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**Supplementary material to**

**Identifying priorities for the protection of deep Mediterranean Sea ecosystems through an integrated approach**

Fanelli Emanuela1,2\*, Bianchelli Silvia1, Foglini Federica3, Canals Miquel4, Castellan Giorgio3, Güell-Bujons Queralt4, Galil Bella5, Goren Menachem5, Evans Julian6, Fabri Marie Claire7, Vaz, Sandrine.8, Ciuffardi Tiziana9, Schembri Patrick Joseph6, Angeletti Lorenzo3, Taviani Marco2,3,10, Danovaro Roberto1,2

1Department of Life and Environmental Sciences, Polytechnic University of Marche, 60131 Ancona, Italy. [e.fanelli@univpm.it](mailto:e.fanelli@univpm.it); [silvia.bianchelli@univpm.it](mailto:silvia.bianchelli@univpm.it); [r.danovaro@univpm.it](mailto:r.danovaro@univpm.it)

2Stazione Zoologica Anton Dohrn di Napoli, Villa Comunale, 80121 Napoli, Italy

3CNR-National Research Council, ISMAR-Institute of Marine Sciences, 40129 Bologna, Italy. federica.foglini@bo.ismar.cnr.it; [giorgio.castellan@bo.ismar.cnr.it](mailto:giorgio.castellan@bo.ismar.cnr.it); lorenzo.angeletti@bo.ismar.cnr.it; marco.taviani@bo.ismar.cnr.it

4GRC Geociències Marines, Departament de Dinàmica de la Terra i de l'Oceà, Facultat de Ciències de la Terra, Universitat de Barcelona, 08028 Barcelona, Spain. miquelcanals@ub.edu; [queraltguell@gmail.com](mailto:queraltguell@gmail.com).

5The Steinhardt Museum of Natural History, Tel Aviv University, 6997801 Tel Aviv, Israel. bgalil@tauex.tau.ac.il; gorenm@tauex.tau.ac.il

6Department of Biology, University of Malta, Msida MSD 2080, Malta. [julian.evans@um.edu.mt](mailto:julian.evans@um.edu.mt); patrick.j.schembri@um.edu.mt

7Ifremer, Centre de Méditerranée, 83500 La Seyne sur Mer, France. marie.claire.fabri@ifremer.fr

8Ifremer, Centre de Méditerranée, 34200 Sète, France. Sandrine.Vaz@ifremer.fr

9Santa Teresa Research Centre, ENEA, 19039 Lerici (SP), Italy. tiziana.ciuffardi@enea.it;

10Woods Hole Oceanographic Institution, Woods Hole MA 02543-1050, Us

\*corresponding author: Fanelli E., e.fanelli@univpm.it

**Table S1.** List of the international regulations (laws, codes etc.) concerning the management or protection of the marine environment and/or its resources, with a focus on the deep sea.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Law/Regulations/Code** | **Entry into force** | **Main scope** | **Application to deep sea** | **References** |
| Habitat Directive (HD) | 1992 | The Habitats Directive ensures the conservation of a wide range of rare, threatened or endemic animal and plant species. Some 200 rare and characteristic habitat types are also targeted for conservation in their own right. | At European level, the Habitat Directive (48/92 EC) in its Appendix 2 includes also deep-sea ecosystems: “H1170 Reefs” and “H1180 Submarine structures made by leaking gases”, which include all cold-water corals, black corals, gorgonians as well as soft-bottom habitat forming species such as *Lytocarpia myriophyllum*, *Isidella elongata* and *Funiculina quadrangularis*. These facies deserve protection and indeed areas hosting these species can be designated as SCIs. |  |
| OSPAR | 1992 |  | The OSPARrecommends protection and conservation of hydrothermal vent fields as “priority habitats” (OSPAR, 2008a) in its maritime area (NE Atlantic). |  |
| UN Convention on the Law of the Sea (UNCLOS) | 1994 | Provides a legal order for the seas and oceans that promotes the equitable and efficient utilization of their resources, the conservation of their living resources and the study, protection and preservation of the marine environment | Recognizes the right of all states to access marine living resources in ABNJs, together with the obligation to cooperate with other states to protect and preserve the marine environment and the duty to protect and preserve rare or fragile ecosystems, and the habitat of depleted, threatened or endangered species and other forms of marine life. | UNGA, 1994; 1995; Van Dover et al., 2014; Danovaro et al., 2017 |
| Implementing Agreements for UNCLOS | 1996 | To address certain difficulties with the seabed mining provisions contained in Part XI of the Convention, which had been raised, primarily by the industrialized countries, the Secretary-General convened in July 1990 a series of informal consultations which culminated in the adoption, on 28 July 1994, of the Agreement relating to the implementation of Part XI of the UNCLOS of 10 December 1982. | Related to the management of seafloor mining in international waters and of straddling and highly migratory fish stocks. The opportunity exists to implement guidelines for restoration and rehabilitation as part of a sustainable and ethical environmental management strategy to protect and preserve the marine environment, rare and fragile ecosystems, and vulnerable species, while allowing the responsible use of marine resources. However, these environmental obligations have been neither well specified nor implemented. |  |
| EC 2347/2002 | 2003 | Establishing specific access requirements and associated conditions applicable to fishing for deep-sea stocks | Define deep-sea fishing permit, effort restriction, fishing gear characteristics and fishing operations, vessel monitoring system, designated ports, observers | COUNCIL REGULATION (EC) No 2347/2002 of 16 December 2002 |
| Convention on Biodiversity (CBD) - Decision VII/5 (paragraph 30) | 2004 | Global treaty concerned with the conservation and sustainable use of biodiversity | “Urgent need for international cooperation and action to improve conservation and sustainable use of biodiversity in marine areas beyond the limits of national jurisdiction”, through the establishment of marine protected areas that include seamounts, hydrothermal vents, cold-water corals, and/or other vulnerable ecosystems. | Bax et al., 2016; Van Dover et al., 2018 |
| UNGA Res. 61/105 | 2007 | Sustainable fisheries, including through the 1995 Agreement for the Implementation of the Provisions of the UNCLOS of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and related instruments | Identification and protection of Vulnerable Marine Ecosystems (VMEs) and Ecologically or Biologically Significant Areas (EBSAs), as well as a call for networks of Chemosynthetic Ecosystem Reserves for deep-sea hydrothermal vent and seep ecosystems. | Rogers et al., 2010; Gilman et al., 2011; Taranto et al., 2012; Weaver and Johnson, 2012; Van Dover et al., 2012 |
| EU Regulation 734/2008 | 2008 | Implement UNGA Resolution 61/105 | European Council requires the protection of hydrothermal vents from bottom fishing and explicitly includes hydrothermal vents in the list of VMEs. | EU 2008a (Article 2b) |
| Marine Strategy Framework Directive (MSFD) | 2008 | The MSFD aims to achieve Good Environmental Status (GES) of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. | The species groups specified in Part II of the Annex to COMM/DEC/2017/848, include birds, deep-sea fish and cephalopods, in addition to deep-diving toothed cetaceans. COMM/DEC/2017/848 also includes deep-sea habitats: a) upper bathyal rocks and biogenic reefs, b) upper bathyal sediments, c) lower bathyal rock and biogenic reef, d) lower bathyal sediments, and e) abyssal seafloor. | EC 2008/56 |
| ISBA Regulation 19/C/17 | 2013 | Decision of the Council of the International Seabed Authority relating to amendments to the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area and related matters | Establish a set of regulations for set of Regulations is to provide for prospecting and exploration for polymetallic nodules in the Area | https://isa.org.jm/files/files/documents/isba-19c-17\_0.pdf |
| International Convention for the regulation of Whaling and its amendments | 1946 (last amendment in 2018) | Convention on the regulation of whaling established by the International Whaling Commission (IWC) and annually amended | Establish a “Moratorium” on commercial whaling since 1982 | https://archive.iwc.int/pages/view.php?ref=3606&k= |

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**Table S2.** Name, source and description of criteria used for the Multicriteria Decision Analysis (MCDA).Further information is available at IDEM WebGIS repository (<http://www.msfd-idem.eu/>).

|  |  |  |  |
| --- | --- | --- | --- |
| **Goal** | **Criteria** | **Source** | **Description** |
| Nature Conservation | Species Distribution | coconetgis.ismar.cnr.it, data.unep-wcmc.org  IDEM partners | Sighting positions of relevant species in the deep Mediterranean Sea from open-access repository and IDEM partners. |
| Slope | emodnet-bathymetry.eu | Rate of change in elevation calculated from bathymetry |
| Nursery Areas  Spawning Grounds | Giannoulaki et al., 2013  Colloca et al. 2015 | Modelled probability presence of nursery areas and spawning grounds of several commercial fish fauna (*Merluccius merluccius*, *Mullus barbatus*, *Pagellus erythrinus*, *Raja clavata*, *Galeus melastomus*, *Solea solea*, *Aristaeomorpha foliacea*, *Parapenaeus longirostris*, *Nephrops norvegicus*, *Eledone cirrhosa*, *Illex coindetii*) |
| Activities Preservation | Fishery Effort | ISMAR-CNR (IDEM partner) | Average trawling fishing effort from AIS fishing vessels’ tracking systems in the Mediterranean Sea. The temporal extent of the data is from 2012-01-01 to 2014-12-31 |
| Shipping intensity | emodnet-humanactivities.eu | Number of vessels per unit area (square kilometre) from ship positions retrieved from the Automatic Identification System (AIS) for the year 2018. |
| Oil and Gas fields | ISMAR-CNR (IDEM partner) | Major oil and natural gas fields georeferenced from nautical charts |
| Oil and Gas extraction sites | emodnet-humanactivities.eu | Offshore installations for hydrocarbon extraction including information on location, operator, water depth, production start, current status, category and function of the installation. |

**Table S3.** List of the different ecological relevance criteria found in literature under revision for its application in the evaluation of deep Mediterranean key areas for monitoring and protection.

|  |  |  |
| --- | --- | --- |
| **ID** | **ECOLOGICAL RELEVANCE CRITERIA REVISED** | **SELECTED?** |
|  | **CBA criteria for defining EBSA** |  |
| **1** | **Uniqueness or rarity.** Area contains either (i) unique, rare or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features | **YES** |
| **2** | **Special importance for life history stages of species.** Areas that are required for a population to survive and thrive. | **YES** |
| **3** | **Importance for threatened, endangered or declining species and/or habitats**. Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species | **YES** |
| **4** | **Vulnerability, fragility, sensitivity, or slow recovery.** Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery | **YES** |
| **5** | **Biological productivity.** Area containing species, populations or communities with comparatively higher natural biological productivity | Encompassed within 42 |
| **6** | **Biological diversity.** Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity | **NO** |
| **7** | **Naturalness.** Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation. | **NO** |
|  | **SPAMI selection criteria (Annex I of the SPA/BD Protocol to the Barcelona Convention** |  |
| **8** | **Uniqueness.** | CBA 1 (**YES**) |
| **9** | **Natural representativeness.** The area has highly representative ecological processes, or community or habitat types or other natural characteristics. | **YES** |
| **10** | **Diversity.** | CBA 6 (**NO**) |
| **11** | **Naturalness.** | CBA 7 (**NO**) |
| **12** | **Presence of habitats that are critical to endangered, threatened or endemic species.** | CBA 3 (**YES)** |
| **13** | **Cultural representativeness.** The area has a high representative value with respect to the cultural heritage, due to the existence of environmentally sound traditional activities integrated with nature which support the well-being of local populations. | **NO** |
| **14** | **Area of special interest at the scientific, aesthetic, cultural or educational levels.** Present a particular value for research in the field of natural sciences or for activities of environmental education or awareness or contain outstanding natural features, landscapes or seascapes | **NO** |
| **15** | **The existence of threat**s likely to impair the ecological, biological, aesthetic or cultural value of the area | **NO** |
| **16** | **The involvement and active participation of the public in general,** and particularly of local communities, in the process of planning and management of the area | **NO** |
| **17** | **The existence of a body representing the public, professional, non-governmental sectors and the scientific community involved in the area** | **NO** |
| **18** | **The existence in the area of opportunities for sustainable development** | **NO** |
| **19** | **The existence of an integrated coastal management plan** | **NO** |
| **20** | **The legal status requirements for an area** that will guarantee the area’s effective long-term protection. | **NO** |
|  | **Particularly Sensitive Sea Area criteria (International Maritime Organization 2006)** |  |
| **21** | **Uniqueness or rarity** | **Already considered** |
| **22** | **Critical habitat –** A sea area that may be essential for the survival, function, or recovery of fish stocks or rare or endangered marine species, or for the support of large marine ecosystems | **Already considered** |
| **23** | **Dependency –** An area where ecological processes are highly dependent on biotically structured systems. Dependency also embraces the migratory routes of fish, reptiles, birds, mammals, and invertebrates. | Encompassed within 2 |
| **24** | **Representativeness –** An area that is an outstanding and illustrative example of specific biodiversity, ecosystems, ecological or physiographic processes, or community or habitat types or other natural characteristics. | **Already considered** |
| **25** | **Diversity** | **Already considered** |
| **26** | **Productivity.** Such productivity is the net result of biological and physical processes which result in an increase in biomass in areas such as oceanic fronts, upwelling areas and some gyres | Encompassed within 42 |
| **27** | **Spawning or breeding grounds** | Encompassed within 27 |
| **28** | **Naturalness** | **Already considered** |
| **29** | **Integrity –** An area that is a biologically functional unit, an effective, self-sustaining ecological entity. | Together with 40 |
| **30** | **Fragility** | **Already considered** |
| **31** | **Bio-geographic importance –** An area that either contains rare biogeographic qualities or is representative of a biogeographic “type” or types, or contains unique or unusual biological, chemical, physical, or geological features. | **YES** |
| **32** | **Social or economic dependency –** An area where the environmental quality and the use of living marine resources are of particular social or economic importance, including fishing, recreation, tourism, and the livelihoods of people who depend on access to the area. | **NO** |
| **33** | **Human dependency –** An area that is of particular importance for the support of traditional subsistence or food production activities or for the protection of the cultural resources of the local human populations. | **NO** |
| **34** | **Cultural heritage –** An area that is of particular importance because of the presence of significant historical and archaeological sites. | **Already considered** |
| **35** | **Research –** An area that has high scientific interest. | Together with 36 |
| **36** | **Baseline for monitoring studies –** An area that provides suitable baseline conditions with regard to biota or environmental characteristics, because it has not had substantial perturbations or has been in such a state for a long period of time such that it is considered to be in a natural or near-natural condition. | Together with 37 |
| **37** | **Education –** An area that offers an exceptional opportunity to demonstrate particular natural phenomena. | **NO** |
|  | **Habitats Directive 92/43/ EEC Annex III** |  |
| **38** | **Degree of representativity of the natural habitat type on the site** | **Already considered** |
| **39** | **Area of the site covered by the natural habitat type in relation to the total area covered by that habitat type within national territory** | **NO** |
| **40** | **Degree of conservation of the structure and functions of the natural habitat type concerned and restoration possibilities** | Together with 29 |
| **41** | **Global assessment of the value of the site for conservation of the natural habitat type concerned** | Together with 9 |
|  | **Other ones** |  |
| **42** | **High-energy processes relevant for deep sea dynamics** | **YES** |
| **43** | **Benthic-pelagic communication** | **YES** |
| **44** | **Part of an already defined EBSA, MPA or other designated area** | **YES** |
| **45** | **Presence of high value resources highly susceptible of suffering from exploitation** | **YES** |
|  | **Parameters and factors used for the multi criteria analysis (ISMAR team)** |  |
| **46** | **Species occurrences.** Classified in 6 classes based on the IUCN Red List of threatened species: DD (Data deficient), LC (Least concern), NT (Near Threatened), VU (Vulnerable), EN (Endangered) and CR (Critically Endangered). | Considered within CBA 3 (**YES)** |
| **47** | **Habitats.** Presence/absence. | **Already considered multiple criteria** |
| **48** | **Nursery areas.** Presence/absence. | Considered within CBA 2 (**YES**) |
| **49** | **FRAs.** Presence/absence. | Considered within 44 **(YES)** |

**Table S4**. List of the different anthropogenic threat criteria found in the literature under revision for its application in the evaluation of deep Mediterranean key areas for monitoring and protection.

|  |  |  |
| --- | --- | --- |
| **ID** | **ANTHROPOGENIC THREAT CRITERIA REVISED** | **SELECTED?** |
|  | **Blue growth in the Mediterranean Sea. WWF Report (2015)** |  |
| **1** | **Offshore oil and gas exploration and extraction** | **Considered within 24** |
| **2** | **Maritime transport and ports** | ? |
| **3** | **Professional fisheries** | **Considered within 23** |
| **4** | **Recreational fisheries** | **NO** |
| **5** | **Tourism** | **NO** |
| **6** | **Marine renewable energy** | **NO** |
| **7** | **Marine mining** | **Considered within 24** |
| **8** | **Coastal development** | **NO** |
| **9** | **Land-based pollution sources** | **Considered within 28** |
|  | **Micheli et al. (2013). Cumulative Human Impacts on Mediterranean and Black Sea Marine Ecosystems: Assessing Current Pressures and Opportunities** | |
| **10** | **Climatic divers.** Temperature and UV increase, acidification | **Considered within 25** |
| **11** | **Land-based drivers.** Nutrient input, organic pollution, urban runoff, risk of hypoxia and coastal population density. | **Considered within 28** |
| **12** | **Sea-based drivers.** Commercial shipping, invasive species, oil spills and oil rings. | Split within different ones |
| **13** | **Fishing.** All fishing gears and types. | **Considered within 23** |
|  | **Korpinen et al. (2012). Human pressures and their potential impact on the Baltic Sea ecosystem** | |
| **14** | **Physical loss of seabed.** Smothering by dumped material, sealing of seabed. | **NO** |
| **15** | **Physical damage to seabed.** Changes in siltation, abrasion of seabed, selective extraction of non-living resources. | **NO** |
| **16** | **Other physical disturbance.** Underwater noise. | **Considered within 27** |
| **17** | **Interference with hydrological processes.** Changes in thermal regime, changes in salinity regime. | **Considered within 25** |
| **18** | **Contamination by hazardous substances.** Introduction of synthetic compounds, introduction of non-synthetic substances and compounds, introduction of radio-nuclides. | **Considered within 26** |
| **19** | **Nutrient and organic matter enrichment.** Inputs of nutrients, inputs of organic matter. | **Considered within 22** |
| **20** | **Biological disturbance.** Introduction of microbial pathogens, selective extraction of species (e.g. fishing). | **NO** |
|  | **Other criteria (based on information extracted from IDEM previous deliverables)** | |
| **21** | **Introduction of alien species (D2-based)** | **YES** |
| **22** | **Areas with high artificial nutrient inputs delivered to the deep-sea.** Considering zones with high risk of hypoxia or other alterations due to the increase of nutrient concentrations. **(D5-based)** | **YES** |
| **23** | **Intensive practice of fishing techniques (D6-based)** | **YES** |
| **24** | **Deep sea exploration and exploitation activities for mineral, energy or bioprospecting resources (D6-based)** | **YES** |
| **25** | **Crucial area for the detection of significant alterations of hydrological processes.** Areas affected by climatic drivers where changes in thermal and salinity regimes and/or acidification processes are palpable. **(D7-based)** | **YES** |
| **26** | **Areas of accumulation, transport and dispersion of contaminants and/or litter (D8-D9-D10)** | **YES** |
| **27** | **Areas of continuous and intense underwater noise (D11-based)** | **YES** |
| **28** | **Critical area for the study of land-based drivers effects on deep-sea ecosystems.** This criterion should consider suitable areas highly impacted by land-based pressures in order to monitor how these impacts are translated to deep sea ecosystems. | **YES** |
| **29** | **Area affected by an important data and knowledge scarcity** that causes high uncertainty about the potential pressures and the impacts currently happening. | **YES** |
|  | **Parameters and factors used for the multi criteria analysis (ISMAR team)** | |
| **30** | **Fishery pressure** | **Considered within 23** |
| **31** | **Pollution pressure** | **Considered within 26** |

**Table S5.** List of all the potential areas, their final classification and the number of scores obtained determining their final selection as key area, based on the Expert evaluation. Green highlights the areas selected and thus provided with a descriptive sheet in **Annex 1**, and red those presented as potential areas requiring further revision. ST=straits or channels; DW=areas of formation of dense water; CS= canyon systems; CWC=cold-water coral reefs; SM=seamounts; OR=other types of features/habitats.

|  |  |  |  |
| --- | --- | --- | --- |
| Code | Area proposed for evaluation | Classification | Number of scores/Total (209) |
| ST.1 | Strait of Gibraltar | TYPE 1 | 91 |
| ST.2 | Eivissa and Mallorca channels | TYPE 1 | 74 |
| ST.4 | (Deep basins of the) Sicilian Channel | TYPE 1 | 92 |
| ST.5 | Otranto Strait | TYPE 1 | 77 |
| ST.6 | Aegean Sea and Cretan northern Ionian Sea straits | TYPE 1 | 52 |
| DW.1 | North-western Mediterranean dense water formation (MEDOC area) and spreading area | TYPE 1 | 85 |
| DW.2 | Adriatic dense water formation and spreading area | TYPE 1 | 76 |
| DW.3 | Aegean dense water formation and spreading area | TYPE 1 | 58 |
| CS.1 | Canyon systems of the western Gulf of Lion and north Catalan margin | TYPE 1 | 105 |
| CS.2 | Canyon systems of the southern Adriatic Sea | TYPE 1 | 81 |
| CS.3 | Cassidaigne Canyon, eastern Gulf of Lion | TYPE 1 | 93 |
| CS.4 | Levante Canyon, Ligurian Sea | TYPE 1 | 69 |
| CS.5 | East Levantine canyons (ELCA) | TYPE 1 | 79 |
| CWC.1 | CWC habitats of Santa Maria Di Leuca and nearby occurrences | TYPE 1 | 86 |
| CWC.2 | CWC Western Mediterranean Northern Province | TYPE 1 | 38 |
| CWC.3 | CWC Habitats of Bari Canyon System | TYPE 1 | 16 |
| SM.1 | Seamounts of the Alborán Sea | TYPE 1 | 68 |
| SM.2 | Eratosthenes Seamount | TYPE 1 | 85 |
| SM.3 | Other seamounts 1 (e.g. Tyrrhenian Sea) | TYPE 1 | 55 |
| OR.1 | Deep Nile Delta Fan | TYPE 1 | 71 |
| OR.2 | Hellenic trench | TYPE 1 | 47 |
| OR.3 | Levant Sea | TYPE 1 | 78 |
| OR.4 | Eastern Corsican slope | TYPE 2 | 62 |

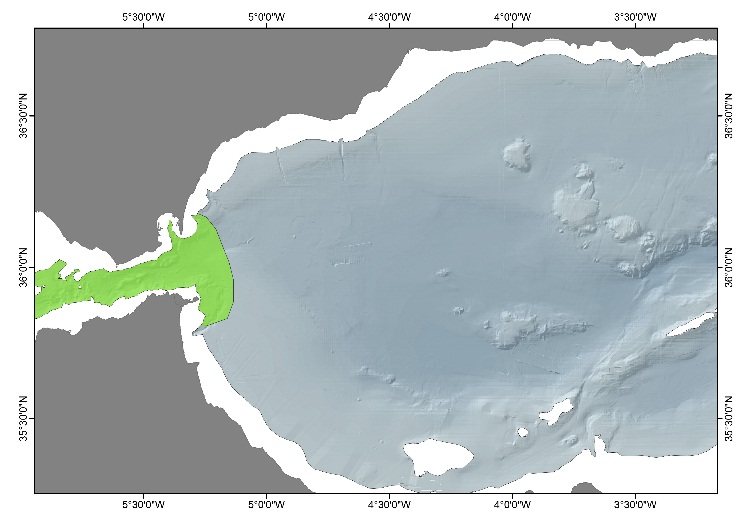
**Annex 1. Descriptive sheets of the key areas selected on the base of Expert Evaluation (EE).**

**ST.1 STRAIT OF GIBRALTAR**

**BASIN: WESTER MEDITERRANEAN**

**ER SCORE: 2.21/3 AT SCORE: 1.93/3 CLASSIFICATION: TYPE 1**

IDEM Key areas descriptive sheet

**― INTRODUCTION TO THE AREA**

Straits likely deserve being monitored by themselves independently if they are included in larger areas. As a transition zone between the Atlantic Ocean and the Mediterranean Sea, the Strait of Gibraltar is the only relevant zone of dynamic water exchange with a large ocean basin. The area is characterized by surface inflow of Atlantic water and a deep outflow of Mediterranean waters that foster the establishment of peculiar conditions determining and influencing the communities present. Thus, apart from the importance as water exchange zone, monitoring of the Gibraltar Strait is also highly relevant regarding the occurrences of deep-water corals communities and as habitat of a large number of cetacean and rare, unique species. Taking into account the importance of maritime traffic in the strait and the high occurrence of cetaceans, the monitoring of this region is highly relevant for Descriptor 11. Additionally, it encompasses other relevant deep-sea systems as pockmarks at water depths between 370 and 1020 m on either side of the Strait. Pockmarks are one of the seabed expressions of active fluid and/or gas flow and thus are highly interesting for the scientific community. Partly overlaps with SPAMI site "Southwestern Alborán".

**― ECOLOGICAL RELEVANCE AND ANTHROPOGENIC THREATS OF THE AREA**

**Highly relevant ecological relevance criteria (>2.5):** Uniqueness | Dependency | Importance for threatened, endangered or declining species and/or habitats | Vulnerability, fragility, sensitivity, or slow recover | Natural representativeness | Bio-geographic importance | High-energy processes relevant for deep sea dynamics | Water exchanges | Extreme scientific interest.

**Highly important anthropogenic threat criteria (>2.5):** Introduction of alien species (D2-based) | Persistent and intense underwater noise (D11-based) | Maritime traffic (D2, D8, D10 and D11-based).

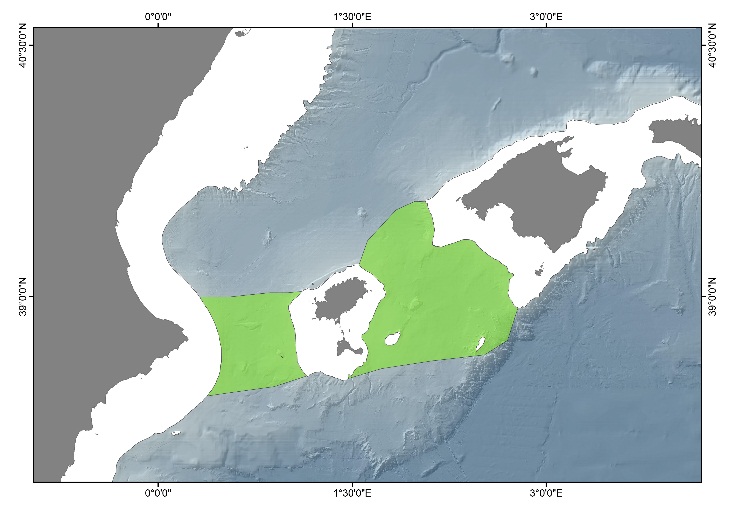
**― KEY REFERENCES:** Candela, 1991; Álvarez-Pérez et al., 2005; de Stephanis et al., 2008; UNEP-MAP-RAC/SPA, 2010; León et al., 2014.

**ST.2 EIVISSA AND MALLORCA CHANNELS**

**BASIN: WESTER MEDITERRANEAN**

**ER SCORE: 2.36/3 AT SCORE: 1.66/3 CLASSIFICATION: TYPE 1**

IDEM Key areas descriptive sheet

**― INTRODUCTION TO THE AREA**

Straits likely deserve being monitored by themselves independently if they are included in larger areas. These two deep channels are key for the north-south exchanges between the northern Gulf of Lion and the southern Algerian Basin since they are the only significant passages for the circulation of surface and intermediate waters. Apart from the relevance regarding water exchanges, peculiar characteristics of the channels also support the monitoring of these two areas. Both in the Eivissa and Mallorca channels, evidence of pockmarks and fluid escape features are present. Additionally, in the median depression of the Eivissa Channel a prominent 200m high seamount can be found and a volcanic field composed by 118 cone-shaped volcanic intrusions is described in the southeast of the Central Depression of the Mallorca Channel. Additionally, the area hosts large *Isidella elongata* meadows. This area is encompassed within the SPAMI site "Southern Balearic".

**― ECOLOGICAL RELEVANCE AND ANTHROPOGENIC THREATS OF THE AREA**

**Highly relevant ecological relevance criteria (>2.5):** Importance for threatened, endangered or declining species and/or habitats | Vulnerability, fragility, sensitivity, or slow recover | Existing MPAs | Extreme scientific interest.

**Highly important anthropogenic threat criteria (>2.5):** Overfishing and stock depletion (D3-based) | Intensive, sustained fishing (D6-based).

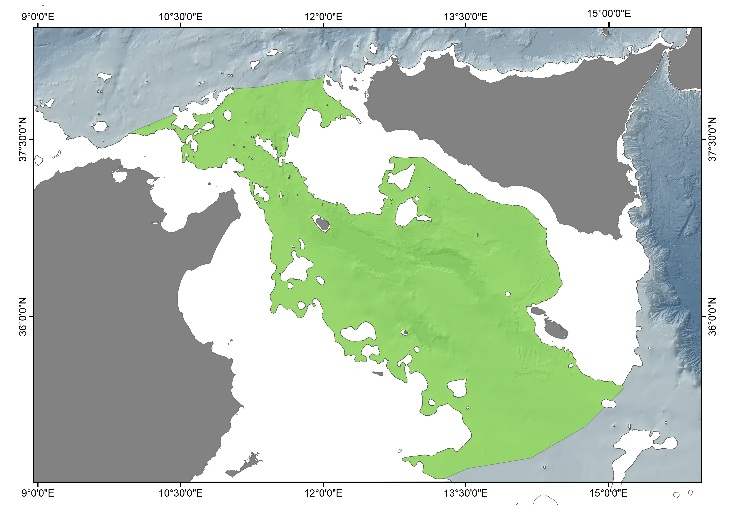
**― KEY REFERENCES:** Astraldi et al., 1999; Acosta et al., 2003; Lastras et al., 2004; UNEP-MAP-RAC/SPA, 2010; WGVME, 2018 and WGMPA, 2019.

**ST.4 (DEEP BASINS OF THE) SICILIAN CHANNEL**

**BASIN: CENTRAL-IONIAN MEDITERRANEAN**

**ER SCORE: 2.55/3 AT SCORE: 2.02/3 CLASSIFICATION: TYPE 1**

IDEM Key areas descriptive sheet

**― INTRODUCTION TO THE AREA**

The Sicilian Channel (Sicily Channel, Strait of Sicily) is the natural corridor connecting the East and West basins of the Mediterranean. The Siculo-Tunisian Sill, the narrower sector of the strait between the Tunisian and Sicilian coasts, reaches a maximum depth of 430 m. The complex physiography is predominantly shallow but includes the grabens (troughs) of the Pantelleria Rift System, with water depths greater than 1000 m in the otherwise shallow sea between Tunisia and Sicily, volcanic edifices and banks. Deep water masses flowing westwards are the Levantine Intermediate Water (LIW) and the upper layer of the Eastern Mediterranean Deep Water (EMDW) passing over the Siculo-Tunisian Sill on their way to the western Mediterranean (combined in the Eastern Overflow Water). The Pantelleria Rift System contains the Malta Trough (1721 m), Linosa Trough (1529 m) and Pantelleria Trough (1317 m) that serve as important conduits for the westward flow of LIW and EMDW. The present distribution of cold-water coral (CWC) frameworks in the Mediterranean is closely linked to the LIW flow, and the Sicilian Channel represents one of the eight major CWC provinces in the Mediterranean, bridging the gap between the CWC provinces in the South Adriatic/Santa Maria di Leuca, and south Sardinia. Open slopes dominated by bamboo coral or seapens, which can serve as essential habitats for some commercially-exploited species, are also known from the Sicilian Channel, while a pockmark field is present West of Gela Basin and hosts chemosynthesis-based communities. The entire area is included within the EBSA "Sicilian Channel" (Convention on Biological Diversity, https://www.cbd.int/ebsa/). Three FRAs for protection of essential fish habitats are established within the Sicilian Channel: the "East of Adventure Bank", "West of Gela Basin" and "East of Malta Bank" FRAs. There is partial overlap with the SPAMI sites "Northern Strait of Sicily" and "Tunisian Plateau". Within Maltese waters, five deep-water areas have been declared as pSCIs to form part of the Natura2000 network (<https://era.org.mt/en/Pages/Natura-2000-Datasheets-Maps.aspx>).

**― ECOLOGICAL RELEVANCE AND ANTHROPOGENIC THREATS OF THE AREA**

**Highly relevant ecological relevance criteria (>2.5):** Uniqueness | Dependency | Importance for threatened, endangered or declining species and/or habitats | Vulnerability, fragility, sensitivity, or slow recover | natural representativeness | Bio-geographic importance | Water exchanges | Existing MPA | Extreme scientific interest.

**Highly important anthropogenic threat criteria (>2.5):** Overfishing and stock depletion (D3-based) | Intensive, sustained fishing (D6-based) | Deep-sea exploration and production activities (D6-based) | Maritime traffic (D2, D8, D10 and D11-based).

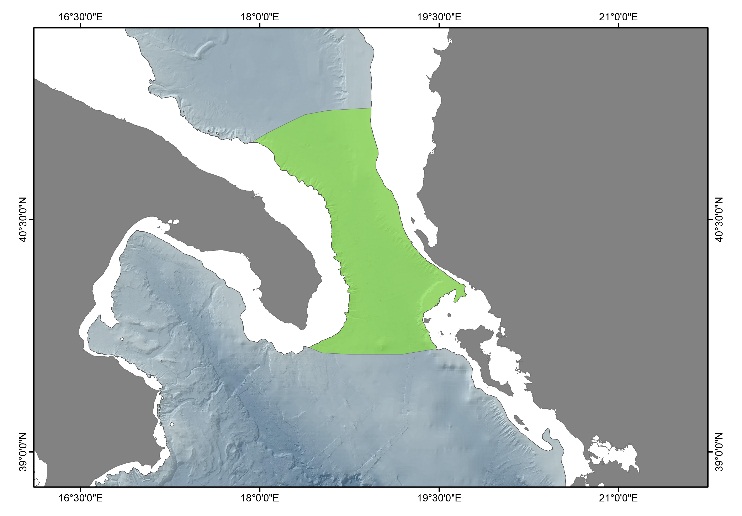
**― KEY REFERENCES:** UNEP-MAP-RAC/SPA, 2010; Lauria et al., 2017; FAO, 2018; Convention on Biological Diversity (<https://www.cbd.int/ebsa/>); Natura2000 network (<https://era.org.mt/en/Pages/Natura-2000-Datasheets-Maps.aspx>).

**ST.5 OTRANTO STRAIT**

**BASIN: CENTRAL-IONIAN MEDITERRANEAN**

**ER SCORE: 2.55/3 AT SCORE: 2.12/3 CLASSIFICATION: TYPE 1**

IDEM Key areas descriptive sheet

**― INTRODUCTION TO THE AREA**

The water masses circulation and exchanges through the Otranto Strait is crucial for the hydrodynamic budget of the Adriatic Sea as well as the deep thermohaline cell of the Eastern Mediterranean. During winter, the strong cooling associated with the northerly winds favors the formation of the Northern Adriatic Dense Water (NAdDW) in the northern part of the basin, and the Adriatic Deep Water (ADW) in the southern part. In the strait, a cyclonic gyre spreads the two deep waters into the Ionian Sea, one adjacent to the western shelf/slope and the other along the strait bottom, influencing the Mediterranean deep convection. The northern Adriatic Sea is also characterized by considerable freshwater run-off by rivers, forming a coastal relatively fresh current, the Adriatic Surface Water (ASW), flowing along the western shelf. To compensate for this outflow of fresher water, two saline water masses, the Ionian Surface Water (ISW) and the Levantine Intermediate Water (LIW), enter the perchè prima era strait e ora è channel?Adriatic Basin through the eastern side of Strait of Otranto. The Otranto Strait has been recently proposed as a Fishery Restricted Area to the GFCM due to the occurrence of large *Isidella elongata* meadows and *Aristeomorpha foliacea* nurseries. Although more data has been requested to the proponent group and further data are necessary, the area seems to be a hot spot of biodiversity also for other VME indicator species, such as *Anthipathes dichotoma*.

**― ECOLOGICAL RELEVANCE AND ANTHROPOGENIC THREATS OF THE AREA**

**Highly relevant ecological relevance criteria (>2.5):** Uniqueness | Vulnerability, fragility, sensitivity, or slow recover | Natural representativeness | High-energy processes relevant for deep sea dynamics | Water exchanges.

**Highly important anthropogenic threat criteria (>2.5):** Intensive, sustained fishing (D6-based) | Deep-sea exploration and production activities (D6-based) | Significant alterations of hydrological processes (D6-D7-based) | Persistent and intense underwater noise (D11-based) | Significant effects of land-sourced, coastal and surface drivers on deep-sea ecosystems (D5-D10-based) | Maritime traffic (D2, D8, D10 and D11-based).

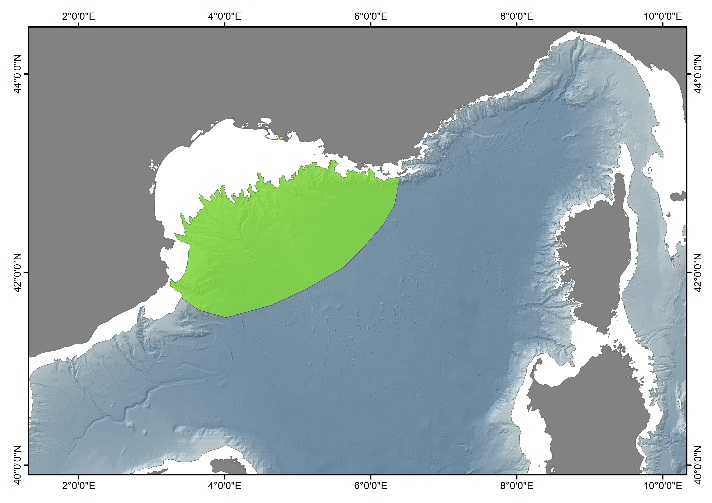
**― KEY REFERENCES:** Pollak, 1951; Ovchinnikov et al., 1985; Malanotte-Rizzoli, 1991; Roether and Schlitzer, 1991; Vilibic and Orlic, 2002; Lembo, 2015; Bo et al. 2018; GFCM, 2019;

**DW.1 NORTH WESTERN MEDITERRANEAN DENSE WATER FORMATION (MEDOC AREA) AND SPREADING AREA**

**BASIN: WESTER MEDITERRANEAN**

**ER SCORE: 2.54/3 AT SCORE: 2.16/3 CLASSIFICATION: TYPE 1**

IDEM Key areas descriptive sheet

**― INTRODUCTION TO THE AREA**

Area highly relevant in terms of monitoring as one of the main drivers of the functioning of the deep Mediterranean Sea, and of the Mediterranean Sea as a whole. The area constitutes one of the three main areas of dense water formation (DWF) in the Mediterranean Sea. DWF is driven mainly by two processes: near-bottom currents driven by seawater density contrast, known as dense shelf water cascading (DSWC), and open sea convection. The Gulf of Lion located in the NW Mediterranean Sea is a micro-tidal and river-dominated continental margin with an intricate network of submarine canyons. The winter heat losses and evaporation induced by northern and northwesters winds promote cooling and densification of coastal waters that facilitate DSWC. The canyon systems perform as main conduits of the cascading shelf water transporting matter and energy to the deep basin, strongly influencing deep sea communities. In the open sea, the same cold and dry winds that cause the DSWC also generate the winter convection process in the region known as MEDOC area. The area partly overlaps with the CS.1 (Canyon systems of the western Gulf of Lion and north Catalan margin). It also includes FRAs regions for protecting deep-sea sensitive habitats, including vulnerable marine ecosystems (FAO, 2018) and partly overlaps with SPAMI site "Gulf of Lions Shelf and slope" (UNEP-MAP-RAC/SPA, 2010).

**― ECOLOGICAL RELEVANCE AND ANTHROPOGENIC THREATS OF THE AREA**

**Highly relevant ecological relevance criteria (>2.5):** Vulnerability, fragility, sensitivity, or slow recover | Natural representativeness | Integrity | High-energy processes relevant for deep sea dynamics | Water exchanges | Existing MPAs | Extreme scientific interest.

**Highly important anthropogenic threat criteria (>2.5):** Overfishing and stock depletion (D3-based) | Intensive, sustained fishing (D6-based) | Large-scale seascape change (D6-based) | Dispersal and accumulation of contaminants including marine litter (D8-D10-based) | Presence of contaminants in fish and other seafood for human consumption exceeding levels established in relevant standards (D9-based).

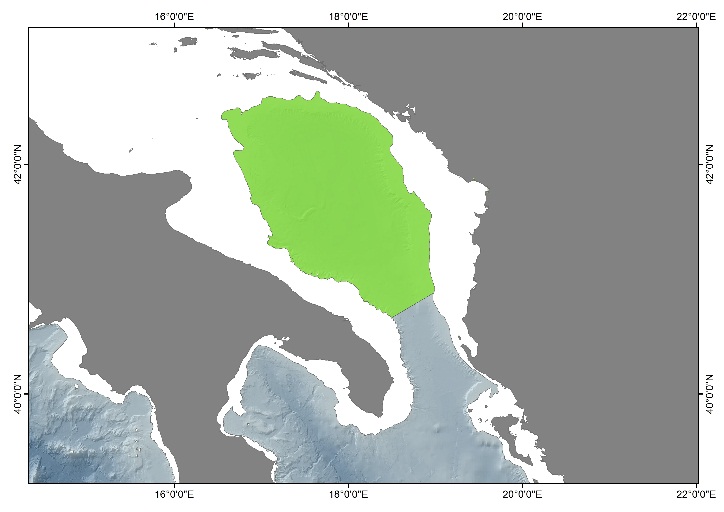
**― KEY REFERENCES:** Canals et al., 2006, 2009; Puig et al., 2008; Palanques et al., 2009; UNEP-MAP-RAC/SPA, 2010; FAO, 2018.

**DW.2 ADRIATIC DENSE WATER FORMATION AND SPREADING AREA**

**BASIN: CENTRAL-IONIAN MEDITERRANEAN**

**ER SCORE: 2.59/3 AT SCORE: 2.15/3 CLASSIFICATION: TYPE 1**

IDEM Key areas descriptive sheet

**― INTRODUCTION TO THE AREA**

In the Adriatic Sea, during winter, waters are subject to intense cooling, becoming dense enough to sink in the bottom layer and forming the North Adriatic Dense Water (NAdDW), in the northern part of the basin and the Adriatic Deep Water (ADW) in the southern part. These water masses outflow from the Otranto Strait, influencing the Mediterranean deep convection.

**― ECOLOGICAL RELEVANCE AND ANTHROPOGENIC THREATS OF THE AREA**

**Highly relevant ecological relevance criteria (>2.5):** Importance for threatened, endangered or declining species and/or habitats | Vulnerability, fragility, sensitivity, or slow recover | Bio-geographic importance |High-energy processes relevant for deep sea dynamics | Water exchanges | Existing MPAs | Extreme scientific interest.

**Highly important anthropogenic threat criteria (>2.5):** Overfishing and stock depletion (D3-based) | Intensive, sustained fishing (D6-based) | Large-scale seascape change (D6-based) | Significant alterations of hydrological processes (D6-D7-based) | Persistent and intense underwater noise (D11-based) | Significant effects of land-sourced, coastal and surface drivers on deep-sea ecosystems (D5-D10-based).

**― KEY REFERENCES:** Ovchinnikov et al., 1985 and Vilibic and Orlic, 2002.

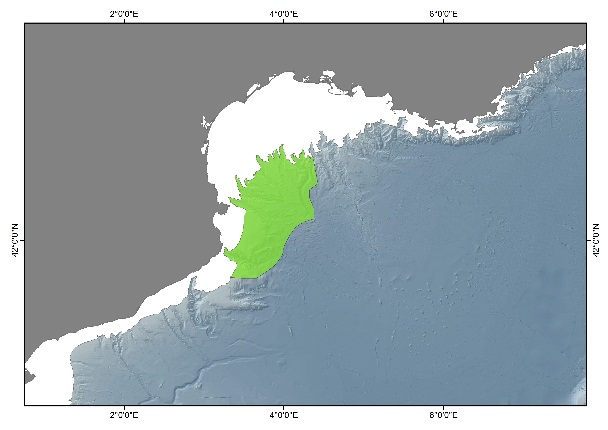
**CS.1 CANYON SYSTEMS OF THE WESTERN GULF OF LION AND NORTH CATALAN MARGIN**

**BASIN: WESTER MEDITERRANEAN**

**ER SCORE: 2.65/3 AT SCORE: 2.03/3 CLASSIFICATION: TYPE 1**

IDEM Key areas descriptive sheet

**― INTRODUCTION TO THE AREA**

The area includes a set of submarine canyons incised into the continental shelf, which from est to west are Petit-Rhone, Montpellier, Sète, Hérault (Marti), Aude (Bourcart), Pruvost, Lacaze-Duthiers, Cap de Creus and La Fonera canyons. All these canyons but La Fonera form an underwater drainage system opening into Sète Canyon and then into the continental rise. La Fonera is the only isolated canyon in the group. Canyons cross the continental slope and have their distalmost reaches at depths in excess of 2000 m. The western canyons of Cap de Creus, and to a lesser extent Lacaze-Duthiers and La Fonera, constitute the main path for dense shelf water cascades (DSWC) carrying large amounts of sediment, organic carbon, chemical pollutants and litter. Some of these canyons host CWC habitats, some others host meadows of VMEs. The main direct anthropogenic threat they are exposed to is bottom trawling on their flanks down to 1000 m depth. However, the effects of trawling (e.g. resuspension, suffocation) extend much deeper, down to the canyons axes and beyond. This area partially overlaps with EBSA "North-western Mediterranean Benthic Ecosystems" (Convention on Biological Diversity, <https://www.cbd.int/ebsa/>), "South-West Gulf of Lion canyons system" marine area of INDEMARES proposed for SCI (INDEMARES project, <https://www.indemares.es/en/home>) and SPAMI site "Gulf of Lion Shelf and slope" (UNEP-MAP-RAC/SPA, 2010). Three of these features (CB, CP, CLD) are enclosed in the Gulf of Lion Marine Park (<http://www.parc-marin-golfe-lion.fr/images/doc_link/juin_2013/perimetre_fevrier2013.pdf>). Two small bottom impacting fishery permanent closures are located on the edge of two of CB and CS canyons (<https://www.legifrance.gouv.fr/eli/arrete/2018/4/23/AGRM1733988A/jo/texte/fr>). Petit-Rhône canyon also benefits from the relative protection of the Eastern Gulf of Lion Fishery Restricted Area (FAO, 2018).

**― ECOLOGICAL RELEVANCE AND ANTHROPOGENIC THREATS OF THE AREA**

**Highly relevant ecological relevance criteria (>2.5):** Dependency | Importance for threatened, endangered or declining species and/or habitats | Vulnerability, fragility, sensitivity, or slow recover | Natural representativeness | Bio-geographic importance | High-energy processes relevant for deep sea dynamics | Water exchanges | Existing MPAs | Extreme scientific interest.

**Highly important anthropogenic threat criteria (>2.5):** Overfishing and stock depletion (D3-based) | Intensive, sustained fishing (D6-based) | Large-scale seascape change (D6-based) | Dispersal and accumulation of contaminants including marine litter (D8-D10-based).

**― KEY REFERENCES:** Canals et al., 2006, 2013; Orejas et al., 2009; Fabri et al., 2014; Lastras et al., 2016; FAO, 2018; Convention on Biological Diversity, <https://www.cbd.int/ebsa/>; INDEMARES project, <https://www.indemares.es/en/home>; <https://www.legifrance.gouv.fr/eli/arrete/2018/4/23/AGRM1733988A/jo/texte/fr>;

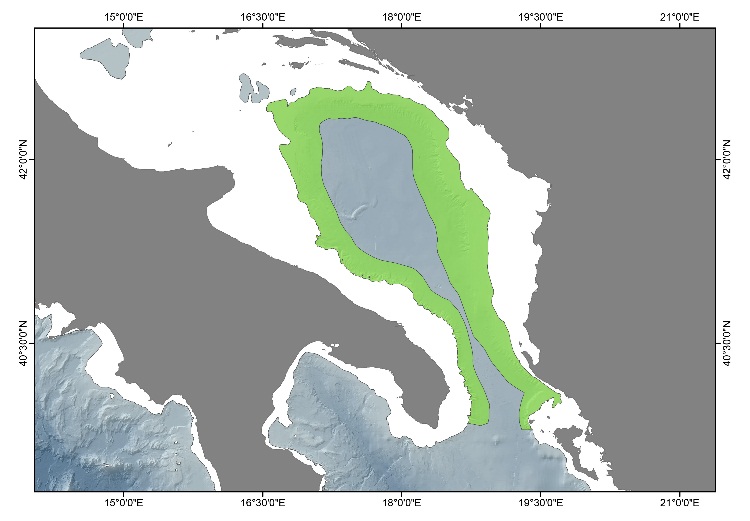
<http://www.parc-marin-golfe-lion.fr/images/doc_link/juin_2013/perimetre_fevrier2013.pdf>.

**CS.2 CANYON SYSTEMS OF THE SOUTHERN ADRIATIC SEA**

**BASIN: CENTRAL-IONIAN MEDITERRANEAN**

**ER SCORE: 2.83/3 AT SCORE: 2.18/3 FINAL CLASSIFICATION: TYPE 1**

IDEM Key areas descriptive sheet

**― INTRODUCTION TO THE AREA**

The southern Adriatic Sea is characterized by an articulated and heterogeneous geomorphology along the margin, encompassing the Bari Canyon System (BCS) in the western part. The BCS is an erosional-depositional structure consisting of two almost parallel E-W oriented main branches, with sub-vertical flanks in its southern part and less abrupt flanks northward. The Bari Canyon represents an efficient channel transporting sediments and nutrients from the continental shelf down to the bathyal zone, being a-periodical impacted by dense water flow (North Adriatic Dense Water, NAdDW) developing from the northern Adriatic Sea and by the Levantine Intermediate Water (LIW) that generates in the Aegean Sea and flows through the entire Mediterranean Sea. The hydrodynamic of the canyon contribute to the sustention of deep-water ecosystems such as cold-water corals. The Canyon is also characterized by a-periodical dense water cascading, responsible, of erosional-sediment features (e.g., slope incision and dune field) in the area nearby of the Bari Canyon System.

**― ECOLOGICAL RELEVANCE AND ANTHROPOGENIC THREATS OF THE AREA**

**Highly relevant ecological relevance criteria (>2.5):** Uniqueness | Dependency | Importance for threatened, endangered or declining species and/or habitats | Vulnerability, fragility, sensitivity, or slow recover | Natural representativeness | Bio-geographic importance | Integrity | High-energy processes relevant for deep sea dynamics | Water exchanges | Extreme scientific interest.

**Highly important anthropogenic threat criteria (>2.5):** Overfishing and stock depletion (D3-based) | Deep-sea exploration and production activities (D6-based) | Persistent and intense underwater noise (D11-based) | Significant effects of land-sourced, coastal and surface drivers on deep-sea ecosystems (D5-D10-based).

**― KEY REFERENCES:** Trincardi et al., 2007; Turchetto et al., 2007; Freiwald et al., 2009; Angeletti et al., 2014; Foglini et al., 2016; Taviani et al., 2016.

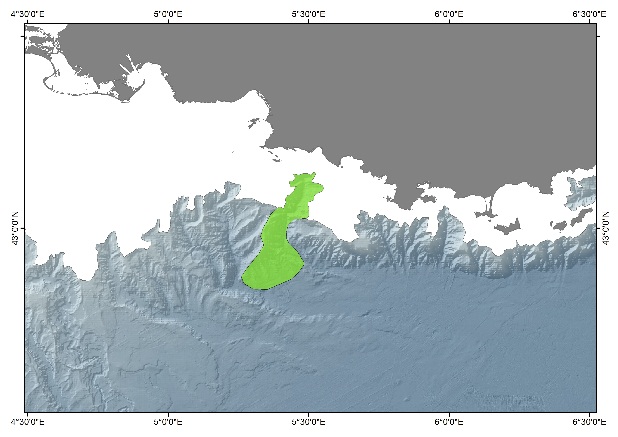
**CS.3 CASSIDAIGNE CANYON and EASTERN GULF OF LION**

**BASIN: WESTER MEDITERRANEAN**

**ER SCORE: 2.50/3 AT SCORE: 2.22/3 CLASSIFICATION: TYPE 1**

IDEM Key areas descriptive sheet

**― INTRODUCTION TO THE AREA**

****This area includes a set of submarine canyons incised into the continental shelf, which from east to west are the Cassidaigne, Planier, Marseille and Grand Rhône. The most intense upwelling of the Gulf of Lion is centred within the Cassidaigne canyon. During the upwelling events, deep- and thus colder-water is channelled along the canyon axis up onto the shelf. However, during downwelling events (mostly in winter), this process is reversed and bottom currents can carry huge amounts of sediment and organic matter to the deep ocean as they scour the shelf and slope seafloor. Cold-water corals have settled in the Cassidaigne canyon and formed large colonies, providing a structural habitat for other species. Nevertheless, the communities are physically impacted by discharges of bauxite residue discharges from an aluminium industry. Red bauxite has been discharged into the canyon since 1967 and red mud extends into the abyssal plain more than 50 km away from the pipe. The quantity of solid particles in the effluent has been progressively reduced, and the outflow was stopped at the end of 2015. Nevertheless, the industrial company concerned requested and was granted a six-year authorization starting in January 2016 for a different effluent containing only chemicals and no suspended matter. The Cassidaigne canyon is included in the Marine Protected Area (MPA) of the “Parc National des Calanques” since 2012 (www.calanques-parcnational.fr – Decree 2012-507). A small bottom impacting fishery permanent closure is located on the edge of the Grand Rhône canyon (<https://www.legifrance.gouv.fr/eli/arrete/2018/4/23/AGRM1733988A/jo/texte/fr>). Marseille and Grand-Rhône canyons also benefit from the relative protection of the Eastern Gulf of Lion Fishery Restricted Area (<http://www.fao.org/gfcm/data/maps/fras/fr/>).

**― ECOLOGICAL RELEVANCE AND ANTHROPOGENIC THREATS OF THE AREA**

**Highly relevant ecological relevance criteria (>2.5):** Dependency | Importance for threatened, endangered or declining species and/or habitats | Vulnerability, fragility, sensitivity, or slow recover | High-energy processes relevant for deep sea dynamics | Extreme scientific interest.

**Highly important anthropogenic threat criteria (>2.5):** Overfishing and stock depletion (D3-based) | Intensive, sustained fishing (D6-based) | Large-scale seascape change (D6-based) | Significant alterations of hydrological processes (D6-D7-based) | Dispersal and accumulation of contaminants including marine litter (D8-D10) | Presence of contaminants in fish and other seafood for human consumption exceeding levels established in relevant standards (D9-based) | Significant effects of land-sourced, coastal and surface drivers on deep-sea ecosystems (D5-D10-based).

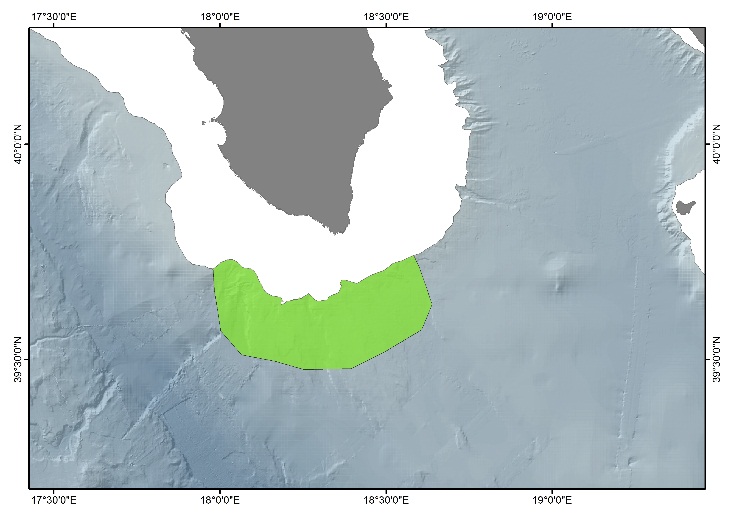
**― KEY REFERENCES:** Millot, 1990; Alberola and Millot., 2003; Dauvin, 2010; Stora et al., 2011; Fontanier et al., 2012, 2015; Fabri et al., 2014, 2017 and Fabri et al., submitted. [www.calanques-parcnational.fr](http://www.calanques-parcnational.fr), <https://www.legifrance.gouv.fr/eli/arrete/2018/4/23/AGRM1733988A/jo/texte/fr>. <http://www.fao.org/gfcm/data/maps/fras/fr/>,

**CWC.1 CWC HABITATS OF SANTA MARIA DI LEUCA AND NEARBY OCCURRENCES**

**BASIN: CENTRAL-IONIAN MEDITERRANEAN**

**ER SCORE: 2.64/3 AT SCORE: 1.71/3 CLASSIFICATION: TYPE 1**

IDEM Key areas descriptive sheet

**― INTRODUCTION TO THE AREA**

The area is characterized by high density of *Madrepora oculata* and *Desmophyllum pertusum* (=*Lophelia pertusa*)bioconstructions, occurring both as isolated colonies and mounds (10–20 m high). The province is located between 300 and 1100 m depth off Apulia on a gently sloping plateau with a complex seabed topography. The area host a high-biodiversity megafaunal community, characterized by the presence of stony corals as *Desmophyllum dianthus*, *Stenocyathus vermiformis* and the yellow coral *Dendrophyllia cornigera*, antipatharians (*Leiopathes glaberrima*) and gorgonians (*Callogorgia verticillata*), often in association with sponges, such as *Pachastrella monilifera* and *Poecillastra compressa*. Here, in 2006, the GFCM established a Fishery Restricted Area (FRA) banning the use of towed gears due to the presence of priority commercial species (e.g. *Aristaeomorpha foliacea, Aristeus antennatus, Merluccius merluccius, Nephrops norvegicus, Pagellus bogaraveo*). In addition, the area represent an important migratory corridor for megafauna like the short-beaked common dolphin (*Delphinus delphis*) and marine turtles.

**― ECOLOGICAL RELEVANCE AND ANTHROPOGENIC THREATS OF THE AREA**

**Highly relevant ecological relevance criteria (>2.5):** Uniqueness | Dependency | Importance for threatened, endangered or declining species and/or habitats | Vulnerability, fragility, sensitivity, or slow recover | Natural representativeness | Bio-geographic importance | Integrity | Existing MPAs | Extreme scientific interest.

**Highly important anthropogenic threat criteria (>2.5):** Intensive, sustained fishing (D6-based).

**― KEY REFERENCES:** Tursi et al., 2004; Taviani et al., 2005a, b; Freiwald et al., 2009; Malinverno et al., 2010; Savini and Corselli, 2010; Vertino et al., 2010; Taviani et al., 2011: D'Onghia et al., 2012, 2017; Oceana, 2014; Savini et al., 2014; Bargain et al., 2017.

**SM.2 ERATOSTHENES SEAMOUNT**

**BASIN: AEGEAN – LEVANTINE MEDITERRANEAN**

**ER SCORE: 2.50/3 AT SCORE: 1.99/3 CLASSIFICATION: TYPE 1**

IDEM Key areas descriptive sheet

**― INTRODUCTION TO THE AREA**

The Eratosthenes Seamount (ca. 120 by 80 km) is located in the Eastern Mediterranean about 100 km south of western Cyprus, rising 2000 m above the surrounding abyssal plain. A single faunal investigation took place in 1994 and consisted of an hour haul of a 2 m wide beam-trawl across the seamount top, and 9 box core samples. Yet, these samples yielded a rich and diverse fauna. This notably comprises two species of scleractinian coral (*Caryophyllia calveri, Desmophyllum dianthus*), which were the first live records from the Levant Basin and significantly extended the species' depth ranges. During the Quarternary the eastern Mediterranean underwent a series of synchronous basin-wide anoxic episodes, the last in the early Holocene. If the anoxia left the seamount as an isolated refuge, and the anoxic episodes were of sufficient duration, its fauna would include taxa not found on the adjacent slope. These may include "relict" taxa that were once widespread but that are now restricted to the seamount, or endemic taxa that evolved in isolation on the seamount. The Eratosthenes Seamount would thus be a UNIQUE HABITAT worthy of detailed investigation and conservation. The 1994 benthos samples provide a glimpse of a deep Levant seamount fauna, in an area and depth commonly expected to be poor in faunal wealth. The surprising faunal diversity and density, and the unexpected presence of live scleractinians, suggests that investigation and conservation of Eratosthenes Seamount should be undertaken.

**― ECOLOGICAL RELEVANCE AND ANTHROPOGENIC THREATS OF THE AREA**

**Highly relevant ecological relevance criteria (>2.5):** Uniqueness | Importance for threatened, endangered or declining species and/or habitats | Vulnerability, fragility, sensitivity, or slow recover | Natural representativeness | Bio-geographic importance | Extreme scientific interest.

**Highly important anthropogenic threat criteria (>2.5):** Overfishing and stock depletion (D3-based) | Intensive, sustained fishing (D6-based).

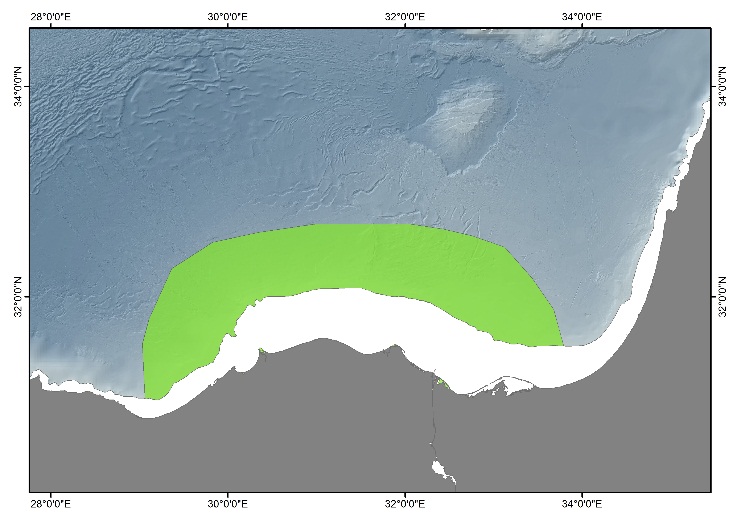
**― KEY REFERENCES:** Galil and Zibrowius, 1998; Rubin-Blum et al., 2014.

**OR.1 DEEP NILE DELTA FAN**

**BASIN: AEGEAN – LEVANTINE MEDITERRANEAN**

**ER SCORE: 2.61/3 AT SCORE: 2.53/3 CLASSIFICATION: TYPE 1**

IDEM Key areas descriptive sheet

**― INTRODUCTION TO THE AREA**

The Nile Deep Sea Fan (NDSF) hosts numerous active fluid escape structures including several large gas emitting mud volcanoes characterized by emissions of thermogenic methane and higher hydrocarbons. The NDSF comprises 4 morpho-structural provinces. The faunal assemblages associated with the structures dominated by variable emissions of methane and heavier hydrocarbons and associated with a major thermal contribution are little known. Videographic surveying and sampling revealed patchy mats of sulphide-oxidizing bacteria and association of symbiont-bearing chemosynthetic bivalves and tubeworms (vestimentiferans and lamellibranchians). The environmental high heterogeneity is reflected in significant differences at different spatial scales: (1) the fauna of reduced habitats differed substantially in activity, diversity and biomass from the non-seep environment at similar water depth, (2) cold seep microhabitats showed differences in community structure and composition related to substratum type as well as to the intensity and location of fluid emissions. In view of the prospecting, bidding and extraction of extensive offshore gas and oil fields in the NDSF, and the vulnerability and low resilience of the biotic assemblages, a robust commitment for a coordinated, integrative research and conservation at national and regional levels, is required to achieve protection for the NDSF biota. The region still lacks comprehensive ecological characterization, including scientifically-sound habitat mapping, which is the principal requisite for informing policy makers.

**― ECOLOGICAL RELEVANCE AND ANTHROPOGENIC THREATS OF THE AREA**

**Highly relevant ecological relevance criteria (>2.5):** Uniqueness | Dependency | Importance for threatened, endangered or declining species and/or habitats | Vulnerability, fragility, sensitivity, or slow recover | Natural representativeness | Bio-geographic importance | Integrity | High-energy processes relevant for deep sea dynamics.

**Highly important anthropogenic threat criteria (>2.5):** Introduction of alien species (D2-based) | Overfishing and stock depletion (D3-based) | High artificial nutrient inputs delivered to the deep-sea (D5-based) | Intensive, sustained fishing (D6-based) | Deep-sea exploration and production activities (D6-based) | Persistent and intense underwater noise (D11-based) | Significant effects of land-sourced, coastal and surface drivers on deep-sea ecosystems (D5-D10-based).

**― KEY REFERENCES:** Dupre et al., 2007; Bayon et al., 2009; Huguen et al., 2009; Brissac et al., 2011; Ritt et al., 2011, 2012; Felden et al., 2013.

**OR.3 LEVANT SEA (LEVANTINE SLOPE, BATHYAL SOFT BOTTOMS)**

**BASIN: AEGEAN – LEVANTINE MEDITERRANEAN**

**ER SCORE: 2.02/3 AT SCORE: 1.94/3E CLASSIFICATION: TYPE 1**

IDEM Key areas descriptive sheet

**― INTRODUCTION TO THE AREA**

The results of a recent IDEM-funded survey suggest that the megafauna of the soft bottom upper slope in the southern Levant Sea comprise distinct and unique assemblages, complementing more extensive studies of the bathyal biota, and differing in the composition and relative abundance of their taxa form slope habitats elsewhere in the Mediterranean Sea. Moreover, these assemblages comprise aggregations of regionally rare erect sponges, hydrozoans, anthozoans and brachiopod fields, which play a significant structural role in soft bottom ecosystems by furnishing the biota with spatially complex habitats. These ecosystem engineer/habitat former taxa are highly susceptible to human disturbance, thus their conservation is crucial for biodiversity preservation. In the Mediterranean Sea such habitats are associated with commercially important fishery grounds, and in consequence, have greatly declined over the past century. Yet, as the local bottom-trawling fishery has been mostly confined to the shelf and shelf edge, these vulnerable assemblages have survived. In view of the prospecting, bidding and extraction of extensive offshore gas and oil fields in the Levant Sea, and the vulnerability and low resilience of the soft bottom assemblages, a robust commitment for a coordinated, integrative research and conservation at national and regional levels, is required to achieve protection for the deep Levantine biota. The region still lacks comprehensive ecological characterization, including scientifically-sound habitat mapping, which is the principal requisite for informing policy makers. Additionally, the presence of NIS, including invasive NIS, beyond the shelf edge and deeper has been documented (thus far) from the Levant, plus an intriguing record off the Spanish Mediterranean coast. This is clearly an EMERGING issue and likely to increase with global change. We suggest that it is important AND PRUDENT to include the Levant in the suggestions for "sensitive areas" for NIS monitoring. It bears remembering that many of the marine NIS now established along the Mediterranean coast of Member States, had been recorded earlier in the Levant. It is likely, actually - it is certain, that a similar pattern will be forthcoming for upper slope NIS

**― ECOLOGICAL RELEVANCE AND ANTHROPOGENIC THREATS OF THE AREA**

**Highly relevant ecological relevance criteria (>2.5):** Vulnerability, fragility, sensitivity, or slow recover | Bio-geographic importance | Extreme scientific interest.

**Highly important anthropogenic threat criteria (>2.5):** Deep-sea exploration and production activities (D6-based) | Maritime traffic (D2, D8, D10 and D11-based).

**― KEY REFERENCES:** Galil, 2004; Goren and Galil, 2005; Goren et al., 2008; Danovaro et al., 2010.

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