HELLENiQ UPSTREAM
KYPARISSIAKOS GULF

BLOCK 10

LEASE AREA

ENVIRONMENTAL REPORT 2025 - 2026

Contents

BLOCK 10 LEASE AGREEMENT AREA

ENVIRONMENTAL REPORT 2025 - 2026

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Introduction

HELLENiQ UPSTREAM Kyparissiakos Gulf Single Member S.A. (HELLENiQ UPSTREAM Kyparissiakos Gulf), 100% subsidiary of HELLENiQ UPSTREAM S.A., owns all the rights to explore and produce hydrocarbons deriving from the Lease Agreement with the Greek State in the offshore area of Kyparissiakos Gulf (Block 10), total area 3.420,6 sq. km. HELLENiQ Upstream Kyparissiakos Gulf SA (100%, Operator) officially signed the Lease Agreement with the Minister of Environment & Energy on April 9, 2019 and on October 10, 2019, the Greek Parliament ratified (Law 4630/10.10.2019). HELLENiQ UPSTREAM Kyparissiakos Gulf, acting as Operator, is fulfilling its commitments and planning of the first phase of the exploration work program by implementing the most up-to-date, safe and environmentally friendly technological methods and practices with the outmost respect to local societies and socioeconomic activities. According to the Provisions of Article 12 for "Environmental Protection": "The Lessee shall include in each Annual Work Program and Budget to be submitted to the Lessor, an environmental report on the work to be undertaken as provided in that document, as well as on the work undertaken in accordance with the preceding Annual Work Program and Budget".

1. Environmental Monitoring and Recording of Critical Biodiversity Indicators 2025 final results

Survey of the Status of Important Fauna Species in the Block 10 Lease Area

1.1. Introduction

In the context of Environmental Monitoring and Recording of Critical Environmental Indicators of Biodiversity, such as marine mammals (cetaceans and monk seals), sea turtles and seabirds, the Hellenic Petroleum Exploration & Production of Hydrocarbons Kyparissiakos Gulf Single Member S.A. company has assigned to Nature Conservation Consultants (NCC) Ltd a contract for conducting the present Project, namely the "Survey of the Status of Important Fauna Species in the Block 10 Lease area. The Project consists of 3 work packages (WP):

I. Pelagic Surveys for marine mammals, seabirds, sea turtles, nearshore and in the open sea, using an open water RIB vessel, a sailing boat and a single engine aircraft.

II. Coastal surveys for monk seals and Mediterranean shag breeding sites in the coastal zones of the adjacent Natura 2000 sites, using inflatable RIB boats.

III. Colony surveys at the Strofades islets SPA and the surrounding project area, using GSM nest cameras and GPS/GSM transmitters, as well as analysis of the transmitters' data fitted on Loggerhead turtles in the previous years.

The present project is the 2025 continuation of the ongoing project implemented also in the period 2020- 2024.

1.2. Description of the Project Area

The Project Area is located in the Ionian Sea, southeast of Zakynthos Island and west of Peloponnese, approximately from the latitude town Zacharo in the north and Methoni in the south. It extends between latitudes of 36º50'N in the south and 37º30'N in the north and between latitudes of 20º55'E in the west and 21º30'E in the east. Its total surface area is 3.422.5 km^2.

The Wider Project Area envelops the project area and extends further north and east to additionally include the southwestern, south-eastern and eastern coast of Zakynthos, and the western coast of Peloponnese south of Kyllini, together with their neighboring islets. The Pelagic Survey Area, where pelagic surveys are carried out includes the Project Area together with neighboring waters to the east.

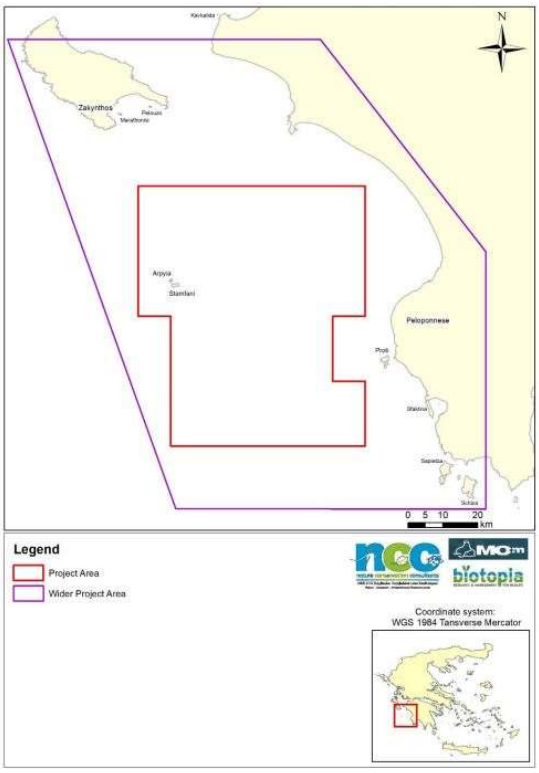

Fig. 1: Wider Project Area

1.2.1. Oceanographic characteristics of the Project Area

The sea depth within the Project Area exceeds 500m and reaches more than 3.500m at its southwestern corner. The only exception is the Strofades islets in the west, which are surrounded by a narrow belt of coastal waters.

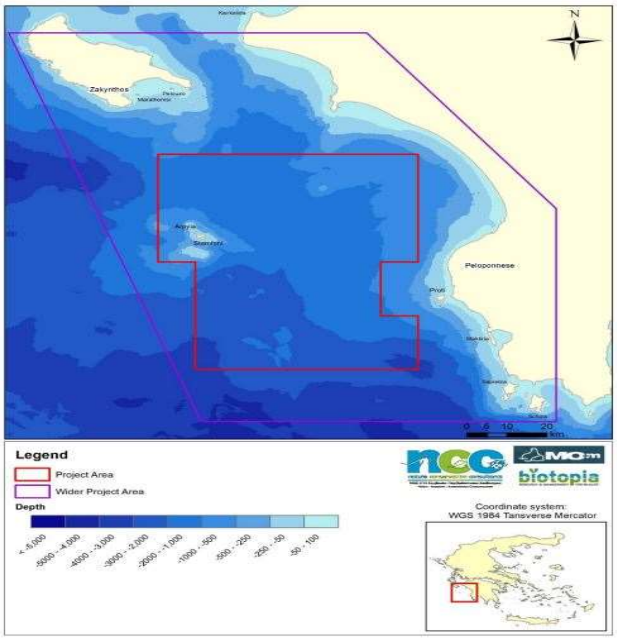

Fig. 2: Bathymetry in the Project Area

In northern, north-eastern and eastern part of the Wider Project Area the slope of the sea floor descends gradually, without abrupt breaks towards southwest, however the southern and the western part exhibit numerous abrupt descends of the sea floor, accompanied by step slopes of the sea floor reaching up to 53º.

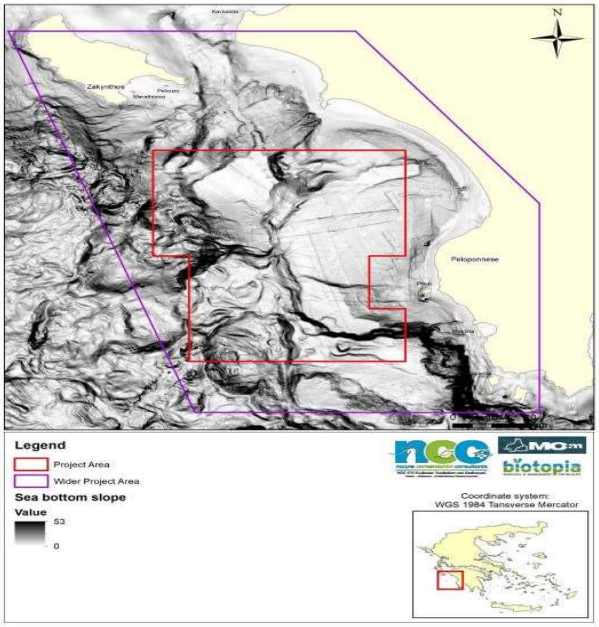

Fig. 3: Slope of the sea floor in the Wider Project Area

1.3. Methodology

1.3.1. Pelagic surveys

Pelagic surveys for cetaceans, sea turtles and seabirds are carried out using i) a 15m sailing boat, ii) a 7,5m RIB boat and iii) a high wing, ultralight aircraft.

1.3.1.1. Boat surveys

Visual-based surveys

The method applied for visual surveying seabirds, cetaceans and sea turtles in the Pelagic surveys area is the European Seabirds at Sea (ESAS), based on Tasker et.al 1984 and Champhuysen & Garthe 2004 and adopted to Greek/Mediterranean conditions through the LIFE-Nature project for the Identification of Marine Important Bird Areas (marine IBAs) in Greece, entitled "Concrete Conservation Actions for the Mediterranean Shag and Audouin's Gull in Greece, including the Inventory of Relevant Marine IBAs", LIFE07 NAT/GR/000285, (http://www.ornithologiki.gr/en/seabirds), as described in Fric & Gaganis 2009.

In summary, the method is aimed at systematically recording seabirds, cetaceans and sea turtles as well as human activities in the survey area, in transects by trained observers, from a boat which is moving at a constant low speed but no distance recorded. For flying birds, coded with F, there is no distance indication. Boat position (poskey), namely geographical longitude and latitude, are recorded every 5 min. The marine species are spotted by a naked eye or binoculars and are identified by binoculars.

A method described by Heinemann (1981) is used to determine the distances at sea and more particularly the distance of 300m from the observing platform which determines the width of the line transect by using a caliper or a ruler. During ESAS surveys data is recorded regarding (A) boat route, (B) marine species and (C) human activities in the survey area, which may have an effect on the presence and behavior of the marine species.

Survey boat data include: start and end location date, time and geographical location of each line transect, sea state, visibility and floating matter (including fishing vessels). Species data recorded include: species, number of individuals, age (if applicable), distance from the observation vessel, location within or outside 300m line transect, flight direction (for birds), behavior and association with human activities or other species.

Fig. 4: Visual boat surveys using the ESAS survey method

The *survey design for cetaceans* is similar to the established methodology designs for such surveys, used over the past 4 decades (Buckland et al. 2001, Buckland et al. 2004) and used a grid of parallel line transects, that provided comprehensive coverage of the study area. The transect lines acted as the basis for the daily track line followed by the vessel providing roughly uniform coverage of the study area. Attempts were made when selecting the orientation of the transect lines, to have them move across (at an angle to) the depth gradient in the area as opposed to moving along (parallel to) the depth gradient. This was done to allow for the coverage of different depth levels during navigation of each transect, to minimize detection bias on individual transect lines when mapping sighting data.

When a group of cetaceans is sighted (group defined 'dolphins observed in apparent association, moving in the same direction and often, but not always, engaged in the same activity' (Bearzi et al. 2005) by any of the on-effort observers, the systematic search effort is interrupted while the vessel diverted from the track line toward the sighted animals in order to achieve more accurate determinations of the species, the group size, group age class composition and group activity of the group sighted. In addition to basic environmental data.

Beaufort sea state, visibility conditions etc.) collected at regular 1 hour intervals as well as at the start and at the end of each transect line, data collected for each sighting includes the time, GPS coordinates, initial bearing and radial distance to the cetacean group (used to calculate the perpendicular distance of the sighting to the track line), species identity, group size, group age class composition (3 age classes: Calf < 1/2 length of adult, Juvenile < 2/3 length of adult and adult) and the general activity in which the group is engaged in at the time of approach (e.g. foraging, travelling, milling).

For the correct identification of the species as well as the correct recording of group size and group age class composition attempts are made to approach the animals to obtain photographs. Where possible the photographs taken are also used for the photo-identification of individuals. This is being done to ensure the same group of animals was not counted twice during the same survey day.

Encounter Rates are calculated as the number of encounters / 100km of "on effort" navigation. The navigation schedule coincided with the Visual boat-based surveys.

In case a group of cetaceans or seabirds was spotted, a drone was used in order to more accurately identify the species and assess the number of the individuals, record their behavior and gather the relevant photographic evidence. The numbers of individuals of each species recorded by ESAS surveys were transformed into species densities per km^2, considering the 2x300m=600m transect survey width and the distance travelled by the survey vessels per 5-minute time interval distance travelled = boat speed x 5 min. The locations of number of recorded individuals per species and the density of individuals per species were overlaid 4 geographical minutes (4'x4') reference grid in WGS84 projection coordinate system.

Considering that more than one may have crossed each 4'x4' reference grid cell, for each cell the following variables were calculated:

• The average over all survey trips of the total number of individuals per species recorded in a 4'x4' grid cell per trip

• The maximum over all survey trips of the total number of individuals per species recorded in a 4'x4' grid cell per trip

• The average over all survey trips of the average density of individuals per km^2 per species in a 4'x4' grid cell per trip

• The average over all survey trips of the maximum density of individuals per km^2 per species in a 4'x4' grid cell per trip

• The maximum over all survey trips of the average density of individuals per km^2 per species in a 4'x4' grid cell per trip

• The maximum over all survey trips of the maximum density of individuals per km^2 per species in a 4'x4' grid cell per trip.

It should be noted that individuals recorded outside transects are excluded from density calculation. The densities of the species per reference grid cell are representative of the habitat suitability. The variable "average over all survey trips of the average density of individuals per km^2 per species in a 4'x4' grid cell per trip" was used as a measure of habitat suitability for each species. This variable was classified into 4 classes:

• Most suitable habitats – top 5% of positive (i.e., non-zero) densities in grid cells

• More suitable habitats – 25-5% top values of positive densities in grid cells

• Suitable habitats – 75-25% top values of positive densities in grid cells, and

• Presence – remaining grid cells with species presence (bottom 25% values).

To further analyze the patterns of seabird movements in the area for each grid cell the prevailing flight directions were calculated. Additionally, locations of interactions of seabirds with fisheries were identified in association with their abundance in absolute numbers.

Finally, for each grid cell the number of species of interest recorded in the grid cell was calculated to identify those areas where the species richness is the greatest.

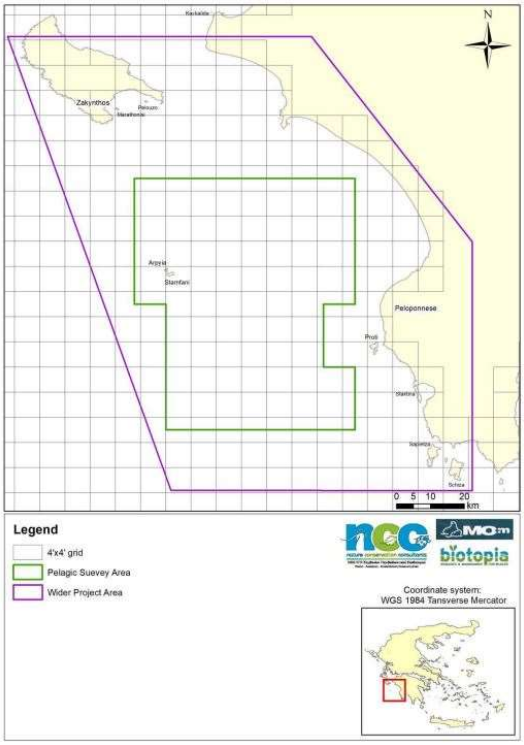

Fig. 5: Four decimal minute (4'x4') reference grid in WGS84 coordinate system

Acoustic surveys

The acoustics detection team worked in cooperation with the visual observers, detecting cetacean vocalizations by using a hydrophone array towed behind sailing boat. The hydrophone array system consisting of High Frequency Magrec HP03 hydrophone elements, comprising a HP03 preamp (Low cut filter set at 2kHz) with a nominal sensitivity of 1.5kHz – 150kHz along with a topside Magrec HP/27ST Amplifier along with a Lenovo Thinkpad Laptop using the PAMGUARD acoustic analysis software specifically developed for cetacean monitoring, covering the range of possible vocalizations for species likely to be encountered during our surveys. The towed hydrophone system was submerged and active, and a PAM operator was active on the equipment during all "On Effort" times during the survey.

The hydrophone system consists of 4 hydrophones which record in 4 different channels. The visual observers and PAM operator rotated every 1.5 hour to minimize fatigue.

The PAM operator immediately informed the visual observer team of any acoustic detection.

The hydrophone recordings were analyzed by PAMGUARD software using "whistle and moan detector" module.

Fig. 6: Night PAM boat survey

Photo – Identification

Photo – Identification Photo-identification (photo-ID) is one of the most reliable non-invasive methods, that is widely applied across for identifying individual of different species of marine mammals such as dolphins, seals, and whales by using permanent external traits (scars, pigmentation patterns, and notches) that remain stable over time. It relies on the unique natural characteristics of each animal, including the shape, scars, and pigmentation patterns on the tail fluke or dorsal fin, which act as a biological "fingerprint" for individual recognition.

This approach enables the estimation of population trends, spatial distribution, and individual movement patterns. In the case of the sperm whale (Physeter macrocephalus), the technique focuses primarily on the tail fluke, whose morphology is distinct for each individual and represents a highly reliable feature for identification. The shape of the fluke, the pattern of its trailing edge, notches, scars, and pigmentation marks remain consistent over time and can be used as diagnostic characteristics for individual recognition. Through this approach, it is possible to estimate the minimum number of individuals observed, detect potential re-sightings, and assess the spatial and temporal distribution of sperm whales within the study area. During field surveys,

photographs were taken whenever sperm whales were sighted, focusing particularly on moments of deep diving when the tail fluke was fully raised above the water surface (fluke-up).

For each encounter, the date and time of the first and last observation, the group size and composition, and the general behavior of the animals were recorded. From the total number of photographs, only those meeting the quality criteria for identification clear focus, full fluke exposure, and near-perpendicular angle were selected for further analysis. High-quality images were selected and analyzed using the Flukebook platform, which applies automated pattern-matching algorithms followed by expert visual confirmation. Each confirmed individual was assigned a unique code(SW1–SW14) and archived with representative photographs in a reference database. Photo-ID data were compiled in an Excel file to document morphological traits and support future cross-comparisons. Despite limitations related to environmental and behavioral factors, photo-identification remains an essential tool for estimating population size, spatial distribution, and movement patterns of sperm whales.

Fig. 7: Deployment of the towed hydrophone array behind the sailing boat

1.3.1.2.Aerial surveys

For the aerial surveys, a high wing, light aircraft Cessna C172R Skyhawk was used, powered with a Lycoming IO-360-L2A, 160 Hp. This four-seater aircraft offers an excellent view from its cockpit and is considered suitable, reliable and cost-effective for such a mission. Messolonghi Airport (ICAO designator GR-0008) was used as a base for the aerial expeditions to the Northern Ionian Project Area. The flight was performed along the Project Area at an altitude of 1000 ft MSL and an average Speed Over Ground of 85 knots. The flights were performed under ideal weather conditions (wind speed less than 10 knots, clear sky and visibility more than 8 km). In every case where an "object/s of interest" was spotted, the airplane left its track and performed one or more

circles over the object/s in order to visually identify it. Furthermore, the object was photographed so that a proper record of its observation and identification is kept.

The photographic operation was performed using a full frame DSLR (Nikon D750) with a 70-200mm F/2.8 Tamron SP lens. All photographs were georeferenced since the camera was equipped with a GPS Unit (Nikon GP-1A). The flights were monitored and recorded with the use of two specialized applications, namely the GARMIN-Pilot and the Fore-Flight.

Fig. 8: The aircraft used for the aerial surveys spotting a group of Sperm whales

In the following example, the staged photographic identification process of an initially "object of interest" located on the shore is clearly shown.

Fig. 9: Recording an "object of interest", B: Approaching, C: Identifying

1.3.2.Coastal surveys

1.3.2.1.Coastal surveys and cave monitoring for the Mediterranean Monk Seal

Coastline surveys will be conducted across southwest Zakynthos Island, the Strofades Islands, the Kyparissiakos Gulf, and the southwestern Peloponnese to identify and monitor marine caves that may serve as suitable pupping sites for the Mediterranean

monk seal (Monachus monachus). Surveys will be carried out using a Rigid Inflatable Boat (RIB), enabling efficient coverage of extensive and complex coastal areas to ensure that no potential pupping site is overlooked. In addition, infrared (IR) trap cameras will be installed in selected caves to collect data that will support further assessment of monk seal breeding activity. Depending on the monitoring objective, cameras will either operate in timelapse mode capturing images at regular intervals (e.g., every 1 or 2.5 hours) for continuous observation of known breeding sites, or in motion-triggered mode to record presence-absence data of the species. Lastly, records of seal observations are collected through the operation of Rescue and Information Network (RINT).

Fig. 10: Installation of infrared camera systems in a monk seal shelter

1.3.3. Colony surveys – Telemetry

1.3.3.1. Colony surveys of Scopoli's Shearwater at the Strofades islets SPA with nest cameras

The internationally significant colony of Scopoli's Shearwater (Calonectris diomedea) at the Strofades Islets SPA, and the surrounding project area, will be monitored using GSM-enabled stationary nest cameras and audio recordings. These systems will document the breeding activity, assess the presence and behavior of ground predators, and detect potential anthropogenic disturbances to the colony. Cameras will be deployed throughout the breeding season. All visual and acoustic data collected will undergo systematic analysis. The cameras are equipped with PTZ (pan-tilt-zoom) capabilities, allowing for adjustable fields of view and enhanced monitoring coverage compared to fixed-angle systems. Furthermore, their integrated audio recording

functionality enables dual use of data for both visual and acoustic analysis, providing a comprehensive assessment of the colony's status and threats.

1.3.3.2 Telemetry of Scopoli's Shearwater at the Strofades islets SPA with satellite transmitters

10 GPS/GSM tagswill be deployed to Scopoli's shearwater fledglings on September-early October 2025, to record the maiden journeys of the fledged birds and identify possible threats and mortality factors during this high-risk period. By processing the data through Artificial Intelligence and machine learning software, the bird populations, movements, patterns of space use by the species for foraging in the "Kyparissiakos block" lease area will be further explored.

1.4. Results

1.4.1. Pelagic surveys

1.4.1.1. Boat surveys

A total of 950 nautical miles of boat-based visual and acoustic surveys using both the sailing boat as well as the RIB vessel were carried out from 10/6/2025 to 16/6/2025 and from 19/9/2025 to 1/10/2025 in the Project Area, as well as in the Wider Project Area and the surrounding areas, to assess the presence, abundance and distribution of the cetacean, sea turtle and seabird species of interest.

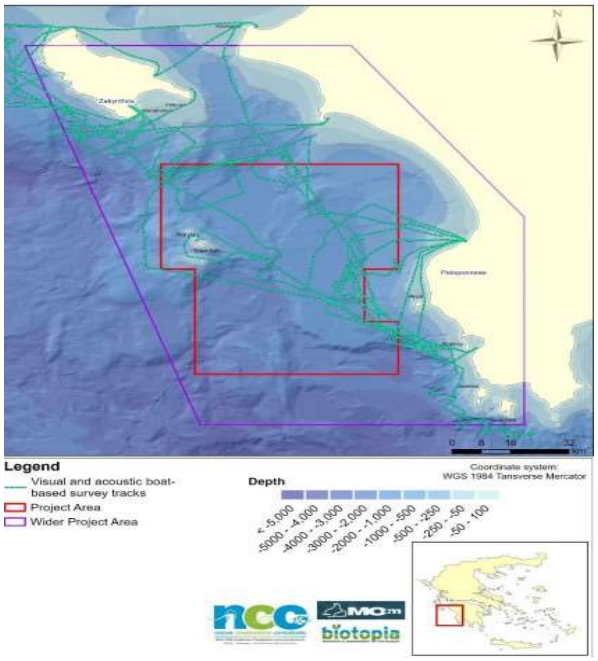

Fig. 11: Visual and acoustic boat-based survey tracks

During the visual surveys the following species were recorded inside the Project Area:

- 3 cetacean species: sperm whale (Physeter macrocephalus), Cuvier's beaked whale (Ziphius cavirostris), and striped dolphin (Stenella coeruleoalba),

- 2 seabird species: Scopoli's shearwater (Calonectris diomedea) and Yelkouan shearwater (Puffinus yelkouan)

- 1 raptor bird species: An unidentified buzzard species (Buteo sp.)

- 1 sea turtle species: loggerhead turtle (Caretta caretta)

Table 1: Species visually recorded in the Project Area

Species	Common name	Number of individuals
Physeter macrocephalus	sperm whale	17
Ziphius cavirostris	Cuvier's beaked whale	24
Stenella coeruleoalba	striped dolphin	105
Calonectris diomedea	Scopoli's Shearwater	43
Buteo sp.	buzzard species	1
Puffinus yelkouan	Yelkouan shearwater	1

Moreover, during the visual surveys, the following target species were observed outside the Wider Project Area:

- 3 loggerhead turtles, - 7 sperm whales NW of Zakynthos Island,

- 70 striped dolphins, S of the SE border of the wider project area,

- 5 bottlenose dolphins (Tursiops truncatus) NW of Zakynthos Island,

- 9 Scopoli's shearwaters NW of Zakynthos Island.

During the surveys conducted with the RIB vessel, covering 93 nautical miles, 2 detections of Cuvier's beaked whale, 1 detection of 2 sperm whales were recorded, as well as 1 detection of striped dolphins in the Wider Project Area. During the acoustic surveys with the towed hydrophone, covering 857 nautical miles, 8 detections of Cuvier's beaked whale, 4 independent detections of sperm whales (two of which ended up successfully tracking the animals) were recorded, as well as 28 detections of dolphins (species identification is not possible for dolphin species with the acoustic data) in the Wider Project Area. Additionally, another 1 acoustic detection of sperm whales (which ended up successfully tracking a group of 7 animals), 3 detections of Cuvier's beaked whale and 13 detections of dolphins were recorded outside the Wider Project Area (NW of Zakynthos and S of the SW border of the Wider Project Area). It is noteworthy that during the visual and acoustic surveys conducted in June 2025, a total of 20 to 21 sperm whales (Physeter macrocephalus) were recorded within the wider project area Lease area. This represents an exceptionally high number of individuals, considering the estimated population in Greek waters is between 180 and 280 animals. The results of the boat visual and acoustic surveys are presented in the following figures.

Cetaceans' visual record

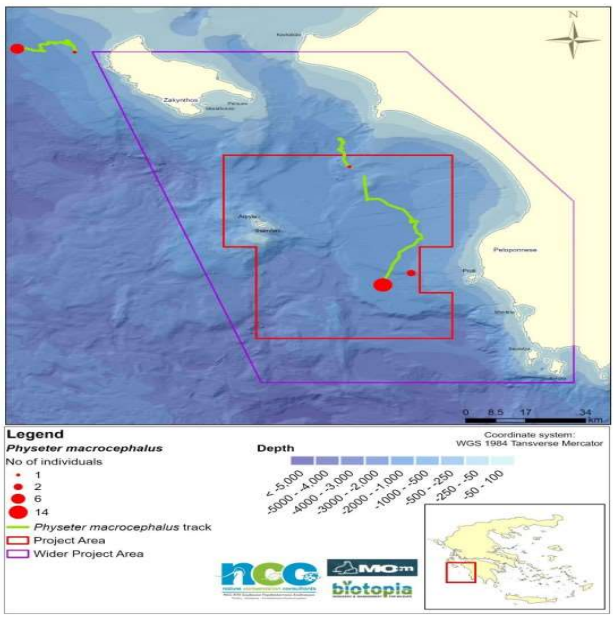

Fig. 12: Locations of encounters and tracks following sperm whales

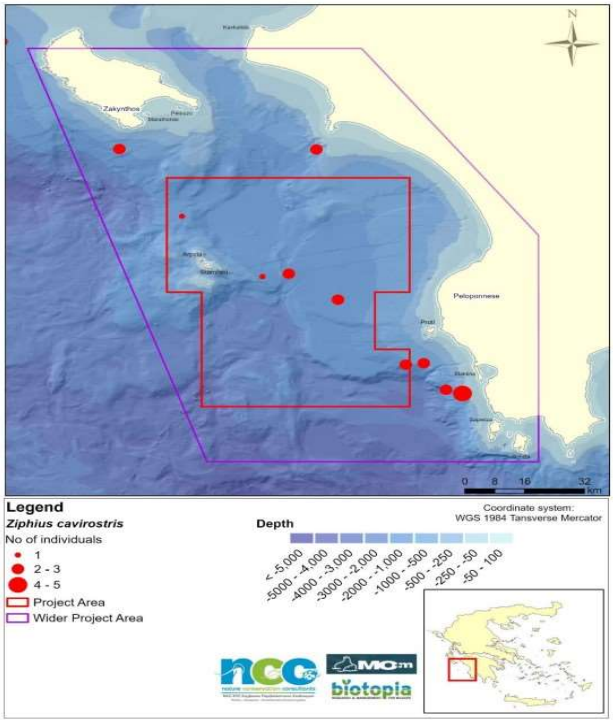

Fig. 13: Locations of Cuvier's beaked whale visual records

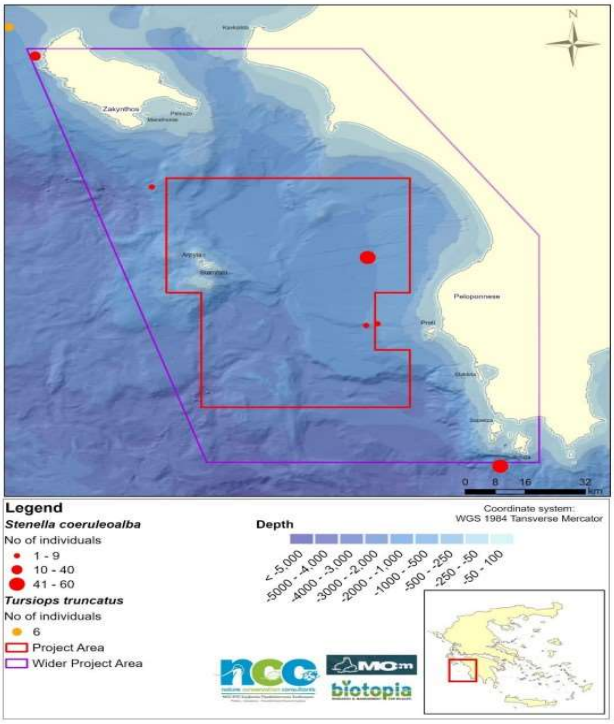

Fig. 14: Locations of dolphin species visual records.

Sperm Whale Photo – Identification

The present section covers the photo-identification analysis carried out between 8 and 16 June 2025. Sperm whales were visually recorded on 13, 14, and 16 June. Following photos and a table from the results derive from these three survey days. Processing and visual validation of the images in Flukebook (https://www.flukebook.org/).

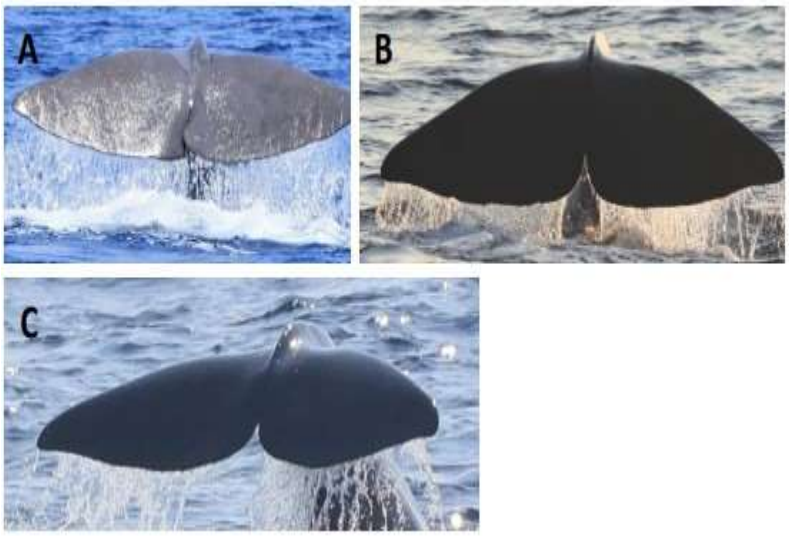

Fig. 15: Image A shows individual SW1, Image B individual SW2, and Image C individual SW12, all displaying the dorsal (upper) surface of the tail fluke during full extension at the initiation of a deep dive

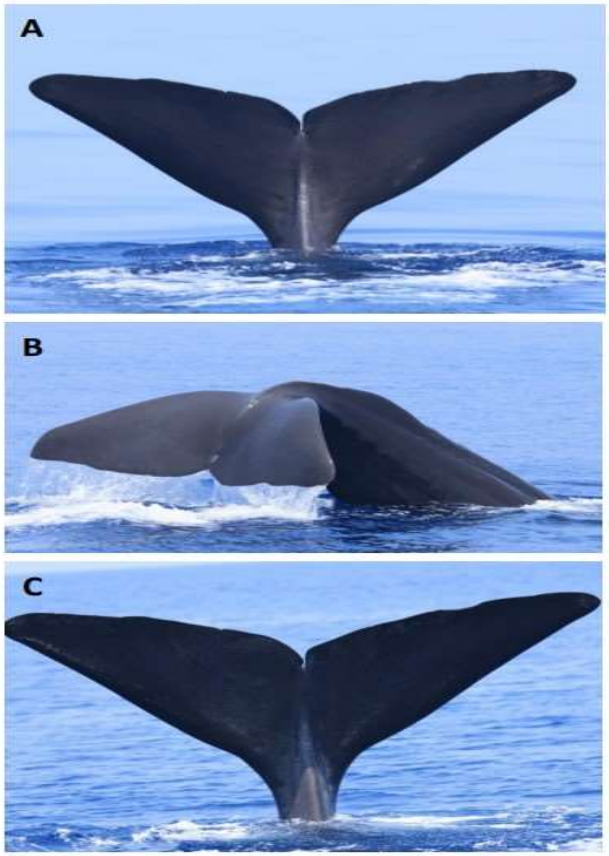

Fig. 16: Fluke-up photographs of individual Physeter macrocephalus (SW13) captured on 14 June 2025. Images A–C depict the three consecutive deep-diving events of the same whale, recorded at 08:02, 10:07, and 11:05, respectively. Frames A and C show the tail fluke

Table 2: Summary of sperm whale (Physeter macrocephalus) sightings and photo-identification results during the June and September 2025 surveys in the Kyparissiakos Gulf. The table includes observation periods, estimated number of individuals, identified whales, behavioral notes and photo-ID quality assessment.

Date	Observation period (local time)	Estimated number of individuals	Identified individuals (Flukebook IDs)	Behavioural notes	Photo-ID quality / remarks
13 June 2025	09:17 – 17:20	6	SW1, SW2, SW3, SW5, SW7, SW12	Repeated re-sightings of same individuals; multiple feeding dives	Excellent visibility; multiple fluke-ups (10:12, 13:54, 15:34)
14 June 2025	07:55 – 11:05	1	SW13	Solitary adult male; three successive deep dives (~08:00, 10:07, 11:05); no other whales observed.	High-quality images of fluke and dorsal fin; individual fully identifiable.
16 June 2025	10:35 – 21:30	11–14 (visual & aerial count)	SW14	Large social aggregation including juveniles; steady southward movement; no feeding behaviour observed.	One complete fluke-up (10:46); insufficient data for ID; valuable behavioural documentation.
September 2025 expedition	Two-week period	0 visual (2 acoustic detections)	—	No visual sightings: only two distant acoustic detections recorded.	Indicates possible seasonal movement; further monitoring required.

Seabirds visual records

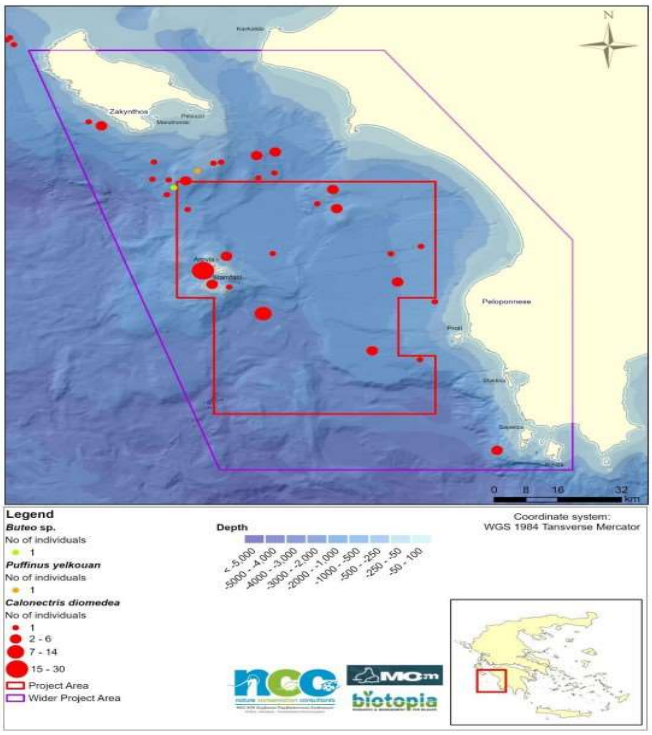

Fig. 17: Locations of bird species visual records

Cetaceans acoustic records

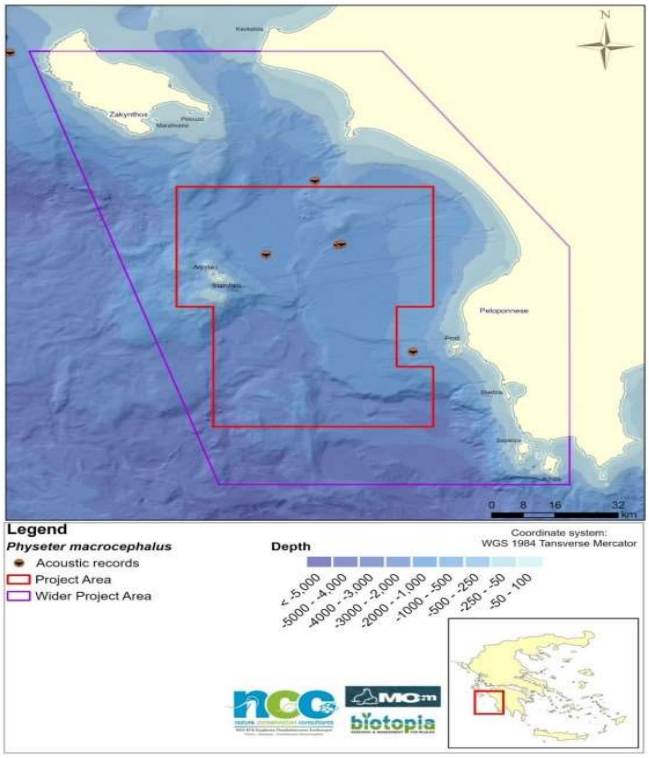

Fig. 18: Locations of sperm whale acoustic records.

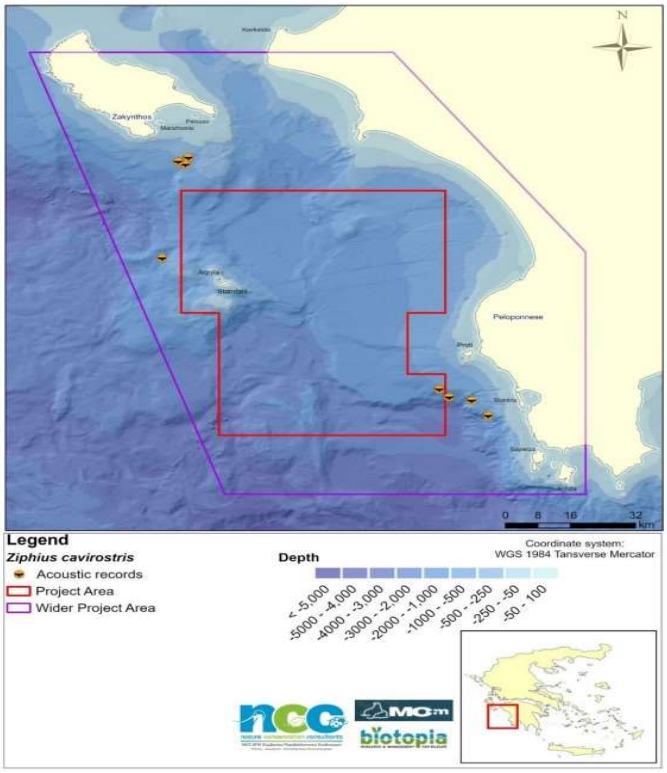

Fig. 19: Locations of Cuvier's beaked whale acoustic records.

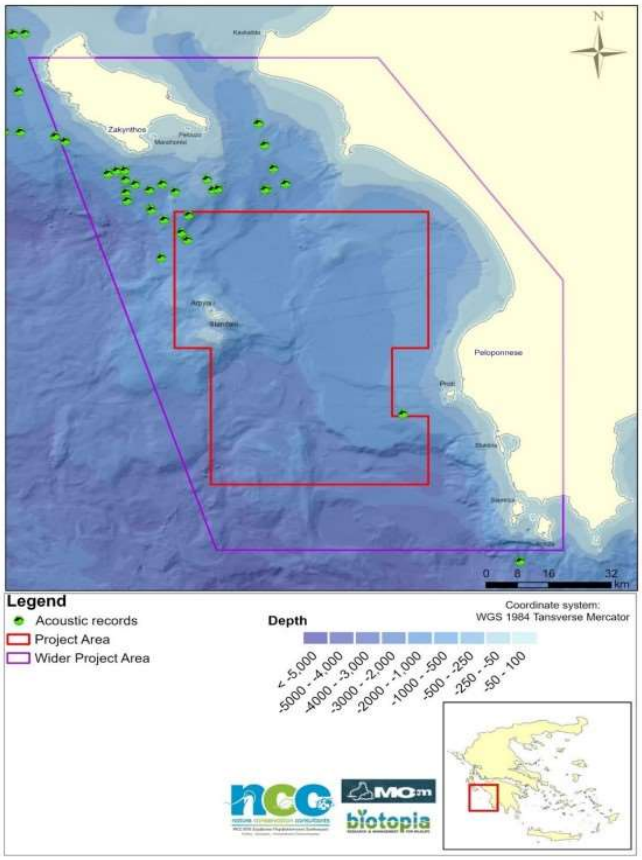

Fig. 20: Locations of dolphin species acoustic records.

Fig. 21: Group of Sperm whales with a sailing boat (above) and Scopoli's Shearwater (below).

1.4.1.2. Aerial surveys

The aerial surveys have been conducted on the 16th and 17th of June 2025 and the 14th and 15th of October 2025. A total of 1.850 km has been inspected, covering the Wider Project Area and the surrounding areas.

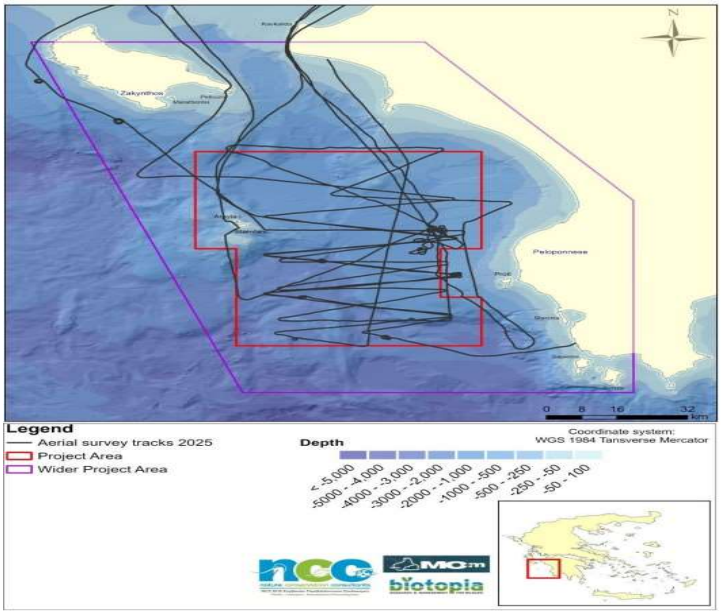

Fig. 22: Aerial surveys track

During the aerial surveys the following species were recorded visually inside the Project Area:

- 4 cetacean species: sperm whale (Physeter macrocephalus), Cuvier's beaked whale (Ziphius cavirostris), striped dolphin (Stenella coeruleoalba) and Risso's dolphin (Grampus griseus)

- 1 sea turtle species: loggerhead turtle (Caretta caretta)

Table 3: Species recorded during the aerial surveys in the Wider Project Area

Species	Common name	Number of individuals
Physeter macrocephalus	sperm whale	14
Ziphius cavirostris	Cuvier's beaked whale	1
Stenella coeruleoalba	striped dolphin	18
Grampus griseus	Risso's dolphin	10
Caretta caretta	Loggerhead turtle	2

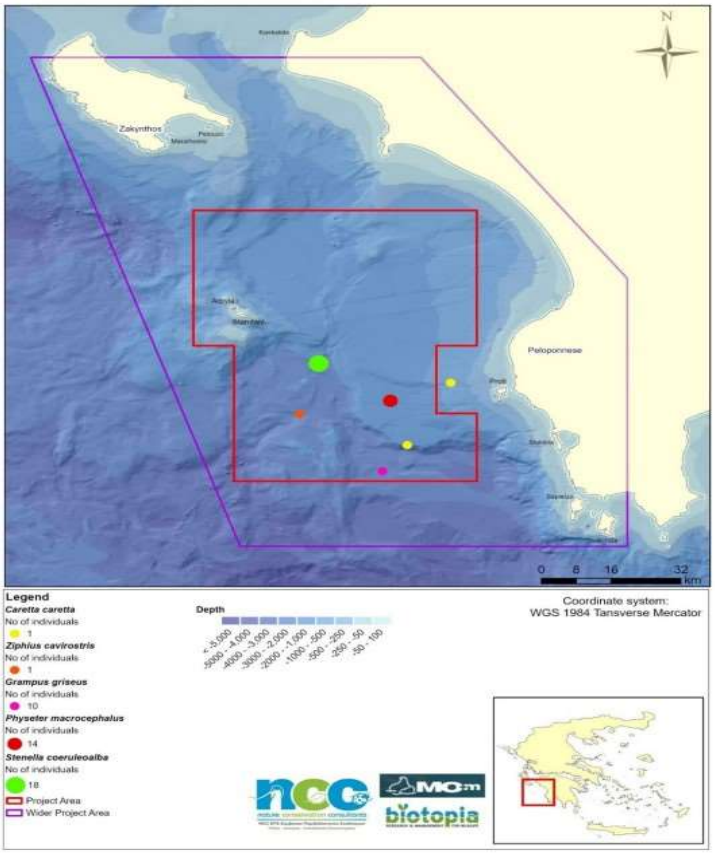

Fig. 23: Aerial surveys records

Fig. 24: Group of 14 Sperm whales observed on the 16th of June 2025

Fig. 25: Loggerhead turtle photographed on the 14th of October 2025

Fig. 26: Group of 10 Risso's dolphins photographed on the 15th of October 2025

1.4.2. Coastal surveys

1.4.2.1. Coastal surveys for the Mediterranean Monk Seal

During the 2024–2025 monitoring period, systematic monitoring of the Mediterranean monk seal population continued within the framework of the National Rescue and Information Network (RINT), with a particular focus on the southwestern coast of Zakynthos—an area already identified as critically important for the species' reproduction in the Ionian Sea.

Moreover, six infrared Camera Traps have been placed in 2 caves on the southwest coast of Zakynthos Island, located in the Wider project area. Four of the cameras were scheduled to work in Time Lapse configuration (every 1 hour or every 2.5 hours) while the two others were set in Motion detection configuration. The cameras were placed on the rocky walls of the caves and were positioned in such a way to maximize the coverage of the terrestrial components of the caves (internal beaches). Through the RINT, a total of 19 monk seal sightings were recorded between 1 July 2024 and 22 October 2025, including 16 live animals and 3 dead.

Age classification of the observed individuals comprised of:

- 12 adults,

-1 subadult,

-4 pups,

-2 of unknown age.

Sex classification indicated 5 males, 6 females, and 7 individuals of undetermined sex. The updated data confirms the species' consistently high presence and reproductive activity in the wider Zakynthos area, where an estimate of six pups are born annually. In contrast, the species appears to be only sporadically present in the Kyparissiakos Gulf. Most sightings are concentrated along the southwest coast of Zakynthos, with their spatial distribution presented in Figure 27. The specific locations of pup sightings are depicted separately in Figure 28, highlighting the core pupping zone. Two significant negative incidents have been also documented: the deliberate killing of two adult male monk seals.

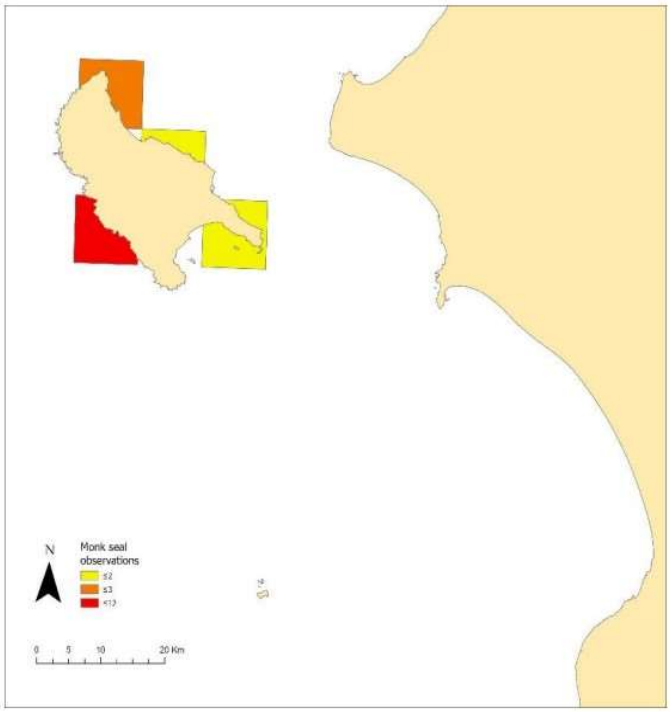

Fig. 27: Geographic distribution of sightings during the period 1/6/2024-22/10/2025 within the wider project area.

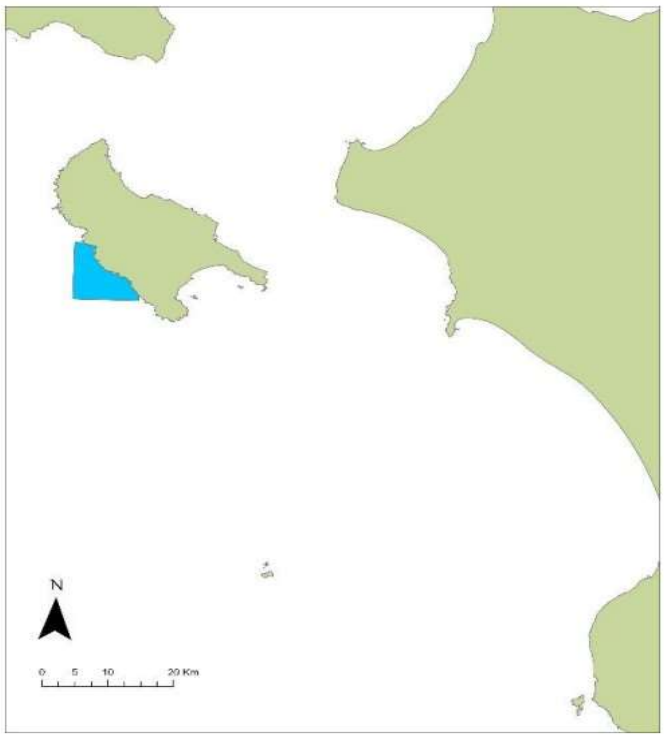

Fig. 28: Geographic distribution of pup sightings(N=4) during the period 1/6/2024-22/10/2025 within the wider project area.

Fig. 29: Deliberately killed adult male monk seal that was found washed ashore within the National Marine Park of Zakynthos in February 2025. There was another killed adult male monk seal found in Zakynthos on the 30th of January 2025

Given the breeding season of the species is in October, the infrared cameras haven't been retrieved yet. The retrieval of the camera traps is scheduled to take place later in the year after the completion of the yearly pupping period. It should be noted that the data available to date has already documented the importance of one cave as a breeding site, while for the second cave, where cameras were installed for the first time, researchers have assessed from indirect evidence (scats and tracks) that it is frequently used by the monk seals. These findings reinforce the ecological significance of Zakynthos as a key reproductive hotspot for the Mediterranean monk seal in the southern Ionian Sea. In the upcoming study period, the planned retrieval and data analysis of infrared camera systems in marine caves of southwestern Zakynthos will further support documentation of the area's importance for the species' reproductive activity.

1.4.3 Colony surveys – Telemetry

1.4.3.1 Coastal surveys of Scopoli's Shearwater at the Strofades Islets SPA

Two GSM-enabled stationary nest cameras were deployed on June 26, 2024, and retrieved on October 3, 2024, at two Scopoli's Shearwater (Calonectris diomedea) nests located on the Strofades islets. These cameras operated continuously throughout the entire breeding season, providing a comprehensive dataset that includes high-resolution images, video recordings, and ambient audio. This dataset offers valuable insights into key aspects of the species' breeding behavior, chick development, and potential disturbances from natural predators or human activity. The two cameras recorded the condition and activity of each nest on a daily basis, from 11/07/2024 to 02/10/2024. The audiovisual material was stored on OneDrive and subsequently analyzed separately for each nest. Based on the recordings, an ethogram was created in which the behaviors of the individuals (parents) were coded. The factors considered

during the analysis were: (a) the recording date, (b) the time of behavior occurrence, (c) the type of behavior, (d) the number of individuals inside and outside the nest, and (e) the sex of the individual (where it was possible to identify). Sex identification was based on the frequency range of the individuals' vocal calls, as the species exhibits vocal sexual dimorphism, with males producing calls of a higher fundamental frequency compared to females. Specifically, for parental care behavior through feeding, the number of feeding events per day and the duration of each feeding event inside the nest were additionally recorded.

The purpose of this study was to:

(a) calculate the feeding rate per nest during the breeding period,

(b) determine the temporal distribution of feeding events throughout the night,

(c) estimate the duration and frequency of the parents' absence from the nest,

(d) identify potential differences between males and females in feeding rate and feeding duration.

Coastal surveys for the Mediterranean shag at the Kyparissia coastline and the Strofades islets revealed no birds. This is attributed to the very low densities of the species in the project area, due to the unsuitable habitat (Kyparissia) or the offshore character of the project sites.

The data from the two nests showed variation both in the duration and in the frequency of feeding events during the breeding season (from early July to early October) (Figure 30). Specifically, feeding duration exhibited higher values and greater dispersion during the first weeks of July, followed by a gradual decrease toward the middle of the period (August) and lower or sporadic values toward the end (September Between the two nests, quantitative differences were observed in the magnitude of the values. However, in both cases, the temporal pattern of change remained similar, with high parental activity at the beginning and a marked reduction toward the end. It should be mentioned that the presence of rats was confirmed in Nest A (5 days of presence in total), while no rats were recorded in Nest B.

The analysis of the nocturnal temporal distribution of feeding events (20:00–06:00) showed that parental activity follows a non-uniform pattern and tends to cluster within distinct time intervals (Figure 31).

A differentiation in the temporal pattern of parental arrivals was observed between the two nests (Figure32).

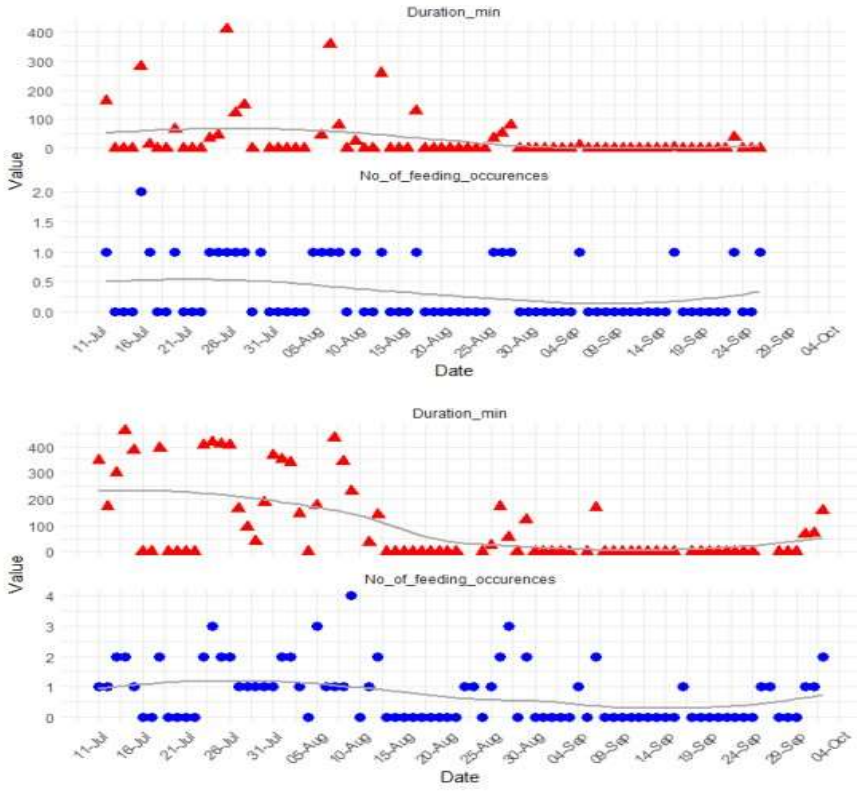

Fig. 30: Duration and frequency of feeding events during the breeding season in nest A (above) and B (below).

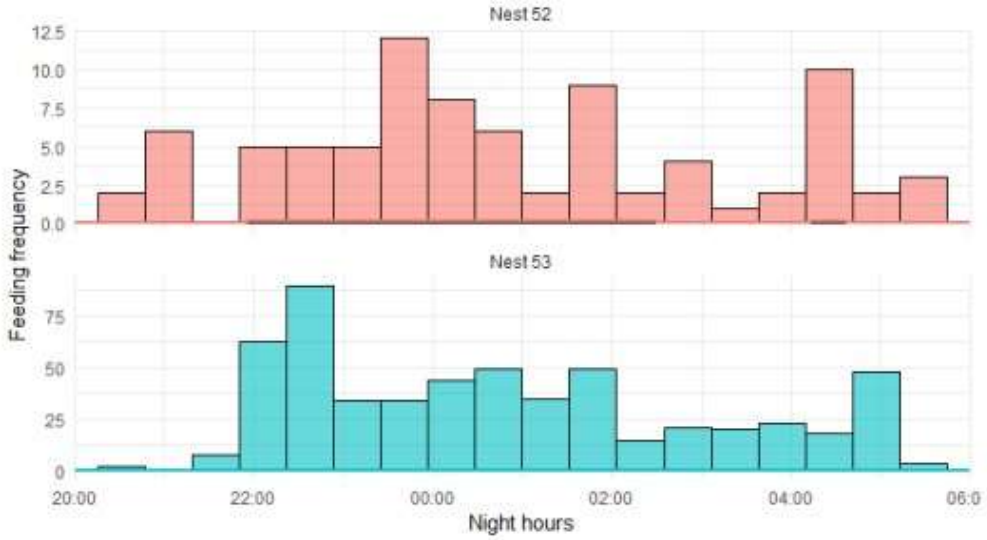

Fig. 31: Night-time feeding activity (Nest 52=nest A and Nest 53=nest B)

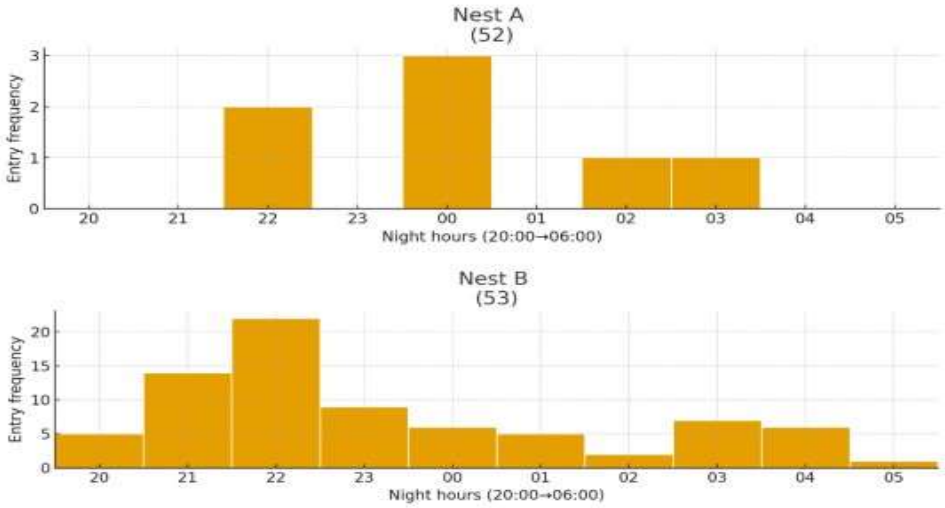

Fig. 32: Arrival time of parents in nests A and B

Both pairs exhibited extended periods of absence from their nests, being away for more than half of the days during the breeding season. The longest absence was recorded at Nest A, lasting for 10 consecutive days in September, while at Nest B the longest absence occurred in mid-August and lasted for 9 days. In contrast, the lowest daily absence values were observed in early July in both nests, a period that coincides with the initial stages of chick development. This finding is expected, as the increased demands for thermoregulation, feeding, and protection during this phase require greater parental presence in the nest, significantly limiting the possibility of prolonged absences.

Table 4: Absence of parents from the nests

Nest	Streak #	Start Date	End Date	Length (days)
A	1	2024-07-13	2024-07-15	3
A	2	2024-07-18	2024-07-19	2
A	3	2024-07-21	2024-07-23	3
A	4	2024-07-29	2024-07-29	1
A	5	2024-07-31	2024-08-04	5
A	6	2024-08-09	2024-08-09	1
A	7	2024-08-11	2024-08-12	2
A	8	2024-08-14	2024-08-16	3
A	9	2024-08-18	2024-08-25	8
A	10	2024-08-29	2024-09-04	7
A	11	2024-09-06	2024-09-15	10
A	12	2024-09-17	2024-09-22	6
A	13	2024-09-24	2024-09-25	2
B	1	2024-07-16	2024-07-17	2
B	2	2024-07-19	2024-07-22	4
B	3	2024-08-04	2024-08-04	1
B	4	2024-08-10	2024-08-10	1
B	5	2024-08-13	2024-08-21	9
B	6	2024-08-24	2024-08-24	1
B	7	2024-08-28	2024-08-28	1
B	8	2024-08-30	2024-09-03	5
B	9	2024-09-05	2024-09-05	1
B	10	2024-09-07	2024-09-15	9
B	11	2024-09-17	2024-09-24	8
B	12	2024-09-27	2024-09-29	3

Table 5: Max and min days of parents' absence from the nests

	Nest A	Nest B
% of days absent	68.8	53.6
Maximum consecutive number of days absent (days)	10	9
Mean consecutive number of days absent (days)	4.08	3.75
Minimum consecutive number of days absent (days)	1	1
Total number of days absent	53	45
Total number of nest monitoring days	77	84

The days of recording and identifying the female and male individuals were 4 for Nest A and 16 for Nest B.

In Nest A, the male shows a wide temporal spread, indicating inconsistent presence at the nest, while the female displays a narrower distribution, with her activity concentrated later in the night, just before dawn (03:00–05:00) (Figure 32). In Nest B, both sexes exhibit a more compact temporal distribution; however, the female shows later median feeding times compared to the male.

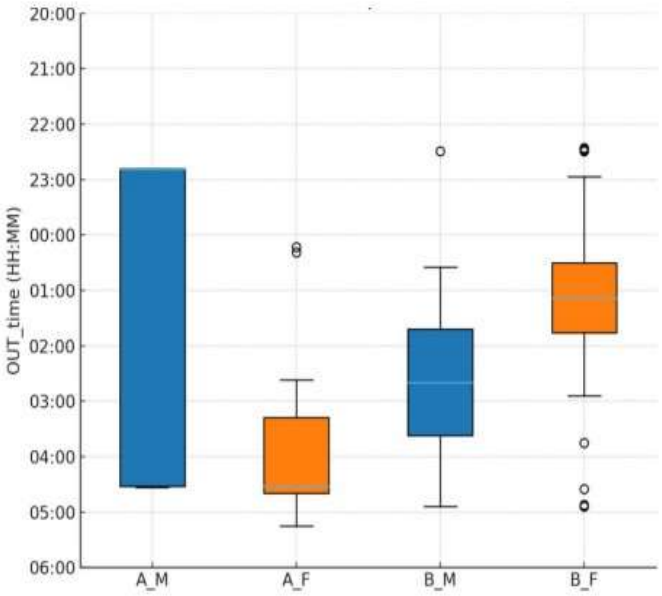

Fig. 33: Boxplot of feeding time for male and female individuals in both nests

Overall, the results indicate sex-specific temporal strategies, with females remaining active later into the night. These findings confirm the presence of sex-specific temporal strategies in both nests, with females entering the nest significantly later in the night than males. The analysis of the nocturnal behavior of the two pairs in Nests A and B revealed patterns of parental activity, with high feeding rates and frequent nest attendance during the early stages of the breeding season, which gradually declined toward the end. High parental activity in the initial phases reflects the increased need for thermoregulation, protection, and frequent feeding of the chicks, which have limited thermoregulatory capacity. The species appears to employ a dual foraging strategy, in which parents alternate between short, nearshore foraging trips and longer trips to balance immediate chick provisioning with their own energetic maintenance (Phillips et al., 2009). It has been found that the intensity and frequency of this strategy are, regulated by food availability in the broader colony area, resulting in individuals adjusting their behavior in environments with fluctuating food abundance (Burke & Montevecchi, 2009). Within this context, extended and repeated periods of nest absence likely reflect low local food availability, forcing parents to undertake energetically costly long-range trips to secure sufficient resources for self-maintenance and successful chick rearing. There is a clear behavioral difference between adults and juveniles Scopoli's shearwaters during the post-breeding season. The young birds leave the colony and head directly westward to their wintering grounds in the Atlantic, whereas the adults first disperse either to the Adriatic Sea or the Corinthiakos Gulf, where they remain for several days before beginning their migration toward the Atlantic (Figure 34).

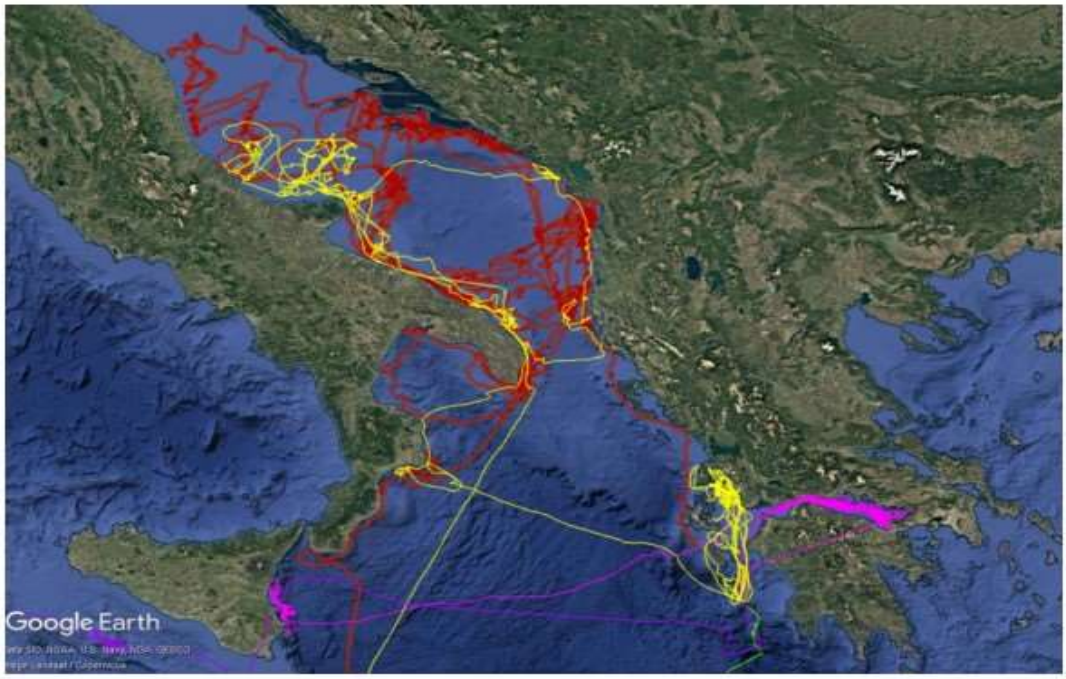

Fig. 34: Tracks of tagged Scopoli's shearwaters (youngs: green and purple lines), adults: yellow, red and magenta

1.4.3.2 Sea turtle Telemetry

Following the loggerhead turtle (Caretta caretta) satellite and GSM telemetry tagging efforts that have taken place over previous years (from 2019 to 2024), data analysis has led to the publication of two peer-reviewed articles (Rees et al., 2025a, Rees et al., 2025b), with an additional manuscript in preparation.

The first published study (Rees et al., 2025a) focused on Kyparissia Bay, which hosts the largest loggerhead nesting aggregation in the Mediterranean. Using satellite and GSM telemetry in combination with drone surveys, researchers tracked the interesting movements of female turtles during the breeding season, which spans from late May to August. From the data analyzed till the present date the turtles predominantly remained nearshore, within the 50 m isobath, and within proximity to their nesting sites in the southern section of the bay (from Elaia to Kalo Nero). A notable hotspot was also identified within the sheltered waters of Kyparissia harbor. The study further updated the estimated clutch frequency for this population, indicating an average of 3.3 to 3.5 clutches per turtle per season, slightly lower than earlier estimates but still among the highest reported in the Mediterranean.

The second study (Rees et al., 2025b) focused on the dispersal and foraging strategies of adult loggerhead sea turtles breeding in Kyparissia Bay. Argos satellite transmitters were deployed in 11 adult individuals to study their migratory routes and foraging strategies during the post-breeding period. End points for the tracked turtles were grouped into four distinct regions: Aegean Sea (end point for 3 turtles), Adriatic Sea (3 turtles), northern Ionian Sea (3 turtles) and Tunisian plateau (2 turtles). Six turtles migrated to restricted area foraging sites, 1 turtle remained nomadic for the entirety of its tracking duration, 2 turtles were semi-nomadic incorporating both restricted area foraging and large-scale movements during their tracking period, and the tracks of the final 2 turtles ceased before their behavior type could be determined, but sedentary behavior type was inferred. The turtles generally moved to locations that had been previously identified by flipper tag recaptures, however the tracking identified routes taken to get there, which were often highly convoluted. These foraging sites, also identified through other tracking studies of loggerhead turtles nesting elsewhere in Greece and from Cyprus, were often sites of high fishing activity and cause for concern for turtles present there.

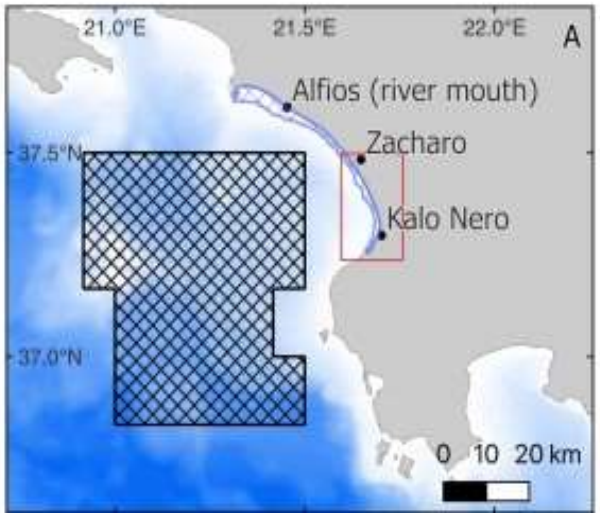

Fig. 35: Hotspots during the internesting period for loggerhead turtles in Kyparissia Bay, Greece. Southwestern Peloponnese, showing the marine Natura 2000 site relating to sea turtles in blue hatching(GR2330008: Thalassia Periochi Kolpou Kyparissias (Marine Area Kyparissia Bay)) and Block 10 Lease Area (black hatching).

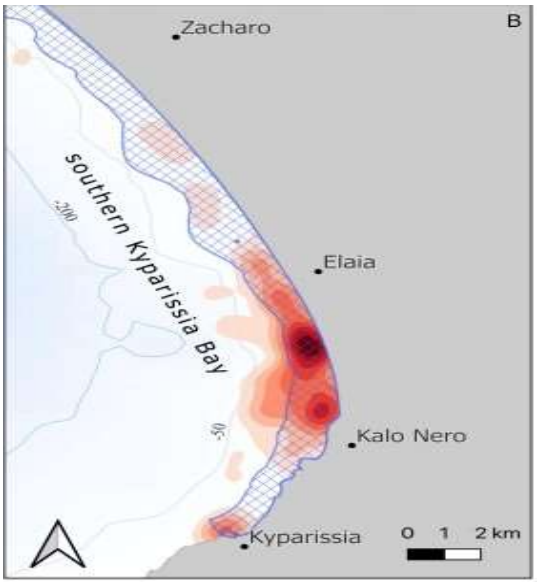

Fig. 36: Heatmap density distribution of loggerhead turtles with darker reds representing higher kernel densities. Isobaths are derived from global GEBCO bathymetry dataset (www.gebco.net)

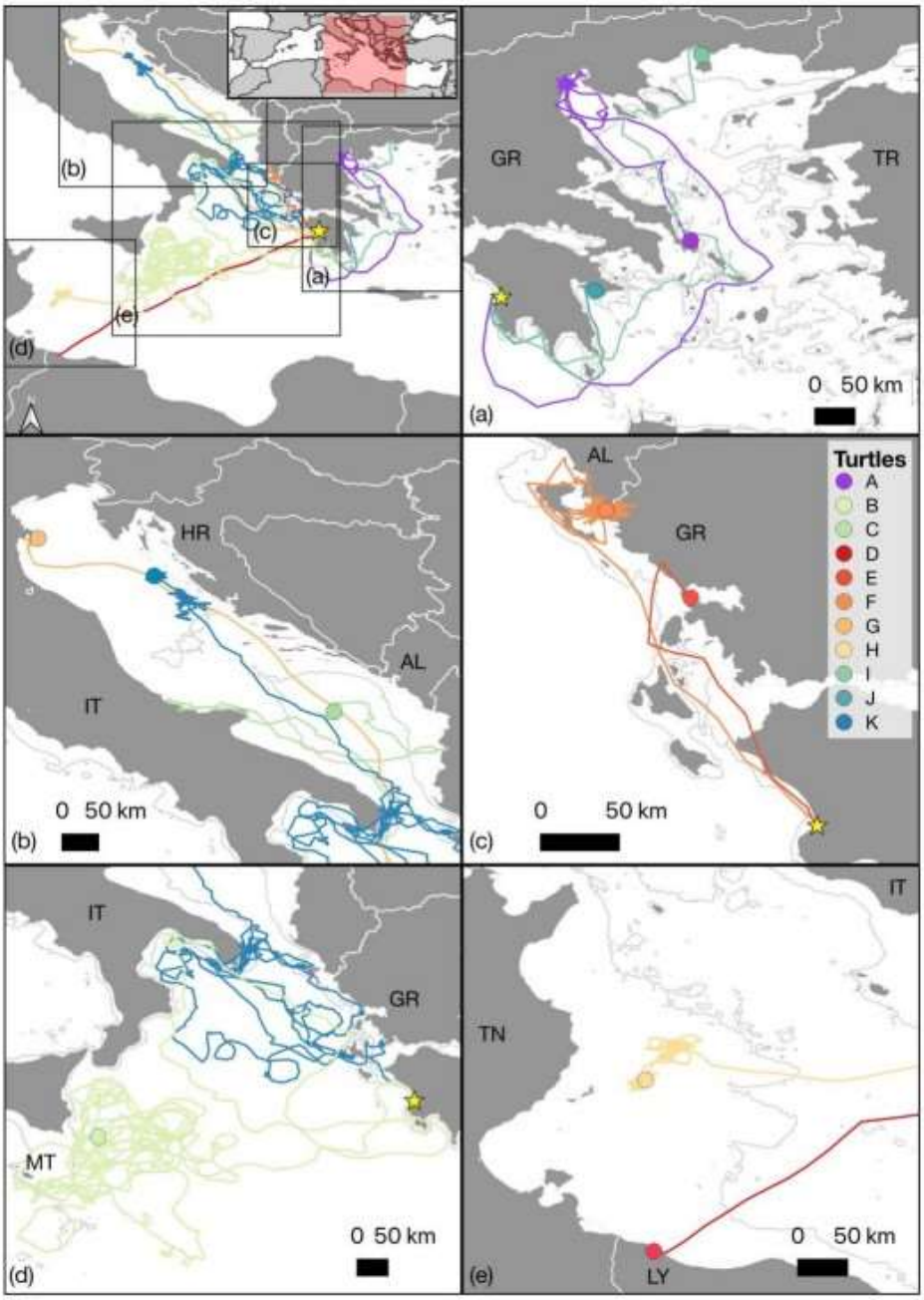

Figure 37: Post-breeding migrations, movements and end points for the 11 loggerhead turtles tracked from Kyparissia Bay. (a) Aegean Sea, (b) Adriatic Sea, (c) Ionian Sea (sedentary turtles), (d) Ionian Sea/ northern Libyan Sea (nomadic turtles), and (e) Tunisian Shelf. The nomadic portion of the track ending in the Adriatic panel (b) is shown in panel (d). Grey line = 200 m isobath. Bathymetry representation is derived from GEBCO data (https://www.gebco.net/). Yellow star is the tagging site. Colored circles are end points of each track

1.5. Conclusions

During 2025, all planned activities were successfully completed. Both boat-based (visual and acoustic) and aerial surveys were conducted within the project area in June, September and October 2025. Four cetacean species were recorded: the sperm whale (Physeter macrocephalus), Cuvier's beaked whale (Ziphius cavirostris), Risso's dolphin (Grampus griseus) and striped dolphin (Stenella coeruleoalba), all typical species of the deep waters in the Project Area. The most notable finding was the observation of sperm whale groups, both inside and outside the Project Area. Particularly significant was the encounter with a group of 14 individuals in June. This group not only represented an unusually large aggregation but also exhibited atypical behavior, which remains insufficiently understood and warrants further investigation. By combining the visual and acoustic surveys with the photo-identification analysis during June 2025, it is estimated that a total of 20 to 21 sperm whales were recorded within the wider project area and its surroundings, which is an exceptionally high number of individuals, considering the estimated population in Greek waters is between 180 and 280 animals. It is worth noting that encounters with sperm whales during autumn were noticeably fewer compared to June. However, it remains unclear whether this difference reflects seasonal changes in the species' distribution or is the result of variations in sampling effort or other non-ecological factors. In contrast, Cuvier's beaked whales were encountered more frequently in autumn than in early summer, though the factors influencing this pattern are still unknown. Additionally, Scopoli's Shearwater (Calonectris diomedea) was the most abundant seabird during the boat surveys, as the species breeds on the Strofades Islands—home to the largest colony in Greece—and utilizes the broader project area as a feeding habitat. The installation of GSM cameras at Scopoli's Shearwater nesting sites in July 2024 allowed for continuous monitoring throughout the entire breeding season. Analysis of the collected footage provided valuable insights into the species' breeding ecology, particularly in relation to parental behavior, including feeding rates and their temporal patterns during the critical chick-rearing period. The analysis of GSM cameras data in two nests of the species revealed that parental activity, including feeding and nest attendance, was highest during the early stages of the breeding season and declined toward the end. Feeding and nest visits clustered between 22:00 and 02:00, suggesting non-random, possibly energetically optimized behavior, with females tended to attend the nest later than males. Both nests showed extended periods of absence, likely reflecting a dual foraging strategy where parents alternate short nearshore trips with longer trips to balance chick provisioning and self-maintenance. Variations in this strategy appear linked to local food availability. However, the limited sample size reduces the statistical power of these findings, emphasizing the need for additional data to support more robust conclusions.

The pilot implementation of the nest camera monitoring has been rather successful, in recording the timing and efficiency of the parental feeding behavior at the colony of Strofades and providing valuable insights for the breeding ecology of the species. A further expansion of the method would be desirable for future research on the species

in this important colony. Coastal surveys focused on the Mediterranean monk seal (Monachus monachus) reaffirmed the importance of the southwestern region of Zakynthos Island as a key reproductive site for the species in the South Ionian Sea. Between July 2024 and October 2025, 19 sightings were recorded (16 live, 3 dead), including adults, sub-adults, and pups, confirming high presence and ongoing reproduction, with an estimated six pups born annually. Most sightings were concentrated along the southwest coast of Zakynthos, highlighting core pupping zones, while the species was only sporadically observed in the Kyparissiakos Gulf. Two incidents of deliberate killing of adult males were documented. Moreover, six infrared cameras were installed in two caves to monitor the terrestrial components of the caves. Data from the cameras, which will be fully retrieved and analyzed after the end of the breeding season, already indicates the importance of one cave as a breeding site and suggest frequent use of the second cave. These findings reinforce Zakynthos' ecological significance as a key reproductive hotspot for the Mediterranean monk seal. Finally, telemetry studies on loggerhead turtles (Caretta caretta), conducted during previous phases of the project, have generated significant findings. These results have contributed to peer-reviewed publications, enhancing our knowledge of the species' ecological requirements within the region.

The above-described surveys carried out during 2025 and the results in each Work Package of the project "Survey of the Status of Important Fauna Species in the Kyparissiakos Lease area" are being presented in detail in the Final Progress Report that could be found in the relevant website of the Environmental Unit of HELLENiQ UPSTREAM Kyparissiakos:

Environmental Monitoring Program for Critical Habitats - Biodiversity (helpe-kyparissiakos.gr)

Πρόγραμμα Περιβαλλοντικής Παρακολούθησης Κρίσιμων Ενδιαιτημάτων - Βιοποικιλότητας (helpe-kyparissiakos.gr)

2. Environmental Monitoring and Recording of Critical Biodiversity Indicators – 2026 onwards

In the context of Environmental Monitoring and Recording of Critical Environmental Indicators of Biodiversity such as marine mammals (cetaceans and monk seals), marine turtles and seabirds, it is proposed that the company, Nature Conservation Consultants -NCC Ltd, in collaboration with the scientifically specialized NGO MOm and the highly experienced in the marine field research company BIOTOPIA, set up an expert's project team. The present proposal refers to the further continuation in 2026, and integration, of the field surveys that have been carried out during the previous years, at the project area of "Kyparissiakos" (including the marine and coastal areas of adjacent Natura sites), using appropriate and state of the art field sampling techniques, in order to provide sufficient and well documented data on the status of monk seals, marine mammals, seabirds and sea turtles in the project area, as well as other sensitive

elements and locations that should be prioritized by a future monitoring program. The 2026 environmental monitoring will be focused on the update-improvement of the biodiversity baseline data gathered during the previous period and the expansion of monitoring methods, to cover more effectively the hydro-acoustic environment, and further expand the work with biosensors (cameras and transmitters) at the Strofades breeding colony of Scopoli's shearwater and at the important sites of Mediterranean Monk seal within the wider project area. The field surveys will combine "traditional" methods, such as visual and acoustic surveys, with more innovative field techniques, such as GSM cameras, bio-acoustic devices and thermal cameras and telemetry with satellite transmitters to gather sufficient data regarding the populations, distribution, breeding process and threats of the target species. Additionally, focus will be given to the analysis of the telemetry data gathered in the previous years of the project.

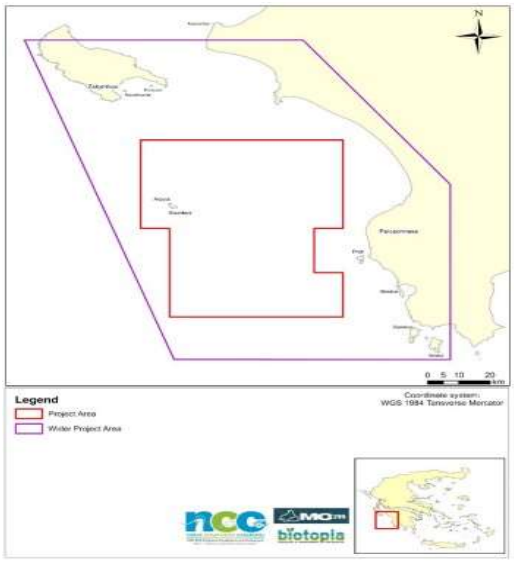

Fig. 38: Project area for the proposed work packages

The project team will use appropriate research vessels for open sea surveys, including two inflatable RIB boats, a 15m sailing boat, drones and related equipment for offshore and coastal surveys, in order to identify breeding sites -and congregation sites of seals, cetaceans and seabirds. Concerning the coastal surveys, they will be focused within the adjacent to the lease zone Natura 2000 sites. The following Work Packages (WP) will involve survey reports combined with the existing literature information on the presence of marine turtles, cetaceans, seals, and seabirds in the wider project area, and identification and mapping of the most sensitive areas, including also the adjacent protected Natura 2000 sites.

WPI. Pelagic surveys for marine turtles- seals - cetaceans and seabirds

Two pelagic boat surveys for marine mammals, seabirds, sea turtles, nearshore and in the open sea in the periods March - July 2026 and September - November 2026, totaling 17 field days, emphasizing in the recording of marine mammals on the offshore part of the project area and if possible in the identification of individual animals and family groups,

using state-of-the-art techniques. The WPI also includes 4 pelagic aerial surveys, with a one-engine aircraft involving 2 observers (2 field days each), which will be carried out in early spring, late spring, summer and autumn 2026 to improve the efficiency of the pelagic surveys for marine turtles, cetaceans and seabirds and to cover gaps in the seasonality of past surveys.

WPII. Coastal Surveys for monk seal's pupping sites and seabirds in the coastal zones of the adjacent Natura 2000 sites:

Coastal surveys for monk seal and seabirds breeding sites in the coastal zones of the adjacent Natura 2000 sites, in the period February – March and August - October 2026, with inflatable RIB boats with total duration of 6 days and a crew of 2 marine mammal/seabird experts.

Colony surveys at the Strofades islets SPA and the surrounding project area, using GSM nest cameras working 24/7 combined with bio-acoustic stations, thermal cameras and GPS/GSM transmitters. Additionally, further analysis of the marine turtle telemetry data, gathered in the previous years, will be performed.

PROJECT DELIVERABLES

An Interim and a Final project report will be delivered on 30 June 2026 and 31 October 2026 respectively.

Work Package deliverables will be included in these two reports:

I. Pelagic Survey Report (Boat and aerial surveys): Report of seasonal presence - spatial distribution of marine turtles, seals, cetaceans, seabirds in the study area, based on transect lines.
II. Report of the Coastal survey for monk seal pupping sites and seabird breeding sites: Reporting and identification of breeding sites in the wider study area.
III. Report of the colony survey at the Strofades islets: Reports including maps of the tracks and distribution of Cory's shearwater in the area, analysis of the results of the GSM cameras, identification of sensitive areas during the different seasons.

3. Seismicity Monitoring – Results 2025

3.1 Real time seismicity monitoring in Kyparissiakos

Given the high seismic activity in the broader area of Western Greece, and especially in the Kyparissiakos Gulf, and aim at the safety of the future planned research, HELLENiQ UPSTREAM KYPARISSIAKOS GULF SINGLE MEMBER S.A. cooperated with the Geodynamic Institute of the National Observatory of Athens (CONTRACT AGREEMENT 2022013/06.05.2022) regarding the monitoring and analysis of the existing seismic activity and the seismic hazard assessment in the area of interest.

During 2nd Exploration Period in the Lease Area of Block 10 considering the Strategic Environmental Assessment (SEA) for the said lease area, the Joint Ministerial Decision (JMA) approving the above SEA and the reference of Article 12 (Environmental Protection), HELLENiQ UPSTREAM Kyparissiakos Gulf S.A. in collaboration with the "National Observatory of Athens (NOA) and its Geodynamic Institute, put the seismicity of the Kyparissiakos Gulf under scientific monitoring and study. The installation of a local network, which was decided, ensures accurate and detailed monitoring of all seismic events up to and including the local micro seismicity. The resulting data is also useful for identifying any potential active seismic zones in the area.

The monitoring of seismicity, even at the level of micro seismicity, was decided to be carried out in "real time" conditions by installing a local network of seismographs. The data, which will result at the end of the project, will also be particularly useful for identifying the active faults in the exploration area. The National Observatory of Athens (NOA), headed by the President of the research center, Prof. Emm. Plionis, and the Principal Investigator Vassilis Karastathis (Research Director IG/NOA) undertook the installation of a local network consisting of twenty-two (22) portable seismographs, as well as the operation of a local seismic array in the area of Pylos, in order to make denser the already existing national seismograph network, used by the Institute of Geodynamics of NOA for the continuous monitoring of the daily seismic activity of the Greek area. The 22 new stations are in continuous operation with simultaneous (real-time) data transmission to the Institute of Geodynamics.

The installation of the stations was performed in such a way as to achieve the maximum density of the network using, where possible, even the smallest islands of the Ionian (e.g. Strophades islets). Besides the geometry of the network, the selection of the station locations considered, both the soil conditions and the noise level of each location. He also considered the coverage of the mobile telephony, so that direct transmission of the data is possible. For the completion of the installations, nine (9) visits by technical and scientific staff were made to the areas of interest, during the period June - September 2022. The objective was to ensure optimal azimuthal coverage of the area with the portable seismographs and to combine them with the array of seismographs installed in the Kynigos area of Pylos. It is expected that with the addition of the microseismicity, which was identified after visual inspection of the

waveforms, the magnitude of completeness will be greatly reduced. Since the microearthquakes have a limited number of recorded phases, they have not yet been implemented to the figures. The large number of stations is intended to scan the study area with dense ray-paths to enable the construction of a 3D seismic velocity model. With this model, the earthquake locations will be recalculated in order to obtain highly accurate solutions that will accurately indicate the active zones.

The coordinates of the local network positions are described in Fig. 39 show how the stations complemented the existing network. The stations installed by the Institute of Geodynamics as part of the project are shown in yellow color. The portable stations will remain in operation throughout the duration of the project.

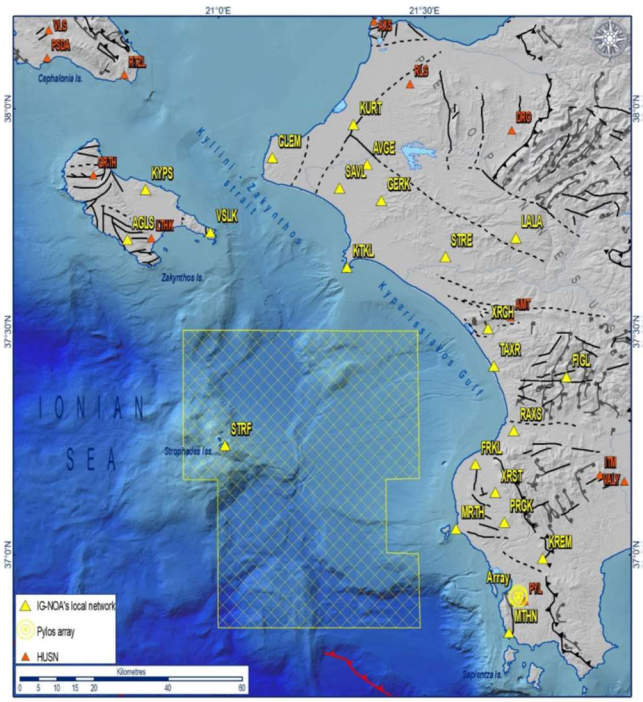

Figure 39 Schematic presentation of the locations where the 23 new portable seismographs were installed (yellow symbols). The locations of the permanent stations of the National Seismograph Network are shown with a red symbol. The seismic array of the Institute of Geodynamics, which will have a key role in the location and analysis of the remote offshore events is shown with the yellow concentric circles.

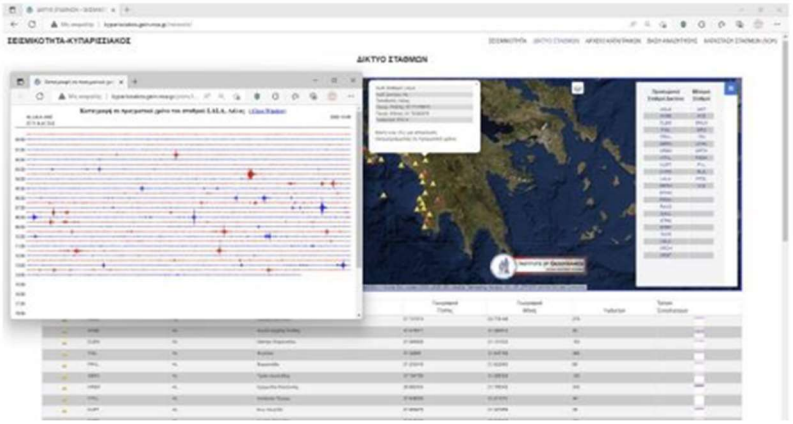

Fig. 40: Current state of the network. Real time monitoring of the recordings

Data acquisition and processing began after the first stations were installed in the area in mid-May of 2022. At the end of July of the same year, there was complete installation of the stations with continuous and uninterrupted recording. The number of earthquakes recorded during the monitoring period, within the narrow area of interest increased drastically with the installation of the local network, due to the detection of a large number of microearthquakes. It is noteworthy that throughout the same operational period the National seismograph network recorded 7.545 earthquakes, while with the local network around 16.980 events were detected. The additional earthquakes are very small events, also known as microearthquakes, which nevertheless give valuable information about the active zones and the structure of the region. For the accurate spatial mapping of the microseismicity of the area, the precise knowledge of the seismic velocity model within the network area is important. Likewise, a large number of recorded events is important in order to achieve a reliable 3D seismic velocity model. The seismicity was determined based on a 3D seismic velocity model that was created for the area.

Table 6: The stations of the local network installed by G.I. around the Kyparissiakos Gulf for the microseismic monitoring of the area.

No	Code	Location	Latitude	Longitude
1	KURT	Ano Kourtesi, Ilia	37.97	21.33
2	CLEM	Clemoutsi castle, Ilia	37.89	21.13
3	AVGE	Avgio, ancient Ilida	37.88	21.36
4	SAVL	Savalia, Amaliada	37.82	21.29
5	GERK	Geraki, Amaliada	37.79	21.4
6	KTKL	Katakolo, Ilia	37.65	21.31
7	STRE	Strefi, Ilia	37.67	21.55
8	LALA	Lala, Ilia	37.71	21.72
9	XRCH	Xirochori, Ilia	37.51	21.65
10	TAXR	Taxiarches, Ilia	37.42	21.68
11	FIGL	Figalia, Ilia	37.4	21.84
12	RAXS	Raches Trifyllias, Messinia	37.28	21.72
13	FRKL	Faraklada, Messinia	37.2	21.62
14	XRST	Christianoupoli, Messinia	37.14	21.67
15	PRGK	Pirgaki Gargalianon, Messinia	37.07	21.69
16	MRTH	Marathoupoli Messinia	37.06	21.58
17	KREM	Kremmydia, Messinia	37	21.79
18	MTHN	Methoni, Messinia	36.83	21.7
19	KYPS	Kypseli, Zante	37.81	20.82
20	VSLK	Vasilikos, Zante	37.72	20.98
21	AGLS	Agalas, Zante	37.71	20.78
22	STRF	Strofades, Zante	37.25	21.02
23	VRTL	Vartholomio	37.86	21.20

3.2 Data analysis

For the acquisition, analysis and archiving of the data, the SeisComP3 software was used, which was developed by the GEOFON project in Helmholtz Centre Potsdam in GFZ German Research Centre for Geosciences and Gempa GmbH. The software was installed on an independent server and the huge amounts of data, which are obtained by the local network, are stored on special disk arrays. The SeisComP3 software performs, after appropriate parametrization, automatic picking of seismic phases for the recorded seismic waves and makes an initial automatic determination of the local earthquakes. Immediately after, the specialized analysis staff undertakes the

evaluation and correction of the automatically picked phases, as well as the addition of new ones, so that the focal parameters of the earthquakes can be identified with better accuracy. This processing is done through the specialized SCOLV software, which is part of SeiscomP3. The correction of the automatic solutions and processing is done by four analysts daily.

The most important earthquake that was automatically detected and analyzed occurred in the second recording period between May 2023 – May 2024, and more precisely on March 29, 2024, 07:12. The magnitude of the earthquake was ML5.7 (Fig. 41).

An SMS paging system was also built, with automatic alerts, with automatic solutions for important earthquakes that are sent to the relevant scientists of G.I. and HELLENiQ UPSTREAM within 1-3 minutes.

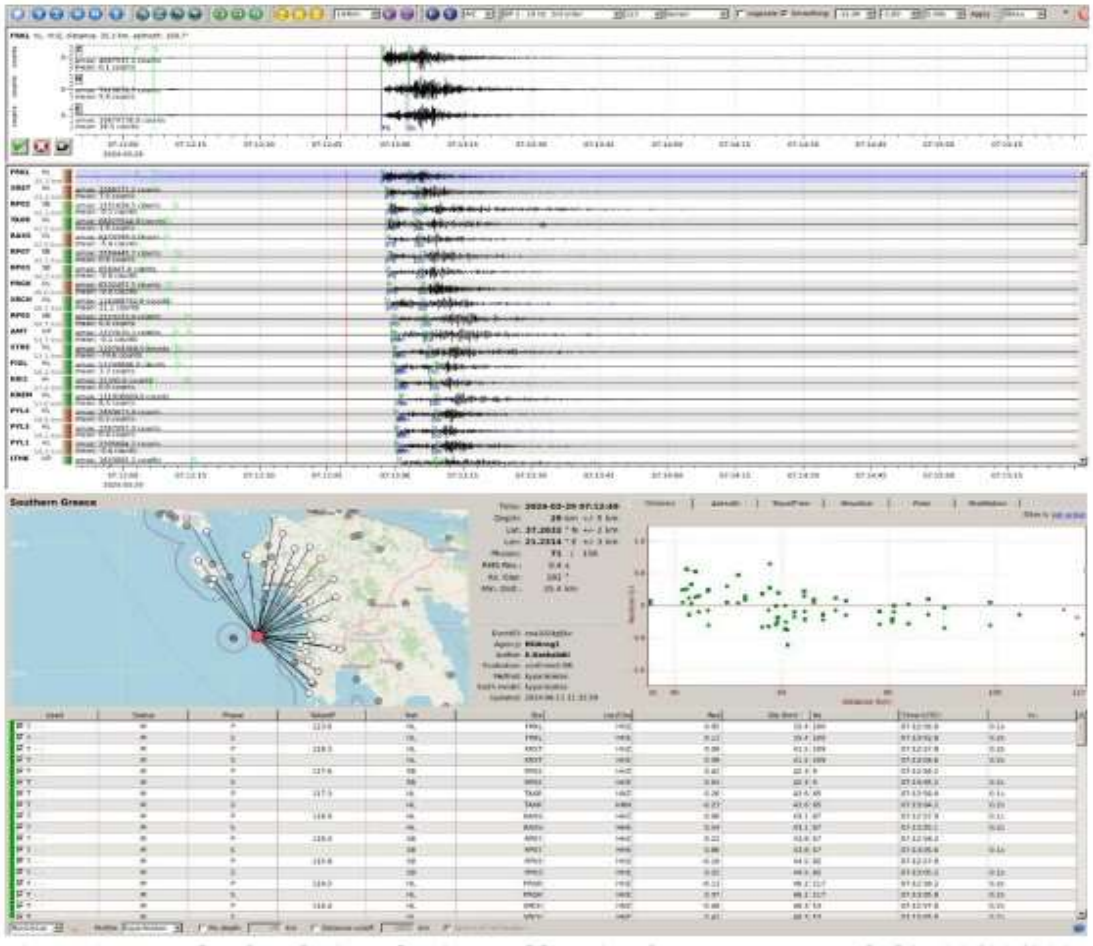

Fig. 41: Example of analysis and epicentral location for an event recorded in 29/03/2024 07:12GMT. The magnitude of the earthquake was ML5.7and its epicenter was in the offshore region between Filiatra and Strofades.

3.3 Recorded seismicity from the local network

Although the installation and operation of the local network started on May 2022, it was completed at the end of July 2022 and therefore seismicity monitoring under the same conditions practically started from August 2022. From the start of the recording period up to the end of May 2024, a total number of more than 16,980 earthquakes were recorded, with 954 of them having magnitudes larger than ML2.5. Increased seismicity was observed, both within the narrow area of the plot and in its periphery, in areas such as the offshore area SW of Zakynthos, in the Zacharo area, in the Neda River area and on the coasts of the Kyparissiakos Gulf (Fig. 42).

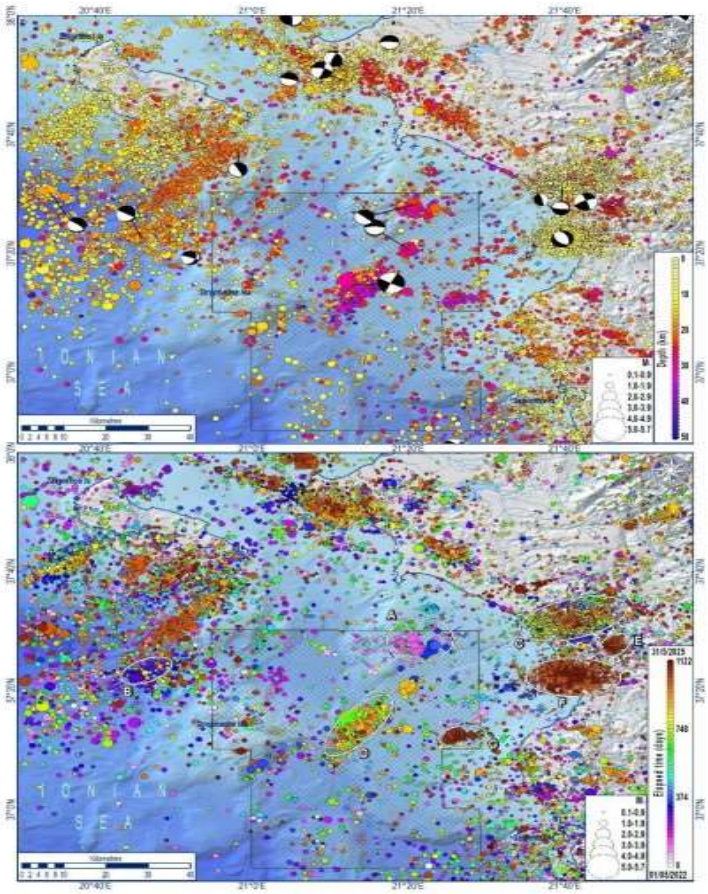

Fig. 42 : The total seismic activity recorded throughout the whole monitoring period (May 2022 - May 2025). Top map: epicenters with coloring according to depth. NOA-IG calculated during the same period. Bottom map: epicenters with coloring according to depth.

Also presented are the focal mechanisms of NOA-IG calculated during the same period. Bottom map: epicenters with coloring according to time. Also, the epicentral clusters that are described within the text are marked with white ellipses

The most important activity within the plot was the activation of a NE-SW trending strike slip structure, which produced a strong earthquake of magnitude M5.7 on March 29, 2024, at 07:12:49.65, whose epicenter (37.273, 21.235) was in the offshore area between Strofades and Filiatra (Fig. 43) The seismicity that was recorded within the narrow region of interest, within block 10, can be considered as significant. In particular, there was an activation of a strike-slip structure with a NE-SW orientation, which gave

the strong M5.7 earthquake of 29th March 2024 at 07:12:49.65 with epicenter (37.273, 21.235) located at the offshore region between Strofades and Filiatra (Figure 43).

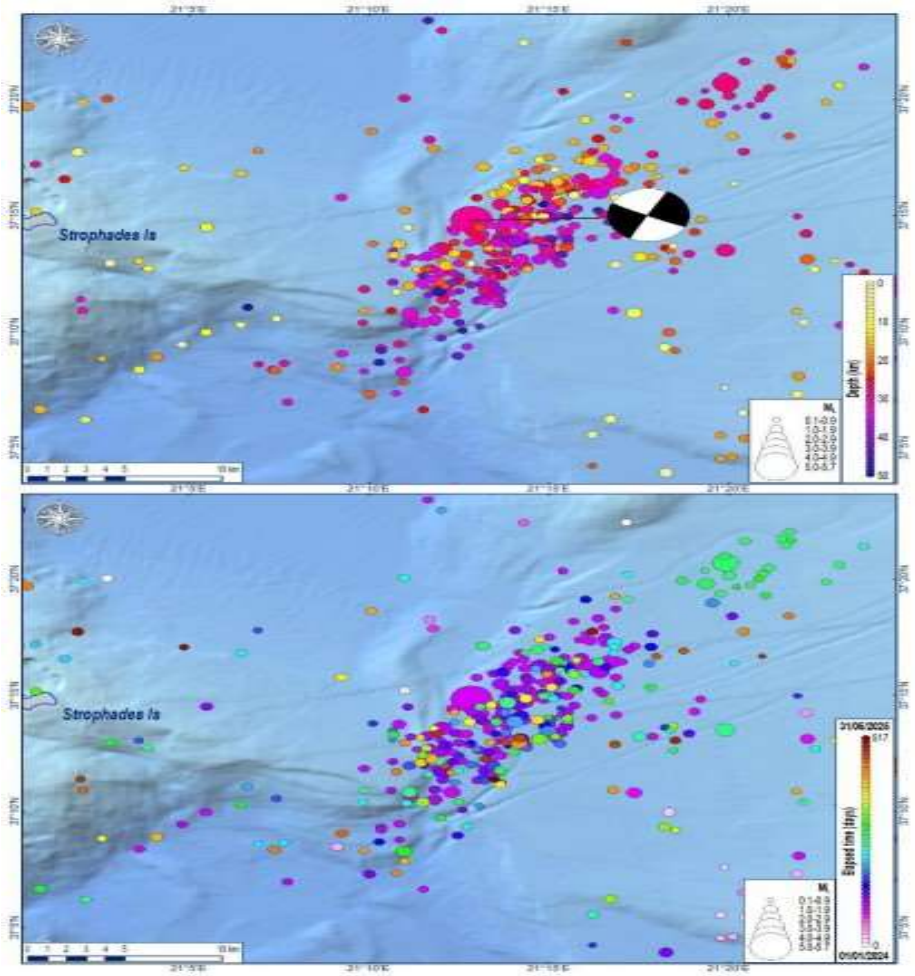

Fig. 43: The strong earthquake of magnitude M5.7 on March 29, 2024, time 07:12:49.65, with an epicenter (37.273, 21.235) in the sea area between Strofades and Filiatra and its aftershock sequence.

Seismic activity by each region is examined below.

In the area south of Cape Katakolo, marked by the ellipse A in Figure 42, increased seismic activity was noted during the initial recording period between May – December 2022 and more specifically in the period between September-October, however, with less than 100 events of very small magnitudes. Only ten of these, had magnitudes above M3.0, with the largest one having a magnitude of M4.2 on 16/9/22 (epicenter 37.457, 21.319). The above seismicity was within the Block 10 area. The important factor regarding this seismicity was the relatively large depths of the hypocenters, which are in the majority greater than 20 km and reach up to 40 km of depth. The activity is not limited to the upper crust but most is most likely related to the lower crustal boundary and the area of contact of the lithospheric plates. The focal mechanism which has an increased CLVD parameter does not exclude the participation of a non-tectonic component.

Immediately afterwards, and during the 2nd recording period between January – May 2023, while the seismicity south of Cape Katakolo decreased, an increase in seismic activity appeared in a neighbouring area of the study area, to the east, in the Zacharo area (ellipse C in Figure 42). Since the beginning of the recording until today, more than 2000 events have been recorded in this area. It is noted that the depths of the seismicity are small and the magnitudes did not exceed ML3.6. From the magnitude and the Gutenberg-Richter distributions it appears that the local recorded seismicity had a magnitude of completeness of approximately M1.09. The form of the sequence and its evolution probably indicate a swarm of earthquakes associated with fluid movement. The extremely high number of earthquakes cannot be attributed to an aftershock sequence of a major event and given that the area has all the conditions due to geothermal energy to attribute seismicity to fluid movement, the sequence can be characterized with considerable certainty as a "swarm". In the last quarter of 2024 and mainly after the beginning of January 2025, there was an increase in seismicity in the immediately adjacent area of the cluster, to the south, in the Neda River (ellipse F in Figure 42). Seismic activity in this new area, having a total number of earthquakes of about 1800, has been maintained at a very low rate, up to this date (Figure 44). In this area, as well as further to the north there are E-W trending structures. In this case there was a mainshock of magnitude ML4.5 on 6/1/2025 in Gianitsochori but it cannot be ruled out that also here, fluids have facilitated the activation of the Neda zone and maintained the extended aftershock sequence for a long period. It is common when fluids are involved for the sequences to be preserved in time for quite a while (Miller, 2020) and to appear spatially displaced. On 9 March 2025 another event occurred close to the two sequences with M4.7, slightly further to the west, at a depth of 26 km which was also followed by aftershocks at depths between 20-27 km, which are like that of the initial event (ellipse E in Fig. 42).

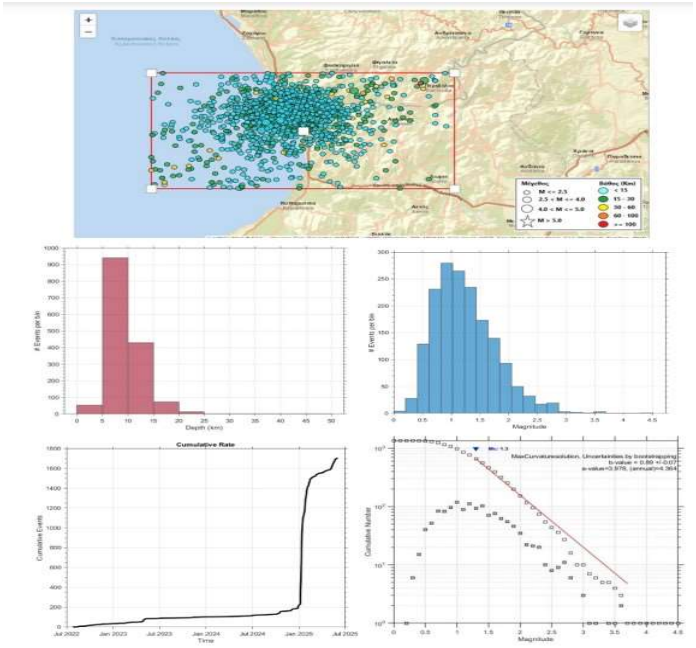

Fig. 44: The sequence in the Neda River area from the end of 2024 up to the beginning of 2025, the corresponding depth and magnitude distributions, the cumulative seismicity distribution and the corresponding Gutenberg-Richter curve

The most significant seismic activity that was recorded during the seismic monitoring period occurred within the area of block 10. More specifically, on March 29, 2024, a strong earthquake of magnitude ML5.7 (MW5.8) occurred at a depth of approximately 30 km. This depth indicates that the focal area is within the subducting tectonic plate. The epicenter was determined approximately 17 km east of Strofades Islands. The earthquake was followed by a NE-SW (Fig. 43) trending aftershock sequence thus indicating the fault that was activated. The sequence has completely weakened since March 2025. The focal mechanism is strike-slip and is typical for these depths. The greatest clustering of hypocenters occurs at depths greater than 15 km and does not exceed 40 km (Fig.45).

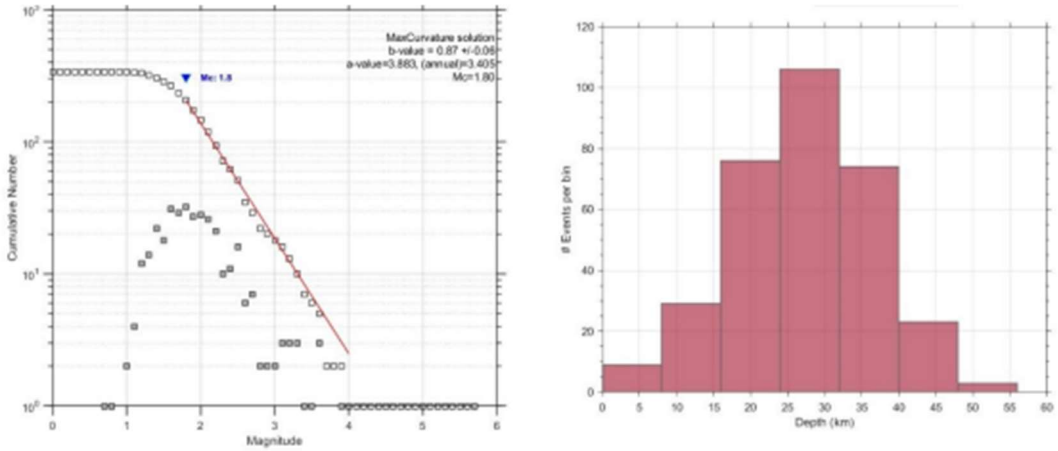

Fig. 45: Depth distribution of the earthquake sequence of 29/03/2024 of magnitude MW5.8 recorded within plot 10.

Beyond the boundaries of Block10 but in a relatively close distance there is a continuous mild seismic activity south of Zakynthos, which is related to the zone that was activated in the sequence of the very strong earthquake of October 25, 2018, with a magnitude of MW6.7. During the monitoring period, only one earthquake with a relatively large magnitude occurred in the area, the earthquake of 18/2/2023 with a magnitude of ML4.6. This seismic activity, although not intense, was useful in providing information for the study of the active structures of the area, which is presented in the relevant deliverable of the "Seismic Hazard Assessment Study (3rd year) - Statistical analysis of seismicity and earthquake sequences recorded in the reporting period". There was also seismic activity in the Kyllini area, with the strongest event being an earthquake of magnitude ML4.9, which occurred 40 km from the northernmost borders of the site. The earthquake was followed by an aftershock of magnitude ML4.7. Finally, near the coasts of Ilia and parallel to them, an active zone is outlined by seismicity, which is also particularly useful for reinforcing the picture we have of the active zones of the region. Figures 46-48 show a representation of most recent temporal evolution of seismicity in the broader area of Plot 10.

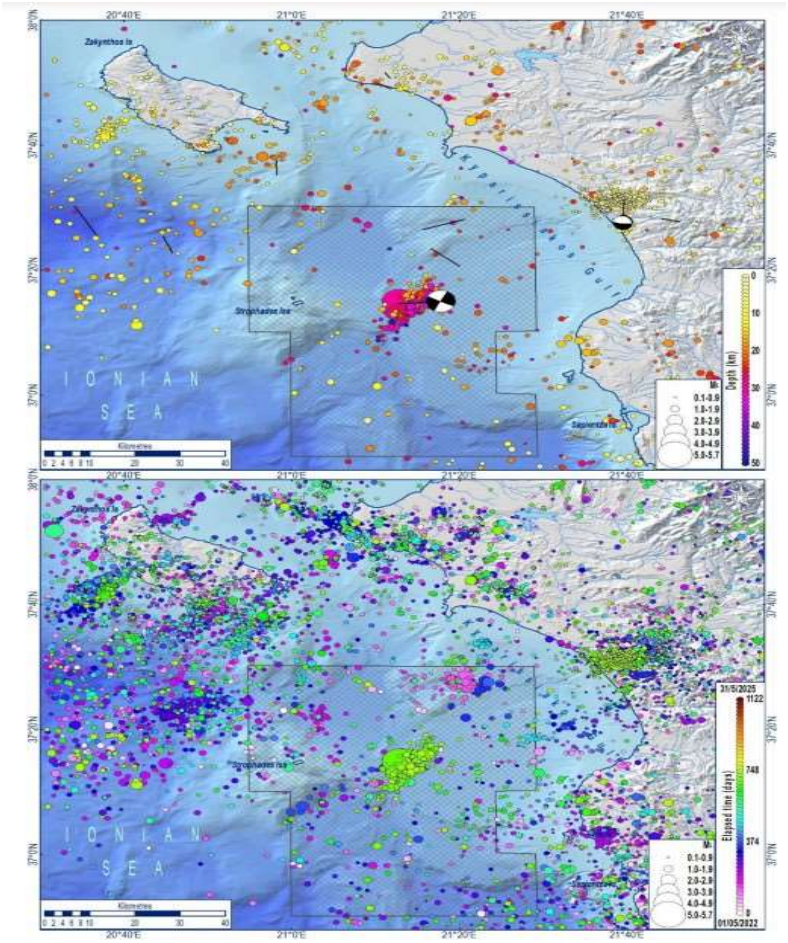

Fig. 46: Above: Seismicity recorded during the 4th 6-month monitoring period (January – May 2024). Within the area of interest, an earthquake of magnitude MW5.8 (ML5.7) and a notable aftershock sequence occurred on 29/3/24. Below: Seismicity from the beginning of the recording until the end of the 4th 6-month period.

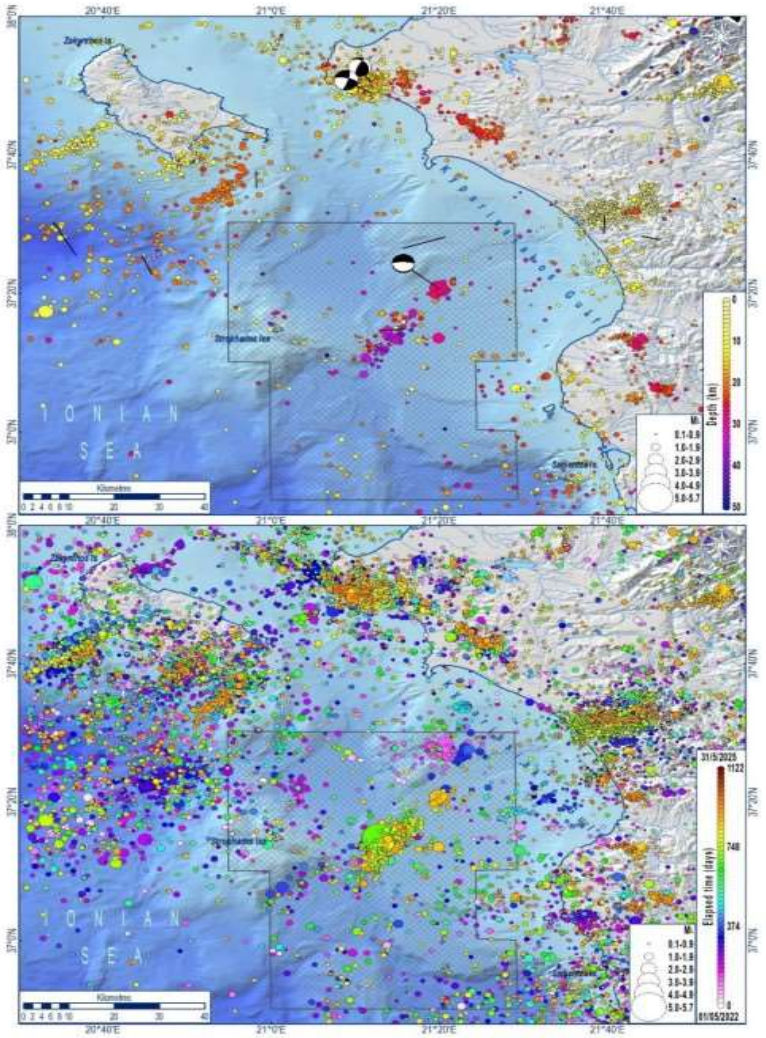

Fig. 47: Above: Seismicity recorded during the 5th 6-month monitoring period (June – December 2024). The aftershock sequence of the previous period continued to decrease while various concentrations are present in the surrounding area. Below: Seismicity from the beginning of the recording until the end of the 5th 6-month period.

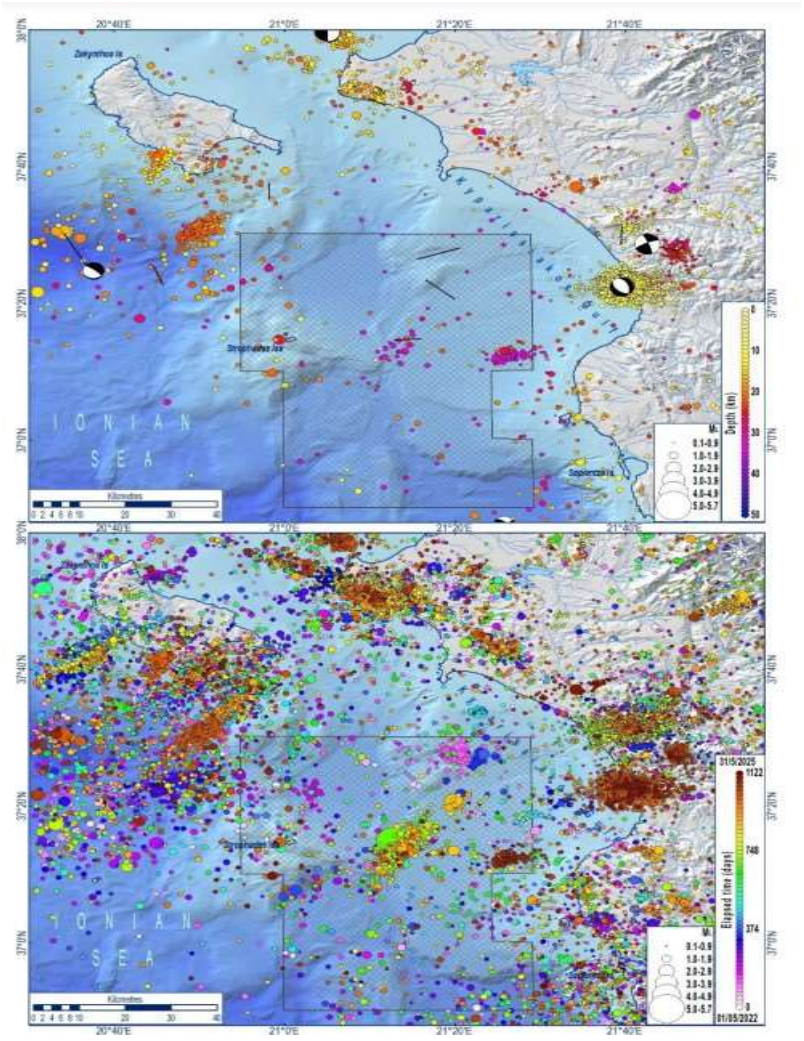

Fig. 48: Seismicity recorded during the 6th 6-month monitoring period (January – May 2025). The activity related to the sequence of the 29 Mar 2024 earthquake has decreased significantly, while a small activity is observed on the eastern margin of the area of interest. Local activity around the area of interest continues with the most significant one near Zacharo. Below: Seismicity from the beginning of the recording until the end of the 6th 6-month period.

For the above seismic events, analysis is based on the 3D velocity model that was created in the framework of the deliverable "Report on the third year of monitoring – results – suggestions". This detailed model resulted from the analysis and process of the P- and S-wave arrival times for each earthquake recorded in the local seismographic stations. In the seismicity analysis, apart from the stations of the local network, all the stations that are available in the routine seismicity analysis of the Greek region carried out by the Institute of Geodynamics have been considered. From the magnitude distribution of the earthquakes that have been analyzed up to now (6/2022 – 5/2025), a decrease in the "magnitude of completeness Mc" from M1.8-M1.9, as derived from the national network (Fig. 49), to M1.5-M1.6 (Fig. 50) was observed.

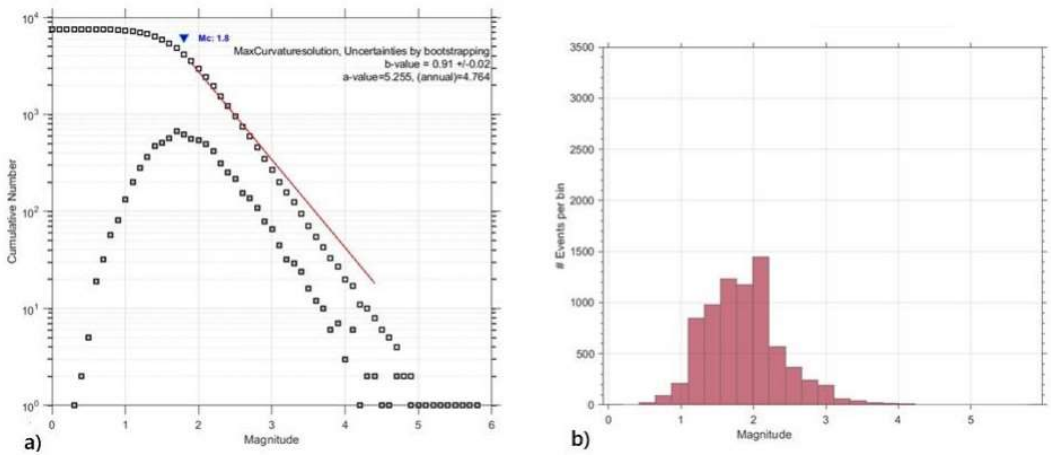

Fig. 49: a) Gutenberg-Richter relationship that shows the magnitude of completeness for the total recording period (5/2022-5/2025) from the national seismographic network of NOA and b) respective magnitude histogram.

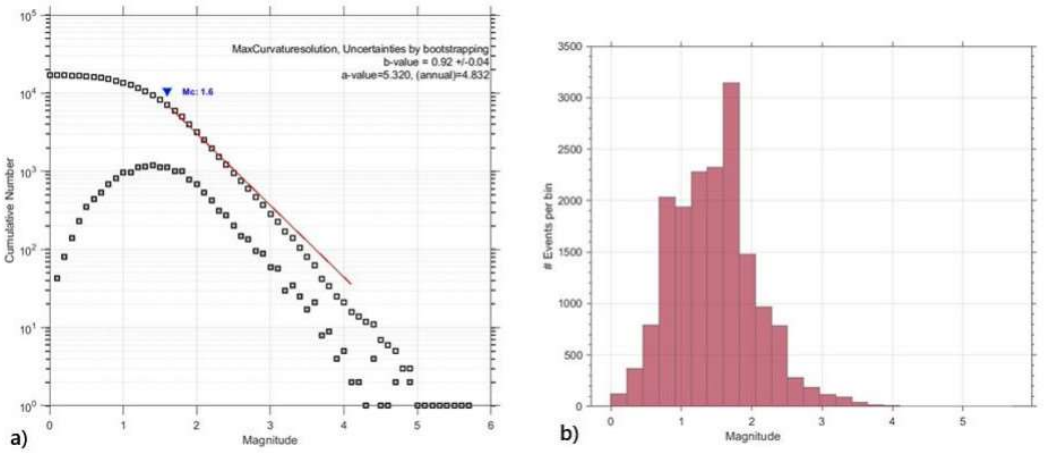

Fig. 50: a) Gutenberg-Richter relationship that shows the magnitude of completeness for the total recording period (5/2022-5/2025) from the local network and b) respective magnitude histogram.

3.4 Conclusions

Seismicity monitoring continued for the period between January - May 2025, completing 3 full years of continuous recording. Seismic monitoring so far has identified and studied each active zone in the region in detail. The most notable case of seismicity is the one that followed the strong earthquake of magnitude MW5.8 on March 29, 2024. Its depth and its focal mechanism suggest an earthquake that occurred within the subducting tectonic plate. This fact is essential both for the precise determination of the seismic hazard and for the separation of this zone from the active tectonics of the upper crust. The prolonged seismicity observed in the Zacharo Area is most likely a swarm associated with the movement of geothermal fluids. The prolonged duration of the aftershock sequence of January 6, 2025, magnitude ML4.5 earthquake in the Giannitsochori area, in Neda, can also probably be attributed to the fluids.

3.5 Seismic2025, Monitoring & Seismic Hazard Assessment – 2026 onwards

The collaboration with the Institute of Geodynamics of NOA in the context of the Program "Seismicity Monitoring & Seismic Hazard Assessment in the Lease Area of Block 10" will continue in 2026 and the relevant tasks will include the following:

- Maintenance of 22 portable seismographs in addition to the permanent national network and a seismic array of 9 portable seismographs.
- Data transmission in real-time and a daily basis analysis.
- Development of a 3D tomographic model.
- Automatic notifications SMS to "HELLENiQ UPSTREAM KYPARISSIAKOS" based on the automatic solutions for earthquakes in the area with size from (≥M4.0).
- Seismic Hazard assessment Study in the wider area of the "Block10".