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IONIANS 2022

Mapping seismogenic faults offshore Ionian Islands, North Western Greece

ISMAR – CNR BOLOGNA

Principal Investigator

Maria Filomena Loreto

R/V G. Dallaporta of CNR 17/05/2022 -28/05/2022

The technician / scientific team:

From ISMAR: Valentina Ferrante, Camilla Palmiotto, Stefania Romano, Marco Ligi
From IGAG: Lorenzo Petracchini
From INGV: Filippo Muccini
From NKUA: Paraskevi Nomikou

Oceanographic cruise started on 17th May 2022 and ended on 28th May 2022

Embarking port: Livorno (Italy). Landing port: Ancona (Italy)

Working area: North-eastern Ionian Sea, offshore Ionian Islands

Disciplinary sectors: Marine Geology, Geophysics

The research cruise IONIANS 2022 was carried out with the 35meter R/V Dallaporta (Fig.1), operated by FINSHIP S.r.l. and on long-term lease to CNR.

Figure 1 – 35 meters R/V G. Dallaporta vessel rented by the CNR

Aims of the project

The offshore area of the regional West Greece comprising the Ionian Islands (i.e., Cephalonia, Zakynthos, Ithaca and Lefkada) and their sourroundings is continuously struck by highly destructive earthquakes able to trigger tsunamis and landslides (Fig. 2, left). This project aims at improving the knowledge on seismic hazard of the area by identifying the deformational structures affecting shallow sediments that can be related to earthquakes. Furthermore, a better definition of the interaction between compressive / transpressive deformation of sediments and the transcurrent movement of the main Cephalonia fault is expected. In order to detect the fault planes related to earthquakes recorded in the past years, we carried out a high-resolution multichannel seismic survey coupled with a magnetometric acquisition in key areas around Cephalonia and Zakynthos (Fig. 2, right). The survey is part of the project IONIANS supported by CNR and proposed in collaboration with the NKUA, NOA, CSIC, INGV and ISPRA. Moreover, the potentially deformed shallow sediments detected by the seismic survey will provide further clues useful to the analysis of the rupture propagation along the mega-thrust fault planes deforming the overriding plate during the co-seismic release.

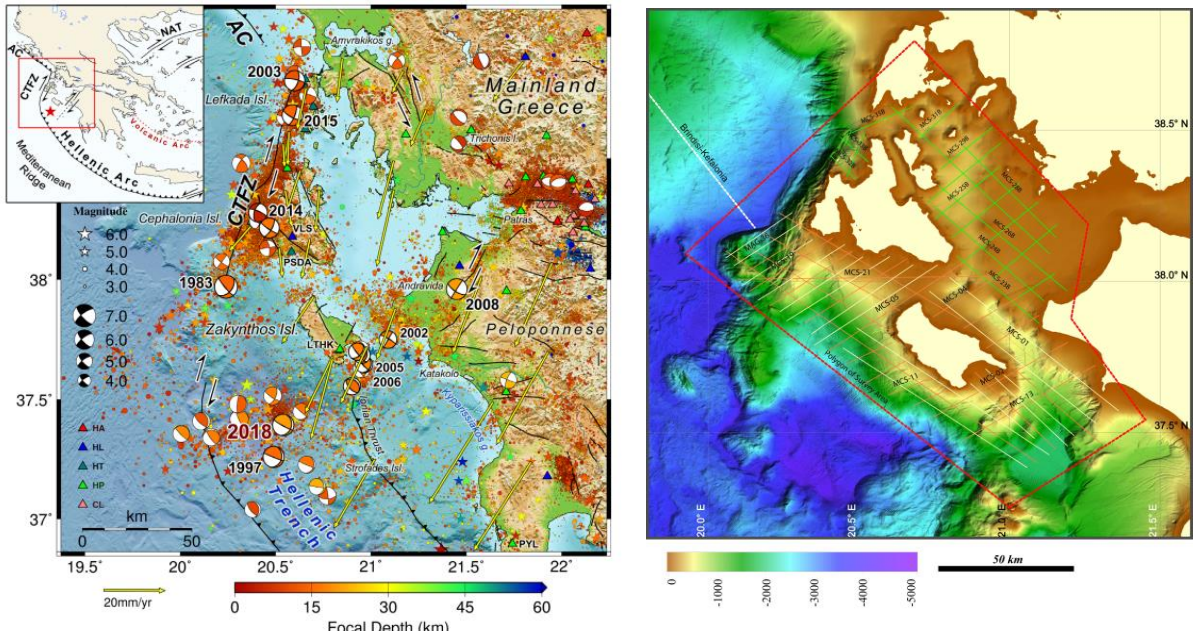

Figure 2 – On left side: Seismotectonic map of western Greece—Central Ionian Islands, presenting manually analysed seismicity of the period 2010–2018 and large earthquakes (Mw ≥ 5.0) occurred since 1970 (Makropoulos et al., 2012). On right side: Acquisition plan map. MCS profiles in orange, magnetic profiles in yellow, the alternative acquisition plan in case of bad weather conditions to south Islands in green.

Geological and geodynamic background

The Hellenic Arc, located in the central part of the Mediterranean region, accommodates the high-velocity of migration (up to 30 mm/yr; Reilinger et al., 2010) driven by the Africa and Eurasia convergence ranging from 4.8 to 6.9 mm/yr(NUVEL-1; McClusky et al.,2003; Sella et al., 2002). Accordingly, the elastic energy accumulated along the fault planes affecting the upper-plate is very high. Thus, the release of this energy is able to generate highly destructive earthquakes and tsunamis. The tectonics of northern Hellenic Arc is further complicated by the presence of a long (about 70 km) NE-striking bounding fault, named Cephalonia fault, also interpreted as a transform fault or proto-STEP fault. The Cephalonia fault is characterized by a very high seismic moment release generating earthquakes with Mw ranging from 6.7 to 6.9 that caused several casualties and damages (Ganas et al., 2016) and thus representing a high seismic hazard feature for the entire region of Ionian Islands and also for South Italy (Puglia and Calabria regions). If on one hand, the Cephalonia fault shows only transcurrent focal mechanisms (Ganas et al., 2020), on the other hand the region immediately to south shows inverse or transpressive focal mechanisms, or not well-defined focal mechanism (Fig. 3; Papadimitriou et al., 2021). One of the most recent earthquakes recorded in this area is a Mw 6.7 that struck Zakynthos in 2018 and that also triggered a tsunami recorded along the coasts of Calabria and Peloponnese (Cirella et al., 2020). Even if this area is characterized by a very high seismic hazard, it is still poorly studied and few or no data allow identifying faults associable to the seismogenic source. Recently, several models have been performed using seismicity, GPS and GNSS data in order to define the stress field and the fault plane ruptures associable to the largest events (Fig. 4; Ganas et al., 2020; Papadimitriou et al., 2021). Thus, based on seismological data, on middle resolution morpho-bathymetry, and on few seismic profiles a first structural map (Fig. 5) has been proposed by Ganas et al. (2020).

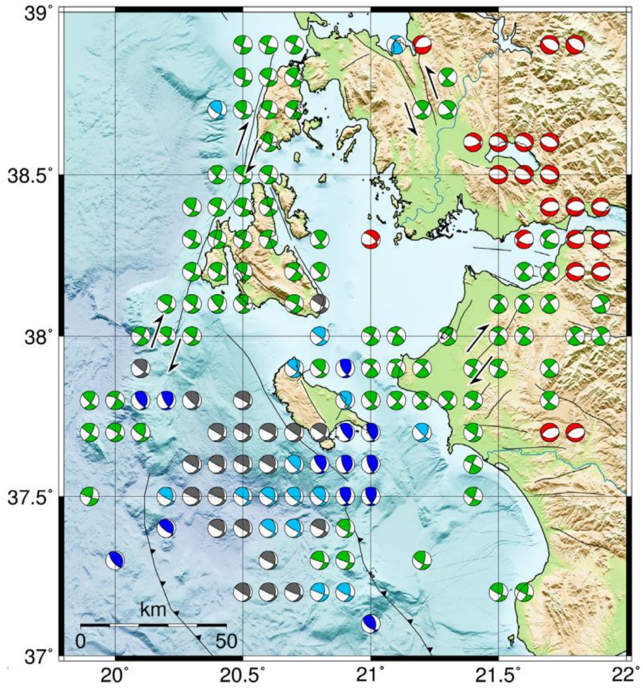

Figure 3 – map of focal mechanism derived by earthquakes affecting the Ionian Islands and Peloponnese. Colours represent different faulting types according to Zoback's (1992) classification criteria (NF-red/NS-orange: Normal/Oblique-Normal, TF-blue/TS-light blue: Thrust/Oblique-Thrust, SS-green: Strike-Slip, U-gray: Undefined)

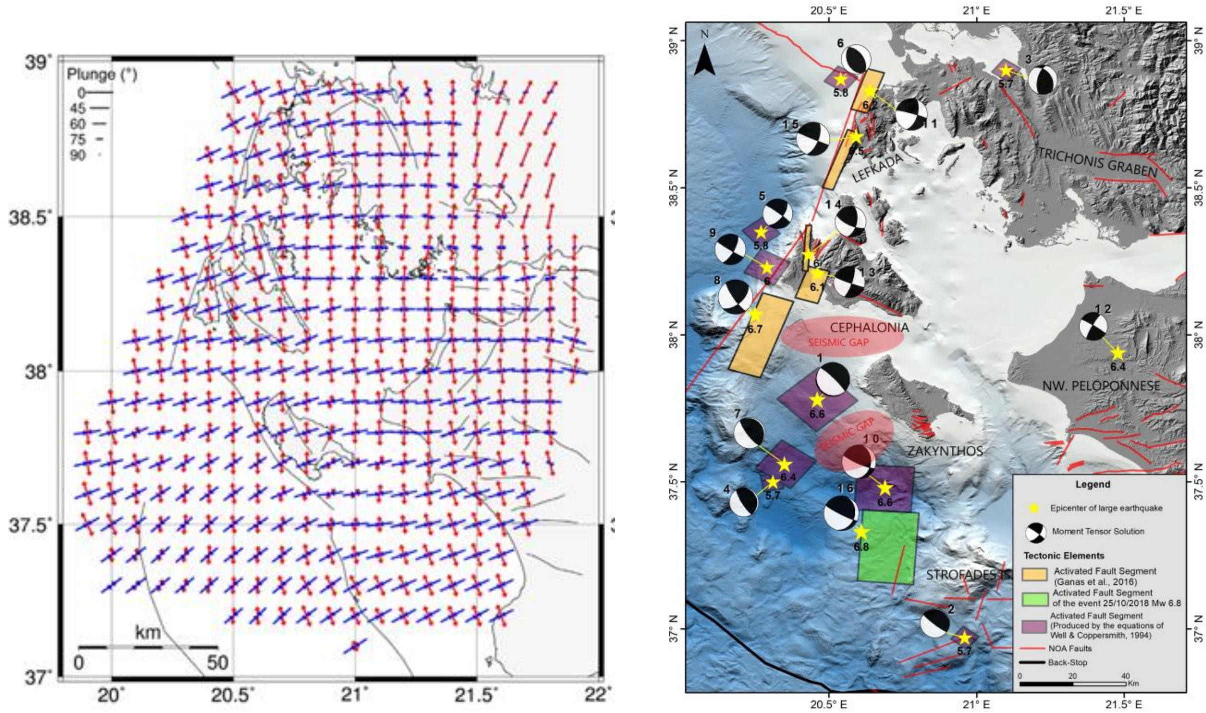

Figure 4 – On left side: map of stress field derived by GPS. . On right side: map of seismogenic fault planes for the most destructive earthquakes recorded in the region.

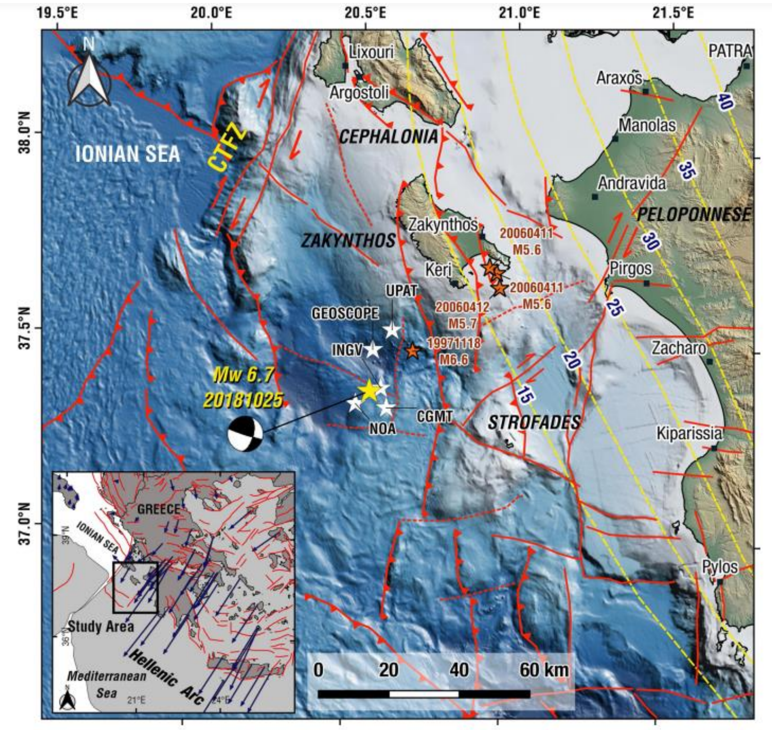

Figure 5 – Structural map produced integrating seismological data with middle resolution bathymetric data and few seismic profiles (Ganas et al., 2020).

The investigated area

The investigated area is represented by the south-western offshore of Cephalonia Is. and the southern offshore of Zakynthos (Fig. 6). We also acquired a profile in the internal part within Itaka, Lefkada and the Pelopennese. The original acquisition plan presented in the proposal was changed due to the reduction of the time dedicated to the acquisition. Figure 6 shows the navigation map starting from the port of Livorno to Ionian Islands and back to the port of Ancona. Considered the transit and one day of standby-meteo, we had dedicated to the acquisition 4.5 full days, during which we acquired ca. 440 km of MCS and Mag data (Fig. 6). The navigation track of seismic profiles has been adjusted in order to intersect the main inferred or observed faults on the structural map proposed by Ganas et al. (2020; Fig. 5) and to optimize acquisition.

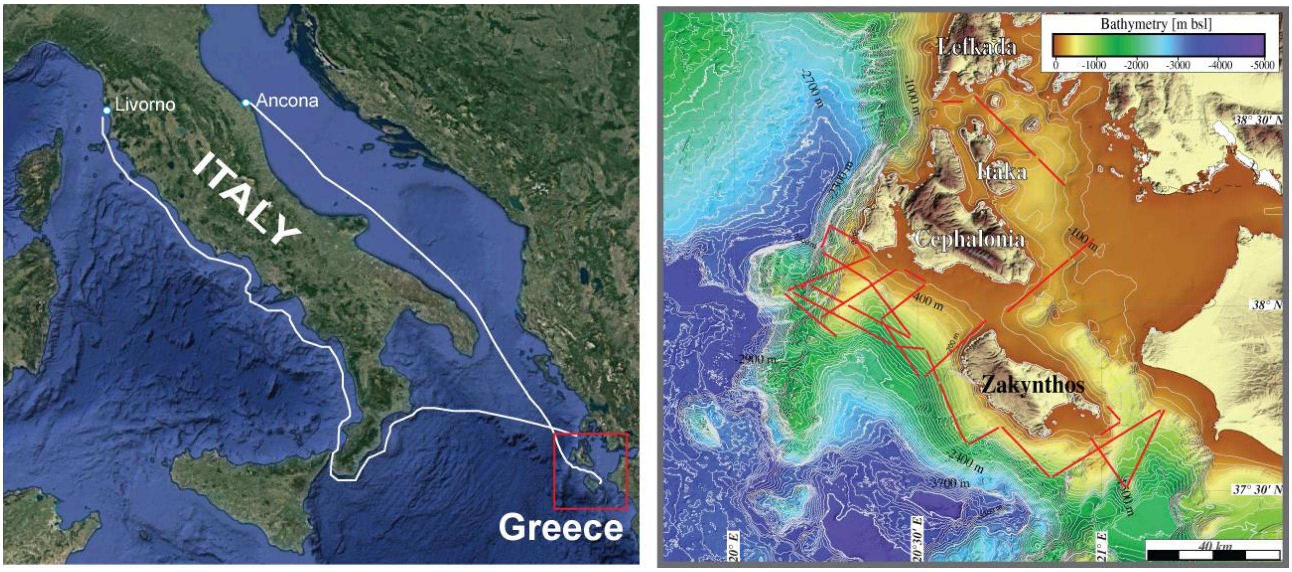

Figure 6 – On left side: map of navigation from Livorno port to Ancona port. On right side: navigation map of mcs and Mag profiles actually acquired during the survey.

Staff

***Technician/Scientific staff*:**

mcs acquisition and PI	M. Filomena Loreto	ISMAR-BO
mcs acquisition and processing	Valentina Ferrante	ISMAR-BO
mcs acquisition and navigator	Stefania Romano	ISNAR-BO
mcs and magnetic acquisition	Filippo Muccini	INGV
mcs and magnetic acquisition	Camilla Palmiotto	ISMAR-BO
mcs acquisition and navigator	Lorenzo Petracchini	IGAG-RM
design seismic transects-interpretation	Paraskevi Nomikou	NKUA

N/O Dallaporta Crew:

Master:	Salvatore Pappalardo
Chief Mate:	Tudor Cirmis
Chief Engineer:	Barbarossa Paolo
Chief Engineer 2:	Altamura Gennaro
Sailor:	Alberto Lamanuzzi
Sailor:	Bernardo Salvo
Cook:	Luigi La Masa

Data Acquisition

Geodetic Parameters:

SYSTEM: WGS84 - WGS84-UTM34N

ELLIPSOID: WGS84

DATUM TRANSFORMATION : WGS84 - WGS84-UTM34N

Datum Transformation from WGS84:

Satellite ellipsoid: WGS84

Local ellipsoid: WGS84

PROJECTION: Geographic

Acquisition Laboratory :

The vessel was set-up with ECDIS Transas marine navigation system placed on the bridge and connected to a GPS antenna. The instrumental offset between the antenna and the stern is 21 meters.
Additional equipment were arranged in the dry-lab for data acquisition:

- Navigation: the COMM-TECH NAVPRO software, installed on a laptop, was used to plan and follow seismic and magnetic routes. Due to different navigation systems used, the lab furnished to the bridge the starting and ending points of each line time by time.
- Multichannel Seismic Acquisition: the Geometrics StataVisor NX Seismograph was used for seismic data recording. Data were recorded both on tape and on HD in SEGD 8048 format. The record length is 3072 ms and the sample rate 0.25 ms.
- A gun-control system (Masini and Ligi, 1995) was connected to the StrataVisor to provide a proper shot interval and, as a consequence, a good seismic coverage. Shot distances were supplied in times with a shot interval of 4 sec and the speed vessel was kept at 3 Kn. This configuration corresponds at a shot interval of about 6.25 m.
- A SUN workstation for on-board seismic processing.
- Magnetic data recording equipment.

For data acquisition, timing was set to UTC whereas the positions, received through a NEMEA sentence by a GPS receiver, were recorded at a rate of 1 second. The positions were therefore recorded as lat/long of the GPS antenna.

High-resolution multichannel seismic data

High resolution seismic reflection data were obtained using a SERCEL (formerly SODERA-SSI) S15-02 water gun (Fig. 7) as seismic source, powered by a 500 l/min, diesel driven, Mod. KA16DD air compressor by BAUER (Fig. 8, left). The pressure to the water gun was set to 140 bar (2500 psi), actually ranging between 140 and 160 bar. The seismic source was deployed at about 14 m from the stern and towed at an average depth of 1.5 m. The shot interval was 6.25 m. The receiver system is a 24 channel streamer (Figs. 8 right and 9), consisting of a deck cable, a tow-leader, a stretch section and an active section which are coupled together into a 200 m mini-streamer solution deployed by an electrical winch (Fig. 8, right). The deck cable consists of a 25 m bulk cable containing 29 x 26 AWG twisted pair conductors and terminated with a 65 pin quick coupler connector at the sea end, and with a 61 socket Bendix connector at the boat end. The tow-leader consists of a 25 m bulk cable with 29 x 26 AWG twisted pair conductors and with sea and boat ends terminated with 55 pin quick coupler connectors. The stretch section consists of a 75 m-long streamer section with a diameter of 47 mm and 55 pin quick coupler connectors at sea and boat ends. The active section consists of a 75 m streamer which comprises 24 channels on 3.125 m group spacing. Each group contains 4 pre-amplified T-2 hydrophones. It is fitted with 2 DigiCOURSE communication coils at 25 m and 50 m and a depth transducer at the head end of the section. The boat end is terminated with a 55 pin quick coupler connector, while the sea end is fitted with a tail swivel. The seismic streamer has been weighted with 22 lead sheets (11 kg): 18 lead sheets were regularly distributed on the stretch section in order to bypass the bubble carpet produced by the ship, while 4 lead sheets were put on the active section for cable balancing. A tail buoy, 200 m from the end of the cable, was used to stabilize the streamer at constant depth of about 1 m. Using this configuration (shot interval 6.25 m and group spacing 3.125 m) a coverage of 600% has been achieved.

All acquisition parameters are summarized in the table below. While offsets of deployed seismic system (Fig. 9) are sketched in figures 10.

SEISMIC ACQUISTION PARAMETERS					
SOURCE		**STREAMER**		**RECORDING**	
Type	S15-02 of Sercel	Type	Teledyne	Type	STRATAVISOR NX
Configuration	1 x 12 in3 (ca. 0,2 l)	Length	75 m	Sampling	0,25 ms
Shot interval	4 sec; ca. 6.17 m	Channels	24	Rec. Length	3072 ms
Depth	1,5 m	Distance	3,125 m	Filter LC	15 Hz
pressure	140 bar	Depth	1 m	Filter HC	2000 Hz
		Near Offset	72,945 m		
		*Fold	6		

*Nominal fold derived by the formula [n x Δn /(2xΔs)]

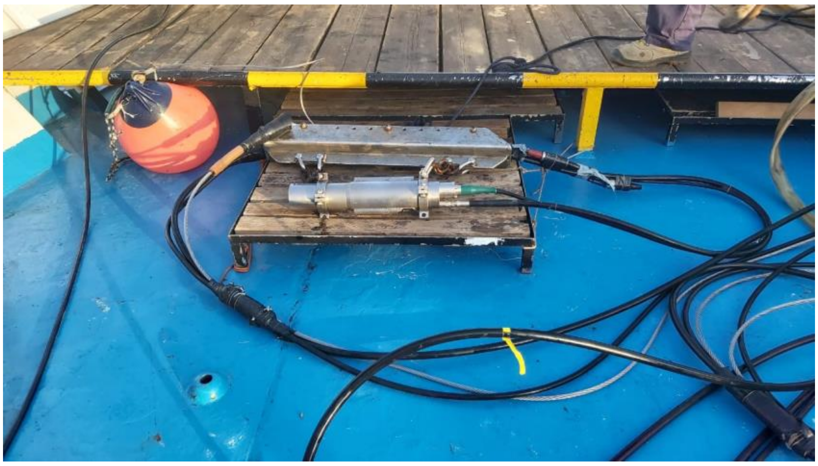

Figure 7 - Seismic souce S15 water gun

Figure 8 – On left side, air compressor Mod. KA16DD by BAUER. On right side, the receiver system spooled on an electric winch

Figure 9 – The photo shows on left the streamer, in the centre the water gun marked also by the presence of the buoy, and on right the magnetometer.

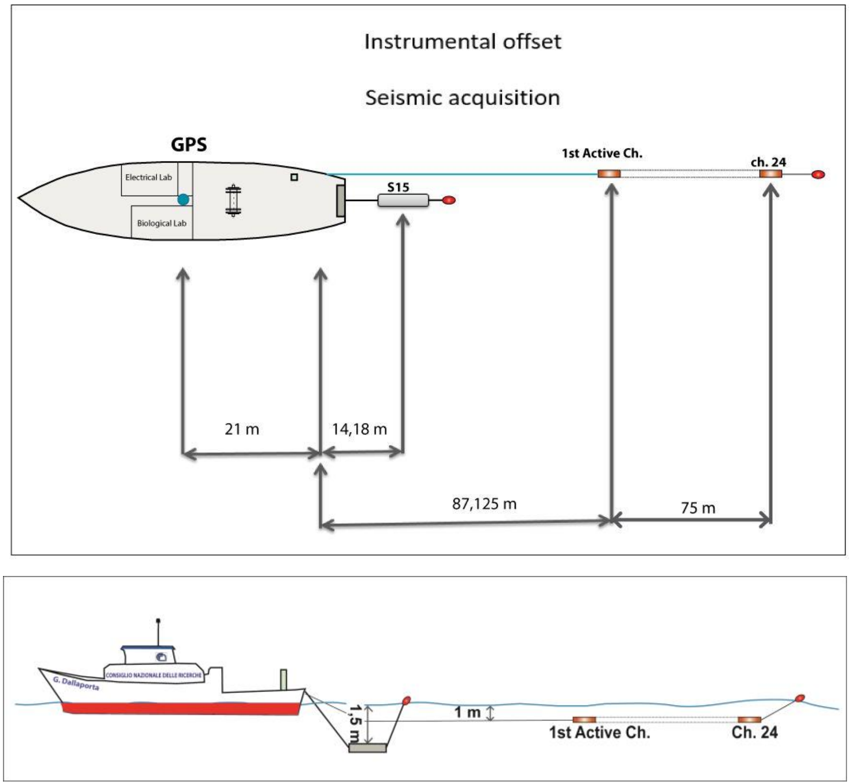

Figure 10 - Offsets of seismic acquisition system towed at the stern of the vessel, plan and side view.

Magnetometric acquisition

Magnetic data were collected by using a SeaSpy marine magnetometer manufactured by Marine Magnetics (Fig. 11) and towed 133 m respect to the stern (Fig. 12) to reduce the magnetic noise induced by the ship. The towing system consists of a vectran cable with twisted pair conductors. The SeaSpy uses a principle known as the Overhauser effect based on the measurement of the magnetic flux density. The sensor sensitivity is 0.01 nT and it is externally triggered by a RS232 protocol interfaced with a dedicated notebook. The data were recorded by the Marine Magnetics's Sealink software at 1 Hz sampling rate (equivalent to an average acquisition point distance of about 1.5 m). Positioning was assured by the NMEA sentences provided by the GPS antenna of the ship.

Figure 11 - The SeaSpy magnetometer with the 133 m-length cable

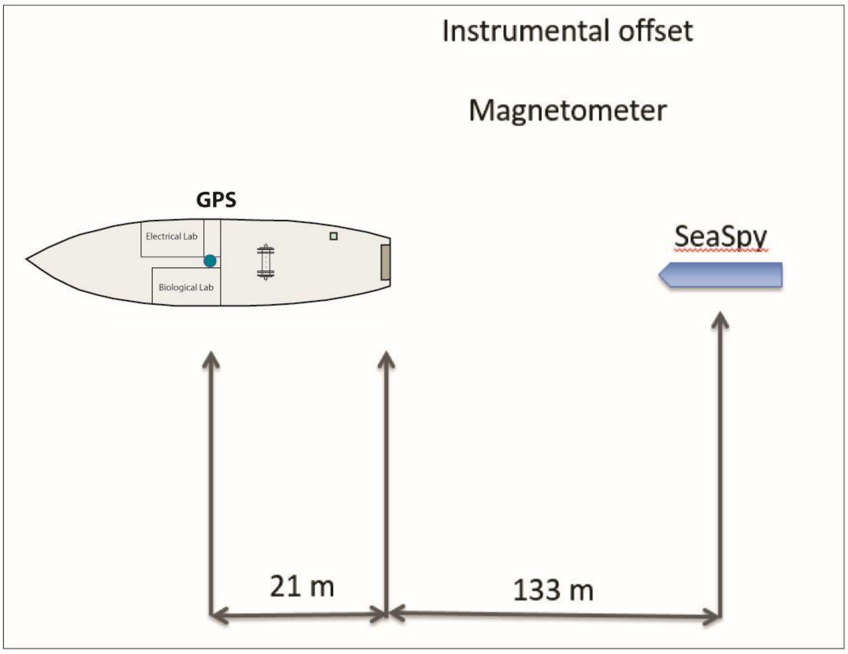

Figure 12 - Offsets of magnetometer towed at the stern of vessel.

A table with coordinates of Starting and Ending Of Lines (SOL and EOL, respectively) acquired is reported below. We acquired in total:

- 437 km of High Resolution Multichannel seismic MCS profiles
- ca. 450 km of High Resolution Magnetic (Mag) data

LINE ID	SOL (Lat; Long)	EOL (Lat; Long)	Lenght (Nm)
IIS-MCS-001	38° 32.815'N; 20° 34.016'E	38° 32.789'N; 20° 37.300'E	2.577
IIS- MCS 002	38° 33.513'N; 20° 39.431'E	38° 32.123'N; 20° 40.875'E	1.792
IIS- MCS 003	38° 31.985'N; 20° 41.024'E	38° 31.972'N; 20° 41.040'E	0.018
IIS- MCS 004	38° 31.938'N; 20° 41.079'E	38° 24.163'N; 20° 49.099'E	10
IIS- MCS 005	38° 23.459'N; 20° 49.789'E	38° 19.358'N; 20° 53.945'E	5.241
IIS- MCS 006	38° 10.658'N; 20° 58.737'E	38° 07.532'N; 20° 54.947'E	4.323
IIS- MCS 007	38° 07.245'N; 20° 54.566'E	37° 58.967'N; 20° 44.640'E	11.395
IIS- MCS 008	37° 57.500'N; 20° 41.077'E	37° 48.595'N; 20° 31.234'E	11.825
IIS- MCS 009	37° 48.615'N: 20° 30.155'E	37° 57.275'N; 20° 24.293'E	9.817
IIS- MCS 010	37° 57.894'N; 20° 24.205'E	38° 03.190'N; 20° 31.016'E	7.547
IIS- MCS 011	38° 03.903'N; 20° 31.150'E	38° 05.658'N; 20° 27.968'E	3.064
IIS- MCS 01	38° 05.749'N; 20° 26.445'E	38° 04.812'N; 20° 24.960'E	1.500
IIS- MCS 013	38° 04.810'N; 20° 24.957'E	37° 58.100'N; 20° 14.361'E	10.725
IIS- MCS 014	37° 55.034'N; 20° 16.623'E	38° 01.754'N; 20° 08.364'E	9.365
IIS- MCS 015	38° 02.418'N; 20° 08.871'E	38° 04.030'N; 20° 12.812'E	3.505
IIS- MCS 016	38° 04.079'N; 20° 12.935'E	38° 06.293'N; 20° 18.399'E	4.848
IIS- MCS 017	38° 06.295'N; 20° 18.402'E	38° 07.790'N; 20° 22.102'E	3.280
IIS- MCS 018	38° 08.399'N; 20° 21.901'E	38° 10.676'N; 20° 19.523'E	2.948
IIS- MCS 019	38° 10.718'N; 20° 19.475'E	38° 12.797'N; 20° 15.604'E	3.691
IIS- MCS 020	38° 12.608'N; 20° 15.546'E	38° 09.315'N; 20° 14.297'E	3.434
IIS- MCS 021	38° 08.507'N; 20° 14.492'E	38° 03.935'N; 20° 22.004'E	7.484
IIS- MCS 022	38° 03.671'N; 20° 22.198'E	37° 55.236'N; 20° 28.685'E	9.864
IIS- MCS 023	37° 54.812'N; 20° 28.559'E	37° 59.878'N; 20° 18.735'E	9.272
IIS- MCS 024	38° 00.299'N; 20° 17.936'E	38° 03.095'N; 20° 12.644'E	5.028
IIS- MCS 025	38° 03.059'N; 20° 11.591'E	38° 02.783'N; 20° 10.916'E	0.6
IIS- MCS 026	38° 01.982'N; 20° 09.739'E	37° 53.759'N; 20° 25.579'E	14.979
IIS- MCS 027	37° 53.374'N; 20° 26.455'E	37° 52.967'N; 20° 30.949'E	3.581
IIS- MCS 028	37° 52.607'N; 20° 31.458'E	37° 47.831'N; 20° 33.347'E	5
IIS- MCS 029	37° 47.208'N; 20° 33.633'E	37° 39.627'N; 20° 36.877'E	7.998
IIS- MCS 030	37° 39.485'N; 20° 36.938'E	37° 37.966'N; 20° 37.869'E	1.688
IIS- MCS 031	37° 37.570'N; 20° 38.348'E	37° 40.217'N; 20° 43.107'E	4.613
IIS- MCS 032	37° 40.292'N; 20° 43.792'E	37° 36.895'N; 20° 47.130'E	4.306
IIS- MCS 033	37° 36.776'N; 20° 47.241'E	37° 32.372'N; 20° 51.419'E	5.512
IIS- MCS 034	37° 32.373'N; 20° 52.092'E	37° 43.021'N; 21° 09.531'E	17.465

IIS- MCS 035	37° 43.014'N; 21° 10.197'E	37° 30.884'N; 21° 04.215'E	13.015
IIS- MCS 036	37° 30.757'N; 21° 03.787'E	37° 38.621'N; 20° 58.243'E	9.007
IIS- MCS 037	37° 39.164'N; 20° 59.945'E	37° 41.094'N; 21° 02.886'E	3.028
IIS- MCS 038	37° 41.510'N; 21° 02.974'E	37° 43.610'N; 21° 01.041'E	2.599
			236

Acquisition test

Figure 13 shows a shot gather visualized during the acquisition tests performed at the beginning of the acquisition in order to test the instrumentation.

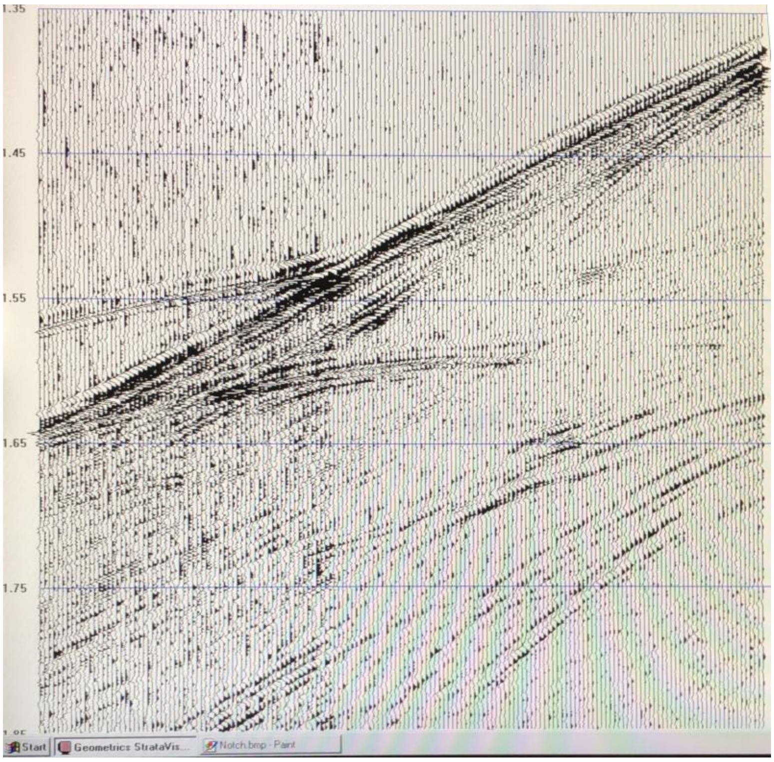

Figure 13 – Shot Gather test

During the acquisition the spectra, trigger, shot, gather, noise and noise parameters were monitored (Fig. 14).

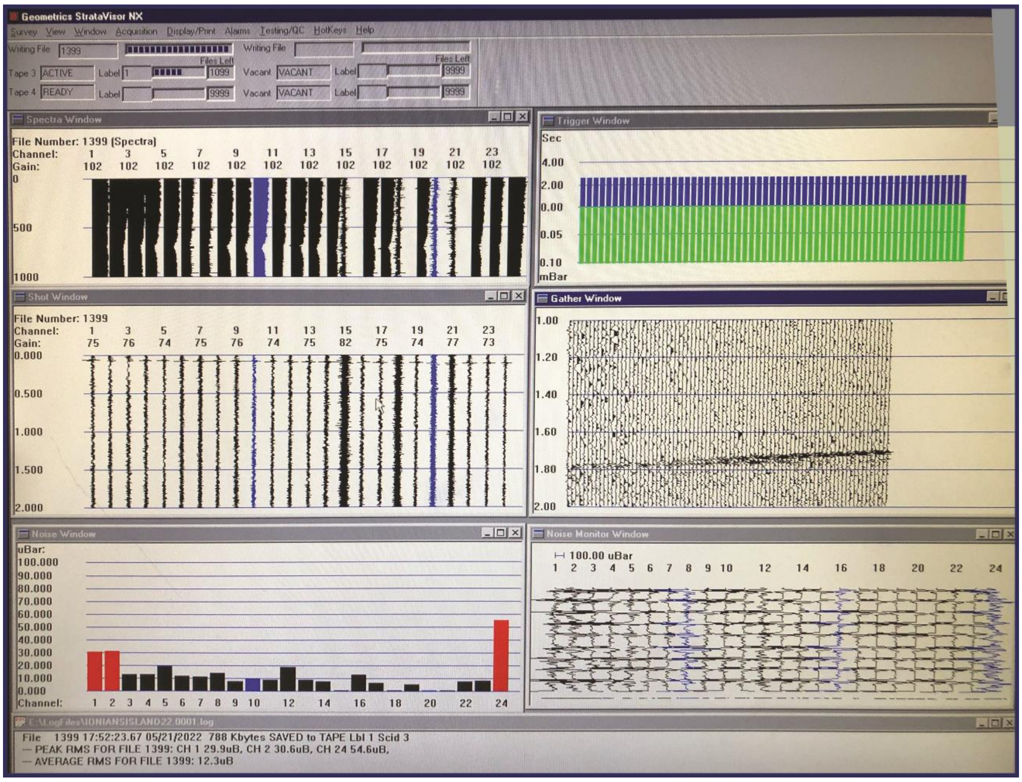

Figure 14 – Window of acquisition parameters.

Pre-processing:

During the acquisition, a pre-processing (Figure 15) of some seismic lines has been done. Segd format files had been converted into Segy format files and a near-trace and a brute-stack have been done in order to check the quality of acquired data.

Figure 15 – Photo of pre-processing phase.

Examples of data acquired

A pre-processing of magnetic data has been also done during the acquisition. In figure 16 is shown an example of acquired mag profile.

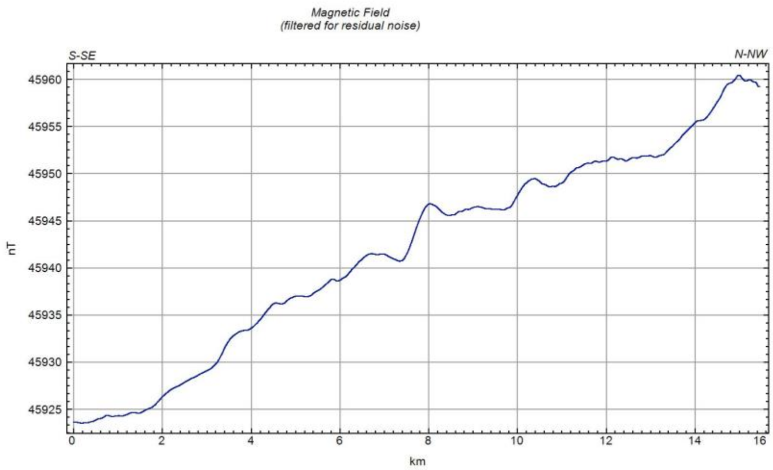

Figure 16. Magnetic field recorded after residual noise removal

Neartrace of a seismic profile shown as example in figure 17.

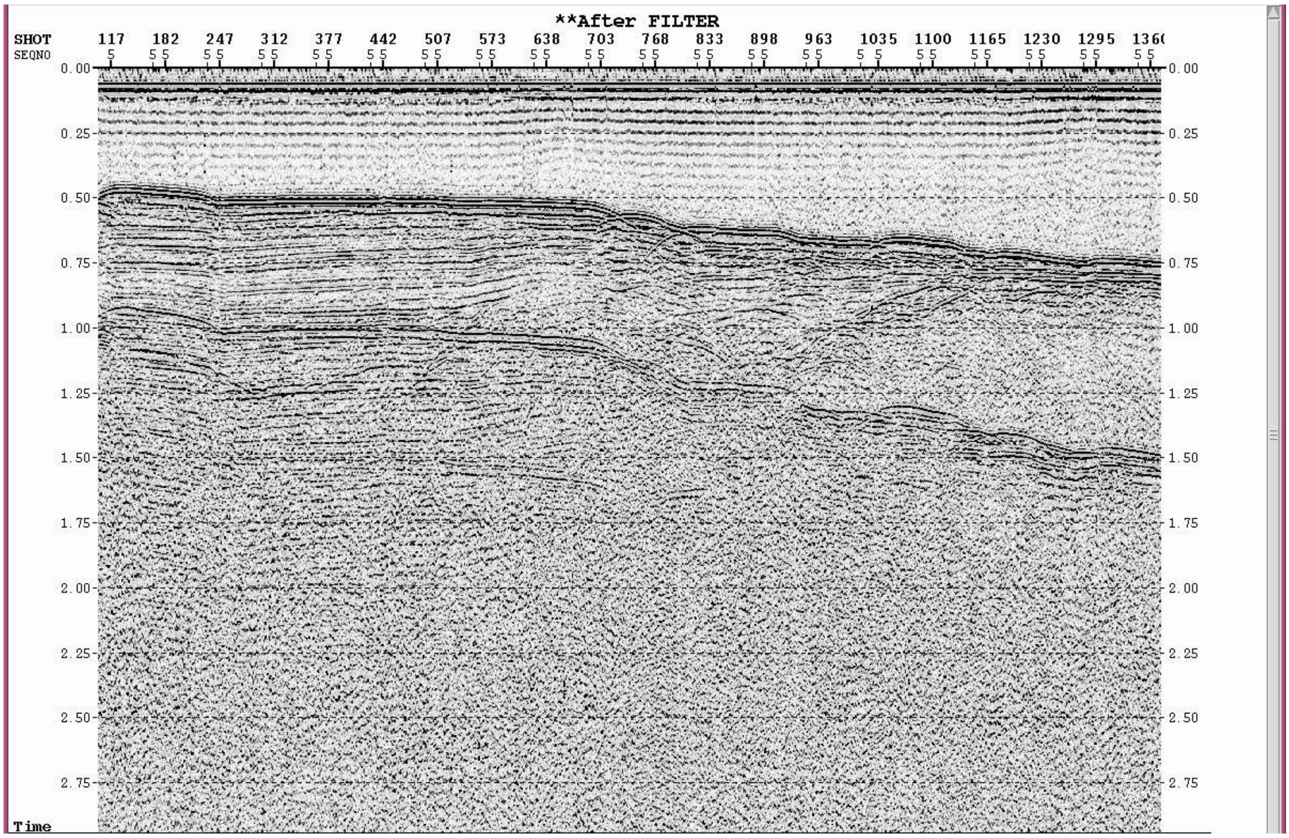

Figure 17– Neartrace of seismic profile IIS-MCS-32.

Day 17-05-2022

7:30 Instrumentation arrived in the Livorno port at the 42 Nord mooring pier

10:00 Instrumentation on board

14:00 ship leave Livorno port and start navigation toward the survey area

Day 18-05-2022

Ship is in navigation along the Italian coast within the Tyrrhenian Sea

Day 19-05-2022

Ship is in navigation along the Italian coast within the Tyrrhenian Sea

11:00 ship stop in front of *Capo Vaticano* waiting for the weather condition improvement, in the Ionian Sea there is a small storm and we cannot cross the Messina strait

Day 20-05-2022

04:00 start moving toward the Messina strait. The weather conditions improve and we can pass the strait and navigate along the Calabria coast toward Crotone.

Day 21-05-2022

07:30 arrived in the working area. We wait and arrange for the disembarking of a sailor that was sick.

10:00 sailor out of board. Ship start to move toward the WP1.

08.30 Check compressor, air cable and connection from compressor to air tanks and gun.

08.38 End of check. Check ok

08.45 Check winch streamer. Check ok

10:57 starting of deployment of the mcs system. Speed 3kn

15.30 Gun deployment 2.5 kn

16:15 deployment and testing finished

16:16 starting acquisition testing

18:40 stop acquisition test, problem with the memory of disk E:/

19:15 start acquisition test 2, problems with noise.

20:20 about stop acquisition and switch off all instruments.

21:40 on line IIS-MCS-2 (WP4). Before to switch on geometrics check of cable and compressor.

21:43 start line

22:03 stop line for shot interval change

22:15 circa start line IIS-MCS-2

Day 22-05-2022

00:36 gasoline to the compressor

01:27 End of line Ionians2022.0004 error of geometrics

01:40 added oil to the compressor

01:44 start of line Ionians2022.0005 recording on disk H:/ .. All segd file are transferred on a pc.

03:25 End of line. The pressure of the compressor is too low, it was firing at 80 bar.

03:26 transit to line IIS-MCS-8

With the aim of identify the problem of lost in pressure, we take on board the air gun. Then it is verify that the air gun lost air, and the same happen to the spare air gun.

It is began the operation of substitution of o-ring in the two guns.

In the mean time was transferred the geometric files of line IONIANS2022.0005 for the backup.

07:10 Gun was put in water with air pressure of 120 bar.

07:35 Start of line IONIANS2022.0006 (which correspond to IIS.MCS8A on NAVpro)

09:04 Stop line from shot 101 to 1825.

10:30 gasoline to the compressor

11:10 deployed of MAG

11:25 Mag data with strong anomalies.

11:28 Mag ok. Data are now normal

11:40 Mag data with strong anomalies for 20 secs

12:32 Mag data with strong anomalies for 30 secs

12:56 EOL MCS IONIANS2022.0007 from shot 101 to 3403. Problems with the space on the hard disk. Geometrics crashed. Missing some data.

13:02 EOL mamagsism6.mag and SOL mamagsism6_000.mag (the file can be deleted)

13:12 Start turn towards WP50, Mag is close to the ship and kept like this till approaching WP50

13:44 Start new MAG line: mamagsism6_001

14:09 SOL seismic line IONIANS2022.0008

15:00 gasoline to the compressor

17:50 EOL seismic line IONIANS2022.0008

18:14 New Mag Line

18:13:10 SOL seismic line IONIANS2022.0009

20:30 gasoline to the compressor

21:26:37 EOL seismic line IONIANS2022.0009

21:30 New Mag Line

21:40:28 SOL seismic line IONIANS2022.0010

23:30 gasoline to the compressor

Day 23-05-2022

00:08:52 circa EOL seismic line IONIANS2022.0010

00:15 circa New Mag Line

00:28:16 SOL seismic line IONIANS2022.0011

01:28:44 EOL seismic line IONIANS2022.0011 (chiusa linea per spazio disco insufficiente sul file 917 su baracco)

01:38:47 Mag on board

02:01 SOL seismic line IONIANS2022.0012 (38° 05.70” N; 20° 26.35’)

02:32 SOL seismic line IONIANS2022.0013 starting from file 563 , it continues the previous line

06:02:15 EOL seismic line IONIANS2022.0013

06:19 Mag on board

08:08 Mag out board

08:09 SOL seismic line IONIANS2022.0014 (circa 37° 55? N; 20° 16? E) corresponding to the IIS-MCS-13 new

11:15:50 EOL seismic line IONIANS2022.0014

11:36:09 SOL seismic line IONIANS2022.0015, recording on tape R1, corresponding to the IIS-MCS-14 new

12:46:09 EOL seismic line IONIANS2022.0015

12:48:17 SOL seismic line IONIANS2022.0016, recording on tape R2, corresponding to the IIS-MCS-14 new

14:25:17 EOL seismic line IONIANS2022.0016

14:27:34 SOL seismic line IONIANS2022.0017, recording on tape R3, corresponding to the IIS-MCS-14 new

15:31:17 EOL seismic line IONIANS2022.0017

15:35 Mag on board

15:46 Mag out board

15:47:12 SOL seismic line IONIANS2022.0018, recording on tape R1, corresponding to the IIS-MCS-15 new

16:42:17 EOL seismic line IONIANS2022.0018

16:44:14 SOL seismic line IONIANS2022.0019, recording on tape R2, corresponding to the IIS-MCS-15 new

17:58:36 EOL seismic line IONIANS2022.0019

18:03 Mag on board

18:25 Mag out board

18:26:43 SOL Start test tapes IONIANS2022.0020

18:40:07 SOL test tapes IONIANS2022.0020

19:47:14 EOL test tapes IONIANS2022.0020

19:48:55 Mag on board

20:09:05

20:09:05 Mag out board

20:06 SOL seismic line IONIANS2022.0021, corresponding to line IIS-MCS-17new

22:30 Mag on boar

22:32 EOL seismic line IONIANS2022.0021. Inizio accostata .

22:38 Mag out board. 38° 54.221'N ; 20° 24.733' E

22:39:00 SOL seismic line IONIANS2022.0022, corresponding to line IIS-MCS-18new. Tape 1 and Tape2

Day 24-05-2022

01:52 Mag on board

01:56:45 EOL seismic line IONIANS2022.0022

02:14 Mag out board

02:15:12 SOL seismic line IONIANS2022.0023, corresponding to line IIS-MCS-19new. Tape 1 and Tape2

05:14 Mag on board

05:16:30 EOL seismic line IONIANS2022.0023

05:29 Mag out board

05:30:05 SOL seismic line IONIANS2022.0024, corresponding to line IIS-MCS-19new. Tape 1, tape 2 and 3

07:06 Mag on board

07:07:38 EOL seismic line IONIANS2022.0024

07:23 Mag out board

07:24:35 SOL seismic line IONIANS2022.0025, corresponding to line IIS-MCS-20new. Tape

07:36 EOL seismic line IONIANS2022.0025 per problema al geometrics

08:10:24 SOL seismic line IONIANS2022.0026, corresponding to line IIS-MCS-21new. Tape 1 and tape 2

12:40 GPS problems, lost 5 minuts of navigation

12:47 Mag on board

13:05 EOL seismic line IONIANS2022.0026, corresponding to line IIS-MCS-21new.

13:20 Mag out board, non è stata fatta un'accostata

13:20:53 SOL seismic line IONIANS2022.0027, corresponding to line IIS-MCS-22new. Tape 1 and tape 2

14:32:05 Mag on board

14:32:55 EOL seismic line IONIANS2022.0027, corresponding to line IIS-MCS-22new.

14:49:14 Accostata

14:45:20 SOL seismic line IONIANS2022.0028, corresponding to line IIS-MCS-22new. Tape 1 and tape 2

16:21:06 EOL seismic line IONIANS2022.0028, geometrics crash

16:32:24 SOL seismic line IONIANS2022.0029, corresponding to line IIS-MCS-22new. Reel 1 and Reel 2. 37°47' 9.66" N; 20°33'39.6" E.

19:00 geometric crash.

19:00 EOL seismic line IONIANS2022.0029, corresponding to line IIS-MCS-22new.

19:02 SOL seismic line IONIANS2022.0030, corresponding to line IIS-MCS-22new. Reel 3

19:34:53 EOL seismic line IONIANS2022.0030, corresponding to line IIS-MCS-22new.

19:49:40 SOL seismic line IONIANS2022.0031, corresponding to line IIS-MCS-23new.

21:19:01 EOL seismic line IONIANS2022.0031, 37° 37.58' N; 20° 38.3' E, corresponding to line IIS-MCS-23new

21:31:14 SOL seismic line IONIANS2022.0032, corresponding to line IIS-MCS-24new.

22:55:05 EOL seismic line IONIANS2022.0032, corresponding to line IIS-MCS-24new.

22:58:50 SOL seismic line IONIANS2022.0033, corresponding to line IIS-MCS-24new

Day 25-05-2022

00:18:01 SOL seismic line IONIANS2022.0033, corresponding to line IIS-MCS-24new

00:18:01 EOL seismic line IONIANS2022.0033, corresponding to line IIS-MCS-24new

01:03:18 SOL seismic line IONIANS2022.0034, corresponding to line IIS-MCS-25new. Tape 1, 2, 3, 4

01:03:27 EOL sism6_025 (accostata)

01:03:27 SOL MAG sism6_026, 37° 32' 25.1" N; 20° 52' 10.1" E

06:41:26 EOL seismic line IONIANS2022.0034, corresponding to line IIS-MCS-25new

06:46:00 EOL MAG sism6_026

06:46:00 SOL MAG sism6_027 (accostata), 37° 43' 12.7" N; 21° 9' 51.7" E

07:01:46 SOL seismic line IONIANS2022.0035, corresponding to line IIS-MCS-26new, Reel 1, 2, 3

07:05:44 EOL MAG sism6_027 (accostata),

07:05:44 SOL MAG sism6_028 (accostata), 37° 42' 49.8" N; 21° 10' 4.91" E

08:48:37 seismic line IONIANS2022.0035, TAPE 2, 37° 37' 57.9" N; 21° 7' 41.33" E

11:19:46 EOL seismic line IONIANS2022.0035, corresponding to line IIS-MCS-26new

11:24:00 Mag on board

11:33:30 Mag out of board

11:33:34 SOL seismic line IONIANS2022.0036, corresponding to line IIS-MCS-27new. Reel 1, 2

14:29:24 EOL seismic line IONIANS2022.0036, corresponding to line IIS-MCS-27new

14:32 Mag on board

14:45 Mag out of board

14:45:28 SOL seismic line IONIANS2022.0037, corresponding to line IIS-MCS-28new. Reel 1

15:56:10 EOL seismic line IONIANS2022.0037, corresponding to line IIS-MCS-28new.

16:00 Mag on board

16:06 Mag out of board

16:06:03 SOL seismic line IONIANS2022.0038, corresponding to line IIS-MCS-29new. Reel 1

18:00 EOL seismic line IONIANS2022.0038, corresponding to line IIS-MCS-29new

18:01 Instrumentation recovery

19:00 Ending of instrumentation recovery.

20:00 Disembarking of the Prof. Ass. Paraskevi Nomikou in the Zakynthos port.

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