracene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
Fluoranthene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
Naphthalene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
Chloromethane	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
Dichloromethane	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
Trichloromethane (Chloroform)	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
Vinyl chloride	mg/kg	EPA5021 8260	0.00079	0.001	0.00072	0.00077	0.00079	0.0009	0.00081	0.00093	0.00087	0.00091
1,2 - Dichloroethane	mg/kg	EPA5021 8260	0.00079	0.001	0.00072	0.00077	0.00079	0.0009	0.00081	0.00093	0.00087	0.00091
1,1 - Dichloroethylene	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
Trichlorethylene	mg/kg	EPA5021 8260	0.00079	0.001	0.00072	0.00077	0.00079	0.0009	0.00081	0.00093	0.00087	0.00091
Tetrachlorethylene (PCE)	mg/kg	EPA5021 8260	0.00079	0.001	0.00072	0.00077	0.00079	0.0009	0.00081	0.00093	0.00087	0.00091
1,1 - Dichloroethane	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
1,2 - Dichloroethylene	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
1,1,1 - Trichloroethane	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
1,2 - Dichloropropane	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
1,1,2 - Trichloroethane	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
1,2,3 - Trichloropropane	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
1,1,2,2 - Tetrachloroethane	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
Tribromomethane	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
1,2 - Dibromoethane	mg/kg	EPA5021 8260	0.00079	0.001	0.00072	0.00077	0.00079	0.0009	0.00081	0.00093	0.00087	0.00091
Dibromochloromethane	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
Bromodichloromethane	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
Monochlorobenzene	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
1,2 - Dichlorobenzene	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
1,4 - Dichlorobenzene	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
1,2,4 - Trichlorobenzene	mg/kg	EPA5021 8260	0.004	0.005	0.0036	0.0039	0.004	0.0045	0.004	0.0047	0.0044	0.0046
1,2,4,5 - Tetrachlorobenzene	mg/kg	EPA3545 8270	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
(1,2,3,5 + 1,2,4,5) - Tetrachlorobenzene	mg/kg	EPA3545 8270	0.0025	0.00051	0.0005	0.00047	0.00049	0.0005	0.0005	0.00048	0.00051	0.00054
Pentachlorobenzene	mg/kg	EPA3545 8270	0.0012	0.00025	0.00025	0.00023	0.00025	0.00025	0.00025	0.00024	0.00025	0.00027
Hexachlorobenzene	mg/kg	EPA3545 8270	0.0012	0.00025	0.00025	0.00023	0.00025	0.00025	0.00025	0.00024	0.00025	0.00027
M.T.B.E.	mg/kg	EPA5021 8260	0.04	0.05	0.036	0.039	0.04	0.045	0.04	0.047	0.044	0.046
Aldrin	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
alpha - hexachlorocyclohexane	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
beta - hexachlorocyclohexane	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
gamma - hexachlorocyclohexane (Lindane)	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
2,4 DDT + 4,4 DDD	µg/kg	EPA3545 8270	2.5	0.51	0.5	0.47	0.49	0.5	0.5	0.48	0.51	0.54
2,4' - DDD	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27

Parameter (or Determinant)	U. M.	Method	Test Certificate Code									
			19LA 0046165	19LA 0046352	19LA 0046179	19LA 0046185	19LA 0046319	19LA 0046358	19LA 0046189	19LA 0046191	19LA 0046323	19LA 0046364
			Stations									
			S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
			LoD									
2,4' - DDE	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
4,4 - DDE	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
4,4 - DDT	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
DDD, DDT, DDE	µg/kg	EPA3545 8270	2.5	0.51	0.5	0.47	0.49	0.5	0.5	0.48	0.51	0.54
Dieldrin	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
Hexachlorobenzene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.25	0.25	0.24	0.25	0.27
PCB101	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB105	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB110	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB114	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB118	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB123	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB126	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB128	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB138	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB146	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB151	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB153	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB156	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB157	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB167	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB169	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB170	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB177	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB180	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB183	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB187	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB189	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB28	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB52	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB77	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB81	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB95	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
PCB99	mg/kg	EPA3545 8270	0.00025	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
Total PCB	mg/kg	EPA3545 8270	0.000051	0.000051	0.00005	0.000047	0.000049	0.00005	0.00005	0.000048	0.000051	0.000054
Hydrocarbons C<=12	mg/kg	EPA5021 8015	0.19	0.24	0.17	0.19	0.19	0.22	0.19	0.22	0.21	0.22
Hydrocarbons C>12	µg/kg	UNI14039	2100	2200	2200	2100	2100	2200	2200	2100	2200	2200
Methylmercury (MeHg)	µg/kg	M.I.EPA1630	10	10	10	10	10	10	10	10	10	10
Fecal Streptococci count (Enterococci)	MPN/g	CNR3.3 64 + APAT 7040 B	10	10	10	10	10	10	10	10	10	10

Parameter (or Determinant)	U. M.	Method	Test Certificate Code									
			19LA 0046165	19LA 0046352	19LA 0046179	19LA 0046185	19LA 0046319	19LA 0046358	19LA 0046189	19LA 0046191	19LA 0046323	19LA 0046364
			Stations									
			S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
			LoD									
Total Coliform Count	MPN/g	CNR3.1 64 + APAT 7010 B	10	10	10	10	10	10	10	10	10	10
Escherichia coli count	MPN/g	CNR3.1 64 + APAT 7030 B	10	10	10	10	10	10	10	10	10	10
Spore counts of sulphite-reducing anaerobes	MPN/g	CNR3.4 64 + APAT 7060 A	10	10	10	10	10	10	10	10	10	10
Salmonella research	Pres.Ass/25g	CNR3.5 64	-	-	-	-	-	-	-	-	-	-
Staphylococci count	ufc/g	RapIST2006/31 pag 8	10	10	10	10	10	10	10	10	10	10
Yeast and ifomicetes count	ufc/g	CNR5 64	10	10	10	10	10	10	10	10	10	10

Table 3.8 - Analytical methodologies for sediment analyses in Nearshore Gela (S31-S40)

Parameter (or Determinant)	U. M.	Method	Test Certificate Code									
			19LA 0046197	19LA 0046201	19LA 0046171	19LA 0046370	19LA 0046211	19LA 0046175	19LA 0046327	19LA 0046376	19LA 0046382	19LA 0046331
			Stations									
			S31	S32	S33	S34	S35	S36	S37	S38	S39	S40
			LoD									
Alumium	mg/kg	EPA3051 6020	11	10	11	10	11	11	10	11	11	12
Antimony	mg/kg	EPA3051 6020	0.54	0.52	0.54	0.51	0.54	0.53	0.52	0.56	0.53	0.59
Beryllium	mg/kg	EPA3051 6020	0.11	0.1	0.11	0.1	0.11	0.11	0.1	0.11	0.11	0.12
Cadmium	mg/kg	EPA3051 6020	0.022	0.021	0.022	0.02	0.022	0.021	0.021	0.022	0.021	0.024
Arsenic	mg/kg	EPA3051 6020	0.22	0.21	0.22	0.2	0.22	0.21	0.21	0.22	0.21	0.24
Cobalt	mg/kg	EPA3051 6020	1.1	1	1.1	1	1.1	1.1	1	1.1	1.1	1.2
Chromium (VI)	mg/kg	EPA3060 7196	4	3.8	3.9	3.8	4	4	4.1	3.9	4	3.9
Chromium	mg/kg	EPA3051 6020	1.1	1	1.1	1	1.1	1.1	1	1.1	1.1	1.2
Nickel	mg/kg	EPA3051 6020	0.22	0.21	0.22	0.2	0.22	0.21	0.21	0.22	0.21	0.24
Mercury	mg/kg	EPA3051 6020	0.011	0.01	0.011	0.01	0.011	0.011	0.01	0.011	0.011	0.012
Lead	mg/kg	EPA3051 6020	1.1	1	1.1	1	1.1	1.1	1	1.1	1.1	1.2
Copper	mg/kg	EPA3051 6020	1.1	1	1.1	1	1.1	1.1	1	1.1	1.1	1.2
Selenium	mg/kg	EPA3051 6020	0.11	0.1	0.11	0.1	0.11	0.11	0.1	0.11	0.11	0.12
Tin	mg/kg	EPA3051 6020	1.1	1	1.1	1	1.1	1.1	1	1.1	1.1	1.2
Thallium	mg/kg	EPA3051 6020	0.054	0.052	0.054	0.051	0.054	0.053	0.052	0.056	0.053	0.059
Vanadium	mg/kg	EPA3051 6020	1.1	1	1.1	1	1.1	1.1	1	1.1	1.1	1.2
Zinc	mg/kg	EPA3051 6020	1.1	1	1.1	1	1.1	1.1	1	1.1	1.1	1.2
Iron	mg/kg	EPA3051 6020	11	10	11	10	11	11	10	11	11	12
TBT	µg/kg	ICRAMApp 1	1	0.91	1	0.94	1.1	0.98	0.92	1	0.94	1.1
Benzene	mg/kg	EPA5021 8260	0.00067	0.0008	0.00098	0.00084	0.00075	0.00094	0.00094	0.00081	0.00075	0.00091

Parameter (or Determinant)	U. M.	Method	Test Certificate Code									
			19LA 0046197	19LA 0046201	19LA 0046171	19LA 0046370	19LA 0046211	19LA 0046175	19LA 0046327	19LA 0046376	19LA 0046382	19LA 0046331
			Stations									
			S31	S32	S33	S34	S35	S36	S37	S38	S39	S40
			LoD									
Ethylbenzene	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
Styrene	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
Toluene	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
m, p - xylene	mg/kg	EPA5021 8260	0.0067	0.008	0.0098	0.0084	0.0075	0.0094	0.0094	0.0081	0.0075	0.0091
o - Xylene	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
Xylene	mg/kg	EPA5021 8260	0.0067	0.008	0.0098	0.0084	0.0075	0.0094	0.0094	0.0081	0.0075	0.0091
BTEX (aromatic hydrocarbons)	mg/kg	EPA5021 8260	0.0067	0.008	0.0098	0.0084	0.0075	0.0094	0.0094	0.0081	0.0075	0.0091
Pyrene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Indeno (1,2,3-c, d) pyrene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Dibenzo (a, h) anthracene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
chrysene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Benzo (a) anthracene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Benzo (a) pyrene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Benzo (b) fluoranthene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Benzo (e) pyrene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Benzo (g,h,i) perylene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Benzo (j) fluoranthene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Benzo (k) fluoranthene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Anthracene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Fluoranthene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Naphthalene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Chloromethane	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
Dichloromethane	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
Trichloromethane (Chloroform)	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
Vinyl chloride	mg/kg	EPA5021 8260	0.00067	0.0008	0.00098	0.00084	0.00075	0.00094	0.00094	0.00081	0.00075	0.00091
1,2 - Dichloroethane	mg/kg	EPA5021 8260	0.00067	0.0008	0.00098	0.00084	0.00075	0.00094	0.00094	0.00081	0.00075	0.00091
1,1 - Dichloroethylene	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
Trichlorethylene	mg/kg	EPA5021 8260	0.00067	0.0008	0.00098	0.00084	0.00075	0.00094	0.00094	0.00081	0.00075	0.00091
Tetrachlorethylene (PCE)	mg/kg	EPA5021 8260	0.00067	0.0008	0.00098	0.00084	0.00075	0.00094	0.00094	0.00081	0.00075	0.00091
1,1 - Dichloroethane	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
1,2 - Dichloroethylene	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
1,1,1 - Trichloroethane	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
1,2 - Dichloropropane	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
1,1,2 - Trichloroethane	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
1,2,3 - Trichloropropane	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
1,1,2,2 - Tetrachloroethane	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
Tribromomethane	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
1,2 - Dibromoethane	mg/kg	EPA5021 8260	0.00067	0.0008	0.00098	0.00084	0.00075	0.00094	0.00094	0.00081	0.00075	0.00091
Dibromochloromethane	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
Bromodichloromethane	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046

Parameter (or Determinant)	U. M.	Method	Test Certificate Code									
			19LA 0046197	19LA 0046201	19LA 0046171	19LA 0046370	19LA 0046211	19LA 0046175	19LA 0046327	19LA 0046376	19LA 0046382	19LA 0046331
			Stations									
			S31	S32	S33	S34	S35	S36	S37	S38	S39	S40
			LoD									
Monochlorobenzene	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
1,2 - Dichlorobenzene	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
1,4 - Dichlorobenzene	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
1,2,4 - Trichlorobenzene	mg/kg	EPA5021 8260	0.0034	0.004	0.0049	0.0042	0.0037	0.0047	0.0047	0.004	0.0037	0.0046
1,2,4,5 - Tetrachlorobenzene	mg/kg	EPA3545 8270	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
(1,2,3,5 + 1,2,4,5) - Tetrachlorobenzene	mg/kg	EPA3545 8270	0.0024	0.00051	0.00051	0.00047	0.00051	0.00048	0.00048	0.0027	0.00051	0.0026
Pentachlorobenzene	mg/kg	EPA3545 8270	0.0012	0.00025	0.00025	0.00023	0.00025	0.00024	0.00024	0.0014	0.00025	0.0013
Hexachlorobenzene	mg/kg	EPA3545 8270	0.0012	0.00025	0.00025	0.00023	0.00025	0.00024	0.00024	0.0014	0.00025	0.0013
M.T.B.E.	mg/kg	EPA5021 8260	0.034	0.04	0.049	0.042	0.037	0.047	0.047	0.04	0.037	0.046
Aldrin	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
alpha - hexachlorocyclohexane	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
beta - hexachlorocyclohexane	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
gamma - hexachlorocyclohexane (Lindane)	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
2,4 DDT + 4,4 DDD	µg/kg	EPA3545 8270	2.4	0.51	0.51	0.47	0.51	0.48	0.48	2.7	0.51	2.6
2,4' - DDD	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
2,4' - DDE	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
4,4 - DDE	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
4,4 - DDT	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
DDD, DDT, DDE	µg/kg	EPA3545 8270	2.4	0.51	0.51	0.47	0.51	0.48	0.48	2.7	0.51	2.6
Dieldrin	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
Hexachlorobenzene	µg/kg	EPA3545 8270	1.2	0.25	0.25	0.23	0.25	0.24	0.24	1.4	0.25	1.3
PCB101	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB105	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB110	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB114	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB118	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB123	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB126	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB128	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB138	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB146	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB151	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB153	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB156	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB157	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB167	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB169	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026

Parameter (or Determinant)	U. M.	Method	Test Certificate Code									
			19LA 0046197	19LA 0046201	19LA 0046171	19LA 0046370	19LA 0046211	19LA 0046175	19LA 0046327	19LA 0046376	19LA 0046382	19LA 0046331
			Stations									
			S31	S32	S33	S34	S35	S36	S37	S38	S39	S40
			LoD									
PCB170	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB177	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB180	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB183	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB187	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB189	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB28	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB52	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB77	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB81	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB95	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
PCB99	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
Total PCB	mg/kg	EPA3545 8270	0.00024	0.000051	0.000051	0.000047	0.000051	0.000048	0.000048	0.00027	0.000051	0.00026
Hydrocarbons C<=12	mg/kg	EPA5021 8015	0.16	0.19	0.24	0.2	0.18	0.23	0.23	0.19	0.18	0.22
Hydrocarbons C>12	µg/kg	UNI14039	2200	2100	2200	2100	2300	2200	2100	2400	2200	2400
Fecal Streptococci count (Enterococci)	MPN/g	CNR3.3 64 + APAT 7040 B	10	10	10	10	10	10	10	10	10	10
Total Coliform Count	MPN/g	CNR3.1 64 + APAT 7010 B	10	10	10	10	10	10	10	10	10	10
Escherichia coli count	MPN/g	CNR3.1 64 + APAT 7030 B	10	10	10	10	10	10	10	10	10	10
Spore counts of sulphite-reducing anaerobes	MPN/g	CNR3.4 64 + APAT 7060 A	10	10	10	10	10	10	10	10	10	10
Salmonella research	Pres.Ass/25g	CNR3.5 64	-	-	-	-	-	-	-	-	-	-
Staphylococci count	ufc/g	RapIST2006/31 pag 8	10	10	10	10	10	10	10	10	10	10
Yeast and ifomicetes count	ufc/g	CNR5 64	10	10	10	10	10	10	10	10	10	10

Values of LOD applied by the laboratory are always studied according to the experimental conditions. The amount of processed sample, the extraction volume, any dilutions and all the calculations for the data (i.e. expression on dry matter) affect and modify LOD values studied in ideal conditions.

While defining the LoD for water is a quite simple operation, given the negligible uncertainty on the quantity of sample used for the analyses, for sediments the definition of LoD is related to both the uncertainty derived by weighing of the analysed sample and the residual moisture level of the same, which does not affect the water samples. Therefore, the LoD varies amongst sediment samples depending on these factors.

3.9.0 Macrobenthos

Macrofauna was collected with the use of a Box corer size 32x32x50cm and a Van Veen grab (in Nearshore Gela sampling locations). After a preliminary description of the sediment surface, each sample has been placed in a plastic container and sieved through a 0.5mm mesh net and the sieved material has been treated as described below.

The sample was removed from the gear and placed in an appropriate container. A washing desk was equipped with a wide and smooth surface, on which samples were gently washed using pre-screened seawater in order to separate the fauna and the sediment larger than 1mm from finer sediments. Low-pressure seawater was used in order to avoid any damage to the organisms collected. Silty-clay aggregates have been dissolved by gentle manipulation of the sieves (Eleftheriou and Holme, 1984; Kingston and Riddle, 1989). The material retained by the sieve was gently accumulated at the edge of the sieve and collected carefully into the labelled containers. Then the sieve was carefully inspected to check for the presence of further organisms in the mesh. The sieve mesh was washed by means of a low-pressure seawater flow again. Once the material was completely removed and stored in the appropriate containers, the sieve was vigorously washed and cleaned with a brush to avoid any possible contamination of subsequent samples to be sorted out. After the sieving operation was completed, the remaining material (organisms, shell fragments, vegetal debris, coarse sediment, and any other matter) were transferred to the appropriate containers.

Samples have been fixed in 10% buffered formalin solution and stored at room temperature until their analysis. In the laboratory, samples were sorted under binocular and at low magnification, macrofauna was divided into main taxonomic groups. Rose of Bengal was added to stain the samples. The process of staining can take place at any moment prior to identification analysis. Identification keys and books are presented below in the reference section. Samples have been kept and preserved in alcohol.

Once the sediment samples were sorted and marine organisms were identified, a number of biodiversity indices were calculated:

- **Number of individuals (N):** for each sample (total number);
- **Species number (S)**: for each sample;

Shannon and Weaver (H')

The diversity index of Shannon (H ') was calculated as follows:

$$H' = -\sum_{i=1}^{S} p_i \log_2 p_i$$

Where "p_i" is the proportion of individuals belonging to the i^{th} species in the dataset of interest.

- **Eveness of Pielou (J)**

The evenness index (J) of Pielou, indicates how the abundance of each species/taxon is distributed among different species/taxa (equitability), it was calculated as follows:

$$J = \frac{H'}{\log_2 S}$$

where H 'is the Shannon index and Hmax is the maximum diversity (i.e., $\log_2$ of the number of species).

- **Margalef (D)**

The Margalef index was used as a measure of species richness. It is the number of species (S) minus 1 divided by the natural logarithm of the total number of individuals (N).

$$D = S - 1 \ln N$$

Where S is the total number of species; N is the total number of individuals in the sample; ln is the natural logarithm.

- **Simpson (D)**

Simpson's index (D) is a measure of diversity, which takes into account both species richness, and an evenness of abundance among the species present.

$$1 - \sum_{i=1}^{k} \frac{n_i(n_i - 1)}{n(n-1)}$$

In essence it measures the probability that two individuals randomly selected from an area will belong to the same species. The formula for calculating D is presented as:

- **AMBI (ATZI's Marine Biotic Index)**

AMBI index (Borja et al., 2000) (Table 3.10), was designed to establish the ecological quality of European coasts. The index examined the response of soft-bottom benthic communities to natural and man-induced disturbances in coastal and estuarine environments. It's based on species sensitivity/tolerance.

This is derived from the proportions of individual abundance in *five ecological groups*, which are related to the degree of sensitivity/tolerance to an environmental stress gradient.

These groups have been summarized by Grall and Glémarec (1997), as outlined below:

Table 3.9 – Macrofauna sensitivity groups

GROUP I	Species very sensitive to organic enrichment and present under unpolluted conditions (initial state). They include the specialist carnivores and some deposit-feeding tubicolous polychaetes.
GROUP II	Species indifferent to enrichment, always present in low densities with non-significant variations with time (from initial state, to slight unbalance). These include suspension feeders, less selective carnivores and scavengers.
GROUP III	Species tolerant to excess organic matter enrichment. These species may occur under normal conditions, but their populations are stimulated by organic richment (slight unbalance situations). They are surface deposit-feeding species, as tubicolous spionids.
GROUP IV	Second-order opportunistic species (slight to pronounced unbalanced situations). Mainly small sized polychaetes: subsurface deposit-feeders, such as cirratulids.
GROUP V	First-order opportunistic species (pronounced unbalanced situations). These are deposit-feeders, which proliferate in reduced sediments.

Table 3.10 - Summary of the AMBI values and their equivalences

Biotic coefficient	Dominating ecological group	Benthic community health	Site disturbance classification	Ecological status
$0.0 < AMBI \leq 0.2$	I	Normal	Undisturbed	High
$0.2 < AMBI \leq 1.2$	II	Impoverished		
$1.2 < AMBI \leq 3.3$	III	Unbalanced	Slightly disturbed	Good
$3.3 < AMBI \leq 4.3$	IV-V	Transitional to pollution	Moderately disturbed	Moderate
$4.3 < AMBI \leq 5.0$		Polluted		Poor
$5.0 < AMBI \leq 5.5$	V	Transitional to heavy pollution	Heavily disturbed	
$5.5 < AMBI \leq 6.0$		Heavily polluted		Bad

AMBI, AZTI Marine Biotic Index.

- **M-AMBI (Multivariate AMBI)**

M-AMBI is an extension of the AZTI Marine Biotic Index (AMBI). It's a multimetric index for assessing the ecological quality status of marine and transitional waters (Sigovini et al., 2013). It's based on benthic macroinvertebrates and integrated AMBI (Table 3.11).

It is a cumulative index recently developed by Muxika et al. (2007), in which the Shannon diversity index, AMBI index and Number of species (S) are combined, with the aim of integrating into a single index more descriptive variables of the benthic communities. Values assumed by the index are then partitioned into different classes (different ecological status).

Table 3.11 - Threshold values of the m-AMBI index for the classification of the area

Biotic coefficient	Ecological status
0.82 < M-AMBI	High
0.62 ≤ M-AMBI ≤ 0.82	Good
0.41 ≤ M-AMBI ≤ 0.61	Moderate
0.20 ≤ M-AMBI ≤ 0.40	Poor
0,00 ≤ M-AMBI < 0.20	Bad

- **BENTIX INDEX**

The BENTIX index (Simboura & Zenetos, 2002) was developed for the purposes of the European Water Framework Directive 2000/60/EC (WFD) and for the assessment of the ecological quality status of benthic macroinvertebrates' communities. The BENTIX index is a biotic index based on the concept of indicator groups and uses the relative contribution of tolerant and sensitive taxa in general, weighting them accordingly to the ratio of their occurrence in the benthic fauna by definition. The metric renders a five step numerical scheme for the classification of benthic communities (Table 3.12).

Table 3.12 - Classification of EcoQS and threshold values according to ranges of BENTIX

Pollution Classification	BENTIX	EQS WFD	BENTIX in physically stressed muds
Normal/Pristine	4.5 < BENTIX < 6	High	4 < BENTIX < 6
Slightly polluted	3.5 < BENTIX < 4.5	Good	3.0 < BENTIX < 4.0
Moderately polluted	2.5 < BENTIX < 3.5	Moderate	2.5 < BENTIX < 3.0
Heavily polluted	2 < BENTIX < 2.5	Poor	
Azotic	Azotic	Bad	

In the following table a summary of biotic indices is indicated:

Table 3.13 - Classification of EcoQS according to ranges of AMBI, BENTIX, H' and M_AMBI; the Water Framework Directive status is also reported.

Pollution classification	AMBI	BENTIX	H'	M-AMBI	WFD status
Unpolluted/normal	≤ 1.2	4.0 – 6.0	>4.6	> 0.80	High
Slightly polluted	1.3 – 3.3	3.0 – 3.9	4.1 – 4.6	0.60 – 0.80	Good
Moderate polluted	3.4 – 4.3	2.5 – 2.9	3.1 – 4.0	0.40 – 0.59	Moderate

Pollution classification	AMBI	BENTIX	H'	M-AMBI	WFD status
Heavily polluted	4.4 – 5.5	2.0 – 2.4	1.6 – 3.0	0.20 – 0.39	Poor
Extremely polluted/Azotic	5.6 – 6.0	< 2	≤ 1.5	<0.20	Bad
AMBI (Muxika et al., 2005) **BENTIX (UNEP/MAP, 2005)** **H' (UNEP/MAP, 2005)** **M-AMBI (Muxika et al., 2007)**					

Five quality classes (QCs) are defined by the Water Framework Directive (WFD) on the basis of the ecological quality ratio (EQR) and are shown in the following pictures:

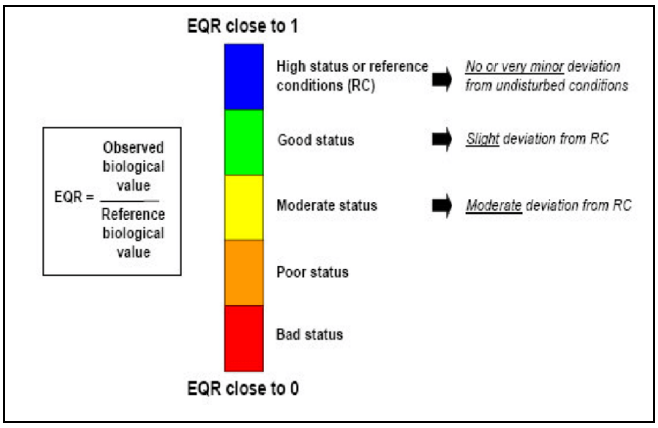


Figure 3.9 – EQR and five quality classes for the different levels of ecological status

3.10.0 Water Quality Indeces

- **TRIX (Trophic Index)**

The TRIX index is identified in D.Lgs. 152/99 to define the trophic status assessment of coastal waters.

Its numerical value is the results of four variables (Dissolved Oxygen, Chlorophyll "a", Total Phosphorus and Dissolved Inorganic Nitrogen), indicative of the main components that characterize the primary production of marine ecosystems (nutrients and phytoplankton biomass).

TRIX is divided in 4 groups summarized below:

Table 3.14 – TRIX scale: Water quality classification

Trophic scale	Conditions	Trophic status
2-4	Water poorly productive Low trophic status	High (Oligotrophic)
4-5	Water moderately productive Medium trophic status	Good (Mesotrophic)
5-6	Water moderate to hightly productive Hight trophic status	Moderate (Mesotrophic to Eutrophic)
6-8	Water highly productive Highest trophic status	Poor (Eutrophic)

These groups correspond to 4 different quality classes associated with the trophic conditions and to the environmental state of the coastal marine environment.

- **CAM (Classificazione Acque Marine – Classification of Marine Waters)**

CAM index is defined in the framework of the *Si.Di.mar* as "Classificazione Acque Marine". Its values provide information about water quality based on oceanographic data such as nitrates, nitrites, ammonia, phosphates, silicates, salinity, transparency, chlorophyll "a".

This index is divided in 3 classes: The first class (Class 1) refers to the highest quality, while the last class (Class 3) refers to the worst quality.

Table 3.15 - CAM classes: Water quality condition

Classi **(Classes)**	**Classi sintetiche** **(Syntetic Classes)**	**Condizioni delle acque** **(Seawater Quality Status)**
1	Blue	Oligotrophic Waters
2	Green	Waters with different degree of eutrophication, but productive from the ecological point of view; therefore they are functionally intact.
3	Yellow	Eutrophic waters with evidence of environmental alterations.

4.0.0 **ENVIRONMENTAL SURVEY RESULTS**

This section presents the results of the analyses carried out on the samples collected during the offshore campaign.

4.1.0 Summary of Results

Environmental campaign and locations were planned based upon the results of the geophysical data.

The locations were planned along the survey route keeping in mind to sample at least 500m away from each cable or pipeline present on the surveyed corridor, Ref (Lighthouse procedure in agreement with ICPC Recommendations No.15, Issue 1, and section 3.1.).

Locations of factual samples (Sediment sampling and Water samplings) are shown below in Figure 4.1 (Italian side), in Figure 4.2 (Maltese side) and in Figure 4.3 (Nearshore Gela).

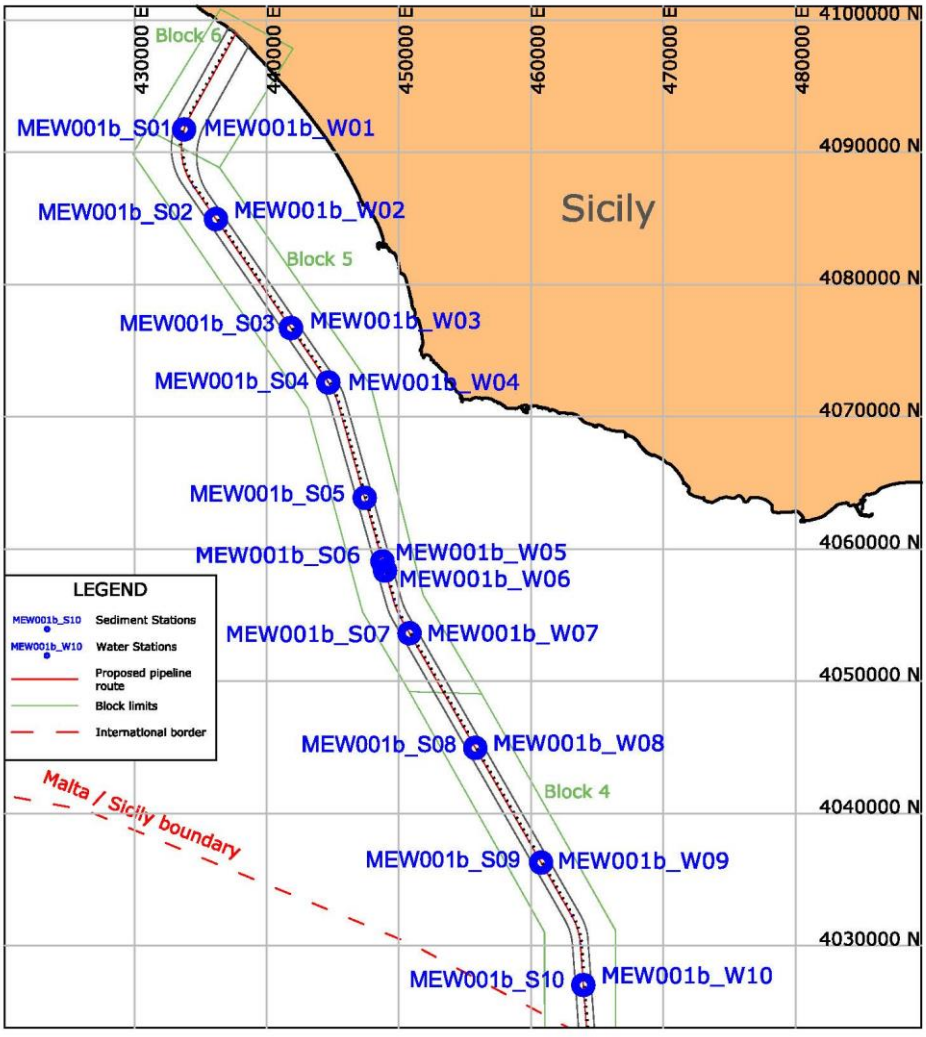


Figure 4.1 – Sketch of Sediment and Water sampling on Italy side

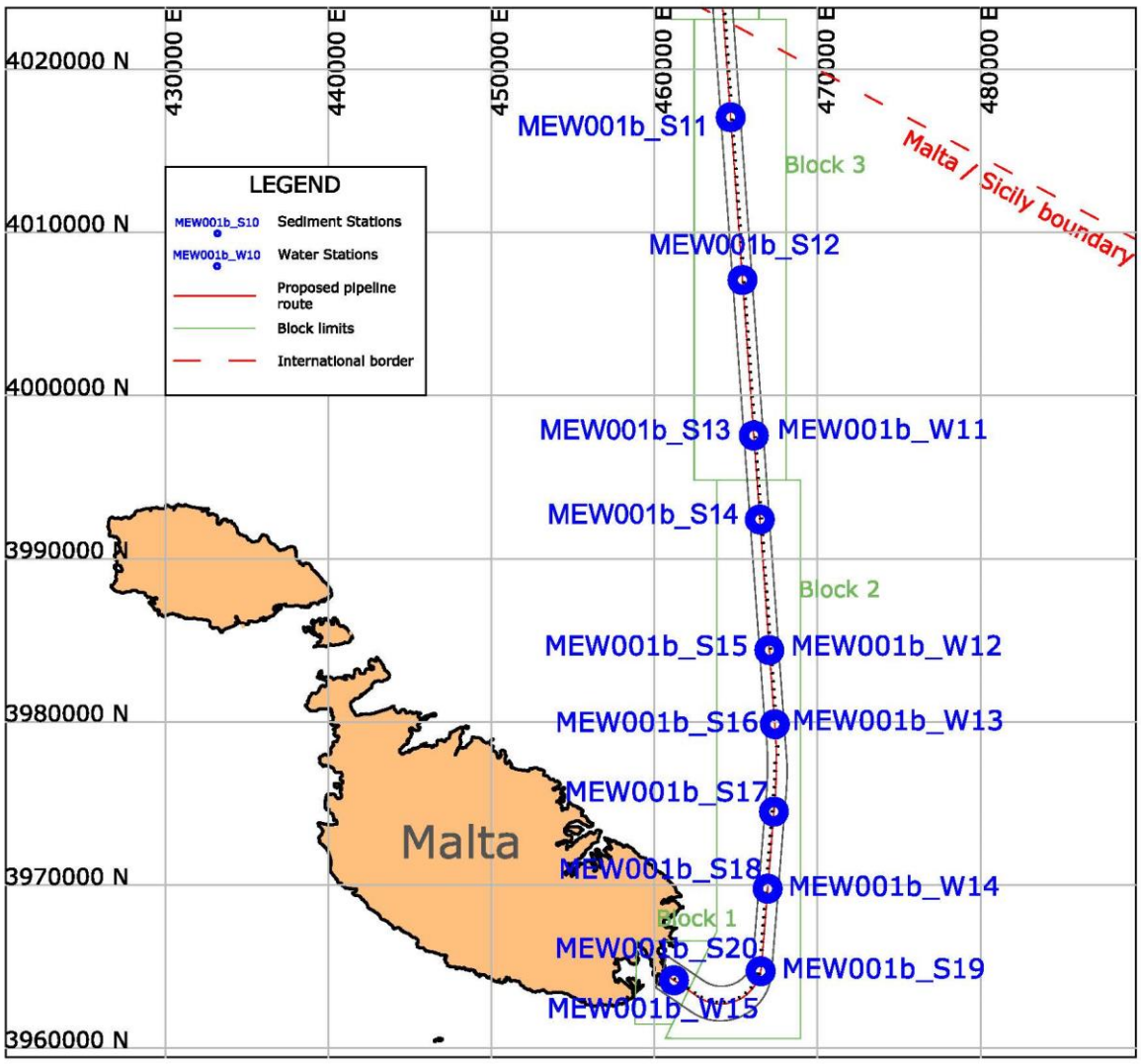


Figure 4.2 – Sketch of Sediment and Water sampling on Malta side

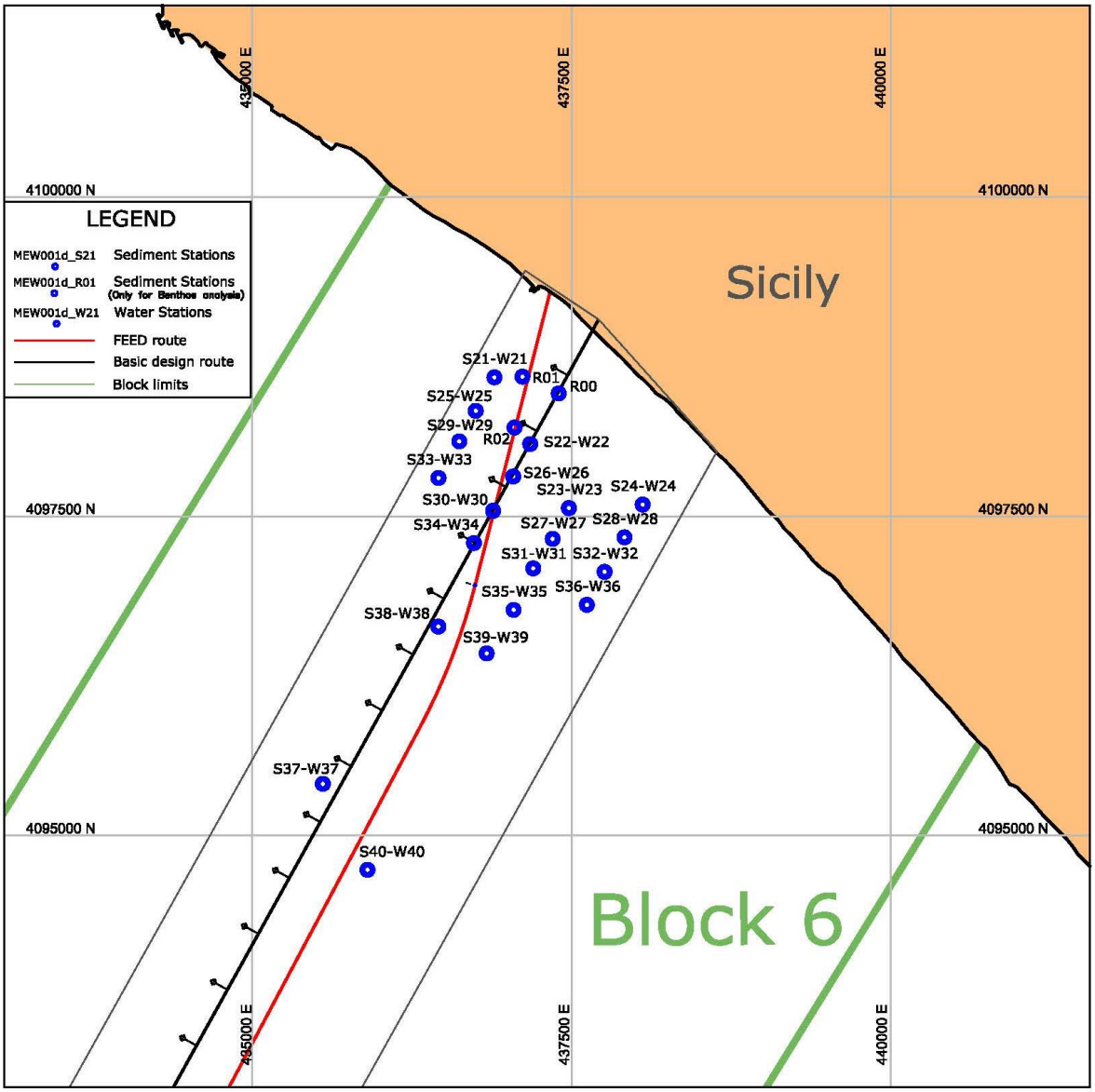


Figure 4.3 - Sketch of Sediment and Water sampling on Nearshore Gela

A total of forty (40) sediment (plus 3 station only for Benthos) and thirty-five (35) water sampling locations have been performed along the route by means, respectively, of Box corer, Van Veen grab, 5L Niskin bottles and Plankton nets.

The total number of collected samples, analysed from the laboratory is shown in tables below:

Table 4.1 – Total number of Sediment analysed samples

	Type of Analysis (Sediments)							
	Sediment Quality	**SRB test**	**Grain size analyses**	**Microbiological analyses**	**Radioactive compounds**	**Methylmercury**	**Benthos**	**Sum**
Italy	30	10	-	-	-	-	-	40
Malta	90	10	-	-	-	-	30	130
Nearshore Gela	60	-	20	20	20	20	20	160

Table 4.2 – Total number of Water analysed samples

	Type of Analysis (Waters)					
	Water Quality	**Only Nutrients**	**Chlorophyll**	**Phytoplankton**	**Zooplankton**	**Sum**
Italy	210	-	10	10	-	230
Malta	-	60	5	30	5	100
Nearshore Gela	60	-	20	20	20	120

4.2.0 Physical characteristics of sediments

4.2.1 Macroscopic features

A total of 40 sediment sampling locations have been performed by means of a box corer and Van Veen grab (only in Nearshore Gela sampling locations).

Locations are listed in the following Table 4.3, together with the preliminary in-situ observation performed on board after the samples recovery.

The box corer used has a capacity of sample recovery up to 50cm.

The sampling and in situ analyses performed on the box corer and grab samples consisted in pH and Temperature measurements (see APPENDIX 2: GWF14a - BOX CORER SAMPLING FORMS). Furthermore, on Malta side, 3 soil samples have been sifted and collected per each location, while in Nearshore Gela, 10 soil samples (2 replicates each one) for Benthic analysis have been carried out.

It is to be noted with regard to the 10 benthos stations in Gela, two replicates have been collected by deploying the system (Van Veen Grab) twice at the same coordinates for a total of 20.

Table 4.3 – Performed Box Cores locations

BOX CORES	EASTING	NORTHING	KP (Km)	DCC (m)	Water depth (m)	Top lithology (in-situ observation)	RECOVERY (cm)	DATE
MEW001b_S01	433768.77	4091732.06	8.313	0.67	28	clayey SILT	0.35	08/03/2019
MEW001b_S02	436171.28	4084948.47	15.836	0.37	78	silty CLAY	0.4	08/03/2019
MEW001b_S03	441837.70	4076707.02	25.837	1.78	87	CLAY	0.4	08/03/2019
MEW001b_S04	444673.43	4072588.95	30.837	-0.64	86	CLAY	0.4	09/03/2019
MEW001b_S05	447422.56	4063864.66	40.010	-7.9	118	silty CLAY	0.5	09/03/2019
MEW001b_S06	448764.50	4059059.00	45.000	1.33	128	silty CLAY	0.2	09/03/2019
MEW001b_S07	450803.83	4053626.70	50.836	0.97	145	silty CLAY	0.2	09/03/2019
MEW001b_S08	455781.90	4044954.08	60.835	0.97	155	silty CLAY	0.3	09/03/2019
MEW001b_S09	460760.94	4036281.48	70.836	0.12	153	silty CLAY	0.3	09/03/2019
MEW001b_S10	463954.85	4027024.40	80.835	0.76	146	silty CLAY	0.2	09/03/2019
MEW001b_S11	464680.46	4017049.03	90.837	-0.27	142	CLAY with silt	0.20/0.20/0.25	09/03/2019
MEW001b_S12	465404.24	4007076.40	100.836	0.32	140	CLAY with silt	0.30/0.30/0.25	09/03/2019
MEW001b_S13	466096.11	3997550.51	110.387	0.38	138	CLAY with silt	0.30/0.30/0.30	09/03/2019
MEW001b_S14	466469.82	3992403.05	115.548	0.56	137	CLAY and SILT	0.30/0.30/0.30	09/03/2019
MEW001b_S15	467052.43	3984397.35	123.575	-0.54	137	CLAY	0.20/0.30/0.28	01/05/2019
MEW001b_S16	467387.28	3979856.43	128.128	-0.08	127	CLAY	0.35/0.35/0.36	01/05/2019
MEW001b_S17	467329.20	3974499.16	133.494	-0.11	117	silty CLAY	0.15/0.15/0.15	01/05/2019
MEW001b_S18	466947.12	3969777.70	138.231	-0.06	79	SAND	0.10/0.10/0.10	30/03/2019
MEW001b_S19	466520.38	3964718.12	143.309	-0.12	98	silty SAND	0.15/0.15/0.15	30/03/2019
MEW001b_S20	461203.77	3964163.10	149.999	1.04	46	SHELL FRAGMENTS	0.10/0.10/0.10	29/03/2019

Table 4.4 - Performed Van Veen Grab locations (Nearshore Gela)

Van Veen Grab	EASTING	NORTHING	KP (Km)	DCC (m)	Water depth (m)	Top lithology (in-situ observation)	DATE
MEW001d_S21	436896.39	4098588.71	0.963	257	6.5	silty SAND	12/08/2019
MEW001d_S22	437176.64	4098066.94	1.399	-144	7.4	silty SAND	16/08/2019
MEW001d_S23	437479.18	4097565.19	1.810	-561	8.2	silty SAND	13/08/2019
MEW001d_S24	438057.04	4097592.55	1.640	-1114	6.3	sandy SILT	13/08/2019
MEW001d_S25	436750.45	4098326.81	1.253	333	7.8	sandy SILT	14/08/2019
MEW001d_S26	437043.75	4097813.17	1.678	-78	8.7	silty SAND	16/08/2019
MEW001d_S27	437352.18	4097324.02	2.075	-498	9.3	silty SAND	13/08/2019
MEW001d_S28	437914.28	4097335.79	1.924	-1040	7.6	silty SAND	13/08/2019
MEW001d_S29	436621.56	4098087.99	1.516	399	9	silty SAND	14/08/2019
MEW001d_S30	436886.35	4097544.14	1.977	8	9.8	silty SAND	16/08/2019
MEW001d_S31	437200.26	4097093.24	2.336	-408	10	sandy SILT	13/08/2019
MEW001d_S32	437758.83	4097065.96	2.224	-956	9	silty SAND	13/08/2019
MEW001d_S33	436458.81	4097800.62	1.835	485	10	silty SAND	12/08/2019
MEW001d_S34	436736.58	4097291.07	2.259	90	10.4	silty SAND and CLAY	15/08/2019
MEW001d_S35	437047.04	4096768.1	2.648	-351	10.7	sandy SILT	13/08/2019
MEW001d_S36	437620.39	4096807.35	2.509	-886	9.8	silty SAND	12/08/2019
MEW001d_S37	435553.9	4095405.27	4.518	464	13.4	silty SAND	14/08/2019
MEW001d_S38	436457.9	4096636.74	2.983	151	11.3	silty SAND	15/08/2019
MEW001d_S39	436835.83	4096427.33	3.042	-277	11.3	silty SAND	15/08/2019
MEW001d_S40	435903.15	4094732.02	4.949	-160	13.8	sandy clayey SILT	14/08/2019
MEW001d_R00	437399.58	4098463.35	0.960	-262	5.3	silty SAND	17/08/2019
MEW001d_R01	437116.30	4098594.42	0.903	45	5.6	silty SAND	17/08/2019
MEW001d_R02	437053.87	4098195.68	1.304	7	7.5	silty SAND	17/08/2019

4.2.2 pH and Temperature

4.2.2.1 Malta and Italy measurements

Sediment measurements in situ performed on box cores samples are shown below.

Temperature at seabottom was between 15.2°C and 20.5°C (Figure 4.4), pH values were between 7.2 and 7.9 pH units (Figure 4.5). To be noted that, on Malta side, the 3 sampling replicates show almost same values for each location.

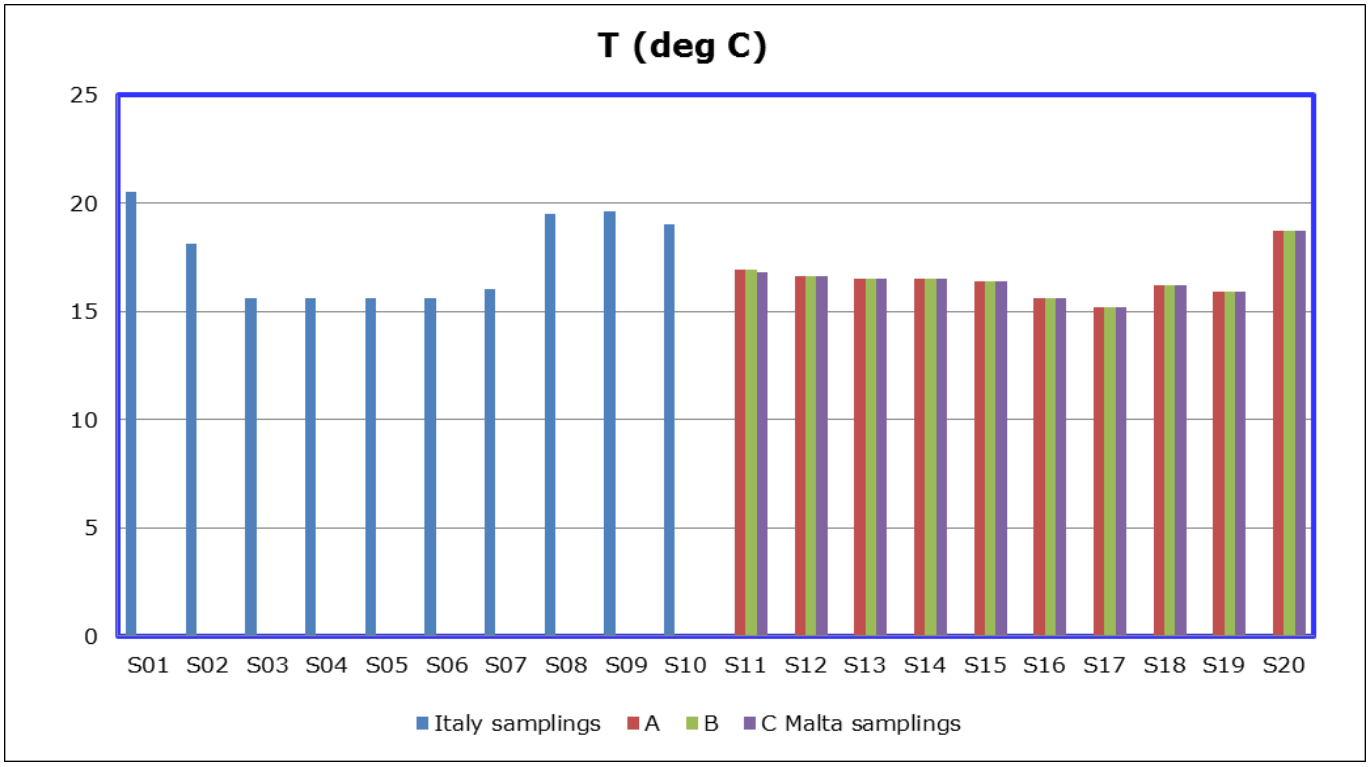


Figure 4.4 – Temperature measured on box cores samples

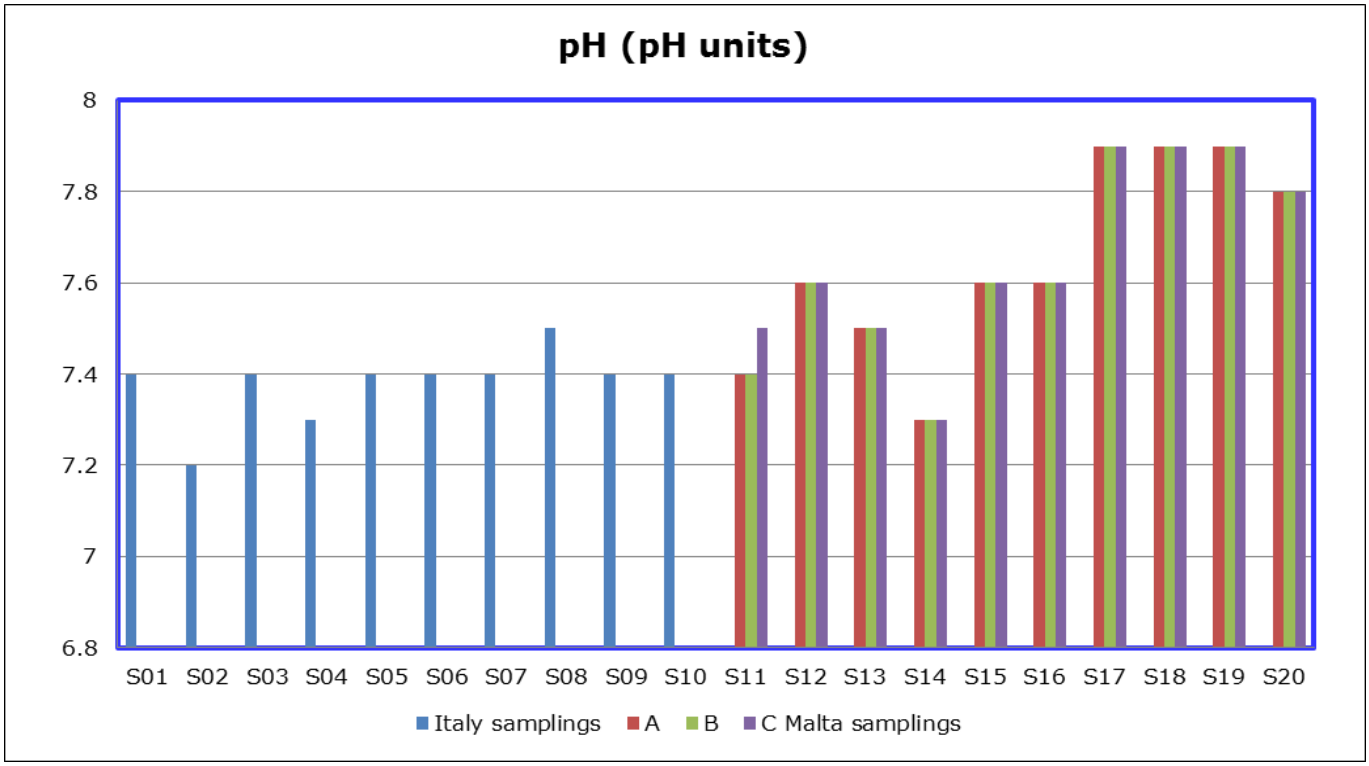


Figure 4.5 – pH measured on box cores samples

4.2.2.2 Nearshore Gela measurements

Sediment measurements in situ performed on box cores samples are shown below.

Temperature at seabottom was between 23.9°C and 29.5°C (Figure 4.6), pH values were between 6.9 and 7.7 pH units (Figure 4.7). In figures below, A and B represent the two replicates for benthic analyses, while the blue column shows all values referred to the only replicate done to collect data for chemical – physical analysis.

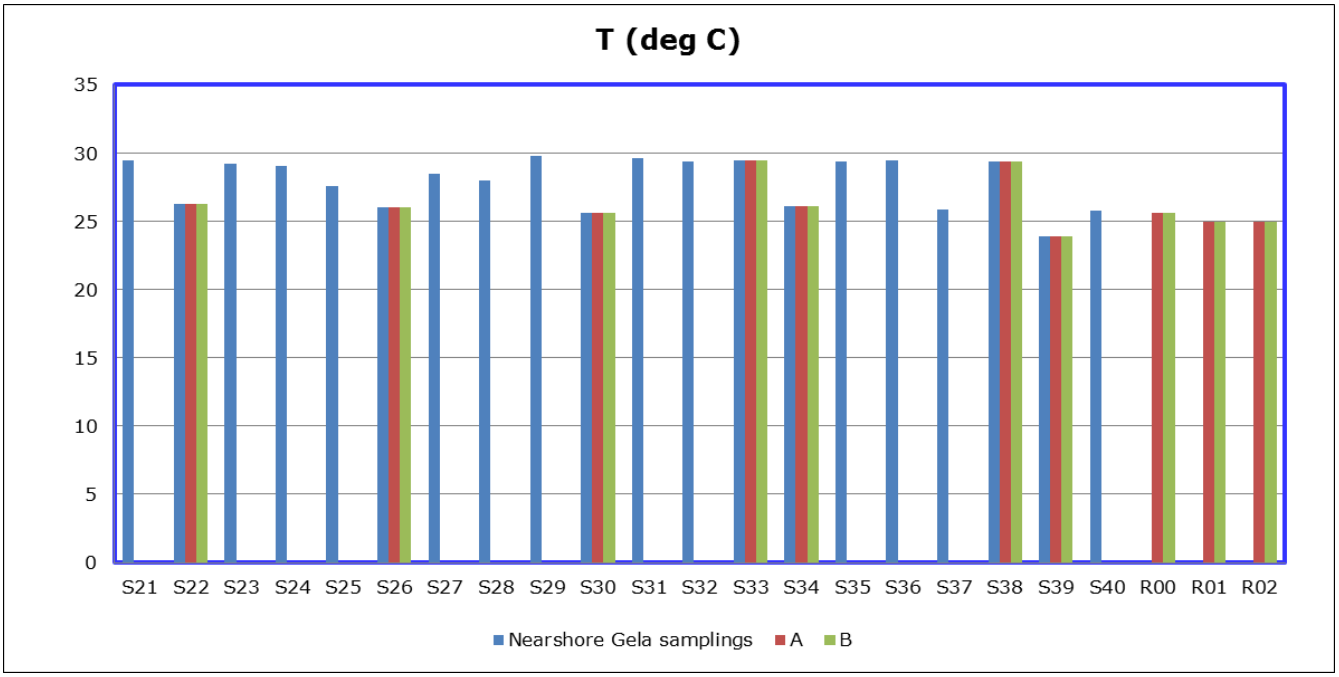


Figure 4.6 - Temperature measured on grab samples

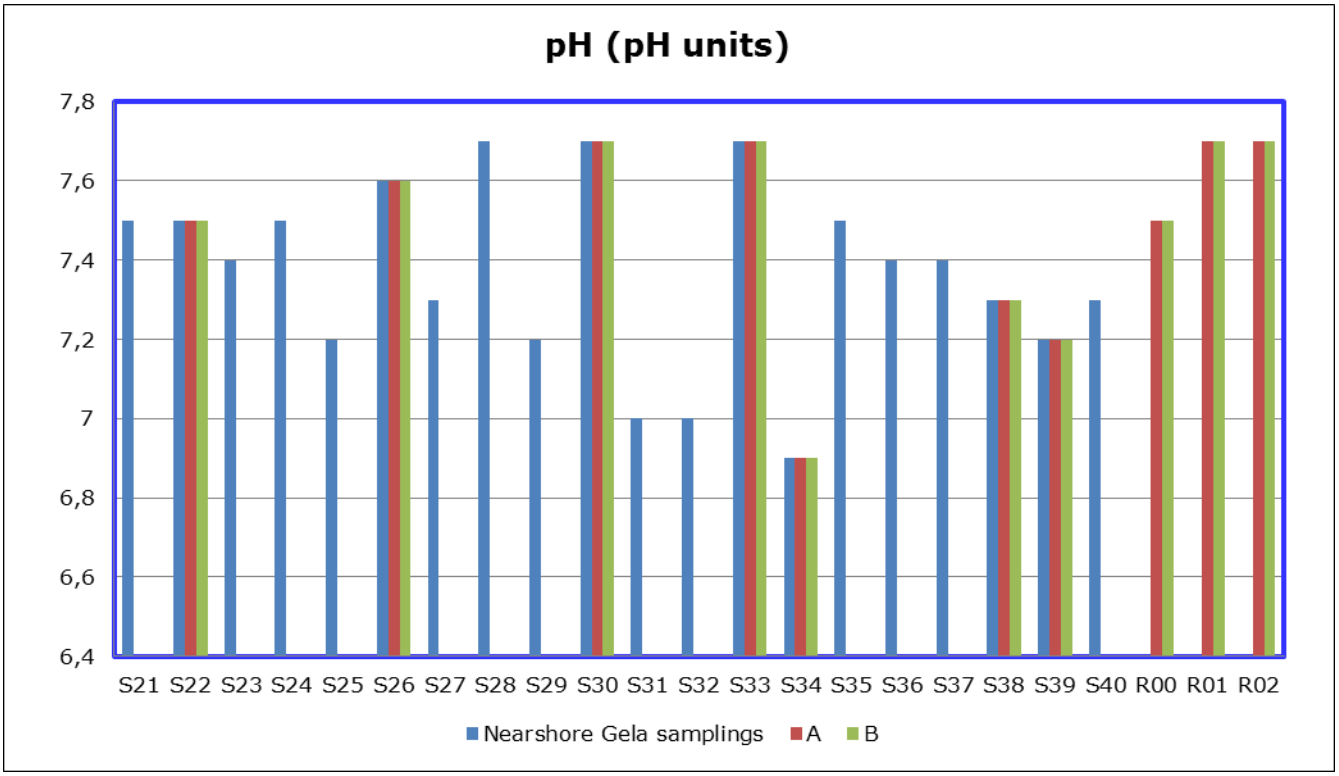


Figure 4.7 - pH measured on grab samples

4.2.3 Dry residue

Result of dry residue analysis is shown in Figure 4.8.

This parameter is correlated to the texture of sediments and inversely proportional to the water content; where sandy content is significant the sediments are characterized by high values of dry residue, whereas clayey sediments are marked by low values of this parameter.

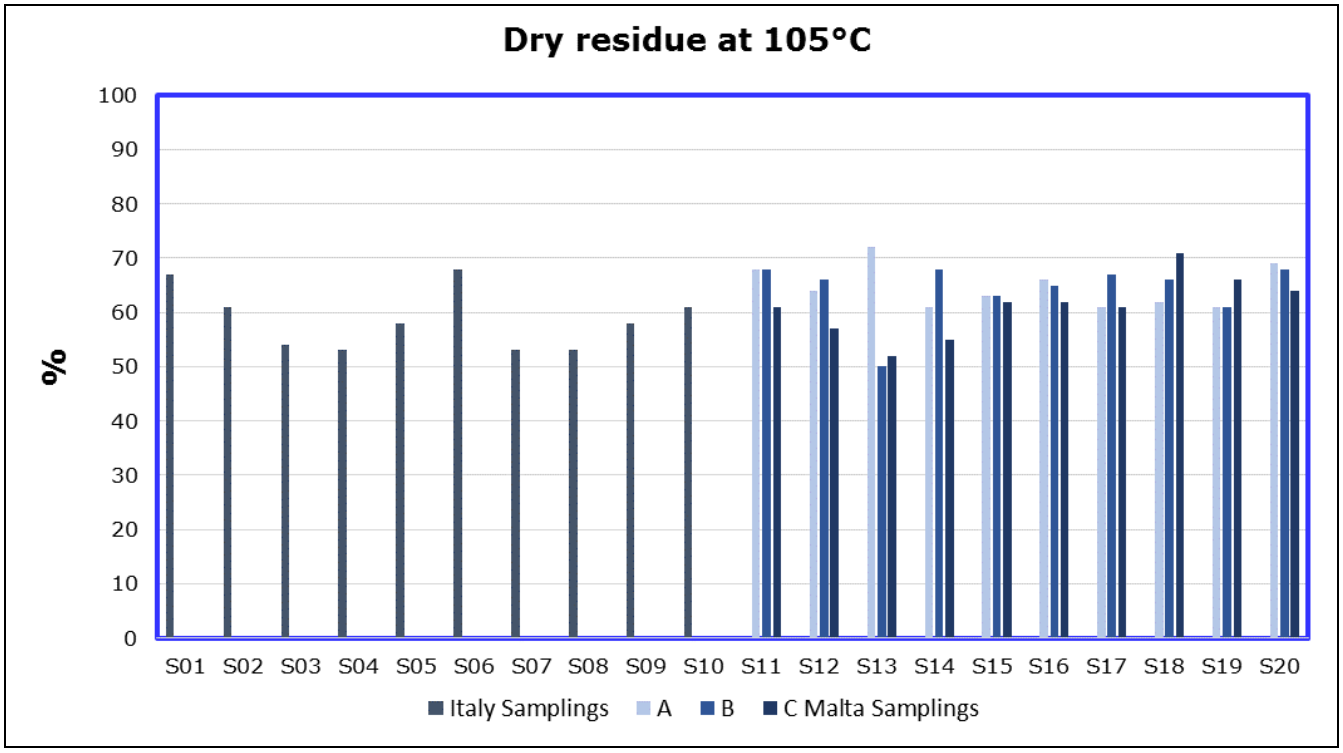


Figure 4.8 –Dry residue at 105°C in sediment samples

4.2.4 Grain Size Analyses

Results of grain size analyses are shown inTable 4.5 and Table 4.6, in which the percentages passing through the different diameters are displayed.
All sediments have been classified as *Silty SAND* (the blue ones in the table), *Sandy SILT* (the orange ones in the table), *Sandy Clayey SILT* (the green ones in the table), *Sandy SILT/Silty SAND* (the yellow one in the table). In particular, sediments classification for each station is shown in Table 4.5.
In some stations (S21, S22, S23, S27, S28, S30, S31, S36, S37) a small percentage of Gravel is present (Table 4.5 and Table 4.6).

Table 4.5 – Textural analyses results in nearshore Gela sediment locations

Station	Clay	Silt	Sand	Gravel
	<0.004 mm [%]	0.004-0.0063 mm [%]	0.063.2.0 mm [%]	> 2.0 mm [%]
S21_S	19.9	39.8	39.7	0.6
S22_S	18.8	38.4	42.2	0.6
S23_S	17.1	41.7	40.5	0.7
S24_S	21.2	46.4	32.4	< 0,1
S25_S	22.2	43.5	34.3	< 0,1
S26_S	19.1	39.9	41	< 0,1
S27_S	18.8	37.2	42.8	1.2
S28_S	17.3	36.9	44.9	0.9
S29_S	20.2	41.2	38.6	< 0,1
S30_S	17.6	37.9	44.1	0.4
S31_S	21.1	42.8	34.9	1.2
S32_S	19.6	40.2	40.2	< 0,1
S33_S	18.8	39.1	42.1	< 0,1
S34_S	18.4	40.7	40.9	< 0,1
S35_S	23.1	45.8	31.1	< 0,1
S36_S	22	38.2	38.9	0.9
S37_S	22	39.3	37.6	1.1
S38_S	16	38.1	45.9	< 0,1
S39_S	23	39.5	37.5	< 0,1
S40_S	22.9	46.5	30.6	< 0,1

Distributions of sediments in grain size Shepard Plot is reported in Figure below.

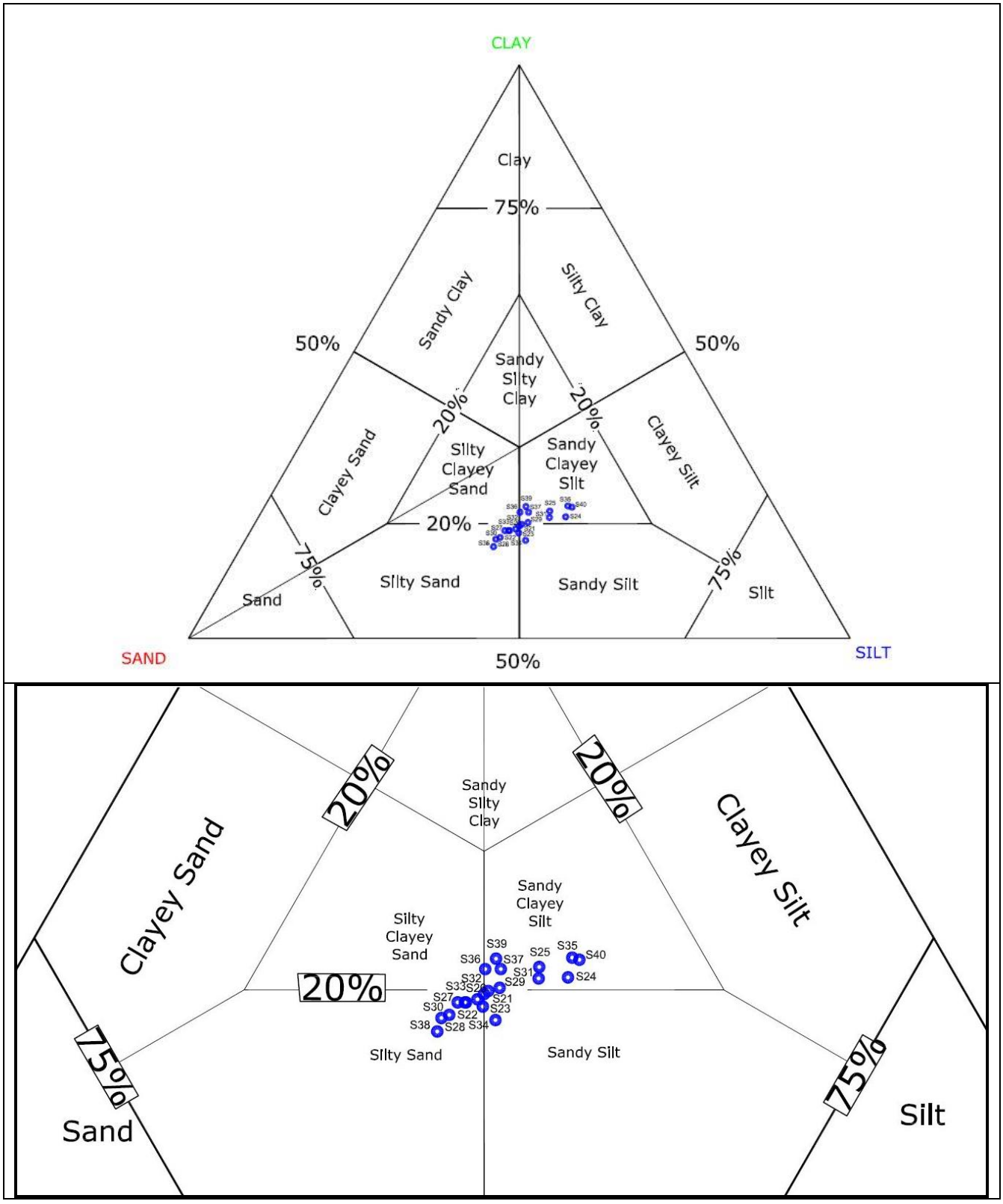


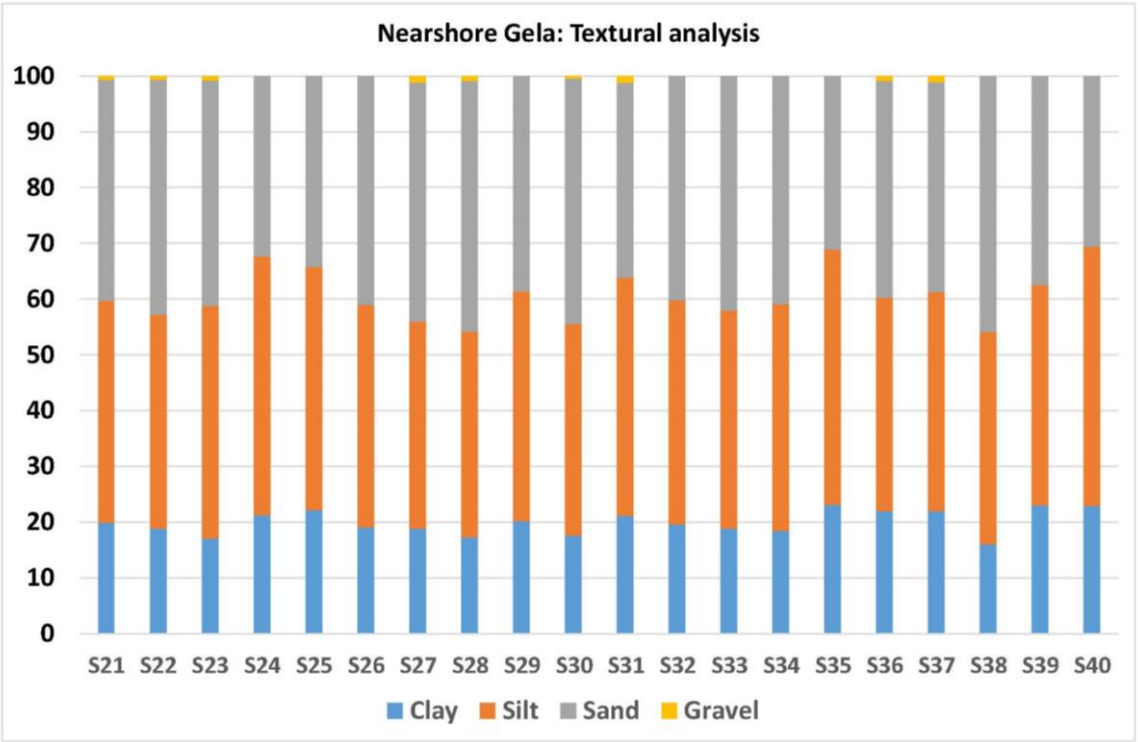
Figure 4.9 - Shepard Plot Classification

Table 4.6 - Textural analyses results in Nearshore Gela sediment stations

Determinant			Unit	S21_S	S22_S	S23_S	S24_S	S25_S	S26_S	S27_S
Test Certificate				19LA 0046163	19LA 0046350	19LA 0046177	19LA 0046183	19LA 0046317	19LA 0046356	19LA 0046187
Grain size analysis	Clay	<0,004 mm	%p/p	19.9	18.8	17.1	21.2	22.2	19.1	18.8
	Silt	0.004-0.063 mm		39.8	38.4	41.7	46.4	43.5	39.9	37.2
	Sand	0.063-2.0 mm		39.7	42.2	40.5	32.4	34.3	41	42.8
	Gravel	>2.0 mm		0.6	0.6	0.7	< 0,1	< 0,1	< 0,1	1.2
Determinant			**Unit**	**S28_S**	**S29_S**	**S30_S**	**S31_S**	**S32_S**	**S33_S**	**S34_S**
Test Certificate				**19LA 0046193**	**19LA 0046321**	**19LA 0046362**	**19LA 0046195**	**19LA 0046199**	**19LA 0046169**	**19LA 0046368**
Grain size analysis	Clay	<0.004 mm	%p/p	17.3	20.2	17.6	21.1	19.6	18.8	18.4
	Silt	0.004-0.063 mm		36.9	41.2	37.9	42.8	40.2	39.1	40.7
	Sand	0.063-2.0 mm		44.9	38.6	44.1	34.9	40.2	42.1	40.9
	Gravel	>2.0 mm		0.9	< 0,1	0.4	1.2	< 0,1	< 0,1	< 0,1
Determinant			**Unit**	**S35_S**	**S36_S**	**S37_S**	**S38_S**	**S39_S**	**S40_S**	**-**
Test Certificate				**19LA 0046203**	**19LA 0046173**	**19LA 0046325**	**19LA 0046374**	**19LA 0046380**	**19LA 0046329**	**-**
Grain size analysis	Clay	<0.004 mm	%p/p	23.1	22	22	16	23	22.9	-
	Silt	0.004-0.063 mm		45.8	38.2	39.3	38.1	39.5	46.5	-
	Sand	0.063-2.0 mm		31.1	38.9	37.6	45.9	37.5	30.6	-
	Gravel	>2.0 mm		< 0,1	0.9	1.1	< 0,1	< 0,1	< 0,1	-

Notes:

- S21_S … S41_S: sub-sample label for Textural analyses;



4.3.0 Chemical characteristics of sediments

A total of 60 deployments were planned (Table 4.7). 30 samples (10 locations x 3 replicates) were collected in Maltese waters. A total of 10 were collected in Italian waters while the remaining 20 sampling locations are in Gela Nearshore.

Table 4.7 – Sediment samplings quantities

	ITALY OFFSHORE (BLOCK 6 AREA 4, BLOCK 5, BLOCK 4)	**MALTA (BLOCK 3, BLOCK 2, BLOCK 1)**	**ITALY NEARSHORE (Block 6, Area 2 and Area 3)**
NUMBER OF STATIONS	10	10	20 [1]
REPLICATES	/	3	2 [2]
TYPE OF ANALYSIS	/	Benthos	Benthos [3]
	Sediment quality	Sediment quality	Sediment quality
	Sulphite-reducing bacteria	Sulphite-reducing bacteria	Microbiological analysis
	/	/	Grain size analysis

Notes:

[1] Three (3) more stations added only for macrobenthos analysis (R00, R01, R02);
[2] Only for Benthos
[3] For macrobenthos analysis 10 sediment stations have been sampled, with 2 replicates each one.

Each sediment sample was stored and preserved in the containers and labelled as shown in APPENDIX 5: SEDIMENT SAMPLING REGISTER TABLE.

On Italian side sediment quality and sulphite-reducing bacteria analysis was carried out by the laboratory. Furthermore, for Malta and nearshore Gela working areas, benthos was sampled and analysed for macrobenthos group.

For laboratory sediment analyses and certificates see APPENDIX 7: SEDIMENT LABORATORY ANALYSES RESULTS CERTIFICATES and APPENDIX 8: SEDIMENT LABORATORY ANALYSES RESULTS TABLE.

4.3.1 Metals

4.3.1.1 Malta – Italy analysis

Fifteen (15) metals have been measured in sediments. All of them are above the LoD, except for Antimony. For the other elements a defined trend is observed, except for few analytes (Tin, Arsenic and Vanadium).

In particular **Lead** shows values between 22 and 7.9 mg/kg; **Chromium** is in the range between 25 and 8.9mg/Kg dry basis; **Copper** is between 20 and 2.8 mg/kg; **Nickel** is almost in the range between 25 and 2.5mg/Kg dry basis except for station S15 in which value reaches 44 mg/kg; **Zinc** is in general between 60 and 14mg/Kg dry basis, except for S2, S3, locations in which values are more than 60mg/Kg dry basis and S4 in which value reaches 75mg/kg; **Vanadium** is in the range between 17 and 56mg/Kg dry basis; **Arsenic** is in the range between 9 and 39mg/Kg dry basis, with the highest value equal to 61mg/Kg dry basis atin S11 location; **Thallium** is below the LoD in the two replicates of station S18 and in station S19, in all the other stations it shows really low values ranging between 0.21 and 0.056mg/kg; **Tin** was found below the LoD except stations S3, S4, S17 and S18 where values range between 1.4 and 1.1mg/kg; **Selenium** in the range between 2.4 and 0.84mg/Kg dry basis; **Mercury** shows small values ranging between 0.2 and 0.017mg/kg; **Cobalt** values are below the LoD only in station S20, in all the others the range is between 9.6 and 1.6mg/kg. **Cadmium** is in the range between 0.17 and 0.051mg/kg. **Beryllium** values are below the LoD only in station S20, while in all the other locations is in the range between 0.67 and 0.19mg/kg.

Results are reported below (Table 4.8, Table 4.9 and Table 4.10).

Table 4.8 - Metals in Italian sediment locations

Determinant	**U.M.**	**LoD***	**S1**	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Test Certificate			**19LA 0014366**	**19LA 0014368**	**19LA 0014370**	**19LA 0014372**	**19LA 0014374**	**19LA 0014376**	**19LA 0014378**	**19LA 0014380**	**19LA 0014382**	**19LA 0014384**
Antimony	mg/Kg	For LoD references see Table 3.3	< 0,55	< 0,56	< 0,51	< 0,56	< 0,55	< 0,53	< 0,58	< 0,56	< 0,57	< 0,55
Arsenic			26	27	25	22	18	13	13	11	16	43
Beryllium			0.42	0.65	0.63	0.63	0.61	0.52	0.64	0.58	0.53	0.36
Cadmium			0.11	0.12	0.12	0.17	0.11	0.1	0.12	0.1	0.12	0.072
Cobalt			8	8.9	8.7	9.6	8.3	7.5	8.4	7.4	7.9	7.7
Chromium			16	22	22	24	22	19	23	20	20	16
Mercury			0.074	0.13	0.17	0.12	0.041	0.025	0.028	0.024	0.023	0.019
Nickel			17	23	23	25	23	20	24	22	23	17
Lead			14	21	22	20	14	10	13	12	12	10
Copper			12	18	18	20	15	12	14	13	12	7.2
Selenium			2	2.2	2.2	2.4	2.2	1.8	2.1	1.9	2	1.5
Tin			< 1,1	< 1,1	1.1	1.1	< 1,1	< 1,1	< 1,2	< 1,1	< 1,1	< 1,1
Thallium			0.11	0.16	0.16	0.17	0.16	0.21	0.2	0.16	0.2	0.097
Vanadium			39	41	41	41	44	37	46	42	47	51
Zinc			53	67	67	75	57	45	54	48	45	33

Notes:

* LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).

Table 4.9 - Metals in Maltese sediment locations (S11-S15)

Determinant	**U.M.**	**LoD***	**S11**	**S11**	**S11**	**S12**	**S12**	**S12**	**S13**	**S13**	**S13**	**S14**	**S14**	**S14**	**S15**	**S15**	**S15**
Test Certificate			**19LA 0014284**	**19LA 0014343**	**19LA 0014344**	**19LA 0014348**	**19LA 0014349**	**19LA 0014350**	**19LA 0014355**	**19LA 0014356**	**19LA 0014357**	**19LA 0014362**	**19LA 0014363**	**19LA 0014364**	**19LA 0023723**	**19LA 0023724**	**19LA 0023725**
Antimony	mg/Kg	For LoD references see Table 3.4 and Table 3.5	< 0,59	< 0,53	< 0,59	< 0,58	< 0,52	< 0,56	< 0,53	< 0,54	< 0,52	< 0,59	< 0,58	< 0,59	< 0,58	< 0,59	< 0,53
Arsenic			61	28	26	49	24	23	20	20	29	26	24	25	22	61	28
Beryllium			0.43	0.37	0.34	0.5	0.46	0.52	0.51	0.48	0.52	0.61	0.67	0.58	0.62	0.43	0.37
Cadmium			0.093	0.08	0.079	0.093	0.081	0.091	0.088	0.083	0.086	0.11	0.11	0.096	0.1	0.093	0.08
Cobalt			9.5	6.8	6.4	9.4	6.7	7.7	6.9	6.8	7.8	8.8	8.6	7.9	8.4	9.5	6.8
Chromium			19	17	16	20	17	20	19	18	19	24	25	21	22	19	17
Mercury			0.036	0.024	0.017	0.032	0.025	0.022	0.021	0.025	0.049	0.042	0.079	0.068	0.055	0.036	0.024
Nickel			21	17	15	23	19	22	20	19	21	25	44	23	24	21	17
Lead			14	8.7	7.9	15	11	11	11	11	15	14	20	19	17	14	8.7
Copper			9.5	7.6	7	11	9.8	11	10	10	12	13	15	13	14	9.5	7.6
Selenium			1.8	1.7	1.6	1.9	1.7	1.9	1.8	1.6	1.8	2.2	2.1	1.8	2	1.8	1.7
Tin			< 1,2	< 1,1	< 1,2	< 1,2	< 1,0	< 1,1	< 1,1	< 1,1	< 1,0	< 1,2	< 1,2	< 1,2	< 1,2	< 1,2	< 1,1
Thallium			0.13	0.15	0.14	0.14	0.13	0.15	0.14	0.13	0.14	0.18	0.17	0.15	0.17	0.13	0.15
Vanadium			56	44	44	55	40	47	42	38	39	52	40	38	41	56	44
Zinc			42	34	31	46	39	44	41	40	46	52	57	52	53	42	34

Notes:

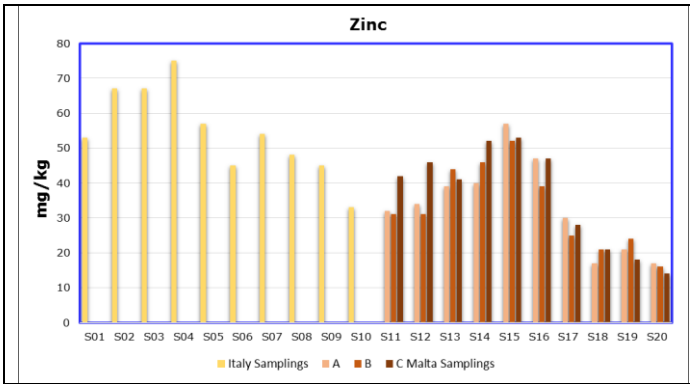
* LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).

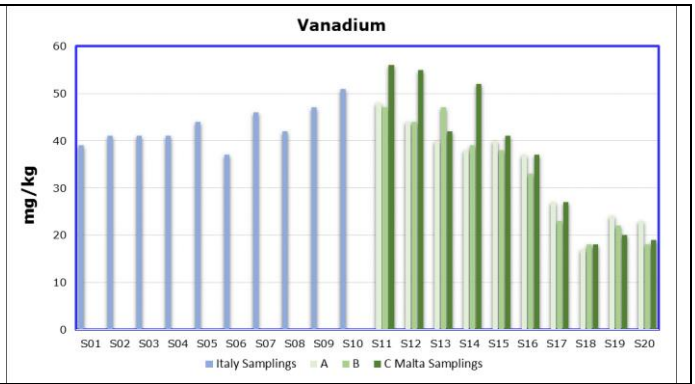
Table 4.10 - Metals in Maltese sediment locations (S16-S20)

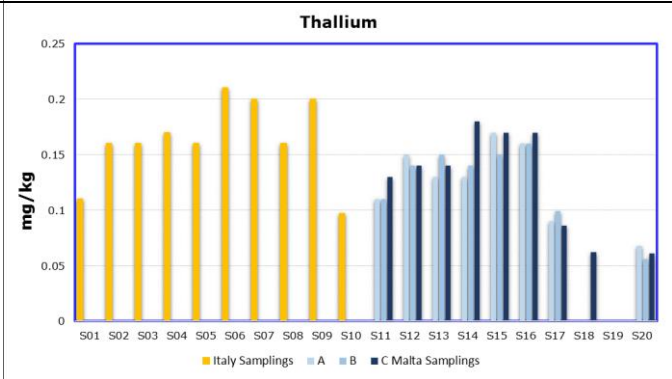
Determinant	U.M.	LoD*	S16	S16	S16	S17	S17	S17	S18	S18	S18	S19	S19	S19	S20	S20	S20
Test Certificate			**19LA 0023729**	**19LA 0023730**	**19LA 0023731**	**19LA 0023736**	**19LA 0023737**	**19LA 0023738**	**19LA 0023743**	**19LA 0023744**	**19LA 0023745**	**19LA 0023750**	**19LA 0023751**	**19LA 0023752**	**19LA 0023757**	**19LA 0023758**	**19LA 0023759**
Antimony	mg/Kg	For LoD references see Table 3.5 and Table 3.6	< 0,60	< 0,55	< 0,59	< 0,59	< 0,55	< 0,57	< 0,55	< 0,57	< 0,56	< 0,59	< 0,57	< 0,51	< 0,54	< 0,55	< 0,56
Arsenic			16	13	17	17	12	17	11	11	9	22	17	17	28	17	22
Beryllium			0.56	0.53	0.58	0.32	0.32	0.35	0.19	0.19	0.24	0.26	0.24	0.21	< 0,11	< 0,11	< 0,11
Cadmium			0.11	0.085	0.11	0.091	0.074	0.081	0.058	0.064	0.078	0.061	0.051	0.054	0.088	0.082	0.069
Cobalt			7.3	6.3	7.3	4.2	3.7	4.2	1.6	1.7	2	2.6	2.5	2.3	< 1,1	< 1,1	< 1,1
Chromium			20	18	20	15	14	16	8.9	9.7	11	12	11	11	11	9.6	9.2
Mercury			0.061	0.035	0.062	0.18	0.1	0.14	0.16	0.17	0.2	0.14	0.13	0.11	0.07	0.082	0.069
Nickel			21	18	21	10	9.1	10	4.2	4.4	5.8	5.5	5.1	4.8	3.9	3.4	2.5
Lead			16	12	16	20	15	17	16	17	18	15	14	13	12	11	9.8
Copper			13	11	13	8.9	6.7	7.7	4.7	4.9	6.6	4.8	4.4	4.2	3.4	3.8	2.8
Selenium			2	1.8	2	1.4	1.3	1.4	0.92	1	1.2	1.2	1	0.97	0.92	0.84	0.84
Tin			< 1,2	< 1,1	< 1,2	1.3	< 1,1	< 1,1	< 1,1	< 1,1	1.4	< 1,2	< 1,1	< 1,0	< 1,1	< 1,1	< 1,1
Thallium			0.16	0.16	0.17	0.09	0.099	0.086	< 0,055	< 0,057	0.062	< 0,059	< 0,057	< 0,051	0.068	0.056	0.061
Vanadium			37	33	37	27	23	27	17	18	18	24	22	20	23	18	19
Zinc			47	39	47	30	25	28	17	21	21	21	24	18	17	16	14

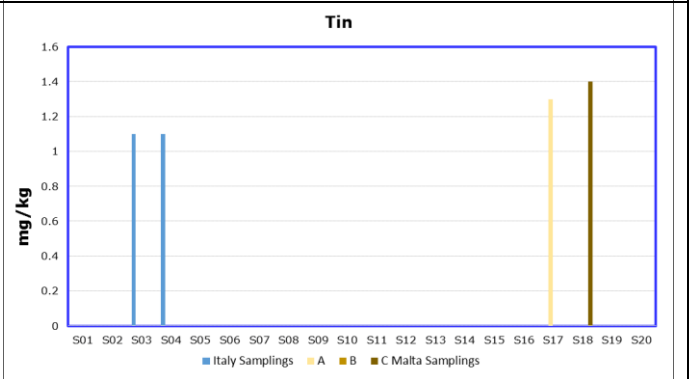
Notes:

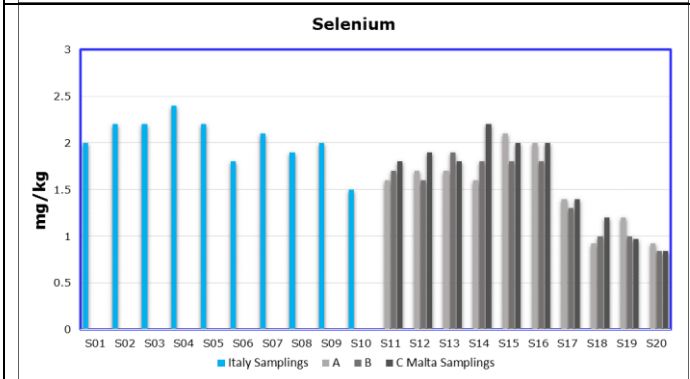
* LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).

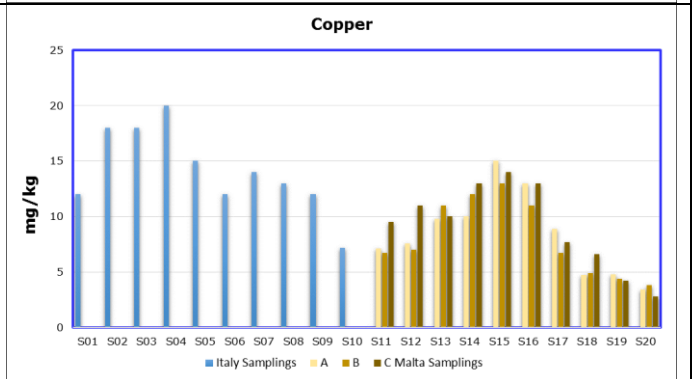

Zinc
mg/kg
0 10 20 30 40 50 60 70 80
S01 S02 S03 S04 S05 S06 S07 S08 S09 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20
Italy Samplings A B C Malta Samplings

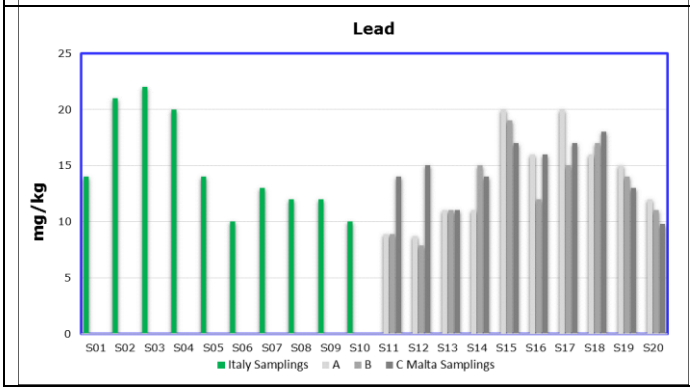

Vanadium
mg/kg
0 10 20 30 40 50 60
S01 S02 S03 S04 S05 S06 S07 S08 S09 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20
Italy Samplings A B C Malta Samplings

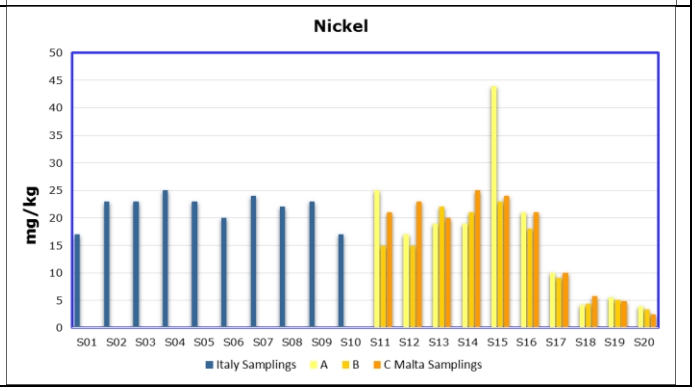

Thallium
mg/kg
0 0.05 0.1 0.15 0.2 0.25
S01 S02 S03 S04 S05 S06 S07 S08 S09 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20
Italy Samplings A B C Malta Samplings


Tin
mg/kg
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6
S01 S02 S03 S04 S05 S06 S07 S08 S09 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20
Italy Samplings A B C Malta Samplings


Selenium
mg/kg
0 0.5 1 1.5 2 2.5 3
S01 S02 S03 S04 S05 S06 S07 S08 S09 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20
Italy Samplings A B C Malta Samplings


Copper
mg/kg
0 5 10 15 20 25
S01 S02 S03 S04 S05 S06 S07 S08 S09 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20
Italy Samplings A B C Malta Samplings


Lead
mg/kg
0 5 10 15 20 25
S01 S02 S03 S04 S05 S06 S07 S08 S09 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20
Italy Samplings A B C Malta Samplings


Nickel
mg/kg
0 5 10 15 20 25 30 35 40 45 50
S01 S02 S03 S04 S05 S06 S07 S08 S09 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20
Italy Samplings A B C Malta Samplings

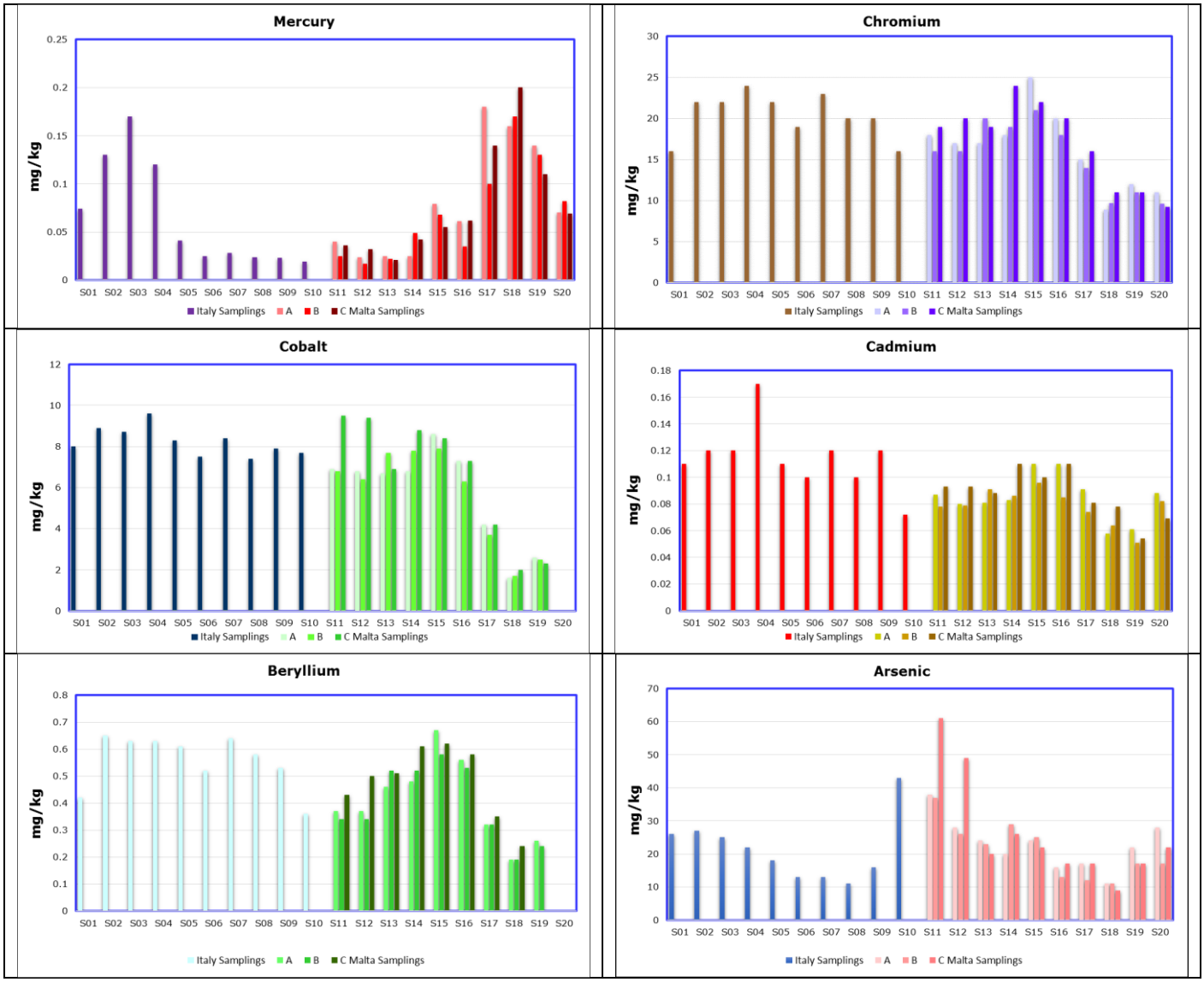


Figure 4.10 – Graphs of the metals concentration in sediment samples (Ref. to Table 3.3, Table 3.4, Table 3.5, Table 3.6 for LoDs)

4.3.1.2 Nearshore Gela analysis

Eighteen (18) metals have been measured in sediments. All of them are above the LoD, except Thallium, Tin, Chromium (VI) and Antimony. For the other elements a defined trend is observed, except for few analytes (Mercury, Arsenic and Vanadium). Results are reported in Table 4.11 and Table 4.12.

It is possible to notice in Figure 4.11 that highest values were generally detected in stations S31, S38 and S39, except for Nickel and Mercury which show the highest one in station S21. In particular **Zinc** shows values between 14 and 20mg/kg except for S31, S38, S40, locations in which values more than 25mg/kg were measured; **Copper** is in the range between 1.8 and 3mg/Kg dry basis, except for stations S31, S38 and S40 where values are above 5mg/kg; **Lead** measurements are quite closed to those of Copper analyte. Values ranging between 2.8 and 4mg/kg with the highest in S31, S38 and S40 (above 5mg/kg); **Aluminum** is almost in the range between 1100 and 2000mg/Kg dry basis except for stations S31, S38 and S40 in which values reach 3400mg/kg, 3100mg/kg and3800 mg/kg respectively; **Beryllium** values are below the LoD only in station S23, S24, S25, S36 and S39, while in all the other locations is in the range between 0.15mg/Kg dry basis and 0.11mg/Kg, except for S31, S30 and S40 where values are above 0.2mg/kg; **Selenium** shows a range between 1.1 and 0.74mg/Kg dry basis; **Iron** is in the range between 7400 and 11000mg/Kg dry basis and the highest value is equal to 11000mg/Kg dry basis in S31 and S40 locations; **Cobalt** shows values ranging between 3.6 and 5.4mg/kg; **Cadmium** shows really low values ranging between 0.086 and 0.06mg/kg; **Chromium** has a range between 3.7 and 5.5mg/Kg dry basis, with values above 6.5mg/kg in stations S21, S31, S38 and the highest one in station S40 (8.4mg/kg); **Nickel** shows a general trend between 4.3 and 7mg/kg with the highest value (16mg/kg) in station S21; **Mercury** shows really low values ranging between 0.023 and 0.012mg/kg and the highest one is 0.036mg/kg in station S21; **Arsenic** is in the range between 14 and 24mg/kg; **Vanadium** values are in the range between 14 and 25mg/kg, with the highest detected value (28mg/kg) in S40.

Table 4.11 - Metals in nearshore Gela sediment locations (S21 - S30)

Determinant	U.M.	LoD*	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
Test Certificate			**19LA 0046165**	**19LA 0046352**	**19LA 0046179**	**19LA 0046185**	**19LA 0046319**	**19LA 0046358**	**19LA 0046189**	**19LA 0046191**	**19LA 0046323**	**19LA 0046364**
Aluminum	mg/Kg	For LoD references see Table 3.7	1500	1300	1200	1100	1200	1400	1300	1200	1400	1700
Antimony			< 0,54	< 0,53	< 0,53	< 0,52	< 0,53	< 0,54	< 0,55	< 0,51	< 0,55	< 0,57
Arsenic			18	18	14	17	15	19	20	18	19	21
Beryllium			0.13	0.11	< 0,11	< 0,10	< 0,11	0.12	0.11	0.11	0.12	0.14
Cadmium			0.069	0.073	0.062	0.063	0.06	0.07	0.07	0.069	0.07	0.076
Cobalt			4.4	4.7	4	4.1	4	4.5	4.5	4.3	4.5	4.6
Chromium (VI)			< 3,8	< 3,8	< 3,8	< 4,2	< 3,9	< 3,9	< 3,9	< 4,2	< 3,8	< 4,0
Chromium			6.8	4.2	3.7	3.8	3.9	4.4	4.2	4	4.3	5
Mercury			0.036	0.013	0.021	0.015	0.014	0.015	0.014	0.014	0.018	0.014
Nickel			16	5.8	5.2	5.5	5.2	5.9	5.5	5.5	5.8	6.1
Lead			3.6	3.4	3	3.3	3.1	3.4	3.3	3.2	3.5	3.9
Copper			3	2.4	2.3	2.1	2.2	2.6	2.3	2.2	2.4	2.9
Selenium			1	1	0.84	1	0.97	0.89	0.91	0.97	0.95	0.89
Tin			< 1,1	< 1,1	< 1,1	< 1,0	< 1,1	< 1,1	< 1,1	< 1,0	< 1,1	< 1,1
Thallium			< 0,054	< 0,053	< 0,053	< 0,052	< 0,053	< 0,054	< 0,055	< 0,051	< 0,055	< 0,057
Vanadium			17	17	15	16	14	18	19	16	18	20
Zinc			19	17	15	16	15	18	17	16	18	19
Iron			8500	8500	7400	8000	7400	8700	8600	8100	8800	9300

Notes:

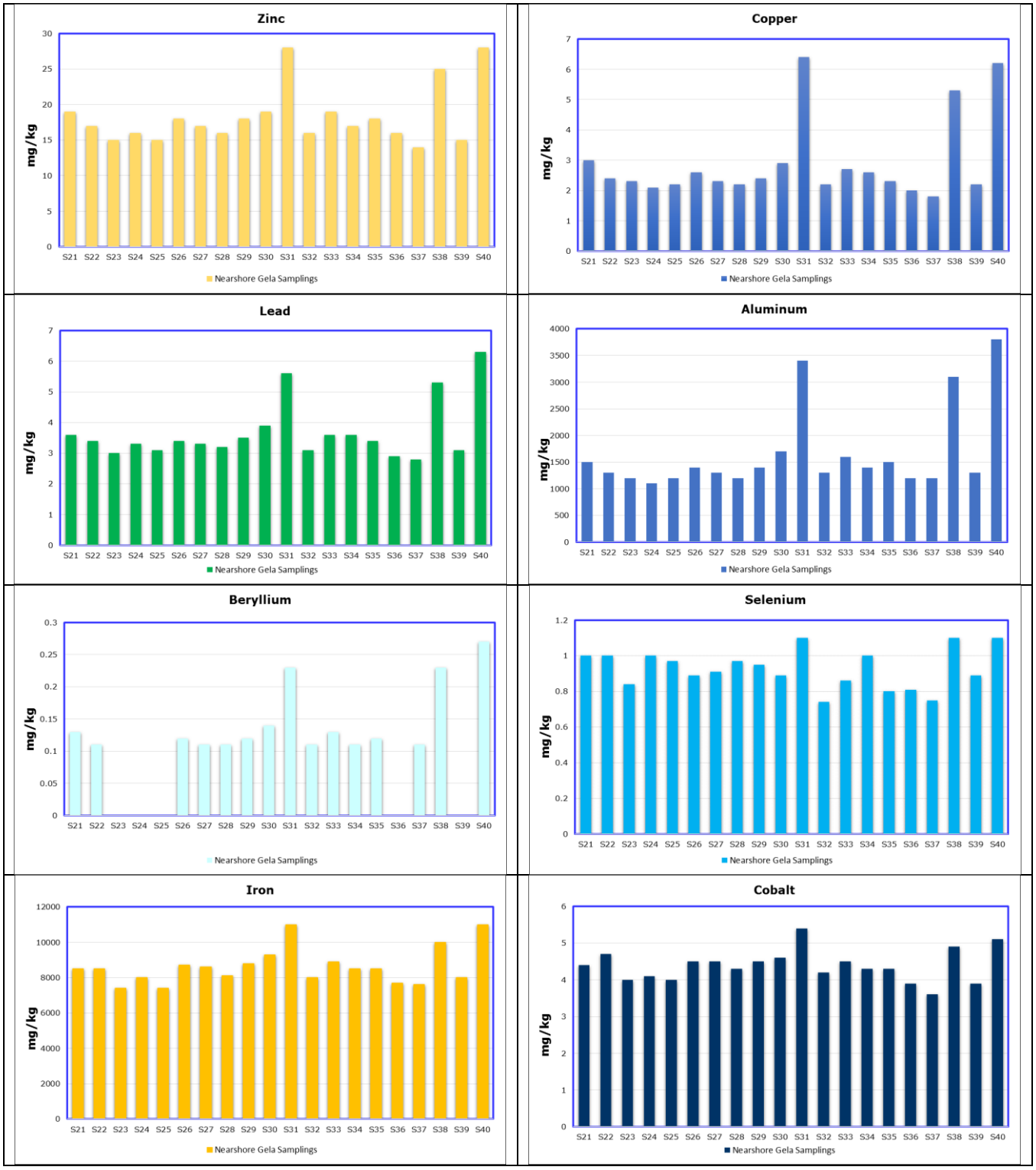
* LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).

Table 4.12 - Metals in nearshore Gela sediment locations (S31 – S40)

Determinant	U.M.	LoD*	S31	S32	S33	S34	S35	S36	S37	S38	S39	S40
Test Certificate			**19LA 0046197**	**19LA 0046201**	**19LA 0046171**	**19LA 0046370**	**19LA 0046211**	**19LA 0046175**	**19LA 0046327**	**19LA 0046376**	**19LA 0046382**	**19LA 0046331**
Aluminum	mg/Kg	For LoD references see Table 3.8	3400	1300	1600	1400	1500	1200	1200	3100	1300	3800
Antimony			< 0,54	< 0,52	< 0,54	< 0,51	< 0,54	< 0,53	< 0,52	< 0,56	< 0,53	< 0,59
Arsenic			21	18	20	18	21	18	20	21	19	24
Beryllium			0.23	0.11	0.13	0.11	0.12	< 0,11	0.11	0.23	< 0,11	0.27
Cadmium			0.086	0.062	0.071	0.071	0.072	0.066	0.066	0.077	0.063	0.08
Cobalt			5.4	4.2	4.5	4.3	4.3	3.9	3.6	4.9	3.9	5.1
Chromium (VI)			< 4,0	< 3,8	< 3,9	< 3,8	< 4,0	< 4,0	< 4,1	< 3,9	< 4,0	< 3,9
Chromium			7.9	4	5.1	4.6	4.6	3.8	4	7.3	4.4	8.4
Mercury			0.021	0.013	0.012	0.013	< 0,011	0.017	0.013	0.019	< 0,011	0.023
Nickel			9.7	5.3	6.1	5.8	5.4	4.9	4.3	8.2	4.8	9.2
Lead			5.6	3.1	3.6	3.6	3.4	2.9	2.8	5.3	3.1	6.3
Copper			6.4	2.2	2.7	2.6	2.3	2	1.8	5.3	2.2	6.2
Selenium			1.1	0.74	0.86	1	0.8	0.81	0.75	1.1	0.89	1.1
Tin			< 1,1	< 1,0	< 1,1	< 1,0	< 1,1	< 1,1	< 1,0	< 1,1	< 1,1	< 1,2
Thallium			< 0,054	< 0,052	< 0,054	< 0,051	< 0,054	< 0,053	< 0,052	< 0,056	< 0,053	< 0,059
Vanadium			22	17	20	18	20	18	21	24	20	28
Zinc			28	16	19	17	18	16	14	25	15	28
Iron			11000	8000	8900	8500	8500	7700	7600	10000	8000	11000

Notes:

* LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).


Zinc
mg/kg
Nearshore Gela Samplings
Copper
mg/kg
Nearshore Gela Samplings
Lead
mg/kg
Nearshore Gela Samplings
Aluminum
mg/kg
Nearshore Gela Samplings
Beryllium
mg/kg
Nearshore Gela Samplings
Selenium
mg/kg
Nearshore Gela Samplings
Iron
mg/kg
Nearshore Gela Samplings
Cobalt
mg/kg
Nearshore Gela Samplings

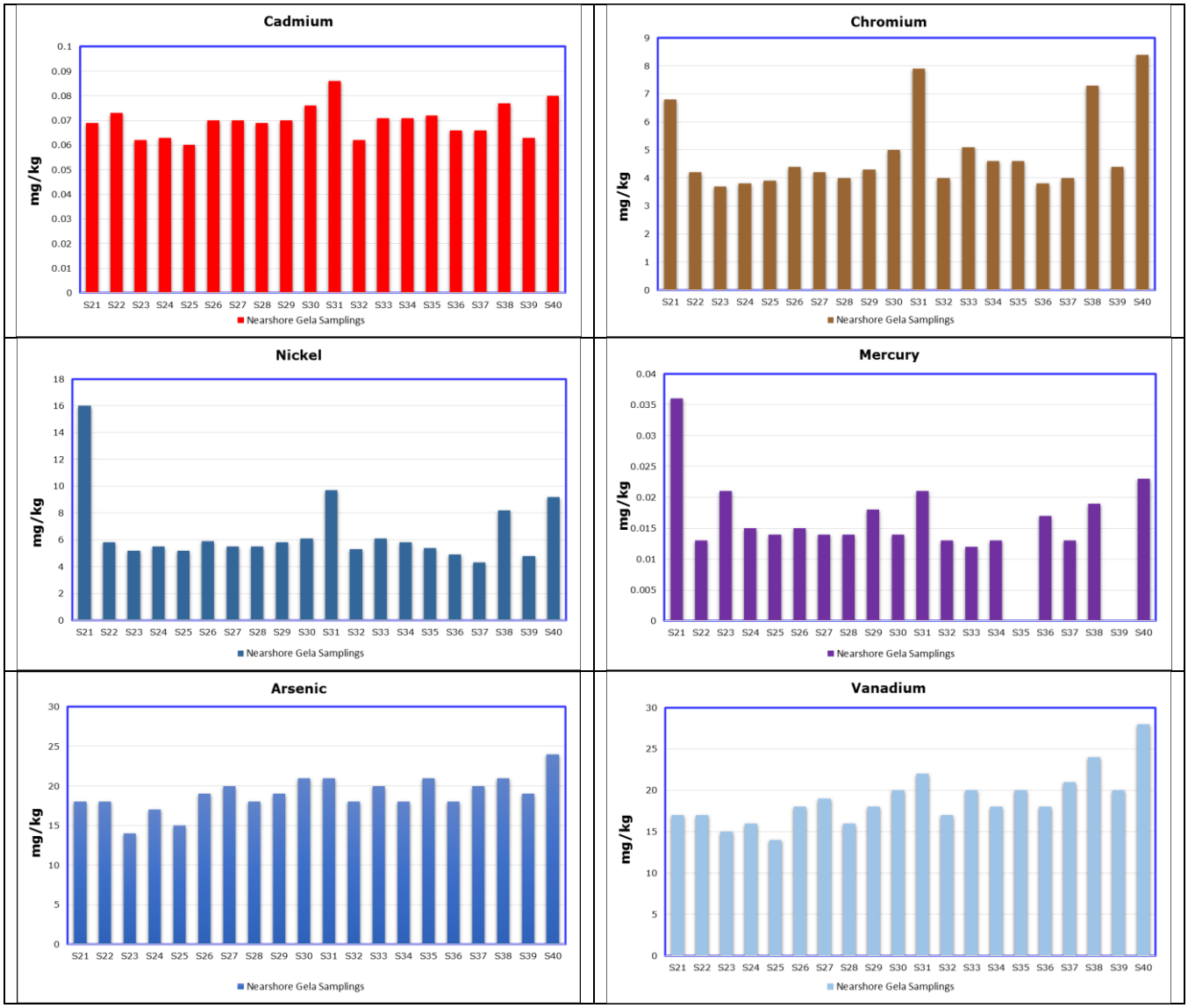


Figure 4.11 - Graphs of the metals concentration in sediment samples (Ref. to Table 3.7, Table 3.8 for LoDs)

4.3.2 Total Hydrocarbons

4.3.2.1 Malta – Italy analysis

Results of Total Hydrocarbons are shown in Figure 4.12

In all sampling locations Total Hydrocarbons concentrations (C<12) are below the LoD.

In most of the sampling locations Total Hydrocarbons concentrations (C>12) are below or close to 2500µg/kg. Sampling locations near the Italian and Maltese coast show higher concentrations respect to offshore sampling locations. In stations S1, S2, S3, S4 values ranges between 5600 (S1) and 7400µg/kg (S2, S3). From stations S15 to station S20 general range is between 2700µg/kg and 6400µg/kg except for a subsamples of S16 location that reaches 17000µg/kg. Results are reported in Table 4.13, Table 4.14 and Table 4.15.

Table 4.13 - Total Hydrocarbons in Italian sediment locations

Determinant	U.M.	LoD [1]	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Test Certificate			**19LA 0014366**	**19LA 0014368**	**19LA 0014370**	**19LA 0014372**	**19LA 0014374**	**19LA 0014376**	**19LA 0014378**	**19LA 0014380**	**19LA 0014382**	**19LA 0014384**
Hydrocarbons C<=12	mg/Kg	[2]	< 0,25	< 0,26	< 0,26	< 0,33	< 0,21	< 0,26	< 0,27	< 0,25	< 0,26	< 0,24
Hydrocarbons C>12	µg/kg		5600	7400	7400	7200	2800	< 2300	2600	3000	< 2400	< 2300

Notes:

[1] LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).
[2] For LoD references see Table 3.3.

Table 4.14 - Total Hydrocarbons in Maltese sediment locations (S11-S15)

Determinant	U.M.	LoD [1]	S11	S11	S11	S12	S12	S12	S13	S13	S13	S14	S14	S14	S15	S15	S15
Test Certificate			**19LA 0014342**	**19LA 0014343**	**19LA 0014344**	**19LA 0014348**	**19LA 0014349**	**19LA 0014350**	**19LA 0014355**	**19LA 0014356**	**19LA 0014357**	**19LA 0014362**	**19LA 0014363**	**19LA 0014364**	**19LA 0023723**	**19LA 0023724**	**19LA 0023725**
Hydrocarbons C≤12	mg/Kg	[2]	< 0,21	< 0,2	< 0,23	< 0,28	< 0,22	< 0,29	< 0,19	< 0,28	< 0,26	< 0,26	< 0,27	< 0,27	< 0,25	< 0,28	< 0,29
Hydrocarbons C>12	µg/kg		< 2400	< 2200	< 2400	< 2200	< 2500	< 2500	< 2200	< 2300	< 2200	< 2300	< 2200	< 2500	4900	5000	4600

Notes:

[1] LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).
[2] For LoD references see Table 3.4 and Table 3.5.

Table 4.15 - Total Hydrocarbons in Maltese sediment locations (S16-S20)

Determinant	**U.M.**	**LoD [1]**	**S16**	**S16**	**S16**	**S17**	**S17**	**S17**	**S18**	**S18**	**S18**	**S19**	**S19**	**S19**	**S20**	**S20**	**S20**
Test Certificate			**19LA 0023729**	**19LA 0023730**	**19LA 0023731**	**19LA 0023736**	**19LA 0023737**	**19LA 0023738**	**19LA 0023743**	**19LA 0023744**	**19LA 0023745**	**19LA 0023750**	**19LA 0023751**	**19LA 0023752**	**19LA 0023757**	**19LA 0023758**	**19LA 0023759**
Hydrocarbons C≤12	mg/Kg	[2]	< 0,21	< 0,25	< 0,28	< 0,28	< 0,28	< 0,26	< 0,28	< 0,22	< 0,24	< 0,28	< 0,28	< 0,26	< 0,25	< 0,27	< 0,26
Hydrocarbons C>12	µg/kg		5400	17000	4400	5900	4400	4400	5300	2700	6400	5400	4800	5400	4300	5200	6300

Notes:

[1] LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).
[2] For LoD references see Table 3.5 and Table 3.6.

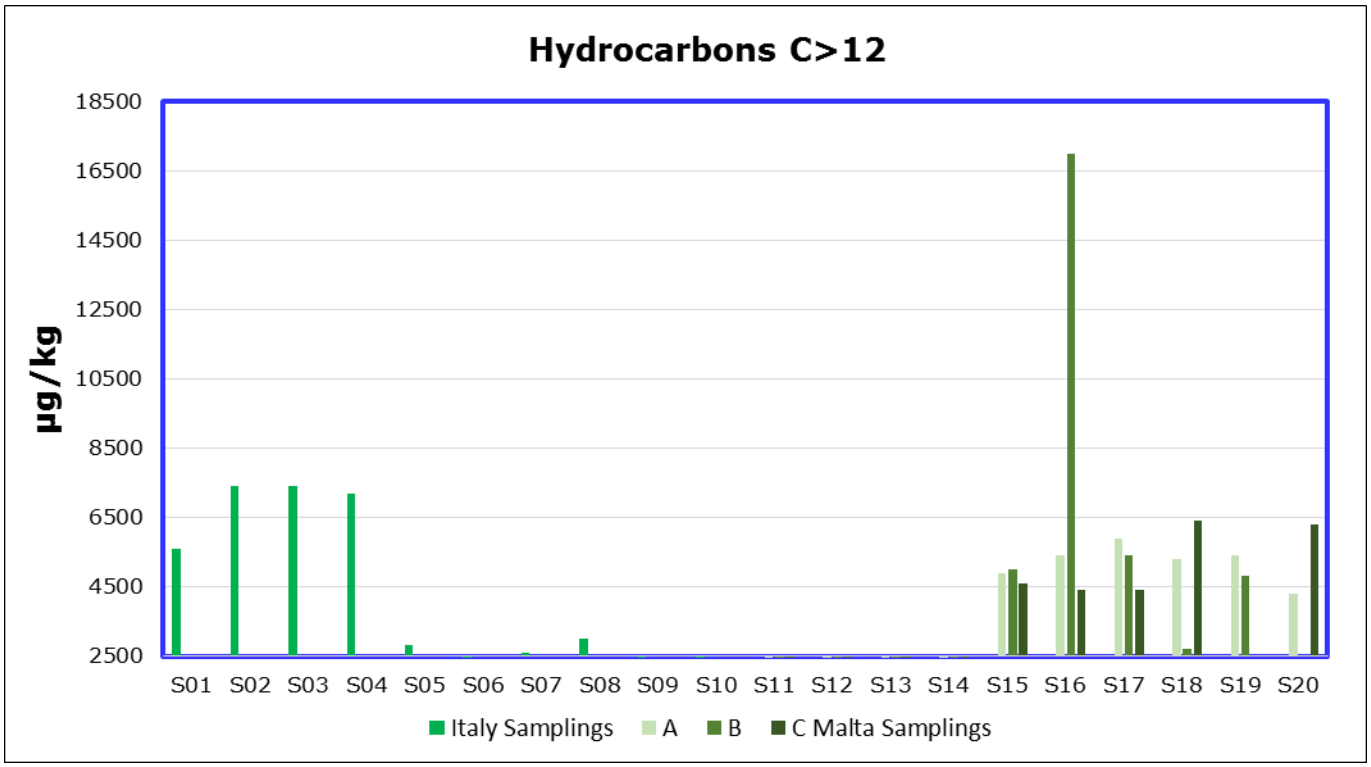


Figure 4.12 – Graph of Total Hydrocarbons in sediment samples (Ref. to Table 3.3, Table 3.4, Table 3.5, Table 3.6 for LoDs)

4.3.2.2 Nearshore Gela analysis

Results of Total Hydrocarbons are shown in Figure 4.13, Table 4.16 and Table 4.17.

In more than half sampling locations Total Hydrocarbons concentrations (C≤12) are above the LoD with a range between 0.48 and 7.1mg/kg. In three (3) stations only values above 5mg/kg were detected and highest one in station S37 (7.1mg/kg).

In most of the sampling locations Total Hydrocarbons concentrations (C>12) are below the LoD. Few samples show value below 3500µg/kg (stations S24, S25 S34 and S37), with the lowest value in S37 (2600µg/kg). The other sampling locations have a range between 4400 and 7500µg/kg which is also the highest detected value (in station S29).

Table 4.16 - Total Hydrocarbons in nearshore Gela sediment locations (S21-S30)

Determinant	U.M.	LoD [1]	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
Test Certificate			**19LA 0046165**	**19LA 0046352**	**19LA 0046179**	**19LA 0046185**	**19LA 0046319**	**19LA 0046358**	**19LA 0046189**	**19LA 0046191**	**19LA 0046323**	**19LA 0046364**
Hydrocarbons C≤12	mg/Kg	[2]	< 0,19	< 0,24	3.4	1.6	< 0,19	< 0,22	0.63	2.7	1.1	< 0,22
Hydrocarbons C>12	µg/kg		< 2100	< 2200	< 2200	3400	3300	< 2200	< 2200	< 2100	7500	< 2200

Notes:

[1] LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).
[2] For LoD references see Table 3.7

Table 4.17 - Total Hydrocarbons in nearshore Gela sediment locations (S31-S40)

Determinant	U.M.	LoD [1]	S31	S32	S33	S34	S35	S36	S37	S38	S39	S40
Test Certificate			**19LA 0046197**	**19LA 0046201**	**19LA 0046171**	**19LA 0046370**	**19LA 0046211**	**19LA 0046175**	**19LA 0046327**	**19LA 0046376**	**19LA 0046382**	**19LA 0046331**
Hydrocarbons C≤12	mg/Kg	[2]	1.1	5.6	0.48	< 0,2	2.6	4.2	7.1	< 0,19	< 0,18	5.3
Hydrocarbons C>12	µg/kg		5500	< 2100	< 2200	2900	< 2300	< 2200	2600	6700	4400	5300

Notes:

[1] LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).
[2] For LoD references see Table 3.8

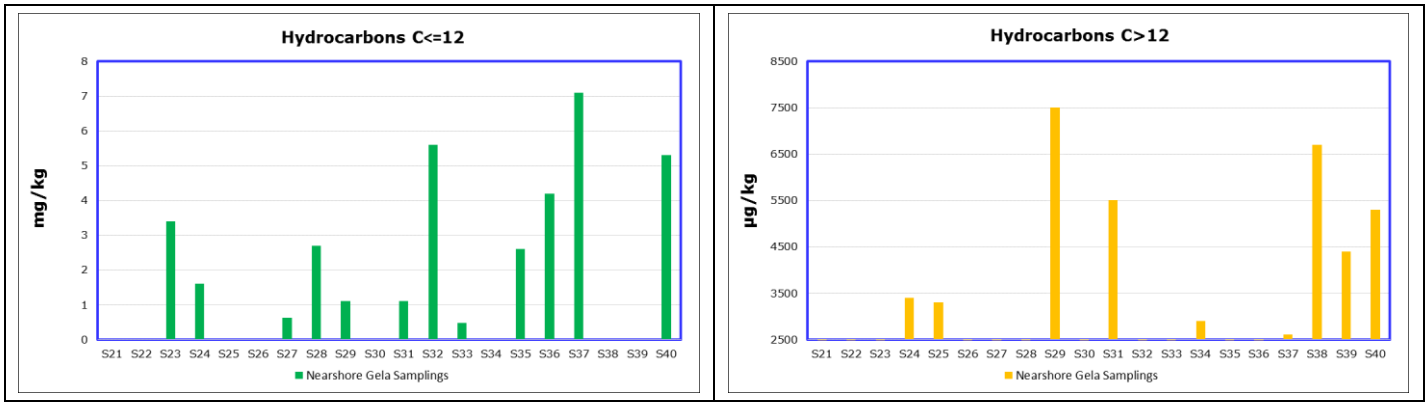


Figure 4.13 – Graph of Total Hydrocarbons in sediment samples (Ref. to Table 3.7, Table 3.8 for LoDs)

4.3.3 Polychlorinated biphenyl (PCB)

In Maltese and Italian sediment locations, PCB compounds are all below the LoD (7.8.0).

PCB analyses results for nearshore Gela sediment stations are shown in Figure 4.14, Table 4.18 and Table 4.19.

In all sediment locations PCB compounds values are below the LoD, except in station S21 where PCB summation, PCB169 and PCB77 have been detected. In particular, **Total PCB** value is 0.00054mg/kg, while **PCB169** and **PCB77** show similar values of 0.00028 and 0.00025mg/kg respectively, both of them very close or equal to the LoD (0.00025mg/kg).

Table 4.18 – PCB compounds in nearshore Gela sediment locations (S21-S30)

Determinant	U.M.	LoD [1]	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
Test Certificate			19LA 0046165	19LA 0046352	19LA 0046179	19LA 0046185	19LA 0046319	19LA 0046358	19LA 0046189	19LA 0046191	19LA 0046323	19LA 0046364
PCB101	mg/kg	For LoD references see Table 3.7	< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB105			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB110			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB114			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB118			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB123			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB126			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB128			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB138			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB146			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB151			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB153			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB156			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB157			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB167			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB169			0.00028	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB170			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB177			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB180			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB183			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB187			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB189			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB28			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB52			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB77			0.00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB81			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB95			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB99			< 0,00025	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054
PCB summation			0.00054	< 0,000051	< 0,000050	< 0,000047	< 0,000049	< 0,000050	< 0,000050	< 0,000048	< 0,000051	< 0,000054

Notes:

[1] LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).

Table 4.19 - PCB compounds in nearshore Gela sediment locations (S31-S40)

Determinant	U.M.	LoD [1]	S31	S32	S33	S34	S35	S36	S37	S38	S39	S40
Test Certificate			19LA 0046197	19LA 0046201	19LA 0046171	19LA 0046370	19LA 0046211	19LA 0046175	19LA 0046327	19LA 0046376	19LA 0046382	19LA 0046331
PCB101	mg/kg	For LoD references see Table 3.8	< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB105			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB110			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB114			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB118			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB123			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB126			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB128			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB138			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB146			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB151			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB153			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB156			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB157			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB167			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB169			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB170			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB177			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB180			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB183			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB187			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB189			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB28			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB52			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB77			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB81			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB95			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB99			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026
PCB summation			< 0,00024	< 0,000051	< 0,000051	< 0,000047	< 0,000051	< 0,000048	< 0,000048	< 0,00027	< 0,000051	< 0,00026

Notes:

[1] LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).

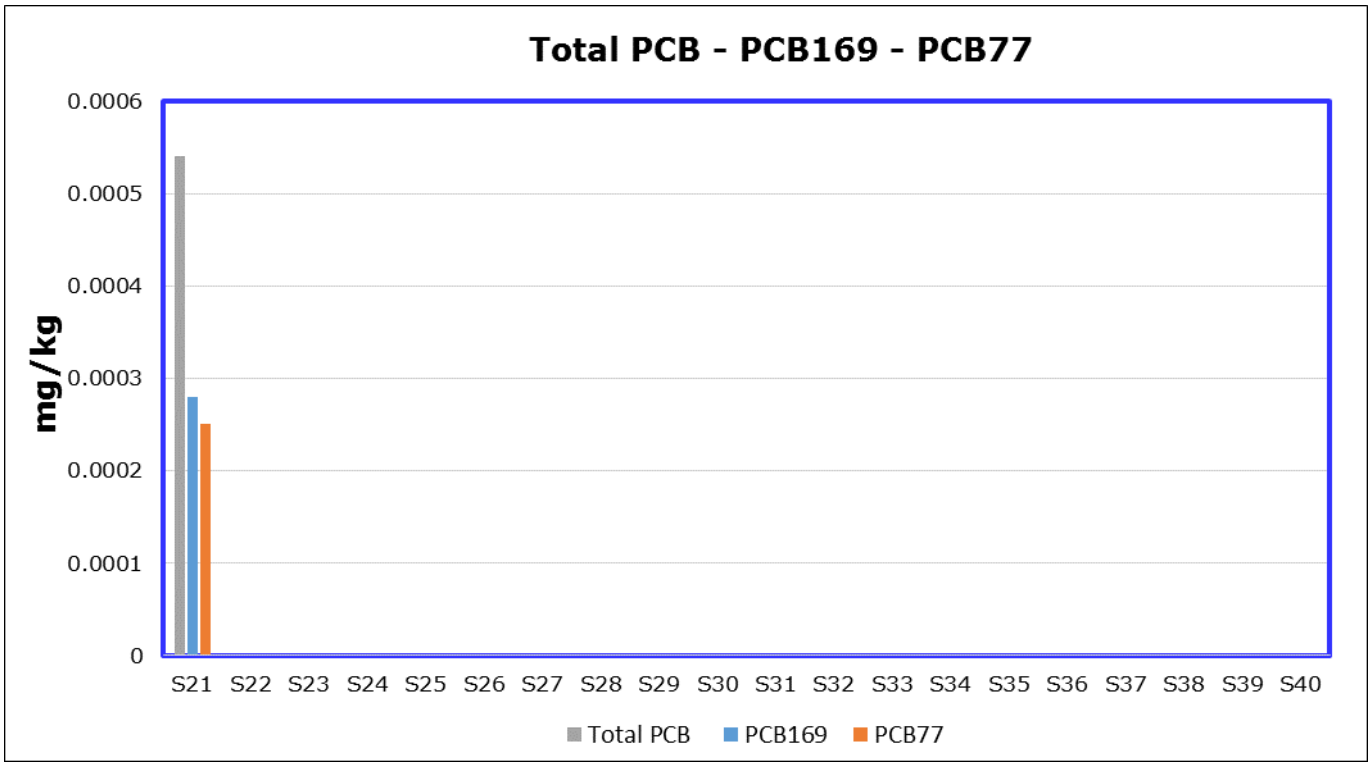


Figure 4.14 – Graph of PCB in nearshore Gela sediment stations (Ref. to Table 3.7, Table 3.8 for LoDs)

4.3.4 PAHs compounds

4.3.4.1 Malta – Italy analysis

PAH compounds have been observed especially in sampling locations close to Italian and Maltese coasts. The trend is very similar for all PAHs analytes (Figure 4.15).

Station S3 shows the highest value for all elements. Also S14 and S17 have values quite far from the average.

In particular, **Naphthalene** concentration is below the LoD in stations S5, S7, S8, S9, S10, S20 and only in one replicate of S18 and S19. In all the other locations the range is between 0.47 and 13µg/kg except in station S3 that shows the highest value of 51µg/kg, while the lowest value is 0.47µg/kg in station S16; **Fluoranthene** shows all values above the LoD with a range between 0.39 and 28µg/kg with the lowest value of 0.39µg/kg in station S12 and the highest value of 400µg/kg in S03. S14 and S17 deviate from the average showing values of 76 and 55µg/kg; **Anthracene** values are below the LoD in station S8, S9, S10, for the other locations shows a range between 13 and 0.58µg/kg with the lowest value in S11 and the highest in S3 (53 µg/kg). **Pyrene** values are below the LoD in station S8, S10, all the other locations have a range between 17 and 0.44 µg/kg. As per the other elements, S3 shows the highest value of 330 µg/kg, while S14 and S17 Pyrene is 61 and 42µg/kg each one. **Dibenzo (a, h) anthracene** is all below the LoD; **Indeno (1,2,3-c, d) pyrene** values are below the LoD in station S8, S9, S10, while for the other stations the range is between 0.5 and 21 µg/kg with the highest value in station S3 (170 µg/kg) and the other two high values in stations S14 (32 µg/kg) and S17 (21 µg/kg). **Chrysene** values are below the LoD in station S8, S9, S10, for the other locations shows a range between 22 and 0.48µg/kg with the lowest value in S11

and the highest in S3 (200 µg/kg); **Benzo (k) fluoranthene** value is below the LoD in S6, S8, S9, S10, S13 and in one replicate of S13. The other values range between 16 and 0.46 µg/kg, while S14 and S17 have different values of 43 and 33 µg/kg. The highest value is in S3 (200 µg/kg). **Benzo (g,h,i) perylene** have the same trend with the highest values in S17 (24 µg/kg), S14 (44 µg/kg), S3 (180 µg/kg), while the lowest value is 0.22 µg/kg in station S5; **Benzo (b) fluoranthene** concentration is below the LoD in stations S8, S9, S10, and one replicate of S13. This element shows the highest values in S17 (28 µg/kg), S14 (33 µg/kg), S3 (130 µg/kg), while the lowest value is 0.36 µg/kg in station S11; **Benzo (a) pyrene** concentration is below the LoD in stations S8, S9, S10, one replicates of S11 and two replicates in S13. This element shows the highest values in S17 (38 µg/kg), S14 (69 µg/kg), S3 (330 µg/kg), while the lowest value is 0.38 µg/kg in station S12; **Benzo (a) anthracene** concentration is below the LoD in stations S5, S6, S8, S9, S10, and two replicates in S11-S13. This element shows the highest values in S17 (33 µg/kg), S14 (29 µg/kg) and S3 with a value of 190 µg/kg.

Results are reported in Table 4.20, Table 4.21 and Table 4.22.

Table 4.20 - PAHs in Italian sediment locations

Determinant	**U.M.**	**LoD***	**S1**	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Test Certificate			**19LA 0014366**	**19LA 0014368**	**19LA 0014370**	**19LA 0014372**	**19LA 0014374**	**19LA 0014376**	**19LA 0014378**	**19LA 0014380**	**19LA 0014382**	**19LA 0014384**
Benzo (a) anthracene	µg/kg	For LoD references see Table 3.3	10	5.4	190	4.8	< 1,0	< 0,99	4.3	< 0,27	< 0,27	< 0,25
Benzo (a) pyrene			13	6.2	330	7.6	1.5	1.3	5.6	< 0,27	< 0,27	< 0,25
Benzo (b) fluoranthene			6.1	3.9	130	5.3	1.6	1.1	3.8	< 0,27	< 0,27	< 0,25
Benzo (g,h,i) perylene			8.9	7.5	180	8.7	2.2	1.9	4.1	0.29	0.4	0.27
Benzo (k) fluoranthene			8.7	3.8	200	7.3	1.7	< 0,99	3.2	< 0,27	< 0,27	< 0,25
chrysene			12	7.9	200	7.5	2.4	1.5	7.3	< 0,27	< 0,27	< 0,25
Dibenzo (a, h) anthracene			< 1,3	< 1,3	< 2,5	< 1,4	< 1,0	< 0,99	< 1,1	< 0,27	< 0,27	< 0,25
Indeno (1,2,3-c, d) pyrene			5.5	5.3	170	6.3	1.7	1.5	3.6	< 0,27	< 0,27	< 0,25
Pyrene			17	10	330	11	1.9	1.6	11	< 0,27	0.61	< 0,25
Anthracene			5.7	4.6	53	5.5	1.5	2	3.4	< 0,27	< 0,27	< 0,25
Fluoranthene			28	14	400	14	3.2	2.5	18	0.39	0.79	0.87
Naphthalene			6.2	4	51	3.2	< 1,0	2.6	< 1,1	< 0,27	< 0,27	< 0,25

Notes:

* LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).

Table 4.21 - PAHs in Maltese sediment locations (S11-S15)

Determinant	U.M.	LoD*	S11	S11	S11	S12	S12	S12	S13	S13	S13	S14	S14	S14	S15	S15	S15
Test Certificate			**19LA 0014284**	**19LA 0014343**	**19LA 0014344**	**19LA 0014348**	**19LA 0014349**	**19LA 0014350**	**19LA 0014355**	**19LA 0014356**	**19LA 0014357**	**19LA 0014362**	**19LA 0014363**	**19LA 0014364**	**19LA 0023723**	**19LA 0023724**	**19LA 0023725**
Benzo (a) anthracene	µg/kg	For LoD references see Table 3.4 and Table 3.5	< 0,27	< 0,25	0.81	< 0,25	< 0,27	0.89	1.7	< 0,26	< 0,97	0.59	29	0.56	2.1	2.5	1.1
Benzo (a) pyrene			< 0,27	0.52	1	0.38	0.52	1.2	1.1	< 0,26	< 0,97	0.94	69	0.84	3.1	3.9	1.8
Benzo (b) fluoranthene			0.36	0.48	1.2	0.42	0.49	1.4	1.4	0.61	< 0,97	1.1	33	1.2	3.2	3.7	1.4
Benzo (g,h,i) perylene			0.42	0.74	1.9	0.65	0.73	2.2	1.9	0.84	1	2	44	1.8	2.9	3.8	1.7
Benzo (k) fluoranthene			0.37	0.37	1.2	0.46	0.54	1.9	1.9	0.46	< 0,97	0.75	43	1.2	3.6	2.7	2.1
chrysene			0.48	1.1	1.6	0.62	0.88	1.7	2.6	1.2	1.3	1.7	47	1.7	3	3.8	1.6
Dibenzo (a, h) anthracene			< 0,27	< 0,25	< 0,27	< 0,25	< 0,27	< 0,28	< 0,24	< 0,26	< 0,97	< 0,26	< 0,98	< 0,28	< 0,29	< 0,29	< 0,28
Indeno (1,2,3-c, d) pyrene			0.5	0.78	2.1	0.75	0.74	2.6	2	0.79	1.3	2	32	1.8	3	3.8	1.8
Pyrene			0.52	0.6	1.3	0.52	1.1	1.4	4.4	0.44	1	1	61	0.92	2.7	4.2	1.9
Anthracene			0.58	1.1	1.2	1.1	1.8	1.3	1	0.89	1.2	1.5	13	0.87	1.3	1.3	1.1
Fluoranthene			0.93	1.4	2.6	1.1	2.2	2.9	7.1	1.7	2	2.9	76	2.4	3.9	5.1	2.5
Naphthalene			1.3	1.5	1.8	1.2	8.3	2.3	1.4	1.2	1.4	2	13	1.7	1.1	0.88	0.63

Notes:

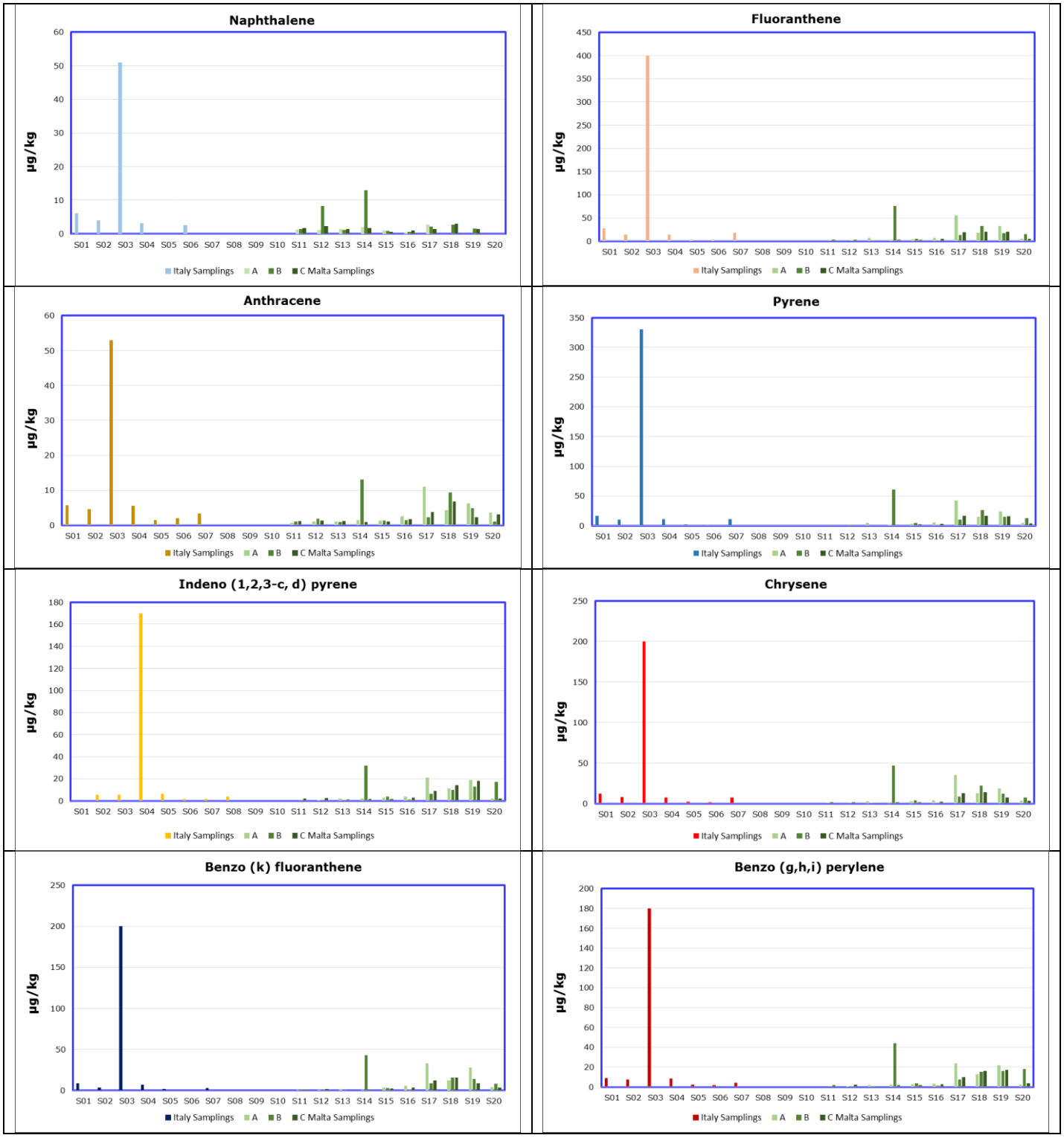
* LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).

Table 4.22 - PAHs in Maltese sediment locations (S16-S20)

Determinant	U.M.	LoD*	S16	S16	S16	S17	S17	S17	S18	S18	S18	S19	S19	S19	S20	S20	S20
Test Certificate			**19LA 0023729**	**19LA 0023730**	**19LA 0023731**	**19LA 0023736**	**19LA 0023737**	**19LA 0023738**	**19LA 0023743**	**19LA 0023744**	**19LA 0023745**	**19LA 0023750**	**19LA 0023751**	**19LA 0023752**	**19LA 0023757**	**19LA 0023758**	**19LA 0023759**
Benzo (a) anthracene	µg/kg	For LoD references see Table 3.5 and Table 3.6	3.1	1.1	2	33	6.8	10	10	19	11	17	11	12	2.6	9.5	3.2
Benzo (a) pyrene			4.5	1.4	2.8	38	9.1	14	19	28	19	27	18	14	3.4	12	4.1
Benzo (b) fluoranthene			2.5	1.1	2.4	28	6.3	9.2	15	17	9.1	17	11	24	2.8	22	2.6
Benzo (g,h,i) perylene			3.4	1.1	2.5	24	7.4	10	13	15	16	22	16	17	2.3	18	3.5
Benzo (k) fluoranthene			5.9	1.3	3.6	33	8.9	12	12	16	16	28	14	8.9	4	8.2	3.5
chrysene			4.3	1.3	2.5	35	8.6	13	13	22	14	19	12	7.5	3.5	7.4	3.5
Dibenzo (a, h) anthracene			< 0,30	< 0,27	< 0,28	< 0,29	< 0,26	< 0,28	< 1,1	< 1,1	< 1,0	< 0,28	< 0,26	8.2	< 1,0	11	< 1,0
Indeno (1,2,3-c, d) pyrene			3.7	1.1	2.8	21	6.2	9	11	10	14	19	13	18	2	17	2.2
Pyrene			5.6	1.6	3.3	42	10	17	15	26	17	24	15	16	4.5	13	3.7
Anthracene			2.6	1.5	1.7	11	2.3	3.8	4.3	9.4	6.8	6.2	4.8	2.2	3.6	1.1	3.1
Fluoranthene			6.7	2.2	4.5	55	13	19	18	33	20	33	17	20	5.2	15	5.2
Naphthalene			0.47	0.64	1	2.7	2.2	1.5	< 1,1	2.7	3	< 0,28	1.6	1.5	< 1,0	< 1	< 1,0

Notes:

* LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).


Naphthalene
µg/kg
S01 S02 S03 S04 S05 S06 S07 S08 S09 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20
Italy Samplings A B C Malta Samplings
Fluoranthene
µg/kg
Anthracene
µg/kg
Pyrene
µg/kg
Indeno (1,2,3-c, d) pyrene
µg/kg
Chrysene
µg/kg
Benzo (k) fluoranthene
µg/kg
Benzo (g,h,i) perylene
µg/kg

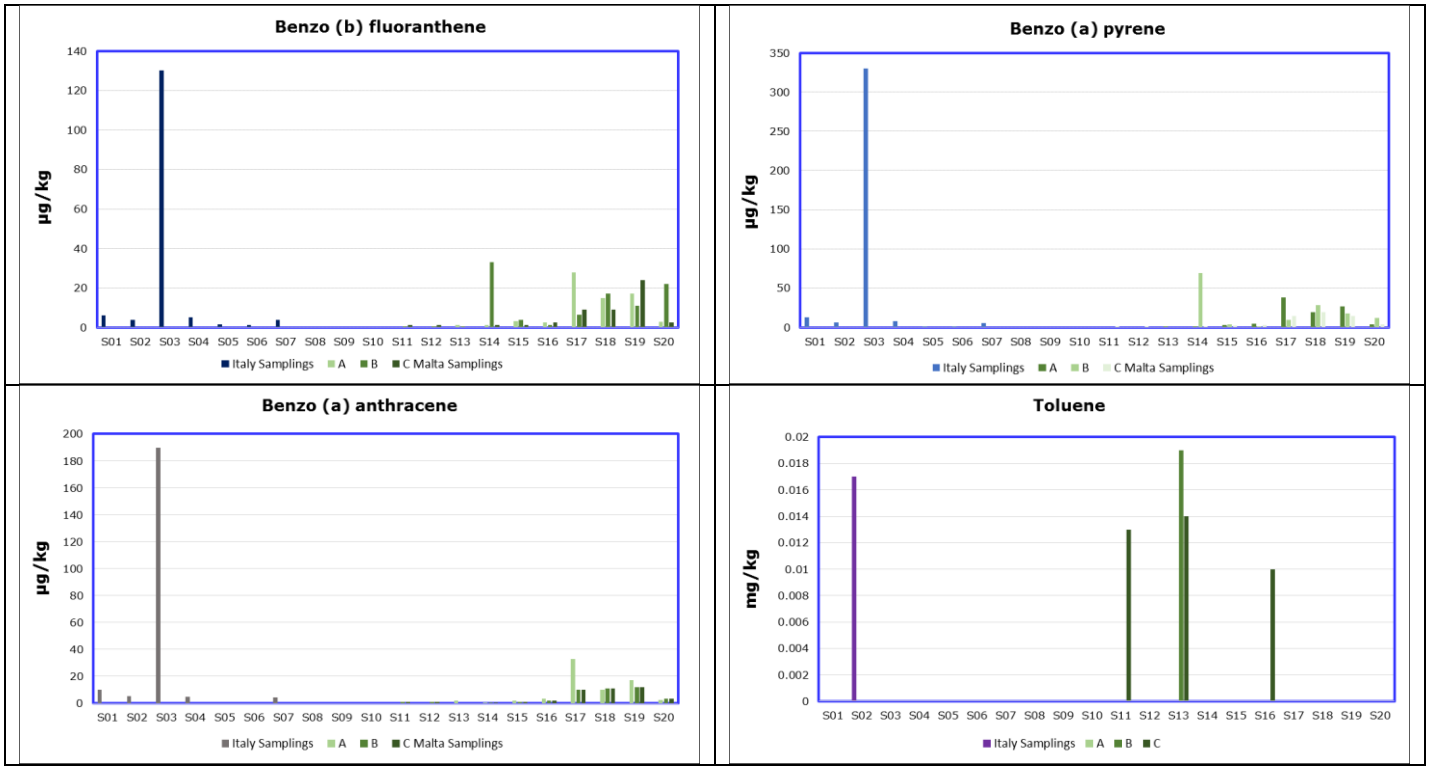


Figure 4.15 – Graphs of the PAH compounds concentration in sediment samples (Ref. to Table 3.3, Table 3.4, Table 3.5, Table 3.6 for LoDs)

4.3.4.2 Nearshore Gela analysis

PAH compounds have been observed especially in few sampling locations. The trend is very similar for almost all PAHs analytes (Table 4.23 and Figure 4.16) and they were detected in only three stations (S21 or S32 only for Naphtalene, S26 and S30), except for Chrysene which is present in seven locations.

Station S21 shows the highest values for all elements, except for Naphthalene where the highest values was detected in station S26.

In particular, **Naphthalene** concentration is above the LoD in stations S26, S30, S32, with the lowest value of 0.42 µg/kg in S32 and the highest one in S26 (0.52µg/kg); **Chrysene** values almost range between 1.7 and 0.53µg/kg with the lowest value of 0.53µg/kg in station S24. Sediment station S21 deviate from the average showing a value of 20µg/kg; **Indeno (1,2,3-c, d) pyrene** was detected in only three stations with the highest value in S21 (2.9µg/kg). Sampling locations S26 and S30 show the same value of 0.68µg/kg; **Benzo (g,h,i) perylene** analyte has almost the same values of Indeno (1,2,3-c, d) pyrene, with the highest in S21 (3.7µg/kg) and the lowest one in S26 (0.76µg/kg); **Benzo (b) fluoranthene** has the highest value in S21 (5.7µg/kg) and the lowest one in S30 (094µg/kg); **Fluoranthene** shows the highest value in S21 (15µg/kg) and the lowest in S26 (2.2µg/kg); **Benzo (k) fluoranthene** shows the highest value in S21 (2.6µg/kg) and the lowest one in S30 (0.64µg/kg); **Benzo (a) pyrene** was detected in stations S21 where it shows the highest value of 1 µg/kg, while in station S30 the lowest value of 0.83 µg/kg was detected ;**Benzo (a) anthracene** concentration reaches 24µg/kg in station S21, 1.3µg/kg in station S26, 0.99µg/kg in S30; **Anthracene**, **Pyrene** and **Dibenzo (a, h) anthracene** were detected only in S21 sampling location with values of 46, 36, 2.5 respectively.

Results are reported in Table 4.23 and Table 4.24 and shown in Table 4.16.

Table 4.23 - PAHs in nearshore Gela sediment locations (S21-S30)

Determinant	U.M.	LoD*	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
Test Certificate			19LA 0046165	19LA 0046352	19LA 0046179	19LA 0046185	19LA 0046319	19LA 0046358	19LA 0046189	19LA 0046191	19LA 0046323	19LA 0046364
Benzo (a) anthracene	µg/kg	For LoD references see Table 3.7	24	< 0,25	< 0,25	< 0,23	< 0,25	1.3	< 0,25	< 0,24	< 0,25	0.99
Benzo (a) pyrene			11	< 0,25	< 0,25	< 0,23	< 0,25	0.92	< 0,25	< 0,24	< 0,25	0.83
Benzo (b) fluoranthene			5.7	< 0,25	< 0,25	< 0,23	< 0,25	1.2	< 0,25	< 0,24	< 0,25	0.94
Benzo (e) pyrene			5.5	< 0,25	0.35	< 0,23	0.33	0.85	< 0,25	0.27	0.29	0.67
Benzo (g,h,i) perylene			3.7	< 0,25	< 0,25	< 0,23	< 0,25	0.76	< 0,25	< 0,24	< 0,25	0.79
Benzo (j) fluoranthene			3.7	< 0,25	< 0,25	< 0,23	0.29	0.8	< 0,25	< 0,24	0.35	0.65
Benzo (k) fluoranthene			2.6	< 0,25	< 0,25	< 0,23	< 0,25	0.79	< 0,25	< 0,24	< 0,25	0.64
chrysene			20	< 0,25	0.65	0.53	< 0,25	1.7	< 0,25	< 0,24	0.7	1.5
Dibenzo (a, h) anthracene			2.5	< 0,25	< 0,25	< 0,23	< 0,25	< 0,25	< 0,25	< 0,24	< 0,25	< 0,27
Indeno (1,2,3-c, d) pyrene			2.9	< 0,25	< 0,25	< 0,23	< 0,25	0.68	< 0,25	< 0,24	< 0,25	0.68
Pyrene			36	< 0,25	< 0,25	< 0,23	< 0,25	< 0,25	< 0,25	< 0,24	< 0,25	< 0,27
Anthracene			46	< 0,25	< 0,25	< 0,23	< 0,25	< 0,25	< 0,25	< 0,24	< 0,25	< 0,27
Fluoranthene			15	< 0,25	< 0,25	< 0,23	< 0,25	2.2	< 0,25	< 0,24	< 0,25	2.4
Naphthalene			< 1,2	< 0,25	< 0,25	< 0,23	< 0,25	0.52	< 0,25	< 0,24	< 0,25	0.44

Notes:

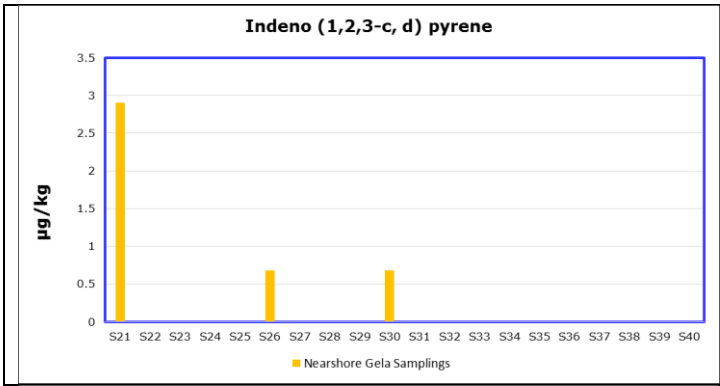
* LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).

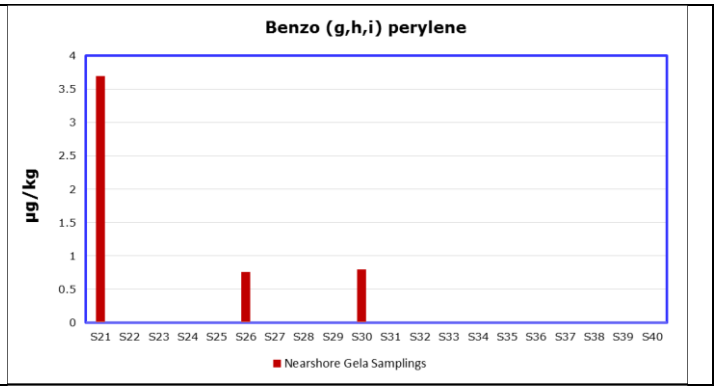
Table 4.24 - PAHs in nearshore Gela sediment locations (S31-S40)

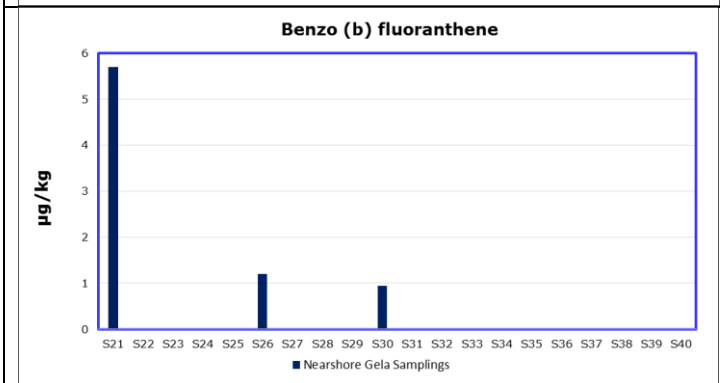
Determinant	U.M.	LoD*	S31	S32	S33	S34	S35	S36	S37	S38	S39	S40
Test Certificate			19LA 0046197	19LA 0046201	19LA 0046171	19LA 0046370	19LA 0046211	19LA 0046175	19LA 0046327	19LA 0046376	19LA 0046382	19LA 0046331
Benzo (a) anthracene	µg/kg	For LoD references see Table 3.8	< 1,2	< 0,25	< 0,25	< 0,23	< 0,25	< 0,24	< 0,24	< 1,4	< 0,25	< 1,3
Benzo (a) pyrene			< 1,2	< 0,25	< 0,25	< 0,23	< 0,25	< 0,24	< 0,24	< 1,4	< 0,25	< 1,3
Benzo (b) fluoranthene			< 1,2	< 0,25	< 0,25	< 0,23	< 0,25	< 0,24	< 0,24	< 1,4	< 0,25	< 1,3
Benzo (e) pyrene			< 1,2	0.57	0.38	< 0,23	0.44	< 0,24	< 0,24	< 1,4	< 0,25	1.5
Benzo (g,h,i) perylene			< 1,2	< 0,25	< 0,25	< 0,23	< 0,25	< 0,24	< 0,24	< 1,4	< 0,25	< 1,3
Benzo (j) fluoranthene			< 1,2	0.42	< 0,25	< 0,23	0.36	< 0,24	0.28	< 1,4	< 0,25	1.5
Benzo (k) fluoranthene			< 1,2	< 0,25	< 0,25	< 0,23	< 0,25	< 0,24	< 0,24	< 1,4	< 0,25	< 1,3
chrysene			< 1,2	1.1	< 0,25	< 0,23	< 0,25	< 0,24	< 0,24	< 1,4	< 0,25	< 1,3
Dibenzo (a, h) anthracene			< 1,2	< 0,25	< 0,25	< 0,23	< 0,25	< 0,24	< 0,24	< 1,4	< 0,25	< 1,3
Indeno (1,2,3-c, d) pyrene			< 1,2	< 0,25	< 0,25	< 0,23	< 0,25	< 0,24	< 0,24	< 1,4	< 0,25	< 1,3
Pyrene			< 1,2	< 0,25	< 0,25	< 0,23	< 0,25	< 0,24	< 0,24	< 1,4	< 0,25	< 1,3
Anthracene			< 1,2	< 0,25	< 0,25	< 0,23	< 0,25	< 0,24	< 0,24	< 1,4	< 0,25	< 1,3
Fluoranthene			< 1,2	< 0,25	< 0,25	< 0,23	< 0,25	< 0,24	< 0,24	< 1,4	< 0,25	< 1,3
Naphthalene			< 1,2	0.43	< 0,25	< 0,23	< 0,25	< 0,24	< 0,24	< 1,4	< 0,25	< 1,3

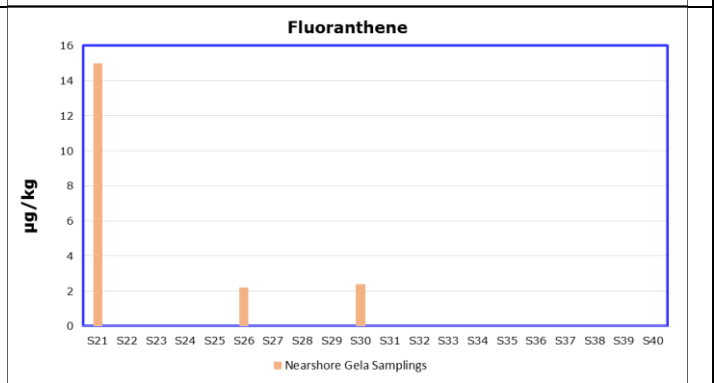
Notes:

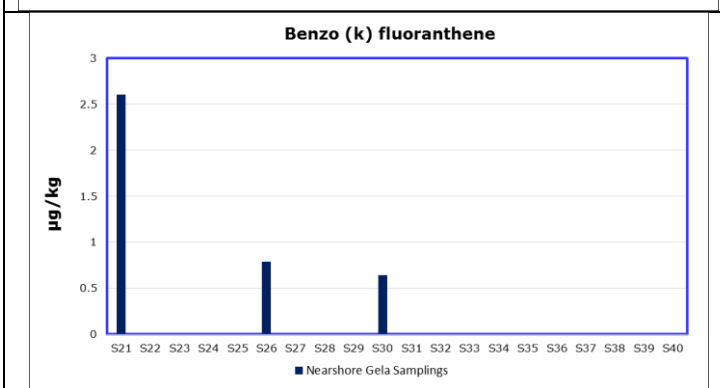
* LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).

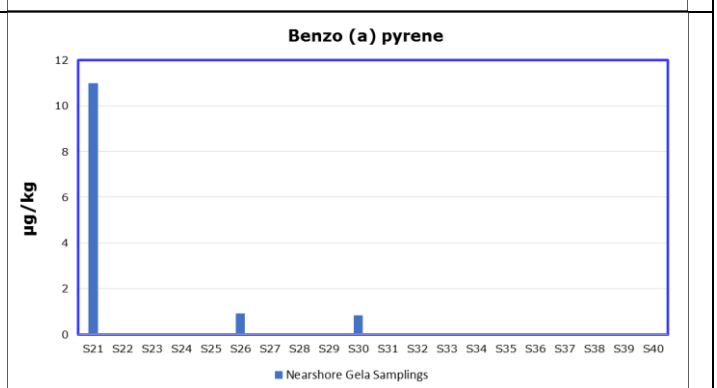

Indeno (1,2,3-c, d) pyrene
µg/kg
S21 S22 S23 S24 S25 S26 S27 S28 S29 S30 S31 S32 S33 S34 S35 S36 S37 S38 S39 S40
Nearshore Gela Samplings

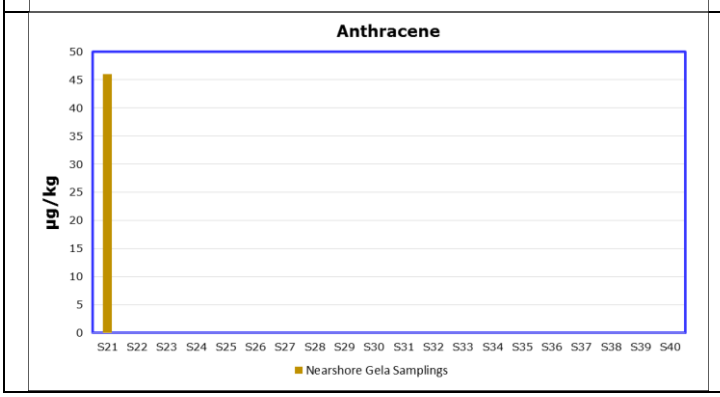

Benzo (g,h,i) perylene
µg/kg
S21 S22 S23 S24 S25 S26 S27 S28 S29 S30 S31 S32 S33 S34 S35 S36 S37 S38 S39 S40
Nearshore Gela Samplings

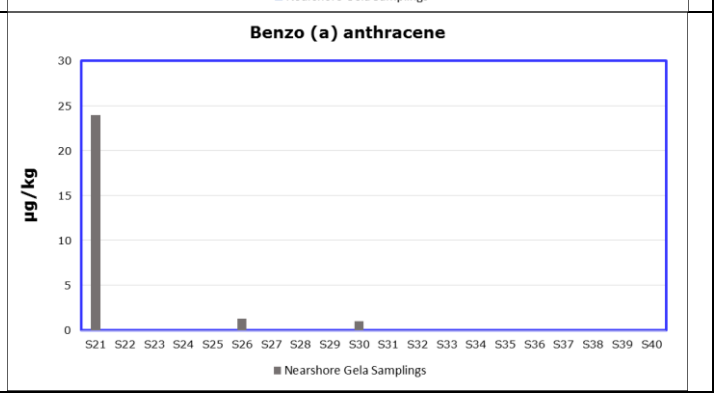

Benzo (b) fluoranthene
µg/kg
S21 S22 S23 S24 S25 S26 S27 S28 S29 S30 S31 S32 S33 S34 S35 S36 S37 S38 S39 S40
Nearshore Gela Samplings


Fluoranthene
µg/kg
S21 S22 S23 S24 S25 S26 S27 S28 S29 S30 S31 S32 S33 S34 S35 S36 S37 S38 S39 S40
Nearshore Gela Samplings


Benzo (k) fluoranthene
µg/kg
S21 S22 S23 S24 S25 S26 S27 S28 S29 S30 S31 S32 S33 S34 S35 S36 S37 S38 S39 S40
Nearshore Gela Samplings


Benzo (a) pyrene
µg/kg
S21 S22 S23 S24 S25 S26 S27 S28 S29 S30 S31 S32 S33 S34 S35 S36 S37 S38 S39 S40
Nearshore Gela Samplings


Anthracene
µg/kg
S21 S22 S23 S24 S25 S26 S27 S28 S29 S30 S31 S32 S33 S34 S35 S36 S37 S38 S39 S40
Nearshore Gela Samplings


Benzo (a) anthracene
µg/kg
S21 S22 S23 S24 S25 S26 S27 S28 S29 S30 S31 S32 S33 S34 S35 S36 S37 S38 S39 S40
Nearshore Gela Samplings

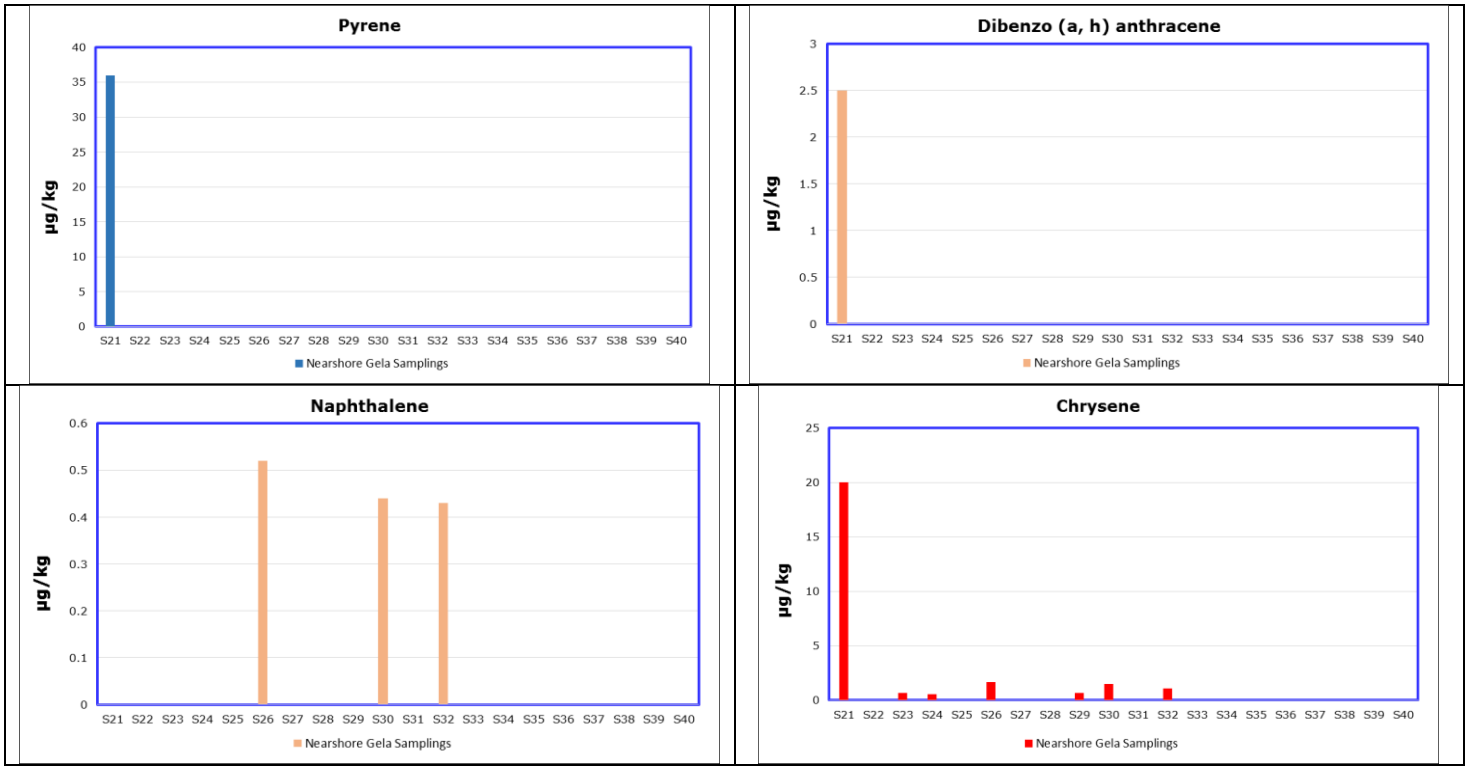


Figure 4.16 - Graphs of the PAH compounds concentration in nearshore Gela sediment samples (Ref. to Table 3.7, Table 3.8 for LoDs)

4.3.5 BTEX

4.3.5.1 Malta – Italy analysis

In Malta and Italy working areas, BTEX are always below the LoD (Table 4.25, Table 4.26 and Table 4.27), except for Toluene and BTEX in S2, S11, S13, S16 locations, in which anyway very low values (ranging from 0.01 and 0.019 mg/kg) are measured.

Table 4.25 - BTEX in Italian sediment locations

Determinant	U.M.	LoD*	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Test Certificate			**19LA 0014366**	**19LA 0014368**	**19LA 0014370**	**19LA 0014372**	**19LA 0014374**	**19LA 0014376**	**19LA 0014378**	**19LA 0014380**	**19LA 0014382**	**19LA 0014384**
Benzene	mg/kg	For LoD references see Table 3.3	< 0,001	< 0,0011	< 0,0011	< 0,0014	<0,00086	< 0,0011	< 0,0011	< 0,001	< 0,0011	<0,00098
Ethylbenzene			< 0,0052	< 0,0054	< 0,0054	< 0,0068	< 0,0043	< 0,0055	< 0,0057	< 0,0051	< 0,0053	< 0,0049
Styrene			< 0,0052	< 0,0054	< 0,0054	< 0,0068	< 0,0043	< 0,0055	< 0,0057	< 0,0051	< 0,0053	< 0,0049
Toluene			< 0,0052	0.017	< 0,0054	< 0,0068	< 0,0043	< 0,0055	< 0,0057	< 0,0051	< 0,0053	< 0,0049
m, p - xylene			< 0,01	< 0,011	< 0,011	< 0,014	< 0,0086	< 0,011	< 0,011	< 0,01	< 0,011	< 0,0098
o - Xylene			< 0,0052	< 0,0054	< 0,0054	< 0,0068	< 0,0043	< 0,0055	< 0,0057	< 0,0051	< 0,0053	< 0,0049
Xylene			< 0,01	< 0,011	< 0,011	< 0,014	< 0,0086	< 0,011	< 0,011	< 0,01	< 0,011	< 0,0098
BTEX (aromatic hydrocarbons)			< 0,01	0.017	< 0,011	< 0,014	< 0,0086	< 0,011	< 0,011	< 0,01	< 0,011	< 0,0098

Notes:

* LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).

Table 4.26 - BTEX in Maltese sediment locations (S11-S15)

Determinant	U.M.	LoD [1]	S11	S11	S11	S12	S12	S12	S13	S13	S13	S14	S14	S14	S15	S15	S15
Test Certificate			**19LA 0014284**	**19LA 0014343**	**19LA 0014344**	**19LA 0014348**	**19LA 0014349**	**19LA 0014350**	**19LA 0014355**	**19LA 0014356**	**19LA 0014357**	**19LA 0014362**	**19LA 0014363**	**19LA 0014364**	**19LA 0023723**	**19LA 0023724**	**19LA 0023725**
Benzene	mg/kg	[2]	<0,00085	<0,00083	<0,00095	< 0,0012	<0,00092	< 0,0012	<0,00079	< 0,0012	< 0,0011	< 0,0011	< 0,0011	< 0,0011	< 0,0011	< 0,0012	< 0,0012
Ethylbenzene			< 0,0043	< 0,0042	< 0,0047	< 0,0059	< 0,0046	< 0,0061	< 0,004	< 0,0058	< 0,0053	< 0,0053	< 0,0056	< 0,0057	< 0,0053	< 0,0058	< 0,006
Styrene			< 0,0043	< 0,0042	< 0,0047	< 0,0059	< 0,0046	< 0,0061	< 0,004	< 0,0058	< 0,0053	< 0,0053	< 0,0056	< 0,0057	< 0,0053	< 0,0058	< 0,006
Toluene			< 0,0043	< 0,0042	0.013	< 0,0059	< 0,0046	< 0,0061	< 0,004	0.019	0.014	< 0,0053	< 0,0056	< 0,0057	< 0,0053	< 0,0058	< 0,006
m, p - xylene			< 0,0085	< 0,0083	< 0,0095	< 0,012	< 0,0092	< 0,012	< 0,0079	< 0,012	< 0,011	< 0,011	< 0,011	< 0,011	< 0,011	< 0,012	< 0,012
o - Xylene			< 0,0043	< 0,0042	< 0,0047	< 0,0059	< 0,0046	< 0,0061	< 0,004	< 0,0058	< 0,0053	< 0,0053	< 0,0056	< 0,0057	< 0,0053	< 0,0058	< 0,006
Xylene			< 0,0085	< 0,0083	< 0,0095	< 0,012	< 0,0092	< 0,012	< 0,0079	< 0,012	< 0,011	< 0,011	< 0,011	< 0,011	< 0,011	< 0,012	< 0,012
BTEX (aromatic hydrocarbons)			< 0,0085	< 0,0083	0.013	< 0,012	< 0,0092	< 0,012	< 0,0079	0.019	0.014	< 0,011	< 0,011	< 0,011	< 0,011	< 0,012	< 0,012

Notes:

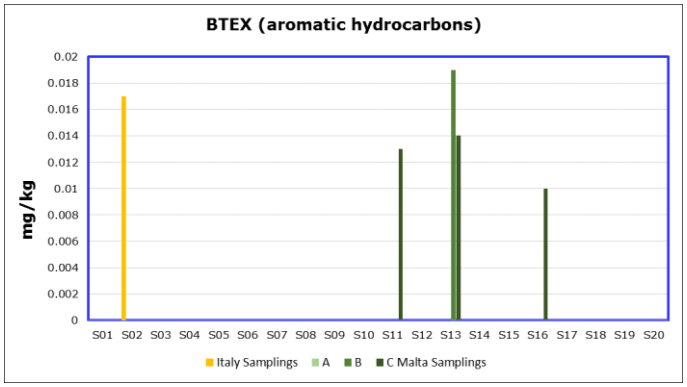
[1] LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).
[2] For LoD references see Table 3.4 and Table 3.5

Table 4.27 - BTEX in Maltese sediment locations (S16-S20)

Determinant	U.M.	LoD [1]	S16	S16	S16	S17	S17	S17	S18	S18	S18	S19	S19	S19	S20	S20	S20
Test Certificate			**19LA 0023729**	**19LA 0023730**	**19LA 0023731**	**19LA 0023736**	**19LA 0023737**	**19LA 0023738**	**19LA 0023743**	**19LA 0023744**	**19LA 0023745**	**19LA 0023750**	**19LA 0023751**	**19LA 0023752**	**19LA 0023757**	**19LA 0023758**	**19LA 0023759**
Benzene	mg/kg	[2]	<0,00086	< 0,001	< 0,0011	< 0,0011	< 0,0011	< 0,0011	< 0,0012	<0,00091	<0,00099	< 0,0012	< 0,0012	< 0,0011	< 0,001	< 0,0011	< 0,0011
Ethylbenzene			< 0,0043	< 0,0051	< 0,0057	< 0,0057	< 0,0057	< 0,0054	< 0,0059	< 0,0046	< 0,005	< 0,0058	< 0,0058	< 0,0054	< 0,0052	< 0,0056	< 0,0055
Styrene			< 0,0043	< 0,0051	< 0,0057	< 0,0057	< 0,0057	< 0,0054	< 0,0059	< 0,0046	< 0,005	< 0,0058	< 0,0058	< 0,0054	< 0,0052	< 0,0056	< 0,0055
Toluene			< 0,0043	< 0,0051	0.01	< 0,0057	< 0,0057	< 0,0054	< 0,0059	< 0,0046	< 0,005	< 0,0058	< 0,0058	< 0,0054	< 0,0052	< 0,0056	< 0,0055
m, p - xylene			< 0,0086	< 0,01	< 0,011	< 0,011	< 0,011	< 0,011	< 0,012	< 0,0091	< 0,0099	< 0,012	< 0,012	< 0,011	< 0,01	< 0,011	< 0,011
o - Xylene			< 0,0043	< 0,0051	< 0,0057	< 0,0057	< 0,0057	< 0,0054	< 0,0059	< 0,0046	< 0,005	< 0,0058	< 0,0058	< 0,0054	< 0,0052	< 0,0056	< 0,0055
Xylene			< 0,0086	< 0,01	< 0,011	< 0,011	< 0,011	< 0,011	< 0,012	< 0,0091	< 0,0099	< 0,012	< 0,012	< 0,011	< 0,01	< 0,011	< 0,011
BTEX (aromatic hydrocarbons)			< 0,0086	< 0,01	0.01	< 0,011	< 0,011	< 0,011	< 0,012	< 0,0091	< 0,0099	< 0,012	< 0,012	< 0,011	< 0,01	< 0,011	< 0,011

Notes:

[1] LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).
[2] For LoD references see Table 3.5 and Table 3.6.



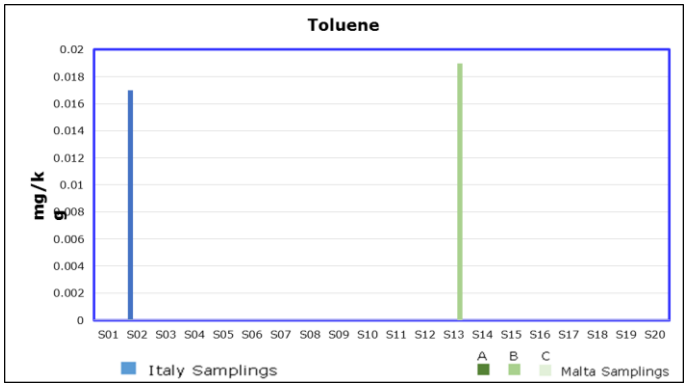


Figure 4.17 - Graphs of the BTEX compounds concentration in sediment samples (Ref. to Table 3.3, Table 3.4, Table 3.5, Table 3.6 for LoDs)

4.3.5.2 Nearshore Gela analysis

In nearshore Gela site, BTEX compounds are all below the LoD (Table 4.28 and Table 4.29).

Table 4.28 - BTEX in nearshore Gela sediment locations (S21-S30)

Determinant	U.M.	LoD [1]	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
Test Certificate			**19LA 0046165**	**19LA 0046352**	**19LA 0046179**	**19LA 0046185**	**19LA 0046319**	**19LA 0046358**	**19LA 0046189**	**19LA 0046191**	**19LA 0046323**	**19LA 0046364**
Benzene	µg/kg	[2]	< 0,00079	< 0,001	< 0,00072	< 0,00077	< 0,00079	< 0,0009	< 0,00081	< 0,00093	< 0,00087	< 0,00091
Ethylbenzene			< 0,004	< 0,005	< 0,0036	< 0,0039	< 0,004	< 0,0045	< 0,004	< 0,0047	< 0,0044	< 0,0046
Styrene			< 0,004	< 0,005	< 0,0036	< 0,0039	< 0,004	< 0,0045	< 0,004	< 0,0047	< 0,0044	< 0,0046
Toluene			< 0,004	< 0,005	< 0,0036	< 0,0039	< 0,004	< 0,0045	< 0,004	< 0,0047	< 0,0044	< 0,0046
m, p - xylene			< 0,0079	< 0,01	< 0,0072	< 0,0077	< 0,0079	< 0,009	< 0,0081	< 0,0093	< 0,0087	< 0,0091
o - Xylene			< 0,004	< 0,005	< 0,0036	< 0,0039	< 0,004	< 0,0045	< 0,004	< 0,0047	< 0,0044	< 0,0046
Xylene			< 0,0079	< 0,01	< 0,0072	< 0,0077	< 0,0079	< 0,009	< 0,0081	< 0,0093	< 0,0087	< 0,0091
BTEX (aromatic hydrocarbons)			< 0,0079	< 0,01	< 0,0072	< 0,0077	< 0,0079	< 0,009	< 0,0081	< 0,0093	< 0,0087	< 0,0091

Notes:

[1] LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).
[2] For LoD references see Table 3.7

Table 4.29 - BTEX in nearshore Gela sediment locations (S31-S40)

Determinant	U.M.	LoD [1]	S31	S32	S33	S34	S35	S36	S37	S38	S39	S40
Test Certificate			**19LA 0046165**	**19LA 0046352**	**19LA 0046197**	**19LA 0046201**	**19LA 0046171**	**19LA 0046370**	**19LA 0046211**	**19LA 0046175**	**19LA 0046327**	**19LA 0046376**
Benzene	µg/kg	[2]	< 0,00067	< 0,0008	< 0,00098	< 0,00084	< 0,00075	< 0,00094	< 0,00094	< 0,00081	< 0,00075	< 0,00091
Ethylbenzene			< 0,0034	< 0,004	< 0,0049	< 0,0042	< 0,0037	< 0,0047	< 0,0047	< 0,004	< 0,0037	< 0,0046
Styrene			< 0,0034	< 0,004	< 0,0049	< 0,0042	< 0,0037	< 0,0047	< 0,0047	< 0,004	< 0,0037	< 0,0046
Toluene			< 0,0034	< 0,004	< 0,0049	< 0,0042	< 0,0037	< 0,0047	< 0,0047	< 0,004	< 0,0037	< 0,0046
m, p - xylene			< 0,0067	< 0,008	< 0,0098	< 0,0084	< 0,0075	< 0,0094	< 0,0094	< 0,0081	< 0,0075	< 0,0091
o - Xylene			< 0,0034	< 0,004	< 0,0049	< 0,0042	< 0,0037	< 0,0047	< 0,0047	< 0,004	< 0,0037	< 0,0046
Xylene			< 0,0067	< 0,008	< 0,0098	< 0,0084	< 0,0075	< 0,0094	< 0,0094	< 0,0081	< 0,0075	< 0,0091
BTEX (aromatic hydrocarbons)			< 0,0067	< 0,008	< 0,0098	< 0,0084	< 0,0075	< 0,0094	< 0,0094	< 0,0081	< 0,0075	< 0,0091

Notes:

[1] LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).
[2] For LoD references see Table 3.7

4.3.6 Organotin compounds

Tributyltin analyses results are shown in Figure 4.18 and Table 4.30. This analyte was detected only in one sediment location (S26) with a value of 5 µg/kg. In all the other stations the concentration was below the LoD.

Table 4.30 – Tributyltin analysis in nearshore Gela sediment stations

Determinant	**U.M.**	**LoD [1]**	**S21**	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Test Certificate			**19LA 0046165**	**19LA 0046352**	**19LA 0046179**	**19LA 0046185**	**19LA 0046319**	**19LA 0046358**	**19LA 0046189**	**19LA 0046191**	**19LA 0046323**	**19LA 0046364**
Tributyltin	µg/kg	[2]	< 0,89	< 0,91	< 0,93	< 1,1	< 1,0	5	< 0,98	< 1,1	< 1,0	< 1,1
Determinant	**U.M.**	**LoD [1]**	**S31**	**S32**	**S33**	**S34**	**S35**	**S36**	**S37**	**S38**	**S39**	**S40**
Test Certificate			**19LA 0046197**	**19LA 0046201**	**19LA 0046171**	**19LA 0046370**	**19LA 0046211**	**19LA 0046175**	**19LA 0046327**	**19LA 0046376**	**19LA 0046382**	**19LA 0046331**
Tributyltin	µg/kg	[2]	< 1,0	< 0,91	< 1,0	< 0,94	< 1,1	< 0,98	< 0,92	< 1,0	< 0,94	< 1,1

Notes:

[1] LoDs were not inserted in this table because values are all different for each sediment station (as explained in paragraph 3.8.0).
[2] For LoD references see Table 3.7

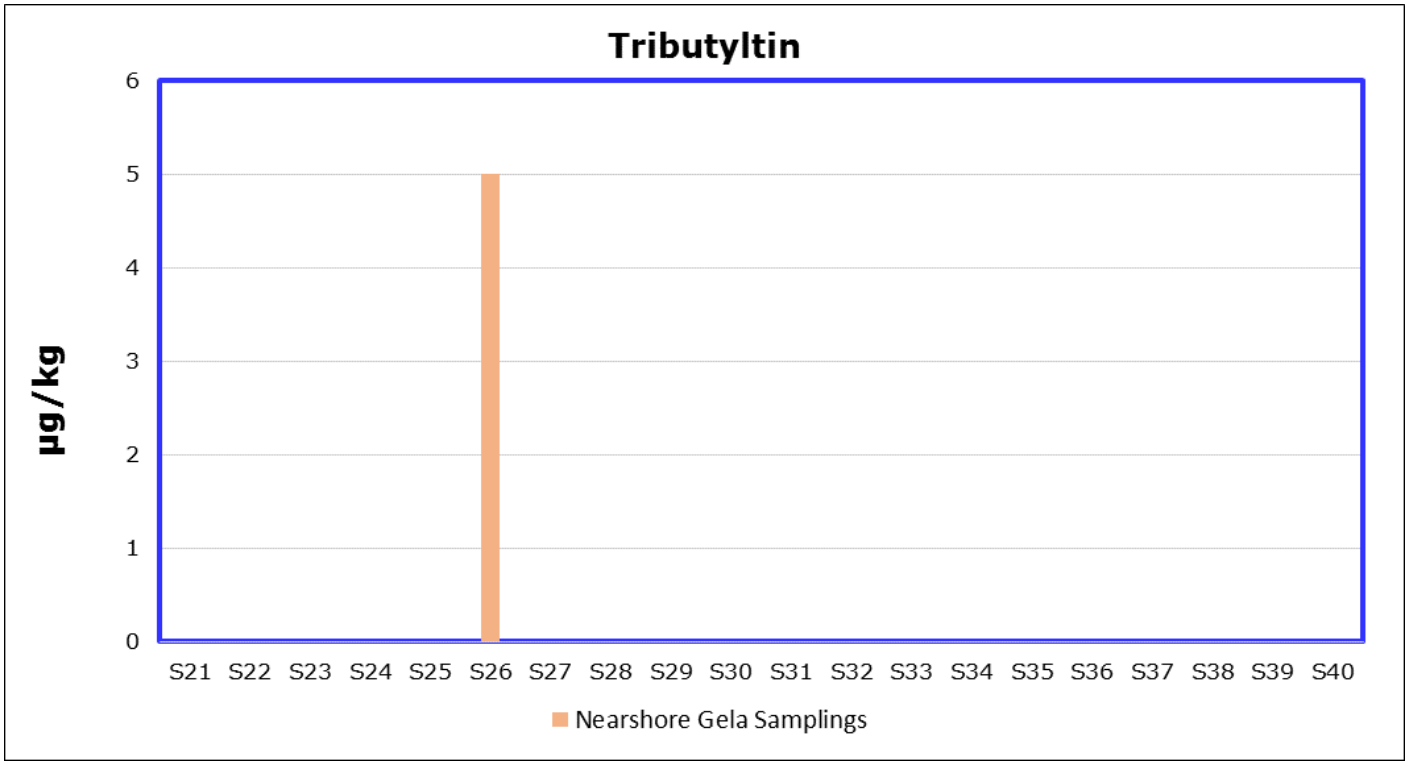


Figure 4.18 - Graphs of Tributyltin concentration in sediment samples (Ref. to Table 3.7, Table 3.8 for LoDs)

4.3.7 Methylmercury

In nearshore Gela site, Methylmercury values are all below the LoD:

Table 4.31 - Methylmercury analysis in nearshore Gela sediment stations

Determinant	**U.M.**	**LoD**	**S21**	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Test Certificate			**19LA 0048865**	**19LA 0048866**	**19LA 0048867**	**19LA 0048868**	**19LA 0048869**	**19LA 0048870**	**19LA 0048871**	**19LA 0048872**	**19LA 0048873**	**19LA 0048874**
Methylmercury (MeHg)	µg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Determinant	**U.M.**	**LoD**	**S31**	**S32**	**S33**	**S34**	**S35**	**S36**	**S37**	**S38**	**S39**	**S40**
Test Certificate			**19LA 0048875**	**19LA 0048876**	**19LA 0048877**	**19LA 0048878**	**19LA 0048879**	**19LA 0048880**	**19LA 0048881**	**19LA 0048882**	**19LA 0048883**	**19LA 0048884**
Methylmercury (MeHg)	µg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

4.3.8 Radioactive compounds

Table 4.32 – Radioactive compounds analysis in nearshore Gela sediment stations (S21-S30)

Sampling point	U.M.	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
Test Report n°		**19LA 0046166**	**19LA 0046353**	**19LA 0046180**	**19LA 0046186**	**19LA 0046320**	**19LA 0046359**	**19LA 0046190**	**19LA 0046192**	**19LA 0046324**	**19LA 0046365**
Cadmium109	Bq/kg	< 120	< 120	< 120	< 160	< 130	< 100	< 120	< 130	< 110	< 110
Cerium139	Bq/kg	< 1,9	< 2	< 2	< 2	< 2	< 1,7	< 2	< 2	< 1,8	< 1,9
Cesium134	Bq/kg	< 1,3	< 1,3	< 1,2	< 1,4	< 1,4	< 1,1	< 1,3	< 1,3	< 1,1	< 1,3
Cesium137	Bq/kg	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Cobalt57	Bq/kg	< 3	< 3	< 3	< 4	< 3	< 3	< 3	< 4	< 3	< 3
Cobalt60	Bq/kg	< 1,6	< 1,5	< 1,5	< 1,5	< 1,5	< 1,3	< 1,5	< 1,6	< 1,4	< 1,5
Iron59	Bq/kg	< 2	< 1,9	< 2	< 2	< 2	< 1,9	< 2	< 2	< 1,9	< 2
Iodine131	Bq/kg	< 1,6	< 1,6	< 1,7	< 1,8	< 1,8	< 1,5	< 1,6	< 1,8	< 1,5	< 1,6
Yttrium88	Bq/kg	< 1,2	< 1,3	< 1,2	< 1,6	< 1,5	< 1,1	< 1,6	< 1,5	< 1,3	< 1,3
Mercury203	Bq/kg	< 1,4	< 1,3	< 1,3	< 1,6	< 1,5	< 1,2	< 1,4	< 1,4	< 1,2	< 1,3
Tin113	Bq/kg	< 2	< 2	< 2	< 2	< 2	< 1,8	< 2	< 2	< 1,7	< 1,9
Strontium85	Bq/kg	< 1,4	< 1,2	< 1,4	< 1,5	< 1,4	< 1,2	< 1,3	< 1,5	< 1,2	< 1,4
Thorium234	Bq/kg	40	39	38	74	45	25	44	40	32	34
Uranium238	Bq/kg	40	39	38	74	45	25	44	40	32	34
Zinc65	Bq/kg	< 1,4	< 1,3	< 1,4	< 1,4	< 1,4	< 1,3	< 1,3	< 1,5	< 1,2	< 1,5

Table 4.33 – Radioactive compounds analysis in nearshore Gela sediment stations (S31-S40)

Sampling point	U.M.	S31	S32	S33	S34	S35	S36	S37	S38	S39	S40
Test Report n°		**19LA 0046198**	**19LA 0046202**	**19LA 0046172**	**19LA 0046371**	**19LA 0046212**	**19LA 0046176**	**19LA 0046328**	**19LA 0046377**	**19LA 0046383**	**19LA 0046332**
Cadmium109	Bq/kg	< 130	< 110	< 160	< 150	< 120	< 150	< 110	< 110	< 110	< 130
Cerium139	Bq/kg	< 2	< 1,8	< 1,9	< 2	< 1,9	< 1,7	< 1,7	< 1,7	< 1,8	< 2
Cesium134	Bq/kg	< 1,4	< 1,2	< 1,2	< 1,5	< 1,4	< 1,2	< 1,1	< 1,1	< 1,1	< 1,4
Cesium137	Bq/kg	< 2	< 2	< 2	< 3	< 2	< 2	< 1,9	< 1,9	< 1,9	< 2
Cobalt57	Bq/kg	< 3	< 3	< 3	< 4	< 3	< 3	< 3	< 3	< 3	< 4
Cobalt60	Bq/kg	< 1,7	< 1,5	< 1,5	< 1,8	< 1,6	< 1,4	< 1,3	< 1,3	< 1,4	< 1,8
Iron59	Bq/kg	< 3	< 2	< 2	< 3	< 2	< 1,9	< 2	< 2	< 1,9	< 2
Iodine131	Bq/kg	< 1,8	< 1,6	< 1,6	< 2	< 1,7	< 1,4	< 1,4	< 1,5	< 1,5	< 1,8
Yttrium88	Bq/kg	< 1,6	< 1,2	< 1,3	< 1,8	< 1,6	< 1,4	< 1,1	< 1,2	< 1,3	< 1,5
Mercury203	Bq/kg	< 1,5	< 1,3	< 1,3	< 1,6	< 1,4	< 1,2	< 1,2	< 1,2	< 1,2	< 1,5
Tin113	Bq/kg	< 2	< 2	< 1,9	< 2	< 2	< 1,9	< 1,8	< 1,8	< 1,8	< 2
Strontium85	Bq/kg	< 1,5	< 1,2	< 1,4	< 1,7	< 1,4	< 1,2	< 1,1	< 1,2	< 1,2	< 1,5
Thorium234	Bq/kg	47	32	30	31	28	27	27	31	33	30
Uranium238	Bq/kg	47	32	30	31	28	27	27	31	33	30
Zinc65	Bq/kg	< 1,6	< 1,4	< 1,4	< 1,8	< 1,5	< 1,2	< 1,3	< 1,2	< 1,2	< 1,6

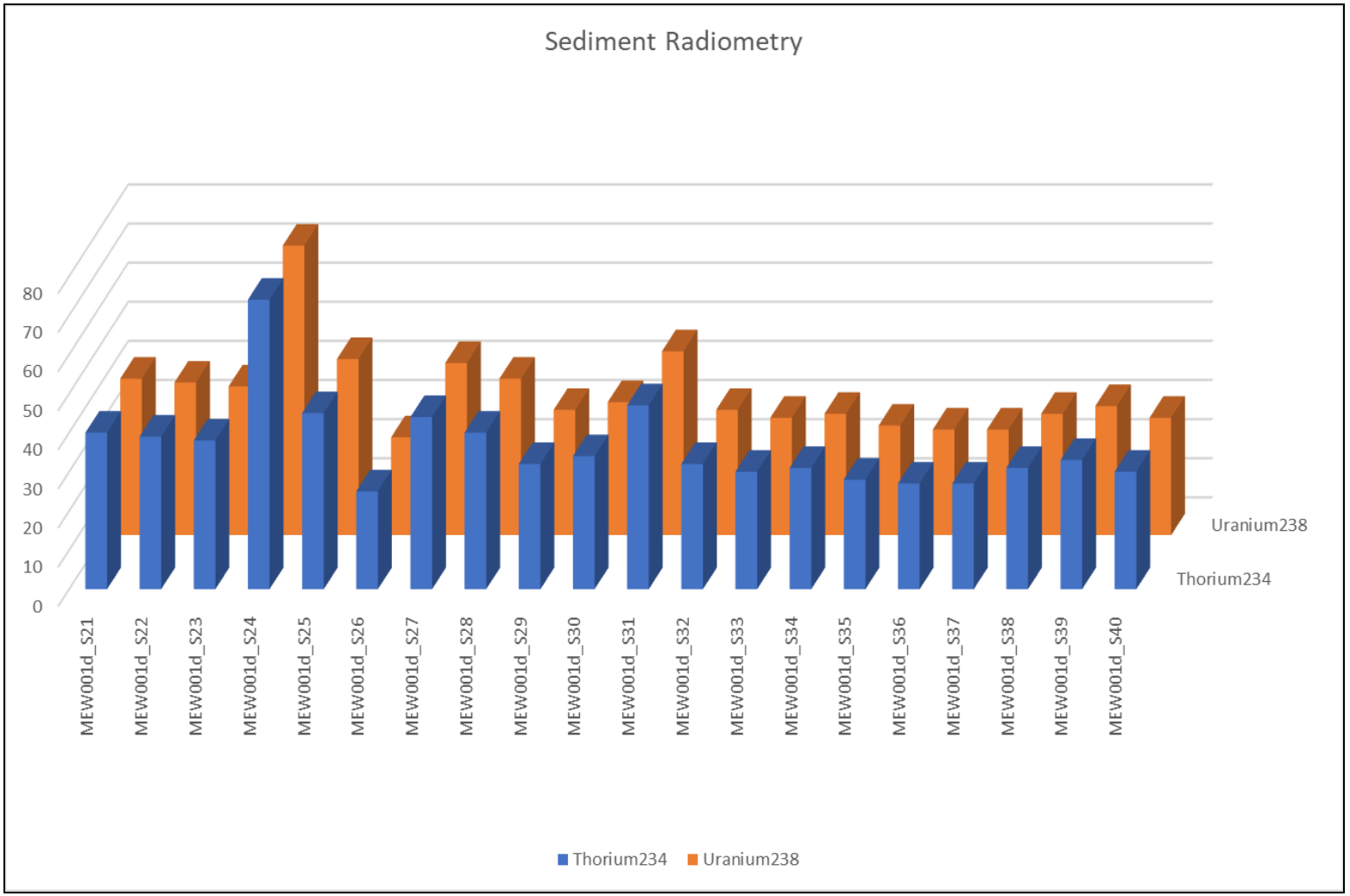


Figure 4.19 - Graphs of sediment radiometry

4.3.9 Sulphite-reducing bacteria

As shown in Figure 4.20 sulphite reducing bacteria have not a well-defined trend. This analyte is lower than the Detectable Limit (<10MPN/g) in most of sampling locations. For other samples, excepting for S20 location that presents a concentration of 2400MPN/g, general range is between 11MPN/g and 420MPN/g (Table 4.34).

Table 4.34 - SRB in Italian and Maltese sediment locations

Determinant	**U.M.**	**S1**	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Test Certificate		**19LA 0014367**	**19LA 0014369**	**19LA 0014371**	**19LA 0014373**	**19LA 0014375**	**19LA 0014377**	**19LA 0014379**	**19LA 0014381**	**19LA 0014383**	**19LA 0014385**
Spore counts of sulphite-reducing anaerobes	MPN/g	240	460	210	14	< 10	< 10	< 10	< 10	< 10	< 10
Determinant	**U.M.**	**S11**	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Test Certificate		**19LA 0014285**	**19LA 0014351**	**19LA 0014358**	**19LA 0014365**	**19LA 0023722**	**19LA 0023732**	**19LA 0023739**	**19LA 0023746**	**19LA 0023753**	**19LA 0023760**
Spore counts of sulphite-reducing anaerobes	MPN/g	< 10	< 10	< 10	11	< 10	< 10	70	< 10	110	2400

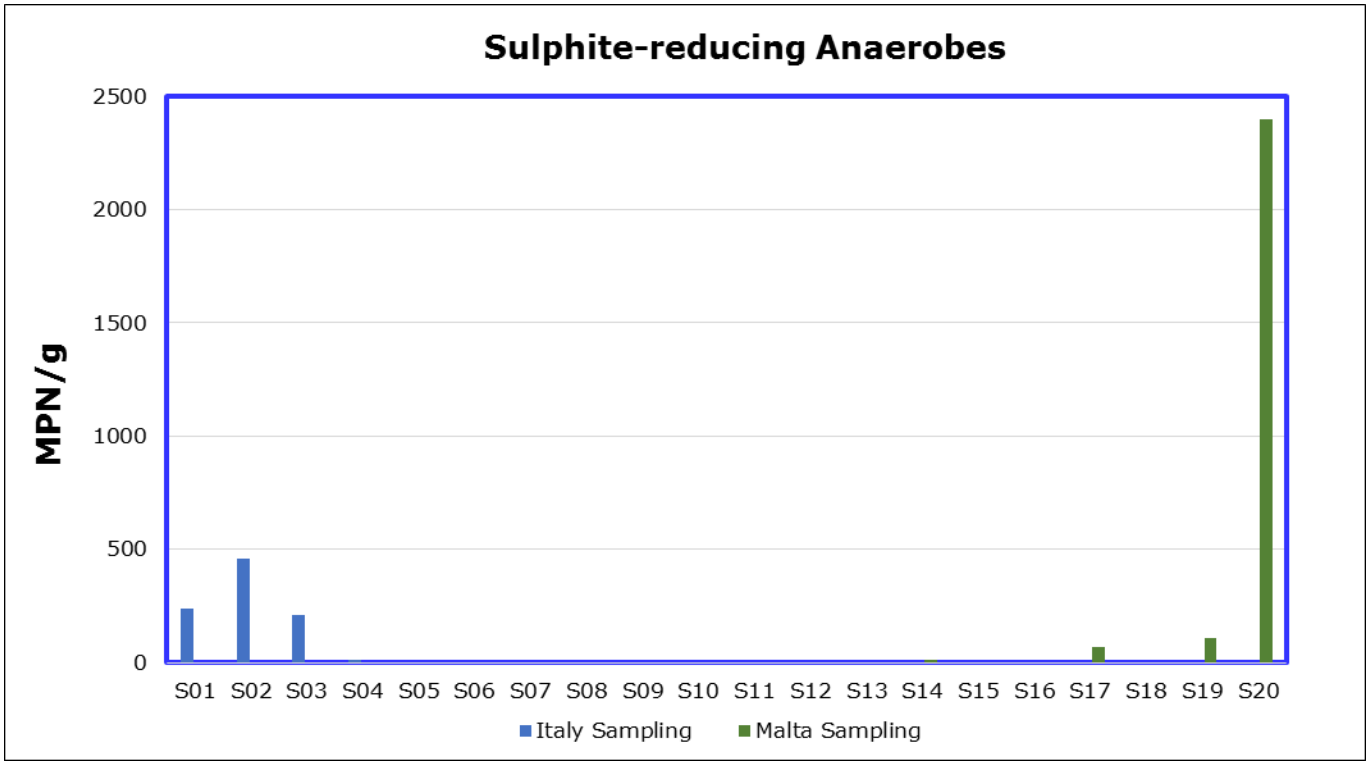


Figure 4.20 – Sulphite-reducing anaerobes in sediment samples

4.4.0 Biological characteristics of sediments

4.4.1 Introduction

The results of this section are based on the taxonomic identification of the macrofaunal individuals collected during the survey.
Marine benthic invertebrates are among the most common biological components used especially in coastal monitoring, but also in offshore habitats they give a good indication about the environmental quality. The biodiversity and community structure of macro-fauna, indeed, reflects the cumulative anthropogenic impacts that have occurred in a given region (e.g. Rosenberg & Resh 1993).

The organisms of the benthic (macro) fauna present some advantages if compared to other biological groups (e.g. plankton, fish and marine birds) as they show: (1) a high species richness with a variety of life history patterns and different tolerances to habitat stress and disturbance (including the presence of organic enrichment and/or the presence of different contaminants in the sediments); (2) several macro faunal species are sessile or sedentary (i.e., limited to null mobility and dispersal thus reflecting the local conditions); (3) their responses integrate water and sediment quality changes; (4) some species have relatively long life spans (thus can be used for long-term monitoring); and (5) they are key elements in the food web of aquatic systems and affect chemical fluxes between sediments and water columns through bioturbation and suspension feeding activities (Boesh & Rosenberg, 1981; Aller, 1982; Dauer et al., 1982; Hartley, 1982; Hargrave & Theil, 1983; Gray et al., 1988; Warwick et al., 1990; Weston, 1990; Weisberg et al., 1997).

Macro-fauna include all metazoan organisms larger than 300 or 500 µm and typically exclude the permanent components of the meiofauna (taxa such as nematodes, harpacticoid copepods, and ostracods. Soft-bottom macro-benthic communities in marine habitats are mainly composed of in-faunal organisms, mainly including polychaetes, amphipod and decapod crustaceans, bivalve molluscs, and echinoderms. Macro-faunal density, biomass, and trophic structure generally decrease with increasing water depth, so large volume of sediments is required for accurate determination of macro faunal variables.

4.4.2 Requested Indices

For the aim of this environmental survey, the following indices were requested for Malta and Gela working area:

- **Number of individuals (N)** for each sample;
- **Species number (S)** for each sample;
- **Shannon and Weaver (H')** for each station;
- **Margalef (D)** for each station;
- **Eveness of Pielou (J)** for each station;
- **Simpson (D)** for each station;
- **AMBI** for each station;
- **M-AMBI** for each station;
- **BENTIX** for each station.

The analysis carried out are described in Table 4.39 and Table 4.40.

4.4.3 Results and Discussion

4.4.3.1 Malta results

In Malta working area, the species found during the analysis of the samples are: 1) bivalves, 2) gastropods 3) crustaceans 4) pteropods. During their life time they constitute a significant part of the zooplankton population and upon death their shells sink to the ocean bed. Empty shells of pteropods constitute a major portion of shallow marine sediments, especially in the tropical and subtropical regions (Herman, 1968); 5) echinoderms 6) brachiopods.

It is important to underline that for the macrobenthos samples investigated it is often difficult to determine the taxonomic identifications at the species level. This is due to the fact that some species can be partially damaged during sampling or are altered by the use of preservatives, so that in certain cases this makes their identification difficult.

A total of 20 taxa has been found, and include Gastropoda, Bivalvia, Malacostraca, Echinoidea, Scaphopoda, Anthozoa, Polichaeta and Craniata. In particular 12 species and 1 Unknown belong to Gastropoda, 5 species to Bivalvia, and 2 species to Malacostraca, 2 species to Echinoidea, 1 species to Scaphopoda, 1 species to Anthozoa, 1 specie and 1 Unknown to Polichaeta and 1 species to Craniata.

The complete list of species/taxa found is shown below and reported in APPENDIX 7: SEDIMENT LABORATORY ANALYSES RESULTS CERTIFICATES:

Table 4.35 – Species List: Stations S11, S12, S13

Samples	**MEW001b_A_S11_S11G**			**MEW001b_A_S12_S12G**			**MEW001b_A_S13_S13G**		
Replicates	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**
Samples ID	**19LA 0014286**	**19LA 0014341**	**19LA 0014342**	**19LA 0014345**	**19LA 0014346**	**19LA 0014347**	**19LA 0014352**	**19LA 0014353**	**19LA 0014354**
Gastropoda									
Cavolinia tridentata (Forsskål [in Niebuhr], 1775)	1	-	-	1	8	1	-	-	-
Cryptonatica operculata (Jeffreys, 1885)	-	-	1	-	-	-	-	-	-
Gracilipurpura rostrata (Olivi, 1792)	-	-	-	2	-	-	-	-	2
Pseudosimnia carnea (Poiret, 1789)	-	-	-	-	1	-	-	-	-
Bivalvia									
Flexopecten glaber (Linnaeus, 1758)	-	-	-	-	-	1	-	-	-
Anthozoa									
Caryophyllia smithii Stokes & Broderip, 1828	2	1	1	-	-	-	2	-	-
Polychaeta									
Polychaeta indet.	-	-	1	-	-	-	-	-	-
Craniata									
Novocrania anomala (O. F. Müller, 1776)	-	-	-	-	-	-	-	-	-

Table 4.36 - Species List: Stations S14, S15, S16

Samples	**MEW001b_A_S14_S14G**			**MEW001b_A_S15_S15G**			**MEW001b_A_S16_S16G**		
Replicates	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**
Samples ID	**19LA 0014359**	**19LA 0014360**	**19LA 0014361**	**19LA 0023719**	**19LA 0023720**	**19LA 0023721**	**19LA 0023726**	**19LA 0023727**	**19LA 0023728**
Gastropoda									
Turritella communis Risso, 1826	-	-	-	2	-	1	-	2	-
Euspira fusca (Blainville, 1825)	-	-	-	-	-	1	-	-	-
Gracilipurpura rostrata (Olivi, 1792)	1	-	-	-	-	-	-	-	-
Bivalvia									
Nucula nitidosa Winckworth, 1930	-	-	-	1	1	1	-	-	1
Peronidia albicans (Gmelin, 1791)	-	-	-	-	-	-	1	-	-
Malacostraca									
Goneplax rhomboids (Linnaeus, 1758)	-	-	-	-	-	-	-	-	1
Anthozoa									
Caryophyllia smithii Stokes & Broderip, 1828	1	1	1	-	-	-	-	-	-

Table 4.37 - Species List: Stations S17, S18, S19

Samples	**MEW001b_A_S17_S17G**			**MEW001b_A_S18_S18G**			**MEW001b_A_S19_S19G**		
Replicates	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**
Samples ID	**19LA 0023733**	**19LA 0023734**	**19LA 0023735**	**19LA 0023740-**	**19LA 0023741**	**19LA 0023742**	**19LA 0023747**	**19LA 0023748**	**19LA 0023749**
Gastropoda									
Turritella communis Risso, 1826	-	1	-	-	-	-	-	-	-
Cavolinia tridentata (Forsskål [in Niebuhr], 1775)	1	-	-	-	-	-	-	-	-
Unknown 1	-	-	1	-	-	-	-	-	-
Volvarina mitrella (Risso, 1826)	-	-	-	1	1	-	1	-	-
Fusinus parvulus (Monterosato, 1884)	-	-	-	-	-	-	-	-	1
Fusinus pulchellus (Philippi, 1840)	-	-	-	-	-	-	-	-	1
Ringicula auriculata (Ménard de la Groye, 1811)	-	-	-	-	-	-	1	-	-
Bivalvia									
Sportella recondita (P. Fischer in de Folin, 1872)	-	-	-	-	-	-	-	-	1
Lembulus pella (Linnaeus, 1758)	-	-	-	-	-	-	-	-	1
Echinoidea									
Echinocyamus pusillus (O.F. Müller, 1776)	-	-	-	-	1	1	5	1	-
Stylocidaris affinis (Philippi, 1845)	-	-	-	1	-	-	-	-	-
Malacostraca									
Abludomelita gladiosa (Spence Bate, 1862)	-	-	-	1	-	-	-	-	-

Samples	**MEW001b_A_S17_S17G**			**MEW001b_A_S18_S18G**			**MEW001b_A_S19_S19G**		
Replicates	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**
Samples ID	**19LA 0023733**	**19LA 0023734**	**19LA 0023735**	**19LA 0023740-**	**19LA 0023741**	**19LA 0023742**	**19LA 0023747**	**19LA 0023748**	**19LA 0023749**
Scaphopoda									
Antalis dentalis (Linnaeus, 1758)	1	-	-	-	-	-	-	-	-
Anthozoa									
Caryophyllia smithii Stokes & Broderip, 1828	-	-	1	-	-	-	2	2	5
Polichaeta									
Unknown 2	-	-	-	-	-	-	1	-	-
Craniata									
Novocrania anomala (O. F. Müller, 1776)	-	-	-	-	-	-	-	1	-

Table 4.38 - Species List: Station S20

Samples	**MEW001b_A_S20_S20G**		
Replicates	**R1**	**R2**	**R3**
Samples ID	**19LA0023754**	**19LA0023755**	**19LA0023756**
Gastropoda			
Notocochlis dillwynii (Payraudeau, 1826)	1	-	-
Gibbula guttadauri (Philippi, 1836)	1	-	-
Echinoidea			
Echinocyamus pusillus (O.F. Müller, 1776)	-	6	2

Notes:
- R1 = first replicate
- R2 = second replicate
- R3 =third replicate

Most of the taxa encountered were identified at species level, but in few cases the identification to this level was impossible and the organisms have been indicated as "Unknown". However, recent studies demonstrated that analyses based also on higher taxonomic levels could provide accurate information on the species distribution and have an integer potential in detecting changes induced by different forms of environmental impact (Terlizzi *et al.,* 2009).

In Table 4.39 are reported the diversity indices calculated in the sampling stations, in which "S" refers to the number of species for each sample and "N" indicates the number of individuals for each sample (Figure 4.23).

Table 4.39 – Diversity Indices for Malta working area.

Ref.	Species	Abundance	Shannon and Weaver	Margalef's index	Eveness of Pielou	Simpson
	S	N	H'	D	J'	D
MEW001b_A_S11_S11G	4	7	1.664	1.542	0.832	0.388
MEW001b_A_S12_S12G	4	14	1.292	1.137	0.646	0.541
MEW001b_A_S13_S13G	2	4	1.000	0.721	1.000	0.500
MEW001b_A_S14_S14G	2	4	0.811	0.721	0.811	0.625
MEW001b_A_S15_S15G	3	7	1.449	0.635	0.914	0.388
MEW001b_A_S16_S16G	4	5	1.922	1.066	0.961	0.280
MEW001b_A_S17_S17G	5	5	2.322	1.422	1.000	0.200
MEW001b_A_S18_S18G	4	6	1.918	1.001	0.959	0.278
MEW001b_A_S19_S19G	10	23	2.609	2.074	0.785	0.236
MEW001b_A_S20_S20G	3	10	0.922	0.570	0.582	0.660

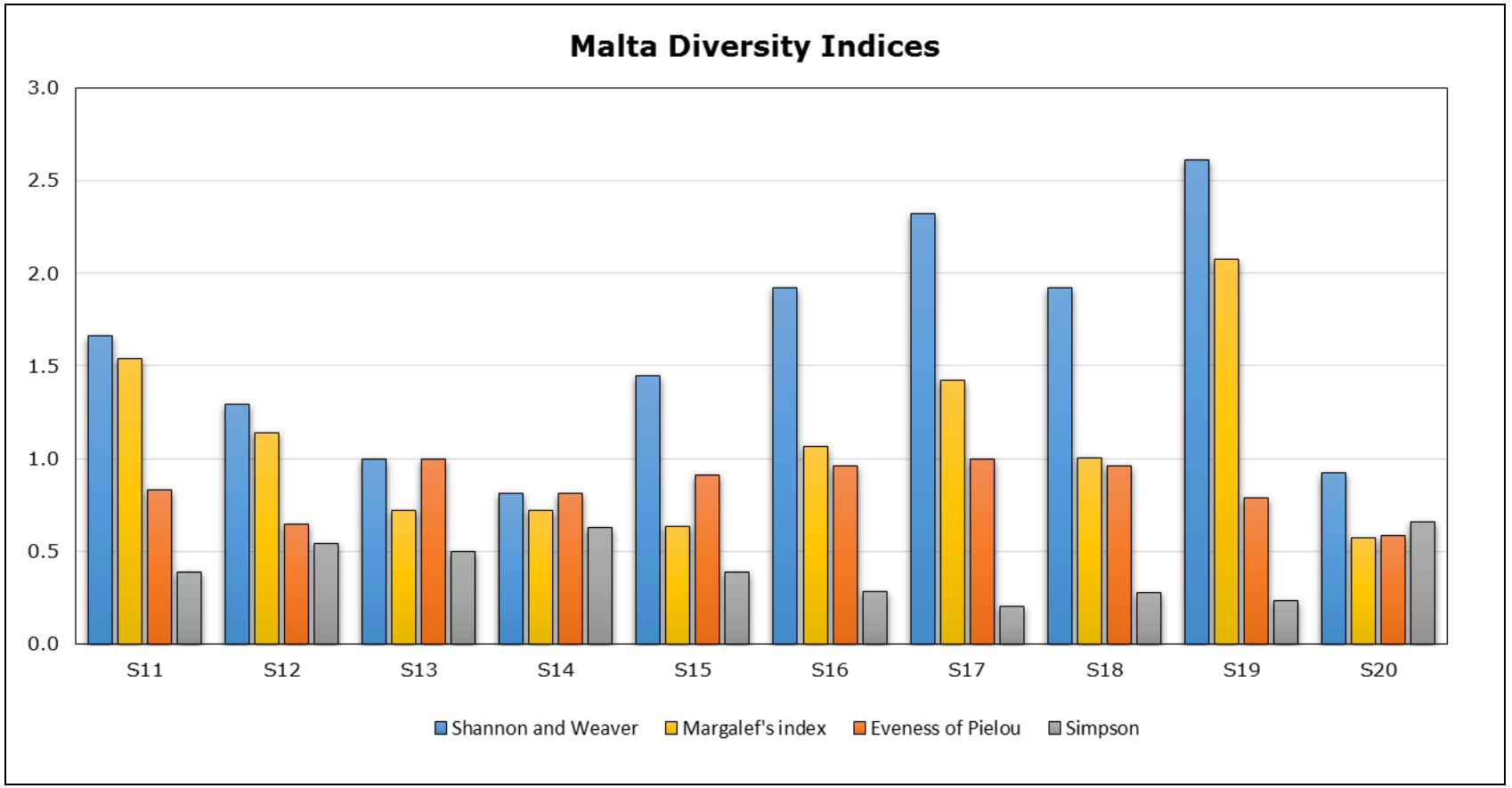


Figure 4.21 – Malta Diversity Indices

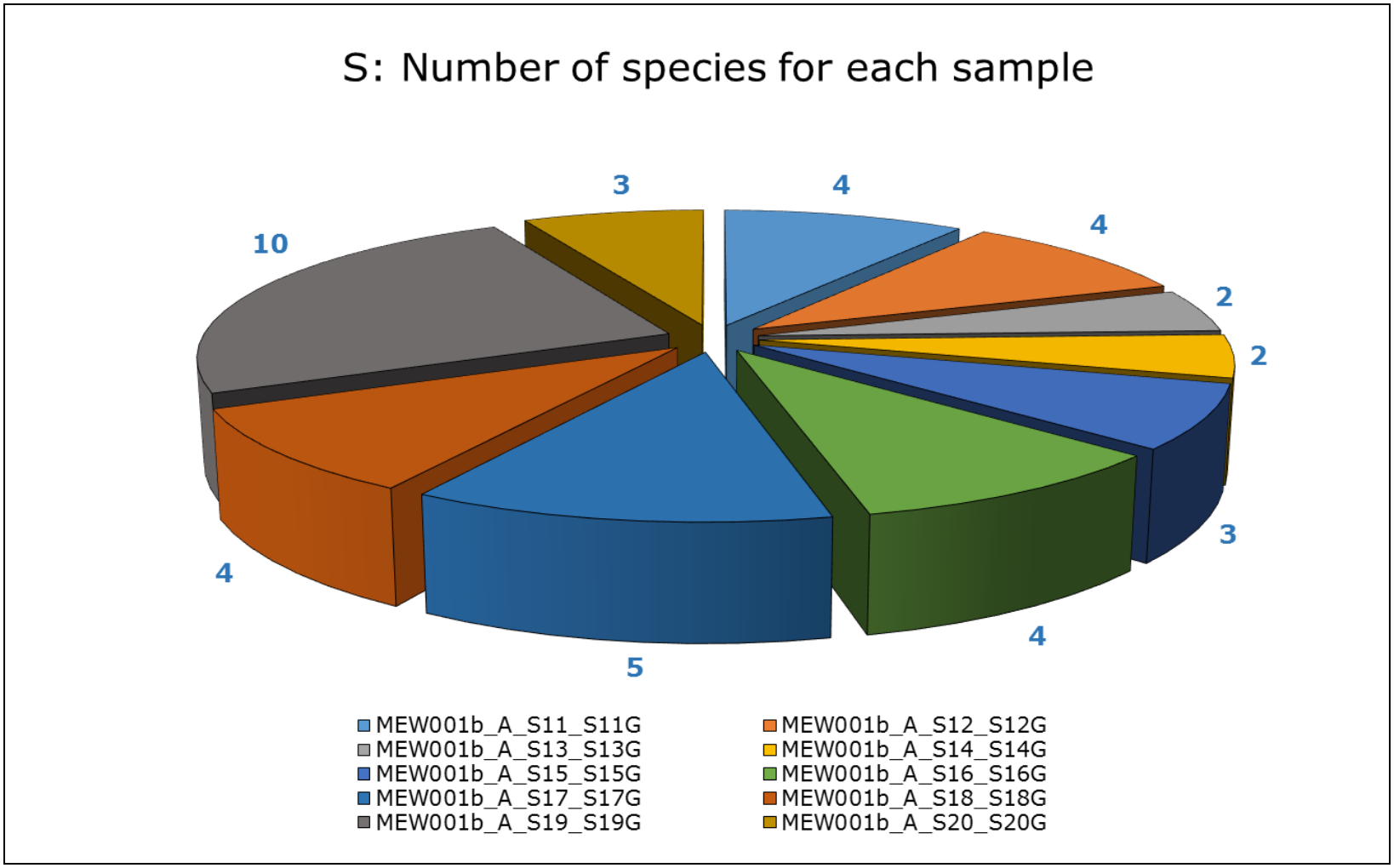


Figure 4.22 – Number of species (S) for Malta working area.

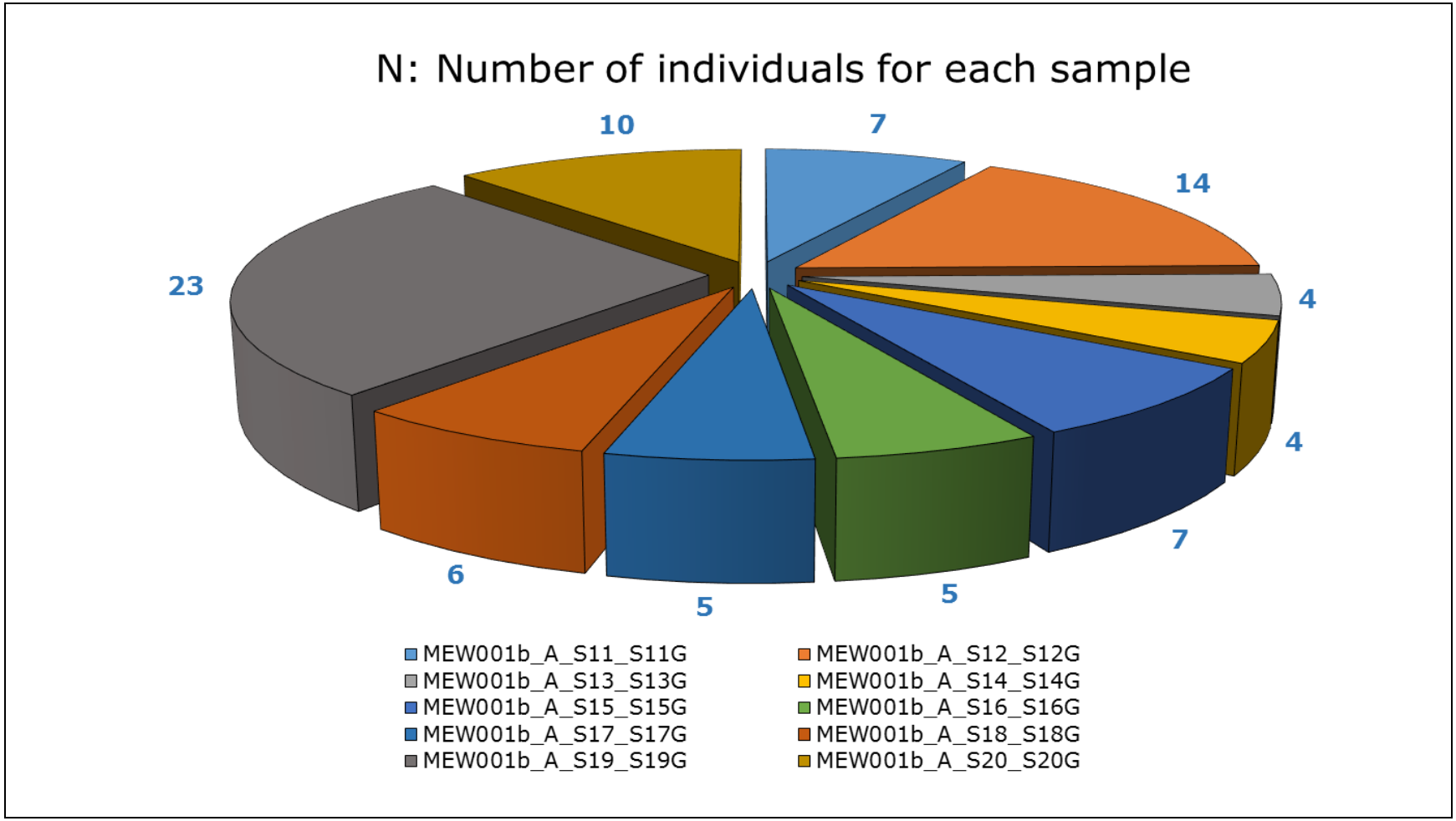


Figure 4.23 – Number of individuals (N) for Malta working area.

The following main aspects are summarized:

- Interpretation of H': values are between 0.5 and 3. The Shannon index increases as both the richness and the evenness of the community increase;
- Interpretation of Simpson (D): D is a measure of dominance, so as D increases, diversity (in the sense of evenness) decreases. With this index, 0 represents infinite diversity and 1, no diversity. That is, the bigger the value of D, the lower the diversity;
- Interpretation of Evenness (J): the range of the values is between 0 and 1, 0 when the taxa are in one group and 1 when the species belong to different groups. Most of the samples are near 1. There are no dominant species considering all samples and this is the reason why values are near 1;
- Interpretation of Margalef's index (D): as Species number increases in a sample, D increases.

Biotic Indices are summarized in the following Table 4.40 and in Figure 4.24:

Table 4.40 – Biotic Indices in Malta working area (colors refer to Figure 3.9)

Ref.	AMBI	M-AMBI	BENTIX
MEW001b_A_S11_S11G	0.250	0.891	4.000
MEW001b_A_S12_S12G	2.333	0.880	0.430
MEW001b_A_S13_S13G	2.333	0.629	3.000
MEW001b_A_S14_S14G	0.000	0.704	4.500
MEW001b_A_S15_S15G	0.667	0.580	3.430
MEW001b_A_S16_S16G	0.500	0.690	4.400
MEW001b_A_S17_S17G	0.500	0.770	3.600
MEW001b_A_S18_S18G	1.000	0.660	2.000
MEW001b_A_S19_S19G	0.056	1.000	4.260
MEW001b_A_S20_S20G	0.000	0.550	4.800

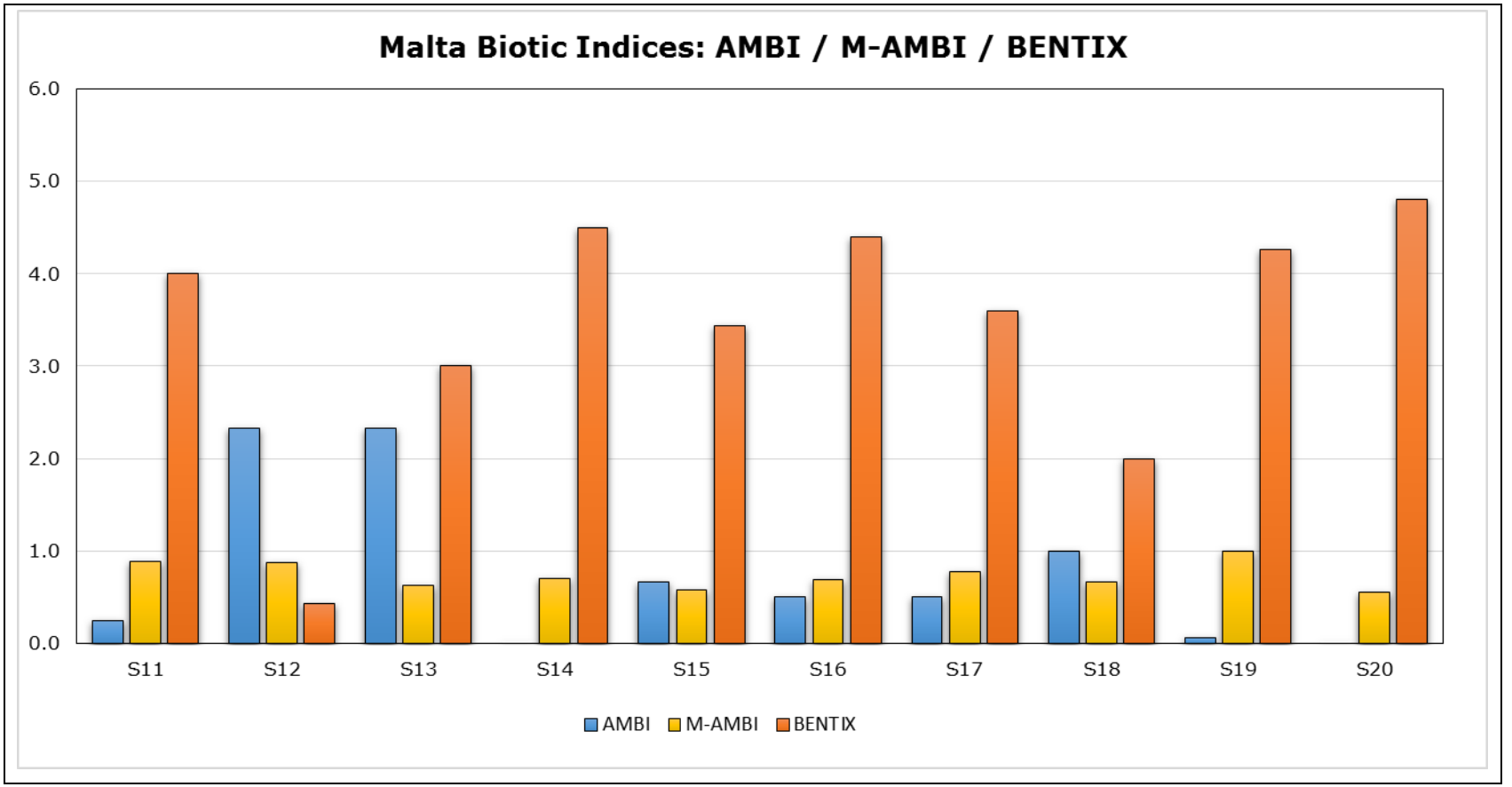


Figure 4.24 – Malta Biotic Indices;

- AMBI INDEX: values are between 0 and 2.5. The result obtained is an Unpolluted site with a normal benthic community health in S19, S20, and an impoverished benthic community in S11, S15, S16, S17, S18. Only S12 and S13 can be classified as Slightly disturbed sites with a value of 2.333.
- M-AMBI INDEX: values range between 0.5 and 1. The result indicates that ecological classes in Stations S15 and S20 are moderate, while in stations S13, S14 ,S16, S17, S18 are classified as good; moreover are High in Station S11, S12, S19 where M-AMBI value ranges between 0.88 and 1.
- BENTIX INDEX: values are between 0.4 and 5. According to index values, sampling sites are pristine in S14, S20, Slightly polluted in S11, S16, S17, S19, Moderate polluted in S13, S15, Heavily polluted in S18 and Extremely polluted/Azotic in station S12.

The comparison between BENTIX and Diversity index (H') trends is shown in the following Figure:

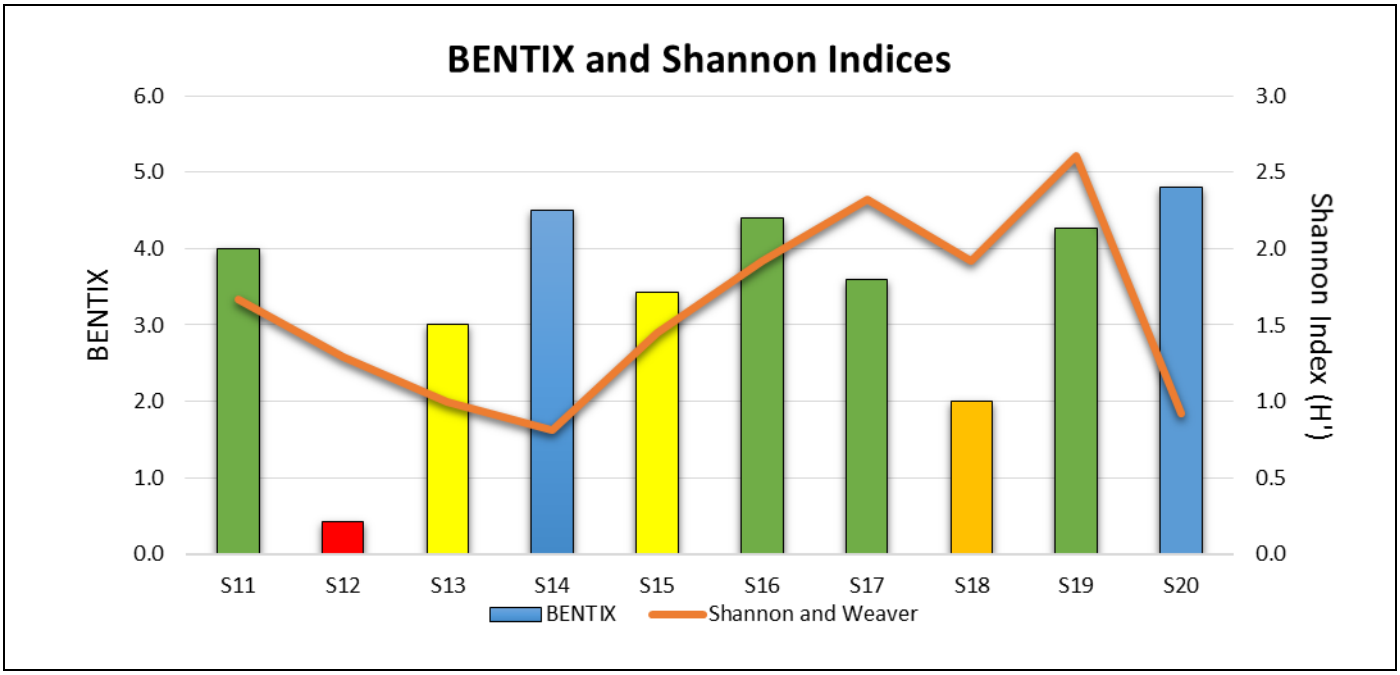


Figure 4.25 - BENTIX and Shannon Trends; Colours correspond to EQS classes as defined in the WFD (Source: Dogan, 2004)

4.4.3.2 Nearshore Gela results

In nearshore Gela working area, the species found during the samples analysis are: 1) bivalves, 2) gastropods 3) crustaceans 4) polychaetes 5) scaphopods.

A total of 21 taxa has been found, and include Gastropoda, Bivalvia, Malacostraca, Scaphopoda and Polychaeta. In particular 4 species belong to Gastropoda, 11 species to Bivalvia, 6 species to Malacostraca, 1 species to Scaphopoda and 5 species, 3 Unknown to Polychaeta.

The complete list of species/taxa found is shown below and reported in APPENDIX 7: SEDIMENT LABORATORY ANALYSES RESULTS CERTIFICATES:

Table 4.41 – Species List: Stations S22, S26, S30, S33, S34

Samples	**MEW001d_S22_A_S22G**	**MEW001d_S22_B_S22G**	**MEW001d_S26_A_S26G**	**MEW001d_S26_B_S26G**	**MEW001d_S30_A_S30G**	**MEW001d_S30_B_S30G**	**MEW001d_S33_A_S33G**	**MEW001d_S33_B_S33G**	**MEW001d_S34_A_S34G**	**MEW001d_S34_B_S34G**
Replicates	**R1**	**R2**	**R1**	**R2**	**R1**	**R2**	**R1**	**R2**	**R1**	**R2**
Samples ID	**19LA0046354**	**19LA0046355**	**19LA0046360**	**19LA0046361**	**19LA0046366**	**19LA0046367**	**19LA0046167**	**19LA0046168**	**19LA0046372**	**19LA0046373**
Gastropoda										
Smaragdia viridis (Linnaeus, 1758)	-	-	-	-	1	-	3	3	-	-
Tritia incrassata (Strøm, 1768)	-	-	-	1	-	-	2	3	2	-
Tritia mutabilis (Linnaeus, 1758)	-	-	-	-	-	1	-	-	-	-
Bivalvia										
Fabulina fabula (Gmelin, 1791)	-	-	-	-	-	-	-	1	-	5
Moerella pulchella (Lamarck, 1818)	1	1	3	1	1	2	-	1	2	-
Pharus legumen (Linnaeus, 1758)	-	1	-	1	1	-	-	1	-	-
Donax trunculus Linnaeus, 1758	1	-	-	-	1	-	-	-	1	-
Macra stultorum (Linnaeus, 1758)	2	-	-	-	-	-	-	-	-	-
Bosemprella incarnata (Linnaeus, 1758)	-	2	1	-	-	-	-	-	-	-
Venus sp.	-	-	1	-	1	-	-	-	-	-
Polychaeta										
Glycera sp.	-	-	-	-	-	-	-	2	1	4
Eunice sp.	2	-	-	-	1	-	-	-	-	-
Lumbrinereis sp.	1	-	-	-	1	-	-	-	-	-

Samples	**MEW001d_S22_A_S22G**	**MEW001d_S22_B_S22G**	**MEW001d_S26_A_S26G**	**MEW001d_S26_B_S26G**	**MEW001d_S30_A_S30G**	**MEW001d_S30_B_S30G**	**MEW001d_S33_A_S33G**	**MEW001d_S33_B_S33G**	**MEW001d_S34_A_S34G**	**MEW001d_S34_B_S34G**
Malacostraca										
Lysianassina longicornis (Lucas, 1846)	-	-	-	-	-	1	-	-	-	1
Goneplax rhomboides (Linnaeus, 1758)	-	-	-	-	-	-	-	-	-	2
Tmetonyx similis (G.O. Sars, 1891)	-	-	-	-	-	-	-	-	-	1

Notes:
- R1 = first replicate
- R2 = second replicate

Table 4.42 - Species List: Stations S38, S39, R01, R02, R00

Samples	**MEW001d_S38_A_S38G**	**MEW001d_S38_B_S38G**	**MEW001d_S39_A_S39G**	**MEW001d_S39_B_S39G**	**MEW001d_R01_A_R01G**	**MEW001d_R01_B_R01G**	**MEW001d_R02_A_R02G**	**MEW001d_R02_B_R02G**	**MEW001d_R00_A_R00G**	**MEW001d_R00_B_R00G**
Replicates	**R1**	**R2**	**R1**	**R2**	**R1**	**R2**	**R1**	**R2**	**R1**	**R2**
Samples ID	19LA 0046378	19LA 0046379	19LA 0046384	19LA 0046385	19LA 0046386	19LA 0046387	19LA 0046388	19LA 0046389	19LA 0046390	19LA 0046391
Gastropoda										
Smaragdia viridis (Linnaeus, 1758)	-	1	4	-	-	-	-	-	-	-
Tritia incrassata (Strøm, 1768)	-	-	1	1	-	-	-	-	-	-
Epitonium clathrus (Linnaeus, 1758)	-	1	4	-	-	-	-	-	-	-
Bivalvia										
Fabulina fabula (Gmelin, 1791)	-	-	-	1	-	-	-	1	-	-
Moerella pulchella (Lamarck, 1818)	2	1	1	2	1	2	-	-	-	-
Pharus legumen (Linnaeus, 1758)	-	-	-	-	1	-	1	1	-	-
Donax trunculus Linnaeus, 1758	-	-	-	2	-	-	1	-	-	-
Macra stultorum (Linnaeus, 1758)	-	-	1	-	-	1	-	-	1	-
Venus sp.	-	-	-	-	1	-	1	-	-	-
Nucula nucleus (Linnaeus, 1758)	2	-	-	-	-	-	-	-	-	-
Chamelea gallina (Linnaeus, 1758)	-	1	1	1	-	-	-	-	1	1
Nucula sulcata Bronn, 1831	-	-	-	-	-	-	-	1	-	-
Donax semistriatus Poli, 1795	-	-	-	-	-	-	-	-	-	1
Scaphopoda										

Samples	**MEW001d_S38_A_S38G**	**MEW001d_S38_B_S38G**	**MEW001d_S39_A_S39G**	**MEW001d_S39_B_S39G**	**MEW001d_R01_A_R01G**	**MEW001d_R01_B_R01G**	**MEW001d_R02_A_R02G**	**MEW001d_R02_B_R02G**	**MEW001d_R00_A_R00G**	**MEW001d_R00_B_R00G**
Antalis vulgaris (da Costa, 1778)	-	3	1	1	-	-	-	1	1	-
Polycaeta										
Eunice sp.	-	1	-	-	-	-	-	-	-	-
Nereidae	1	-	-	-	-	-	-	-	-	-
Nereidae ind.	-	2	-	-	-	1	-	-	-	-
Nereiphylla paretti Blainville, 1828	-	-	-	-	-	-	-	1	-	-
Glycera tridactyla Schmarda, 1861	-	-	-	-	-	-	-	-	1	-
Goniadidae ind.	-	-	-	-	-	-	-	-	-	1
Malacostraca										
Lysianassina longicornis (Lucas, 1846)	2	1	-	-	-	-	-	-	-	-
Apseudopsis latreillii (Milne Edwards, 1828)	3	1	-	-	-	-	-	-	-	-
Liocarcinus maculatus (Risso, 1827)	-	-	-	1	-	-	-	-	1	-
Diogenes pugilator	-	-	-	-	-	1	-	-	11	5

Notes:
- R1 = first replicate
- R2 = second replicate

Most of the taxa encountered were identified at species level, but in few cases the identification to species level was impossible and the organisms have been indicated as "*sp.*" or "*ind.*" It is herein noted that the term "*sp*" refer to cases in which the specific name of the individual could not be identified. The term "*ind.*" Is used to address the cases in which a deterioration of the organisms was found, not allowing a clear definition at a lower level than what indicated. This classification is applicable to results reported in the tables.

In Table 4.43 are reported the diversity indices calculated in the sampling stations, in which "S" refers to the number of species for each sample and "N" indicates the number of individuals for each sample (Figure 4.29).

Table 4.43 – Diversity Indices for nearshore Gela working area.

Ref.	Species	Abundance	Shannon and Weaver	Margalef's index	Eveness of Pielou	Simpson
	S	N	H'	D	J'	D
MEW001d_S22_A_S22G	5	7	2.236	0.942	0.963	0.224
MEW001d_S22_B_S22G	3	4	1.500	0.542	0.946	0.375
MEW001d_S26_A_S26G	3	5	1.371	0.511	0.865	0.440
MEW001d_S26_B_S26G	3	3	1.585	0.588	1.000	0.333
MEW001d_S30_A_S30G	7	7	2.807	1.412	1.000	0.143
MEW001d_S30_B_S30G	3	4	1.500	0.542	0.946	0.375
MEW001d_S33_A_S33G	2	5	0.971	0.256	0.971	0.520
MEW001d_S33_B_S33G	6	11	2.413	1.064	0.934	0.207
MEW001d_S34_A_S34G	4	6	1.918	0.733	0.959	0.278
MEW001d_S34_B_S34G	5	13	2.038	0.822	0.878	0.278
MEW001d_S38_A_S38G	5	10	2.246	0.869	0.967	0.220
MEW001d_S38_B_S38G	8	11	2.845	1.489	0.948	0.157
MEW001d_S39_A_S39G	6	9	2.281	1.111	0.882	0.259
MEW001d_S39_B_S39G	7	9	2.725	1.333	0.971	0.160
MEW001d_R01_A_R01G	3	3	1.585	0.588	1.000	0.333
MEW001d_R01_B_R01G	5	6	2.252	0.977	0.970	0.222
MEW001d_R02_A_R02G	3	3	1.585	0.588	1.000	0.333
MEW001d_R02_B_R02G	5	5	2.322	1.022	1.000	0.200
MEW001d_R00_A_R00G	6	16	1.622	0.985	0.627	0.492
MEW001d_R00_B_R00G	4	8	1.549	0.685	0.774	0.438

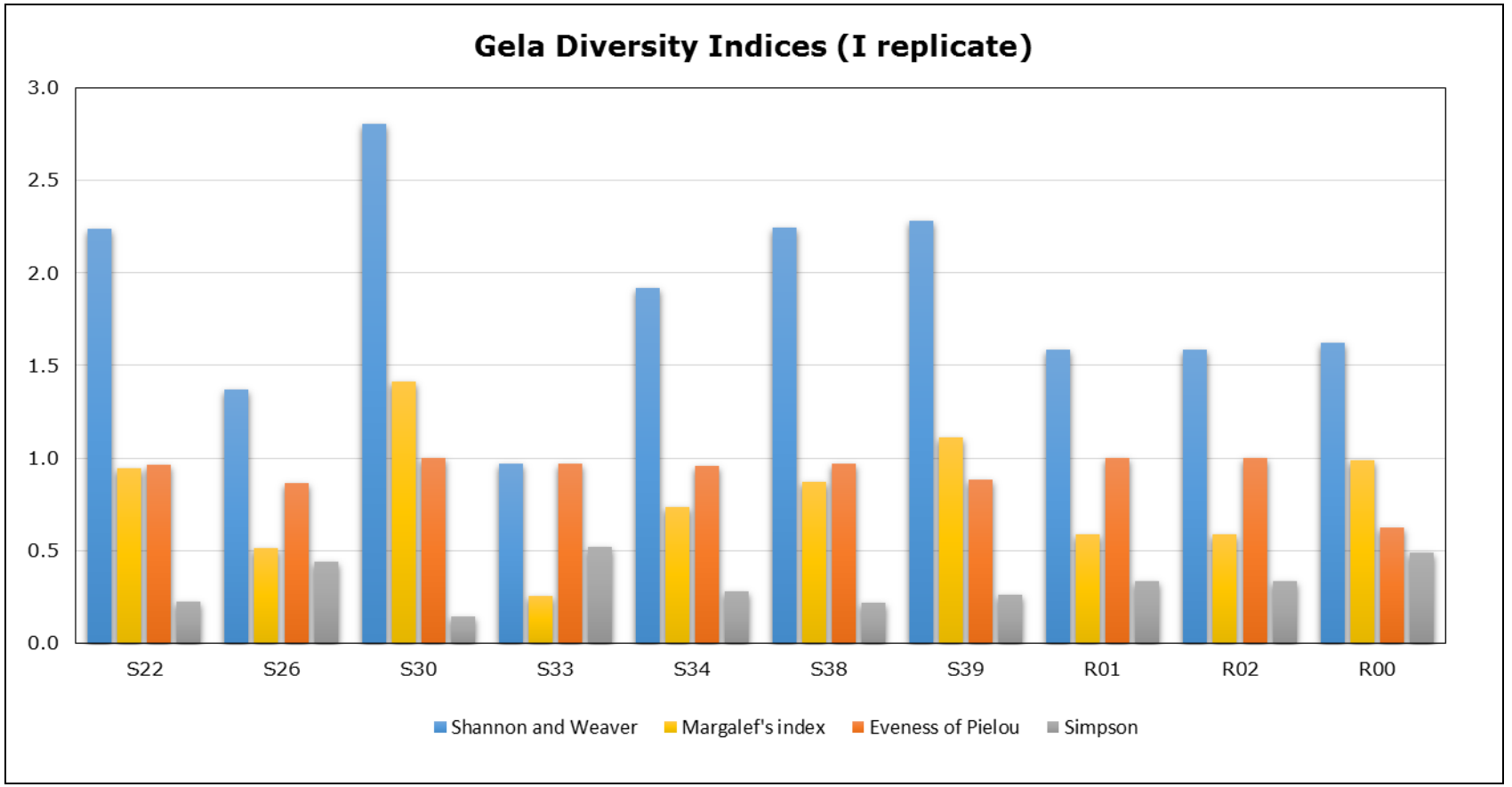


Figure 4.26 – Nearshore Gela Diversity Indices (First Replicate)

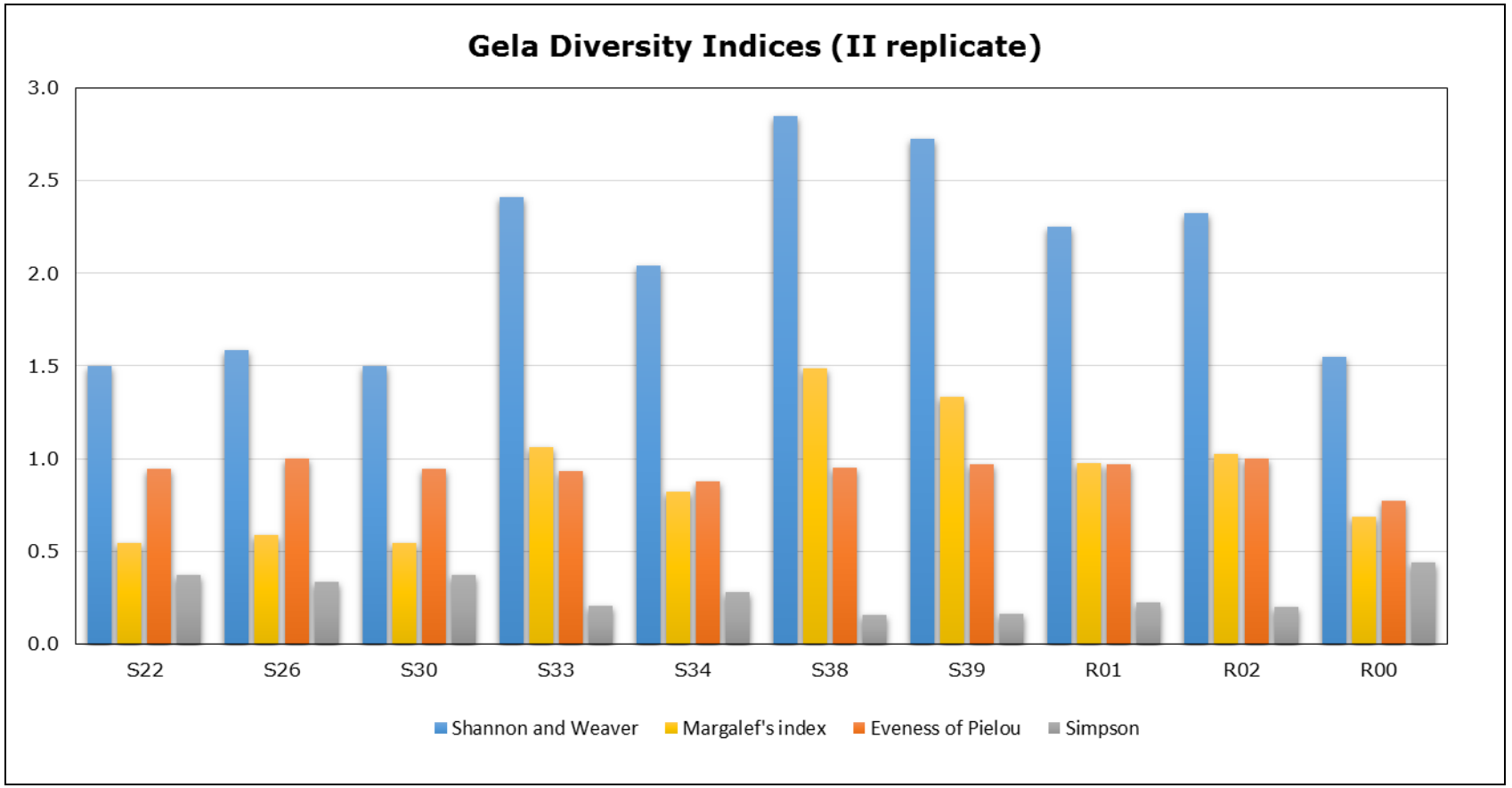


Figure 4.27 - Nearshore Gela Diversity Indices (Second Replicate)

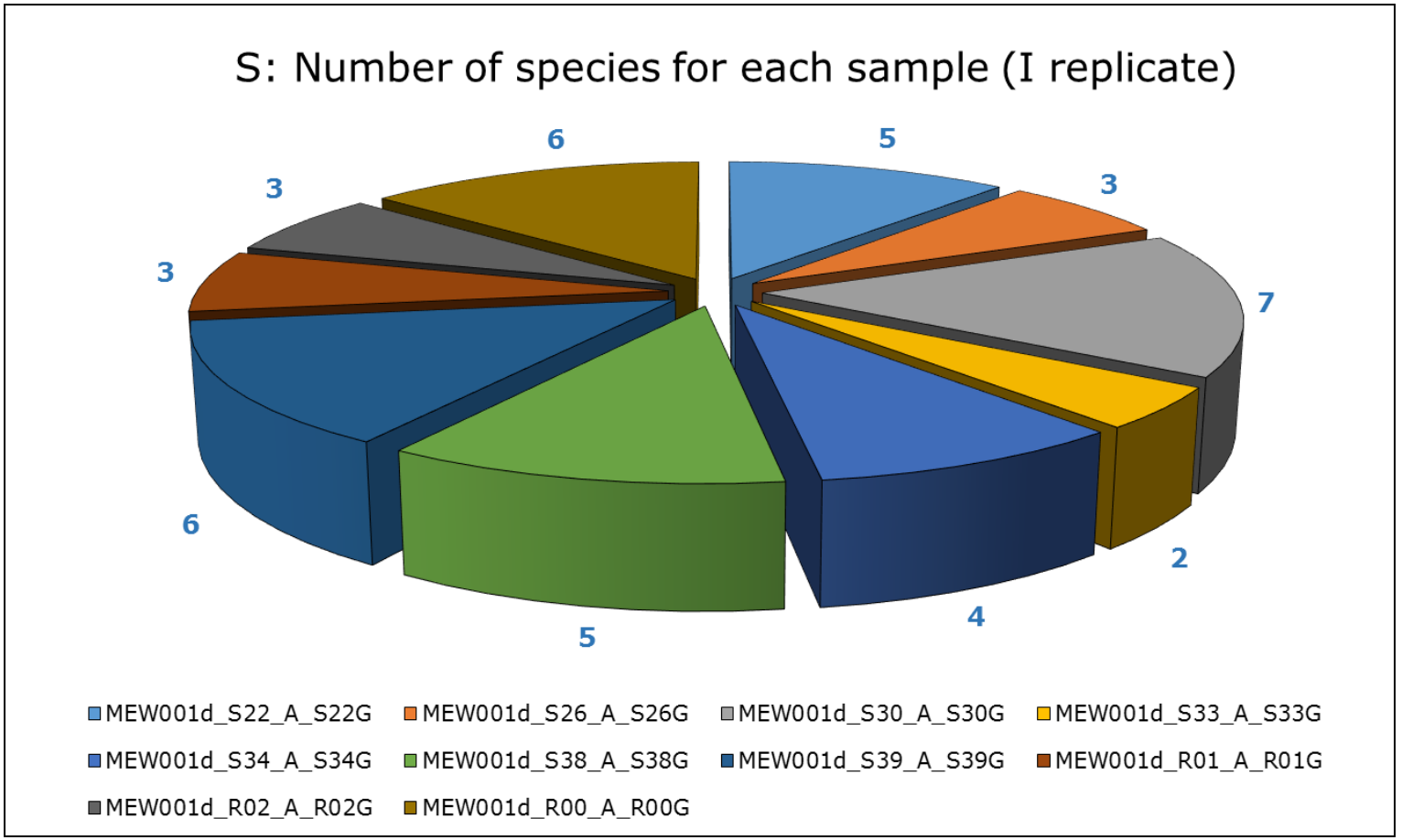


Figure 4.28 – Number of species (S) for nearshore Gela working area (first replicate)

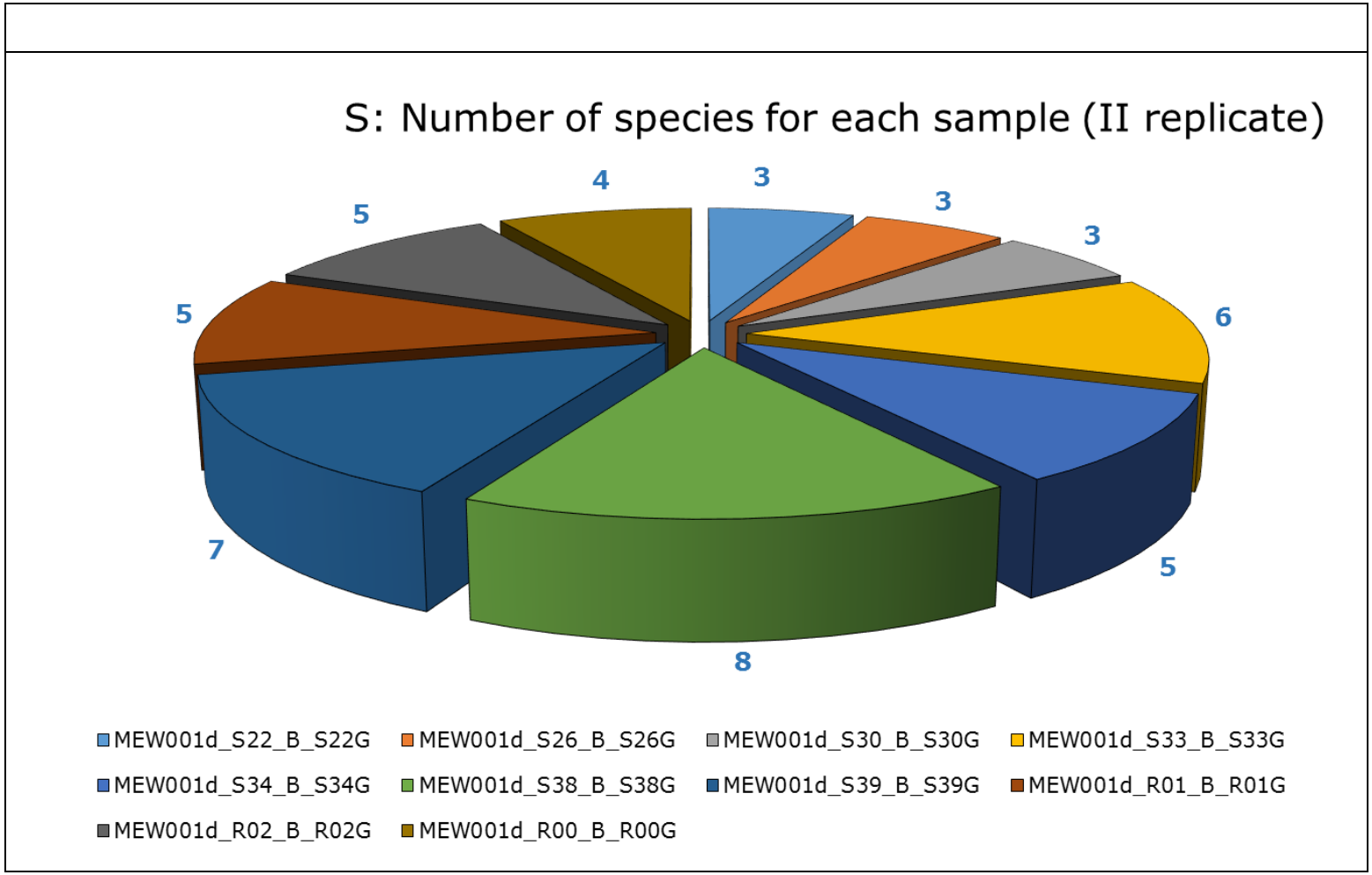


Figure 4.29 – Number of species (S) for nearshore Gela working area (second replicate)

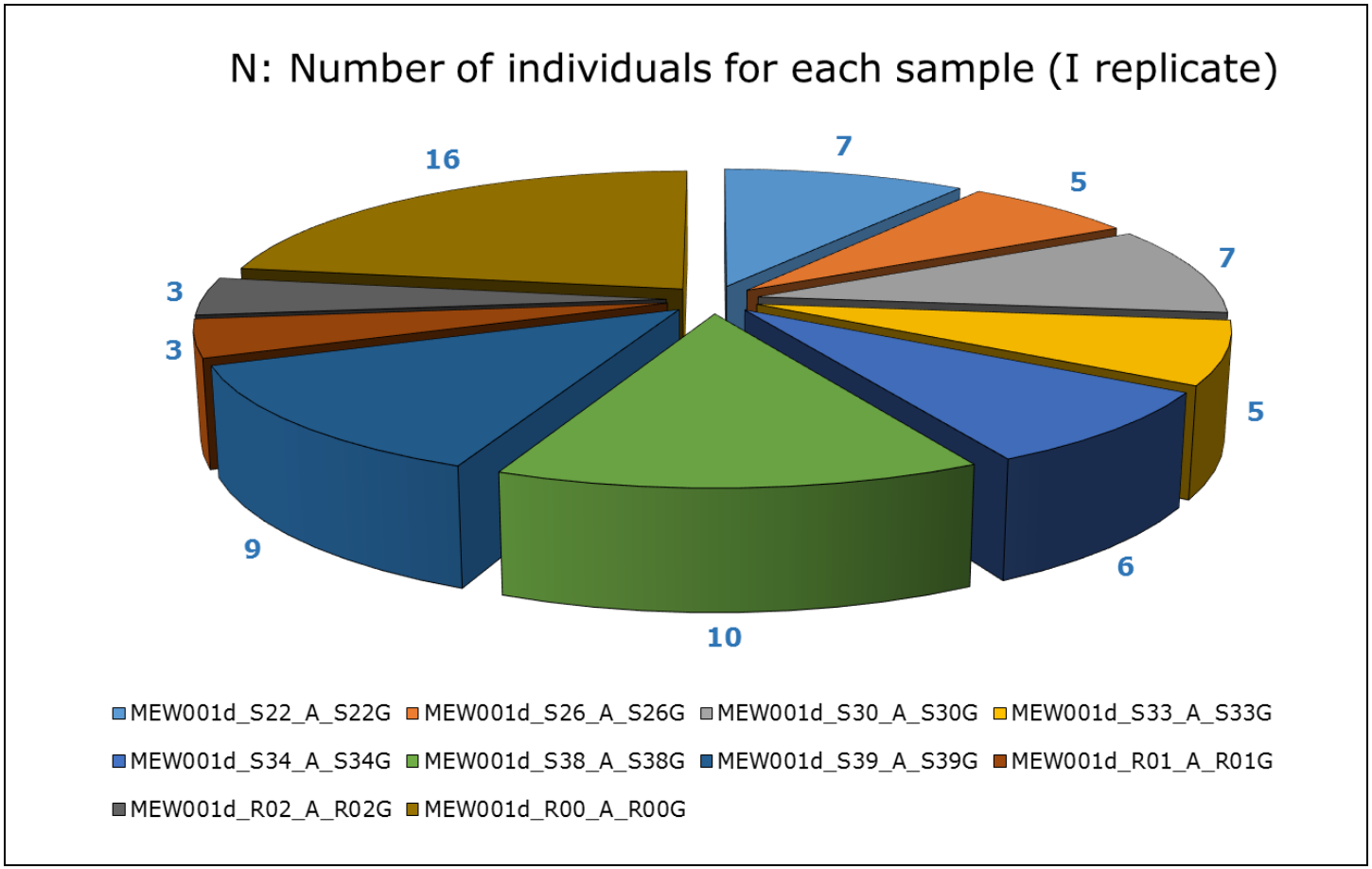


Figure 4.30 - Number of individuals (N) for nearshore Gela working area (first replicate).

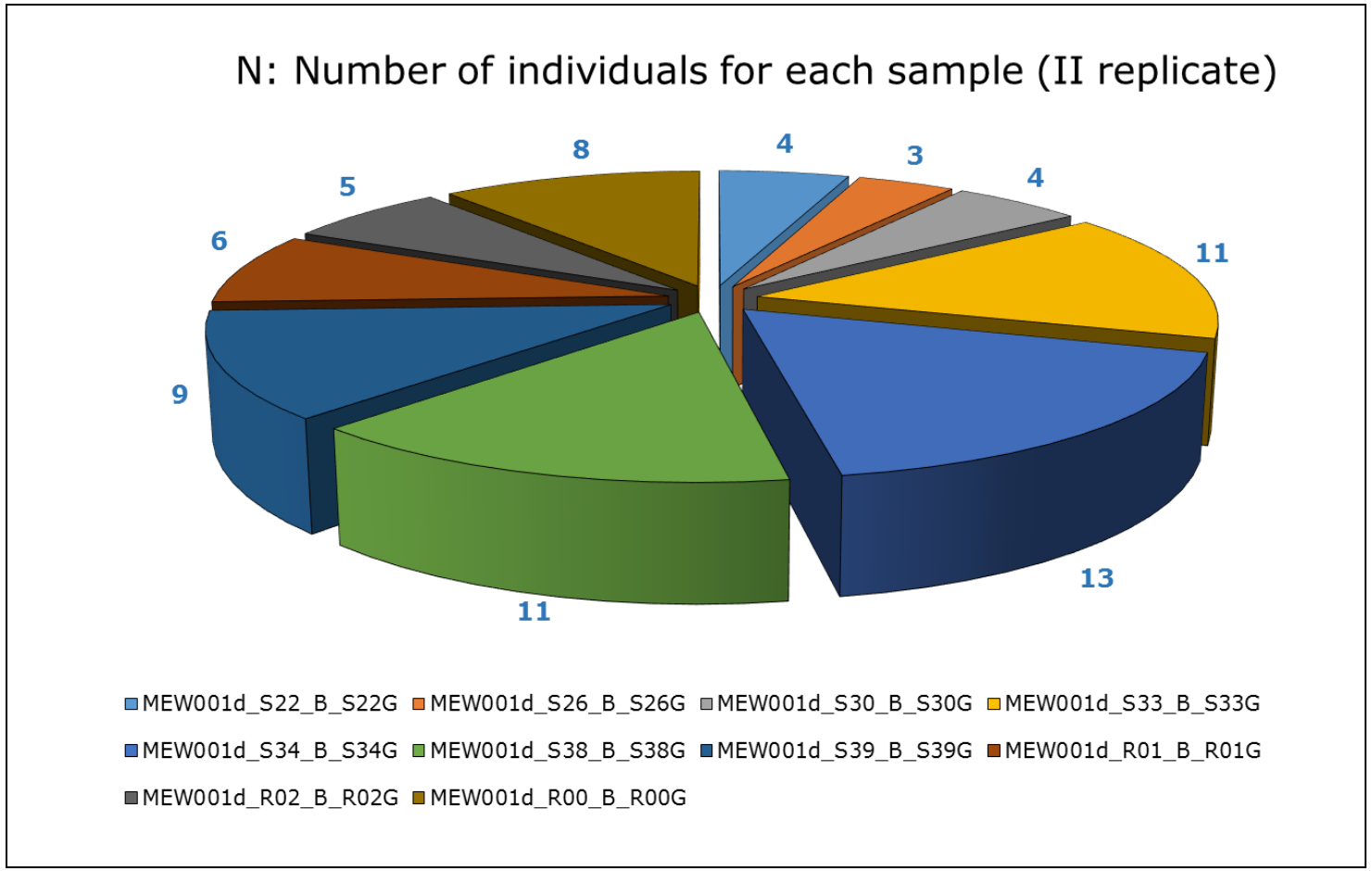


Figure 4.31 - Number of individuals (N) for nearshore Gela working area (second replicate)

The main results are resumed in the following paragraph:

- Interpretation of H': values are between 0.971 and 2.845;
- Interpretation of Simpson (D): values are between 0.143 and 0.520;
- Interpretation of Evenness (J): the range of the values is between 0 and 1, 0 when the taxa are in one group and 1 when the species belong to different groups. Most of the samples are near 1. There are no dominant species considering all samples and this is the reason why values are near 1 (ranging between 0.627 and 1.000);
- Interpretation of Margalef's index (D): values are between 0.256 and 1.489;
- Biotic Indices are summarized in the following Table 4.44, in Figure 4.33 and Figure 4.33:

Table 4.44 – Biotic Indices in nearshore Gela working area (colors refer to Figure 3.9)

Ref.	AMBI	M-AMBI	BENTIX
MEW001d_S22_A_S22G	0.643	0.772	5.14
MEW001d_S22_B_S22G	0.000	0.642	4.50
MEW001d_S26_A_S26G	0.000	0.626	0.48
MEW001d_S26_B_S26G	0.500	0.623	2.00
MEW001d_S30_A_S30G	0.429	0.931	2.86
MEW001d_S30_B_S30G	0.375	0.620	5.00
MEW001d_S33_A_S33G	0.600	0.505	1.20
MEW001d_S33_B_S33G	0.682	0.830	1.64
MEW001d_S34_A_S34G	0.750	0.688	3.00
MEW001d_S34_B_S34G	0.353	0.776	2.59
MEW001d_S38_A_S38G	1.000	0.753	3.60
MEW001d_S38_B_S38G	0.500	0.971	4.18
MEW001d_S39_A_S39G	0.167	0.844	3.56
MEW001d_S39_B_S39G	0.167	0.936	4.67
MEW001d_R01_A_R01G	0.000	0.652	2.00
MEW001d_R01_B_R01G	0.300	0.793	4.33
MEW001d_R02_A_R02G	0.000	0.652	2.00
MEW001d_R02_B_R02G	0.300	0.802	2.80
MEW001d_R00_A_R00G	1.200	0.636	5.73
MEW001d_R00_B_R00G	1.125	0.622	5.25

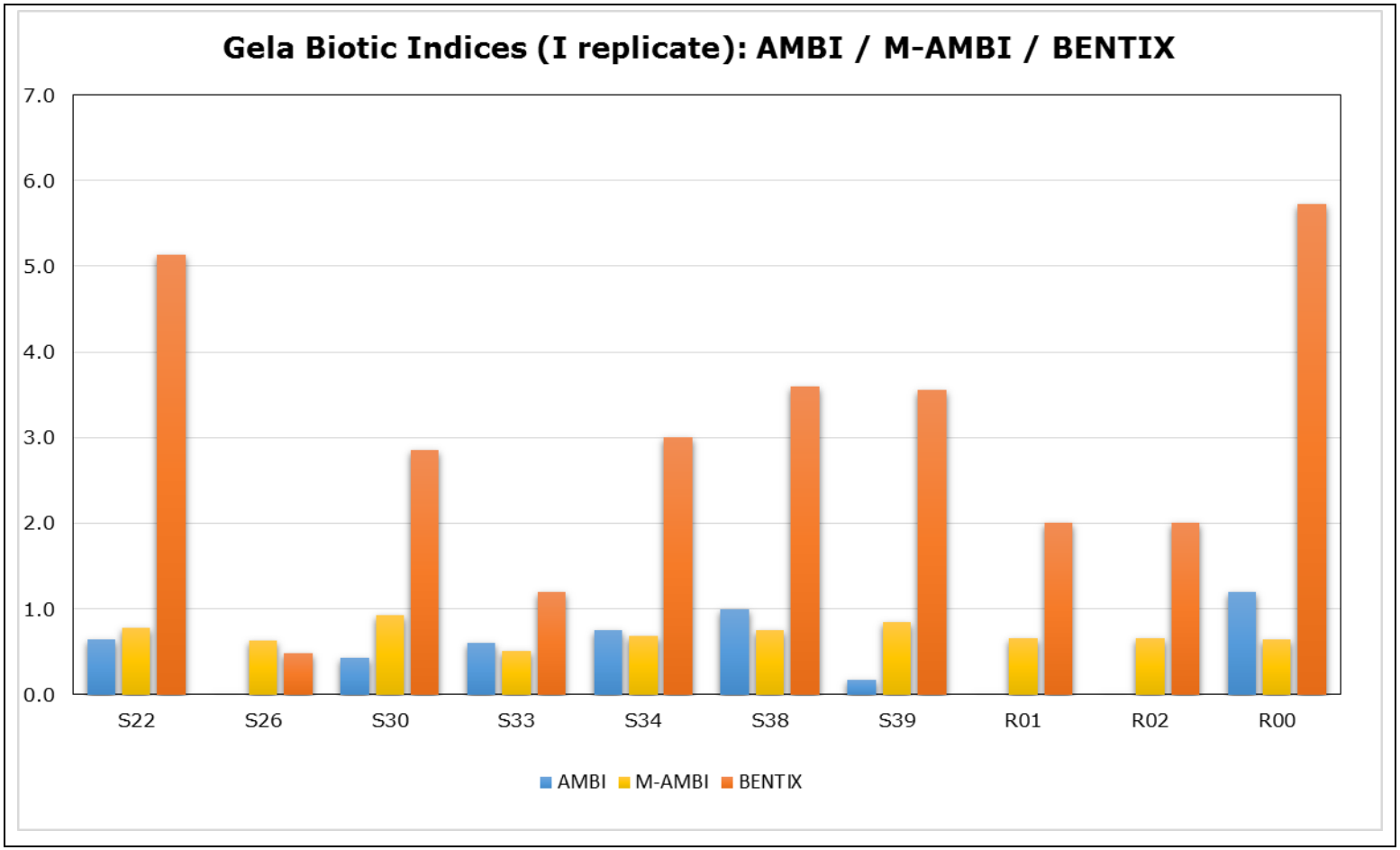


Figure 4.32 - Nearshore Gela Biotic Indices (I replicate)

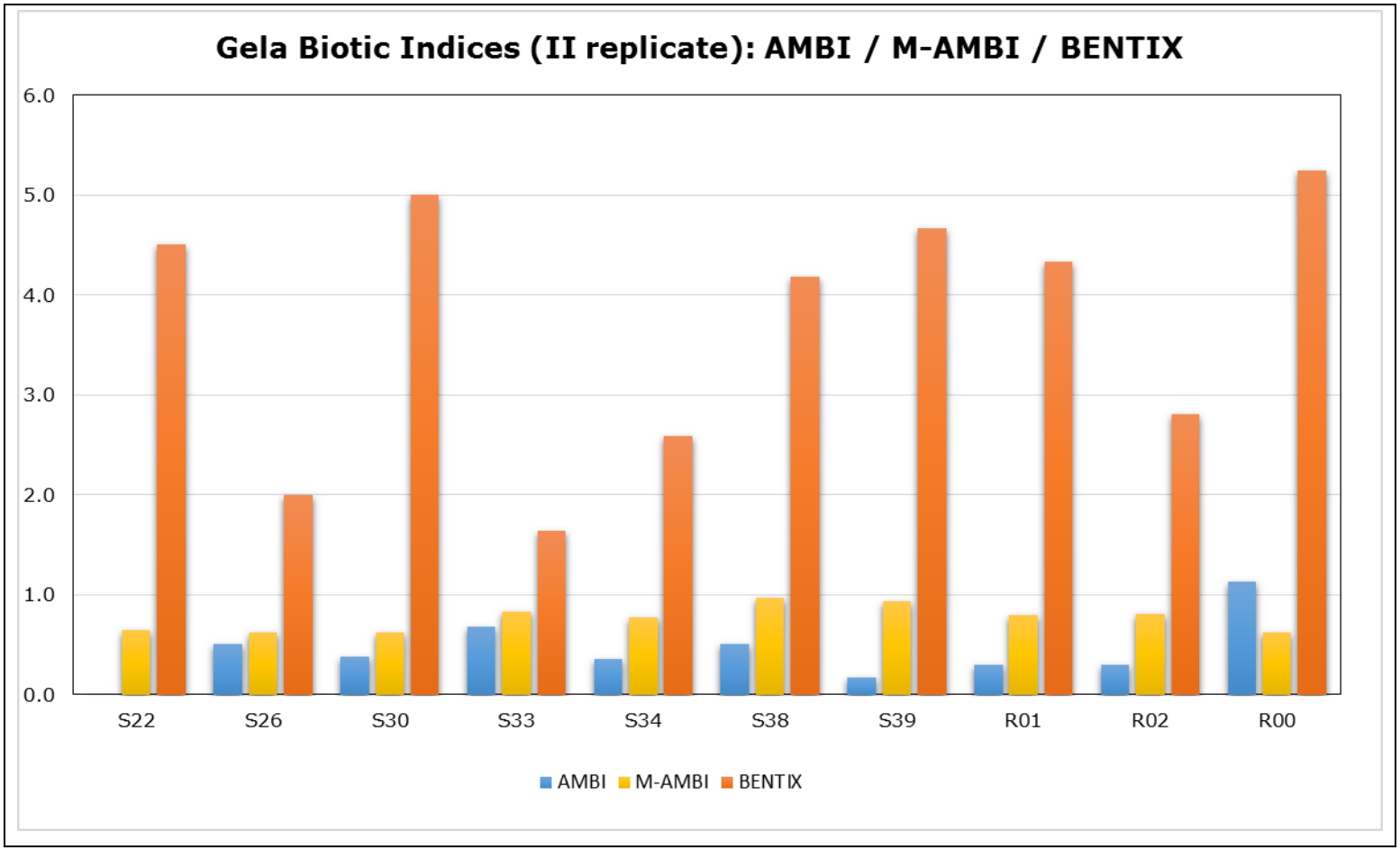


Figure 4.33 – Nearshore Gela Biotic Indices (II replicate)

- AMBI INDEX: values are between 0 and 1.2. The result obtained is an Unpolluted site with a normal benthic community health in S22 (II replicate), S26 (I replicate), S39, R01-R02 (I replicate) and an impoverished benthic community in all the other stations.
- M-AMBI INDEX: values range between 0.5 and 1.0. The result indicates that ecological status in Stations S22, S26, S34, R01, R02, R00, S30 (II replicate), S38 (I replicate) are good, while in stations S30 (I replicate), S33-S38 (II replicate), and S39 are classified as high; only in station S33 (I replicate) the ecological status is moderate.
- BENTIX INDEX: values are between 0.5 and 5.7. According to index values, sampling sites are pristine in S22, R00, S30-S39 (II replicate); Slightly polluted in S38, S39 (I replicate), R01 (II replicate); Moderate polluted in S30 (I replicate), S34 and R02 (II replicate); Heavily polluted in R01-R02 (I replicate), S26 (II replicate) and Extremely polluted/Azotic in station S33 and S26 (I replicate).

The comparison between BENTIX and Diversity index (H') trends is shown in the following Figure:

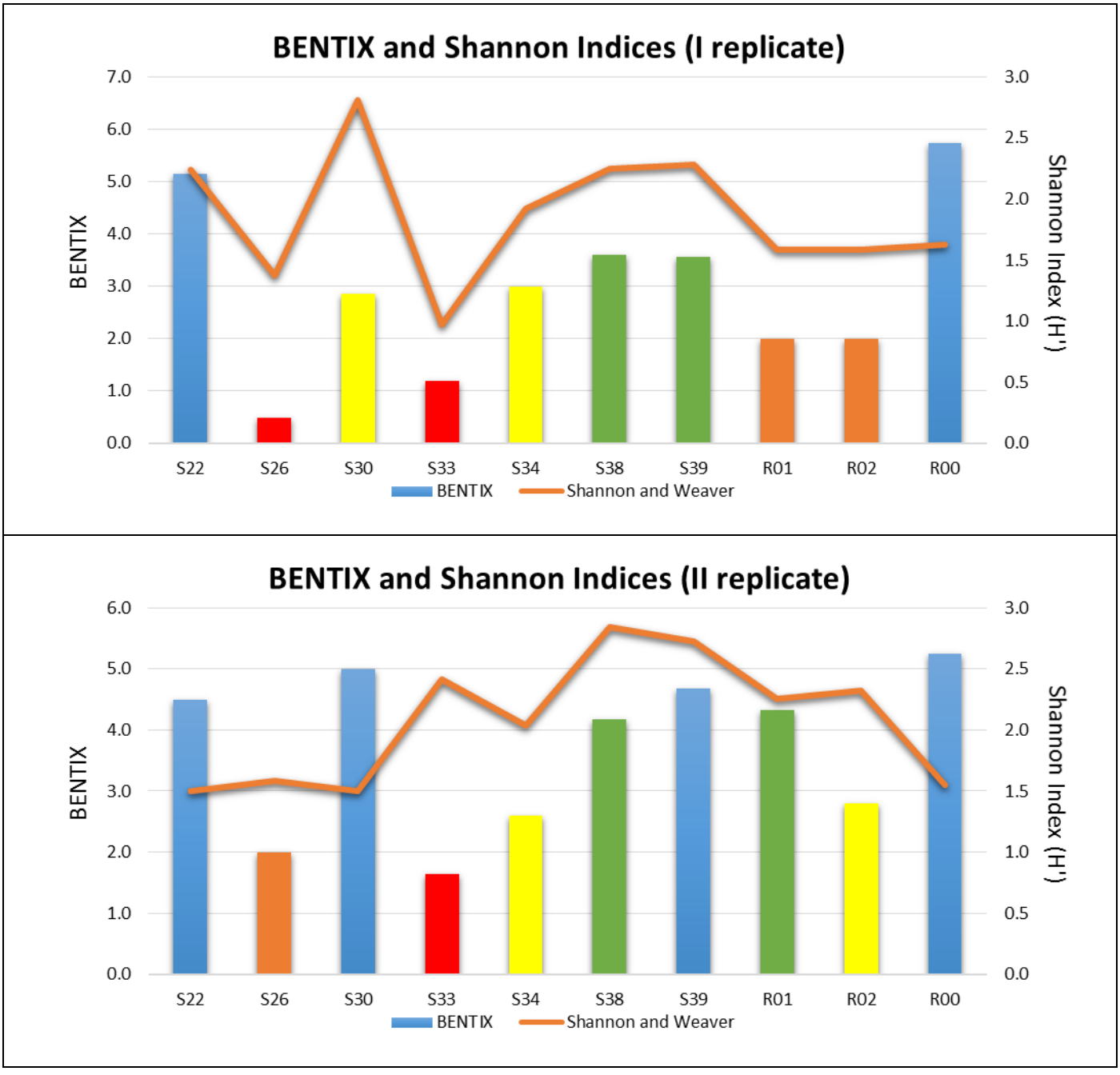


Figure 4.34 - BENTIX and Shannon Trends; Colours correspond to EQS classes as defined in the WFD (Source: Dogan, 2004)

4.4.4 Microbiological analysis (Nearshore Gela)

Results of microbiological analysis are shown in Table 4.45, Table 4.46 and Figure 4.35.

In all sampling locations Microorganism counts are below the LoD (<10), except for Fecal streptococci that were detected in stations S26 (230 MPN/g), S31 (230 MPN/g) and S40 (230 MPN/g); Spore of sulphite-reducing anaerobes present values above the LoD, with the highest one in station S34 (11000 MPN/g); Yeast and ifomicetes count showed values always above the LoD with the highest value of 4000 ufc/g in S38.

Table 4.45 – Microbiological analysis in Nearshore Gela sediment locations

Determinant	**U.M.**	**S21**	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Test Certificate		**19LA 0046164**	**19LA 0046351**	**19LA 0046178**	**19LA 0046184**	**19LA 0046318**	**19LA 0046357**	**19LA 0046188**	**19LA 0046194**	**19LA 0046322**	**19LA 0046363**
Fecal Streptococci count (Enterococci)	MPN/g	< 10	< 10	< 10	< 10	< 10	230	< 10	< 10	< 10	< 10
Total Coliform Count	MPN/g	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Escherichia coli count	MPN/g	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Spore counts of sulphite-reducing anaerobes	MPN/g	75	43	4	4	150	240	15	43	93	1100
Salmonella research	Pres.Ass/25g	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Staphylococci count	ufc/g	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Yeast and ifomicetes count	ufc/g	230	290	81	52	220	340	190	240	230	1100

Table 4.46 - Microbiological analysis in Nearshore Gela sediment locations (S31-S32)

Determinant	**U.M.**	**S31**	**S32**	**S33**	**S34**	**S35**	**S36**	**S37**	**S38**	**S39**	**S40**
Test Certificate		**19LA 0046196**	**19LA 0046200**	**19LA 0046170**	**19LA 0046369**	**19LA 0046204**	**19LA 0046174**	**19LA 0046326**	**19LA 0046375**	**19LA 0046381**	**19LA 0046330**
Fecal Streptococci count (Enterococci)	MPN/g	230	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	230
Total Coliform Count	MPN/g	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Escherichia coli count	MPN/g	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Spore counts of sulphite-reducing anaerobes	MPN/g	460	150	< 3	11000	240	23	1100	460	240	4600
Salmonella research	Pres.Ass/25g	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Staphylococci count	ufc/g	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Yeast and ifomicetes count	ufc/g	1200	280	320	720	250	180	180	4000	550	2000

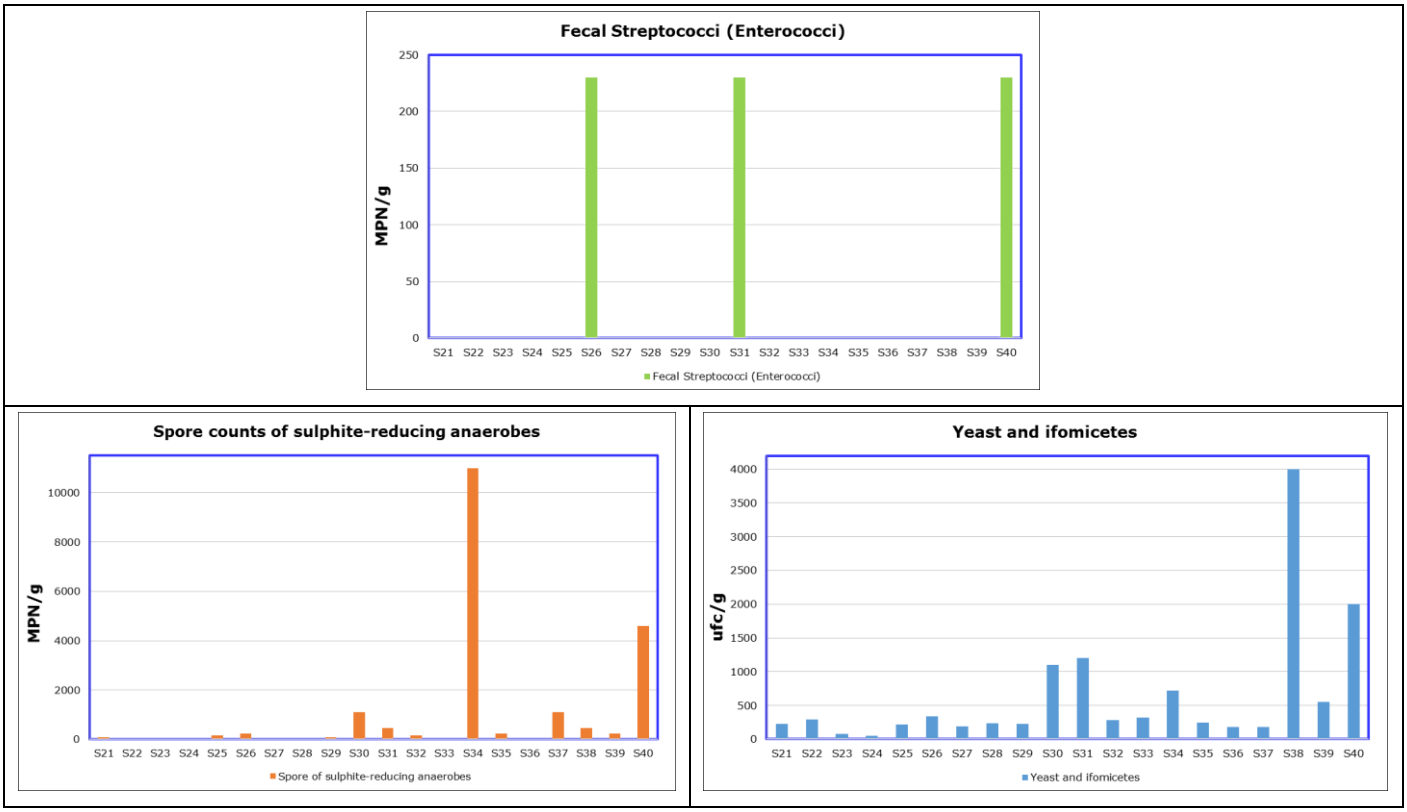


Figure 4.35 – Microbiological analysis in Nearshore Gela sediment stations

4.5.0 Water Sampling Results

4.5.1 Physical characteristics of waters

A total of 35 water sampling locations have been performed by means of 5L Niskin bottles at different depths, depending on:

- Water column depth
- Visibility determined by Secchi disk test
- Thermocline determined from CTD probe
- Chlorophyll determined from CTD probe

Table 4.47 – Performed water sampling locations

WATER SAMPLINGS	EASTING	NORTHING	KP (Km)	DCC (m)	Water depth (m)	DATE
MEW001b_W01	433769.90	4091732.12	8.313	-0.4	26	11/03/2019
MEW001b_W02	436170.11	4084949.85	15.835	1.11	76	11/03/2019
MEW001b_W03	441839.18	4076710.02	25.836	-1.14	86	11/03/2019
MEW001b_W04	444671.47	4072590.15	30.835	0.29	60	10/03/2019
MEW001b_W05	448764.93	4059058.31	45.001	1.1	106	10/03/2019
MEW001b_W06	448962.43	4058359.81	45.728	0.35	104	10/03/2019
MEW001b_W07	450803.50	4053627.67	50.836	1.27	144	10/03/2019
MEW001b_W08	455781.80	4044954.69	60.835	0.75	133	10/03/2019
MEW001b_W09	460759.75	4036281.29	70.835	1.24	118	10/03/2019
MEW001b_W10	463955.75	4027024.05	80.836	-0.1	131	10/03/2019
MEW001b_W11	466097.30	3997549.43	110.388	-0.73	130	10/03/2019
MEW001b_W12	467051.68	3984396.58	123.576	0.27	121	01/05/2019
MEW001b_W13	467387.58	3979856.47	128.128	-0.39	116	01/05/2019
MEW001b_W14	466947.61	3969776.94	138.231	-0.61	70	30/04/2019
MEW001b_W15	461202.96	3964162.68	150.000	0.23	46	29/04/2019
Nearshore Gela						
MEW001d_W21	436891.40	4098578.33	0.974	259	6.5	12/08/2019
MEW001d_W22	437180.01	4098080.50	1.385	-144	7.4	13/08/2019
MEW001d_W23	437467.67	4097571.25	1.807	-549	8.2	12/08/2019
MEW001d_W24	438061.34	4097596.27	1.636	-1118	6.3	13/08/2019
MEW001d_W25	436748.59	4098316.87	1.263	333	7.8	13/08/2019
MEW001d_W26	437029.14	4097820.93	1.674	-62	8.7	12/08/2019
MEW001d_W27	437358.45	4097318.02	2.079	-506	9.3	12/08/2019
MEW001d_W28	437918.53	4097331.68	1.927	-1045	7.6	12/08/2019
MEW001d_W29	436613.96	4098081.86	1.524	405	9	13/08/2019
MEW001d_W30	436887.14	4097549.74	1.972	8	9.8	12/08/2019
MEW001d_W31	437200.29	4097086.71	2.343	-410	10	11/08/2019
MEW001d_W32	437769.09	4097060.92	2.227	-967	9	12/08/2019
MEW001d_W33	436461.74	4097800.33	1.834	483	10	12/08/2019
MEW001d_W34	436738.32	4097283.85	2.266	87	10.4	11/08/2019
MEW001d_W35	437039.05	4096766.81	2.652	-344	10.7	11/08/2019

WATER SAMPLINGS	EASTING	NORTHING	KP (Km)	DCC (m)	Water depth (m)	DATE
MEW001d_W36	437610.15	4096801.30	2.518	-877	9.8	12/08/2019
MEW001d_W37	435552.44	4095413.99	4.511	470	13.4	11/08/2019
MEW001d_W38	436467.95	4096626.04	2.990	138	11.3	11/08/2019
MEW001d_W39	436838.62	4096429.55	3.039	-279	11.3	11/08/2019
MEW001d_W40	435903.81	4094738.14	4.944	-157	13.8	11/08/2019

4.5.2 Transparency

From the transparency values, it is possible to obtain the depth of the euphotic zone (the upper water layer from the surface to the depth of effective light penetration: it is above the compensation level and therefore the zone of effective photosynthesis). On average this depth corresponds to three times the value of transparency, therefore in the surveyed stations the euphotic zone is shown below:

Table 4.48 - Secchi Disk results

WATER SAMPLINGS	Secchi Disk depth (m)	Euphotic zone (m)	DATE
MEW001b_W01	17.5	/	11/03/2019
MEW001b_W02	17.5	52.5	11/03/2019
MEW001b_W03	17.5	52.5	11/03/2019
MEW001b_W04	17.5	52.5	10/03/2019
MEW001b_W05	17.5	52.5	10/03/2019
MEW001b_W06	17.5	52.5	10/03/2019
MEW001b_W07	17.5	52.5	10/03/2019
MEW001b_W08	17.5	52.5	10/03/2019
MEW001b_W09	17.5	52.5	10/03/2019
MEW001b_W10	17.5	52.5	10/03/2019
MEW001b_W11	15.0	45.0	10/03/2019
MEW001b_W12	22.5	67.5	01/05/2019
MEW001b_W13	22.5	67.5	01/05/2019
MEW001b_W14	25.0	75.0	30/04/2019
MEW001b_W15	13.0	39.0	29/04/2019
Nearshore Gela			
MEW001d_W21	/	/	12/08/2019
MEW001d_W22	6		13/08/2019
MEW001d_W23	/		12/08/2019
MEW001d_W24	6		13/08/2019
MEW001d_W25	6		13/08/2019
MEW001d_W26	/		12/08/2019
MEW001d_W27	/		12/08/2019
MEW001d_W28	/		12/08/2019
MEW001d_W29	6		13/08/2019
MEW001d_W30	/		12/08/2019
MEW001d_W31	/		11/08/2019
MEW001d_W32	/		12/08/2019
MEW001d_W33	/		12/08/2019

WATER SAMPLINGS	Secchi Disk depth (m)	Euphotic zone (m)	DATE
MEW001d_W34	/		11/08/2019
MEW001d_W35	/		11/08/2019
MEW001d_W36	/		12/08/2019
MEW001d_W37	/		11/08/2019
MEW001d_W38	/		11/08/2019
MEW001d_W39	/		11/08/2019
MEW001d_W40	/		11/08/2019
• Note: the depth in W01 is below 30 meters. • Note: in Nearshore Gela water stations (shallow waters), there wasn't Secchi disk depth.			

4.5.3 CTD Probe

A Conductivity, Temperature, Depth probe YSI 6600V2 (see APPENDIX 4: CTD RAW DATA) has been deployed at each location to record the chemical and physical parameters within the water column, in order to determine the depth for water sampling and the deployment of the plankton nets.

Water column profile (CTD) (see APPENDIX 3: CTD PROBE) is a multi-parametric probe for detecting the following physical-chemical features:

- water temperature
- water salinity
- dissolved oxygen
- pH
- redox potential (Eh)
- turbidity
- clorophyll-a (fluorescence)

The time range for all water locations is shown in the following table:

Table 4.49 – Time range for all water locations

Water Stations	Date (d/m/y)	Reference Time (hh:mm)
Offshore Italy		
MEW001b_W01	11/03/2019	06:00
MEW001b_W02	11/03/2019	04:00
MEW001b_W03	11/03/2019	02:00
MEW001b_W04	10/03/2019	00:00
MEW001b_W05	10/03/2019	22:00
MEW001b_W06	10/03/2019	21:00
MEW001b_W07	10/03/2019	19:00
MEW001b_W08	10/03/2019	16:00
MEW001b_W09	10/03/2019	14:00
MEW001b_W10	10/03/2019	12:00
Malta		
MEW001b_W11	10/03/2019	03:00

Water Stations	Date (d/m/y)	Reference Time (hh:mm)
MEW001b_W12	01/05/2019	16:00
MEW001b_W13	01/05/2019	11:00
MEW001b_W14	30/04/2019	21:00
MEW001b_W15	29/04/2019	10:00
Nearshore Gela		
MEW001d_W21	12/08/2019	12:00
MEW001d_W22	13/08/2019	10:00
MEW001d_W23	12/08/2019	18:00
MEW001d_W24	13/08/2019	11:00
MEW001d_W25	13/08/2019	09:00
MEW001d_W26	12/08/2019	19:00
MEW001d_W27	12/08/2019	17:00
MEW001d_W28	13/08/2019	11:00
MEW001d_W29	13/08/2019	09:00
MEW001d_W30	12/08/2019	16:00
MEW001d_W31	11/08/2019	18:00
MEW001d_W32	12/08/2019	18:00
MEW001d_W33	12/08/2019	09:00
MEW001d_W34	11/08/2019	17:00
MEW001d_W35	11/08/2019	16:00
MEW001d_W36	12/08/2019	14:00
MEW001d_W37	11/08/2019	14:00
MEW001d_W38	11/08/2019	16:00
MEW001d_W39	11/08/2019	15:00
MEW001d_W40	11/08/2019	12:00
Notes: The time range is rounded to the nearest hour.		

4.5.3.1 Malta CTD results

As shown below in Figure 4.36 temperature values are comprised between 14°C and 17°C and generally decrease going deeper. Few sampling locations (W12, W13, W14, W15) are slightly warmer in the first 50m of water column. The difference between W01-W11 and W12-15 can be associated to the different sampling period. In fact locations from W01 to W11 were performed in March, while stations W12-W15 were surveyed between the end of April and the beginning of May.

Salinity's graph (Figure 4.37) shows values between 41ppt and 43ppt and generally increase going deeper.

Dissolved Oxygen is considered as a marine ecosystem quality indicator. The oxygen concentration is influenced by primary production, temperature, salinity, water turbulence and consuming oxygen processes. This parameter shows (Figure 4.38), for most samples, values between 5mg/l and

10mg/l and generally decreases going deeper; W09, W11 and W15 have lower values of DO if compared to the other samples besides a different trend following the depth.

The pH parameter is correlated with the primary production and the oxidation processes. In Figure 4.39 pH values are shown, all the samples present values between 8.1 and 8.3 pH units and are constant for the whole water column.

The Redox potential (Eh) expresses the ability to oxidize or to reduce an environmental system. This parameter is connected with the pH and the dissolved oxygen. Oxygen-reduction potential shown in Figure 4.40 has values between 184mV and 260mV maintaining a constant trend, lowest values have been detected in sampling W15.

Turbidity values shown in Figure 4.41 vary between 2NTU and 5NTU and generally remain in the same range for the entire water column.

Chlorophyll graph (Figure 4.42) shows a values variation between <0µg/l and 2µg/l, samplings W10 and W12 presents values >8 µg/l for the shallowest part of the water column.

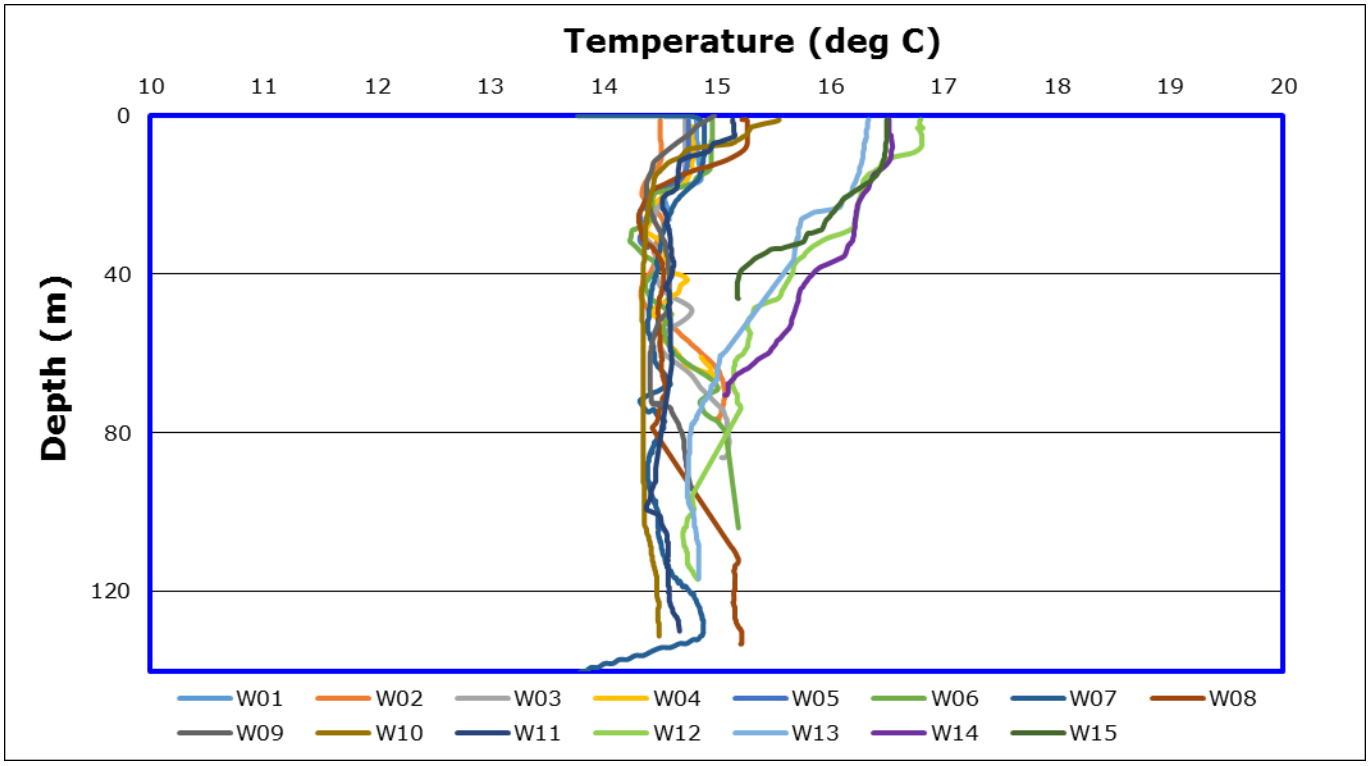


Figure 4.36 – CTD Temperature comparison graph

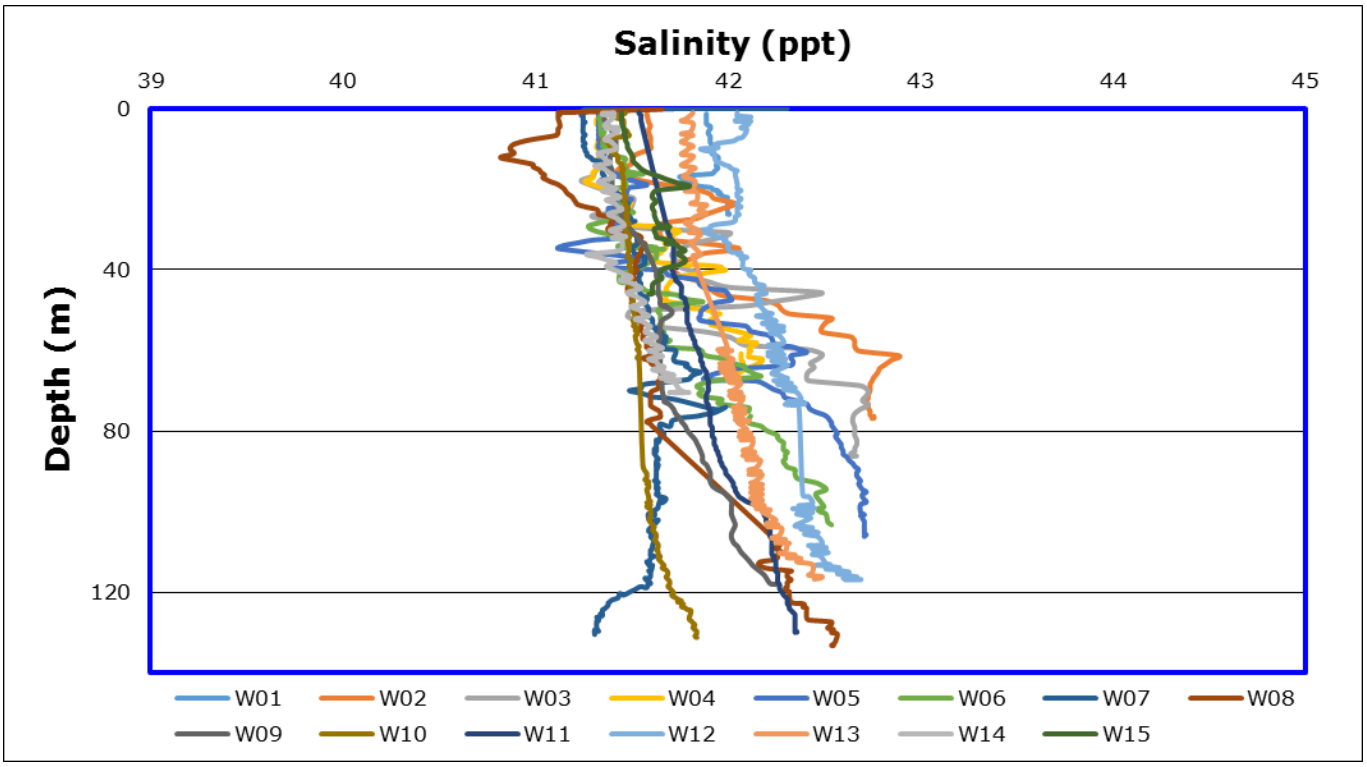


Figure 4.37 – CTD Salinity comparison graph

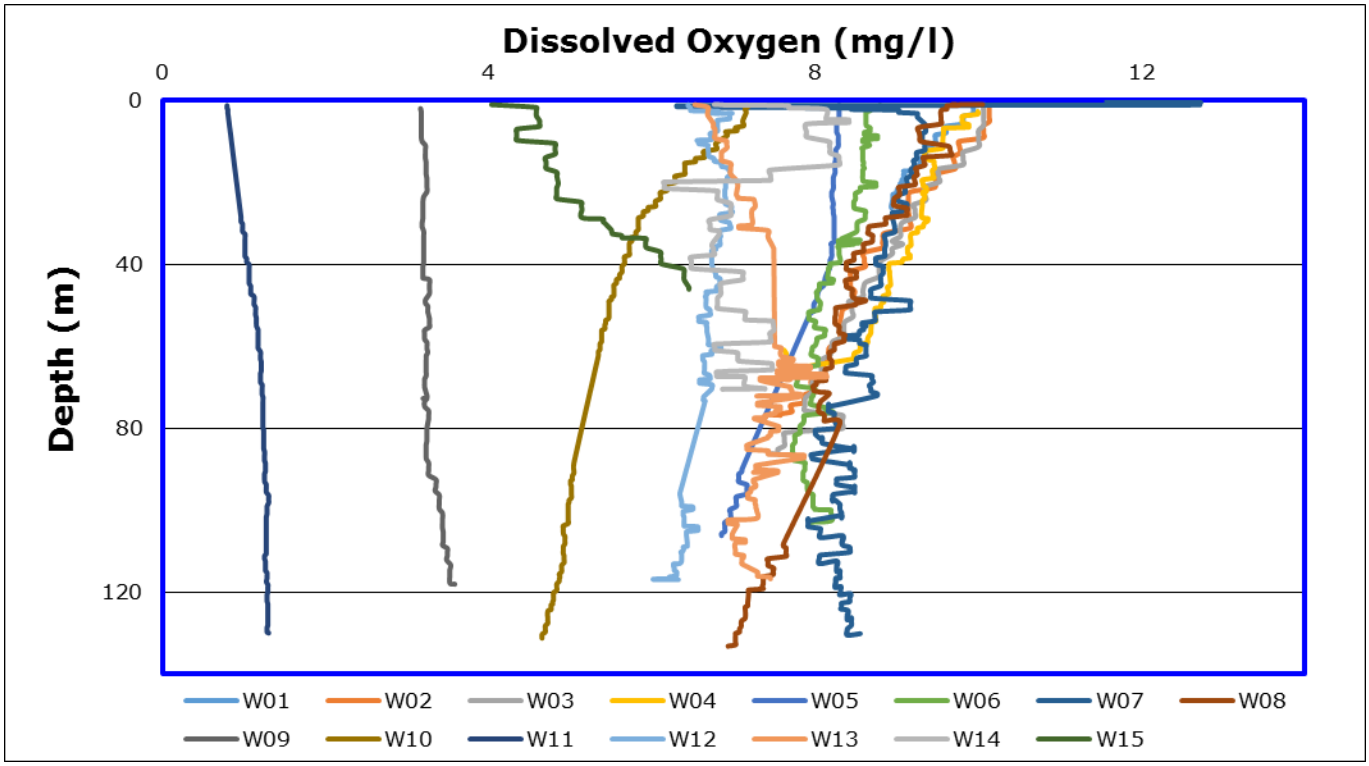


Figure 4.38 – CTD Dissolved Oxygen comparison graph

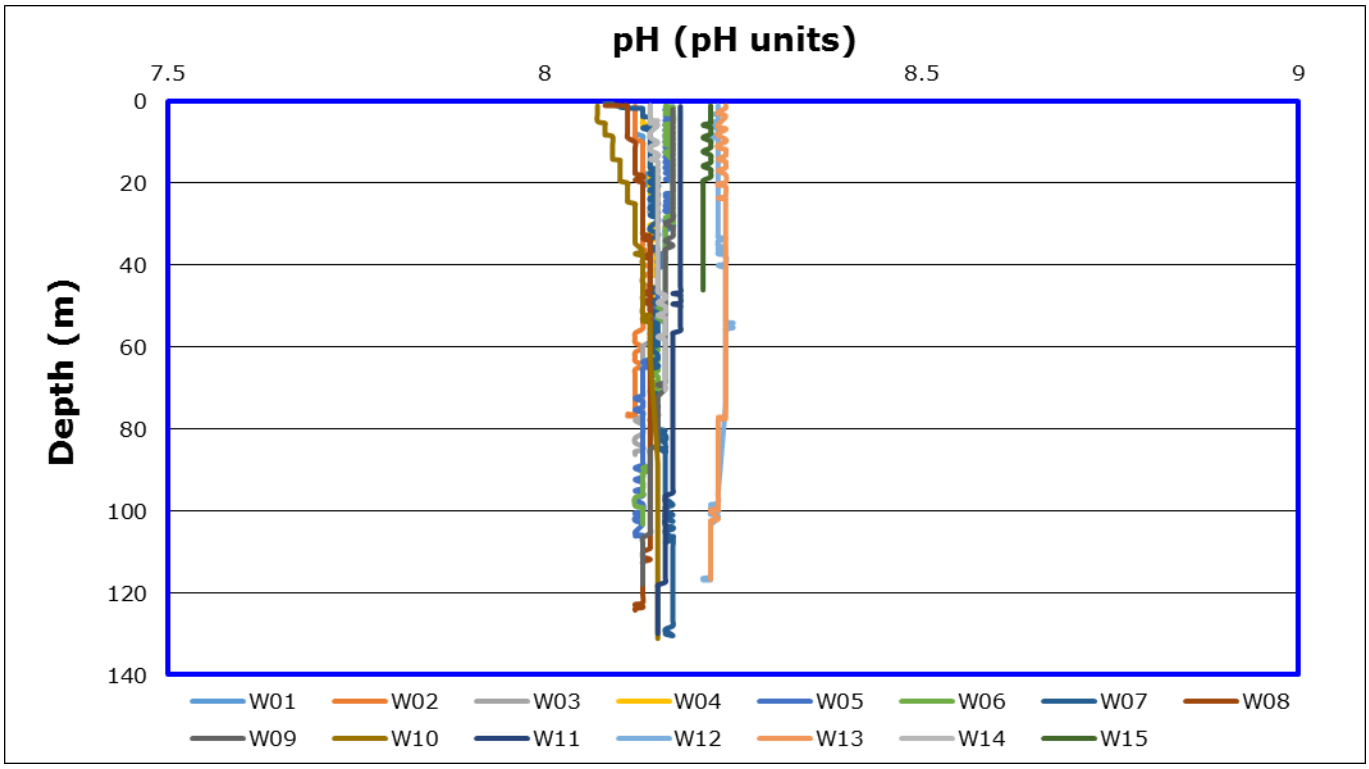


Figure 4.39 – CTD Acidity comparison graph

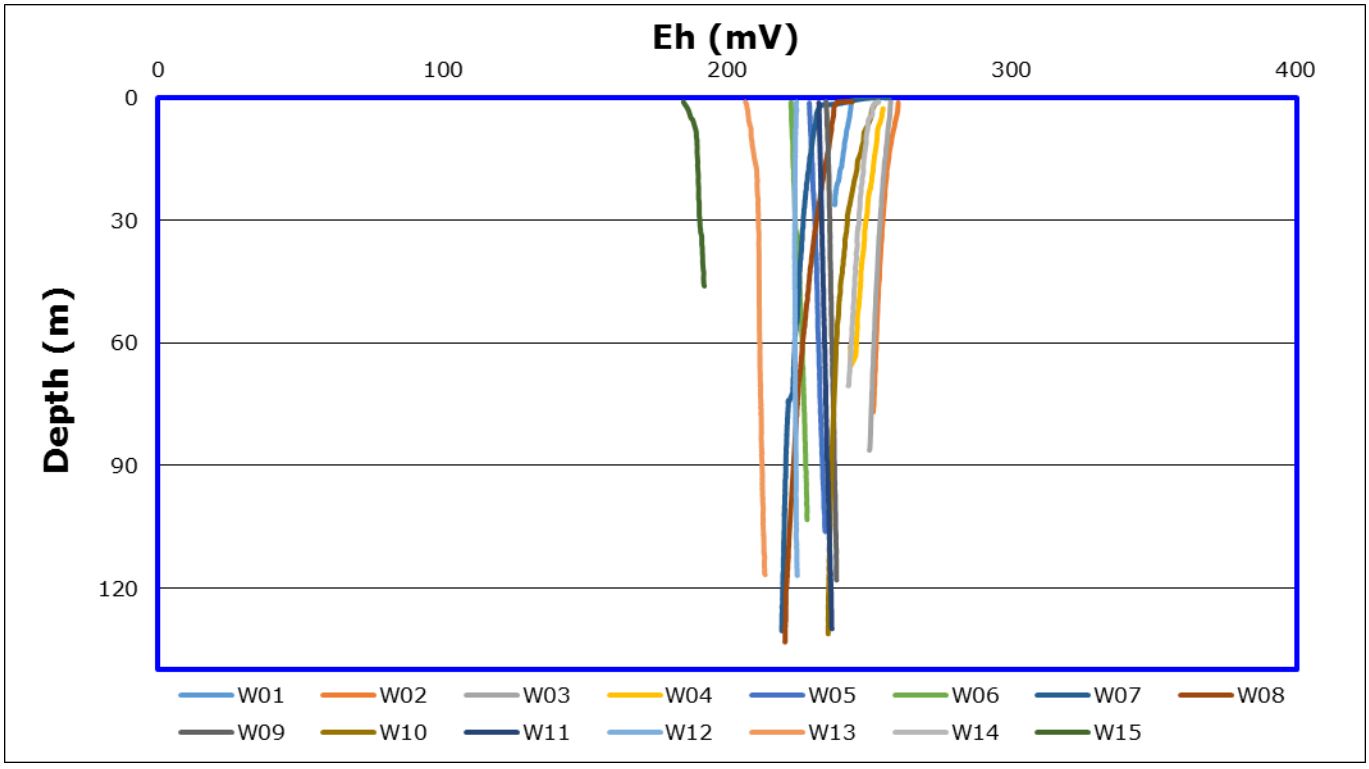


Figure 4.40 – CTD Oxygen Reduction comparison graph

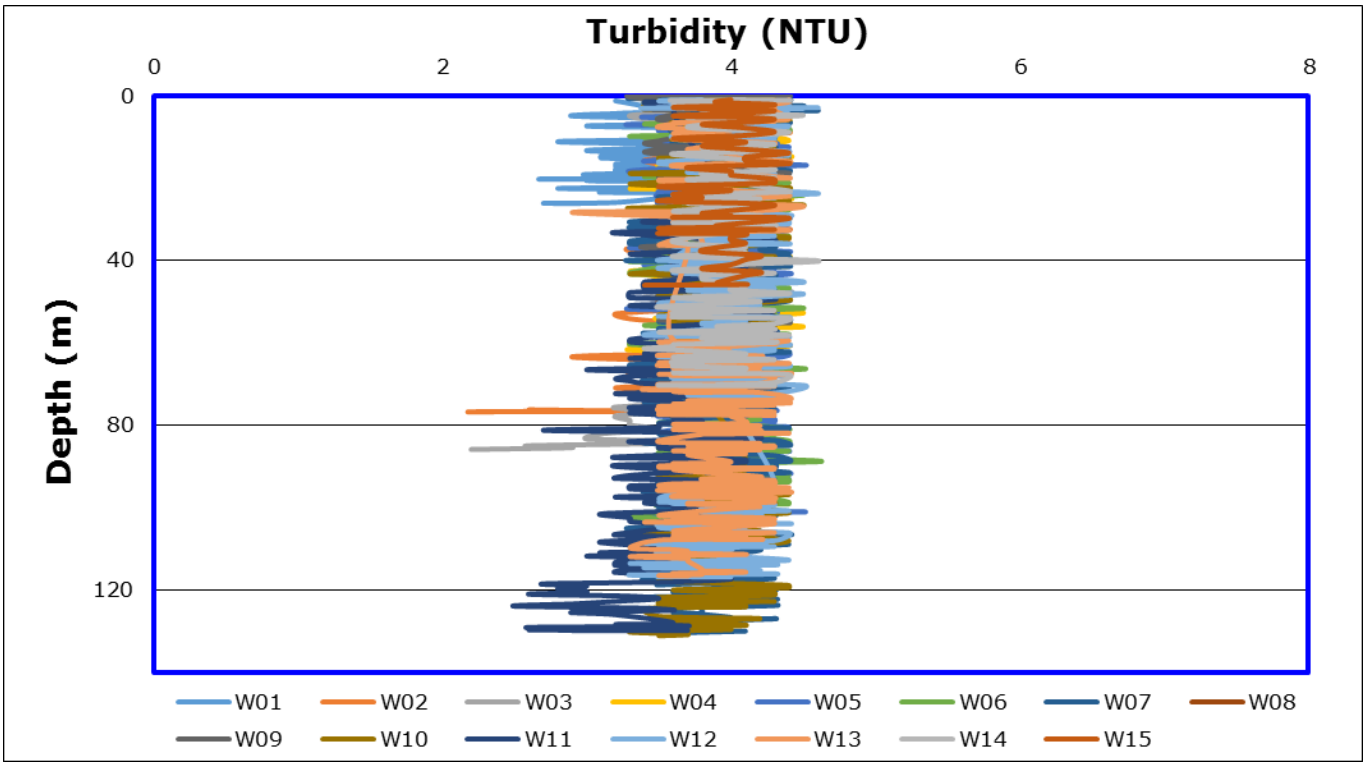


Figure 4.41 – CTD Turbidity comparison graph

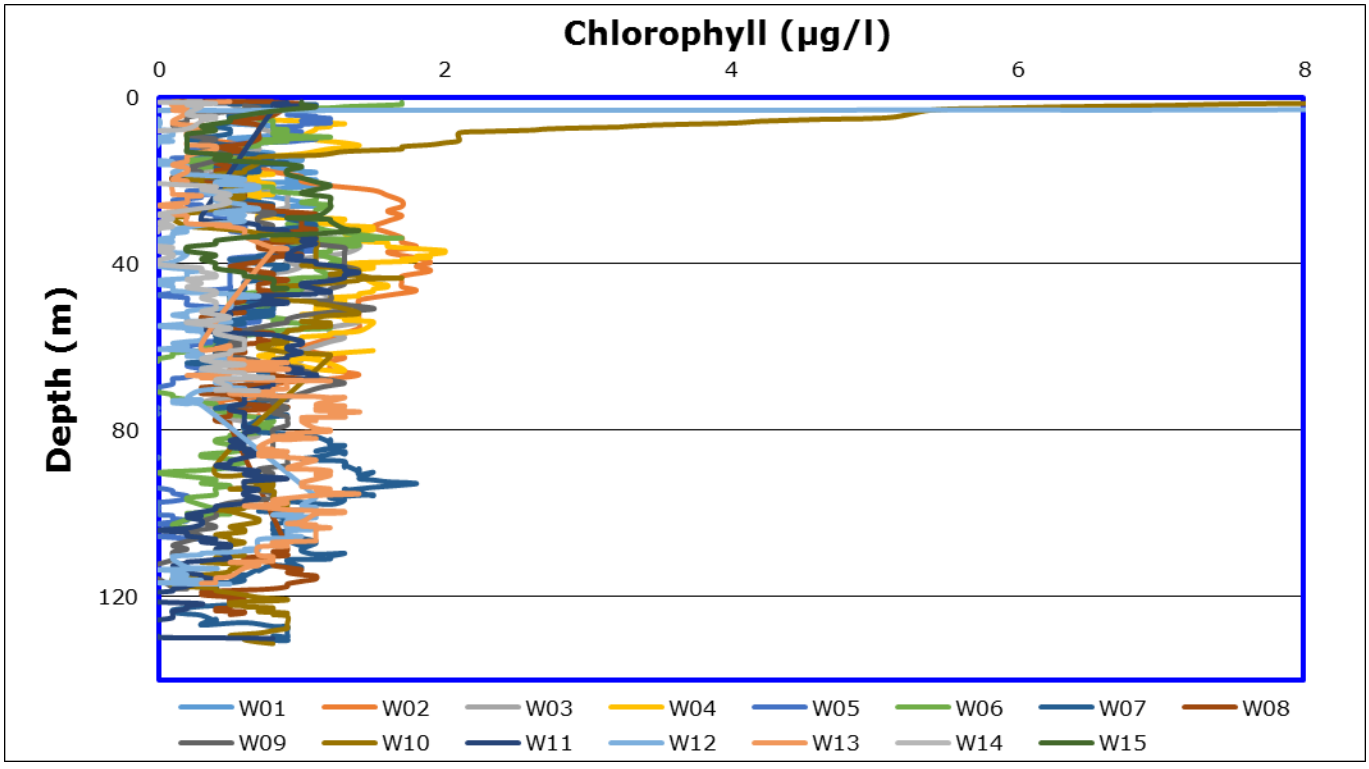


Figure 4.42 – CTD Chlorophyll comparison graph

4.5.3.2 Nearshore Gela CTD results

As shown below in Figure 4.43, in the twenty (20) sampled stations (W21-W40), temperature has almost the same values. In particular, temperature values are comprised between 27°C and 28°C at the surface and slowly decrease to almost 24°C to a depth of 6m.

Salinity's graph (Figure 4.44) shows values between 40ppt and 41ppt and generally remains almost stable down to the maximum depth.

Conductivity trends (Figure 4.45) are very similar to the temperature ones. In general, they start at the surface from values between 62000µS/cm and 64000µS/cm, then decrease down to values of 60500µS/cm (between 6m and 7m).

Dissolved oxygen shows (Figure 4.46), for most part of samples, values between 7mg/l and 10mg/l and generally remains stable down to 6m. The values then increase slowly from 6m down to the maximum depth. W22 has lower value of DO with if compared to the other samples and it shows a different trend following the depth.

The pH trends (Figure 4.49) show a very low reduction and all the samples present values between 8.1 and 8.2 pH units and are constant for the whole water column.

Oxygen-reduction potential (Eh) shown in Figure 4.50 has values always positive and ranging between 170mV and 280mV maintaining a constant trend till the maximum depth. The lowest values are reached by the sampling W37 (around 170mV).

Turbidity values shown in Figure 4.47 vary between 2NTU and 5NTU and generally slowly decrease from 6m going deeper until the maximum depth.

Chlorophyll graph (Figure 4.48) shows a values variation between <0µg/l and 2.5µg/l, sampling W33 presents values >4 µg/l for the shallowest part of the water column.

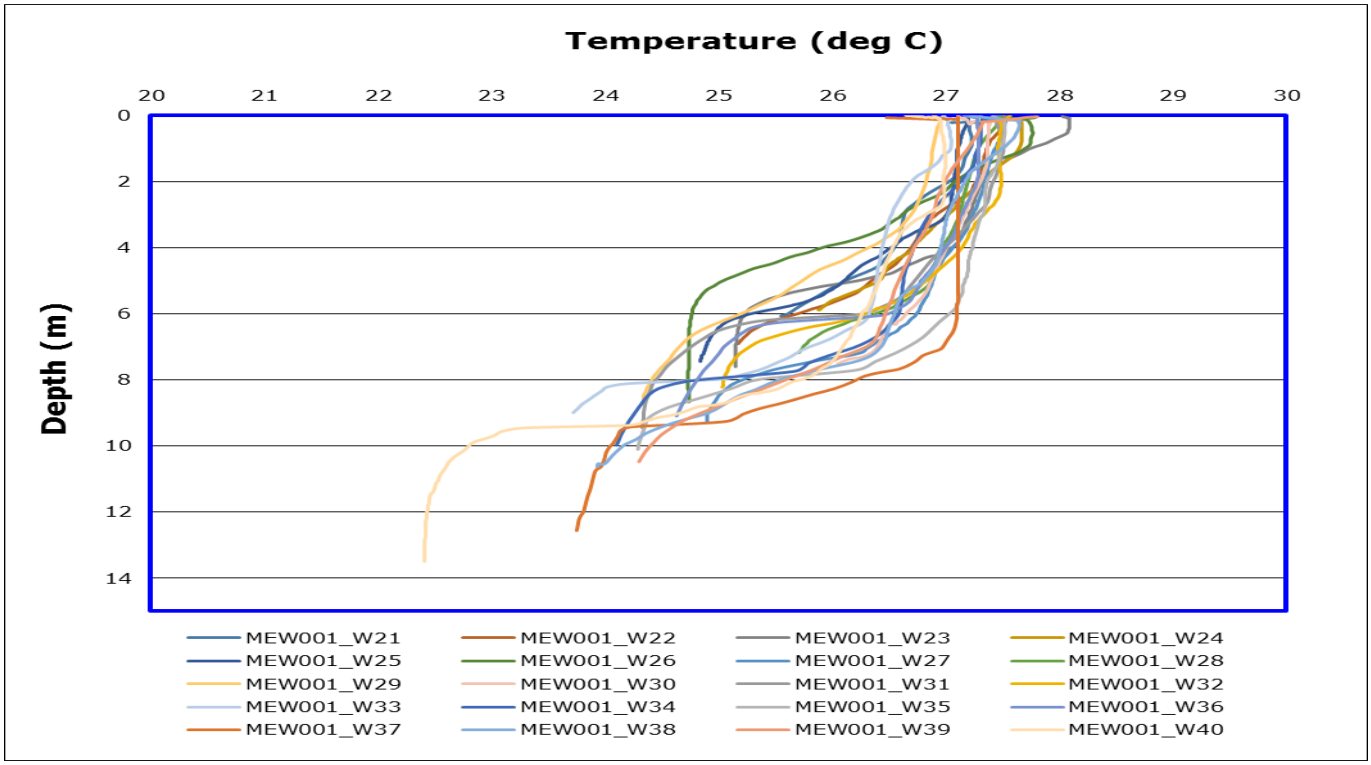


Figure 4.43 - CTD Temperature comparison graph

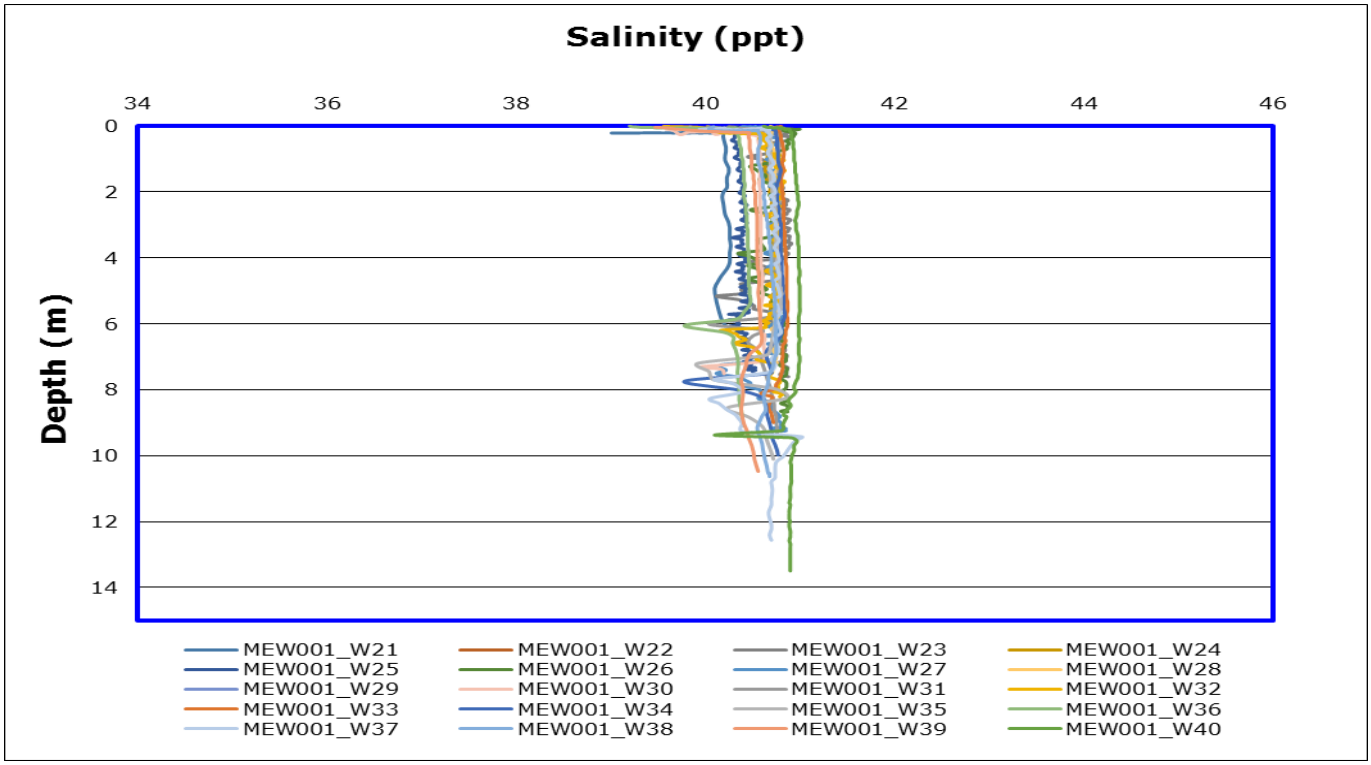


Figure 4.44 - CTD Salinity comparison graph

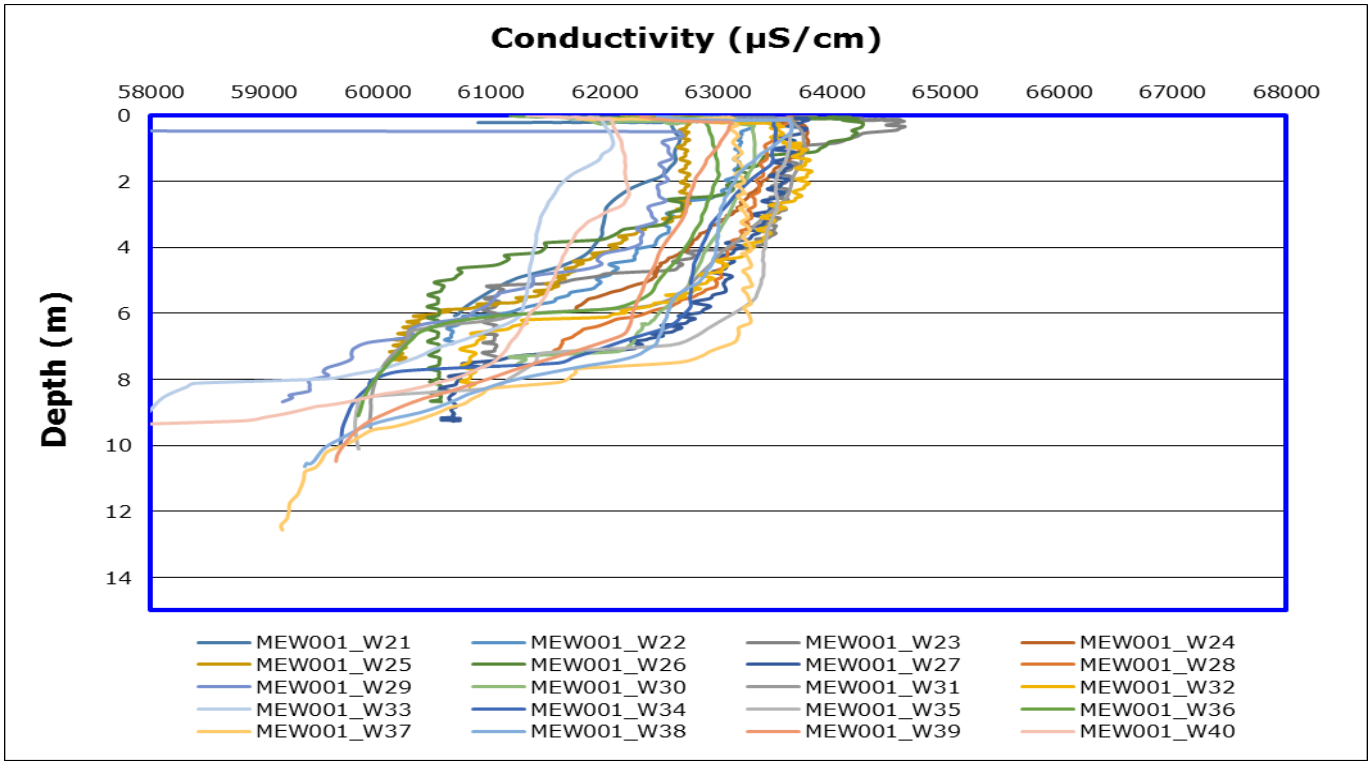


Figure 4.45 - CTD Conductivity comparison graph

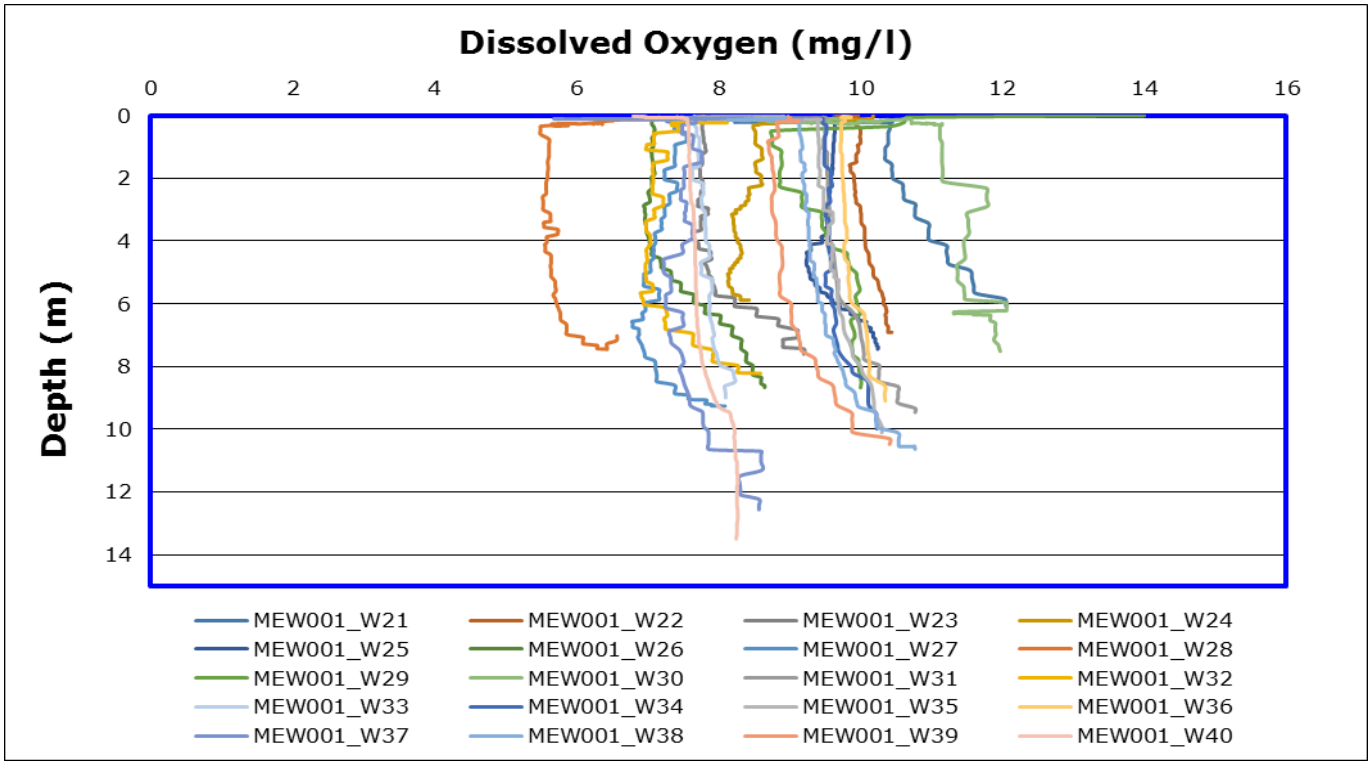


Figure 4.46 - CTD Dissolved Oxygen comparison graph

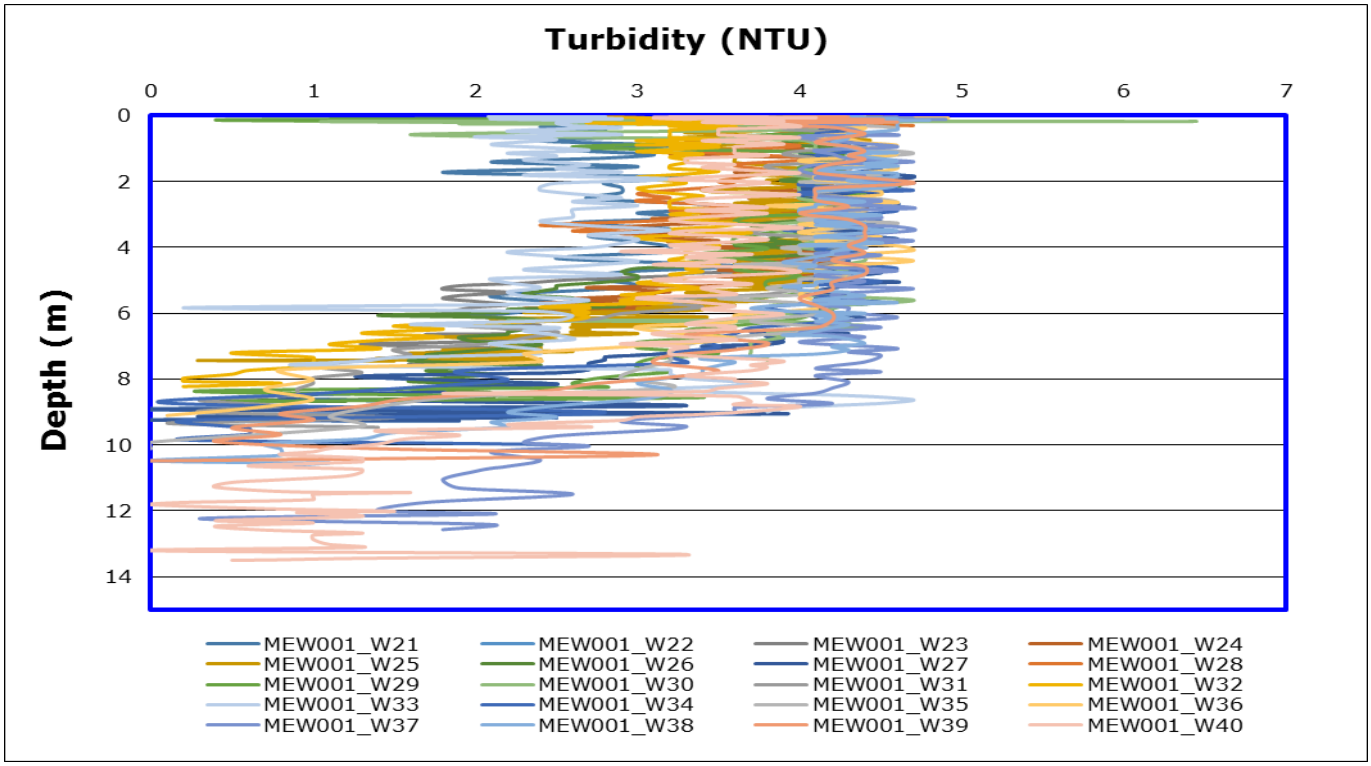


Figure 4.47 - CTD Turbidity comparison graph

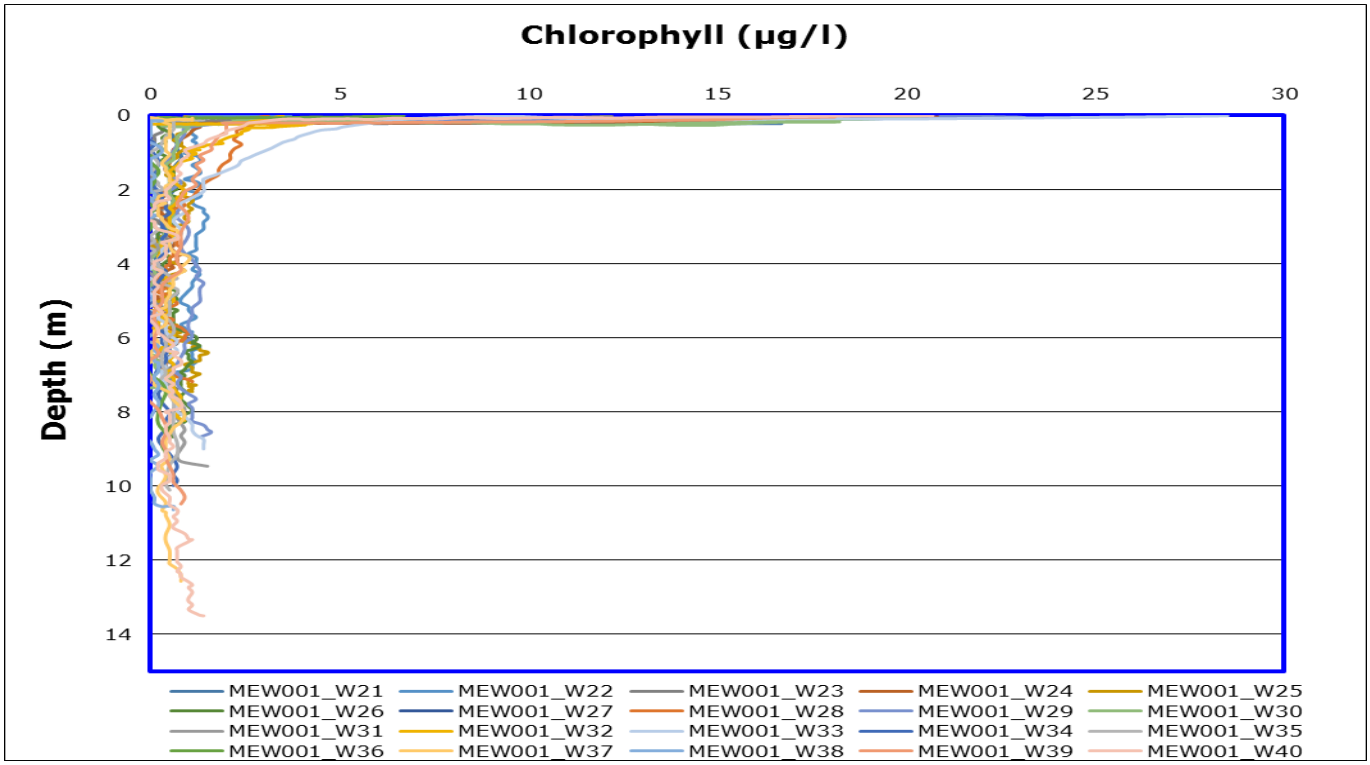


Figure 4.48 - CTD Chlorophyll comparison graph

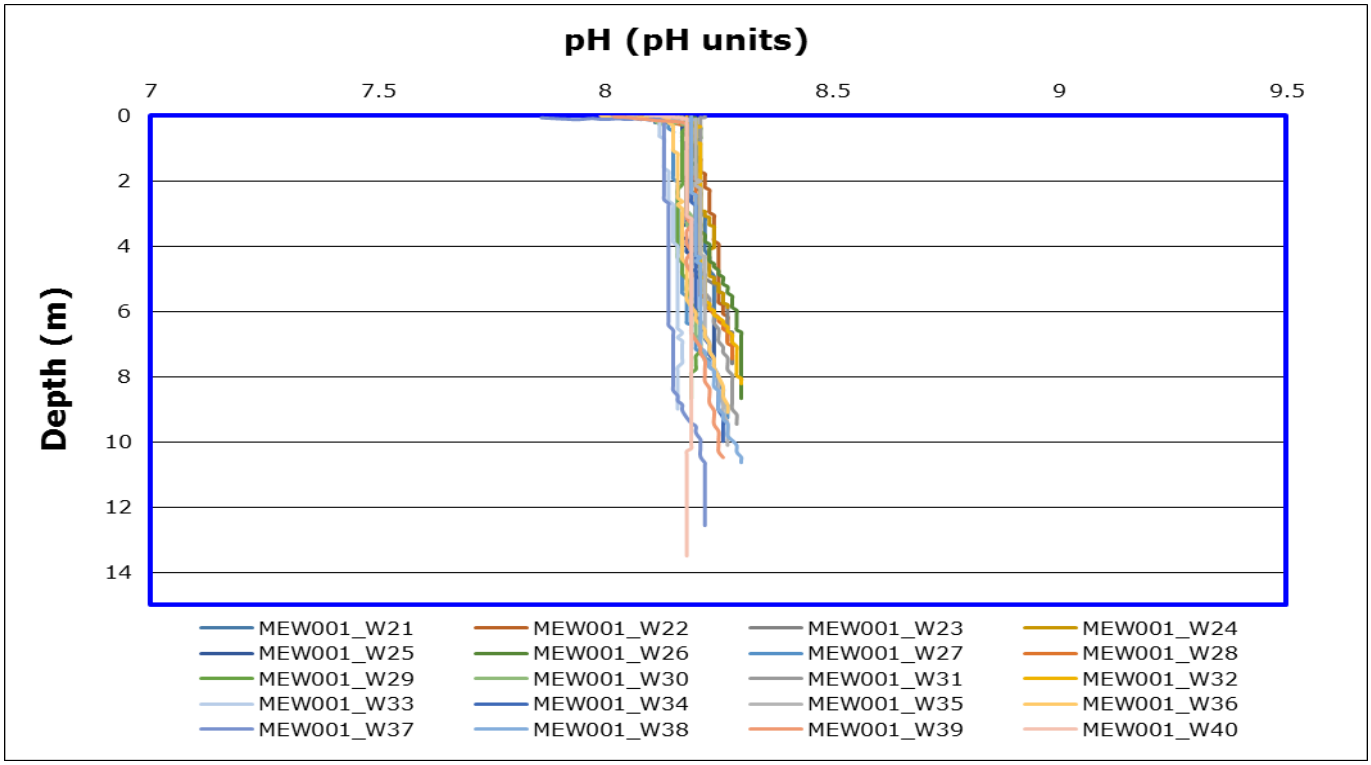


Figure 4.49 - CTD pH comparison graph

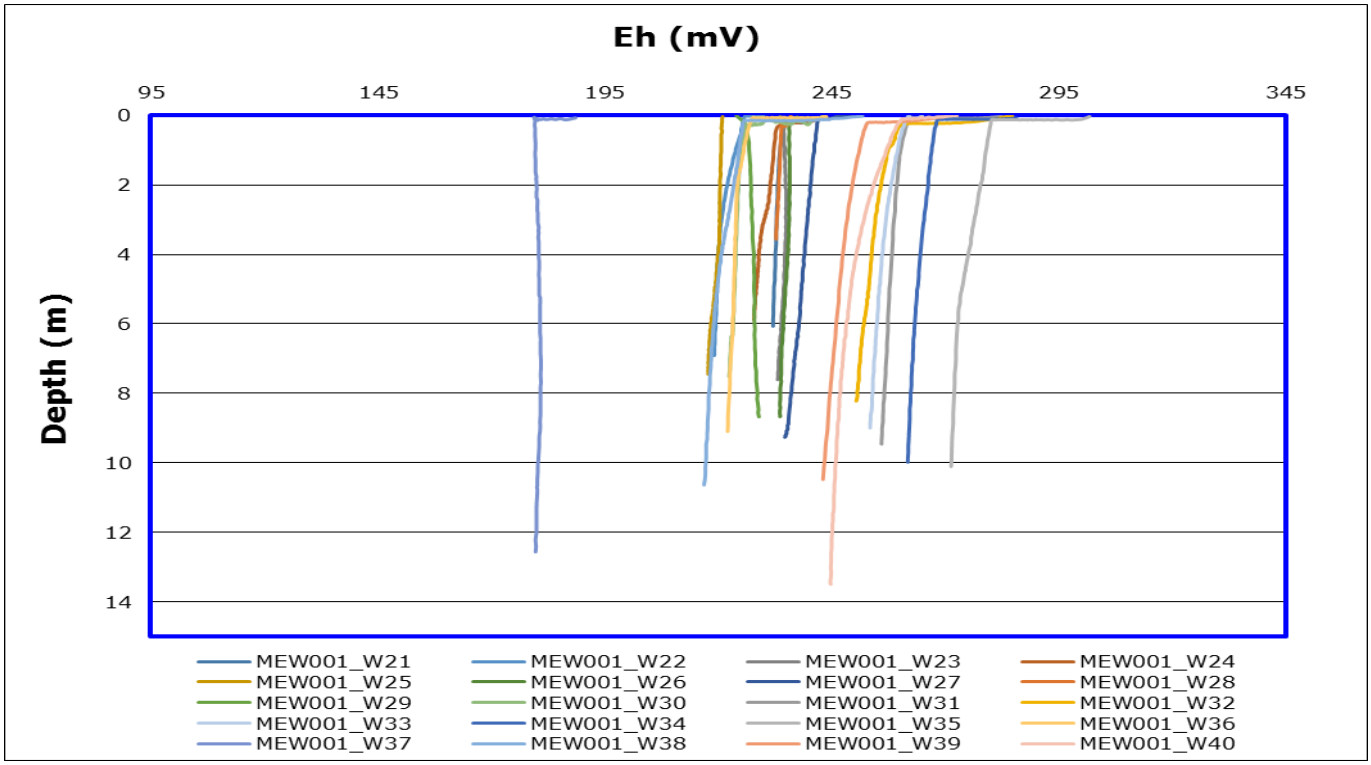


Figure 4.50 - CTD Oxygen Reduction comparison graph

4.6.0 Chemical characteristics of waters

A total of 45 locations were planned (Table 4.50). Sampling of 3 replicates, at 2 different depths, at 5 locations, was collected in Maltese waters; 10 sampling locations were performed in Italian waters and 20 sampling locations in Italian nearshore waters, for a total of 60 deployments.

Table 4.50 – Water samplings quantities

	ITALY OFFSHORE (BLOCK 6 AREA 4, BLOCK 5, BLOCK 4)	**MALTA (BLOCK 3, BLOCK 2, BLOCK 1)**	**ITALY NEARSHORE (Block 6, Area 2 and Area 3)**
NUMBER OF STATIONS	10	5	20
REPLICATES	/	3	/
TYPE OF ANALYSIS	3 (0.5m from the bottom, mid water, 0.5m from the surface) for water quality	2 (0.5m from the bottom, 0.5m from the surface) for nutrients and 1 phytoplankton	1 for water quality and 1 for phytoplankton *
	1 Phytoplankton	2 Phytoplankton	1 Phytoplankton
	/	1 Zooplankton	1 Zooplankton
	1 Chlorophyll	1 Chlorophyll	1 Chlorophyll
Notes: *10 stations - 0.5m from the bottom / 10 stations - 0.5m from the surface.			

Each water sample was stored and preserved in the containers, and labelled as shown in APPENDIX 6: WATER SAMPLING REGISTER TABLE.

3 samplings at different depths (0.5m under sea surface, half depth column and 0.5m from sea bottom) were taken on Italy side. On Malta side 2 samples at different depths (0.5m from the sea bottom and 0.5m under sea surface) were collected.

To be noted that the use of Plankton nets was envisaged in the Maltese section only, in line with section 2.2.2 of MT-IT JV recommendation.

Zooplankton and Phytoplankton samples were collected in Malta, as follow:

- Zooplankton – Vertical Net with 200 µ mesh size
- Phytoplankton – Vertical Net with 20 µ mesh size

Within the Italian section, only Phytoplankton was to undergo laboratory analyses, in line with Section 2.2.2 of MT-IT JV recommendation. Phytoplankton analyses in the Italian section were based on samples taken by means of Niskin Bottles.

Within the nearshore Gela section, 20 samples at two different depths (10 at 0.5 from the surface and 10 at 0.5 from the sea bottom) were collected, by mean of Niskin bottles for water quality and phytoplankton and by mean of plankton net for zooplankton samples.

On Italy side chlorophyll, phytoplankton and water quality analysis was carried out by the laboratory. On Malta and nearshore Gela areas chlorophyll, zooplankton, phytoplankton and nutrients analysis was carried out by the laboratory.

For laboratory water analyses and certificates see APPENDIX 9: WATER LABORATORY ANALYSES RESULTS CERTIFICATES and APPENDIX 10: WATER LABORATORY ANALYSES RESULTS TABLE.

4.6.1 Chlorophyll pigments

4.6.1.1 Malta – Italy results

Concentration of the chlorophyll "a" pigments range is almost between 0.02µg/l and 1µg/l, as expected in oligotrophic environment (Figure 4.51 and Table 4.51). In sampling locations W03, W06 and W011 concentrations for this analyte are below the Detectable Limits (<0.01µg/l).

Table 4.51 - Chlorophyll analyses results in Malta/Italy areas

LOCATIONS			**W01Cf**	**W02Cf**	**W03Cf**	**W04Cf**	**W05Cf**
Determinant	**Unit**	**LoD**	**19LA0014283**	**19LA0014292**	**19LA0014298**	**19LA0014304**	**19LA0014310**
Chlorophyll	µg/L	0.01µg/l	0.07	0.05	< 0.01	0.08	0.04
LOCATIONS			**W06Cf**	**W07Cf**	**W08Cf**	**W09Cf**	**W10Cf**
Determinant	**Unit**	**LoD**	**19LA0014316**	**19LA0014322**	**19LA0014328**	**19LA0014334**	**19LA0014340**
Chlorophyll	µg/L	0.01µg/l	< 0.01	0.02	0.02	0.02	0.06
LOCATIONS			**W11Cf**	**W12Cf**	**W13Cf**	**W14Cf**	**W15Cf**
Determinant	**Unit**	**LoD**	**19LA0014327**	**19LA0023761**	**19LA0023775**	**19LA0023789**	**19LA0023803**
Chlorophyll	µg/L	0.01µg/l 0.3µg/l	< 0.3	0.36	0.68	0.96	0.74

Notes:
The LoD of 0.3µg/l is referred to station W11 only (please refer to "*ambiente_19LA0014327_SeawatersampleMEW001b_A_W11_W11Cf_10.03.2019"* certificate).

4.6.1.2 Nearshore Gela results

Concentration of the chlorophyll "a" pigments range is almost between 0.02µg/l and 1.1µg/l, as expected in oligotrophic environment (Figure 4.52, Table 4.52). In sampling locations W29, W36, W39 and W40 concentrations for this analyte are below the Detectable Limits (<0.01µg/l).

Table 4.52 - Chlorophyll analyses results in Nearshore Gela area

LOCATIONS			**W21Cf**	**W22Cf**	**W23Cf**	**W24Cf**	**W25Cf**
Determinant	**Unit**	**LoD**	**19LA0046120**	**19LA0046149**	**19LA0046123**	**19LA0046152**	**19LA0046155**
Chlorophyll	µg/L	0.01µg/l	0.22	0.54	0.76	1.1	0.98
LOCATIONS			**W26Cf**	**W27Cf**	**W28Cf**	**W29Cf**	**W30Cf**
Determinant	**Unit**	**LoD**	**19LA0046126**	**19LA0046129**	**19LA0046132**	**19LA0046158**	**19LA0046135**
Chlorophyll	µg/L	0.01µg/l	0.14	0.34	1.1	< 0,01	0.12
LOCATIONS			**W31Cf**	**W32Cf**	**W33Cf**	**W34Cf**	**W35Cf**
Determinant	**Unit**	**LoD**	**19LA0045882**	**19LA0046140**	**19LA0046143**	**19LA0045883**	**19LA0045884**
Chlorophyll	µg/L	0.01µg/l	0.14	0.14	0.12	0.16	0.04
LOCATIONS			**W36Cf**	**W37Cf**	**W38Cf**	**W39Cf**	**W40Cf**
Determinant	**Unit**	**LoD**	**19LA0046146**	**19LA0045885**	**19LA0045886**	**19LA0045887**	**19LA0045888**
Chlorophyll	µg/L	0.01µg/l	< 0,01	0.02	0.08	< 0,01	< 0,01

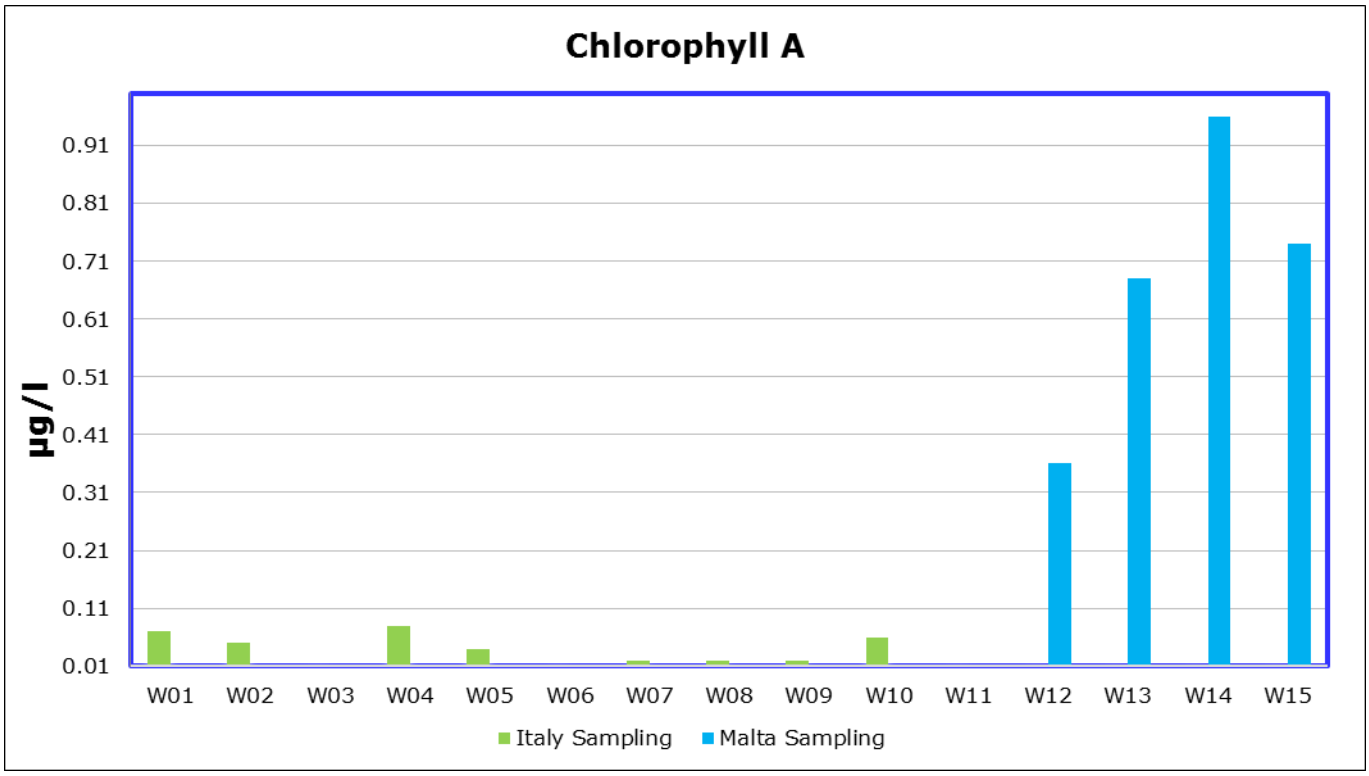


Figure 4.51 – Chlorophyll A pigments in Maltese and Italian water samples

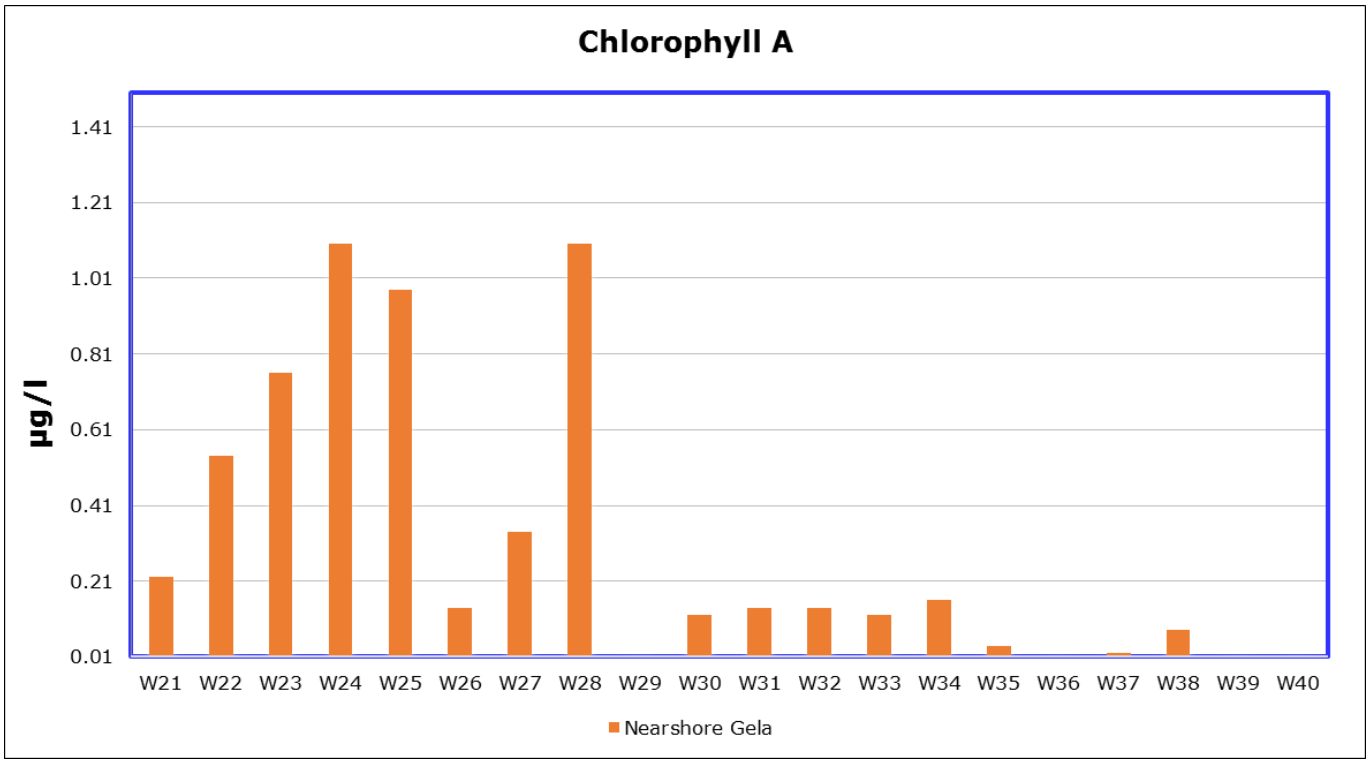


Figure 4.52 - Chlorophyll A pigments in nearshore Gela water stations

4.6.2 Nutrients

4.6.2.1 Malta – Italy analysis

In the collected samples, the Nutrients (Ammonium, Orthophosphate, Phosphorus, Nitrite, and Nitrate) concentrations are almost always lower than the Detectable Limits, except for W04 location where Nitrate concentration reaches 17000µg/l (Table 4.53, Table 4.54,Table 4.55 and Figure 4.53). In the following tables only one depth is reported for Italian and Maltese stations: for the complete results check APPENDIX 8: SEDIMENT LABORATORY ANALYSES RESULTS TABLE.

Table 4.53 - Nutrients in Italian water locations

Determinant	**U.M.**	**LoD**	**W01**	**W02**	**W03**	**W04**	**W05**	**W06**	**W07**	**W08**	**W09**	**W10**
Test Certificate			**19LA 0014278**	**19LA 0014287**	**19LA 0014293**	**19LA 0014299**	**19LA 0014305**	**19LA 0014311**	**19LA 0014317**	**19LA 0014323**	**19LA 0014329**	**19LA 0014335**
Silica (SiO2)	mg/l	0.2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2
Nitrate	µg/l	5000	< 5000	< 5000	< 5000	17000	< 5000	< 5000	< 5000	< 5000	< 5000	< 5000
Nitrite	µg/l	500	< 500	< 500	< 500	< 500	< 500	< 500	< 500	< 500	< 500	< 500
Phosphorus	µg/l	5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
orthophosphate	µg/l	1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Ammonium	mg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

Table 4.54 - Nutrients Maltese water locations (W11-W13)

Determinant	U.M.	LoD	A1_W11	B1_W11	C1_W11	A1_W12	B1_W12	C1_W12	A1_W13	B1_W13	C1_W13
Test Certificate			**19LA 0014282**	**19LA 0014297**	**19LA 0014309**	**19LA 0023762**	**19LA 0023764**	**19LA 0023766**	**19LA 0023776**	**19LA 0023778**	**19LA 0023780**
Silica (SiO2)	mg/l	0.2	< 1,1	< 1,1	< 1,1	< 1,1	< 1,1	< 1,1	< 1,1	< 1,1	< 1,1
Nitrate	µg/l	5000	< 5000	< 5000	< 5000	< 5000	< 5000	< 5000	< 5000	< 5000	< 5000
Nitrite	µg/l	500	-	-	-	-	-	-	-	-	-
Phosphorus	µg/l	5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
orthophosphate	µg/l	1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Ammonium	mg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

Notes:
- A: sub-sample label for first replicate
- B: sub-sample label for second replicate
- C: sub-sample label for third replicate

Table 4.55 - Nutrients Maltese water locations (W14-W15)

Determinant	U.M.	LoD	A1_W14	B1_W14	C1_W14	A1_W15	B1_W15	C1_W15
Test Certificate			**19LA 0023790**	**19LA 0023792**	**19LA 0023794**	**19LA 0023804**	**19LA 0023806**	**19LA 0023808**
Silica (SiO2)	mg/l	0.2	< 1,1	< 1,1	< 1,1	< 1,1	< 1,1	< 1,1
Nitrate	µg/l	5000	< 5000	< 5000	< 5000	< 5000	< 5000	< 5000
Nitrite	µg/l	500	-	-	-	-	-	-
Phosphorus	µg/l	5	< 5	< 5	< 5	< 5	< 5	< 5
orthophosphate	µg/l	1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Ammonium	mg/l	10	< 10	< 10	< 10	< 10	< 10	< 10

Notes:
- A: sub-sample label for first replicate
- B: sub-sample label for second replicate
- C: sub-sample label for third replicate

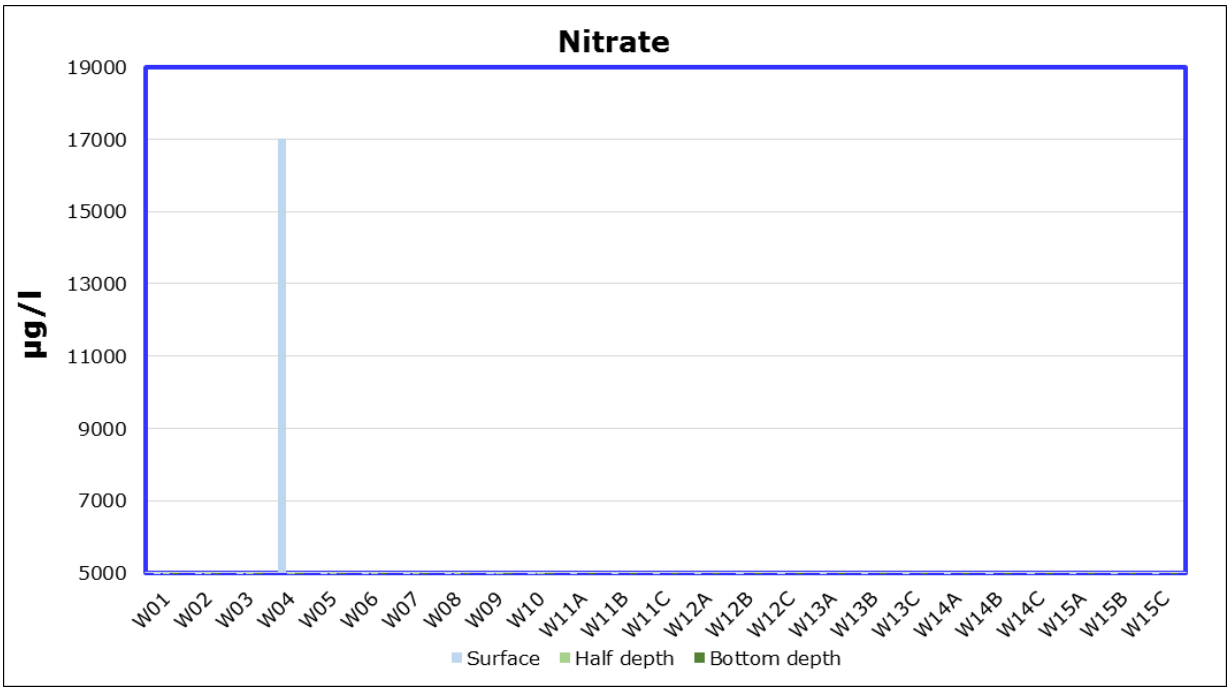


Figure 4.53 –Graph of Nutrients in Italian and Maltese water locations

4.6.2.2 Nearshore Gela analysis

In the collected samples (Table 4.56 and Figure 4.54), the Nutrients (Silica, Orthophosphate, Phosphorus, Nitrite) concentrations are lower than the Detectable Limits. **Ammonium** shows values ranging between 11 and 17µg/l, with the highest value in W33 (20µg/l). Only in water location W26 the analyte is below the LoD. **Nitrate** concentration values were detected in 13 location with a range between 310000 and 320000µg/l. **Total phosphorus** was detected in 8 water stations with the highest value in W25 (13µg/l) and the lowest in W30 (7.3µg/l).

Table 4.56 - Nutrients nearshore Gela water locations

Determinant	**U.M.**	**LoD**	**W21**	**W22**	**W23**	**W24**	**W25**	**W26**	**W27**	**W28**	**W29**	**W30**
Test Certificate			**19LA 0046121**	**19LA 0046150**	**19LA 0046124**	**19LA 0046153**	**19LA 0046156**	**19LA 0046127**	**19LA 0046130**	**19LA 0046133**	**19LA 0046159**	**19LA 0046136**
Silica (SiO2)	mg/l	2.1	< 2,1	< 2,1	< 2,1	< 2,1	< 2,1	< 2,1	< 2,1	< 2,1	< 2,1	< 2,1
Nitrate	µg/l	5000	310000	320000	320000	320000	320000	320000	320000	320000	320000	320000
Nitrite		500	< 500	< 500	< 500	< 500	< 500	< 500	< 500	< 500	< 500	< 500
Total Phosphorus (P)		5	< 5	11	< 5	11	13	< 5	< 5	< 5	12	7.3
Phosphate	mg/l	1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Orthophosphate	mg/l	1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Ammonium	µg/l	10	14	15	17	14	12	< 10	15	15	15	14
Determinant	**U.M.**	**LoD**	**W31**	**W32**	**W33**	**W34**	**W35**	**W36**	**W37**	**W38**	**W39**	**W40**
Test Certificate			**19LA 0046044**	**19LA 0046141**	**19LA 0046144**	**19LA 0046046**	**19LA 0046048**	**19LA 0046147**	**19LA 0046050**	**19LA 0046052**	**19LA 0046054**	**19LA 0046056**
Silica (SiO2)	mg/l	2.1	< 2,1	< 2,1	< 2,1	< 2,1	< 2,1	< 2,1	< 2,1	< 2,1	< 2,1	< 2,1
Nitrate	µg/l	5000	< 5000	320000	320000	< 5000	< 5000	320000	< 5000	< 5000	< 5000	< 5000
Nitrite		500	< 500	< 500	< 500	< 500	< 500	< 500	< 500	< 500	< 500	< 500
Total Phosphorus (P)		5	< 5	9.8	10	< 5	< 5	11	< 5	< 5	< 5	< 5
Phosphate	mg/l	1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Orthophosphate	mg/l	1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Ammonium	µg/l	10	17	15	20	15	12	14	11	12	13	15

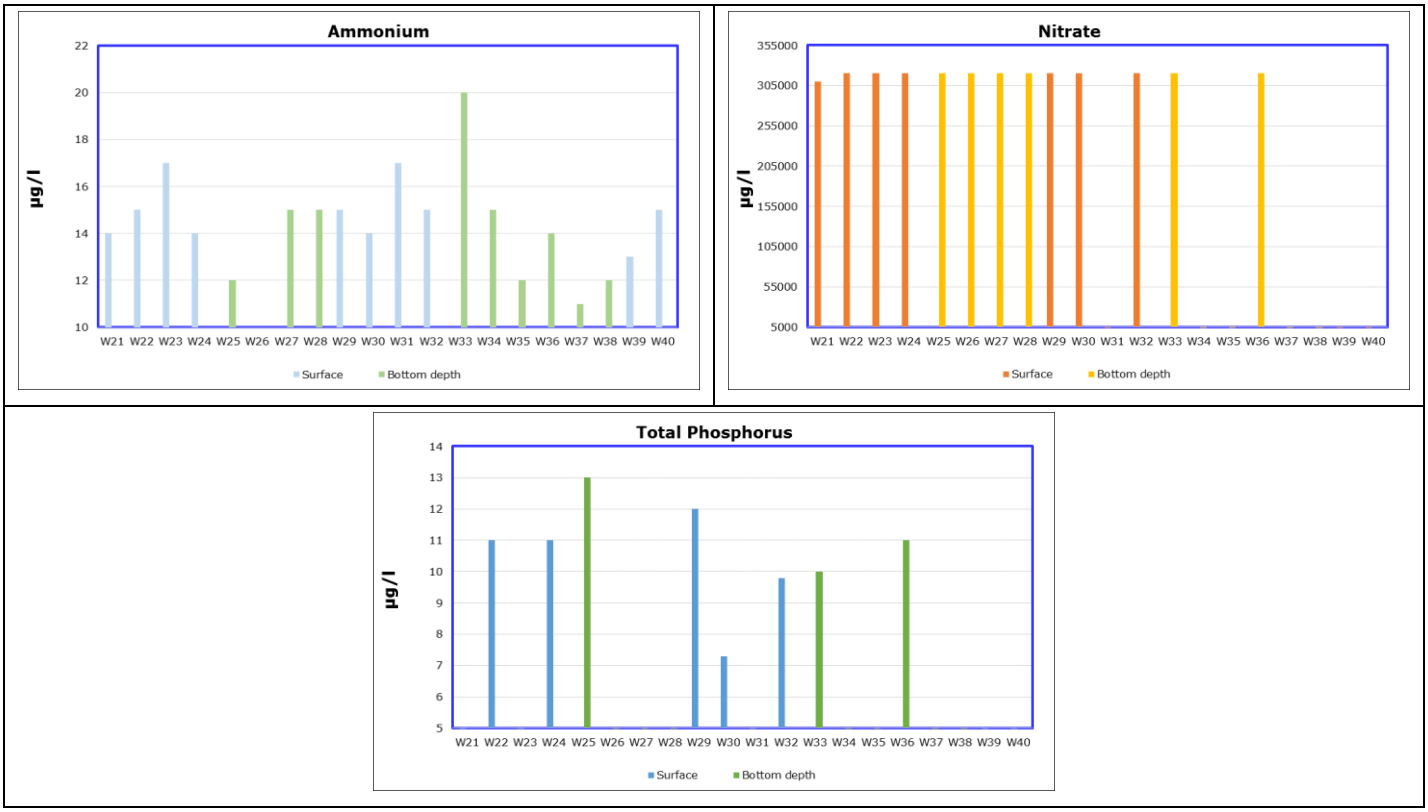


Figure 4.54 – Graphs of Nutrients nearshore Gela water locations

4.6.3 Metals

4.6.3.1 Italy analysis

Concentrations of the metals in water samples are almost all below the detectable limit. Only for **Arsenic, Iron, Beryllium** and **Selenium** (highlighted in blue in the tables below) results are recorded. As it is possible to notice in Figure 4.52, Table 4.57 and Table 4.58, **Cadmium** and **Antimony** were recorded only at one depth of stations W10, W07. **Copper** and **Nickel** values show a similar trend. **Mercury** and **Manganese** were recorded only at one depth of two stations W04, W10 and W01, W04 each one. **Zinc** has a range between 16 and 45µg/l and was recorded at all sample depths of station W01, with the highest value of 45 µg/l. Chromium shows a range between 4.1 and 5.2µg/l and was recorded at all sample depths of station W03, with the highest value of 5.2µg/l.

Table 4.57 – Metals in Italian water locations (W01-W04)

Determinant	U.M.	LoD	W01			W02			W03			W04		
			A	A2	A3	A	A2	A3	A	A2	A3	A	A2	A3
Test Certificate			**19LA 0014278**	**19LA 0014279**	**19LA 0014280**	**19LA 0014287**	**19LA 0014288**	**19LA 0014289**	**19LA 0014293**	**19LA 0014294**	**19LA 0014295**	**19LA 0014299**	**19LA 0014300**	**19LA 0014301**
Aluminum	µg/l	16	29	38	33	33	< 16	33	< 16	20	< 16	< 16	< 16	< 16
Antimony		0.4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4
Silver		0.8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8
Arsenic		0.8	1.6	2.2	2.3	2.5	2.4	2.4	2.5	2.5	2.6	2.4	2.6	2.4
Beryllium		0.32	< 0,32	< 0,32	0.89	0.73	0.61	0.49	0.69	0.53	0.49	0.53	0.89	0.32
Cadmium		0.4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4
Cobalt		4.0	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Chromium		4	< 4	< 4	4.3	5.2	4.2	< 4	4.2	4.8	4.4	4.2	4.1	< 4
Chromium (VI)		2.5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5
Iron		16	44	70	55	65	57	63	58	67	64	56	61	56
Mercury		0.1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	0.15	< 0,1	< 0,1
Nickel		1.6	1.9	2.2	2.5	2.4	< 1,6	< 1,6	< 1,6	< 1,6	< 1,6	3	< 1,6	< 1,6
Lead		0.8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8
Copper		4	9.7	4.7	5.6	5.2	< 4	< 4	< 4	< 4	< 4	4.5	4.2	< 4
Selenium		0.8	< 0,8	< 0,8	< 0,8	0.81	0.97	1.2	1.3	1.3	1.2	1.6	1.4	1.3
Manganese		4	< 4	4.2	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	12	< 4
Thallium		0.16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16
Zinc		16	45	38	44	44	< 16	< 16	< 16	< 16	< 16	< 16	< 16	< 16

- A: sub-sample label for Metals, Aliphatic compounds in surficial sampling level;
- A2: sub-sample label for Metals in mid-depth sampling level;
- A3: sub-sample label for Metals in deep sampling level.

Table 4.58 - Metals in Italian water locations (W05-W07)

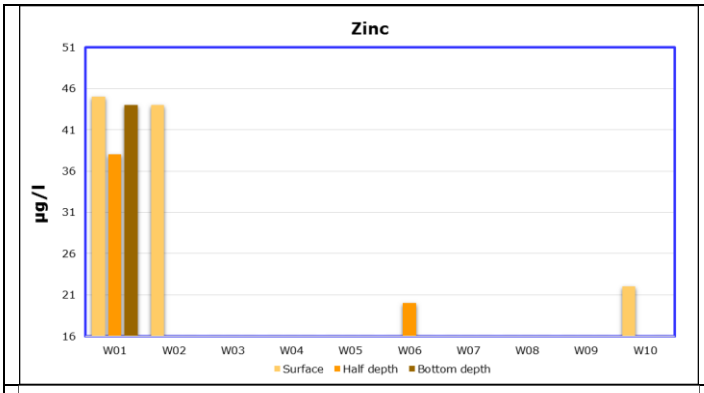
Determinant	U.M.	LoD	W05			W06			W07		
			A	A2	A3	A	A2	A3	A	A2	A3
Test Certificate			**19LA 0014305**	**19LA 0014306**	**19LA 0014307**	**19LA 0014311**	**19LA 0014312**	**19LA 0014313**	**19LA 0014317**	**19LA 0014318**	**19LA 0014319**
Aluminum	µg/l	16	20	< 16	23	< 16	< 16	< 16	< 16	< 16	< 16
Antimony		0.4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	0.45	< 0,4
Silver		0.8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8
Arsenic		0.8	2.7	2.4	2.5	2.7	2.4	2.6	2.3	2.3	2.4
Beryllium		0.32	0.81	0.69	0.53	0.93	0.69	0.85	0.53	0.57	0.93
Cadmium		0.4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4
Cobalt		4.0	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Chromium		4	4.1	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Chromium (VI)		2.5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5
Iron		16	69	62	67	68	61	65	51	48	60
Mercury		0.1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1
Nickel		1.6	< 1,6	< 1,6	< 1,6	< 1,6	< 1,6	< 1,6	< 1,6	< 1,6	< 1,6
Lead		0.8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8
Copper		4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Selenium		0.8	1.2	1.5	1.5	1.4	1.2	1.4	1.1	1.2	1.3
Manganese		4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Thallium		0.16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16
Zinc		16	< 16	< 16	< 16	< 16	20	< 16	< 16	< 16	< 16

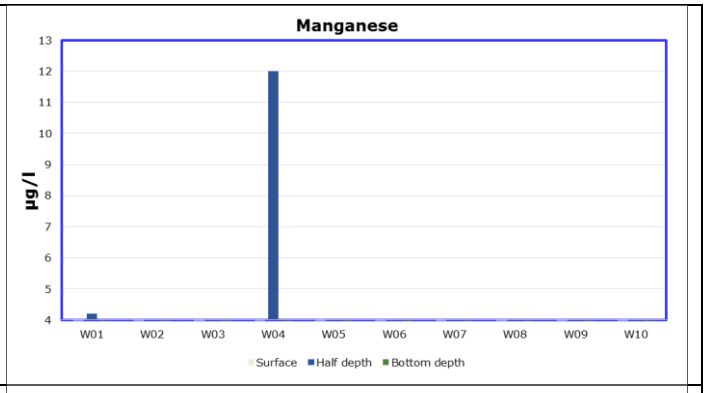
- A: sub-sample label for Metals, Aliphatic compounds in surficial sampling level;
- A2: sub-sample label for Metals in mid-depth sampling level;
- A3: sub-sample label for Metals in deep sampling level.

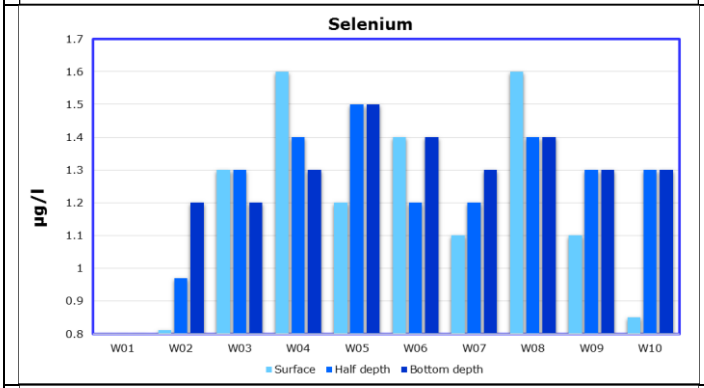
Table 4.59 - Metals in Italian water locations (W08-W10)

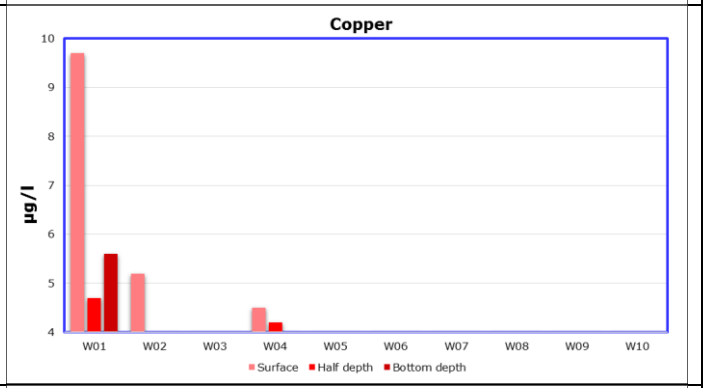
Determinant	U.M.	LoD	W08			W09			W10		
			A	A2	A3	A	A2	A3	A	A2	A3
Test Certificate			**19LA0014323**	**19LA0014324**	**19LA0014325**	**19LA0014329**	**19LA0014330**	**19LA0014331**	**19LA0014335**	**19LA0014336**	**19LA0014337**
Aluminum	µg/l	16	< 16	< 16	< 16	< 16	< 16	< 16	19	< 16	< 16
Antimony		0.4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4
Silver		0.8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8
Arsenic		0.8	2.4	2.5	2.3	2.6	2.3	2.5	2.3	2.3	2.4
Beryllium		0.32	0.61	0.77	0.93	0.73	0.49	0.49	0.73	0.89	0.77
Cadmium		0.4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	0.8	< 0,4	< 0,4
Cobalt		4.0	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Chromium		4	< 4	< 4	< 4	4.3	< 4	4.3	< 4	< 4	4
Chromium (VI)		2.5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5
Iron		16	55	55	50	62	49	56	58	52	52
Mercury		0.1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	0.12	< 0,1	< 0,1
Nickel		1.6	< 1,6	< 1,6	< 1,6	< 1,6	< 1,6	< 1,6	< 1,6	< 1,6	< 1,6
Lead		0.8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8	< 0,8
Copper		4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Selenium		0.8	1.6	1.4	1.4	1.1	1.3	1.3	0.85	1.3	1.3
Manganese		4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Thallium		0.16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16	< 0,16
Zinc		16	< 16	< 16	< 16	< 16	< 16	< 16	22	16	< 16

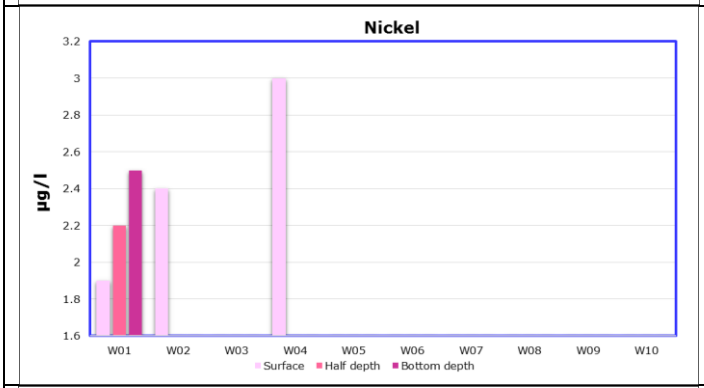
- A: sub-sample label for Metals, Aliphatic compounds in surficial sampling level;
- A2: sub-sample label for Metals in mid-depth sampling level;
- A3: sub-sample label for Metals in deep sampling level.

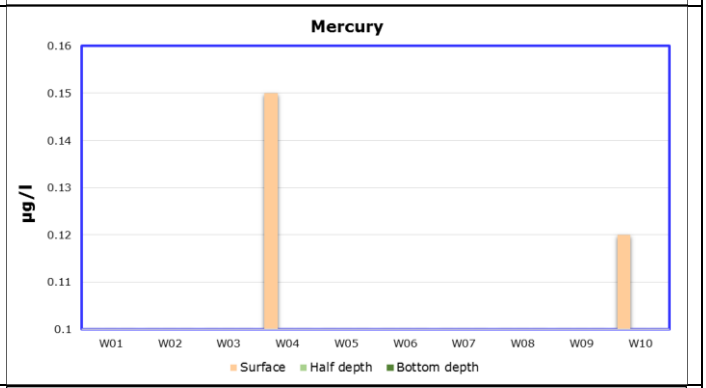

Zinc
µg/l
W01 W02 W03 W04 W05 W06 W07 W08 W09 W10
Surface Half depth Bottom depth

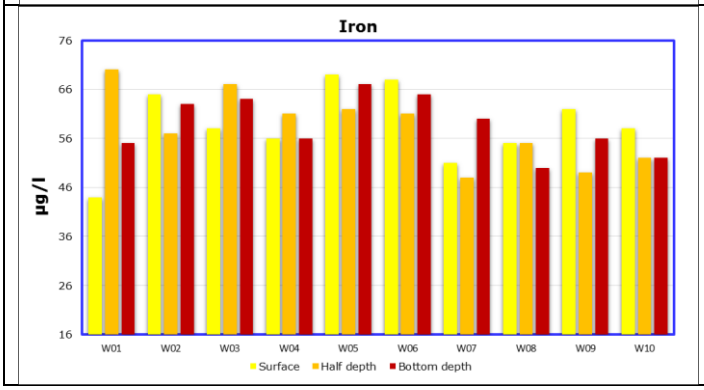

Manganese
µg/l
W01 W02 W03 W04 W05 W06 W07 W08 W09 W10
Surface Half depth Bottom depth

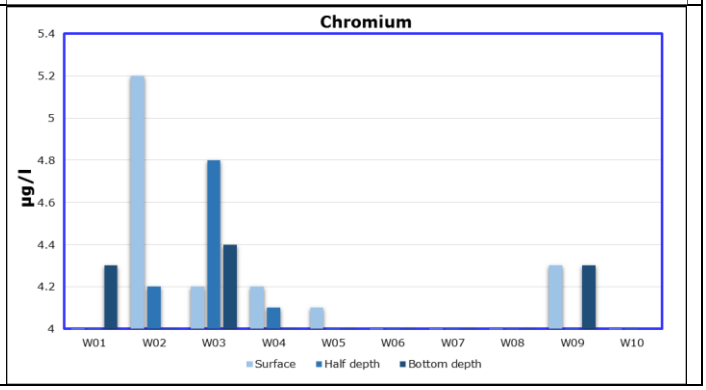

Selenium
µg/l
W01 W02 W03 W04 W05 W06 W07 W08 W09 W10
Surface Half depth Bottom depth


Copper
µg/l
W01 W02 W03 W04 W05 W06 W07 W08 W09 W10
Surface Half depth Bottom depth


Nickel
µg/l
W01 W02 W03 W04 W05 W06 W07 W08 W09 W10
Surface Half depth Bottom depth


Mercury
µg/l
W01 W02 W03 W04 W05 W06 W07 W08 W09 W10
Surface Half depth Bottom depth


Iron
µg/l
W01 W02 W03 W04 W05 W06 W07 W08 W09 W10
Surface Half depth Bottom depth


Chromium
µg/l
W01 W02 W03 W04 W05 W06 W07 W08 W09 W10
Surface Half depth Bottom depth

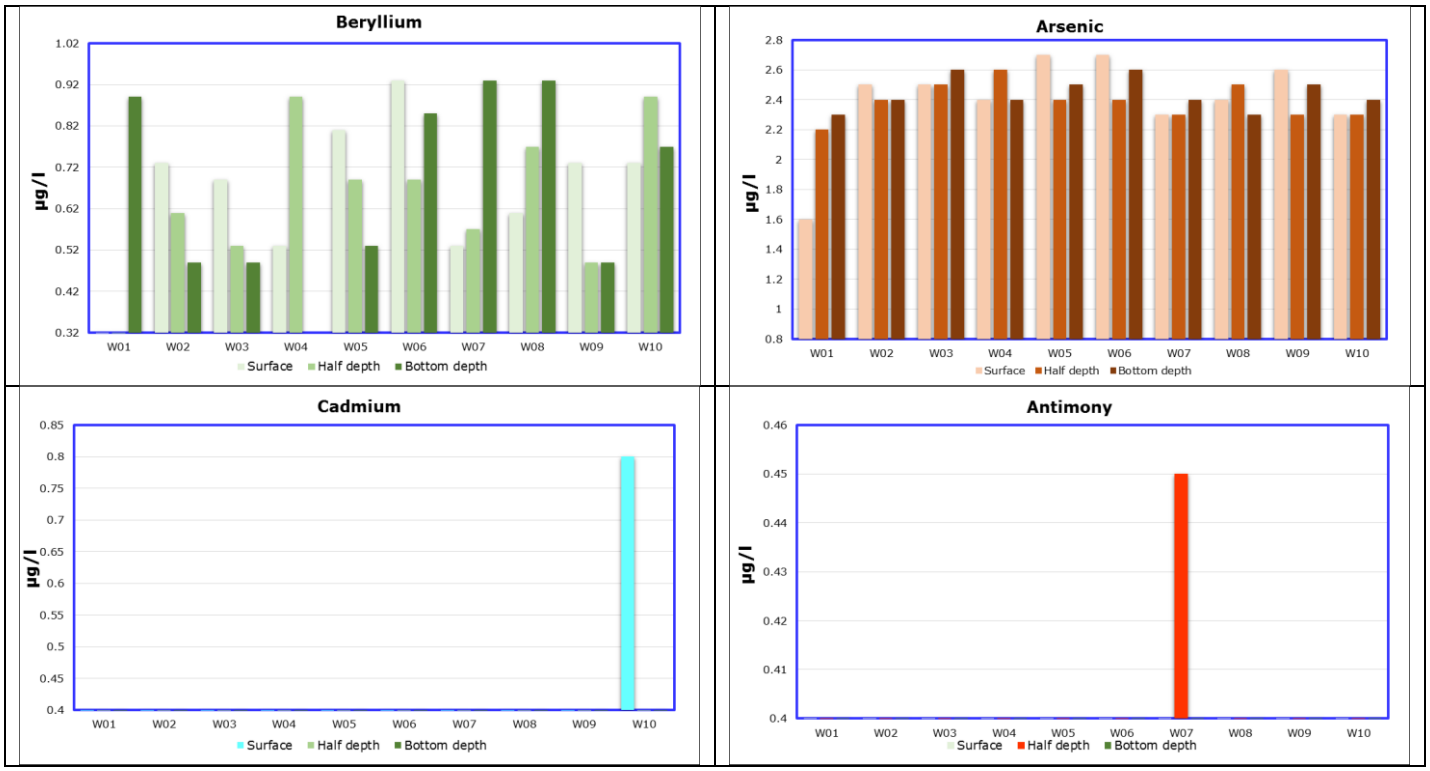


Figure 4.55 – Graphs of the metals concentration in Italy water samples

4.6.3.2 Nearshore Gela analysis

Concentrations of the metals in water samples are almost all below the detectable limit. Only for **Arsenic**, **Iron** and **Antimony** (highlighted in blue in the tables below) results are recorded at all water locations. In particular, **Iron** concentration ranging between 14 and 19µg/l; **Arsenic** has a range between 1.2 and 1.6µg/l; **Antimony** values range between 0.13 and 0.3µg/l;

As it is possible to notice in Figure 4.56 and Table 4.60 **Manganese** was recorded at one water location (W25). **Zinc** was detected in three stations only (W21, W33, W40), with the highest value in S40 (49µg/l); **Lead** was detected in four stations, with the highest value in W21 (1.1µg/l); **Aluminum** was detected in six stations with the highest value of 7.4µg/l in W34 and the lowest one in W28 (4µg/l); **Beryllium** was recorded in almost all locations except for W34, W35 and W39 ranging between 0.19 and 0.75µg/l; **Selenium** is always above the LoD except for W22, W23 and W38, showing values between 0.22 and 1µg/l; Vanadium is always above the LoD except for W25 and W33, with a concentration ranging between 1 and 1.5µg/l.

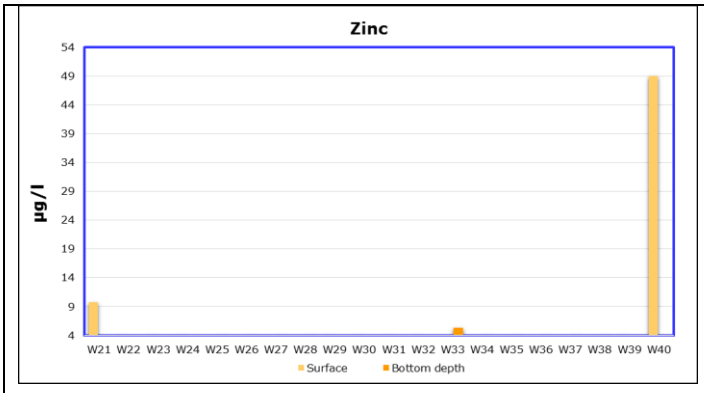
Table 4.60 - Metals in nearshore Gela water locations (W21-W30)

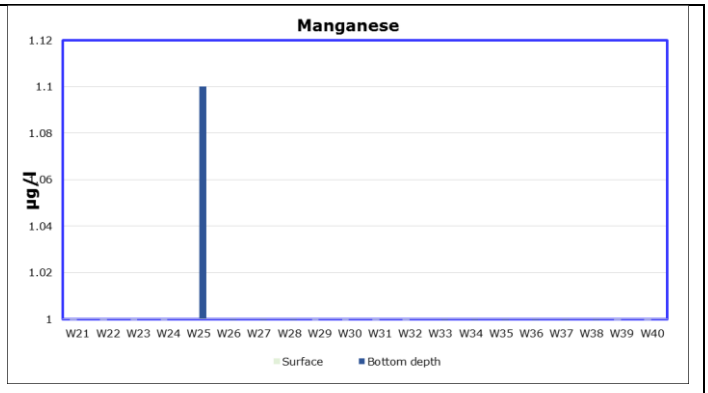
Determinant	U.M.	LoD	W21	W22	W23	W24	W25	W26	W27	W28	W29	W30
Test Certificate			19LA 0046121	19LA 0046150	19LA 0046124	19LA 0046153	19LA 0046156	19LA 0046127	19LA 0046130	19LA 0046133	19LA 0046159	19LA 0046136
Aluminum	µg/l	4	< 4,0	< 4,0	< 4,0	< 4,0	5.2	5.1	< 4,0	4	< 4,0	< 4,0
Antimony		0.1	0.19	0.18	0.17	0.14	0.18	0.17	0.17	0.17	0.16	0.13
Silver		0.2	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20
Arsenic		0.2	1.5	1.5	1.3	1.5	1.2	1.2	1.6	1.3	1.4	1.4
Beryllium		0.08	0.22	0.51	0.48	0.67	0.46	0.46	0.36	0.63	0.49	0.63
Tin		10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cadmium		0.1	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10
Cobalt		1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Chromium		1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Chromium (VI)		2.5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5
Iron		4	18	19	16	17	18	17	18	17	16	16
Mercury		0.02	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020
Nickel		0.4	< 0,40	< 0,40	< 0,40	< 0,40	< 0,40	< 0,40	< 0,40	< 0,40	< 0,40	< 0,40
Lead		0.2	1.1	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20
Copper		1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Selenium		0.2	0.42	< 0,20	< 0,20	0.72	0.26	0.61	0.58	0.27	0.91	0.65
Manganese		1	< 1,0	< 1,0	< 1,0	< 1,0	1.1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Thallium		0.04	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040
Vanadium		1	1.1	1.1	1.1	1.1	< 1,0	1	1.2	1	1.1	1.1
Zinc		4	9.7	< 4,0	< 4,0	< 4,0	< 4,0	< 4,0	< 4,0	< 4,0	< 4,0	< 4,0

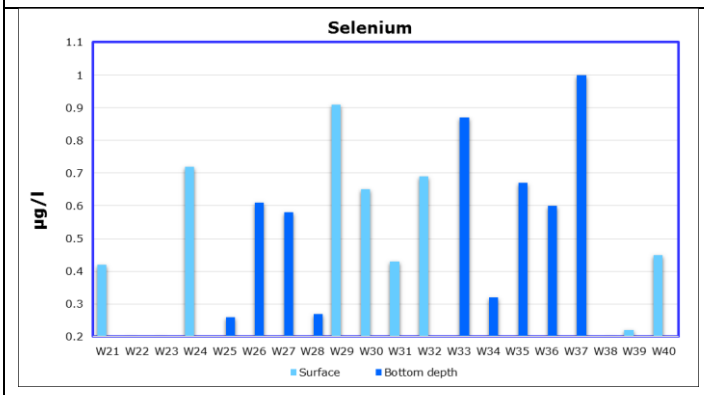
Table 4.61 - Metals in nearshore Gela water locations (W31-W40)

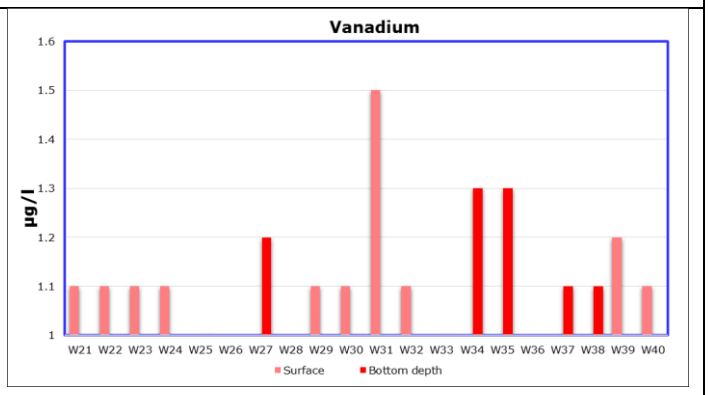
Determinant	U.M.	LoD	W31	W32	W33	W34	W35	W36	W37	W38	W39	W40
Test Certificate			19LA 0046044	19LA 0046141	19LA 0046144	19LA 0046046	19LA 0046048	19LA 0046147	19LA 0046050	19LA 0046052	19LA 0046054	19LA 0046056
Aluminum	µg/l	4	< 4,0	< 4,0	< 4,0	7.4	< 4,0	6.4	4.6	< 4,0	< 4,0	< 4,0
Antimony		0.1	0.18	0.15	0.16	0.17	0.15	0.14	0.2	0.18	0.16	0.3
Silver		0.2	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20	< 0,20
Arsenic		0.2	1.4	1.4	1.3	1.4	1.3	1.2	1.3	1.4	1.3	1.5

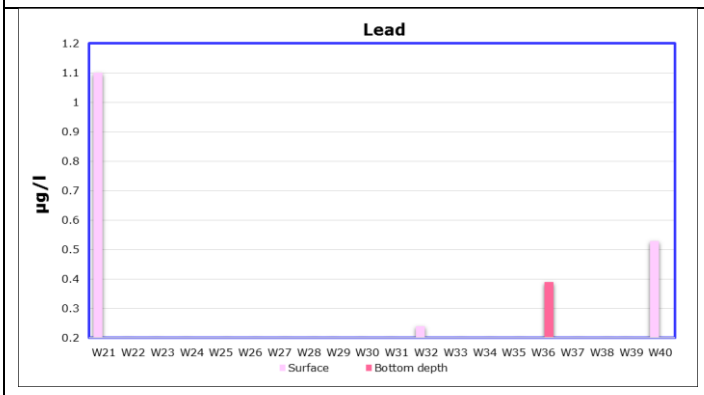
Determinant	U.M.	LoD	W31	W32	W33	W34	W35	W36	W37	W38	W39	W40
Beryllium		0.08	0.59	0.21	0.2	< 0,080	< 0,080	0.5	0.48	0.19	< 0,080	0.75
Tin		10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cadmium		0.1	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10
Cobalt		1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Chromium		1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Chromium (VI)		2.5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5
Iron		4	17	18	17	17	17	18	14	14	17	15
Mercury		0.02	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020
Nickel		0.4	< 0,40	< 0,40	< 0,40	< 0,40	< 0,40	< 0,40	< 0,40	< 0,40	< 0,40	< 0,40
Lead		0.2	< 0,20	0.24	< 0,20	< 0,20	< 0,20	0.39	< 0,20	< 0,20	< 0,20	0.53
Copper		1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Selenium		0.2	0.43	0.69	0.87	0.32	0.67	0.6	1	< 0,20	0.22	0.45
Manganese		1	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0	< 1,0
Thallium		0.04	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040
Vanadium		1	1.5	1.1	< 1,0	1.3	1.3	1	1.1	1.1	1.2	1.1
Zinc		4	< 4,0	< 4,0	5.3	< 4,0	< 4,0	< 4,0	< 4,0	< 4,0	< 4,0	49

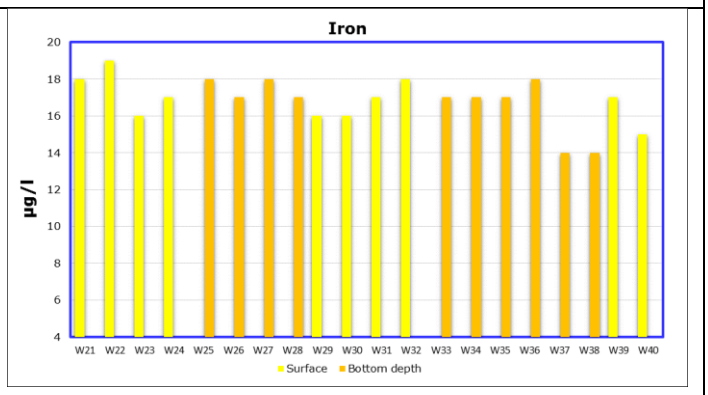

Zinc
µg/l
54
49
44
39
34
29
24
19
14
9
4
W21 W22 W23 W24 W25 W26 W27 W28 W29 W30 W31 W32 W33 W34 W35 W36 W37 W38 W39 W40
Surface
Bottom depth

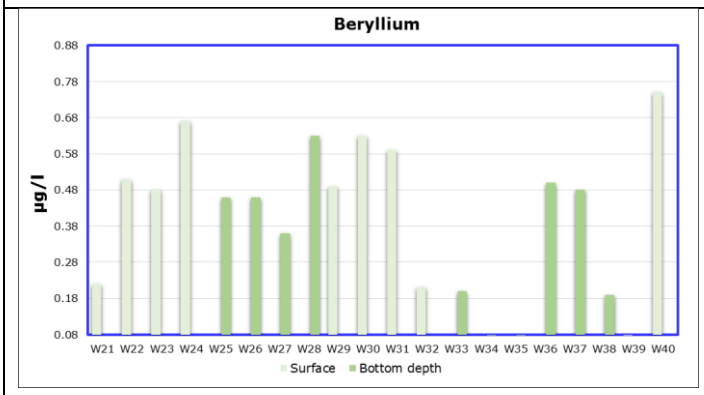

Manganese
µg/l
1.12
1.1
1.08
1.06
1.04
1.02
1
W21 W22 W23 W24 W25 W26 W27 W28 W29 W30 W31 W32 W33 W34 W35 W36 W37 W38 W39 W40
Surface
Bottom depth

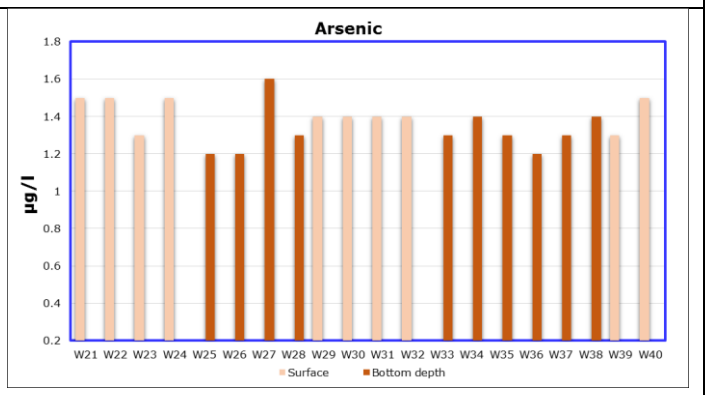

Selenium
µg/l
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
W21 W22 W23 W24 W25 W26 W27 W28 W29 W30 W31 W32 W33 W34 W35 W36 W37 W38 W39 W40
Surface
Bottom depth


Vanadium
µg/l
1.6
1.5
1.4
1.3
1.2
1.1
1
W21 W22 W23 W24 W25 W26 W27 W28 W29 W30 W31 W32 W33 W34 W35 W36 W37 W38 W39 W40
Surface
Bottom depth


Lead
µg/l
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
W21 W22 W23 W24 W25 W26 W27 W28 W29 W30 W31 W32 W33 W34 W35 W36 W37 W38 W39 W40
Surface
Bottom depth


Iron
µg/l
20
18
16
14
12
10
8
6
4
W21 W22 W23 W24 W25 W26 W27 W28 W29 W30 W31 W32 W33 W34 W35 W36 W37 W38 W39 W40
Surface
Bottom depth


Beryllium
µg/l
0.88
0.78
0.68
0.58
0.48
0.38
0.28
0.18
0.08
W21 W22 W23 W24 W25 W26 W27 W28 W29 W30 W31 W32 W33 W34 W35 W36 W37 W38 W39 W40
Surface
Bottom depth


Arsenic
µg/l
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
W21 W22 W23 W24 W25 W26 W27 W28 W29 W30 W31 W32 W33 W34 W35 W36 W37 W38 W39 W40
Surface
Bottom depth

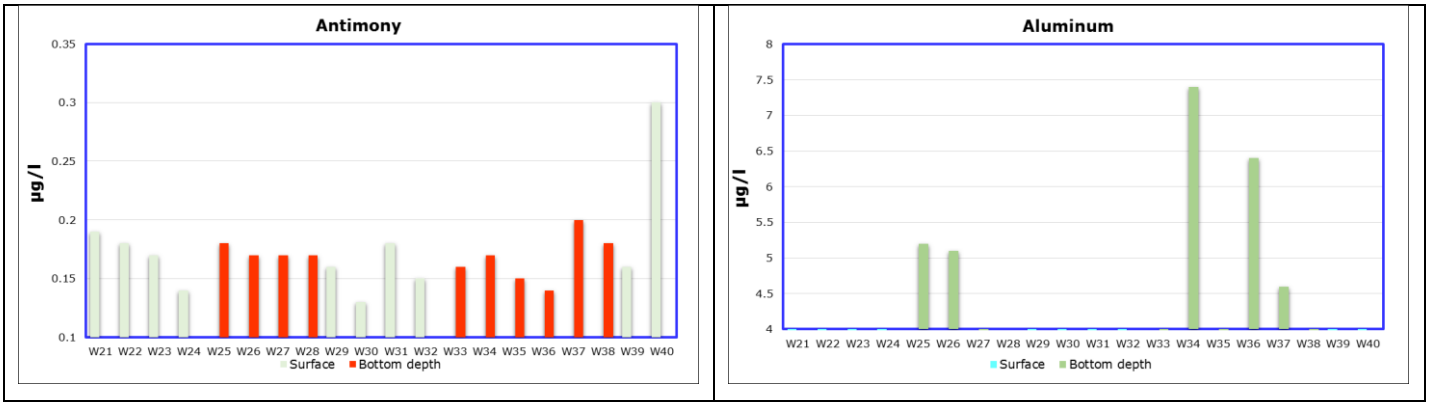


Figure 4.56 – Graphs of metals in nearshore Gela water locations

4.6.4 Total Hydrocarbons

4.6.4.1 Italy analysis

Hydrocarbons C≤ 10 have values all below the Detected limit.
In locations W02-W05 Total Hydrocarbons values are below LoD (< 31µg/l). In the other stations analytes were recorded in surface sample of W01 with a value of 41µg/l and in all sampling depths of W06, W07, W09 and W10. In station W08 they were detected in surface and mid depth samples, with values of 47 and 56µg/l for each depth. The highest value is 180 µg/l that was recorded in station W10.

Table 4.62 – Total Hydrocarbons Italian water locations

Determinant	U.M.	LoD	W01			W02			W03			W04
			A	A2	A3	A	A2	A3	A	A2	A3	A
Test Certificate			**19LA 0014278**	**19LA 0014279**	**19LA 0014280**	**19LA 0014287**	**19LA 0014288**	**19LA 0014289**	**19LA 0014293**	**19LA 0014294**	**19LA 0014295**	**19LA 0014299**
Hydrocarbons C<= 10	µg/l	18	< 18	< 18	< 18	< 18	< 18	< 18	< 18	< 18	< 18	< 18
Total hydrocarbons	µg/l	31	41	< 31	< 31	< 31	< 31	< 31	< 31	< 31	< 31	< 31

Determinant	U.M.	LoD	W04		W05			W06			W07	
			A2	A3	A	A2	A3	A	A2	A3	A	A2
Test Certificate			**19LA 0014300**	**19LA 0014301**	**19LA 0014305**	**19LA 0014306**	**19LA 0014307**	**19LA 0014311**	**19LA 0014312**	**19LA 0014313**	**19LA 0014317**	**19LA 0014318**
Hydrocarbons C<= 10	µg/l	18	< 18	< 18	< 18	< 18	< 18	< 18	< 18	< 18	< 18	< 18
Total hydrocarbons	µg/l	31	< 31	< 31	< 31	< 31	< 31	32	34	47	45	34

Determinant	U.M.	LoD	W07	W08			W09			W10		
			A3	A	A2	A3	A	A2	A3	A	A2	A3
Test Certificate			**19LA 0014319**	**19LA 0014323**	**19LA 0014324**	**19LA 0014325**	**19LA 0014329**	**19LA 0014330**	**19LA 0014331**	**19LA 0014335**	**19LA 0014336**	**19LA 0014337**
Hydrocarbons C<= 10	µg/l	18	< 18	< 18	< 18	< 18	< 18	< 18	< 18	< 18	< 18	< 18
Total hydrocarbons	µg/l	31	90	47	56	< 31	45	43	44	180	40	49

- A: sub-sample label for Metals, Aliphatic compounds in surficial sampling level;
- A2: sub-sample label for Metals in mid-depth sampling level;
- A3: sub-sample label for Metals in deep sampling level.

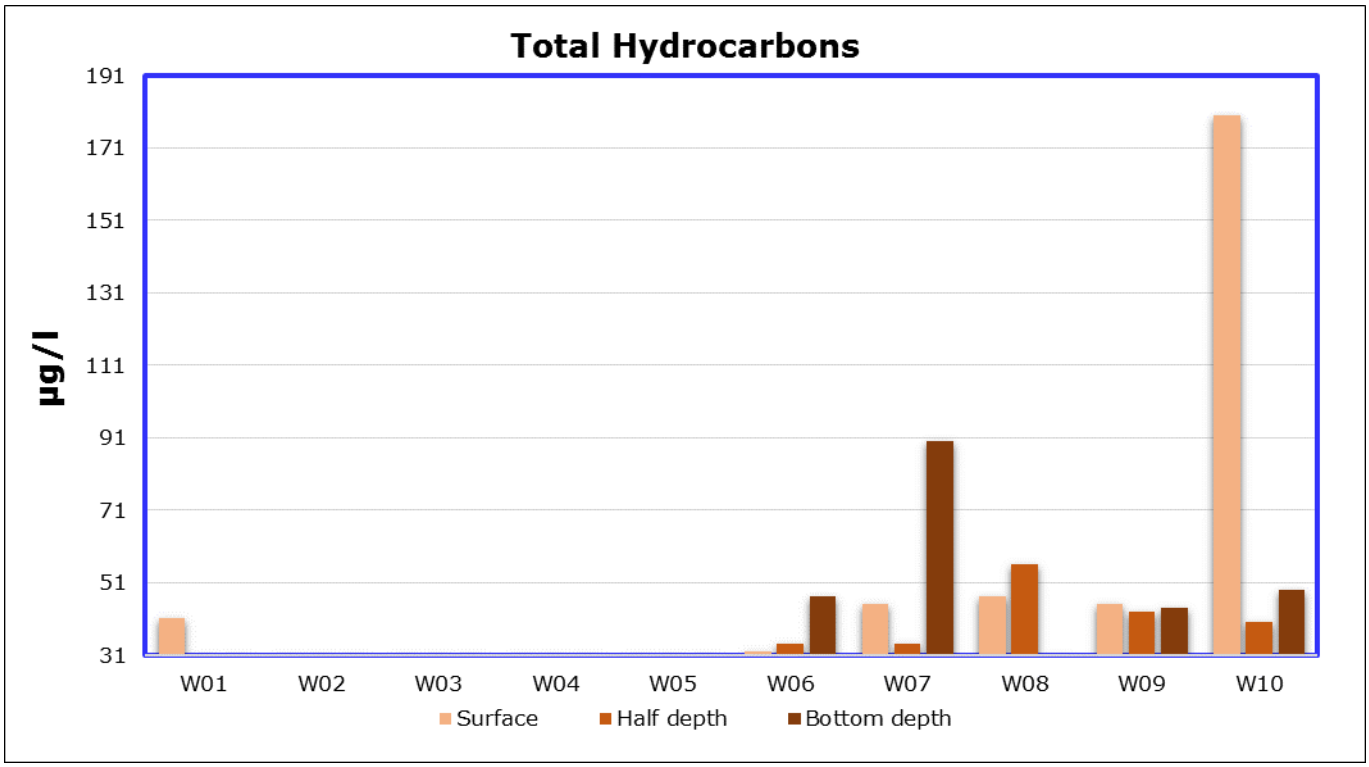


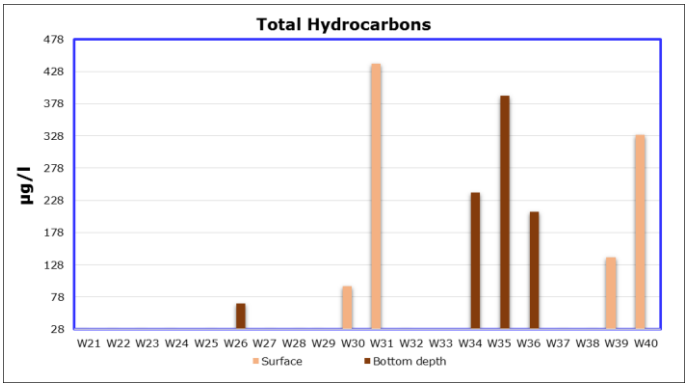
Figure 4.57 – Graph of Total Hydrocarbons in Malta-Italy water samples

4.6.4.2 Nearshore Gela analysis

Hydrocarbons C≤ 10 have values almost all below the Detected limit, except for W31, W33, W34, W35, W39 and W40, where the highest detected value was 300µg/l in stations W31 and W40, while the lowest one is in W33 (25µg/l);
In locations W21-W25, W27-W29, W32, W37, W38 Total Hydrocarbons values are below LoD (< 28µg/l). In the other stations analytes were recorded in surface sample of W01 with the highest value of 440µg/l and the lowest one in W33 (28µg/l).

Table 4.63 - Total Hydrocarbons nearshore Gela water locations

Determinant	**U.M.**	**LoD**	**W21**	**W22**	**W23**	**W24**	**W25**	**W26**	**W27**	**W28**	**W29**	**W30**
Test Certificate			**19LA 0046121**	**19LA 0046150**	**19LA 0046124**	**19LA 0046153**	**19LA 0046156**	**19LA 0046127**	**19LA 0046130**	**19LA 0046133**	**19LA 0046159**	**19LA 0046136**
Total hydrocarbons	µg/l	19	< 19	< 19	< 19	< 19	< 19	< 19	< 19	< 19	< 19	< 19
Hydrocarbons C≤ 10		28	< 28	< 28	< 28	< 28	< 28	68	< 28	< 28	< 28	95
Determinant	**U.M.**	**LoD**	**W31**	**W32**	**W33**	**W34**	**W35**	**W36**	**W37**	**W38**	**W39**	**W40**
Test Certificate			**19LA 0046044**	**19LA 0046141**	**19LA 0046144**	**19LA 0046046**	**19LA 0046048**	**19LA 0046147**	**19LA 0046050**	**19LA 0046052**	**19LA 0046054**	**19LA 0046056**
Total hydrocarbons	µg/l	19	300	< 19	25	99	280	< 19	< 19	< 19	130	300
Hydrocarbons C≤ 10		28	440	< 28	28	240	390	210	< 28	< 28	140	330



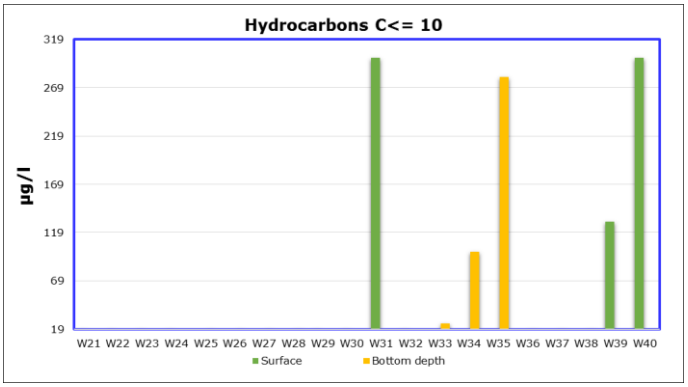


Figure 4.58 - Graphs of Total Hydrocarbons in nearshore Gela water samples

4.6.5 PAH compounds

4.6.5.1 Italy analysis

In the collected samples the PAH compounds are almost below the Detectable Limits. Pyrene is the only analyte that was detected in all locations (Figure 4.59, Table 4.64, Table 4.65 and Table 4.66) with a range between 0.00074 and 0.0057 µg/l. The highest values are in W04 (0.017 µg/l) and in W01 (0.026 µg/l). Very few values are measured for Benzo (b) fluoranthene and Dibenzo (a,h) anthracene in W01, for Benzo (a) Anthracene, Benzo (a) Pirene (values till 0.01 e 0.0052µg/l). All these elements show the highest value in W01. Benzo (g,h,i) Perylene values have a range between 0.0002 and 0.014µg/l, while the highest value is 0.0048 µg/l in W01. Chrysene shows most values below the LoD except in W02, W03, W04 where anyway very low values were recovered. The highest one is in W01 (0.023 µg/l).

Table 4.64 – PAHs compound in Italian water locations (W01-W04)

Determinant	U.M.	LoD	W01			W02			W03			W04		
			A	A2	A3	A	A2	A3	A	A2	A3	A	A2	A3
Test Certificate			**19LA 0014278**	**19LA 0014279**	**19LA 0014280**	**19LA 0014287**	**19LA 0014288**	**19LA 0014289**	**19LA 0014293**	**19LA 0014294**	**19LA 0014295**	**19LA 0014299**	**19LA 0014300**	**19LA 0014301**
Benzo (a) anthracene	µg/l	0.00056	<0,00056	0.01	<0,00056	<0,00056	<0,00056	0.00076	0.00098	<0,00056	0.0015	<0,00056	<0,00056	<0,00056
Benzo (a) pyrene		0.00014	<0,00014	0.0052	<0,00014	<0,00014	<0,00014	<0,00014	0.0013	<0,00014	0.00085	<0,00014	<0,00014	0.00061
Benzo (b) fluoranthene		0.00056	<0,00056	0.0016	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056
Benzo (k) fluoranthene		0.00056	<0,00056	0.0013	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056
Benzo (g,h,i) perylene		0.00014	0.00032	0.0048	<0,00014	<0,00014	<0,00014	0.00042	0.0014	<0,00014	0.001	<0,00014	<0,00014	0.00079
chrysene		0.00056	<0,00056	0.023	<0,00056	<0,00056	<0,00056	0.0021	0.0027	<0,00056	0.002	<0,00056	<0,00056	0.0014
Dibenzo (a,h) anthracene		0.00056	<0,00056	0.00078	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056
Indeno (1,2,3 - c,d) pyrene		0.00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056	<0,00056
Pyrene		0.00056	0.0017	0.026	0.0011	0.0013	0.00094	0.0039	0.0057	0.00089	0.0044	0.0013	0.0011	0.017

Table 4.65 - PAHs compound in Italian water locations (W05-W07)

Determinant	U.M.	LoD	W05			W06			W07		
			A	A2	A3	A	A2	A3	A	A2	A3
Test Certificate			**19LA 0014305**	**19LA 0014306**	**19LA 0014307**	**19LA 0014311**	**19LA 0014312**	**19LA 0014313**	**19LA 0014317**	**19LA 0014318**	**19LA 0014319**
Benzo (a) anthracene	µg/l	0.00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056
Benzo (a) pyrene		0.00014	< 0,00014	< 0,00014	< 0,00014	< 0,00014	< 0,00014	< 0,00014	< 0,00014	< 0,00014	< 0,00014
Benzo (b) fluoranthene		0.00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056
Benzo (k) fluoranthene		0.00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056
Benzo (g,h,i) perylene		0.00014	< 0,00014	< 0,00014	0.00041	< 0,00014	< 0,00014	0.00033	0.00025	< 0,00014	0.00029
chrysene		0.00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056
Dibenzo (a,h) anthracene		0.00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056
Indeno (1,2,3 - c,d) pyrene		0.00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056
Pyrene		0.00056	0.0012	0.0014	0.0023	0.0013	0.00087	0.0028	0.0012	0.00074	0.001

Table 4.66 - PAHs compound in Italian water locations (W08-W10)

Determinant	U.M.	LoD	W08			W09			W10		
			A	A2	A3	A	A2	A3	A	A2	A3
Test Certificate			**19LA0014323**	**19LA0014324**	**19LA0014325**	**19LA0014329**	**19LA0014330**	**19LA0014331**	**19LA0014335**	**19LA0014336**	**19LA0014337**
Benzo (a) anthracene	µg/l	0.00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	0.00074	< 0,00056	< 0,00056
Benzo (a) pyrene		0.00014	< 0,00014	< 0,00014	< 0,00014	< 0,00014	< 0,00014	< 0,00014	< 0,00014	< 0,00014	< 0,00014
Benzo (b) fluoranthene		0.00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056
Benzo (k) fluoranthene		0.00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056
Benzo (g,h,i) perylene		0.00014	< 0,00014	0.00034	0.00028	0.00041	0.00044	0.0002	0.00042	0.00041	0.00036
chrysene		0.00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056
Dibenzo (a,h) anthracene		0.00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056
Indeno (1,2,3 - c,d) pyrene		0.00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056	< 0,00056
Pyrene		0.00056	< 0,00056	0.0011	0.00074	0.0034	0.00095	0.00075	0.0014	0.0016	0.0015

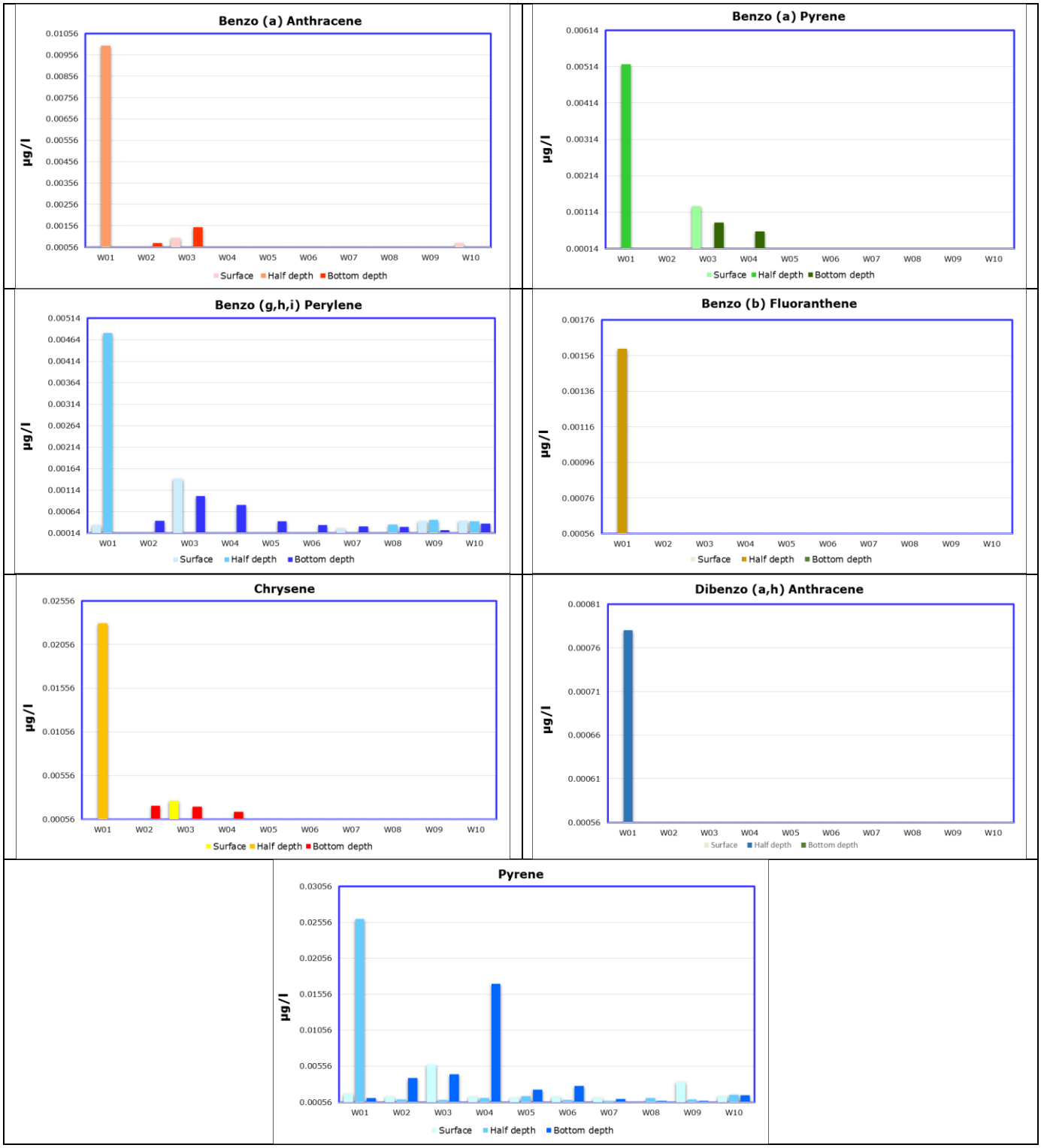


Figure 4.59 – Graphs of the PAH compounds concentration in Italy water samples

4.6.5.2 Nearshore Gela analysis

In the collected samples the PAH compounds are almost all below the Detectable Limits (Table 4.67, Table 4.68 and Figure 4.60). Pyrene is the only analyte that was detected in almost all locations with a range between 0.0048 and 0.00057µg/l. The highest value is in W36 (0.021µg/l). Very few values are measured for Benzo (g,h,i) Perylene, Indeno (1,2,3 –c,d) pyrene, Benzo (a) Pyrene. All these elements show the highest value in W36. In particular **Indeno (1,2,3 –c,d) pyrene** was detected in one station only with a value of 0.00075µg/l; **Benzo (a) Pyrene** was detected both in W31 (0.00036µg/l) and W36 (0.00043µg/l); **Benzo (g,h,i) Perylene** was detected in W31 with a really low value (0.00033µg/l) and in W36 (0.0051µg/l).

Table 4.67 - PAHs compound in nearshore Gela water locations (W21-W30)

Determinant	U.M.	LoD	W21	W22	W23	W24	W25	W26	W27	W28	W29	W30
Test Certificate			**19LA 0046121**	**19LA 0046150**	**19LA 0046124**	**19LA 0046153**	**19LA 0046156**	**19LA 0046127**	**19LA 0046130**	**19LA 0046133**	**19LA 0046159**	**19LA 0046136**
Benzo (a) anthracene	µg/l	0.0005	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050
Benzo (a) pyrene		0.00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013
Benzo (b) fluoranthene		0.0005	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050
Benzo (k) fluoranthene		0.0005	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050
Benzo (g,h,i) perylene		0.00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013	< 0,00013
chrysene		0.0005	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050
Dibenzo (a,h) anthracene		0.0005	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050
Indeno (1,2,3 - c,d) pyrene		0.0005	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050
Pyrene		0.0005	0.0015	0.0048	0.00057	0.0011	0.0013	0.00082	< 0,00050	< 0,00050	0.001	< 0,00050

Table 4.68 - PAHs compound in nearshore Gela water locations (W31-W40)

Determinant	U.M.	LoD	W31	W32	W33	W34	W35	W36	W37	W38	W39	W40
Test Certificate			**19LA 0046044**	**19LA 0046141**	**19LA 0046144**	**19LA 0046046**	**19LA 0046048**	**19LA 0046147**	**19LA 0046050**	**19LA 0046052**	**19LA 0046054**	**19LA 0046056**
Benzo (a) anthracene	µg/l	0.0005	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050
Benzo (a) pyrene		0.00013	0.00036	< 0,00013	< 0,00013	< 0,00013	< 0,00013	0.00043	< 0,00013	< 0,00013	< 0,00013	< 0,00013
Benzo (b) fluoranthene		0.0005	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050
Benzo (k) fluoranthene		0.0005	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050
Benzo (g,h,i) perylene		0.00013	0.00033	< 0,00013	< 0,00013	< 0,00013	< 0,00013	0.0051	< 0,00013	< 0,00013	< 0,00013	< 0,00013
chrysene		0.0005	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050
Dibenzo (a,h) anthracene		0.0005	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050
Indeno (1,2,3 - c,d) pyrene		0.0005	< 0,00050	< 0,00050	< 0,00050	< 0,00050	< 0,00050	0.00075	< 0,00050	< 0,00050	< 0,00050	< 0,00050
Pyrene		0.0005	0.00096	< 0,00050	0.0017	< 0,00050	< 0,00050	0.021	0.00074	< 0,00050	< 0,00050	0.00092

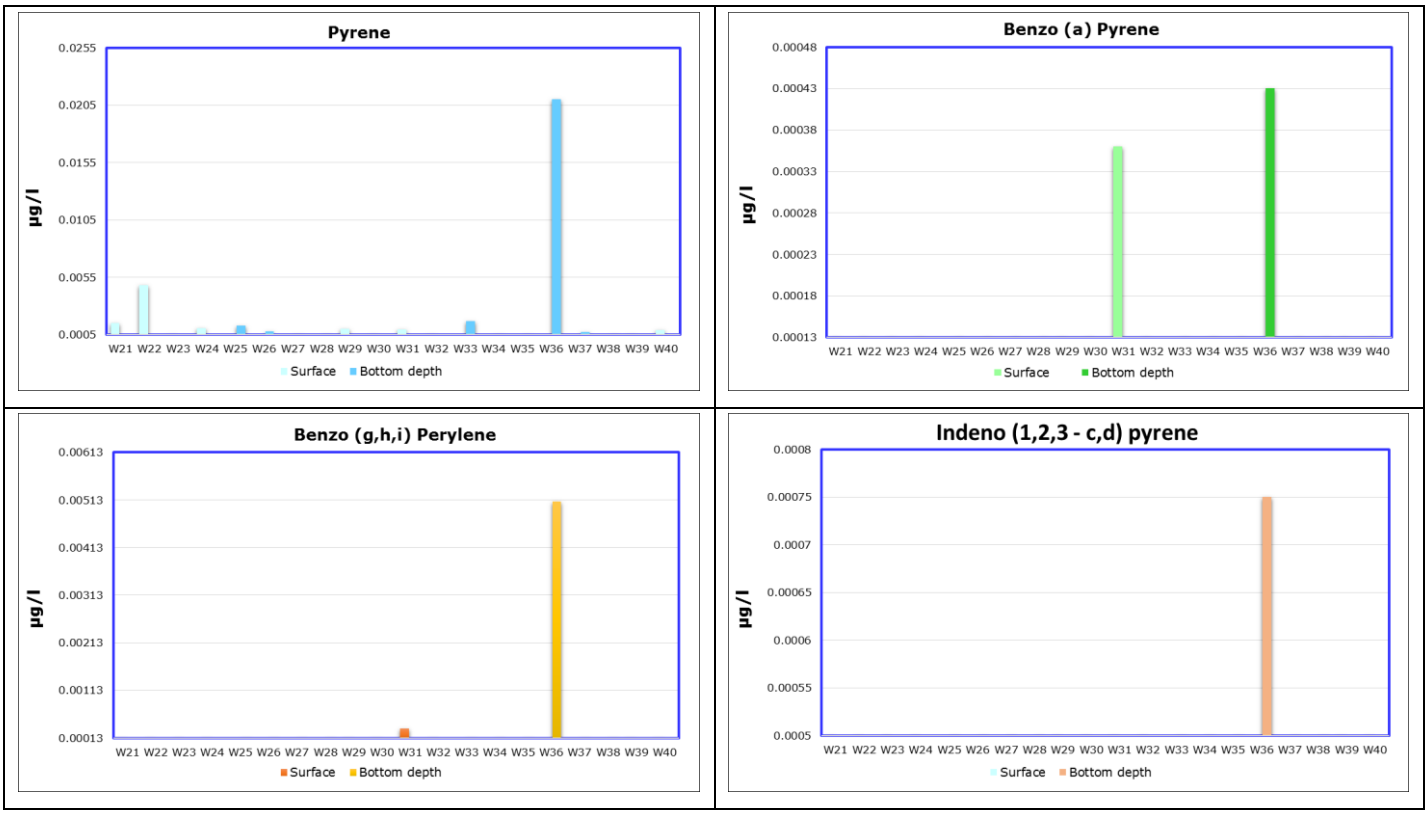


Figure 4.60 – Graphs of PAHs compound in nearshore Gela water locations

4.6.6 BTEX

4.6.6.1 Italy analysis

Benzene is always below the LoD (< 0,010µg/l). Ethylbenzene and meta - Xylene + para – Xylene show the same trend where the greater values were recorded in stations W05 and W06. Ethylbenzene was detected only in three stations with the highest value of 0.033µg/l in station W05 and the lowest one of 0.01µg/l in station W06; meta - Xylene + para – Xylene was recorder in W05, W06, W07, W09 and W10 with the highest value of 0.096µg/l and the lowest in W07 (0.02µg/l) ; Styrene shows a trend ranging between 0.054 and 0.01µg/l with the highest value in W05 and the lowest in W07; Toluene has a general range between 0.29 and 0.1µg/l, with the highest value of 0.58 in W05 (Table 4.69, Table 4.70, Table 4.71 And Figure 4.61).

Table 4.69 - BTEX compound in Italian water locations (W01-W04)

Determinant	U.M.	LoD	W01			W02			W03			W04		
			A	A2	A3	A	A2	A3	A	A2	A3	A	A2	A3
Test Certificate			**19LA 0014278**	**19LA 0014279**	**19LA 0014280**	**19LA 0014287**	**19LA 0014288**	**19LA 0014289**	**19LA 0014293**	**19LA 0014294**	**19LA 0014295**	**19LA 0014299**	**19LA 0014300**	**19LA 0014301**
Benzene	µg/l	0.01	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010
Ethylbenzene		0.01	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010
Styrene		0.01	< 0,010	0.012	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	0.028	0.016	0.011	0.02
Toluene		0.1	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	0.14	< 0,10	< 0,10	0.1
meta - Xylene + para - Xylene		0.02	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020	< 0,020

- A: sub-sample label for Metals, Aliphatic compounds in surficial sampling level;
- A2: sub-sample label for Metals in mid-depth sampling level;
- A3: sub-sample label for Metals in deep sampling level.

Table 4.70 - BTEX compound in Italian water locations (W05-W07)

Determinant	U.M.	LoD	W05			W06			W07		
			A	A2	A3	A	A2	A3	A	A2	A3
Test Certificate			**19LA 0014305**	**19LA 0014306**	**19LA 0014307**	**19LA 0014311**	**19LA 0014312**	**19LA 0014313**	**19LA 0014317**	**19LA 0014318**	**19LA 0014319**
Benzene	µg/l	0.01	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010
Ethylbenzene		0.01	0.033	0.022	0.011	0.01	0.033	0.032	< 0,010	< 0,010	< 0,010
Styrene		0.01	0.054	0.02	0.03	0.027	0.03	0.042	0.015	0.014	0.01
Toluene		0.1	0.58	< 0,10	< 0,10	0.12	0.13	0.29	< 0,10	0.16	0.16
meta - Xylene + para - Xylene		0.02	0.084	0.065	0.024	0.023	0.096	0.091	< 0,020	0.02	< 0,020

- A: sub-sample label for Metals, Aliphatic compounds in surficial sampling level;
- A2: sub-sample label for Metals in mid-depth sampling level;
- A3: sub-sample label for Metals in deep sampling level.

Table 4.71 - BTEX compound in Italian water locations (W08-W10)

Determinant	U.M.	LoD	W08			W09			W10		
			A	A2	A3	A	A2	A3	A	A2	A3
Test Certificate			**19LA0014323**	**19LA0014324**	**19LA0014325**	**19LA0014329**	**19LA0014330**	**19LA0014331**	**19LA0014335**	**19LA0014336**	**19LA0014337**
Benzene	µg/l	0.01	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010
Ethylbenzene		0.01	< 0,010	< 0,010	< 0,010	0.018	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010
Styrene		0.01	0.014	< 0,010	0.011	0.021	0.038	< 0,010	0.015	0.018	0.013
Toluene		0.1	< 0,10	0.11	< 0,10	0.15	0.16	< 0,10	< 0,10	0.12	0.18
meta - Xylene + para - Xylene		0.02	< 0,020	< 0,020	< 0,020	0.052	0.021	< 0,020	< 0,020	< 0,020	0.023

- A: sub-sample label for Metals, Aliphatic compounds in surficial sampling level;
- A2: sub-sample label for Metals in mid-depth sampling level;
- A3: sub-sample label for Metals in deep sampling level.

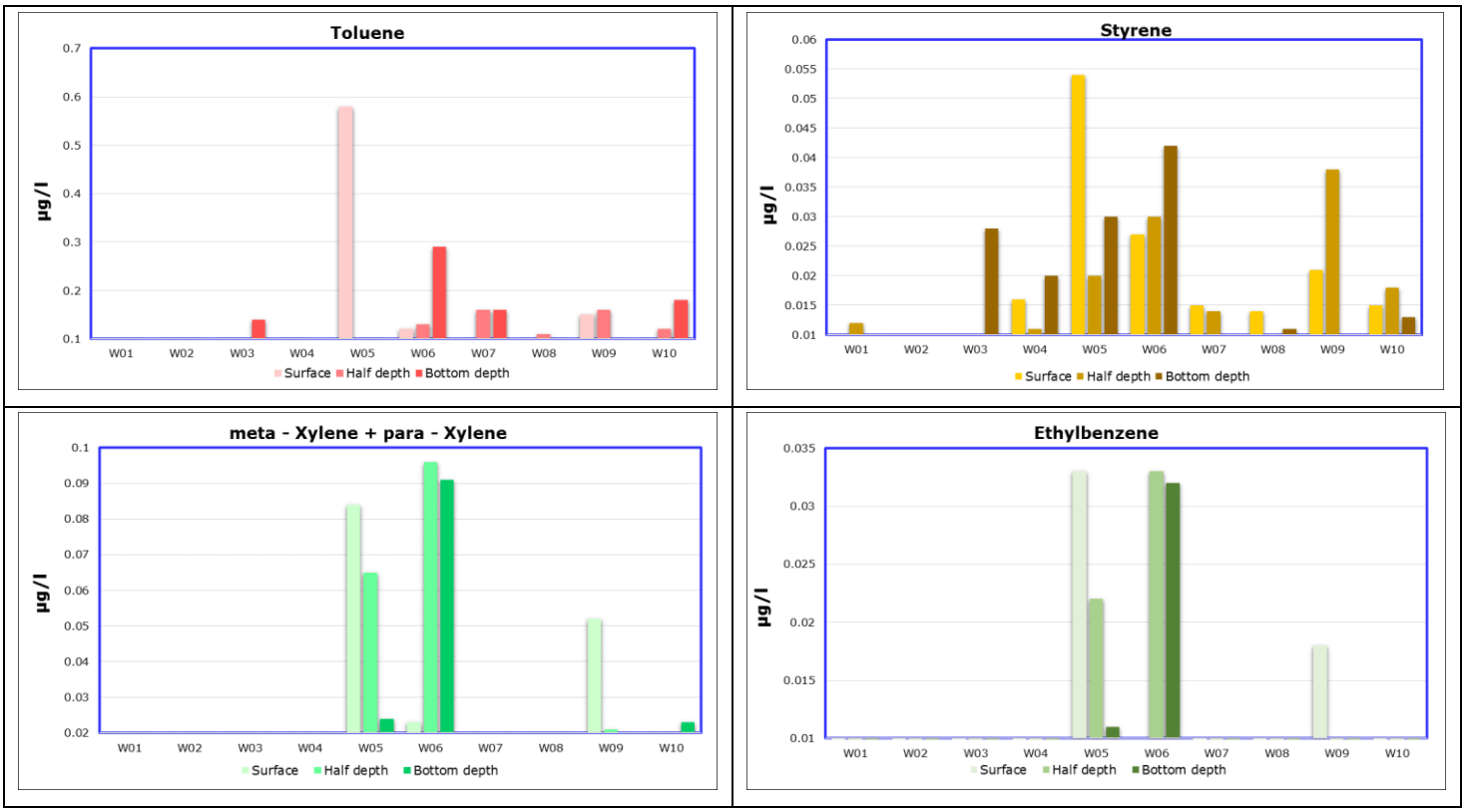


Figure 4.61 - Graphs of the BTEX compounds concentration in Italian water samples

4.6.6.2 Nearshore Gela analysis

Results of BTEX analyses are show in Table 4.72 and Figure 4.62.

Benzene is above the LoD (< 0,010µg/l) in eleven locations, showing a range between 0.011 and 0.024µg/l; Ethylbenzene and meta - Xylene + para – Xylene show a similar trend (Table 4.72 and Figure 4.62). In particular, **Ethylbenzene** was detected in all the water locations except W40 with values between 0.011 and 0.033µg/l; **meta - Xylene + para – Xylene** was detected in all stations except W30 and W40 with a trend ranging between 0.029 and 0.08µg/l with the highest value in W24 and the lowest in W27; **Toluene** was recorded in one station only with a value of 0.15µg/l; **Styrene** was above the LoD only in stations W31 (0.02µg/l) and W34 (0.027µg/l).

Table 4.72 - BTEX compound in nearshore Gela water locations

Determinant	**U.M.**	**LoD**	**W21**	**W22**	**W23**	**W24**	**W25**	**W26**	**W27**	**W28**	**W29**	**W30**
Test Certificate			**19LA 0046121**	**19LA 0046150**	**19LA 0046124**	**19LA 0046153**	**19LA 0046156**	**19LA 0046127**	**19LA 0046130**	**19LA 0046133**	**19LA 0046159**	**19LA 0046136**
Benzene	µg/l	10	< 0,010	0.02	0.015	0.02	0.012	0.015	0.019	< 0,010	0.024	< 0,010
Ethylbenzene		0.01	0.015	0.021	0.017	0.026	0.02	0.014	0.016	0.011	0.021	0.013
Styrene		0.01	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010
Toluene		0.01	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10
meta - Xylene + para - Xylene		0.1	0.049	0.054	0.053	0.08	0.077	0.044	0.029	0.035	0.054	< 0,020
Determinant	**U.M.**	**LoD**	**W31**	**W32**	**W33**	**W34**	**W35**	**W36**	**W37**	**W38**	**W39**	**W40**
Test Certificate			**19LA 0046044**	**19LA 0046141**	**19LA 0046144**	**19LA 0046046**	**19LA 0046048**	**19LA 0046147**	**19LA 0046050**	**19LA 0046052**	**19LA 0046054**	**19LA 0046056**
Benzene	µg/l	10	0.021	0.011	< 0,010	0.013	< 0,010	0.013	< 0,010	< 0,010	< 0,010	< 0,010
Ethylbenzene		0.01	0.027	0.016	0.012	0.033	0.014	0.015	0.013	0.012	0.018	< 0,010
Styrene		0.01	0.02	< 0,010	< 0,010	0.027	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010	< 0,010
Toluene		0.01	< 0,10	< 0,10	< 0,10	0.15	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10
meta - Xylene + para - Xylene		0.1	0.06	0.059	0.045	0.051	0.048	0.052	0.049	0.042	0.068	< 0,020

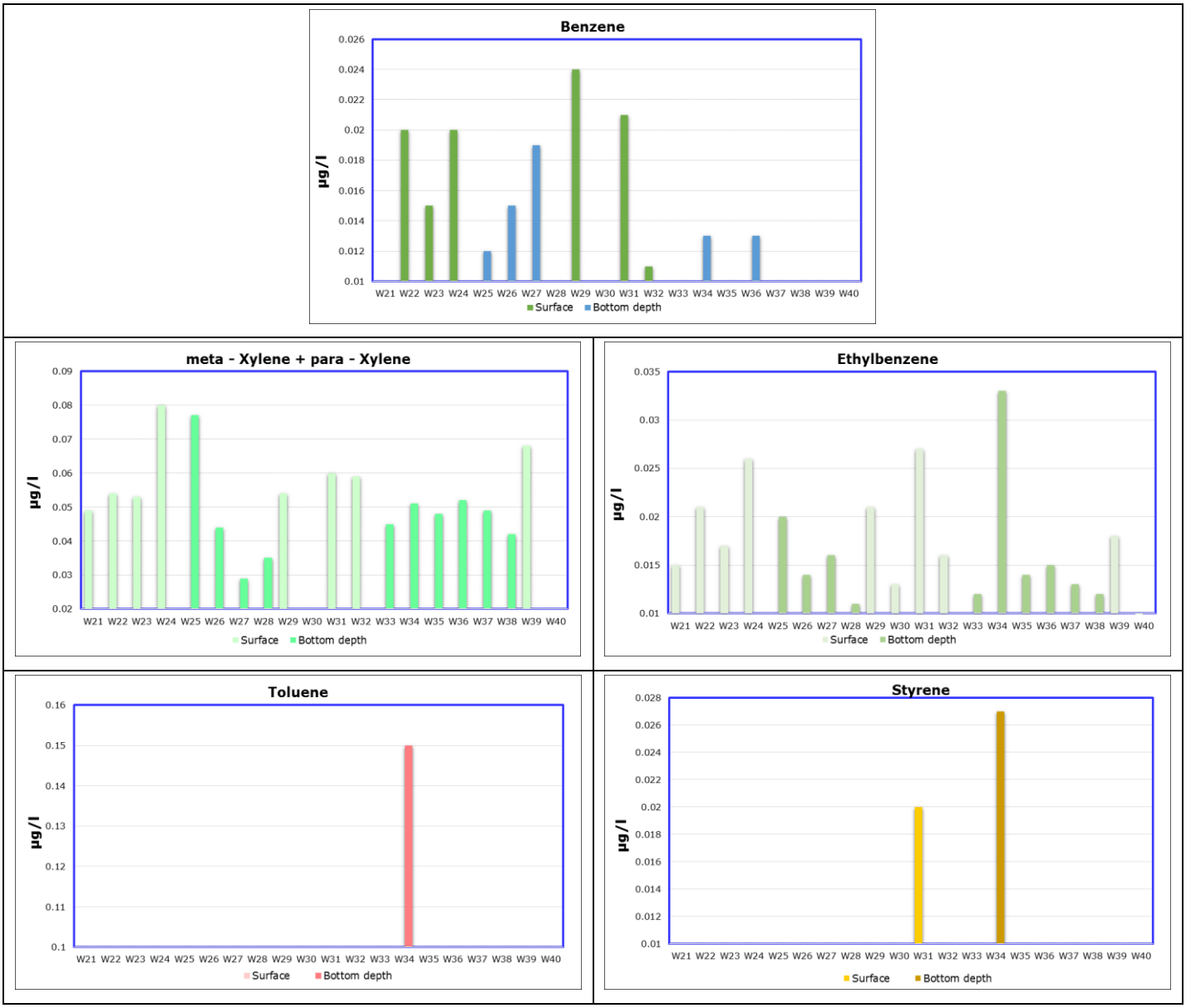


Figure 4.62 – Graphs of BTEX compound in nearshore Gela water locations

4.6.7 THMs compounds

4.6.7.1 Italy analysis

In all the collected samples the THMs compounds concentrations are almost below the Detectable Limit (Figure 4.63).

Very few values are measured for Bromodichloromethane, Dibromodichloromethane and Tribromomethane in W01, for Trichloromethane (values till 0.0038µg/l in W01).

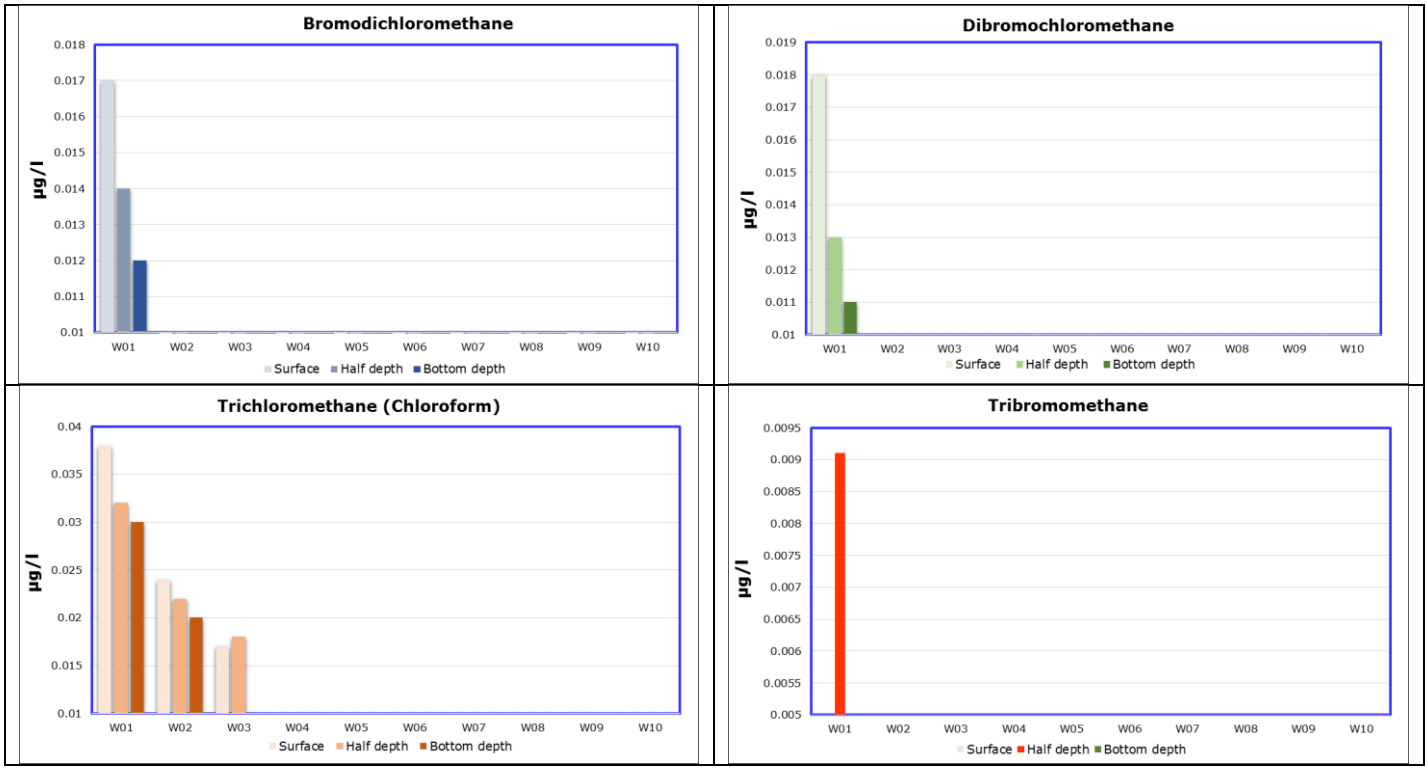


Figure 4.63 – Graphs of the THMs compounds concentration in Italian water samples

4.6.7.2 Nearshore Gela analysis

In all the collected samples the THMs compounds concentrations are always below the Detectable Limit (Figure 4.64), except for Dibromochloromethane, Trichloromethane, Tribromomethane all detected in one station only (W21).

Only one value was measured for Bromodichloromethane, Dibromodichloromethane and Tribromomethane in W01, for Trichloromethane (values are all equal to 1µg/l).

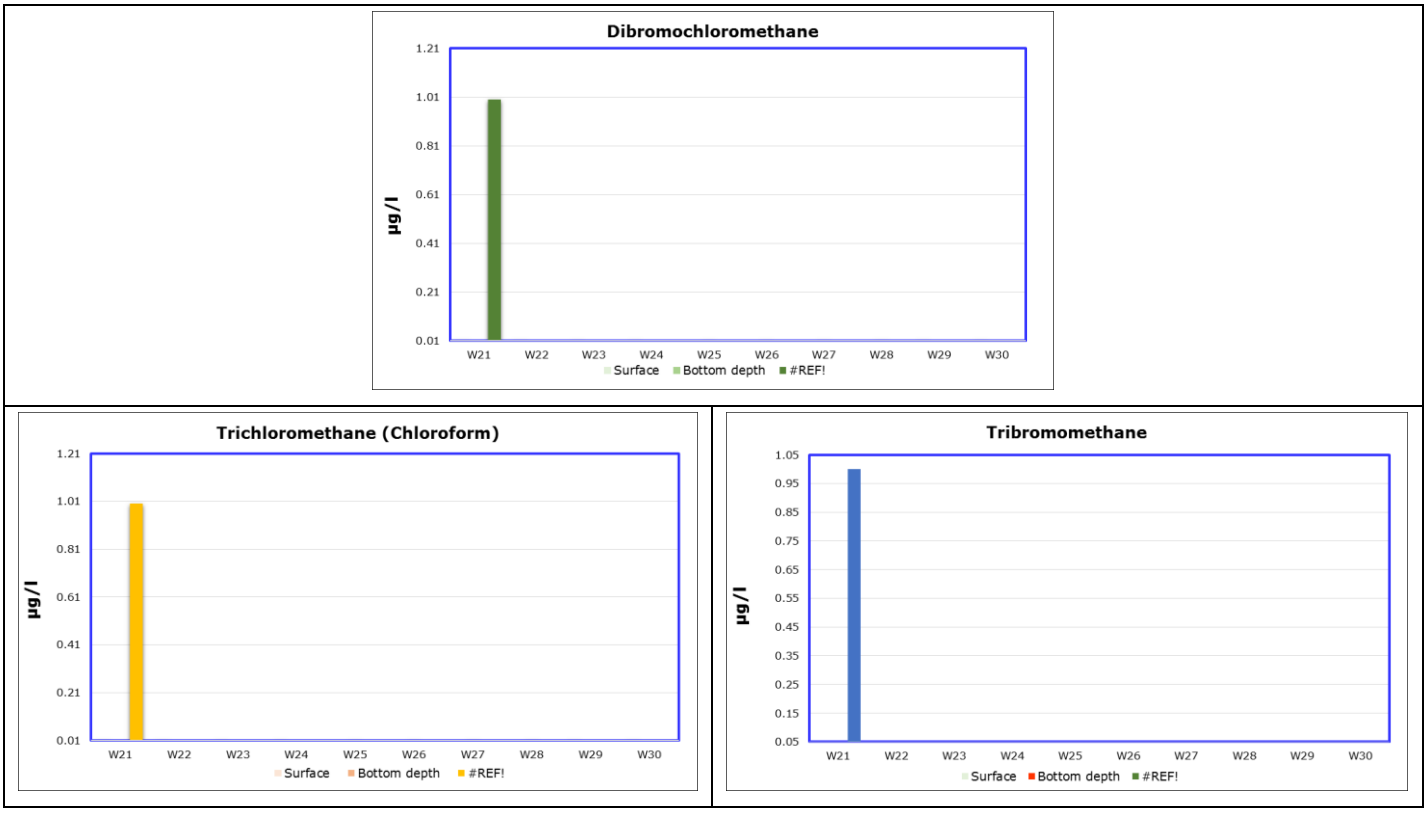


Figure 4.64 - Graphs of the THMs compounds concentration in nearshore Gela water samples

4.6.8 1,2 – Dichloroethane - Sum Organoalogenated – M.T.B.E.

4.6.8.1 Italy analysis

1,2 – Dichloroethane is always below the LoD, (< 0,0050µg/l) except for W09 and W10. The Organoalogenated was detected at all depths in W01, W02, W03 and W10; anyway the highest value of 0.22µg/l was recorded in W05 Figure 4.65.

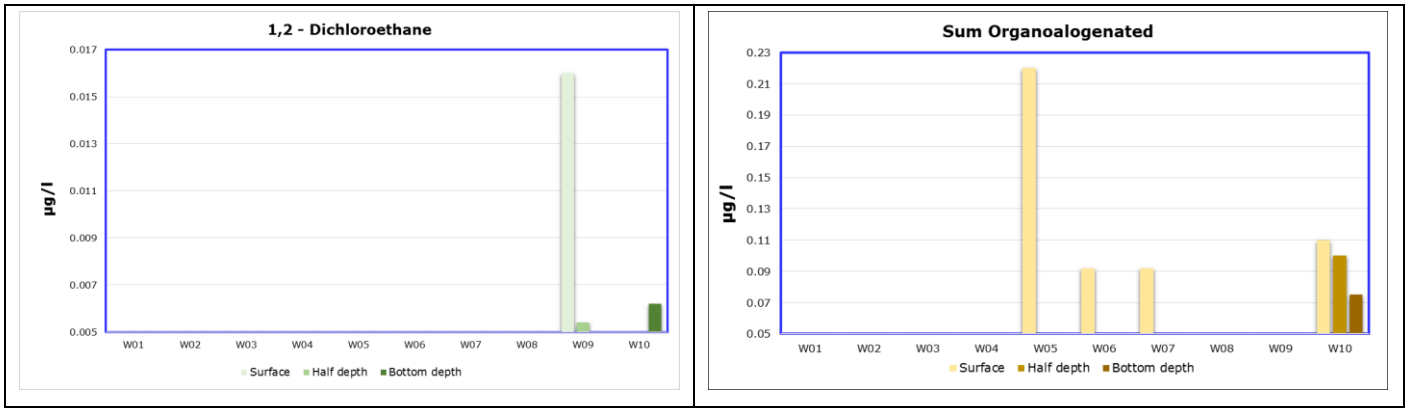


Figure 4.65 - Graphs of 1,2 – Dichloroethane and Sum Organoalogenated the compounds concentration in Italian water samples

4.6.8.2 Nearshore Gela analysis

The Sum of Organoalogenated was detected in only one station with a value of 1 µg/l; while M.T.B.E. analyte was recorded in three stations with the highest value in W37 (0.093µg/l) and the lowest one in W33 (0.07µg/l).

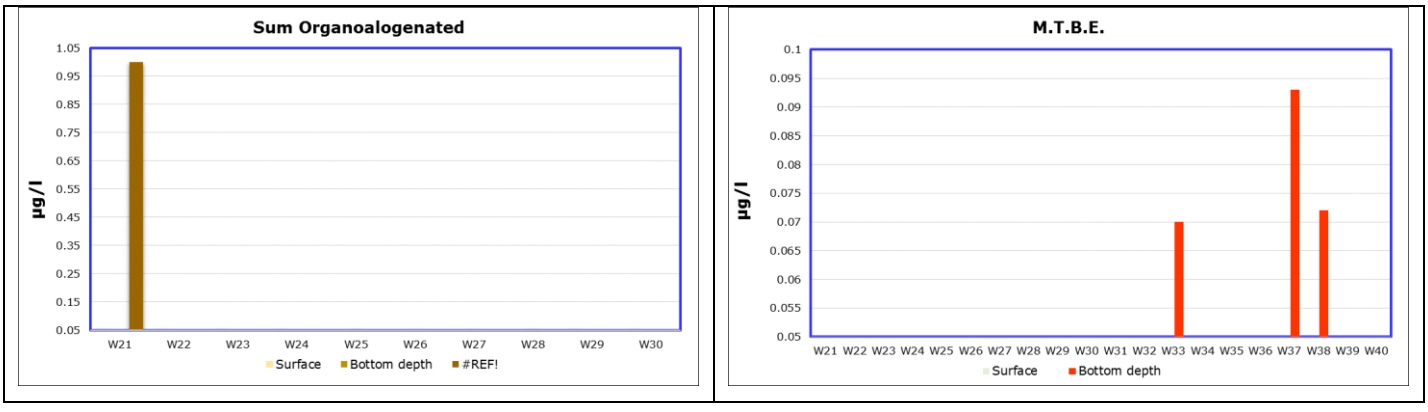


Figure 4.66 - Graphs Sum Organoalogenated and M.T.B.E. compounds concentration in nearshore Gela water samples

4.6.9 Organochlorine pesticides

The only detected pesticides was Atrazine in the nearshore Gela water locations (Figure 4.67).

The analyte concentration values show a range between 0.0005 and 0.0011µg/l except for W22-W24, W27, W29, W30, W32, W33, W36, W39 where Atrazine concentration is always below the LoD (0.00050µg/l).

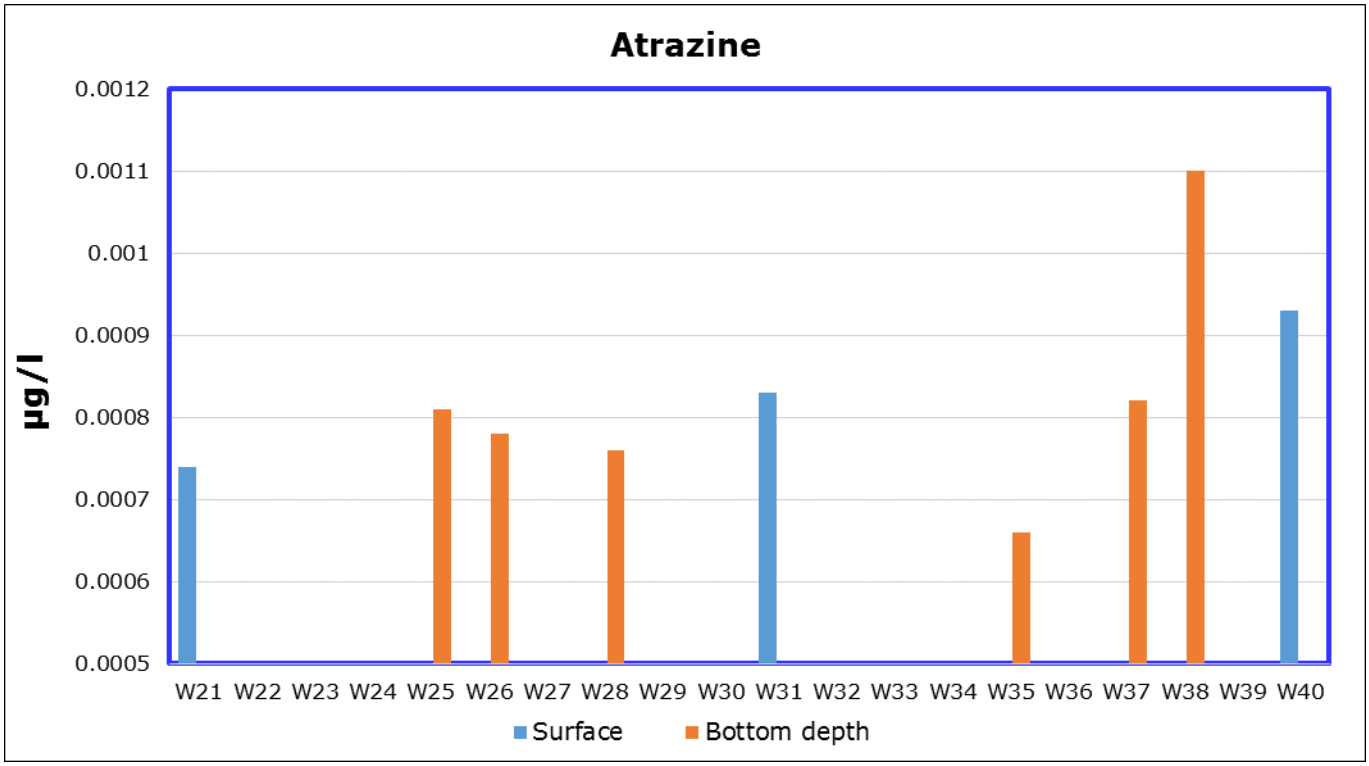


Figure 4.67 – Graph of Atrazine in nearshore Gela water locations

4.6.10 Requested Indices

For the aim of this environmental survey, the following indices were requested for Nearshore Gela working area:

- **TRIX** = Trophic Index
- **CAM** = Classificazione Acque Marine (Marine Waters Classification)

TRIX index shows values between 5.2 and 8.5 at almost all stations (taking into account only the mean values of each parameters). These parameters allow evaluating the trophic status of the water column. Most stations are characterized by Poor (Euthopic) seawater status and only few of them are found to be Moderate (Mesotrophic to Eutrophic).

With regard to CAM index, the mean value of Syntetic class is always 3, except for W21 and W28 which show a value of 2.

The complete results are shown in tables below and in APPENDIX 9: SEA WATER LABORATORY ANALYSES RESULTS CERTIFICATES:

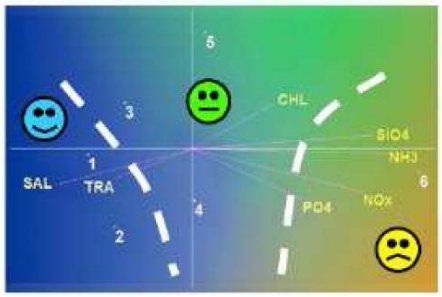
Table 4.73 – TRIX Results in Nearshore Gela water locations

Lab Ref.	Station	TRIX index			Ecological water quality status (Qualitative)		
		MIN.	MAX.	MID.	MIN.	MAX.	MID.
19LA0046399	MEW001d_W21	6.8	9.0	8.3	Poor	Poor	Poor
19LA0049288	MEW001d_W22	8.0	8.7	8.3	Poor	Poor	Poor
19LA0049289	MEW001d_W23	6.4	8.7	7.7	Poor	Poor	Poor
19LA0049290	MEW001d_W24	6.8	9.1	8.5	Poor	Poor	Poor
19LA0049291	MEW001d_W25	7.0	8.4	8.1	Poor	Poor	Poor
19LA0049292	MEW001d_W26	6.1	7.8	7.2	Poor	Poor	Poor
19LA0049293	MEW001d_W27	6.0	8.5	7.5	Poor	Poor	Poor
19LA0049294	MEW001d_W28	6.7	8.1	7.6	Poor	Poor	Poor
19LA0049295	MEW001d_W29	6.9	8.8	8.2	Poor	Poor	Poor
19LA0049296	MEW001d_W30	6.8	9.3	8.5	Poor	Poor	Poor
19LA0049297	MEW001d_W31	5.0	6.6	5.6	Moderate	Poor	Moderate
19LA0049298	MEW001d_W32	6.3	8.4	7.7	Poor	Poor	Poor
19LA0049299	MEW001d_W33	6.3	9.0	8.2	Poor	Poor	Poor
19LA0049300	MEW001d_W34	4.8	6.3	5.7	Good	Poor	Moderate
19LA0049301	MEW001d_W35	4.6	6.5	6.0	Good	Poor	Poor
19LA0049302	MEW001d_W36	7.1	8.9	8.0	Poor	Poor	Poor
19LA0049303	MEW001d_W37	4.7	6.2	5.7	Good	Poor	Moderate
19LA0049304	MEW001d_W38	5.1	6.3	5.2	Moderate	Poor	Moderate
19LA0049305	MEW001d_W39	5.2	7.5	6.7	Moderate	Poor	Poor
19LA0049306	MEW001d_W40	4.4	7.1	6.2	Good	Poor	Poor

Table 4.74 - CAM Results in Nearshore Gela water locations

Lab Ref.	Station	CAM – Syntetic class			CAM – "Other seas" class		
		MID.	MIN.	MAX.	MID.	MIN.	MAX.
19LA0046399	MEW001d_W21	2	2	3	6	6	6
19LA0049288	MEW001d_W22	3	3	3	6	6	6
19LA0049289	MEW001d_W23	2	3	2	6	6	6
19LA0049290	MEW001d_W24	3	3	2	6	6	6
19LA0049291	MEW001d_W25	3	3	3	6	6	6
19LA0049292	MEW001d_W26	2	3	2	6	6	6
19LA0049293	MEW001d_W27	2	3	2	6	6	6
19LA0049294	MEW001d_W28	2	2	2	6	6	6
19LA0049295	MEW001d_W29	3	3	2	6	6	6
19LA0049296	MEW001d_W30	2	3	2	6	6	6
19LA0049297	MEW001d_W31	2	3	2	6	6	6
19LA0049298	MEW001d_W32	2	3	2	6	6	6
19LA0049299	MEW001d_W33	2	3	2	6	6	6
19LA0049300	MEW001d_W34	2	3	2	6	6	6
19LA0049301	MEW001d_W35	2	3	2	6	6	6
19LA0049302	MEW001d_W36	2	3	2	6	6	6
19LA0049303	MEW001d_W37	2	3	2	6	6	6
19LA0049304	MEW001d_W38	3	3	2	6	6	6
19LA0049305	MEW001d_W39	2	3	2	6	6	6
19LA0049306	MEW001d_W40	2	3	2	6	6	6

Table 4.75 – Explanation of CAM Results

CAM - Synthetic class	CAM – "Other seas" class
1 	
2 	
3 	
Ref. to "Attachment 1 Test Reports n° 19LA0046399 + from 19LA0049288 to 19LA0049306 of October 21st, 2019" attached in 7.10.0	

As reported above, the water quality seems to be "poor" in most of nearshore Gela water locations. This can be due to the way the TRIX index was established in the first place:

The trophic index was developed by Vollenweider in 1998 for the coastal area of Emilia-Romagna (northern Adriatic Sea). The main aspect affecting the water quality in the northen Adriatic sea was found to be the Phosporous abundance. It is probable that the TRIX index could have been based on high values of Phosporous, considering Nitrates concentration values as static or negligible. Therefore, the results of the TRIX indexes obtained are most likely affected by the high concentration of nitrates found in the Gela area.

4.7.0 Biological characteristics of waters

4.7.1 Phytoplankton Analyses

4.7.1.1 Offshore Malta – Phytoplankton analysis

Phytoplankton samples from Malta area belong to the families Bacillariophyceae and Dinoficeae dominated in all the investigated area.

The plankton characterization of the collected samples have been performed at AMBIENTE s.p.a (Carrara, Italy).

Numerical results of analysis of phytoplankton samples for Malta area are shown in Table 4.76, Table 4.77, Table 4.78, Table 4.79, Table 4.80 and Table 4.81.

In the present investigation, when the specimens could not be identified to species level with absolute confidence, the name of the taxon encountered was identified by:

Sp. = this abbreviation was used when a single species has not been identified.

Spp. = this abbreviation was used when more than one species has not been identified.

Ind.= Is used to address the cases in which a deterioration of the organisms was found, not allowing a clear definition at a lower level than what indicated.

Sample ID is referred to "Laboratory Certifications" in APPENDIX 9: WATER LABORATORY ANALYSES RESULTS CERTIFICATES.

The results of the processing and interpretation of data are displayed in this report (APPENDIX 10: WATER LABORATORY ANALYSES RESULTS TABLE).

It's interesting to notice a huge difference in abundance between station S11 and the other investigated stations: in particular laboratories results give an evidence about the high number of individuals belonging to *Navicula sp.* And *Coscinodiscus sp.* Taxa.

The presence of *Chaetoceros pendulus* is to be highlighted at station S11, given that the same was not identified in other stations. The morphological characteristics of the observed organism coincide perfectly with those of *C.pendulus*, which is known to be present in the Mediterranean sea. According to bibliography, its presence in the Mediterranean would not include the Ionian Sea. The proximity of the working area to Ionian sea could justify the absence of the *C.pendulus* in the other environmental stations.

Table 4.76 - Phytoplankton analysis: field operations (W11-W12)

LOCATIONS	**MEW001b W11**						**MEW001b_W12**					
Sample ID	**19LA 0016022**	**19LA 0016024**	**19LA 0016083**	**19LA 0016023**	**19LA 0016025**	**19LA 0016084**	**19LA 0023769**	**19LA 0023771**	**19LA 0023773**	**19LA 0023770**	**19LA 0023772**	**19LA 0023774**
Sampling date	**10/03/2019**						**01/05/2019**					
Max tow depth (m)	138	138	138	70	70	70	137	137	137	69	69	69
Net diameter (cm)	40	40	40	40	40	40	40	40	40	40	40	40
Flowmeter counts	3660	6561	2567	4262	1368	1489	520	543	456	483	561	447
WATER VOLUME (l)	219600	393660	154020	255720	82080	89340	31200	32580	27360	28980	33660	26820
WATER VOLUME (m3)	219.60	393.66	154.02	255.72	82.08	89.34	31.20	32.58	27.36	28.98	33.66	26.82
TOW DISTANCE (m)	1098.0	1968.3	770.1	1278.6	410.4	446.7	156.0	162.9	136.8	144.9	168.3	134.1

Table 4.77 - Phytoplankton analysis: field operations (W13-W14)

LOCATIONS	**MEW001b W13**						**MEW001b_W14**					
Sample ID	**19LA 0023783**	**19LA 0023785**	**19LA 0023787**	**19LA 0023784**	**19LA 0023786**	**19LA 0023788**	**19LA 0023797**	**19LA 0023799**	**19LA 0023801**	**19LA 0023798**	**19LA 0023800**	**19LA 0023802**
Sampling date	**01/05/2019**						**30/04/2019**					
Max tow depth (m)	127	127	127	65	65	65	79	79	79	40	40	40
Net diameter (cm)	40	40	40	40	40	40	40	40	40	40	40	40
Flowmeter counts	331	299	401	368	452	369	550	487	388	523	398	245
WATER VOLUME (l)	19860	17940	24060	22080	27120	22140	33000	29220	23280	31380	23880	14700
WATER VOLUME (m3)	19.86	17.94	24.06	22.08	27.12	22.14	33	29.22	23.28	31.38	23.88	14.7
TOW DISTANCE (m)	99.3	89.7	120.3	110.4	135.6	110.7	165	146.1	116.4	156.9	119.4	73.5

Table 4.78 - Phytoplankton analysis: field operations (W15)

LOCATIONS	**MEW001b W15**					
Sample ID	**19LA 0023811**	**19LA 0023813**	**19LA 0023815**	**19LA 0023812**	**19LA 0023814**	**19LA 0023816**
Sampling date	**29/04/2019**					
Max tow depth (m)	46	46	46	20	20	20
net diameter (cm)	40	40	40	40	40	40
flowmeter counts	503	496	474	668	478	334
WATER VOLUME (l)	30180	29760	28440	40080	28680	20040
WATER VOLUME (m3)	30.18	29.76	28.44	40.08	28.68	20.04
TOW DISTANCE (m)	150.9	148.8	142.2	200.4	143.4	100.2

Table 4.79 – Malta area: Phytoplankton density (Cell L^{-1}) / Stations W11-W12

LOCATIONS	**MEW001b_W11**						**MEW001b_W12**					
Sample ID	**19LA 0016022**	**19LA 0016024**	**19LA 0016083**	**19LA 0016023**	**19LA 0016025**	**19LA 0016084**	**19LA 0023769**	**19LA 0023771**	**19LA 0023773**	**19LA 0023770**	**19LA 0023772**	**19LA 0023774**
Species												
Centriche spp.	56	124	245	335	71	89	*53*	*36*	*18*	-	-	-
Chaetoceros laciniosus	8	-	-	-	-	-	-	-	-	-	-	-
Chaetoceros convolutus	16	106	-	-	-	-	*18*	-	-	-	-	-
Chaetoceros pendulus	**12**	-	-	-	-	-	-	-	-	-	-	-
Chaetoceros peruvianus	-	-	-	-	-	-	-	*18*	-	-	-	-
Chaetoceros sp.	24	-	-	-	-	-	-	-	-	-	-	-
Coscinodiscus radiatus	-	-	-	-	-	-	18	18	53	18	18	-
Coscinodiscus sp.	424	406	572	388	511	546	36	-	-	-	-	-
Dactyliosolen fragilissimus	-	-	-	-	-	-	-	-	-	18	-	-
Dactyliosolen sp.	-	36	-	-	-	53	0	0	18	18	-	-
Diploneis spp.	-	-	-	-	-	-	18	18	36	-	-	-
Gyrosigma sp.	4	-	-	-	-	-	-	-	-	-	-	-
Hemiaulus sinensis	4	-	-	-	-	-	-	-	-	-	-	-

LOCATIONS	**MEW001b_W11**						**MEW001b_W12**					
Sample ID	**19LA 0016022**	**19LA 0016024**	**19LA 0016083**	**19LA 0016023**	**19LA 0016025**	**19LA 0016084**	**19LA 0023769**	**19LA 0023771**	**19LA 0023773**	**19LA 0023770**	**19LA 0023772**	**19LA 0023774**
Hemidiscus sp.	-	-	-	-	18	-	-	-	-	-	-	-
Leptocylindrus minimus	8	-	-	-	-	-	-	-	-	-	-	-
Licmophora gracilis	4	-	-	18	-	-	-	-	-	-	-	-
Lithodesmium undulatum	4	-	-	-	-	-	-	-	-	-	-	-
Navicula sp.	360	406	1225	5319	7749	15920	-	36	36	-	-	-
Nitzschia sp.	12	141	62	18	-	-	-	-	-	-	-	-
Pennate spp.	80	212	205	177	89	71	18	18	-	-	-	-
Pleurosigma sp.	4	-	-	-	-	-	-	-	-	-	-	-
Pseudo-nitzchia sp.	-	-	21	-	-	18	-	-	71	-	-	-
Rhizosolenia sp.	40	124	82	18	-	-	-	-	-	-	-	-
Skeletonema sp.	8	-	-	-	-	-	-	-	-	-	-	-
Tabellaria fenestrata	4	141	-	-	-	159	-	-	-	18	-	-
Thalassionema nitzschioides	24	-	21	-	-	-	-	-	-	18	-	-
Thalassionema sp.	4	-	-	-	-	-	-	-	-	18	-	-
Thalassionema rotula	4	-	-	-	-	-	-	-	-	-	-	-
Alexandrium spp.	-	-	21	-	-	-	-	-	-	-	-	-
Ceratium concilians	-	-	-	-	-	-	-	18	-	-	-	-
Ceratium declinatum	-	-	21	18	18	53	-	-	-	-	-	-
Ceratium furca	-	-	-	-	-	-	-	-	-	-	-	-
Ceratium fusus	20	18	41	-	18	-	-	18	-	18	-	-
Ceratium gibberum	-	-	-	-	-	-	-	-	-	-	-	-
Ceratium gravidum	4	-	-	-	18	-	-	-	-	-	-	-
Ceratium horridum	-	71	21	-	36	-	-	36	-	-	-	-
Ceratium pentagonum	-	-	-	36	36	-	-	-	-	18	-	-
Ceratium platycorne	-	18	-	-	-	-	-	-	-	-	-	-
Ceratium sp.	16	18	21	-	-	18	-	-	-	18	-	-
Ceratium trichoceros	-	-	-	-	-	18	-	-	-	53	-	-
Ceratium tripos	92	159	-	106	18	36	-	-	-	-	-	-
Ceratium horrida	8	36	-	-	18	18	-	-	-	-	-	-
Corythodium tesselatum	-	-	21	-	-	-	-	-	-	-	-	-
Dinophysis acuta	4	18	0	36	18	-	-	-	-	-	-	-
Dinophysis caudata	-	-	-	-	-	18	-	-	-	-	-	-

LOCATIONS	**MEW001b_W11**						**MEW001b_W12**					
Sample ID	**19LA 0016022**	**19LA 0016024**	**19LA 0016083**	**19LA 0016023**	**19LA 0016025**	**19LA 0016084**	**19LA 0023769**	**19LA 0023771**	**19LA 0023773**	**19LA 0023770**	**19LA 0023772**	**19LA 0023774**
Dinophysis rotundata	12	-	-	53	-	-	-	-	-	-	-	-
Diplopsalis sp.	4	141	21	36	18	36	-	18	-	-	-	-
Gonyaulax hyalina	-	-	41	-	-	-	-	-	-	-	-	-
Gonyaulax sp.	96	124	123	71	53	18	-	-	-	-	-	-
Heterocapsa minima	8	-	-	-	-	-	-	-	-	-	-	-
Heterocapsa sp.	-	18	-	-	-	-	-	-	-	-	-	-
Karenia sp.	8	-	-	-	-	-	-	-	-	-	-	-
Lingulodinium polyedrum	-	-	-	-	-	-	-	-	-	-	18	-
Mesoporos adriaticus	-	-	-	-	-	-	-	-	-	-	-	-
Ornithocercus magnificus	24	18	-	-	18	18	-	-	-	-	-	-
Ornithocercus quadratus	-	18	-	-	-	36	18	-	-	-	-	-
Oxytoxum variabile	-	-	-	-	-	-	-	18	-	-	71	-
Oxytoxum viridae	8	-	-	-	-	-	-	-	-	-	-	-
Prorocentrum balticum	12	-	-	-	-	-	-	-	-	-	-	-
Prorocentrum gracile	-	-	-	-	-	-	18	-	18	18	53	36
Prorocentrum lima	8	-	-	-	-	-	-	-	-	-	-	-
Prorocentrum sp.	8	-	-	-	-	-	-	-	-	18	-	-
Protocentrum compressum	8	-	-	-	-	36	-	-	-	-	-	-
Protocentrum reticulatum	-	-	21	-	-	-	-	-	-	-	-	-
Protopendinium crassipes	12	-	-	-	-	18	-	-	-	-	-	-
Protopendinium depressum	4	18	-	-	-	89	-	-	-	-	-	-
Protopendinium divergens	12	18	-	-	-	-	-	18	18	-	-	-
Protopendinium oceanicum	4	18	21	18	18	-	-	-	-	-	-	-
Protopendinium sp.	40	-	-	-	-	18	18	-	-	-	18	-
Protopendinium steinii	12	-	41	18	-	-	-	71	-	-	18	-
Scripsiella trochoidea	-	18	-	-	-	35	-	18	-	-	-	-
Tecato sp1	-	-	21	124	124	299	-	-	-	-	-	-
Tecato sp2	-	-	245	-	-	35	-	-	-	-	-	-
Tecati spp.	72	124	82	89	18	229	71	106	89	124	229	53
Tripos azoricus	-	-	-	-	-	18	-	-	-	-	-	-
Tripos arietinus	-	-	-	18	-	-	-	-	36	-	-	-
Tripos candelabrus	36	36	21	36	36	106	-	-	-	-	-	-

LOCATIONS	**MEW001b_W11**						**MEW001b_W12**					
Sample ID	**19LA 0016022**	**19LA 0016024**	**19LA 0016083**	**19LA 0016023**	**19LA 0016025**	**19LA 0016084**	**19LA 0023769**	**19LA 0023771**	**19LA 0023773**	**19LA 0023770**	**19LA 0023772**	**19LA 0023774**
Tripos carriensis	-	-	-	-	-	18	-	-	-	-	-	-
Tripos concilians	-	-	-	-	-	18	-	-	-	-	-	-
Tripos furca	-	18	-	-	-	18	-	-	-	-	-	-
Tripos limulus	12	-	-	-	-	-	-	-	-	-	-	-
Tripos macroceros	12	36	-	106	18	88	-	-	-	-	18	-
Tripos paradoxides	-	-	-	-	-	18	-	-	-	-	-	-
Tripos symmetricus	-	-	-	18	-	-	-	-	-	-	18	-
Chrysochromulina sp.	-	-	21	-	-	-	-	-	-	-	-	-
Cryptophycea spp.	104	124	21	36	-	-	-	-	-	-	36	-
Leucocryptos marina	24	18	-	-	-	-	-	-	18	-	18	-
Pyramimonas spp.	8	18	62	-	-	-	-	-	18	-	18	-
Tetraselmis sp.	-	18	21	-	-	-	1	1	-	-	36	-
Dictyocha fibula	-	36	62	-	-	-	-	-	-	-	-	-
Dictyocha sp.	32	18	82	-	-	18	-	-	-	-	-	-
Cyano n.i.	4	1251	21	-	-	-	-	-	-	-	-	-
Flagellates n.i.	-	-	-	18	36	36	-	-	53	-	36	-
Other	32	-	62	53	282	229	-	-	36	-	124	-
Families												
Bacillariophyceae	1104	1696	2495	6273	8438	16856	161	144	232	108	18	-
Dinoficeae	556	943	783	783	483	1312	125	321	161	267	443	89
Cryptoficeae	128	142	21	36	-	-	-	-	18	-	54	-
Dictyiophyceae	32	54	144	-	-	18	-	-	-	-	-	-
Euglenophyceae	-	-	-	-	-	-	-	-	-	-	-	-
Prasinophyceae	8	36	83	-	-	-	1	-	18	-	54	-
Primnesiophyceae	-	-	21	-	-	-	-	-	-	-	-	-
Flagellates n.i.	-	-	-	18	36	36	-	-	53	-	36	-
Cyanophyceae	4	1251	21	-	-	-	-	-	-	-	-	-
Other (incertae sedis)	32	-	62	53	282	229	-	-	36	-	124	-

Table 4.80 - Malta area: Phytoplankton density (Cell L^{-1}) / Stations W13-W14

LOCATIONS	MEW001b_W13						MEW001b_W14					
Sample ID	19LA 0023783	19LA 0023785	19LA 0023787	19LA 0023784	19LA 0023786	19LA 0023788	19LA 0023797	19LA 0023799	19LA 0023801	19LA 0023798	19LA 0023800	19LA 0023802
Species												
Centriche spp.	18	-	18	-	36	36	18	-	-	-	-	-
Chaetoceros danicus	-	-	-	18	-	-	-	-	-	-	-	-
Chaetoceros convolutus	-	-	-	18	-	-	-	18	-	-	-	-
Chaetoceros peruvianus	-	-	-	-	-	-	-	-	18	18	-	18
Chaetoceros sp.	-	53	18	-	-	-	-	-	-	-	-	18
Coscinodiscus radiatus	-	-	-	-	-	-	18	-	36	-	-	-
Coscinodiscus sp.	-	-	53	-	53	-	124	18	53	-	-	-
Dactyliosolen sp.	18	-	-	-	89	-	-	18	-	89	-	-
Gyrosigma sp.	-	-	-	-	18	-	-	-	-	-	-	-
Licmophora gracilis	-	-	-	18	-	-	-	-	-	-	-	-
Lithodesmium undulatum	-	-	-	-	18	-	-	-	-	-	-	-
Navicula closterium	-	-	-	18	-	-	-	-	-	-	-	-
Navicula sp.	-	36	-	-	-	-	-	-	-	18	-	-
Nitzschia sp.	-	-	-	-	-	18	-	18	-	-	-	-
Pennate spp.	-	-	36	36	106	18	-	-	18	18	-	-
Proboscia alata	-	-	53	-	-	36	-	-	-	-	-	-
Pseudo-nitzchia fraudolenta	-	229	-	-	-	-	-	-	-	-	-	-
Pseudo-nitzchia sp.	-	-	1110	-	705	53	-	-	-	-	-	-
Rhizosolenia sp.	-	-	-	18	-	-	-	-	-	-	-	-
Thalassionema frauenfeldi	36	-	18	-	-	-	18	-	-	-	-	-
Ceratium claviger	18	-	-	-	-	-	-	-	-	-	-	-
Ceratium declinatum	18	-	-	-	-	53	194	159	18	194	-	53
Ceratium furca	-	-	18	36	18	-	-	-	36	-	-	-
Ceratium fusus	-	-	18	36	18	53	-	36	18	53	-	-
Ceratium gravidum	-	-	-	-	18	-	-	-	-	-	-	-
Ceratium horridum	-	-	-	-	-	36	18	18	-	-	-	-
Ceratium pentagonum	-	-	-	18	36	-	18	53	53	106	-	18
Ceratium pulchellum	-	-	-	-	-	-	53	-	-	-	-	71

LOCATIONS	**MEW001b_W13**						**MEW001b_W14**					
Sample ID	**19LA 0023783**	**19LA 0023785**	**19LA 0023787**	**19LA 0023784**	**19LA 0023786**	**19LA 0023788**	**19LA 0023797**	**19LA 0023799**	**19LA 0023801**	**19LA 0023798**	**19LA 0023800**	**19LA 0023802**
Ceratium sp.	-	-	-	18	36	-	36	18	-	36	-	-
Ceratium trichoceros	-	-	18	-	18	18	18	36	-	53	-	36
Ceratium horrida	18	-	36	-	-	-	53	53	18	-	-	-
Corythodium tesselatum	-	-	18	18	53	-	-	-	-	18	-	-
Dinophysis acuta	-	-	18	-	18	-	124	36	18	159	36	53
Dinophysis caudata	-	-	-	-	-	18	18	-	-	36	-	-
Dinophysis fortii	-	-	-	-	71	-	-	-	-	-	-	-
Dinophysis sacculus	-	-	-	-	18	-	18	-	-	-	-	-
Dinophysis rotundata	-	-	53	-	71	36	18	36	18	36	-	-
Diplopsalis sp.	18	-	-	-	18	36	-	-	-	-	-	-
Gonyaulax sp.	-	-	-	18	-	-	71	18	36	71	18	53
Heterocapsa sp.	-	-	18	-	-	-	-	-	-	18	-	-
Lingulodinium polyedrum	-	-	-	-	-	-	-	-	-	180	-	-
Mesoporos adriaticus	-	-	18	-	-	18	-	18	-	-	-	-
Minuscula bipes	-	-	18	18	-	-	-	-	18	-	-	-
Ornithocercus magnificus	-	-	-	18	53	89	106	-	36	71	-	-
Ornithocercus quadratus	-	-	-	-	-	-	53	-	36	18	36	-
Oxytoxum variabile	-	18	-	71	18	-	-	-	-	-	-	-
Oxytoxum scopalax	-	-	-	-	36	53	-	-	-	-	-	-
Oxytoum sp.	-	-	-	-	-	18	18	-	-	18	-	-
Pronoctiluca pelagica	-	-	-	-	53	-	-	-	-	-	-	-
Pronoctiluca sp.	-	-	18	-	36	18	-	-	18	-	-	-
Prorocentrum sp.	-	-	-	-	-	-	-	-	-	18	-	-
Protopendinium crassipes	-	-	53	-	18	18	36	-	36	124	89	-
Protopendinium depressum	-	-	71	71	53	177	159	18	36	212	106	36
Protopendinium diabolum	-	-	-	-	-	-	18	18	-	-	-	-
Protopendinium divergens	-	-	-	-	36	-	-	-	-	-	-	-
Protopendinium oceanicum	-	-	-	-	18	106	18	-	-	36	18	-
Protopendinium sp.	-	18	-	18	53	71	53	-	-	18	-	18
Protopendinium steinii	-	-	53	89	89	159	-	18	36	18	-	18
Scripsiella trochoidea	18	-	-	-	36	36	-	-	-	-	-	-

LOCATIONS	**MEW001b_W13**						**MEW001b_W14**					
Sample ID	**19LA 0023783**	**19LA 0023785**	**19LA 0023787**	**19LA 0023784**	**19LA 0023786**	**19LA 0023788**	**19LA 0023797**	**19LA 0023799**	**19LA 0023801**	**19LA 0023798**	**19LA 0023800**	**19LA 0023802**
Tecati spp.	-	36	89	194	406	300	212	71	36	300	36	18
Tripos arietinus	-	-	53	-	53	36	-	18	-	36	-	-
Tripos candelabrus	-	-	-	-	-	-	-	18	-	-	18	-
Tripos contortus	-	-	-	18	-	-	-	-	-	-	-	18
Tripos macroceros	-	-	-	-	-	-	-	-	-	18	-	-
Tripos paradoxides	-	-	-	-	-	18	-	-	-	-	-	-
Tripos symmetricus	-	-	-	-	18	-	-	-	-	-	18	-
Cyano n.i.	53	18	-	-	36	-	-	18	18	-	-	-
Other	-	-	-	-	-	-	-	-	124	-	-	-
Families												
Bacillariophyceae	72	318	1306	126	1025	161	178	72	125	143	0	36
Dinoficeae	90	72	570	641	1369	1367	1312	642	467	1703	375	392
Cyanophyceae	53	18	-	-	36	-	-	18	18	-	-	-
Other (incertae sedis)	-	-	-	-	-	-	-	-	124	-	-	-

Table 4.81 - Malta area: Phytoplankton density (Cell L^{-1}) / Stations W15

LOCATIONS	**MEW001b_W15**					
Sample ID	**19LA 0023811**	**19LA 0023813**	**19LA 0023815**	**19LA 0023812**	**19LA 0023814**	**19LA 0023816**
Species						
Centriche spp.	18	18	-	71	36	-
Chaetoceros peruvianus	-	36	-	18	18	-
Chaetoceros sp.	-	-	-	-	-	18
Coscinodiscus granii	-	53	-	18	-	-
Coscinodiscus radiatus	18	-	-	-	-	-
Coscinodiscus sp.	18	18	-	36	-	-
Dactyliosolen fragilissimus	89	-	-	-	-	-

LOCATIONS	**MEW001b_W15**					
Sample ID	**19LA 0023811**	**19LA 0023813**	**19LA 0023815**	**19LA 0023812**	**19LA 0023814**	**19LA 0023816**
Dactyliosolen sp.	18	53	-	106	-	36
Guinardia sp.	-	-	-	141	-	-
Gyrosigma sp.	89	-	-	18	-	-
Leptocylindrus sp.	-	-	-	-	-	36
Navicula sp.	71	141	53	229	159	71
Pennate sp1	-	723	335	1462	652	53
Pennate spp.	89	36	36	159	89	141
Phaeodactylum tricomutum	18	-	-	-	-	-
Pleurosigma sp.	18	-	-	-	-	-
Proboscia alata	-	-	-	18	-	-
Pseudo-nitzchia sp.	-	599	335	758	758	194
Tabellaria fenestrata	18	-	-	-	-	-
Ceratium declinatum	53	212	-	141	53	-
Ceratium furca	-	-	-	18	36	-
Ceratium fusus	36	124	71	494	194	124
Ceratium horridum	18	53	-	36	-	-
Ceratium pentagonum	124	247	71	423	141	-
Ceratium pulchellum	-	53	-	124	36	-
Ceratium sp.	-	18	18	18	36	18
Ceratium trichoceros	-	-	18	89	18	-
Ceratium horrida	18	18	-	-	18	-
Corythodium tesselatum	-	18	-	-	18	-
Dinophysis acuta	-	-	36	-	-	-
Dinophysis caudata	-	-	71	106	106	18
Diplopsalis sp.	18	36	-	-	18	-
Gonyaulax sp.	53	36	124	353	71	71
Heterocapsa minima	-	-	-	-	-	-
Heterocapsa sp.	-	18	18	-	-	-
Lingulodinium polyedrum	-	71	-	141	18	18
Minuscula bipes	18	-	-	-	-	-
Ornithocercus magnificus	18	71	36	212	18	36

LOCATIONS	**MEW001b_W15**					
Sample ID	**19LA 0023811**	**19LA 0023813**	**19LA 0023815**	**19LA 0023812**	**19LA 0023814**	**19LA 0023816**
Ornithocercus quadratus	18	18	-	-	-	-
Oxytoxum variabile	-	36	-	36	18	-
Oxytoxum viridae	-	18	-	-	-	-
Oxytoxum scopalax	-	-	-	36	-	-
Pronoctiluca sp.	-	-	-	18	-	-
Protopendinium crassipes	18	194	71	353	53	71
Protopendinium depressum	18	-	18	18	71	53
Protopendinium diabolum	-	-	-	71	-	18
Protopendinium divergens	-	53	-	-	-	-
Protopendinium oceanicum	-	-	-	36	18	-
Protopendinium sp.	-	53	18	-	18	-
Protopendinium steinii	18	-	-	124	53	36
Tecati spp.	124	53	53	229	71	71
Tripos arietinus	-	106	18	141	89	36
Tripos candelabrus	-	36	-	106	71	18
Tripos carriensis	-	18	-	-	-	-
Tripos concilians	-	-	-	-	18	-
Tripos paradoxides	18	-	-	-	-	-
Cyano n.i.	-	-	-	18	-	-
Flagellates n.i.	-	-	-	-	-	-
Other	-	18	-	18	-	-
Families						
Bacillariophyceae	464	1677	759	3034	1712	549
Dinoficeae	570	1560	641	3323	1261	588
Cyanophyceae	-	-	-	18	-	-
Other (incertae sedis)	-	18	-	18	-	-

4.7.1.2 Offshore Italy – Phytoplankton Analysis

Phytoplankton taxa belonging to the families Bacillariophyceae and Dinoficeae dominated in all the investigated area.

In the present investigation, when the specimens could not be identified to species level with absolute confidence, the name of the taxon encountered was identified by:

Sp. = this abbreviation was used when a single species has not been identified.

Spp. = this abbreviation was used when more than one species has not been identified.

Ind.= Is used to address the cases in which a deterioration of the organisms was found, not allowing a clear definition at a lower level than what indicated.

Numerical results of analysis of phytoplankton samples from offshore Italy area are shown below (Table 4.82). Sample ID is referred to "Laboratory Certifications" in APPENDIX 9: WATER LABORATORY ANALYSES RESULTS CERTIFICATES.
The plankton characterization of the collected samples have been performed at AMBIENTE s.p.a (Carrara, Italy).
The results of the processing and interpretation of data are displayed in this report (APPENDIX 10: WATER LABORATORY ANALYSES RESULTS TABLE).
In all investigated area was not always possible to reach the lowest levels in the taxonomic identification (Table 4.82) and most individuals belong to *Pennate spp.* And *Cryptophycea spp.* Taxa.

Table 4.82 - Offshore Italy: Phytoplankton density (Cell L^{-1}) / W01-W10

LOCATIONS	MEW001b_ W01	MEW001b_ W02	MEW001b_ W03	MEW001b_ W04	MEW001b_ W05	MEW001b_ W06	MEW001b_ W07	MEW001b_ W08	MEW001b_ W09	MEW001b_ W10
Sample ID	19LA 0014281	19LA 0014290	19LA 0014296	19LA 0014302	19LA 0014308	19LA 0014314	19LA 0014320	19LA 0014326	19LA 0014332	19LA 0014338
Species										
Centriche spp.	89	18	-	-	-	18	18	-	18	-
Lithodesmium undulatum	-	-	-	-	-	-	-	-	18	-
Navicula sp.	18	-	-	18	-	35	0	-	-	-
Nitzschia sp.	18	-	-	-	-	0	0	-	-	-
Pennate spp.	159	-	18	36	-	18	18	-	-	18
Thalassionema frauenfeldi	18	-	-	-	-	-	-	-	-	-
Ceratium fusus	-	-	-	-	-	-	-	18	-	-
Dinophysis rotundata	-	-	-	-	18	-	-	18	-	-
Diplopsalis sp.	-	-	-	-	-	-	18	-	-	-
Heterocapsa minima	18	-	-	-	-	-	-	-	18	-
Heterocapsa sp.	-	-	-	-	18	-	-	-	-	-
Protocentrum compressum	-	-	-	-	-	-	-	-	18	-
Protocentrum reticulatum	-	-	18	-	-	-	-	-	-	-
Protopendinium diabolum	-	-	-	-	-	-	-	-	18	18
Tecati spp.	36	18	18	-	-	-	-	-	18	36
Cryptophycea spp.	71	18	18	-	18	-	18	-	18	18
Dictyocha fibula	-	-	18	-	18	-	-	-	-	18
Dictyocha sp.	-	-	-	-	-	-	-	-	18	-
Flagellates n.i.	-	-	-	-	-	-	-	-	18	-
Other	-	-	-	-	18	18	-	194	18	-
Families										
Bacillariophyceae	302	18	18	54	-	71	36	-	36	18
Dinoficeae	54	18	36	-	36	-	18	36	72	36
Cryptoficeae	71	18	18	-	18	-	18	-	18	18
Dictyiophyceae	-	-	18	-	18	-	-	-	18	18
Prasinophyceae	-	-	-	-	-	-	-	-	-	18

LOCATIONS	**MEW001b_ W01**	**MEW001b_ W02**	**MEW001b_ W03**	**MEW001b_ W04**	**MEW001b_ W05**	**MEW001b_ W06**	**MEW001b_ W07**	**MEW001b_ W08**	**MEW001b_ W09**	**MEW001b_ W10**
Sample ID	**19LA 0014281**	**19LA 0014290**	**19LA 0014296**	**19LA 0014302**	**19LA 0014308**	**19LA 0014314**	**19LA 0014320**	**19LA 0014326**	**19LA 0014332**	**19LA 0014338**
Flagellates n.i.	-	-	-	-	-	-	-	-	18	-
Other (incertae sedis)	-	-	-	-	18	18	-	194	18	-

4.7.1.3 Nearshore Gela – Phytoplankton Analysis

Phytoplankton taxa belonging to the families Bacillariophyceae and Dinoficeae dominated in all the investigated area. The other families characterized by few individuals are the following: Prasinophyceae, Flagellates n.i., Cryptoficeae, Euglenophyceae.

In the present investigation, when the specimens could not be identified to species level with absolute confidence, the name of the taxon encountered was identified by:

Sp. = this abbreviation was used when a single species has not been identified.

Spp. = this abbreviation was used when more than one species has not been identified.

Ind.= Is used to address the cases in which a deterioration of the organisms was found, not allowing a clear definition at a lower level than what indicated.

Numerical results of analysis of phytoplankton samples from offshore Italy area are shown below (Table 4.83). Sample ID is referred to "Laboratory Certifications" in APPENDIX 9: WATER LABORATORY ANALYSES RESULTS CERTIFICATES.
The plankton characterization of the collected samples have been performed at AMBIENTE s.p.a (Carrara, Italy).
The results of the processing and interpretation of data are displayed in this report (APPENDIX 10: WATER LABORATORY ANALYSES RESULTS TABLE).
In all investigated area was not always possible to reach the lowest levels in the taxonomic identification (Table 4.82 and Table 4.84) and most individuals belong to *Pennate spp.* and *Ceratium gibberum* Taxa.

Table 4.83 – Nearshore Gela: Phytoplankton density (Cell L^{-1}) / W21-W30

LOCATIONS	MEW001d_ W21	MEW001d_ W22	MEW001d_ W23	MEW001d_ W24	MEW001d_ W25	MEW001d_ W26	MEW001d_ W27	MEW001d_ W28	MEW001d_ W29	MEW001d_ W30
Sample ID	19LA 0046122	19LA 0046151	19LA 0046125	19LA 0046154	19LA 0046157	19LA 0046128	19LA 0046131	19LA 0046134	19LA 0046160	19LA 0046139
Species										
Chaetoceros sp.	-	-	-	-	16	-	-	-	8	-
Cylindrotheca closterium	-	-	-	-	8	-	-	-	-	-
Navicula sp.	-	-	-	-	-	12	-	-	-	-
Nitzschia sp.	-	-	-	-	4	-	-	-	-	-
Pennate spp.	4	4	4	-	12	16	-	-	16	-
Pseudo-nitzchia sp.	-	-	-	-	4	-	-	-	-	-
Rhizosolenia sp.	-	-	-	-	-	-	-	-	-	4
Ceratium declinatum	-	-	4	-	-	8	4	12	-	-
Ceratium furca	8	4	8	28	-	-	-	4	-	-
Ceratium fusus	-	-	-	4	-	-	-	-	-	-
Ceratium gibberum	-	-	-	-	60	-	-	-	12	-
Ceratium pulchellum	4	-	-	-	-	-	-	-	-	-
Ceratium trichoceros	-	-	-	-	-	-	-	8	-	8
Dinophysis acuta	-	-	-	-	-	-	-	-	-	4
Gonyaulax sp.	-	12	12	4	-	8	4	-	-	-
Gyrodinium fusiforme	-	-	-	-	-	4	-	-	-	-
Heterocapsa minima	-	-	-	-	-	-	8	-	8	-
Minuscula bipes	-	-	-	-	-	-	-	4		-
Oxytoxum variabile	-	4	4	-	-	-	4	4	-	-
Pronoctiluca acuta	-	4	-	-	-	-	-	-	-	-
Prorocentrum concavum	-	-	-	-	-	-	-	-	4	-
Prorocentrum dentatum	-	-	-	-	-	4	-	-	-	-
Prorocentrum gracile	8	-	-	-	-	-	-	-	-	4
Prorocentrum lima	-	-	-	-	-				4	
Prorocentrum sp.	4	-	4	8	-	4	8	4	-	4
Prorocentrum compressum	-	-	-	-	8	-	-	-	-	-
Prorocentrum reticulatum	-	-	-	-	8	-	-	-	4	-

LOCATIONS	MEW001d_ W21	MEW001d_ W22	MEW001d_ W23	MEW001d_ W24	MEW001d_ W25	MEW001d_ W26	MEW001d_ W27	MEW001d_ W28	MEW001d_ W29	MEW001d_ W30
Sample ID	19LA 0046122	19LA 0046151	19LA 0046125	19LA 0046154	19LA 0046157	19LA 0046128	19LA 0046131	19LA 0046134	19LA 0046160	19LA 0046139
Proropendinium crassipes	-	-	-	-	-	-	-	4	-	-
Proropendinium depressum	-	-	-	-	-	-	-	-	-	4
Scripsiella trochoidea	-	4	8	-	8	-	-	-	-	-
Tecato sp2	-	-	-	-	4	-	-	-	-	-
Tecati spp.	-	-	24	12	-	4	4	4	-	4
Tripos arietinus	-	-	-	-	4	-	-	4	8	-
Tripos macroceros	-	-	-	-	16	-	-	-	-	-
Eutreptiella sp.	-	-	-	-	4	-	-	-	-	-
Pyramimonas spp.	-	-	-	-	-	-	-	-	4	-
Flagellates n.i.	-	-	-	-	-	4	-	-	-	-
Families										
Bacillariophyceae	4	4	4	-	44	28	-	-	24	4
Dinoficeae	24	28	64	56	108	32	32	48	40	28
Euglenophyceae	-	-	-	-	4	-	-	-	-	-
Prasinophyceae	-	-	-	-	-	-	-	-	4	-
Flagellates n.i.	-	-	-	-	-	4	-	-	-	-

Table 4.84 - Nearshore Gela: Phytoplankton density (Cell L^{-1}) / W31-W40

LOCATIONS	MEW001d_ W31	MEW001d_ W32	MEW001d_ W33	MEW001d_ W34	MEW001d_ W35	MEW001d_ W36	MEW001d_ W37	MEW001d_ W38	MEW001d_ W39	MEW001d_ W40
Sample ID	19LA 0046045	19LA 0046142	19LA 0046145	19LA 0046047	19LA 0046049	19LA 0046148	19LA 0046051	19LA 0046053	19LA 0046055	19LA 0046057
Species										
Nitzschia sp.	-	-	-	-	-	-	-	-	-	4
Pennate spp.	8	4	8	-	-	12	8	4	-	-
Pseudo-nitzchia sp.	-	-	-	-	-	-	-		-	-
Ceratium concilians	-	-	-	-	-	-	-	4	-	-

LOCATIONS	**MEW001d_ W31**	**MEW001d_ W32**	**MEW001d_ W33**	**MEW001d_ W34**	**MEW001d_ W35**	**MEW001d_ W36**	**MEW001d_ W37**	**MEW001d_ W38**	**MEW001d_ W39**	**MEW001d_ W40**
Sample ID	**19LA 0046045**	**19LA 0046142**	**19LA 0046145**	**19LA 0046047**	**19LA 0046049**	**19LA 0046148**	**19LA 0046051**	**19LA 0046053**	**19LA 0046055**	**19LA 0046057**
Ceratium declinatum	-	-	-	4	-	8	4	4	-	-
Ceratium furca	-	4	-	-	-	-	-	-	-	-
Ceratium gibberum	-	-	-	-	-	-	-	-	-	-
Ceratium pulchellum	4	-	4	-	-	-	-	-	-	-
Ceratium sp.	-	-	-	-	-	-	4	-	-	-
Ceratium teres	-	4	-	-	-	-	4	-	-	-
Diplopsalis sp.	4		4		4	4	-	-	-	-
Gonyaulax sp.	4	8	4	4	4	4	-	-	-	-
Heterocapsa sp.	-	-	-	-	-	-	4	-	-	-
Minuscula bipes	-	-	-	-	-	4	-	-	-	-
Oxytoxum caudatum	-	-	-	-	4	-	-	-	-	-
Oxytoxum variabile	4	-	4	-	4	4	4	-	-	-
Oxytoxum sp.	4	-	4	-	-	-	-	-	-	-
Pronoctiluca acuta	-	4	-	-	-	-	-	-	-	-
Pronoctiluca sp.	-	-	-	-	4	-	-	-	-	-
Prorocentrum balticum	-	4	-	-		-	-	-	-	-
Prorocentrum concavum	-	-	-	-	-	4	-	-	-	-
Prorocentrum dentatum	-	4	-	-	-	4	-	-	-	-
Prorocentrum sp.	12	12	12	-	4	8	-	-	-	-
Prorocentrum compressum	-	-	-	-	-	-	-	-	-	-
Prorocentrum reticulatum	-	-	-	-	-	-	-	-	-	-
Proropendinium crassipes	-	4	-	-	-	-	-	-	-	-
Proropendinium depressum	-	4	-	-	4	-	-	-	-	18
Proropendinium diabolum	-	-	-	-	-	4	-	-	-	-
Proropendinium sp.	-	8	-	-	-	-	-	-	8	-
Proropendinium steinii	4	-	4	-	-	-	-	-	-	4
Scripsiella trochoidea	-	-	-	-	4	8	-	-	-	8
Tecato sp2	-	-	-	-		-	-	-	-	-
Tecati spp.	-	-	-	-	4	-	-	-	-	4
Tripos arietinus	-	-	-	-		-	-	-	-	-
Tripos candelabrus	-	4	-	-	4	-	4	-	-	-
Tripos incisus	-	-	-	-	-	-	4	-	-	-

LOCATIONS	**MEW001d_ W31**	**MEW001d_ W32**	**MEW001d_ W33**	**MEW001d_ W34**	**MEW001d_ W35**	**MEW001d_ W36**	**MEW001d_ W37**	**MEW001d_ W38**	**MEW001d_ W39**	**MEW001d_ W40**
Sample ID	**19LA 0046045**	**19LA 0046142**	**19LA 0046145**	**19LA 0046047**	**19LA 0046049**	**19LA 0046148**	**19LA 0046051**	**19LA 0046053**	**19LA 0046055**	**19LA 0046057**
Tripos macroceros	-	-	-	-	-	-	-	-	4	16
Plagioselinis nordica	8	-	8	-	-	-	-	-	-	-
Euglena sp.	-	-	-	-	-	-	4	-	-	-
Eutreptiella sp.	-	-	-	-	-	-	4	-	-	4
Pesudoscurfielda marina	-	-	-	-	-	4	-	-	-	-
Pyramimonas spp.	-	-	-	-	-	-	4	-	-	-
Tetraselmis sp.	-	-	-	-	-	-	4	-	-	-
Flagellates n.i.	-	-	-	4	-	-	-	-	-	-
Families										
Bacillariophyceae	8	4	8	-	-	12	8	4	-	4
Dinoficeae	36	60	36	8	40	52	28	8	12	34
Cryptoficeae	8	-	8	-	-	-	-	-	-	-
Euglenophyceae	-	-	-	-	-	-	8	-	-	-
Prasinophyceae	-	-	-	-	-	4	8	-	-	-
Flagellates n.i.	-	-	-	4	-	-	-	-	-	-

4.7.2 Zooplankton

The results of this section are based on the taxonomic identification of the zooplankton individuals collected during the survey. The analysis and taxonomic identification of zooplankton specimens can be difficult at the species level. This is due to the fact that some species can be partly damaged during sampling or shows the effects of preservation on specific details that in certain cases should be indispensable for their identification. Moreover, while some species show a worldwide distribution, other species might be specific of the region and scientific literature from the investigated region is extremely limited. Finally, the identification of soft body organisms (e.g., the presence of cnidarian, planktonic polychaeta and meroplanktonic larvae) could be particularly problematic. In the present investigation, when the specimens could not be identified to species level with absolute confidence, the name of the taxon encountered was identified by:

Sp. = this abbreviation was used when a single species has not been identified.

Spp. = this abbreviation was used when more than one species has not been identified.

Ind.= Is used to address the cases in which a deterioration of the organisms was found, not allowing a clear definition at a lower level than what indicated.

4.7.2.1 Maltese waters - analysis

Numerical results of the analysis of zooplankton samples from Malta area are shown in Table 4.85 and Table 4.86.

Stations W12, W13 are those in which the greatest number of individuals have been found (Table 4.86). Most of species found belong to Crustacea Copepoda Celanoida taxa. In particular, the most representative specie in the whole area is *Paracalanus parvus* (Claus, 1863).

Table 4.85 - Zooplankton analysis: field operations

SAMPLES	MEW001b_W11_W11Z	MEW001b_W12_W12Z	MEW001b_W13_W13Z	MEW001b_W14_W14Z	MEW001b_W15_W15Z
Sample ID	**19LA0014321**	**19LA0023768**	**19LA0023782**	**19LA0023796**	**19LA0023810**
Sampling date	**10/03/2019**	**01/05/2019**	**01/05/2019**	**30/04/2019**	**29/04/2019**
Max tow depth (m)	138	137	127	79	46
Net diameter (cm)	57	57	57	57	57
Flowmeter counts	2436	1221	983	1300	1322
WATER VOLUME (l)	146160	73260	58980	78000	79320
WATER VOLUME (m3)	146.16	73.26	58.98	78.00	79.32
TOW DISTANCE (m)	730.8	366.3	294.9	390.0	396.6

Table 4.86 – Zooplankton Species Classification (individuals/l) in Malta

SAMPLES		MEW001b_W11_W11Z	MEW001b_W12_W12Z	MEW001b_W13_W13Z	MEW001b_W14_W14Z	MEW001b_W15_W15Z
Sample ID		**19LA0014321**	**19LA0023768**	**19LA0023782**	**19LA0023796**	**19LA0023810**
Phylum/Order	**Family/ Genus /Species**					
Radiolaria	Radiolaria ind.	-	20	-	-	-
Coelenterata Trachymedusae	*Aglaura hemistoma* Péron & Lesueur, 1810	80	400	280	58	100
	Liriope tetraphylla (Chamisso & Eysenhardt, 1821)	-	20	-	-	-

SAMPLES		**MEW001b_W11_W11Z**	**MEW001b_W12_W12Z**	**MEW001b_W13_W13Z**	**MEW001b_W14_W14Z**	**MEW001b_W15_W15Z**
Sample ID		**19LA0014321**	**19LA0023768**	**19LA0023782**	**19LA0023796**	**19LA0023810**
Phylum/Order	**Family/ Genus /Species**					
Coelenterata Scyphozoa	Larva Ephyra	-	20	-	-	-
Coelenterata Ind.	Hydromedusa ind.	-	20	60	-	-
Anellida Polychaeta	Larva Nectochaeta	-	40	80	-	-
	Larva Trochophora	-	20	-	-	-
	Tomopteris sp.	-	60	-	-	-
Chaetognatha	*Sagitta sp.*	520	340	1780	-	60
Mollusca Gastropoda	Larva ind.	20	100	40	17	-
Mollusca Bivalvia	Larva ind.	160	40	20	-	-
Crustacea Copepoda Calanoida	*Acartia italica* Steuer, 1910	140	40	-	117	120
	Anomalocera sp.	-	-	20	-	-
	Calocalanus sp.	1160	240	1160	42	300
	Calocalanus contractus Farran, 1926	40	440	380	4	-
	Calocalanus pavo (Dana, 1852)	-	60	60	13	60
	Calocalanus styliremis Giesbrecht, 1888	320	280	860	-	40
	Centropages	-	-	80	-	-

SAMPLES		**MEW001b_W11_W11Z**	**MEW001b_W12_W12Z**	**MEW001b_W13_W13Z**	**MEW001b_W14_W14Z**	**MEW001b_W15_W15Z**
Sample ID		**19LA0014321**	**19LA0023768**	**19LA0023782**	**19LA0023796**	**19LA0023810**
Phylum/Order	**Family/ Genus /Species**					
	sp.					
	Centropages kroyeri Giesbrecht, 1893	-	80	-	21	-
	Centropages typicus Krøyer, 1849	40	80	180	38	60
	Clausocalanus sp.	140	2260	540	-	60
	Ctenocalanus vanus Giesbrecht, 1888	-	560	20	8	-
	Eucalanus attenuatus (Dana, 1849)	-	60	240	-	-
	Euchaeta marina (Prestandrea, 1833)	-	20	-	-	-
	Mecynocera clausi Thompson I.C., 1888	-	80	-	4	-
	Mesocalanus tenuicornis (Dana, 1849)	-	140	-	8	-
	Nannocalanus minor (Claus, 1863)	20	-	-	-	-
	Neocalanus gracilis (Dana, 1852)	-	60	-	-	-

SAMPLES		**MEW001b_W11_W11Z**	**MEW001b_W12_W12Z**	**MEW001b_W13_W13Z**	**MEW001b_W14_W14Z**	**MEW001b_W15_W15Z**
Sample ID		**19LA0014321**	**19LA0023768**	**19LA0023782**	**19LA0023796**	**19LA0023810**
Phylum/Order	**Family/ Genus /Species**					
	Paracalanus parvus (Claus, 1863)	**880**	**2200**	**1740**	**188**	**280**
	Temora stylifera (Dana, 1849)	100	940	1260	-	100
Crustacea Copepoda Cyclopoida	*Oithona sp.*	300	180	340	8	60
	Oithona nana Giesbrecht, 1893	-	460	1200	75	60
	Oithona plumifera Baird, 1843	760	120	320	29	40
	Oithona similis Claus, 1866	-	-	-	-	80
Crustacea Copepoda Poecilostomatoida	*Oncaea sp.*	80	220	780	8	100
	Corycaeus sp.	100	180	140	8	20
Crustacea Cladocera	*Evadne spinifera* P.E. Müller, 1867	-	40	20	-	40
Crustacea Amphipoda	Corophiidae	-	40	-	-	40
	Hyperiidea ind.	-	20	-	-	-
	Hyperoche medusarum (Kroyer, 1838)	-	40	-	-	-
Crustacea Isopoda	Isopoda ind.	-	20	-	-	-
Crustacea Decapoda	Larva Megalopa	-	60	-	-	-

SAMPLES		**MEW001b_W11_W11Z**	**MEW001b_W12_W12Z**	**MEW001b_W13_W13Z**	**MEW001b_W14_W14Z**	**MEW001b_W15_W15Z**
Sample ID		**19LA0014321**	**19LA0023768**	**19LA0023782**	**19LA0023796**	**19LA0023810**
Phylum/Order	**Family/ Genus /Species**					
	Larva Zoea	60	-	-	-	-
Crustacea Ostracoda	Ostracoda ind.	60	60	-	-	-
Crustacea Mysidacea	Mysidacea ind.	20	-	-	-	-
Crustacea Euphausiacea	Larva Furcilia	20	80	120	8	-
rustacea Cirripedia	Larva Cypris	80	-	120	-	20
Crustacea ind.	Larva Nauplius	260	80	40	-	-
Tunicata Thaliacea	*Dolioletta gegenbauri* (Uljanin, 1884)	40	400	560	17	20
Appendicularie	*Oikopleura sp.*	280	240	260	21	60
Osteichthyes	Larva ind.	-	-	-	-	20

4.7.2.2 Nearshore Gela analysis

Numerical results of the analysis of zooplankton samples from nearshore Gela area are shown in Table 4.87 , Table 4.88 and Table 4.89.

Stations W36, W34 are those in which the greatest number of individuals have been found. Most of species found belong to Crustacea Copepoda Celanoida taxa. In particular, the most representative specie in the whole area is *Paracalanus parvus* (Claus, 1863).

Table 4.87 - Zooplankton Species Classification (individuals/l) in nearshore Gela / W21-W28

SAMPLES		**MEW001d_ W21_W21Z**	**MEW001d_ W22_W22Z**	**MEW001d_ W23_W23Z**	**MEW001d_ W24_W24Z**	**MEW001d_ W25_W25Z**	**MEW001d_ W26_W26Z**	**MEW001d_ W27_W27Z**	**MEW001d_ W28_W28Z**
Sample ID		**19LA 0046400**	**19LA 0046401**	**19LA 0046402**	**19LA 0046403**	**19LA 0046404**	**19LA 0046405**	**19LA 0046406**	**19LA 0046407**
Phylum/Order	**Family/ Genus /Species**								
Coelenterata Trachymedusae	*Liriope tetraphylla* (Chamisso & Eysenhardt, 1821)	40	-	-	-	-	-	-	-
Chaetognatha	*Sagitta sp.*	200	-	80	40	160	40	120	140
Mollusca Gastropoda	Larva ind.	20	-	-	-	-	-	-	-
Crustacea Copepoda Calanoida	*Acartia clausi* Giesbrecht, 1889	100	-	-	60	-	80	40	140
	Calocalanus sp.	60	-	-	100	-	80	-	500
	Calocalanus contractus Farran, 1926	-	-	120	-	-	-	-	30
	Calocalanus pavo (Dana, 1852)	-	-	-	-	-	60	600	-
	Calocalanus styliremis Giesbrecht, 1888	100	-	-	-	-	-	-	-
	Centropages sp.	-	-	20	-	-	40	-	20

SAMPLES		**MEW001d_ W21_W21Z**	**MEW001d_ W22_W22Z**	**MEW001d_ W23_W23Z**	**MEW001d_ W24_W24Z**	**MEW001d_ W25_W25Z**	**MEW001d_ W26_W26Z**	**MEW001d_ W27_W27Z**	**MEW001d_ W28_W28Z**
Sample ID		**19LA 0046400**	**19LA 0046401**	**19LA 0046402**	**19LA 0046403**	**19LA 0046404**	**19LA 0046405**	**19LA 0046406**	**19LA 0046407**
Phylum/Order	**Family/ Genus /Species**								
	Centropages kroyeri Giesbrecht, 1893	-	20	-	-	20	100	-	60
	Centropages typicus Krøyer, 1849	60	40	40	40	20	180	20	160
	Clausocalanus furcatus (Brady, 1883)	380	160	680	120	180	240	220	760
	Mecynocera clausi Thompson I.C., 1888	20	-	-	40	-	-	-	-
	Mesocalanus tenuicornis (Dana, 1849)	-	-	-	20	-	-	-	-
	Paracalanus parvus (Claus, 1863)	7100	2940	3060	2940	5560	3440	5780	2180
	Pteriacartia josephinae (Crisafi, 1974)	-	-	-	-	-	-	-	20
	Temora longicornis (Müller O.F., 1785)	20	-	-	-	-	-	20	-
	Temora stylifera (Dana, 1849)	-	-	-	-	20	-	-	
Crustacea Copepoda Cyclopoida	*Oithona sp.*	40	100	40	-	100	-	40	40
	Oithona nana Giesbrecht, 1893	20	40	-	-	-	-	-	-
	Oithona plumifera Baird, 1843	40	-	40	40	-	-	-	20
Crustacea Copepoda Poecilostomatoida	*Oncaea sp.*	-	20	20	-	-	20	-	-
	Corycaeus sp.	100	-	-	-	-	60	20	40
Crustacea Cladocera	*Evadne tergestina* Claus, 1864	-	-	-	-	-	-	20	40
Crustacea Amphipoda	Caprellidea	20	-	-	-	-	-	-	-
Crustacea Decapoda	Larva Zoea	-	20	-	-	-	20	-	-
Crustacea Mysidacea	Mysidacea ind.	-	-	-	-	-	-	40	20

SAMPLES		**MEW001d_ W21_W21Z**	**MEW001d_ W22_W22Z**	**MEW001d_ W23_W23Z**	**MEW001d_ W24_W24Z**	**MEW001d_ W25_W25Z**	**MEW001d_ W26_W26Z**	**MEW001d_ W27_W27Z**	**MEW001d_ W28_W28Z**
Sample ID		**19LA 0046400**	**19LA 0046401**	**19LA 0046402**	**19LA 0046403**	**19LA 0046404**	**19LA 0046405**	**19LA 0046406**	**19LA 0046407**
Phylum/Order	**Family/ Genus /Species**								
Crustacea Euphausiacea	Larva Furcilia	20	-	40	20	60	-	60	60
Crustacea Cirripedia	Larva Cypris	-	20	20	-	-	-	-	-
Crustacea ind.	Larva Nauplius	-	40	-	-	-	-	-	40
Appendicularie	*Oikopleura sp.*	80	40	80	60	-	20	-	80

Table 4.88 - Zooplankton Species Classification (individuals/l) in nearshore Gela / W29-W36

SAMPLES		**MEW001d_ W29_W29Z**	**MEW001d_ W30_W30Z**	**MEW001d_ W31_W31Z**	**MEW001d_ W32_W32Z**	**MEW001d_ W33_W33Z**	**MEW001d_ W34_W34Z**	**MEW001d_ W35_W35Z**	**MEW001d_ W36_W36Z**
Sample ID		**19LA 0046408**	**19LA 0046409**	**19LA 0046410**	**19LA 0046411**	**19LA 0046412**	**19LA 0046413**	**19LA 0046414**	**19LA 0046415**
Phylum/Order	**Family/ Genus /Species**								
Coelenterata Anthozoa	Larva Actinula	-	-	-	-	-	40	-	-
Anellida Polychaeta	Larva Nectochaeta	-	-	-	-	20	-	-	-
Chaetognatha	*Sagitta sp.*	60	20	-	20	-	160	-	100
Mollusca Gastropoda	Larva ind.	-	-	-	-	20	80	-	380
Mollusca Bivalvia	Larva ind.	-	-	-	-	-	-	-	20
Crustacea Copepoda Calanoida	*Acartia clausi* Giesbrecht, 1889	-	-	-	20	20	60	-	120

SAMPLES		**MEW001d_ W29_W29Z**	**MEW001d_ W30_W30Z**	**MEW001d_ W31_W31Z**	**MEW001d_ W32_W32Z**	**MEW001d_ W33_W33Z**	**MEW001d_ W34_W34Z**	**MEW001d_ W35_W35Z**	**MEW001d_ W36_W36Z**
Sample ID		**19LA 0046408**	**19LA 0046409**	**19LA 0046410**	**19LA 0046411**	**19LA 0046412**	**19LA 0046413**	**19LA 0046414**	**19LA 0046415**
Phylum/Order	**Family/ Genus /Species**								
	Anomalocera patersoni Templeton, 1837	40	-	-	-	-	-	-	-
	Calocalanus sp.	20	-	-	260	100	360	180	160
	Calocalanus contractus Farran, 1926	60	-	20	-	-	-	-	-
	Calocalanus pavo (Dana, 1852)	-	-	-	-	-	20	-	-
	Calocalanus styliremis Giesbrecht, 1888	-	-	-	120	220	200	80	120
	Centropages kroyeri Giesbrecht, 1893	60	-	100	-	60	-	40	-
	Centropages typicus Krøyer, 1849	120	40	60	20	80	80	120	120
	Clausocalanus furcatus (Brady, 1883)	300	60	100	320	320	420	120	360
	Mecynocera clausi Thompson I.C., 1888	-	-	-	-	20	-	-	-
	Neocalanus gracilis (Dana, 1852)	-	-	-	20	-	-	-	-
	Paracalanus parvus (Claus, 1863)	6360	2680	1460	7600	5740	10520	4880	12280
	Paracartia grani Sars G.O., 1904	20	-	20	-	-	-	-	-
	Pteriacartia josephinae (Crisafi, 1974)	20	-	-	-	-	-	80	40
	Temora longicornis (Müller O.F.,	-	-	-	40	-	-	-	-

SAMPLES		**MEW001d_ W29_W29Z**	**MEW001d_ W30_W30Z**	**MEW001d_ W31_W31Z**	**MEW001d_ W32_W32Z**	**MEW001d_ W33_W33Z**	**MEW001d_ W34_W34Z**	**MEW001d_ W35_W35Z**	**MEW001d_ W36_W36Z**
Sample ID		**19LA 0046408**	**19LA 0046409**	**19LA 0046410**	**19LA 0046411**	**19LA 0046412**	**19LA 0046413**	**19LA 0046414**	**19LA 0046415**
Phylum/Order	**Family/ Genus /Species**								
	1785)								
Crustacea Copepoda Cyclopoida	*Oithona sp.*	-	-	-	120	-	100	-	-
	Oithona nana Giesbrecht, 1893	-	-	40	20	80	60	20	20
	Oithona plumifera Baird, 1843	40	-	-	20	20	-	-	-
	Oithona setigera (Dana, 1849)	-	40	-	-	-	-	-	-
Crustacea Copepoda Poecilostomatoida	*Oncaea sp.*	20	-	-	40	-	-	-	-
	Corycaeus sp.	-	20	-	20	20	100	60	100
Crustacea Cladocera	*Evadne tergestina* Claus, 1864	-	20	-	20	-	-	-	-
	Podon intermedius Lilljeborg, 1853	-	-	-	-	20	140	-	20
Crustacea Amphipoda Crustacea Decapoda	Caprellidea	-	-	-	-	-	280	-	-
	Larva Zoea	-	40	-	100	20	160	40	120
Crustacea Mysidacea	Mysidacea ind.	20	-	-	-	-	-	-	-
Crustacea Euphausiacea	Larva Furcilia	60	-	-	-	60	-	-	-
Crustacea ind.	Larva Nauplius	-	20	-	40	100	220	140	20
Echinodermata Ophiuroidea	Larva Ophiopluteus	-	-	-	-	-	-	20	-
Appendicularie	*Oikopleura sp.*	80	20	-	320	-	100	40	100
Osteichthyes	Larva ind.	-	-	-	20	20	-	-	-

Table 4.89 - Zooplankton Species Classification (individuals/l) in nearshore Gela / W237-W40

SAMPLES		**MEW001d_ W37_W37Z**	**MEW001d_ W38_W38Z**	**MEW001d_ W39_W39Z**	**MEW001d_ W40_W40Z**
Sample ID		**19LA 0046416**	**19LA 0046417**	**19LA 0046418**	**19LA 0046419**
Phylum/Order	**Family/ Genus /Species**				
Chaetognatha	*Sagitta sp.*	20	20	-	60
Mollusca Gastropoda	Larva ind.	-	20	-	120
Mollusca Bivalvia	Larva ind.	40	-	-	-
Crustacea Copepoda Calanoida	*Acartia clausi* Giesbrecht, 1889	120	40	-	-
	Calocalanus sp.	100	320	-	100
	Calocalanus contractus Farran, 1926	40	-	-	-
	Calocalanus pavo (Dana, 1852)	-	-	80	-
	Calocalanus styliremis Giesbrecht, 1888	-	220	-	40
	Centropages kroyeri Giesbrecht, 1893	40	-	40	-
	Centropages typicus Krøyer, 1849	140	300	-	20
	Clausocalanus furcatus (Brady, 1883)	700	660	-	60
	Mecynocera clausi Thompson I.C., 1888	60	40	-	20
	Neocalanus gracilis (Dana, 1852)	-	-	-	20
	Paracalanus parvus (Claus, 1863)	3080	8440	1520	3840
	Temora longicornis (Müller O.F., 1785)	100	20	-	-
Crustacea Copepoda Cyclopoida	*Oithona sp.*	180	180	20	60
	Oithona nana Giesbrecht, 1893	40	200	60	140
	Oithona plumifera Baird, 1843	40	40	-	-
Crustacea Copepoda Harpacticoida	*Macrosetella gracilis* (Dana, 1846)	0	40	-	-

SAMPLES		**MEW001d_ W37_W37Z**	**MEW001d_ W38_W38Z**	**MEW001d_ W39_W39Z**	**MEW001d_ W40_W40Z**
Sample ID		**19LA 0046416**	**19LA 0046417**	**19LA 0046418**	**19LA 0046419**
Phylum/Order	**Family/ Genus /Species**				
Crustacea Copepoda Poecilostomatoida	*Oncaea sp.*	20	-	-	-
	Corycaeus sp.	-	120	-	-
Crustacea Cladocera	*Evadne tergestina* Claus, 1864	-	-	-	-
	Podon intermedius Lilljeborg, 1853	-	-	20	-
Crustacea Amphipoda	Caprellidea	-	-	-	40
Crustacea Decapoda	Larva Zoea	20	40	-	100
Crustacea Euphausiacea	Larva Furcilia	120	140	-	-
Crustacea ind.	Larva Nauplius	20	40	-	-
Appendicularie	*Oikopleura sp.*	300	80	40	180

5.0.0 **CONCLUSIONS**

LIHTHOUSE S.p.A. of Bologna (Italy) was entrusted by Maltese Ministry for Energy and Water Management to perform a reconnaissance geophysical investigation in the Sicily Strait area, located between Italy and Malta.

The scope of the second phase of this Reconnaissance Marine Survey (RMS) was to collect geotechnical and environmental samples and to show the results within the present report in order to examine the suitability and feasibility of a 22" gas pipeline between Italy (Gela) and Malta (Delimara).

Results and conclusion are summarized below.

It is to be noted that, limited to the conclusions associated with physical carachteristics of waters (i.e. CTD results), the Maltese and Italian sections have not been divided. This is due to CTD parameters being arranged combining profiles of Italian and Maltese measurements.

5.1.0 Physical, chemical and biological features of waters

5.1.1 Physical features

1) Malta and Offshore Italy

The transparency values are comprised between 13.0m in W15 and 25m in W14. Intermediate values of 15m in station W11, 17.5m in W01-W10, and 22.5m in W12, W13 were also found.

Moreover, from the transparency values, it is possible to obtain the depth of the euphotic zone (the upper water layer from the surface to the depth of effective light penetration: it is above the compensation level and therefore the zone of effective photosynthesis): on average this depth corresponds to three times the value of transparency, therefore in the surveyed stations the euphotic zone is more or less equal to 52 (W02-W10), 45 (W11), 67 (W12, W13), 75 (W14) and 39 (W15) metres.

In the fifteen (15) sampled stations (MEW001b_W01, W02, W03, W04, W05, W06, W07, W08, W09, W10, W11, W12, W13, W14, W15) the Temperature shows a huge difference between stations W01-W11 and W12-W15. In fact locations from W01 to W11 were performed in March, while stations W12-W15 were surveyed between the end of April and the beginning of May.

In particular during winter it's possible to notice an almost constant Temperature trend ranging between 14 and 16°C. In early summer the sea surface became warmer than in the previous month and the surface temperature ranges between 16 and 17°C until the depth of 20m, than slowly decrease to 14.5-15°C.

Salinity trends are quite the same. In particular the fifteen profiles show stable values around 41-42ppt till the depth of 40m; then they increase by about 1ppm at the final depths.

In the fifteen investigated stations, Dissolved Oxygen shows, for most part of samples, values between 5mg/l and 10mg/l and generally decreases going deeper.

The pH trends show a very low reduction and all the samples present values between 8.1 and 8.3 pH units and are constant for whole water column.

In the fifteen water locations the Redox potential values are always positive and they range between 184mV and 260mV.

For Turbidity and Chlorophyll no variations can be observed in the fifteen profiles for the shallower depth. In general Turbidity is characterized by very low values, in average equal to 4NTU.

Same trends are observed for all profiles of Chlorophyll: in general values are constant until the deeper depth with values ranging between 0 and 1.5 µg/l.

2) Nearshore Gela

In most stations, Secchi Disk did not disappear along the water column (depth ranging between 5 and 14 meters). In few station only (W22, W24, W25, W29) transparency value was equal to 6 meters.

In the twenty (20) sampled stations (MEW001d_W21, W22, W23, W24, W25, W26, W27, W28, W29, W30, W31, W32, W33, W34, W35, W36, W37, W38, W39, W40) the Temperature show almost the trend. In particular, values are between 27°C and 28°C at the surface then the temperature slowly decrease to almost 24°C at a depth of 6m.

Salinity graph shows values between 40ppt and 41ppt and generally remain almost stable going deeper down to the maximum depth.

Conductivity trends are very similar to the temperature ones. In general, they start at the surface from values between 62000µS/cm and 64000µS/cm, then decrease until values of 60500µS/cm (between 6m and 7m).

Dissolved oxygen shows, for most part of samples, values between 7mg/l and 10mg/l and generally remains stable down to 6m. They increase slowly from 6m until the maximum depth. W22 has lower value of DO in comparison to the other samples besides a different trend following the depth.

The pH trends show a very low reduction and all the samples present values between 8.1 and 8.2 pH units and are constant for the whole water column.

Oxygen-reduction potential (Eh) has values always positive and ranging between 170mV and 280mV maintaining a constant trend till the maximum depth. The lowest values are reached by the sampling W37 (around 170mV).

Turbidity values vary between 2NTU and 5NTU and generally slowly decrease from 6m going deeper until the maximum depth.

Chlorophyll graph shows a values variation between <0µg/l and 2.5µg/l, sampling W33 and W12 presents values >4 µg/l for the shallowest part of the water column.

5.1.2 Chemical features

5.1.2.1 Malta

About Maltese water locations, only Nutrients and Chlorophill analyses were carried out for chemical parameters.

In all collected samples the Nutrients (Ammonium, Orthophosphate, Phosphorus, Nitrite, and Nitrate) concentrations are always lower than the Detectable Limits.

In the five locations Chlorophyll pigments were below the LoD only in station W11; with regard to the other locations, the highest value of 0.96 µg/L was detected in station W14, and the lowest one in W12 (0.36 µg/L).

5.1.2.2 Offshore Italy

In all collected samples the Nutrients (Ammonium, Orthophosphate, Phosphorus, Nitrite, and Nitrate) concentrations are almost always lower than the Detectable Limits, except for W04 location in which Nitrate major concentration is 17000µg/l in the surficial layer.

Concentrations of the metals in water samples are almost all below the detectable limit. Only for Arsenic, Iron, Beryllium and Selenium results are recorded. Cadmium and Antimony were recorded only in one depth of stations W10, W07 each one. Copper and Nickel, show a similar trend, but the elements were recorded only in W01, W02, W04. Mercury and Manganese were recorded only in one depth of two stations: Mercury was detected in W04 and W10, while Manganese in stations W01 and W04. Zinc has a range between 16 and 45 µg/l and was recorded in all sample depths of station W01 with the highest value of 45 µg/l. Chromium shows a range between 4.1 and 5.2 µg/l and was recorded in all sample depths of station W03 with the highest value of 5.2 µg/l.

In the ten locations Chlorophyll pigments were below the LoD only in two stations (W03 and W06), with the highest value of 0.08 µg/L in W04, as expected in an oligotrophic environment.

In all the collected samples Hydrocarbons C≤ 10 has values all below the Detected limit. In locations W02-W05 Total Hydrocarbons values are below LoD (< 31 µg/l). In the other stations analytes were recorded in surface sample of W01 with a value of 41 µg/l and in all sampling depths of W06, W07, W09 and W10. The surface and mid-depth samples of station W08 recorded values of 47 and 56 respectively. The highest value is 180 µg/l that was recorded in station W10.

Regarding PAH it is to be noted that, excluding the superficial depth of W08, Pyrene only was recorded at all stations. The highest values have been identified at locations W04 (0.017 µg/l) and W01 (0.026 µg/l). Moreover, only one value associated with Benzo (b), fluoranthene and Dibenzo (a,h) anthracene, was detected, at W01. Generally, a low number of values associated with Benzo (a) Anthracene and Benzo (a) Pirene were recorded (with values as high as 0.01 and 0.0052µg/l, respectively).

All these elements show the highest value in W01. Benzo (g,h,i) Perylene values have a range between 0.0002 and 0.014µg/l, while the highest value is 0.0048 µg/l in W01. Chrysene shows most values below the LoD except in W02, W03, W04 where anyway very low values were recovered. The highest one is in W01 (0.023 µg/l).

BTEX are always below the LoD in stations W01-W03 (except for the mid depth in W01 and the maximum depth in W03). In the other stations Styrene and Toluene are always recorded with values slightly above to LoD; unlike Styrene, Toluene is not detected at each station depth.

Ethylbenzene and meta - Xylene + para – Xylene show the same trend where the most values were recorded in stations W05 and W06.

In all the collected samples the THMs compounds concentrations are almost below the Detectable Limit. Very few values are measured for Bromodichloromethane, Dibromodichloromethane and Tribromomethane in W01, for Trichloromethane (values till 0.0038µg/l in W01); 1,2 – Dichloroethane is always below the LoD, (< 0,0050 µg/l) except in W09 and W10. The total of Organoalogenated show most detected values in W01, W02, W03 and W10; anyway the highest value of 0.22 µg/l was recorded in W05.

5.1.2.3 Nearshore Gela

In all collected seawater samples the following analyses results were found:

In the twenty locations Chlorophyll pigments are almost between 0.02µg/l and 1µg/l, as expected in oligotrophic environment. In sampling locations W03, W06 and W011 concentrations for this analyte are below the Detectable Limits (<0.01µg/l).

In the collected samples the Nutrients (Silica, Orthophosphate, Phosphorus, and Nitrite) concentrations are always lower than the Detectable Limits. Ammonium shows values ranging between 11 and 17µg/l, with the highest value in W33 (20µg/l). Only in water location W26 the analyte is below the LoD. Nitrate concentration values were detected in 13 location with a range between 310000 and 320000µg/l. Total phosphorus was detected in 8 water stations with the highest value in W25 (13µg/l) and the lowest in W30 (7.3µg/l).

Concentrations of the metals in water samples are almost all below the detectable limit. Only for Arsenic, Iron and Antimony (highlighted in blue in the tables below) results are recorded in all water locations. In particular, Iron concentration ranging between 14 and 19µg/l; Arsenic has a range between 1.2 and 1.6µg/l; Antimony values range between 0.13 and 0.3µg/l; Manganese was recorded in one water location (W25). Zinc was detected in three stations only (W21, W33, W40), with the highest value in S40 (49µg/l); Lead was detected in four stations, with the highest value in W21 (1.1µg/l); Aluminum was detected in six stations with the highest value of 7.4µg/l in W34 and the lowest one in W28 (4µg/l); Beryllium was recorded in almost all locations except for W34, W35 and W39 ranging between 0.19 and 0.75µg/l; Selenium is always above the LoD except for W22, W23 and W38, showing values between 0.22 and 1µg/l; Vanadium is always above the LoD except for W25 and W33, with a concentration ranging between 1 and 1.5µg/l.

Hydrocarbons C≤ 10 have values almost all below the Detected limit, except for W31, W33, W34, W35, W39 and W40, where the highest detected value was 300mg/l in stations W31 and W40, while the lowest one is in W33 (25mg/l);
In locations W21-W25, W27-W29, W32, W37, W38 Total Hydrocarbons values are below LoD (< 28µg/l). In the other stations analytes were recorded in surface sample of W01 with the highest value of 440µg/l and the lowest one in W33 (28µg/l).

Regarding PAH compounds, are almost all below the Detectable Limits. Pyrene is the only analyte that was detected in almost all locations with a range between 0.0048 and 0.00057µg/l. The highest value is in W36 (0.021µg/l). Very few values are measured for Benzo (g,h,i) Perylene, Indeno (1,2,3 –c,d) pyrene, Benzo (a) Pyrene. All these elements show the highest value in W36. In particular Indeno (1,2,3 –c,d) pyrene was detected in one station only with a value of 0.00075µg/l; Benzo (a) Pyrene was detected both in W31 (0.00036µg/l) and W36 (0.00043µg/l); Benzo (g,h,i) Perylene was detected in W31 with a really low value (0.00033µg/l) and in W36 (0.0051µg/l).

Benzene is above the LoD (< 0,010µg/l) in eleven locations, showing a range between 0.011 and 0.024µg/l; Ethylbenzene and meta - Xylene + para – Xylene show a similar trend. In particular, Ethylbenzene was detected in all the water locations except W40 with values between 0.011 and 0.033µg/l; meta - Xylene + para – Xylene was detected in all stations except W30 and W40 with a trend ranging between 0.029 and 0.08µg/l with the highest value in W24 and the lowest in W27; Toluene was recorded in one station only with a value of 0.15µg/l; Styrene was above the LoD only in stations W31 (0.02µg/l) and W34 (0.027µg/l).

In all the collected samples the THMs compounds concentrations are always below the Detectable Limit, except for Dibromochloromethane, Trichloromethane, Tribromomethane all detected in one station only (W21).
Only one value was measured for Bromodichloromethane, Dibromodichloromethane and Tribromomethane in W01, for Trichloromethane (values are all equal to 1µg/l).

The total of Organoalogenated was detected in only one station with a value of 1 µg/l; while M.T.B.E. analyte was recorded in three stations with the highest value in W37 (0.093µg/l) and the lowest one in W33 (0.07µg/l).

The only detected pesticides was Atrazine in the nearshore Gela water locations. The analyte concentration values show a range between 0.0005 and 0.0011µg/l except for W22-W24, W27, W29, W30, W32, W33, W36, W39 where Atrazine concentration is always below the LoD (0.00050µg/l).

5.1.3 Zooplankton and Phytoplankton analysis

5.1.3.1 Malta

For Zooplankton analyses in Malta area, W12 and are those in which the greatest number of individuals has been found. Most of species found belong to Crustacea Copepoda Celanoida taxa. In particular, the most representative species in the whole area is *Paracalanus parvus*.

Phytoplankton samples area belong to the families Bacillariophyceae and Dinoficeae dominated in all the investigated area.

It's interesting to notice a huge difference in abundance between station S11 and the other investigated stations: in particular laboratories results give an evidence about the high number of individuals belonging to *Navicula sp.* And *Coscinodiscus sp.* Taxa.

The presence of *Chaetoceros pendulus* is to be highlighted at station S11, given that the same was not identified in other stations. The morphological characteristics of the observed organism coincide perfectly with those of *C.pendulus*. According to bibliography, its presence in the Mediterranean would not include the Ionian Sea. The proximity of the working area to Ionian sea could justify the absence of the *C.pendulus* in the other environmental stations.

5.1.3.2 Offshore Italy

Phytoplankton taxa belonging to the families Bacillariophyceae and Dinoficeae dominated in all the investigated area.

5.1.3.3 Nearshore Gela

For Zooplankton analyses in nearshore Gela area, W36 and W34 samples are those in which the greatest number of individuals has been found. Most of species found belong to Crustacea Copepoda Celanoida taxa. In particular, the most representative species in the whole area is *Paracalanus parvus*.

Phytoplankton samples from nearshore Gela areas belong to the families Bacillariophyceae and Dinoficeae dominated in all the investigated area (as already see in Italian and Maltese waters).

It's interesting to notice a huge difference in abundance between stations W40, W25 and the other investigated stations: in particular laboratories results give an evidence about the high number of individuals belonging to *Pennate spp.* and *Ceratium gibberum* Taxa.

5.1.4 TRIX and CAM indices

In almost all nearshore Gela stations TRIX index shows values between 5.2 and 8.5 (taking into account only the mean values of each parameters). These values are parameters to evaluate the trophic status of the water column. Most stations are characterize by Poor (Euthopic) seawater status and only few of them are Moderate (Mesotrophic to Eutrophic).

About CAM index, the mean value of Syntetic class is always 3, except for W21 and W28 that show different value of 2.

The water quality seems to be "poor" in most of water locations. This can be due to the way the TRIX index was established in the first place:

The trophic index was developed by Vollenweider in 1998 for the coastal area of Emilia-Romagna (northern Adriatic Sea). The main aspect affecting the water quality in the northen Adriatic sea was found to be the Phosporous abundance. It is probable that the TRIX index could have been based on high values of Phosporous, considering Nitrates concentration values as static or negligible. Therefore, the results of the TRIX indexes obtained are most likely affected by the high concentration of nitrates found in the Gela area.

5.2.0 Physical, chemical and biological features of sediments

5.2.1 Physical features

5.2.1.1 Malta

From sediment measurements in situ, pH range in general between 7.3 and 7.9 pH unit and Temperature is for the most part between 15.2°C and 16.9°C, only one location is closed to 19°C.

5.2.1.2 Offshore Italy

From sediment measurements in situ, pH range in general between 7.2 and 7.5 pH unit and Temperature is for the most part between 15.2°C and 19°C, only few locations are close to 20°C.

5.2.1.3 Nearshore Gela

From sediment measurements in situ, pH range in general between 6.9 and 7.7 pH unit and Temperature is for the most part between 23.9°C and 29.5°C.

Regarding the grain size classification, all sediments have been classified as *Silty SAND* (S22, S26, S27, S28, S30, S33, S34 and S38), *Sandy SILT* (*S21*, S23), *Sandy Clayey SILT* (S24, S25, S29, S31, S35, S36, S37, S39 and S40) and *Sandy SILT/Silty SAND* (S32). In some stations (S21, S22, S23, S27, S28, S30, S31, S36 and S37) a small percentage of Gravel is present.

5.2.2 Chemical features

5.2.2.1 Malta

Total Hydrocarbons concentrations (C≤12) are below the LoD.

In four sampling locations Total Hydrocarbons concentrations (C>12) are below 2500µg/kg. Sampling locations near Maltese coast show values all above the LoDs. From stations S15 to station S20 general range is between 2700µg/kg and 6400µg/kg except for a subsamples of S16 location that reaches 17000µg/kg.

The PAH compounds have been observed especially in sampling locations close to Maltese coasts. The trend is very similar for all PAHs analytes. Stations S14 and S17 have values quite far from the average. In the other stations, PAH values are not so far from the LoD limits.

In particular, Naphthalene concentration is below the LoD in S20 and in one replicate of S18 and S19. In all the other locations the range is between 0.47 and 3µg/kg except in station S14 that shows the highest value of 13µg/kg, while the lowest value is 0.47µg/kg in station S16; Fluoranthene shows all values above the LoD with a range between 0.93 and 20µg/kg with the lowest value of 0.93µg/kg in station S11 and the highest value of 76µg/kg in S14. S17, S18 and S19 deviate from the average showing values of 55, 33 and 33µg/kg; Anthracene values are all above the LoD, and they show a range between 13 and 0.58µg/kg with the lowest value in S11 and the highest in S14 (13µg/kg). Pyrene values are all above the LoD with a range between 17 and 0.44 µg/kg. As per the other elements, S14 shows the highest value of 61 µg/kg; Dibenzo (a, h) anthracene is all below the LoD; Indeno (1,2,3-c, d) pyrene values are always above the LoD: the range is between 0.5 and 21 µg/kg with the highest values in station in S14 (32 µg/kg) and S17 (21 µg/kg). Chrysene values are above the LoD and they show a range between 14 and 0.48µg/kg with the lowest value in S11 and two highest in S14 (47 µg/kg) and S17 (35 µg/kg); Benzo (k) fluoranthene value is below in one replicate of S13. The other values range between 16 and 0.37 µg/kg, while S14 and S17 have different values of 43 and 33 µg/kg. Benzo (g,h,i) perylene have the same trend with the highest values in S17 (24 µg/kg), S14 (44 µg/kg), S3 (180 µg/kg), while the

lowest value is 0.42 µg/kg in station S11; Benzo (b) fluoranthene concentration is below the LoD in one replicate of S13. This element shows the highest values in S17 (28 µg/kg) and S14 (33 µg/kg), while the lowest value is 0.36 µg/kg in station S11; Benzo (a) pyrene concentration is below the LoD in one replicates of S11 and two replicates in S13. This element shows the highest values in S17 (38 µg/kg) and S14 (69 µg/kg), while the lowest value is 0.38 µg/kg in station S12; Benzo (a) anthracene concentration is below the LoD in two replicates in S11-S13. This element shows the highest values in S17 (33 µg/kg) and S14 (29 µg/kg).

The BTEX are always below the LoD, except for Toluene and BTEX in S11, S13 and S16 locations, in which anyway very low values (ranging from 0.01 and 0.019 mg/kg) are measured.

Sulphite reducing bacteria do not show a well-defined trend. This analyte is lower than the Detectable Limit (<10MPN/g) in most of the sampling locations. In the other samples (S17, S19 and S20), the highest value was detected in S20 location that presents a concentration of 2400MPN/g, while the lowest value was recorded in station S17 (70MPN/g).

Fifteen metals have been measured in sediments. Among these, Sb is always below the LoDs. For the remaining ones, a defined trend is observed, except for Vanadium, Tin and Arsenic. In particular Lead shows values between 20 and 7.9 mg/kg; Chromium is in range between 25 and 8.9mg/Kg dry basis; Copper is between 15 and 2.8 mg/kg; Nickel range is between 25 and 2.5mg/Kg dry basis except for station S15 in which value reaches 44 mg/kg; Zinc is in general between 57 and 14mg/Kg dry basis; Vanadium is in range between 17 and 56mg/Kg dry basis; Arsenic is in range between 9 and 39mg/Kg dry basis, the highest value is equal to 61mg/Kg dry basis in S11 location; Thallium is below the LoD in two replicates of station S18 and in station S19, in all the other stations it shows really low values ranging between 0.18 and 0.056mg/kg; Tin is always below the LoD except in stations S17 and S18 where values range between 1.4 and 1.3mg/kg; Selenium in range between 2.2 and 0.84mg/Kg dry basis; Mercury shows small value ranges between 0.2 and 0.017mg/kg; Cobalt values are below the LoD only in station S20, in all the others the range is between 9.5 and 1.6mg/kg. Cadmium is in range between 0.11 and 0.051mg/kg. Beryllium values are below the LoD only in station S20, while in all the other locations it is in the range between 0.67 and 0.19mg/kg.

5.2.2.2 Offshore Italy

Total Hydrocarbons concentrations (C≤12) are below the LoD.

In most of the sampling locations Total Hydrocarbons concentrations (C>12) are below or close to 2500µg/kg. Sampling locations near the Italian show higher concentrations if compared to offshore sampling locations. In stations S1, S2, S3, S4 values ranges between 5600 (S1) and 7400µg/kg (S2, S3).

The PAH compounds have been observed especially in sampling locations close to Italian and Maltese coasts. The trend is very similar for all PAHs analytes. Station S3 shows the highest value for all elements. Also S14 and S17 have values quite far from the average. In other stations, PAH values are not so far from the LoD limits.

In particular, Naphthalene concentration is below the LoD in stations S5, S7, S8, S9 and S10. In all the other locations the range is between 2.6 and 6.2µg/kg except in station S3 that shows the highest value of 51µg/kg, while the lowest value is 2.6µg/kg in station S6; Fluoranthene shows all values above the LoD with a range between 0.39 and 28µg/kg with the lowest value of 0.39µg/kg in station S08 and the highest value of 400µg/kg in S03; Anthracene values are below the LoD in station S8, S9, S10, for the other locations shows a range between 5.7 and 1.5µg/kg with the lowest value in S5 and the highest in S3 (53 µg/kg). Pyrene values are below the LoD in station S8, S10, all the other locations have a range between 17 and 0.61 µg/kg. As per the other elements, S3

shows the highest value of 330 µg/kg. Dibenzo (a, h) anthracene is all below the LoD; Indeno (1,2,3-c, d) pyrene values are below the LoD in station S8, S9, S10, while for the other stations the range is between 1.5 and 6.3 µg/kg with the highest value in station S3 (170 µg/kg). Chrysene values are below the LoD in station S8, S9, S10, for the other locations shows a range between 12 and 1.5µg/kg with the lowest value in S6 and the highest in S3 (200 µg/kg); Benzo (k) fluoranthene value is below the LoD in S6, S8, S9, S10. The other values range between 8.7 and 1.7 µg/kg, with the highest value is in S3 (200 µg/kg). Benzo (g,h,i) perylene have the same trend with the highest value in S3 (180 µg/kg), while the lowest value is 0.22 µg/kg in station S5; Benzo (b) fluoranthene concentration is below the LoD in stations S8, S9 and S10. This element shows the highest values in S3 (130 µg/kg), while the lowest value is 1.1 µg/kg in station S6; Benzo (a) pyrene concentration is below the LoD in stations S8, S9 and S10. This element shows the highest values in S3 (330 µg/kg), while the lowest value is 1.3 µg/kg in station S6; Benzo (a) anthracene concentration is below the LoD in stations S5, S6, S8, S9 and S10. This element shows the highest values in S3 with a value of 190 µg/kg and the lowest one in S7 (4.3 µg/kg).

The BTEX are always below the LoD, except for Toluene and BTEX in S2 location, in which only one value was detected (0.017 mg/kg each one).

Sulphite reducing bacteria do not show a well-defined trend. This analyte is lower than the Detectable Limit (<10MPN/g) in most of the sampling locations. For other samples (S1, S2, S3 and S4), the general range is between 210MPN/g and 460MPN/g, except for S4 that shows a very low value of 14MPN/g.

Fifteen metals have been measured in sediments. Among these, Sb is always below the LoDs. For the remaining ones, a defined trend is observed, except for Vanadium, Tin and Arsenic. In particular Lead shows values between 22 and 10mg/kg; Chromium is in range between 24 and 16mg/Kg dry basis; Copper is between 20 and 7.2mg/kg; Nickel range is between 25 and 17mg/Kg dry basis; Zinc is in general between 60 and 33mg/Kg dry basis, except for S2, S3, locations in which values till 60mg/Kg dry basis are measured and S4 in which value reaches 75mg/kg; Vanadium is in range between 37 and 51mg/Kg dry basis; Arsenic is in range between 11 and 27mg/Kg dry basis, the highest value is equal to 43mg/Kg dry basis in S10 location; Thallium shows really low values ranging between 0.21 and 0.097mg/kg; Tin is always below the LoD except in S3 and S4, where values are 1.1mg/kg in both stations; Selenium in range between 2.4 and 1.5mg/Kg dry basis; Mercury shows small value ranges between 0.074 and 0.017mg/kg, with the highest values in S3 (0.17mg/kg), S2 (0.13mg/kg) and S4 (0.12mg/kg); Cobalt values range is between 9.6 and 7.4mg/kg. Cadmium is in range between 0.12 and 0.072mg/kg, with the highest one in S4 (0.17mg/kg). Beryllium values are always above the LoD and they show a range between 0.65 and 0.36mg/kg.

5.2.2.3 Nearshore Gela

In more than half sampling locations Total Hydrocarbons concentrations (C≤12) are above the LoD with a range between 0.48 and 7.1µg/kg. In three (3) stations only values above 5µg/kg were detected and highest one in station S37 (7.1µg/kg).

In most of the sampling locations Total Hydrocarbons concentrations (C>12) are below the LoD. Few samples show value below 3500µg/kg (stations S24, S25 S34 and S37), with the lowest value in S37 (2600µg/kg). The other sampling locations have a range between 4400 and 7500µg/kg which is also the highest detected value (in station S29).

In all sediment locations PCB compounds values are below the LoD, except in station S21 where PCB summation, PCB169 and PCB77 have been detected. In particular, Total PCB value is

0.00054mg/kg, while PCB169 and PCB77 show similar values of 0.00028 and 0.00025mg/kg respectively, both of them very close or equal to the LoD (0.00025mg/kg)

PAH compounds have been observed especially in few sampling locations. The trend is very similar for almost all PAHs analytes and they were detected in only three stations (S21 or S32 only for Naphtalene, S26 and S30), except for Chrysene which is present in seven locations.

Station S21 shows the highest value for all elements, except for Naphthalene where the highest values was detected in station S26.

The BTEX compounds are always below the LoD.

Regarding the Organotin compounds, the Tributyltin was detected only in one sediment location (S26) with a value of 5 µg/kg. In all the other stations the concentration was below the LoD.

Eighteen (18) metals have been measured in sediments. All of them are above the LoD, except Thallium, Tin, Chromium (VI) and Antimony. For the other elements a defined trend is observed, except for few analytes (Mercury, Arsenic and Vanadium). The highest values were generally detected in stations S31, S38 and S39 except for Nickel and Mercury which show the highest one in station S21. In particular Zinc shows values between 20 and 14mg/kg except for S31, S38, S40, locations in which values more than 25mg/kg were measured; Copper is in the range between 3 and 1.8mg/Kg dry basis, except for stations S31, S38 and S40 where values are above 5mg/kg; Lead measurements are quite closed to those of Copper analyte. Values ranging between 4 and 2.8mg/kg with the highest in S31, S38 and S40 (above 5mg/kg); Aluminum is almost in the range between 2000 and 1100mg/Kg dry basis except for stations S31, S38 and S40 in which values reach 3400mg/kg, 3100mg/kg and3800 mg/kg respectively; Beryllium values are below the LoD only in station S23, S24, S25, S36 and S39, while in all the other locations is in the range between 0.15mg/Kg dry basis and 0.11mg/Kg, except for S31, S30 and S40 where values are above 0.2mg/kg; Selenium shows a range between 1.1 and 0.74mg/Kg dry basis; Iron is in the range between 11000 and 7400mg/Kg dry basis and the highest value is equal to 11000mg/Kg dry basis in S31 and S40 locations; Cobalt shows values ranging between 5.4 and 3.6mg/kg; Cadmium shows really low values ranging between 0.086 and 0.06mg/kg; Chromium has a range between 5.5 and 3.7mg/Kg dry basis, with values above 6.5mg/kg in stations S21, S31, S38 and the highest one in station S40 (8.4mg/kg); Nickel shows a general trend between 7 and 4.3mg/kg with the highest value (16mg/kg) in station S21; Mercury shows really low values ranging between 0.023 and 0.012mg/kg and the highest one is 0.036mg/kg in station S21; Arsenic is in the range between 24 and 14mg/kg; Vanadium values are in the range between 25 and 14mg/kg, with the highest detected value (28mg/kg) in S40.

5.2.3 Macrobenthos Analyses

5.2.3.1 Malta

In Malta working area, the species found during the analysis of the samples are: 1) bivalves, 2) gastropods 3) crustaceans 4) pteropods. During their life time they constitute significantly to the zooplankton population and upon death their shells sink to the ocean bed. Empty shells of pteropods constitute a major portion of shallow marine sediments, especially in the tropical and subtropical regions (Herman, 1968); 5) echinoderms 6) brachiopods.

A total of 20 taxa have been found, and include Gastropoda, Bivalvia, Malacostraca, Echinoidea, Scaphopoda, Anthozoa, Polichaeta and Craniata. In particular 12 species and 1 Unknown belong to Gastropoda, 5 species to Bivalvia, and 2 species to Malacostraca, 2 species to Echinoidea, 1 species to Scaphopoda, 1 species to Anthozoa, 1 species and 1 Unknown to Polichaeta and 1 species to Craniata.

All samples were dominated by few species such as *Turritella communis, Nucula nitidosa, Caryophyllia smithii, Echinocyamus pusillus.*

According to the Shannon Weaver H'(log2) indices values vary between 0.5 and 3. The Shannon index increases as both the richness and the evenness of the community increase.

Simpson 1-Lambda' (D) is a measure of dominance, so as D increases, diversity (in the sense of evenness) decreases. With this index, value 0 represents infinite diversity and 1, no diversity. The greater the value of D, the lower the diversity.

The range of Evenness (J') is between 0 and 1, 0 when the taxa belong in one major group and 1 when the species belong to different groups.

Margalef's index (D), indicates that when the species number increases in a sample, D also increases.

AMBI Index has values between 0 and 2.5. The results make evidence about the health of benthic communities and the High ecological status of each station except for S12 and S13 that is classified as Good.

M-AMBI has values between 0.5 and 1. The ecological status is high and good except for S15 and S20 where it's moderate, with values of 0.580 and 0.550.

BENTIX ranges between 0.4 and 5. Location S12 and S18 shows low values indices of a poor ecological status of the area.

5.2.3.2 Nearshore Gela

In nearshore Gela working area, the species found during the samples analysis are: 1) bivalves, 2) gastropods 3) crustaceans 4) polychaetes 5) scaphopods.

A total of 21 taxa have been found, and include Gastropoda, Bivalvia, Malacostraca, Scaphopoda and Polichaeta. In particular 4 species belong to Gastropoda, 11 species to Bivalvia.

A total of 20 taxa have been found, and include Gastropoda, Bivalvia, Malacostraca, Echinoidea, Scaphopoda, Anthozoa, Polichaeta and Craniata. In particular 12 species and 1 Unknown belong to Gastropoda, 5 species to Bivalvia, and 2 species to Malacostraca, 2 species to Echinoidea, 1 species to Scaphopoda, 1 species to Anthozoa, 1 specie and 1 Unknown to Polichaeta and 1 species to Craniata.

According to the Shannon Weaver H'(log2) indices values vary between 0.971 and 2.845.

Simpson 1-Lambda' (D) values are between 0.143 and 0.520.

The range of Evenness (J') is between 0.627 and 1.000.

Margalef's index (D) values are between 0.256 and 1.489

AMBI Index values are between 0 and 1.2. The result obtained is an Unpolluted site with a normal benthic community health in S22 (II replicate), S26 (I replicate), S39, R01-R02 (I replicate) and an impoverished benthic community in all the other stations.

M-AMBI values range between 0.5 and 1.0. The result indicates that ecological classes in Stations S22, S26, S34, R01, R02, R00, S30 (II replicate), S38 (I replicate) are moderate, while in stations S30 (I replicate), S33-S38 (II replicate), and S39 are classified as good; only in station S33 (I replicate) the ecological status is moderate.

BENTIX values are between 0.5 and 5.7. According to index values, sampling sites are pristine in S22, R00, S30-S39 (II replicate); Slightly polluted in S38, S39 (I replicate), R01 (II replicate);

Moderate polluted in S30 (I replicate), S34 and R02 (II replicate); Heavily polluted in R01-R02 (I replicate), S26 (II replicate) and Extremely polluted/Azotic in station S33 and S26 (I replicate).

6.0.0 **BIBLIOGRAPHY**

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7.0.0 **APPENDICES**

Below the list of appendices enclosed in digital format (*.pdf) to this report:

APPENDIX 1: Daily Reports

APPENDIX 2: GWF14a - BOX CORER SAMPLING FORMS

APPENDIX 3: CTD PROBES

APPENDIX 4: CTD RAW DATA

APPENDIX 5: SEDIMENT SAMPLING REGISTER TABLE

APPENDIX 6: WATER SAMPLING REGISTER TABLE

APPENDIX 7: SEDIMENT LABORATORY ANALYSES RESULTS CERTIFICATES

APPENDIX 8: SEDIMENT LABORATORY ANALYSES RESULTS TABLE

APPENDIX 9: SEA WATER LABORATORY ANALYSES RESULTS CERTIFICATES

APPENDIX 10: SEA WATER LABORATORY ANALYSES RESULTS TABLE

APPENDIX 11: ACCREDITATION CERTIFICATE

7.1.0 APPENDIX 1: Daily Reports

7.2.0 APPENDIX 2: GWF14a - BOX CORER SAMPLING FORMS

All the GW14a produced on board R/V Odin Finder during the in situ tests on box corer samples are attached (*.pdf format) in the following pages.

7.3.0 APPENDIX 3: CTD PROBE

All the CTD probes produced on board R/V Odin Finder during the in situ water sampling are attached (*.pdf format) in the following pages.

7.4.0 APPENDIX 4: CTD RAW DATA

All raw data of CTD performed on board R/V Odin Finder during the in situ water sampling are attached (*.pdf format) in the following pages.

7.5.0 APPENDIX 5: SEDIMENT SAMPLING REGISTER TABLE

A table summarising all the container labelling and handling regarding sediment samples is attached (*.pdf format) in the following pages.

7.6.0 APPENDIX 6: WATER SAMPLING REGISTER TABLE

A table summarising all the container labelling and handling regarding water samples is attached (*.pdf format) in the following pages.

7.7.0 APPENDIX 7: SEDIMENT LABORATORY ANALYSES RESULTS CERTIFICATES

All the certificates produced by the environmental laboratory regarding tests performed on box core and grab samples are enclosed in digital format (*.pdf) in the following pages.

7.8.0 APPENDIX 8: SEDIMENT LABORATORY ANALYSES RESULTS TABLE

All results of the environmental laboratory regarding tests performed on box core samples are summarized within the table attached (*.pdf) in the following pages.

7.9.0 APPENDIX 9: WATER LABORATORY ANALYSES RESULTS CERTIFICATES

All the certificates produced by the environmental laboratory regarding tests performed on water samples are enclosed in digital format (*.pdf) in the following pages.

7.10.0 APPENDIX 10: WATER LABORATORY ANALYSES RESULTS TABLE

All results of the environmental laboratory regarding tests performed on water samples are summarized within the table attached (*.pdf) in the following pages.

7.11.0 APPENDIX 11: ACCREDITATION CERTIFICATE