Integrated marine geospatial information management in Italy

Captain Nicola Pizzeghello
Italian Hydrographic Institute
Head of Survey and Production Department

AGENDA

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- **The governance**
- **The environmental perspective**
- **The technological perpective**
- **The legal perspective**

AGENDA

- The MGI governance

Nicola Pizzeghello – *Italian Hydrographic Institute*

- The environmental perspective

Leonardo Tunesi - *Italian Institute for Environmental Protection and Research*

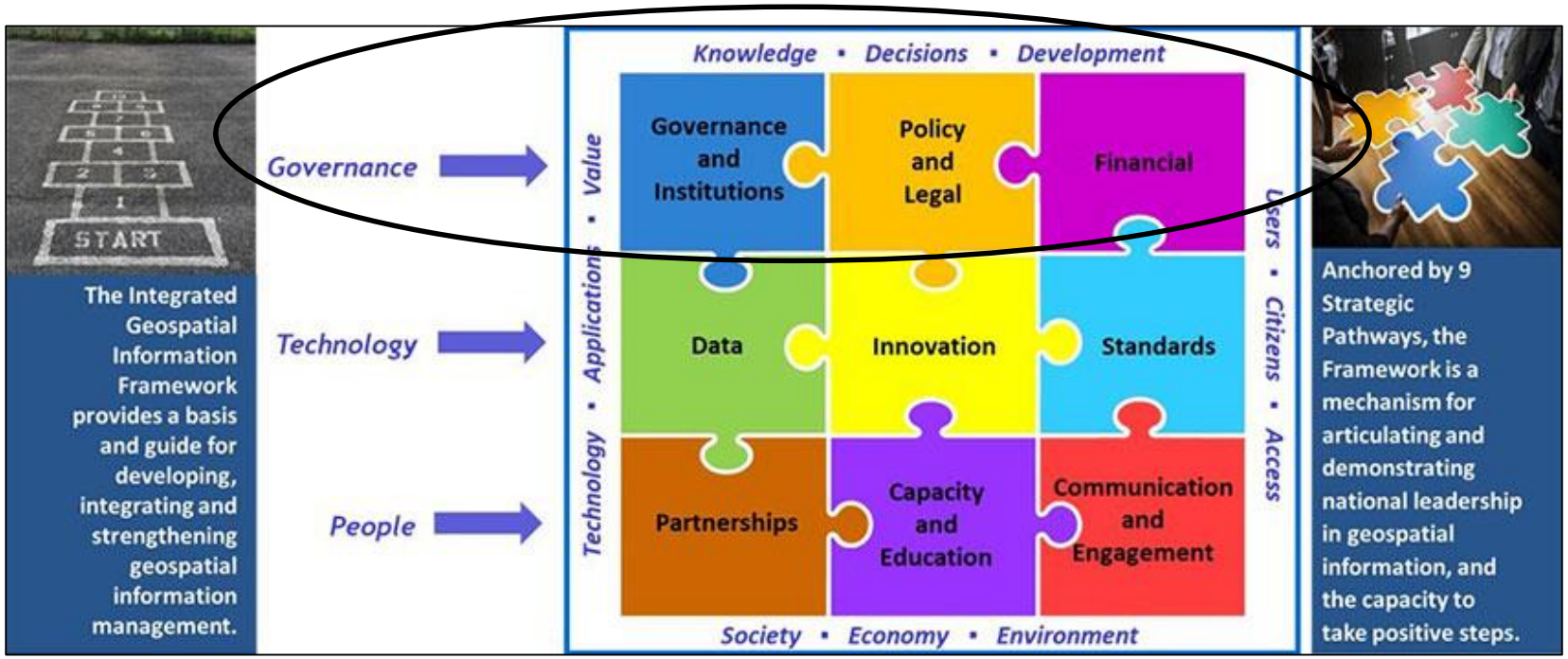
- The technological perspective

Juan Pablo Duque – *Politecnico of Milan*

- The legal perspective

Ilaria Tani – *University of Milano-Bicocca*

GEOSPATIAL INFORMATION GOVERNANCE



GEOSPATIAL INFORMATION GOVERNANCE

- National Spatial Data Infrastructure (under EU directive INSPIRE)
- National GI Council

GEOSPATIAL INFORMATION GOVERNANCE

The Council is made up of the following components:

• CHAIR:

Two representatives from Ministry of Environment, one, identified by the Minister, holds the charge of President;

• 5 NATIONAL CARTOGRAPHIC AGENCIES:

One representative of Military Geographical Institute; Italian Hydrographic Institute; Aeronautical Geotopographic Information Center; Revenue agency - Central Land Registry Directorate and Cartography; Italian Institute for Environmental Protection and Research – Geological Survey.

• 22 ITALIAN SUB-NATIONAL AUTHORITIES

one representative for each of the regions and autonomous provinces (22);

• 9 CENTRAL MINISTERS

one representative of the Ministry of Defence; Ministry of Education, University and Research; Ministry of Infrastructure and Transport; Ministry of Agriculture, Food and Forestry; Ministry of Cultural Heritage, Activities and Tourism; Ministry of Economic Development; Ministry of Health; Ministry for Regional Affairs;

• 4 CENTRAL AUTHORITIES

a representative from Italian Institute for Environmental Protection and Research; National Statistical Institute; Department of Civil Protection of the Presidency of the Council of Ministers; Agency for Digital Italy;

• 3 COORDINATION BODIES

a representative from Union of Italian Provinces; the National Association of Italian Municipalities; the Interregional Centre for geographical, statistical and IT systems.

MARINE GEOSPATIAL INFORMATION GOVERNANCE

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MARINE GEOSPATIAL INFORMATION GOVERNANCE

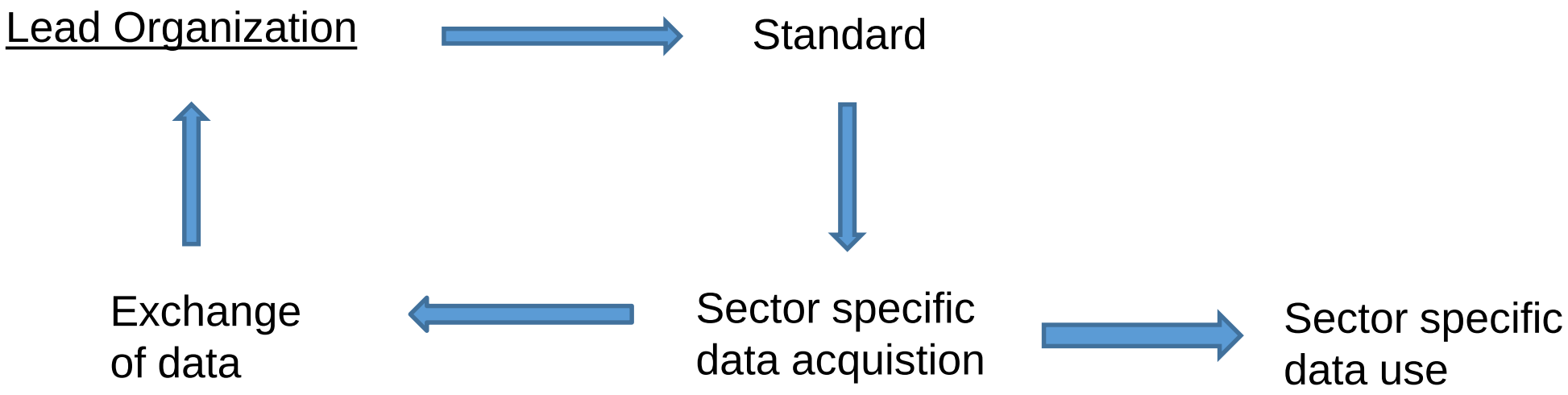
The Charting Authorities in Italy and their activities in the marine domain:

- Military Geographical Institute (geodetical reference frame);
- Aeronautical Geotopographic Information Center (marine areas);
- Revenue agency – Central Land Registry Directorate and Cartography (no interactions);
- Italian Hydrographic Institute;
- Italian Institute for Environmental Protection and Research – Geological Survey (environmental charting).

MARINE GEOSPATIAL INFORMATION GOVERNANCE

- IIM releases nautical services (all features included are official not only for safety of navigation, but also for marine cadastre and marine spatial planning).
- Italian Institute for Environmental Protection and Research releases geological products.
- The Hydrographic Survey Standard is released by IIM (it is binding by law).
- Other authorities (port authorities, regions, research centers etc.) collect data and extract information for specific functional duties.
- Hydrographic data should be shared by law with IIM.
- IIM updates information from data received and releases products.

TOWARD A MODEL OF GOVERNANCE



Reference: IGIF Implementation Guide Pahtway 2 (policy and legal) (DRAFT) - Design and Develop:

- Designation of lead organization
- Data collection and governance
- Sector specific provisions
- Financing

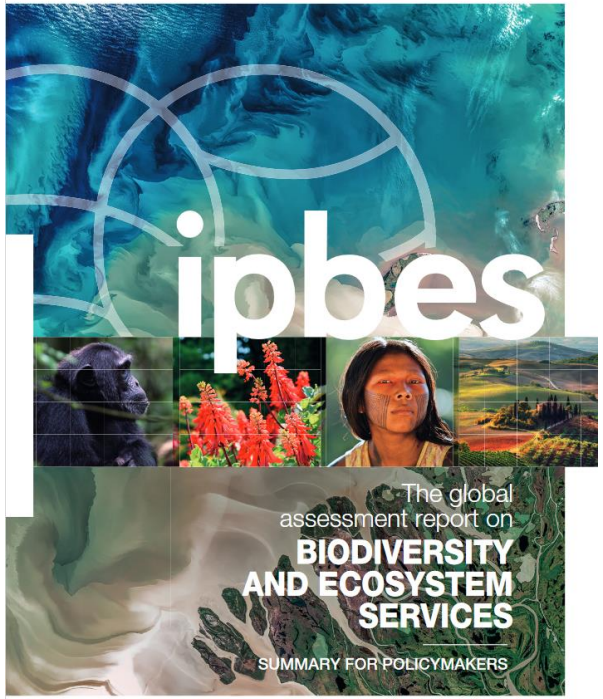
- The environmental perspective
- The technological perspective
- The legal perspective

Integrated marine geospatial information management in Italy

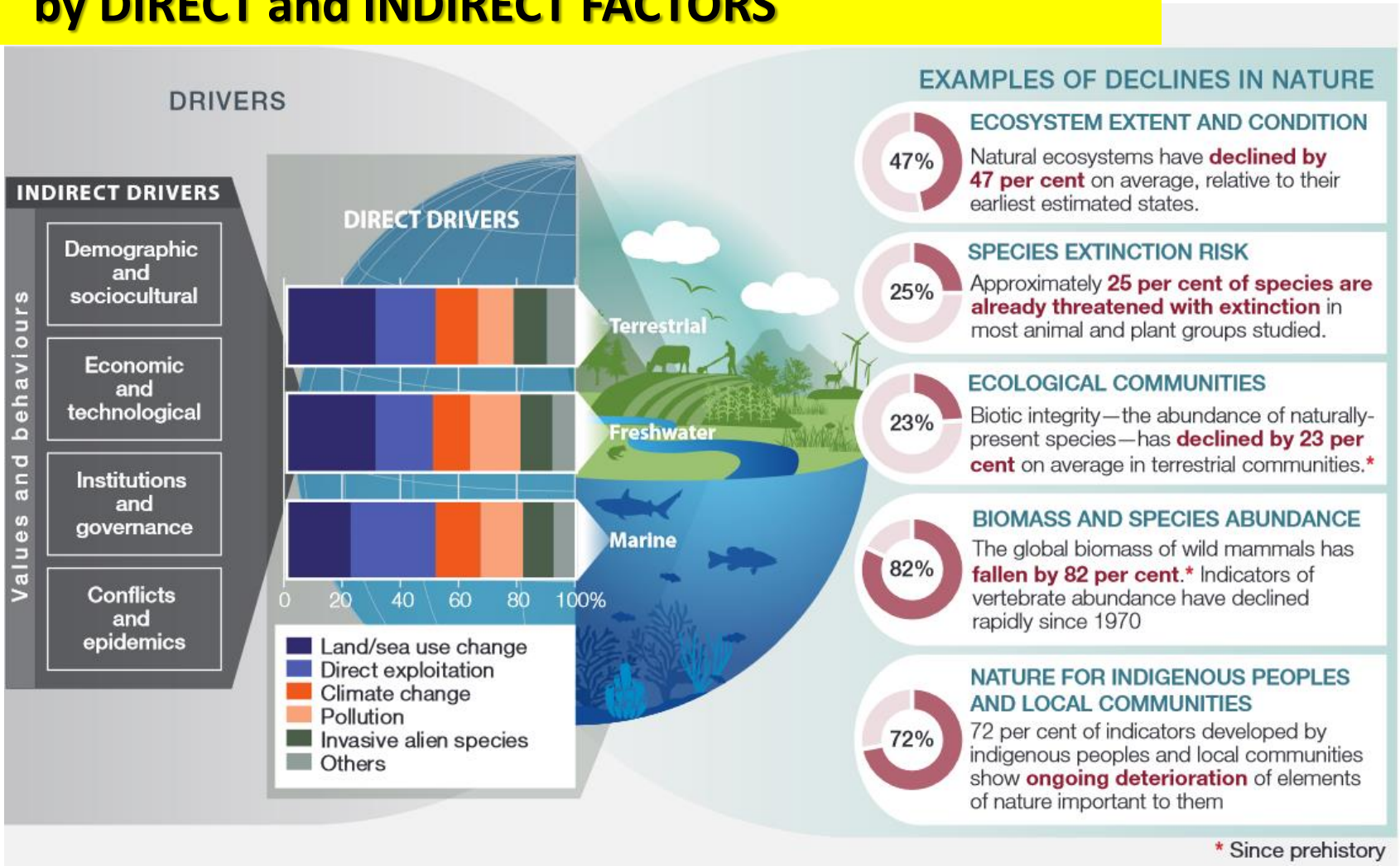
The environmental perspective

Leonardo Tunesi
Research Director
Italian Institute for Environmental Protection and Research
31 February 2023 – Genoa

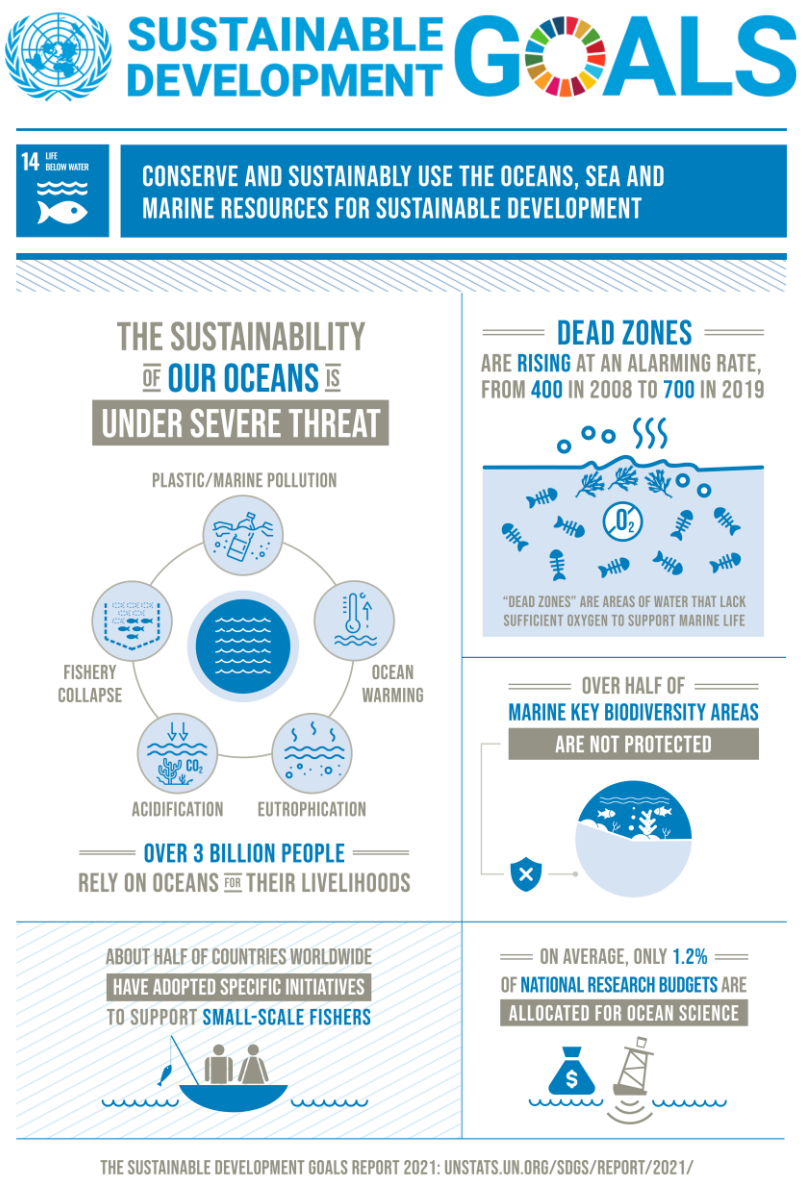
PLANETARY SCALE DECLINE OF NATURE AND BIODIVERSITY CAUSED by DIRECT and INDIRECT FACTORS



IPBES: intergovernmental science-policy platform on biodiversity and ecosystem services - Intergovernmental body established by states to strengthen the science-policy interface on biodiversity and ecosystem services, for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development.



Da IPBES (2019) - *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. Díaz et al. (eds.). IPBES secretariat, Bonn, Germany: 56 pages.



MARINE ENVIRONMENT AND LOSS OF BIODIVERSITY

Main causes, of human origin

Overexploitation of biological resources: overfishing

Physical alterations to the environment and Pollution: dredging, coastal construction, trawling, toxic substances, excess nutrients, etc.

Introduction of non-indigenous species: Direct or accidental through bilge waters of ships, Suez Canal, mariculture, aquariums, etc. .

Substances introduced into the atmosphere: alter the composition of the atmosphere and promote climate change

need for concrete measures to conserve marine biodiversity

need for integrated marine geospatial information

https://sdgs.un.org/goals/goal14

Leonardo Tunesi

ISPRA Istituto Superiore per la Protezione e la Ricerca Ambientale

Sistema Nazionale per la Protezione dell'Ambiente

Main European directives concerning the sea

IAS -Regulation (EU) No 1143/2014 on invasive alien species

Habitats -Habitats Directive

Birds -Birds Directive

CFP -Common Fisheries Policy;

Food standards -Regulation (EC) No 1881/2006 on contaminants in foodstuffs

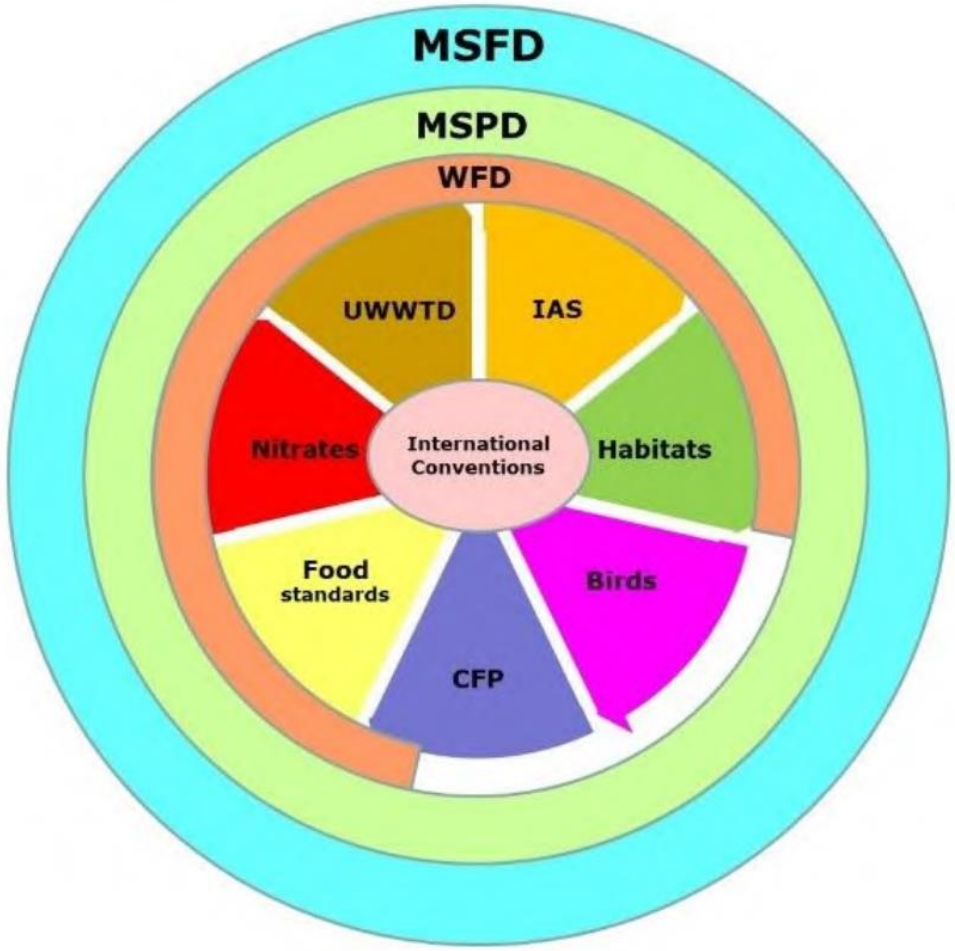
Nitrates -Nitrates Directive

UWWTD -Urban Waste Water Treatment Directive

Water Framework Directive (WFD)

Maritime Spatial Planning Directive (MSPD)

MSFD - Marine Strategy Framework Directive



Da: EC_*SWD(2020) 62 final*

Availability and accessibility of marine geospatial information are crucial for the benefit of society, the environment and the economy

The Italian Institute for Environmental Protection and Research, ISPRA (Istituto Superiore per la Protezione e la Ricerca Ambientale) is a **Public research Institute** working with numerous European and international environmental scientific and technical institutes and organizations, in the implementation of its institutional mandate and in cooperation with the Ministry for the Environment and the Energy Security (MEES), the Ministry of agriculture, food sovereignty and forests (MAFSF) and the Ministry of University and Research (MUR) .

ISPRA with its geological service, it is a National mapping body, like the Hydrographic Institute of the Navy, the reference body for marine cartography

ISPRA with its geological service, it is a state mapping body like the Hydrographic Institute of the Navy

Italian Navy and ISPRA have a **specific Memorandum of Understanding** to "exchange information and update their respective databases for the production of digital nautical and thematic cartography, at the most appropriate scale, as well as the processing of analytical data for ISPRA and Navy purposes.";

According to this agreement, the bathymetric data relative to the submerged areas involved in the survey of the Geological Sheets carried out during the current phase of the CARG Project will be provided by the IIM to ISPRA, which will transmit them to the working groups of the relative Geological Sheets;

For the cartographic restitution of the surveys of the submerged areas, the IIM will provide ISPRA with the data in the xyz file and shapefile formats of some bathymetries already extracted;

ISPRA undertakes to share with IIM a copy of the CARG project products in digital format, for archiving in the IIM database;

MARINE DATA INFRASTRUCTURE

- ISPRA is building an integrated infrastructure of both in-situ monitoring data of current networks and those under construction and mapping activities, as well as modelling systems and, in particular, products derived from them;
- The integrated infrastructure includes a data centre dedicated to medium-long term archiving and a platform that brings together the various software modules for the acquisition, processing and dissemination of data related to the marine environment, both current and under construction;
- The integrated infrastructure aims to feed and extend what is already present in the *EcoAtl@nte* already implemented by ISPRA;

National initiatives to enhance the availability and accessibility of marine geospatial information Environmental Data and Indicators in Italy – The Ecoatlante ISPRA

EcoAtl@nte

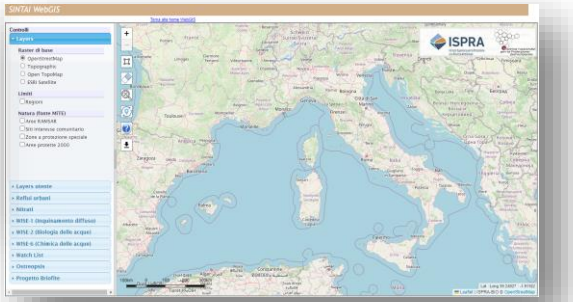
Air	Climate and Weather	Environment and Health, Sustainable development
Environmental indicators	Geology, Soil and Territory	Inland waters
Linked Open Data	Nature and Biodiversity	Physical Agents
Sea	Waste	

Data and Indicators — English (isprambiente.gov.it)

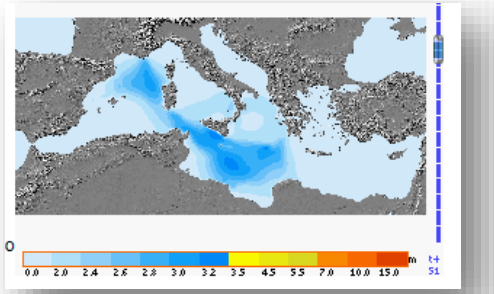
ISPRA marine geospatial data infrastructure

Informative System MSFD

SINTAI - National Information System for the Protection of Italian Waters

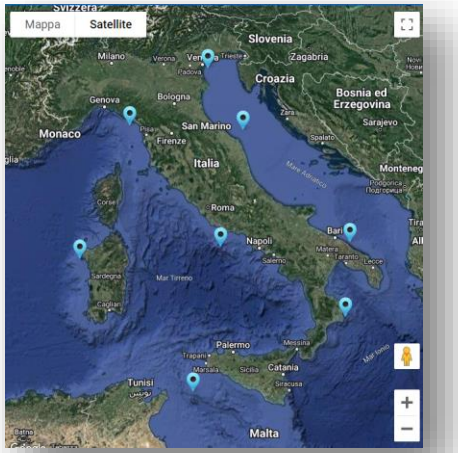


Forecast of the sea conditions



National Mareographic Network (RMN)

National wave metric network (RON)



[Sea — English (isprambiente.gov.it)]

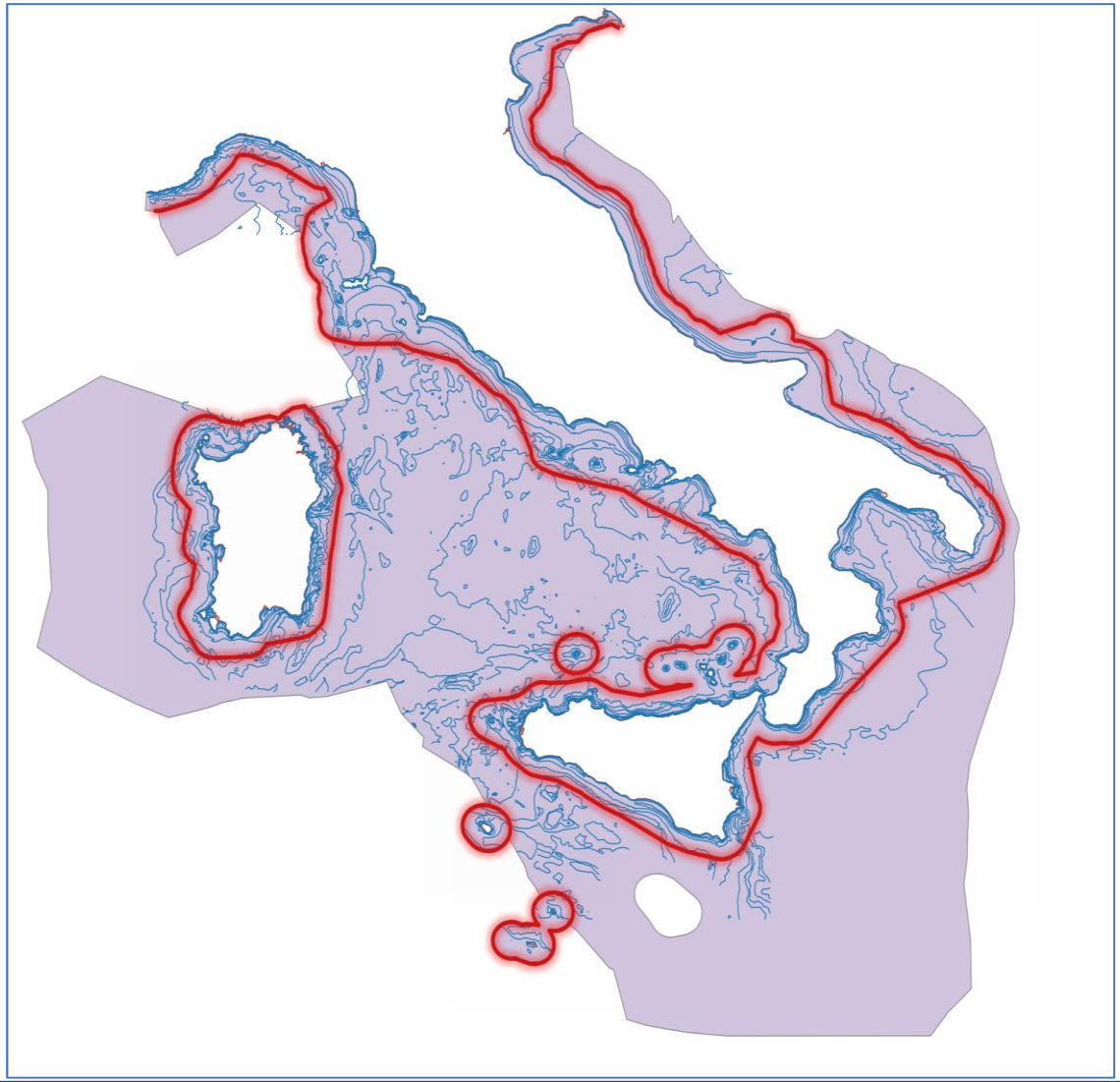
EUROPEAN BIODIVERSITY STRATEGY for 2030 - MAIN TARGETS

a) **Create a European Network of Protected Areas** to protect:
   - at least 30% of the land area and marine environment must be protected through effectively managed protected areas;
   - at least 10% of the land area and marine environment must be strictly protected (the areas with the greatest biodiversity, starting with MPAs and Natura 2000 sites);

b) **European nature restoration plan**

SPATIAL AREA of reference - Italian Waters.

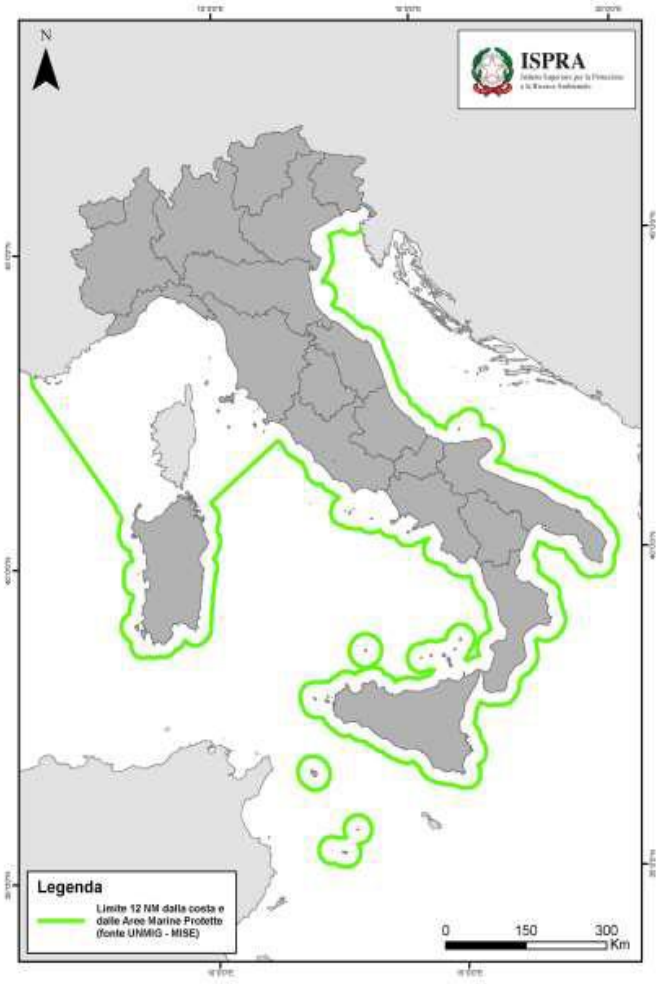
- *Territorial waters;*
- *Ecological protection zone;*
- *Instituted Economic Exclusive Zone;*



Objective: Protect at least 30% of the marine environment.

Principal measures in progress in the Italian seas that can be classified as OECMs (other effective conservation measures)

D.L. Prestigiacomo (22/06/2012 n° 83) which
for the protection of the environment and the ecosystem ... will prohibit prospecting, exploration as well as the cultivation of liquid and gas hydrocarbons at sea ... in the sea areas located within 12 miles from the coastlines along the entire national coastal perimeter and from the outer perimeter of the above-mentioned protected marine and coastal areas
...
The ban of industrial fishing within 3 mn of the coast or at depths less than 50 m

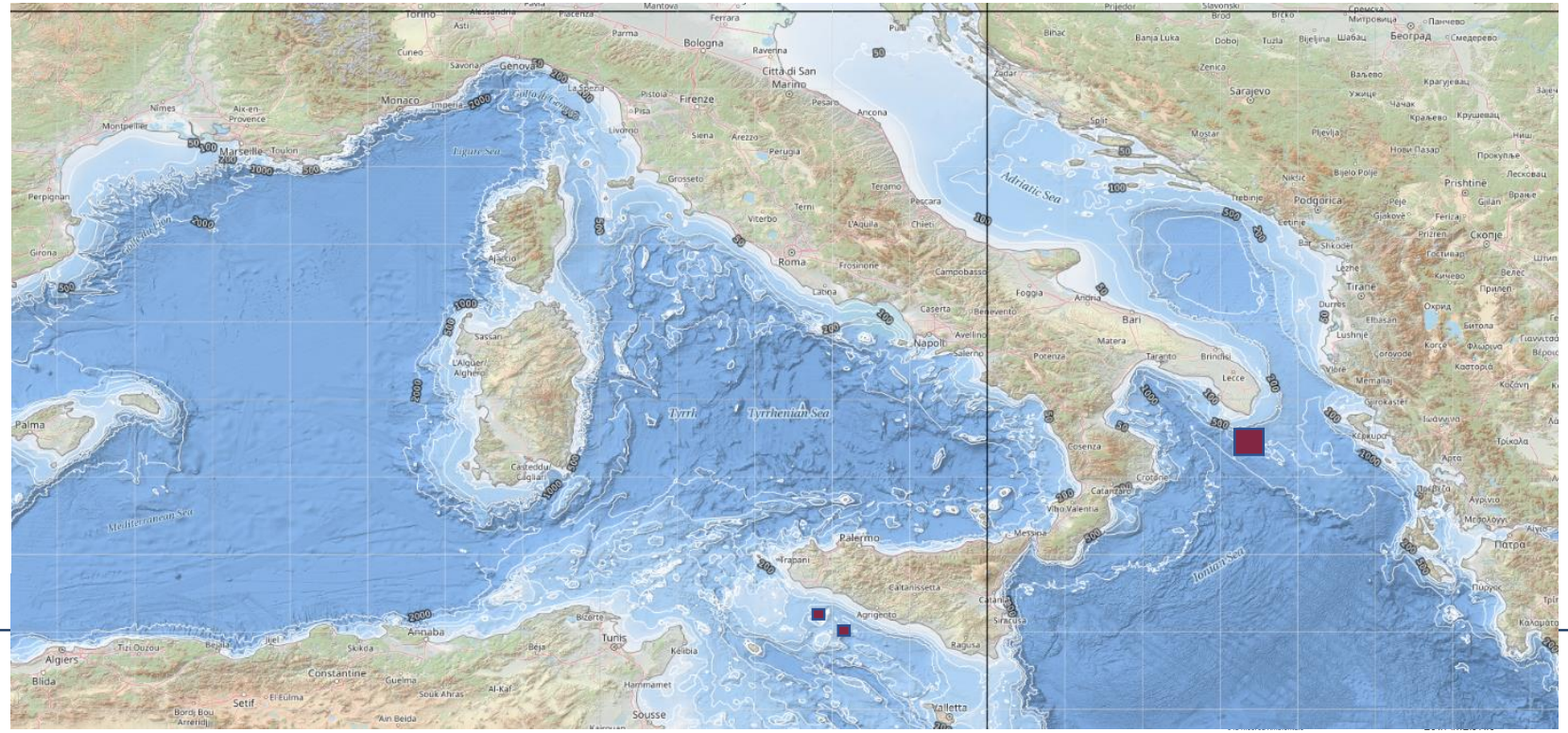


Objective: Protect at least 30% of the marine environment.

Principal FAO measures in place in the Mediterranean that could be classified as OECMs: fishing restricted areas (FRAs):

- Trawling prohibition at depths beyond 1,000 meters-declared in 2005 by the General Fisheries Commission for the Mediterranean - FAO, to protect benthic marine habitats (VMEs) and the slow-growing fish that live there;

- Prohibition of fishing in areas hosting Essential Fish Habitats (EFHs), some of which are in close proximity to Italian waters (Pomo Trench, off Santa Maria di Leuca and two in the Sicilian Channel);



Objective: Strict protection of at least 10% of the marine waters

"Strict protection": a term adopted globally "only" by the European Biodiversity Strategy, and subject to definition at the European level

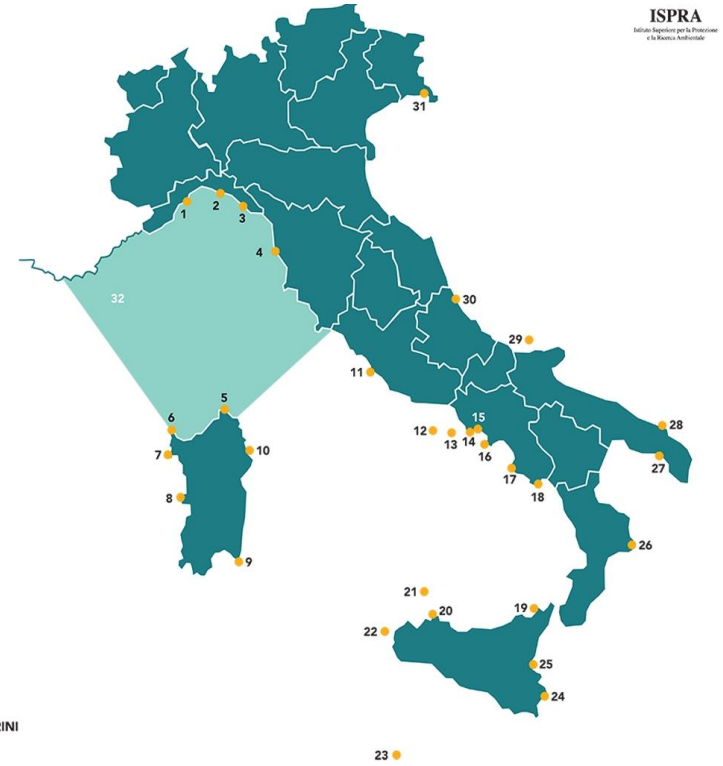
The Italian MPAs could be re considered to be under strict protection because in them:

- **Prohibited:** industrial fishing (trawling and purse seining) (in areas A, Bs, B and C) underwater fishing;
- **Only allowed:** local, sustainable and properly regulated artisanal fishing;

Recognition of this status would allow MPAs and their communities to play an even more pioneering role in defining sustainable and participatory management solutions for the fruition of the marine environment.

Italian Marine Protected Areas

1. ISOLA DI BERGEGGI
2. PORTOFINO
3. CINQUE TERRE
4. SECCHE DELLA MELORIA
5. CAPO TESTA - PUNTA FALCONE
6. ISOLA DELL'ASINARA
7. CAPO CACCIA - ISOLA PIANA
8. PENISOLA DEL SINIS - ISOLA DI MAL DI VENTRE
9. CAPO CARBONARA
10. TAVOLARA - PUNTA CODA CAVALLO
11. SECCHE DI TOR PATERNO
12. ISOLE DI VENTOTENE E SANTO STEFANO
13. REGNO DI NETTUNO
14. PARCO ARCHEOLOGICO SOMMERSO DI BAIA
15. PARCO ARCHEOLOGICO SOMMERSO DI GAIOLA
16. PUNTA CAMPANELLA
17. SANTA MARIA DI CASTELLABATE
18. COSTA DEGLI INFRESCHI E DELLA MASSETA
19. CAPO MILAZZO
20. CAPO GALLO - ISOLA DELLE FEMMINE
21. ISOLA DI USTICA
22. ISOLE EGADI
23. ISOLE PELAGIE
24. PLEMMIRIO
25. ISOLE CICLOPI
26. CAPO RIZZUTO
27. PORTO CESAREO
28. TORRE GUACETO
29. ISOLE TREMITI
30. TORRE DEL CERRANO
31. MIRAMARE
32. SANTUARIO PELAGOS PER LA PROTEZIONE DEI MAMMIFERI MARINI



Target 10% : Strict protection of at least 10% of the marine waters - Italy could achieve it:

with the re-cognition of national MPAs as strict protected, so as to:

- give new impetus to the establishment of new MPAs (now 31 and more than 53 are planned),
- expand the perimeters and update the zoning of those already established,
- identify and apply new ways of fruition of the marine environment more sustainable;
- By implementing effective management measures in already established NATURA2000 Sites;
- By establishing new protected marine sites of the high seas, beyond 12 nautical miles, to protect seamounts, for which specific management measures should be applied, starting with a ban on all forms of harvesting and fishing.

PNRR Marine Ecosystem Restoration Project - MiTE and ISPRA

Designed to address the following NEEDS

CBD's Post-2020 Biodiversity Framework

Respond to the EU Biodiversity Strategy to 2030:

- Protect 30% of national seas,
- Strict Protect 10% of national seas,
- Nature Restoration Plan,

Enhance national marine ecosystem observation systems

Expand knowledge on benthic habitats of conservation interest in order to define and implement restoration actions

PNRR Marine Ecosystem Restoration Project - MASE and ISPRA

Targets

- Mapping 90% of marine habitats of conservation interest (By 2026);
- Reinforcement of the national marine research and monitoring system in Italy with the involvement of key actors (Public Administrations, Research Institutions, CCPPs, MPAs, MMIs, etc.);

Interventions

- Implement non-stationary and *in situ* marine and marine-coastal ecosystem observation systems;
- Mapping coastal and deep-sea marine habitats of conservation interest;
- Implementing ecological restoration activities of benthic habitats through passive and active measures;

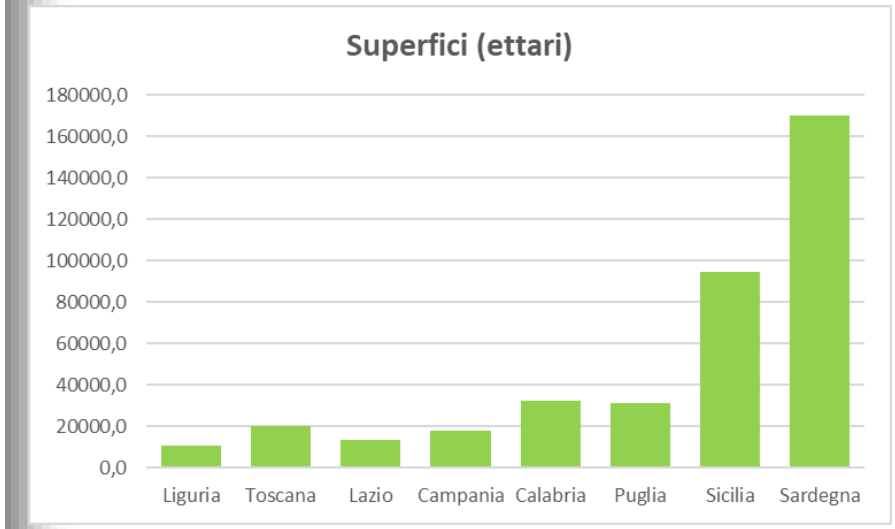
National mapping of Posidonia oceanica and Cymodocea nodosa seagrass beds

Italy has a national mapping of *P.oceanica* meadows, however.

- first mappings date back to the late 1980s (Liguria, continental Toscana, Lazio, e Puglia);
- The latest mappings were carried out between 1999 and 2003, also introducing C. nodosa (Sicilia and minor islands, Sardegna, Calabria and Campania).

Most of the cartography is at least 20 years old and in some cases 30

Regione	Superfici (ettari)
Liguria	11000,0
Toscana	20296,9
Lazio	13548,4
Campania	18009,2
Calabria	32371,9
Puglia	31087,3
Sicilia	94340,0
Sardegna	170242,1
Totale	**390895,8**



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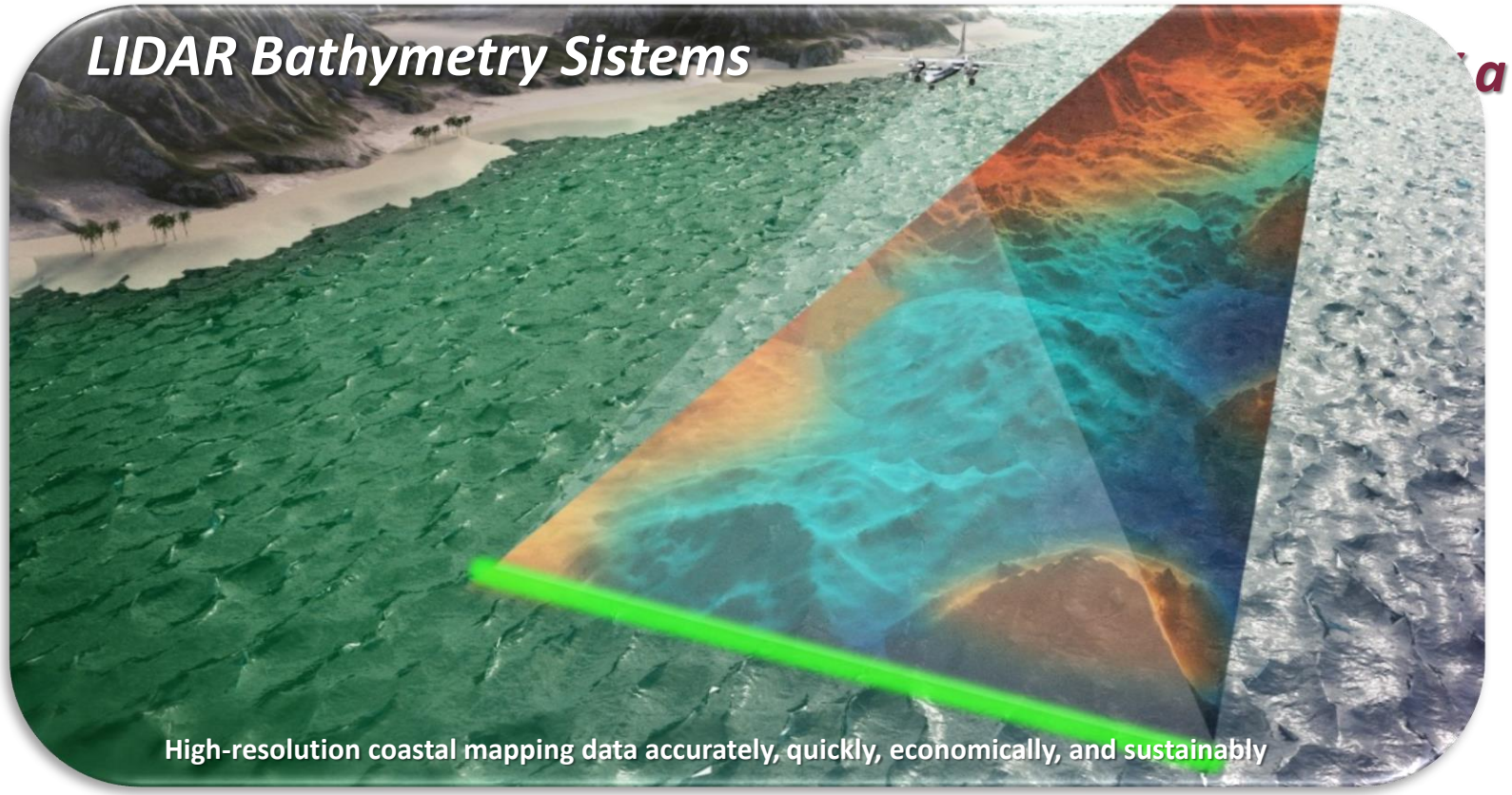
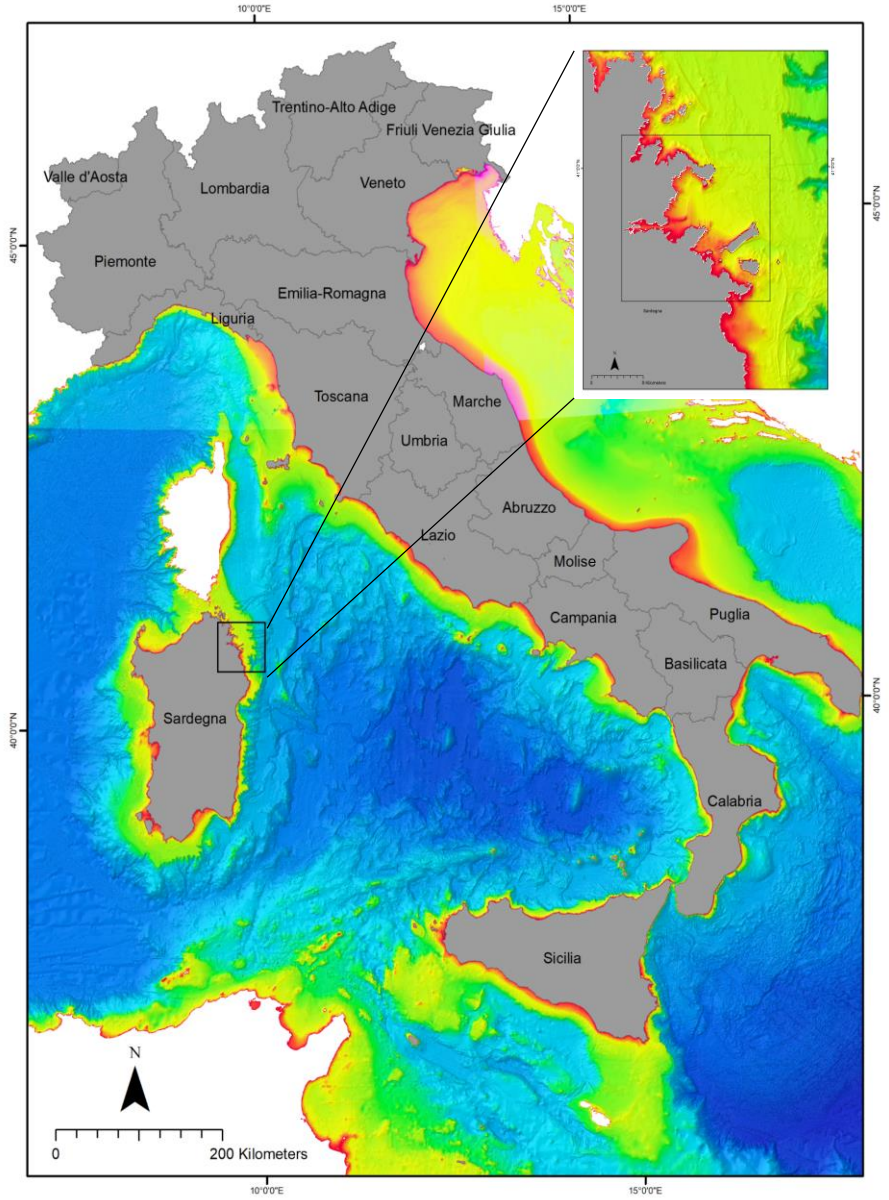
National mapping of Posidonia oceanica and Cymodocea nodosa seagrass beds





- *High-resolution bathymetric data (comparable to Multibeam data);*
- *Data and resolution greater than 3 times the depth (Secchi depth range);*
- *Less time to acquire and return processed data;*
- *Reduced CO2 emissions during survey execution;*

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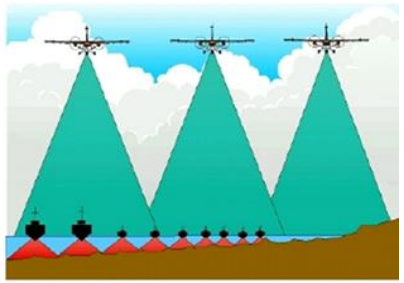
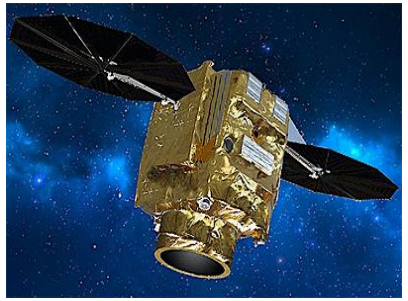
Integrated habitat mapping technologies

LIDAR Bathymetry

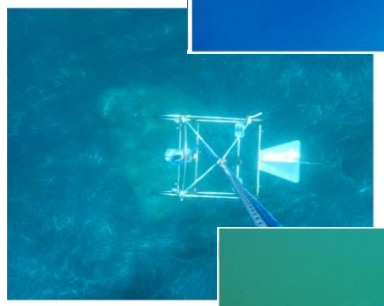
Multibeam

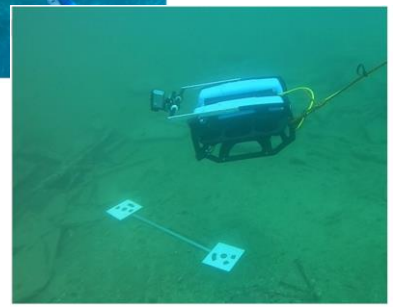


Satellite VHR



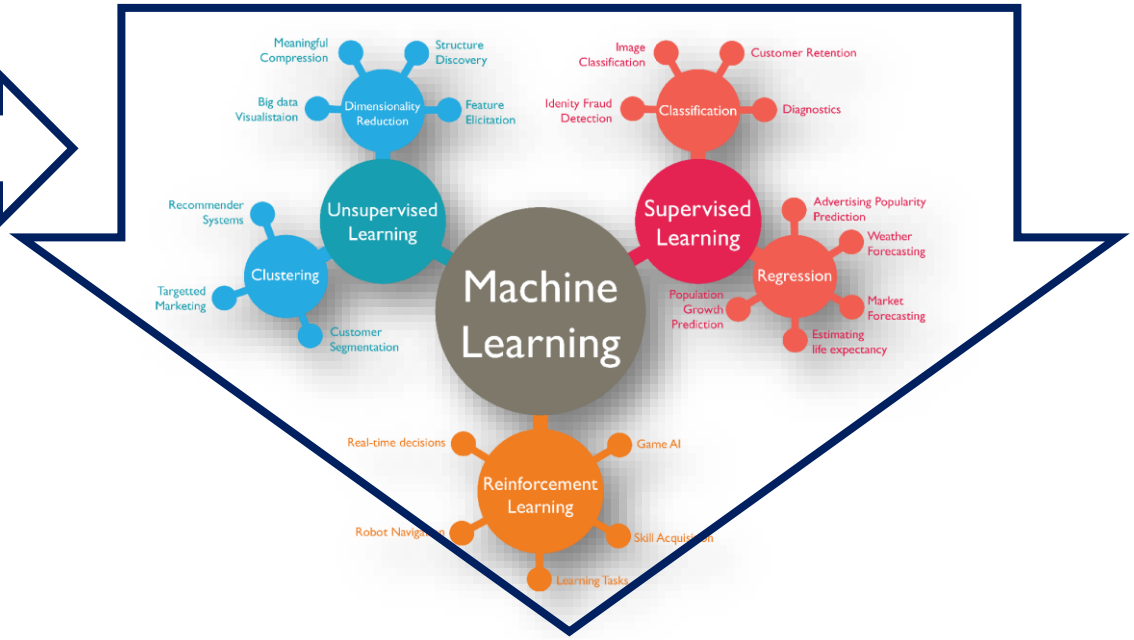
In situ Data Collection





Ground -Truth

Algorithms and processing sequences



EUNIS CLASSIFICATION

EUNIS Code	Descrizione
A5.53	Sublittoral seagrass beds
A5.5313	Mediterranean *Cymodocea* beds
A5.53131	Association with *Cymodocea nodosa* on well sorted fine sands
A5.535	*Posidonia* beds
A5.5351	Ecomorphosis of striped *Posidonia oceanica* meadows
A5.5352	Ecomorphosis of "barrier-reef" *Posidonia oceanica* meadows
A5.5353	Facies of dead "mattes" of *Posidonia oceanica* without much epiflora
A5.5354	Association with *Caulerpa prolifera* on *Posidonia* beds
A2.131	Facies of banks of dead leaves of *Posidonia oceanica* and other phanerogams

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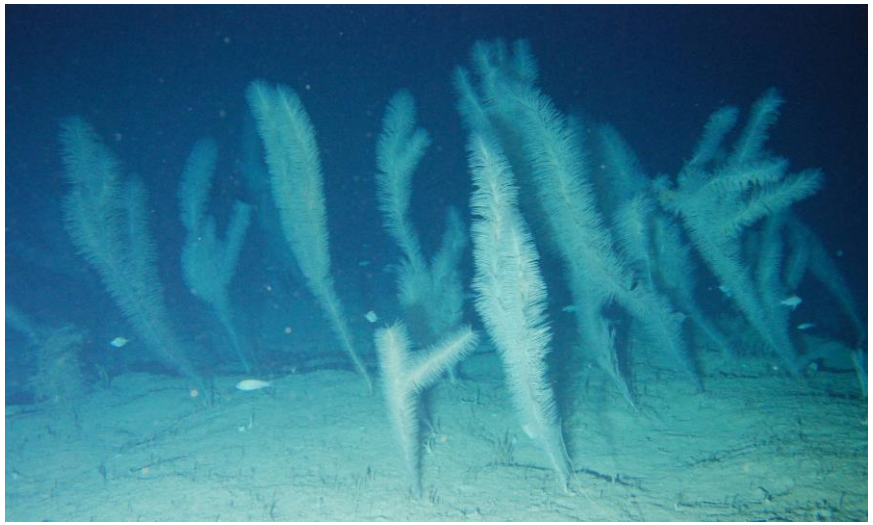
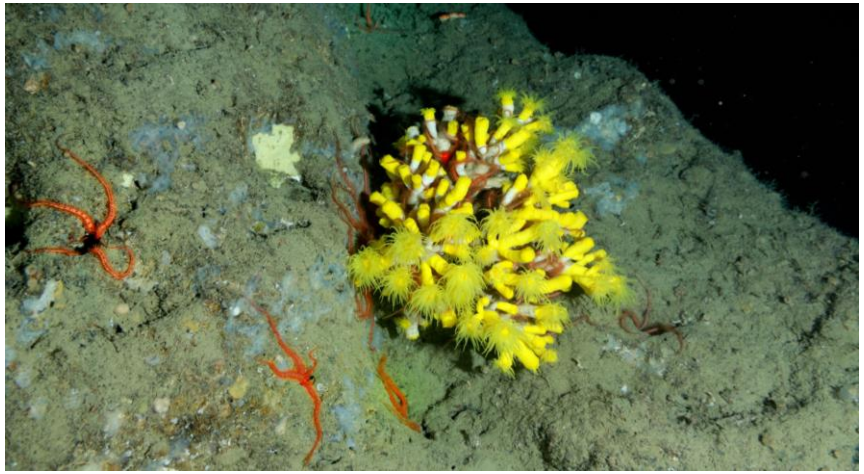
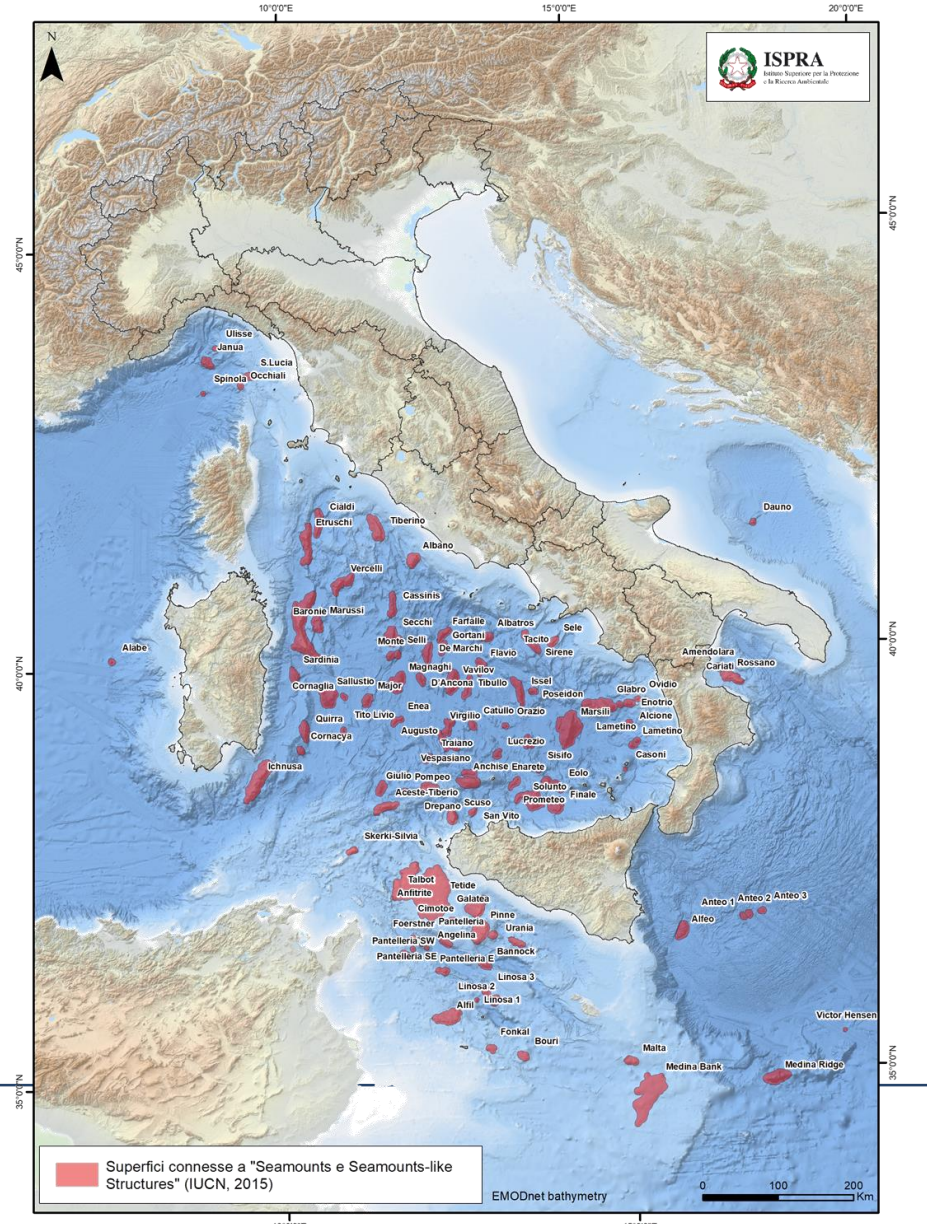
Circalittoral and bathyal hard-bottom marine species and habitats of conservation interest - Habitats Directive (92/43/EEC) - Habitat 1170





National-scale mapping of submarine mountains and circalittoral and bathyal rock outcrops



Submarine mountains for which mapping and study are planned

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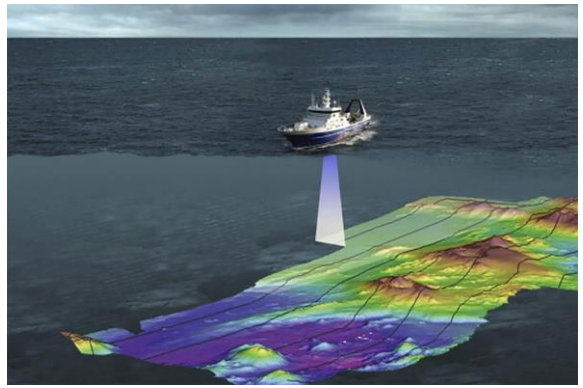
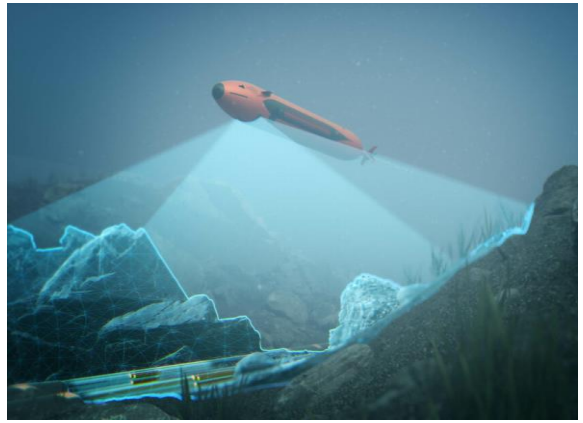
National-scale mapping of submarine mountains and circalittoral and bathyal rock outcrops

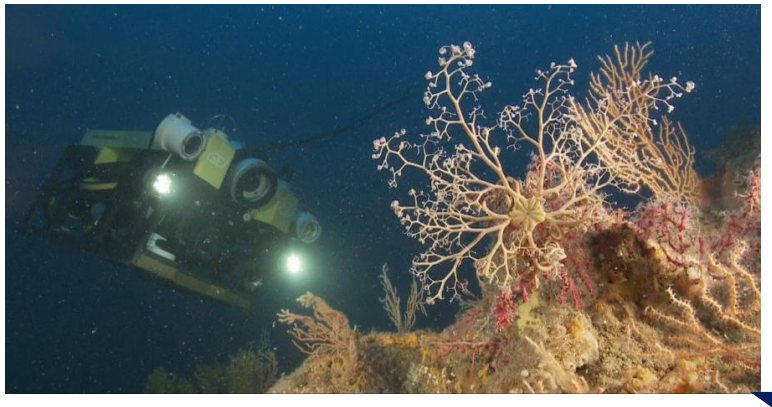
Multibeam



AUV

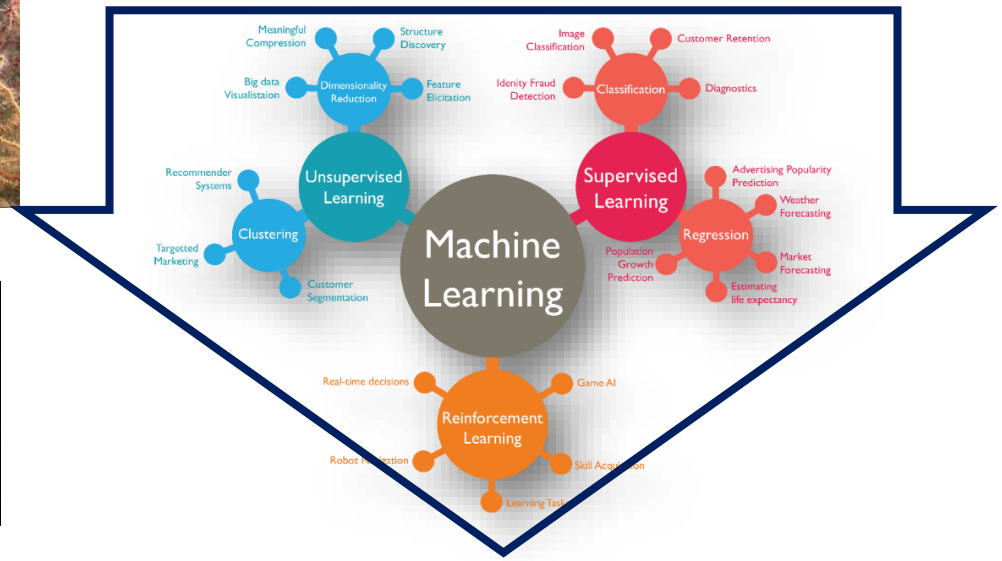


Ground Truth in situ ROV



Verità a mare

Algorithms and processing sequences



Integrated habitat mapping technologies

Characterization of benthic assemblages of conservation interest

Rocky reef - 1170, Habitats Directive

Leonardo Tunesi

ISPRA Istituto Superiore per la Protezione e la Ricerca Ambientale

Sistema Nazionale per la Protezione dell'Ambiente

NATIONAL-SCALE MAPPING OF COASTAL AND DEEP SEA HABITATS OF CONSERVATIONAL INTEREST

Primary Objective: know to protect ➡ 30X30 e 10X30

Additional Objectives:

- ACQUIRE NEW INFRASTRUCTURE AND INSTRUMENTATION;
- ACQUIRE NEW DATA/KNOWLEDGE;
- INVOLVE THE NATIONAL SCIENTIFIC COMMUNITY;

⇩

- **REINFORCING THE NATIONAL SCIENTIFIC COMMUNITY**
- **GROWTH OF NATIONAL MARINE RESEARCH**
- **OPPORTUNITIES FOR THE BLUE-ECONOMY**

ISPRA
Istituto Superiore per la Protezione e la Ricerca Ambientale

Sistema Nazionale per la Protezione dell'Ambiente

Thank you

www.isprambiente.gov.it/it

Marine Geospatial Information: Technological perspective

Juan Pablo Duque Ordoñez, Ph.D. Candidate, GEOLab, Politecnico di Milano

Prof. Maria Antonia Brovelli, GEOLab, Politecnico di Milano and UN-GGIM Academic Network

Maruska Melucci, Senior Solutions Architect, EBWorld s.r.l

GEOLaB Geomatics and Earth Observation lab

UN-GGIM ACADEMIC NETWORK

EBWORLD INTELLIGENCE IN MAPS

Contents

1. Marine Geospatial Information in Europe - The Copernicus Case
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4. Current Developments - Italy and Europe
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Marine Geospatial Information in Europe

Copernicus is the European Union's **Earth Observation** and Monitoring program. It aims to provide accurate, timely and easily accessible information to improve the management of the environment, understand and mitigate the effects of climate change, and ensure civil security.

Marine Geospatial Information in Europe

- The Copernicus Atmosphere Monitoring Service (CAMS)
- The Copernicus Climate Change Service (C3S)
- The Copernicus Emergency Management Service (CEMS)
- The Copernicus Land Monitoring Service (CLMS)
- **The Copernicus Marine Environment Monitoring Service (CMEMS)**
- The Copernicus Security Service (CSS)
- Satellite Imagery (Sentinel-1 and Sentinel-2 and contributing missions)

Marine Geospatial Information in Europe

Copernicus Marine Environment Monitoring Service (CMEMS) → https://marine.copernicus.eu/

- Regional and Global data. For example the **Mediterranean** or the Arctic Sea.

- Past and forecast data
- Interest variables
  - **Biological** components, i.e. Chlorophyll, Dissolved Oxygen
  - **Physical** characteristics, i.e. Salinity, Currents, Temperature
  - **Chemical** composition, i.e. Ammonium, Nitrate, Phosphate, pH

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Marine Geospatial Information in Italy

Some entities that provide authoritative Marine data in Italy are:

- **ISPRA** (Institute for Environmental Protection and Research)
- **Agenzia delle Entrate** (Revenue Agency)
- **Military Geographical Institute**
- **Italian Hydrographic Institute of the Navy**
- **ISMAR** (Institute of Marine Sciences)
- **Several Ministries**
- Among others…

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Technological challenges in Marine Geospatial Information

1. High volume of available data

- Big data (and growing)
  - By the end of 2021, Copernicus had published a total of 32.21 Petabytes!* *(that is **32 Million GB**)*

- Data is not centralized
  - Users must retrieve data from different sources
  - Download and understand the data to use it

*https://scihub.copernicus.eu/twiki/pub/SciHubWebPortal/AnnualReport2021/COPE-SERCO-RP-22-1312_-_Sentinel_Data_Access_Annual_Report_Y2021_merged_v1.0.pdf

2. Interoperability between data

Data Interoperability refers to:
The ability of different systems, platforms, and applications to exchange and use data effectively and efficiently.

- Data standards exist, but services implement them differently.
- In order to create better models and understand better the marine environment, other earth systems must be included

Technological challenges in Marine Geospatial Information

3. Inclusion of innovative technologies such as AI

- Forecasting
- Increase spatial resolution (Data Upscaling)
- Image classification and segmentation

Technological challenges in Marine Geospatial Information

- Example from Copernicus Services

Service	WMS Support	WMS query format	Download
Land	Yes	JSON	Direct download, Raster, Vector
Marine	Yes	XML	API-based, FTP, NetCDF, raster
Atmosphere	Some layers	HTML	API-based, NetCDF

Not fully interoperable!

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Current Developments - Italy

- Tools4MSP Geoplatform → http://data.tools4msp.eu/
  - MSP stands for Marine Spatial Planning
  - Developed and maintained by the Venice office of:
    CNR - Italian National Research Council
    ISMAR - Institute of Marine Sciences

Community-based, open source portal based on GeoNode.
It includes over 700 geospatial datasets.
Being used by government agencies to publish authoritative data.

Current Developments - Italy

Layers Maps Documents Tools4MSP Get involved About Type your search here ... Register Sign in

Explore Layers

Upload Layers

Your selections Clear all filters

Total: 252

Most recent Less recent A - Z Z - A Most popular

TEXT

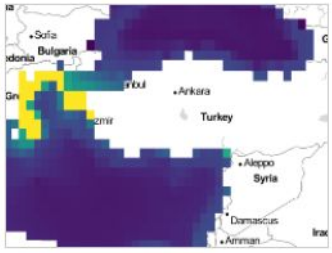
Enter your text here ...

TYPE

- Raster 48
- Vector 204

CATEGORIES

- Biota 2
- Boundaries 24
- Environment 7
- Farming 1
- Health 2
- Imagery Base Maps Earth C... 1
- Location 1
- Coastal Defence and Sand ... 4
- Energy 29
- Environmental Protection 29
- Environment and Ecosystem... 52
- Fisheries and Aquaculture 20
- Maritime Transport and To... 36
- Miscellanea 19
- Oceans 2
- Society 3
- Structure 1

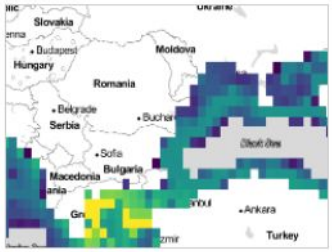


BRIDGE-BS - Pomatomus saltatrix

Environment by tools4msp

No abstract provided

21 Jul 2022 | 41 | 0 | 0 Create a Map

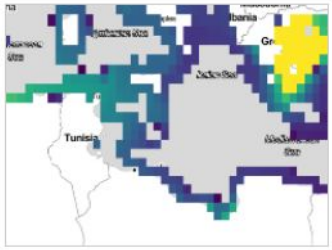


BRIDGE-BS - Trachurus trachurus

Environment by tools4msp

No abstract provided

20 Jul 2022 | 39 | 0 | 0 Create a Map



BRIDGE-BS - Sarda sarda

Environment by tools4msp

No abstract provided

20 Jul 2022 | 29 | 0 | 0 Create a Map

BRIDGE-BS Fishing effort for the Black Sea

Fisheries and Aquaculture by tools4msp

Global Fishing Watch uses data about a vessel's identity, type, location, speed, direction

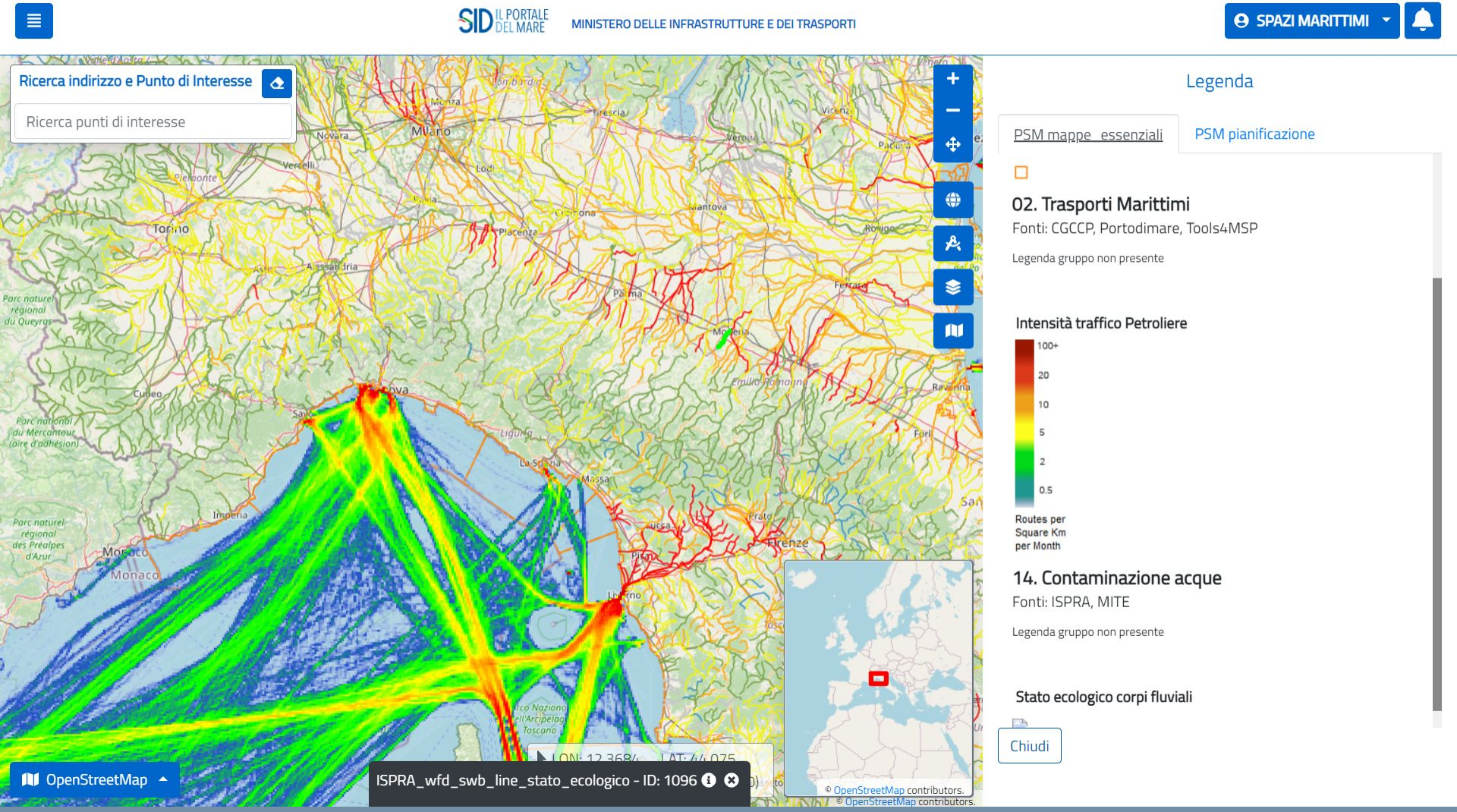
Current Developments - Italy

- SID il Portale del Mare → https://www.sid.mit.gov.it/
  - Ministero delle Infrastrutture e dei Trasporti (MIT)
  - EBWorld s.r.l

SID il Portale del Mare is an integrated portal for state and maritime spatial planning (MSP).
Allows the visualization and querying of multiple geospatial layers from multiple official sources.

The public platform is accessible by clicking on the “Accedi” button on the bottom.

Current Developments - Italy

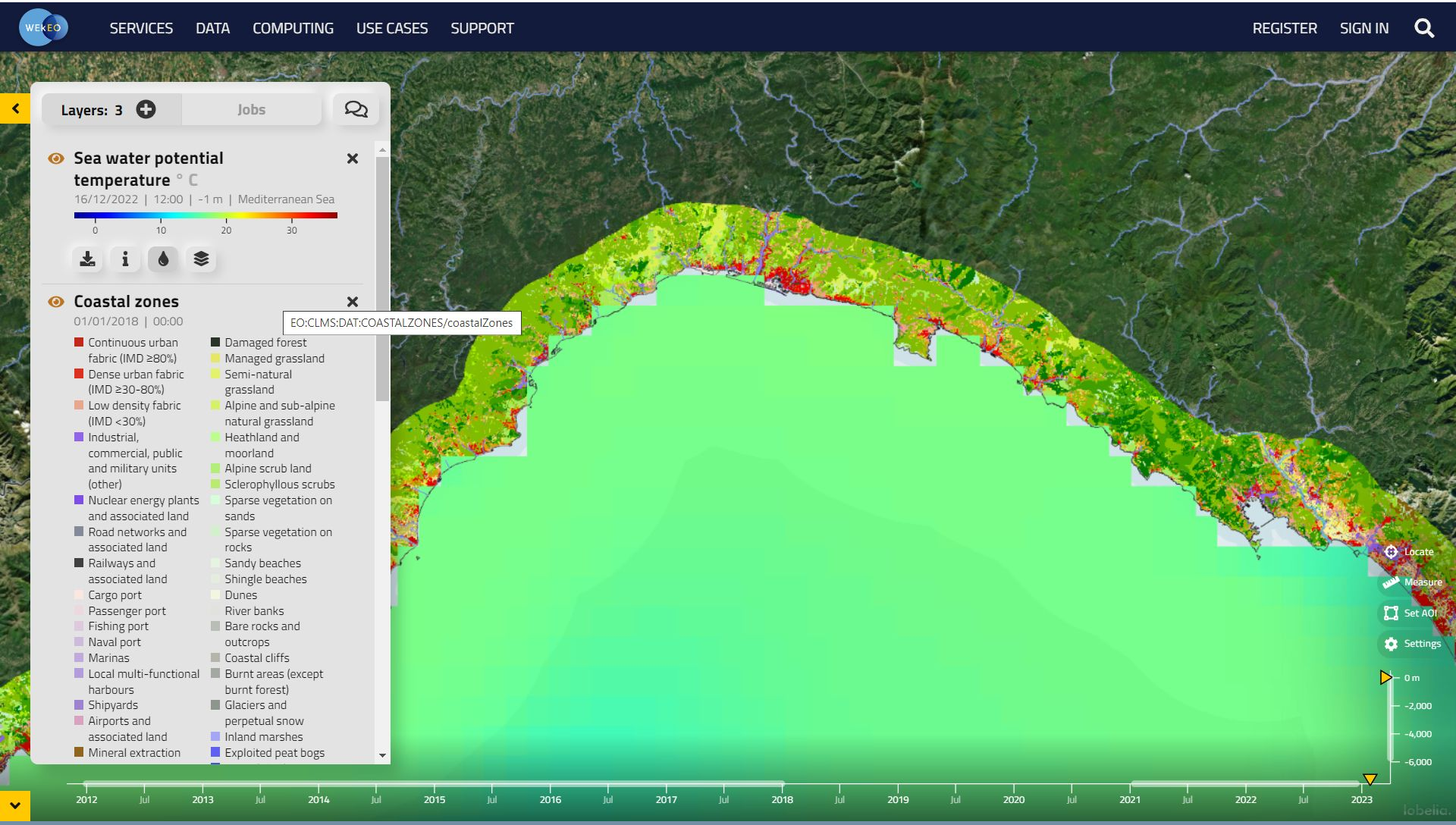


Current Developments - Europe - DIAS Example

- WEkEO → https://www.wekeo.eu/data
  - DIAS for Sentinel and Copernicus data
  - Addition of all the CMEMS data alongside other Copernicus services
  - Funded by the European Commission

WEkEO is the EU Copernicus DIAS (Data and Information Access Services) reference service for environmental data, virtual processing environments and skilled user support.
The more complete DIAS with respect to Copernicus data.

Current Developments - DIAS example



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Our development: COP-CW Platform

- COPERNICUS - Coastal Web Viewer (COP-CW)
  → Temporarily available at:
  http://ec2-3-70-64-164.eu-central-1.compute.amazonaws.com

- **Open Source** web platform that allows users to visualize, extract, and perform simple data analysis from multiple Copernicus services and other external sources.

- Ongoing project

Our development: COP-CW Platform

Several Data Sources for analyzing the interaction of water, land, and population, including:

Copernicus Land Monitoring Service (CLMS)

Copernicus Marine Environment Monitoring Service (CMEMS)

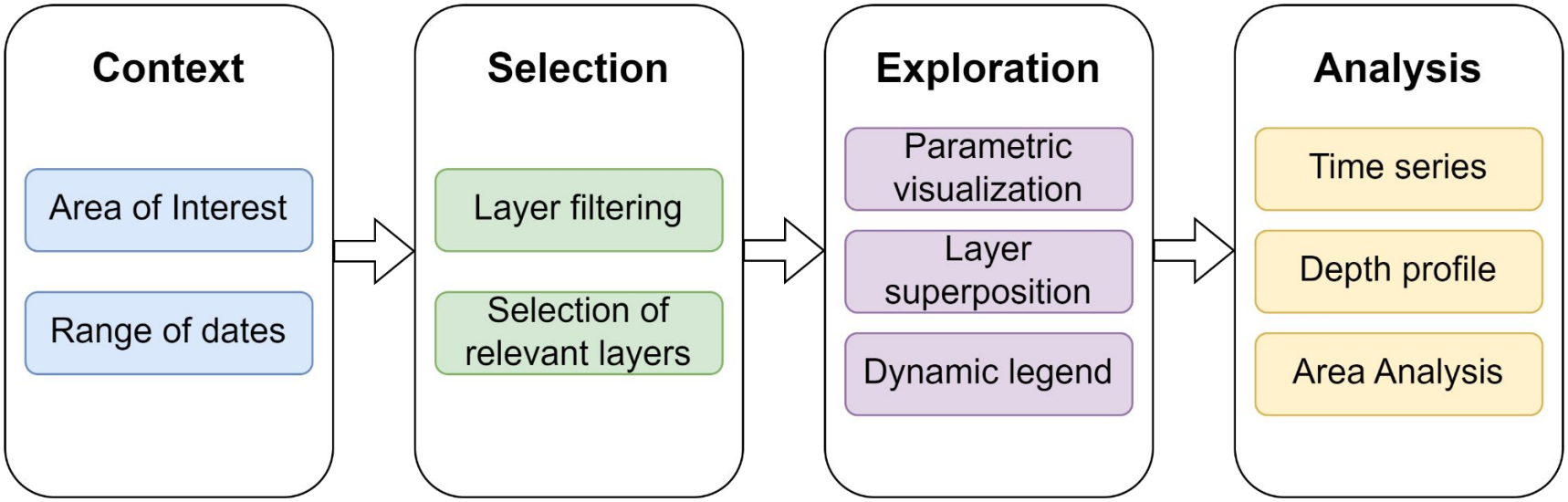
Copernicus Atmosphere Monitoring Service (CAMS)

WorldPop Population Counts

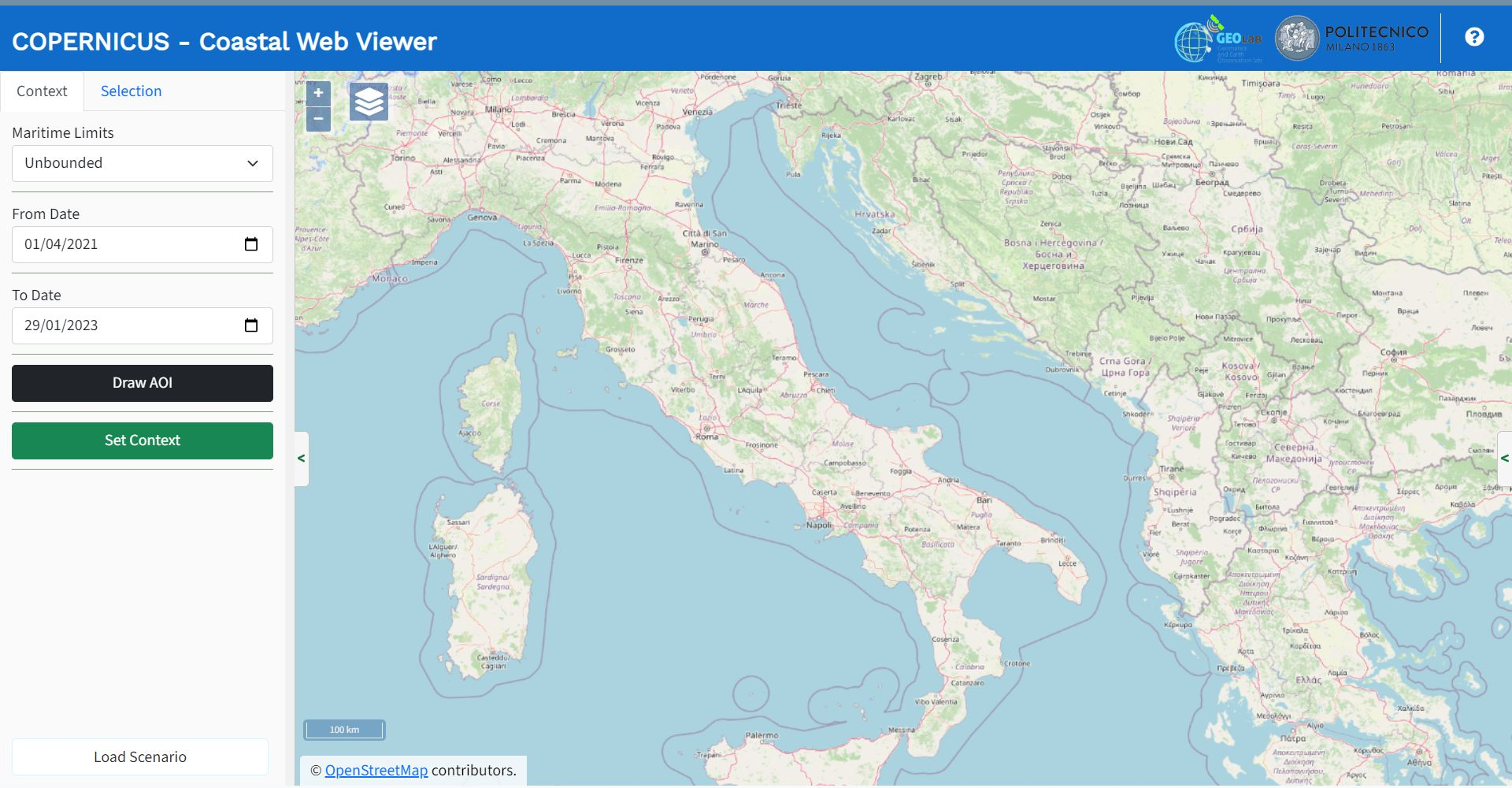
Data is used directly from the sources: **No data replication**

Our development: COP-CW Platform

How does the platform work?



Our development: COP-CW Platform



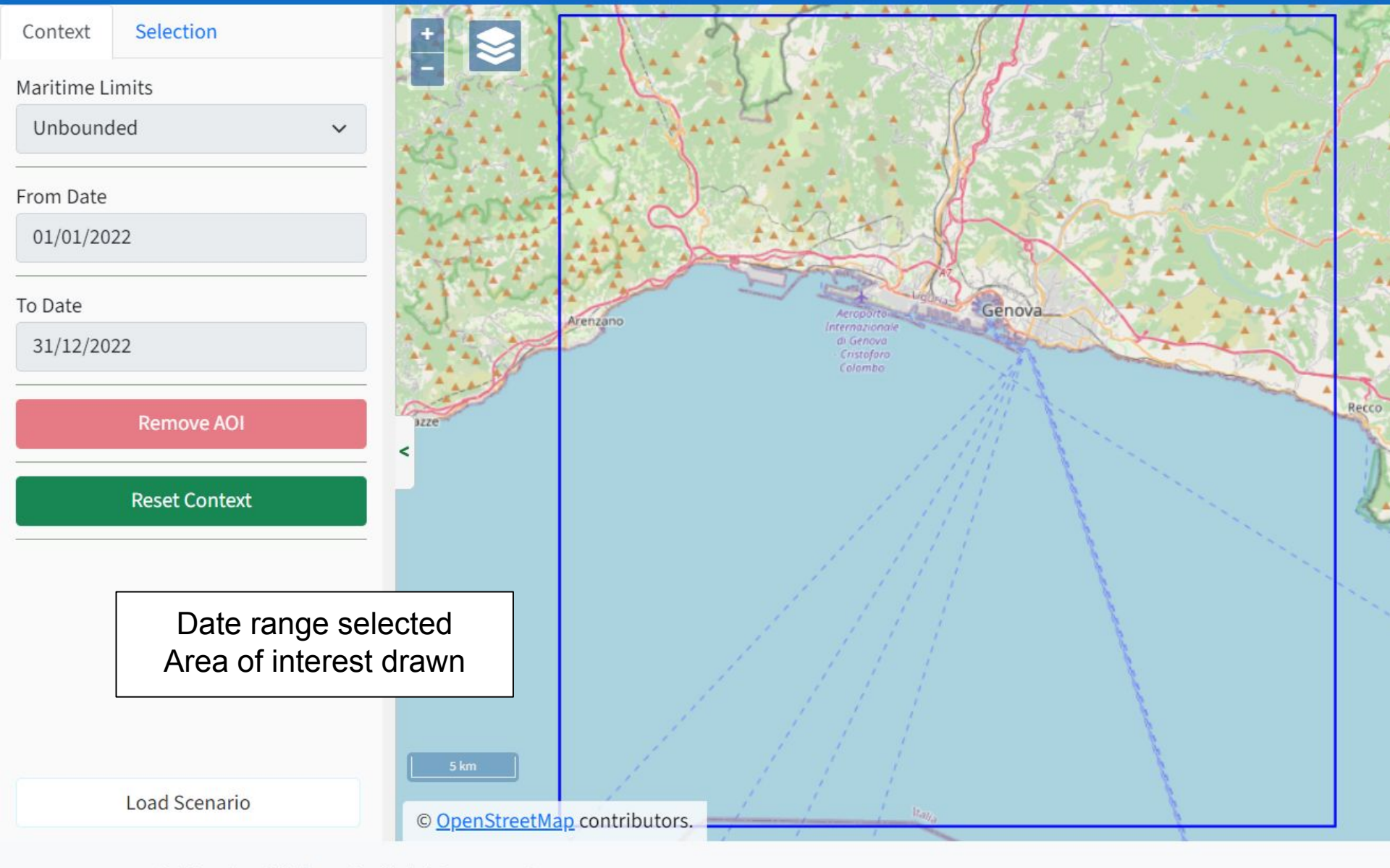
Our development: COP-CW Platform

Choose the spatiotemporal context

- Area of Interest Selection - Genova
- Date range selection - 01/Jan/2022 to 31/Dec/2022

- This is used to filter the available layers

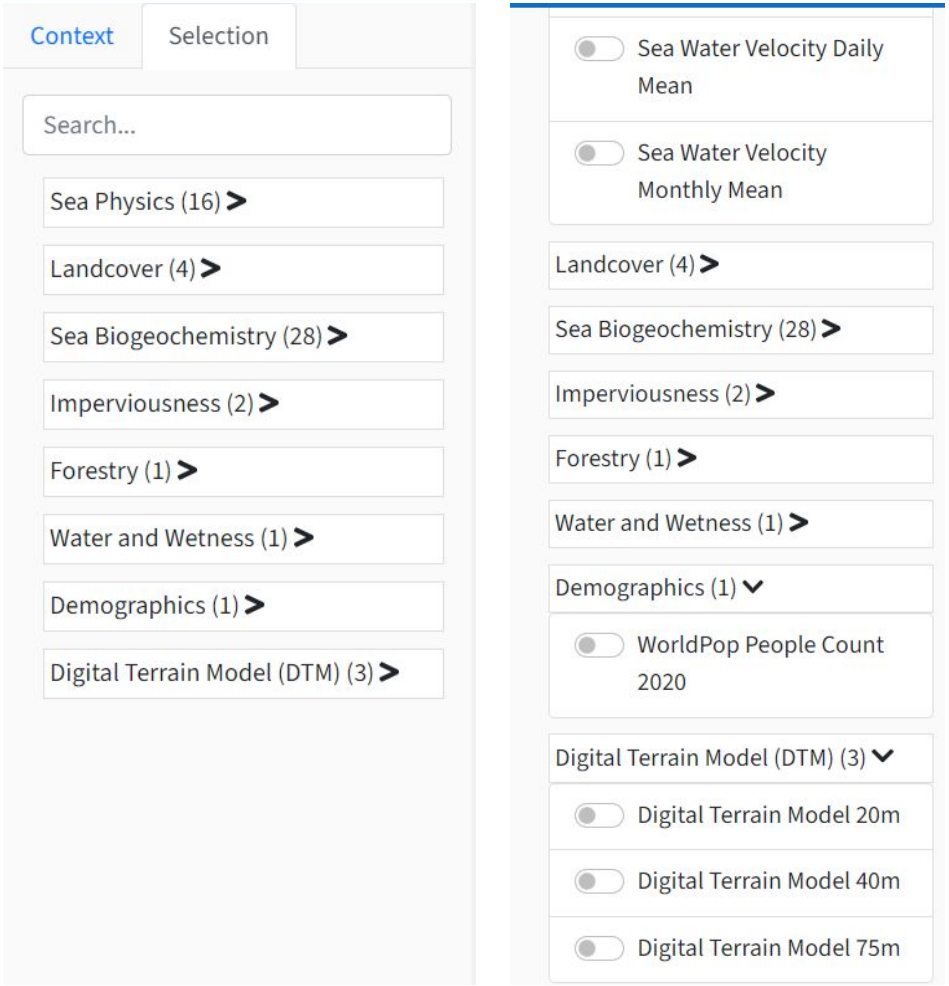
COPERNICUS - Coastal Web Viewer



Date range selected
Area of interest drawn

Our development: COP-CW Platform

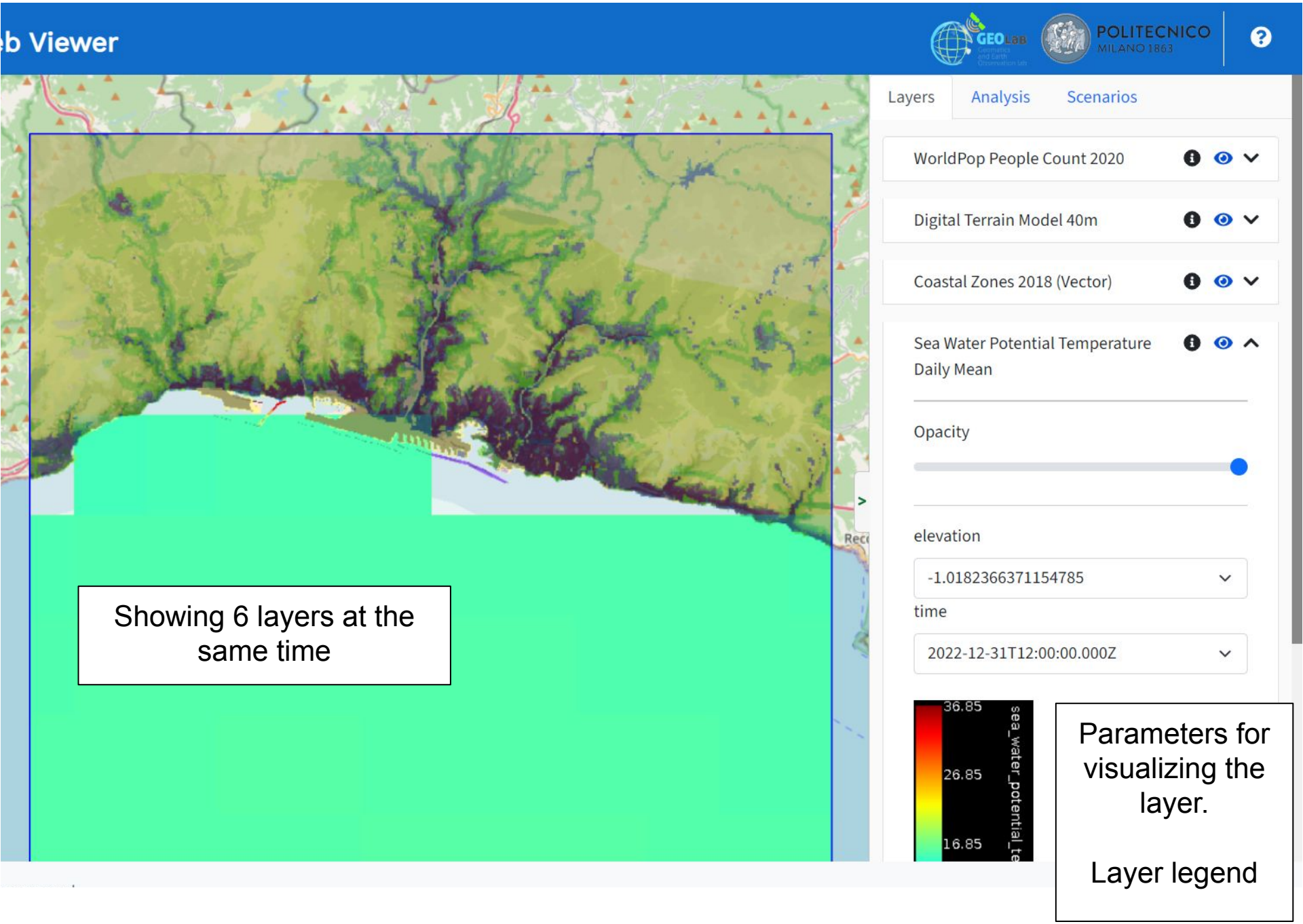
Select the layers to use from the list of available layers with the given context.



Our development: COP-CW Platform

Layers Selected:

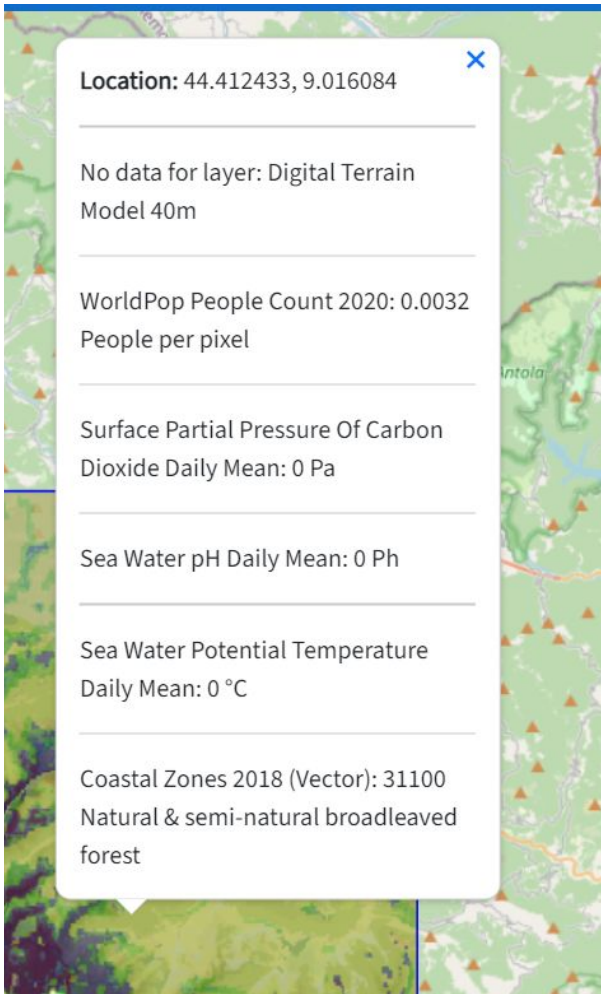
- Sea water pH daily mean
- Surface partial pressure of carbon dioxide daily mean
- Sea water potential temperature daily mean
- Coastal Zones (CZ) 2018
- WorldPop population density 2020
- Digital Terrain Model (40m)


b Viewer
POLITECNICO
MILANO 1863
Layers
Analysis
Scenarios
WorldPop People Count 2020
Digital Terrain Model 40m
Coastal Zones 2018 (Vector)
Sea Water Potential Temperature
Daily Mean
Opacity
elevation
-1.0182366371154785
time
2022-12-31T12:00:00.000Z
36.85
26.85
16.85
sea_water_potential_te
Showing 6 layers at the same time
Parameters for visualizing the layer.
Layer legend

Our development: COP-CW Platform

Data is extracted directly from the services.

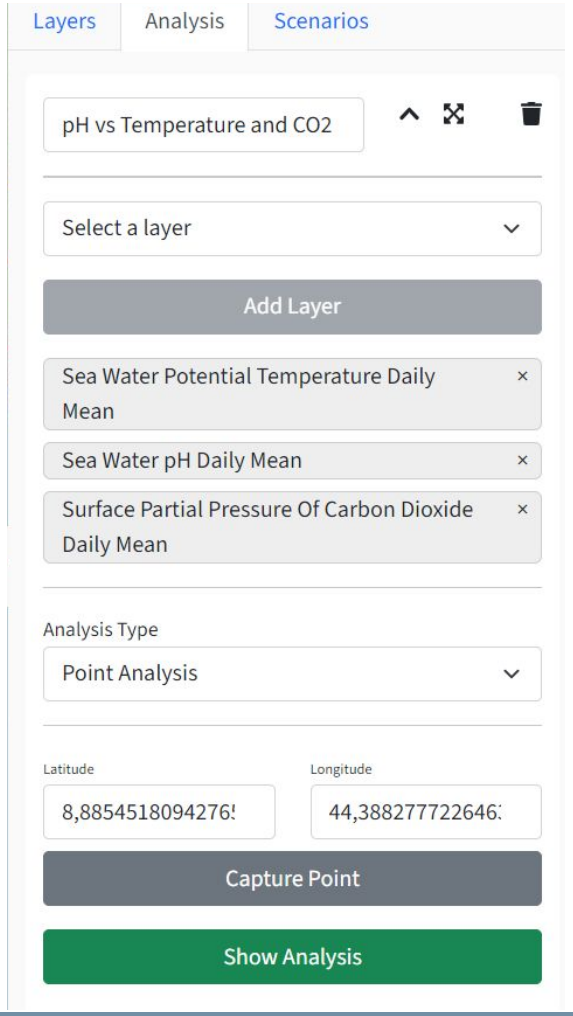
This allows to see the values of multiple layers at the same time



Our development: COP-CW Platform

Multi-layer data analysis capabilities.

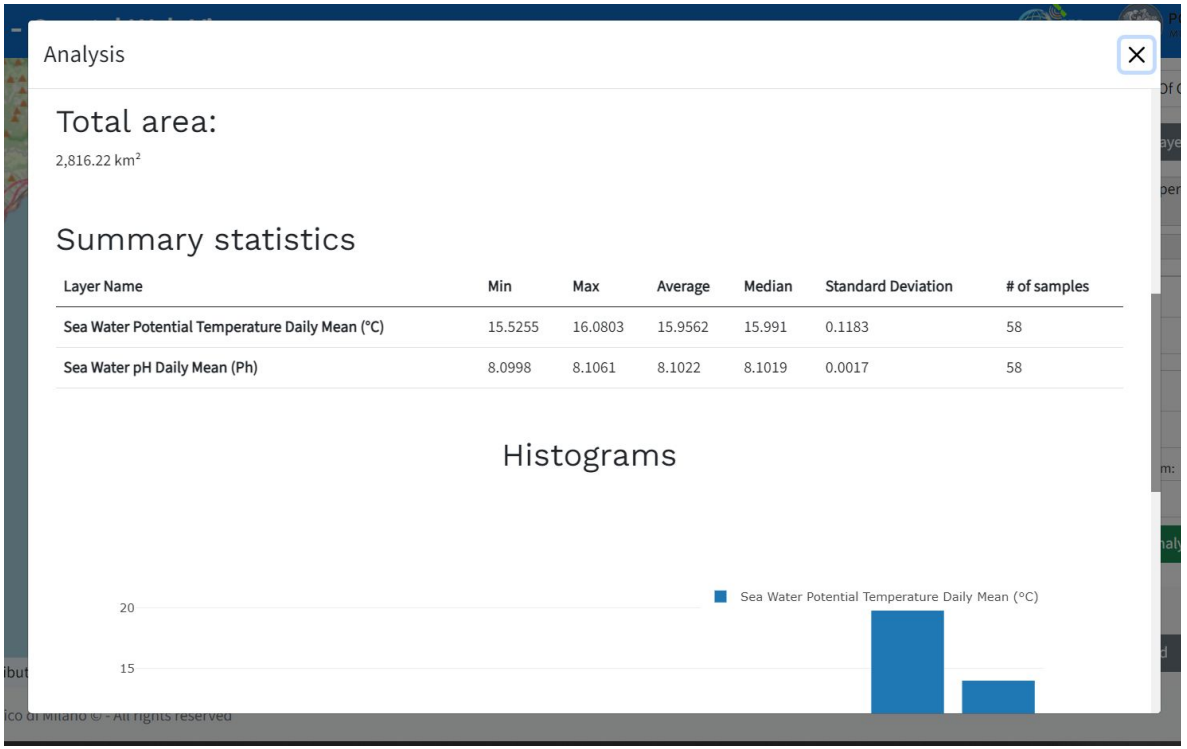
Supports time series and depth profiles for a single location for the layers that allow it, and area analysis doing a sampling of the available layers.

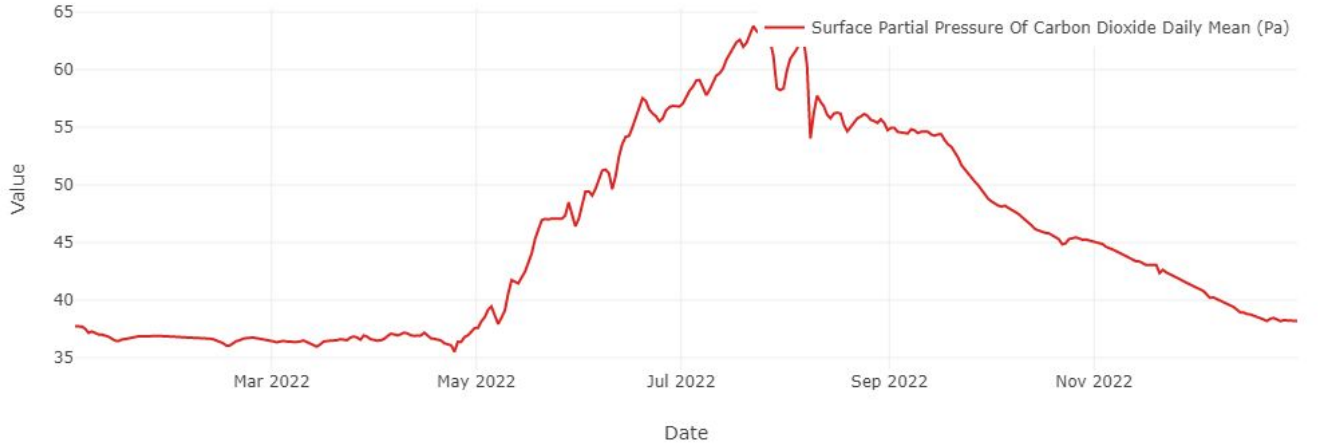


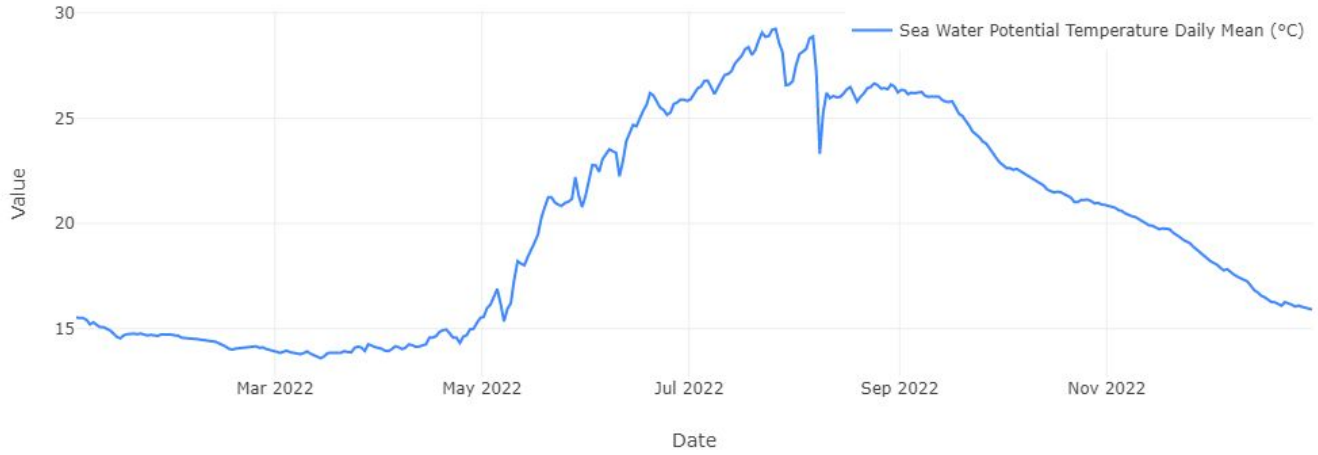
Our development: COP-CW Platform

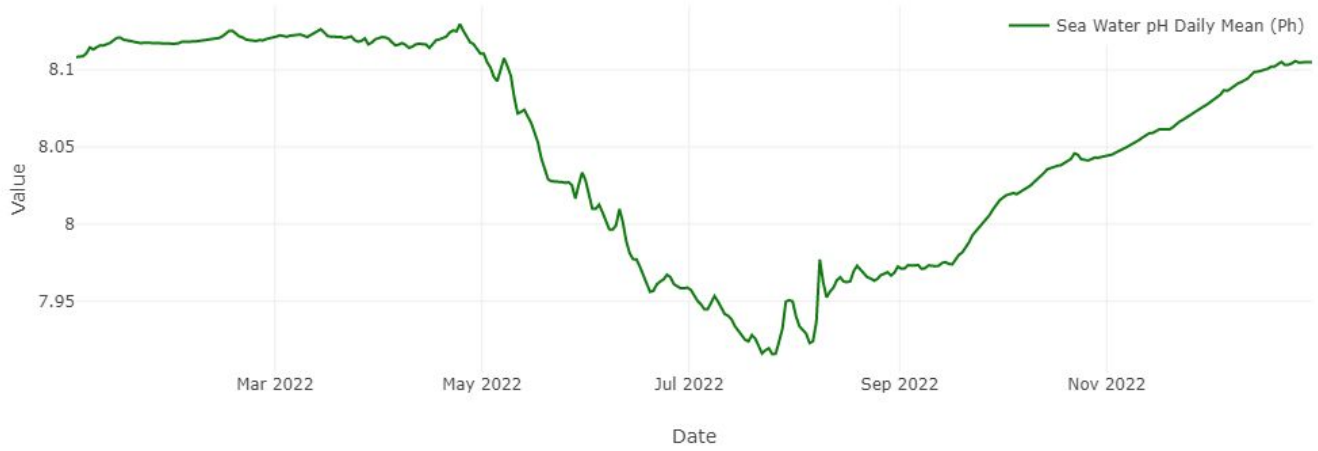
Point and Area Analysis for multiple layers.

The image shows an area analysis of pH and water temperature with summary statistics.









Point Analysis:

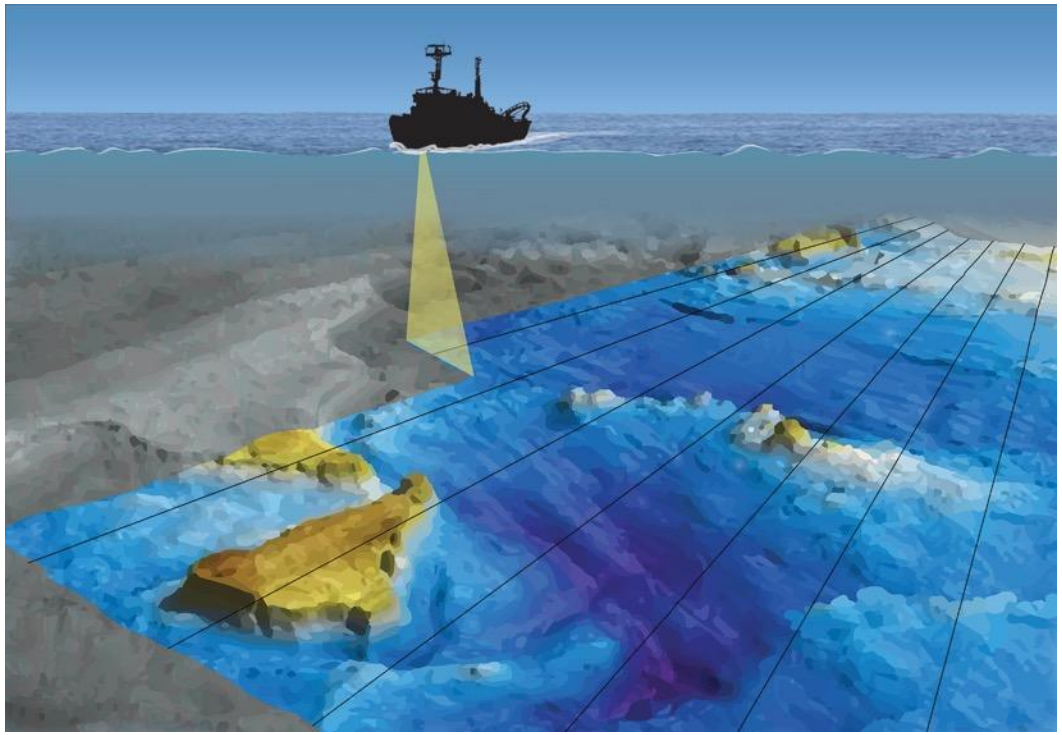
Time series of CO_2 partial pressure (red), Temperature (blue) and pH (green) for 2022 in a point near Genova.

The Dimension of Geospatial Data in the Law of the Sea: Perspectives from an Interdisciplinary Exercise

Ilaria Tani

School of Law

University of Milano-Bicocca (ITALY)



ENVIRONMENT

LEGAL TEXTS

Example of interdisciplinary data-sharing partnership

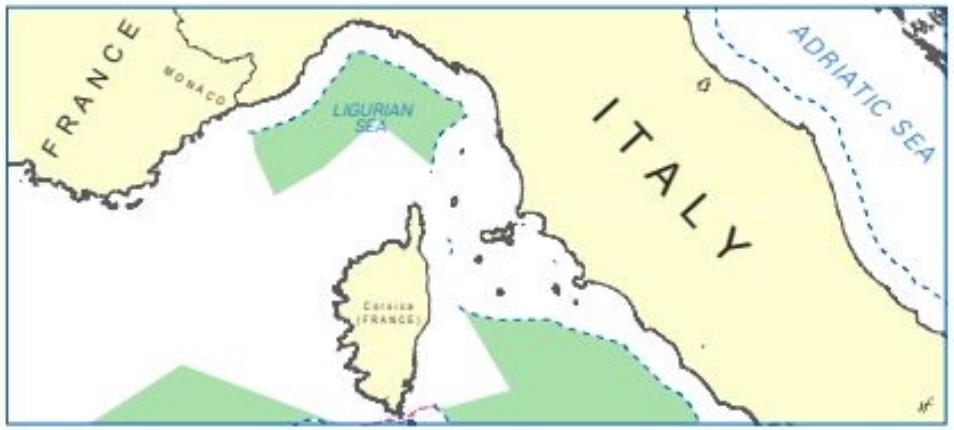
COLLECTION OF RELEVANT LEGAL TEXTS	**lawyers**
ELABORATION OF ILLUSTRATIVE MAPS	**cartographers**

I.I. 3186

ISTITUTO IDROGRAFICO DELLA MARINA

Atlas of Maritime Limits and Boundaries in Central Mediterranean: Legal Texts and Illustrative Maps

Edited by
Ilaria Tani (Legal Aspects)
Stefano Ferrero and Nicola Marco Pizzeghello (Cartographic Aspects)



UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA
DIPARTIMENTO DI GIURISPRUDENZA
SCHOOL OF LAW

ISTITUTO IDROGRAFICO

GENOA 2020

STRAIGHT BASELINES
COASTAL ZONES
MARITIME BOUNDARIES

Albania
Algeria
Bosnia and Herzegovina
Croatia
France (southern front)
Greece (western front)
Italy
Libya
Malta
Monaco
Montenegro
Slovenia
Spain (eastern front)
Tunisia

United Nations Committee of Experts on
Global Geospatial Information Management

Terms of Reference for the Working Group on Marine Geospatial Information

1. Mandate

1.1 The United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) at its Seventh Session in August 2017 endorsed the terms of reference and establishment of the UN-GGIM Working Group on Marine Geospatial.

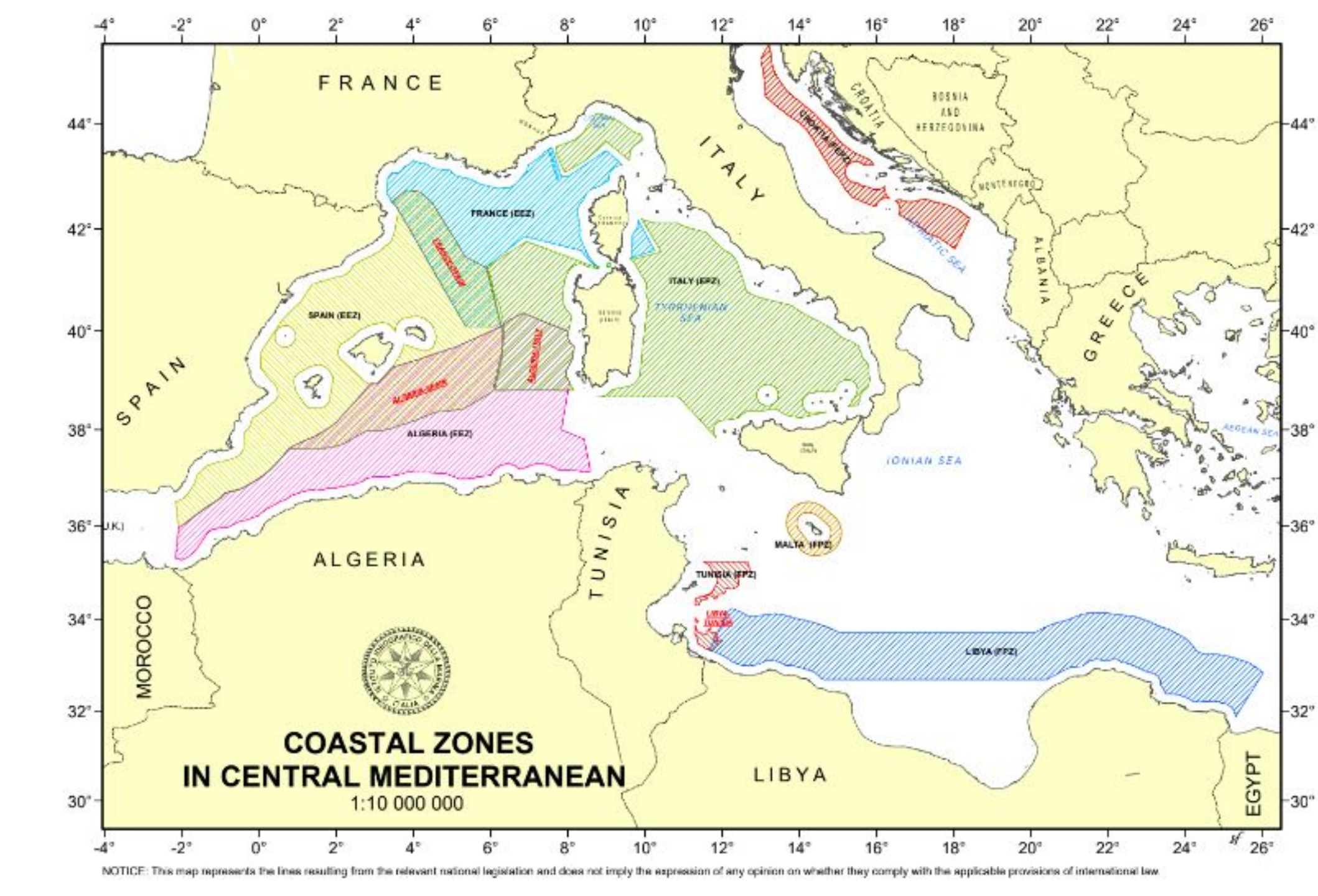
2. Objectives

The objectives of the Working Group are to:

2.1 Play a leading role at the policy level by raising political awareness and highlighting the importance of reliable, timely and fit-for-purpose marine geospatial information to support the administration, management and governance of the marine environment;

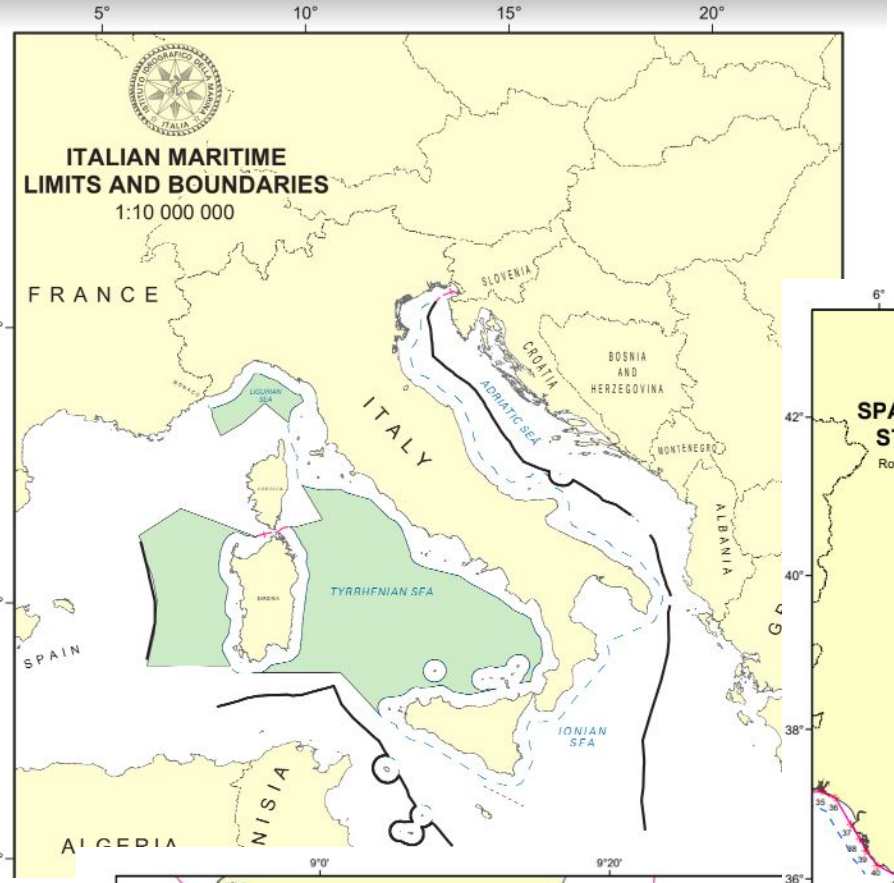
2.2 Encourage the use of internationally agreed-upon geospatial information frameworks, schemas, systems and established standards to improve the growing inter-dependent relationships between people and the marine environments; and

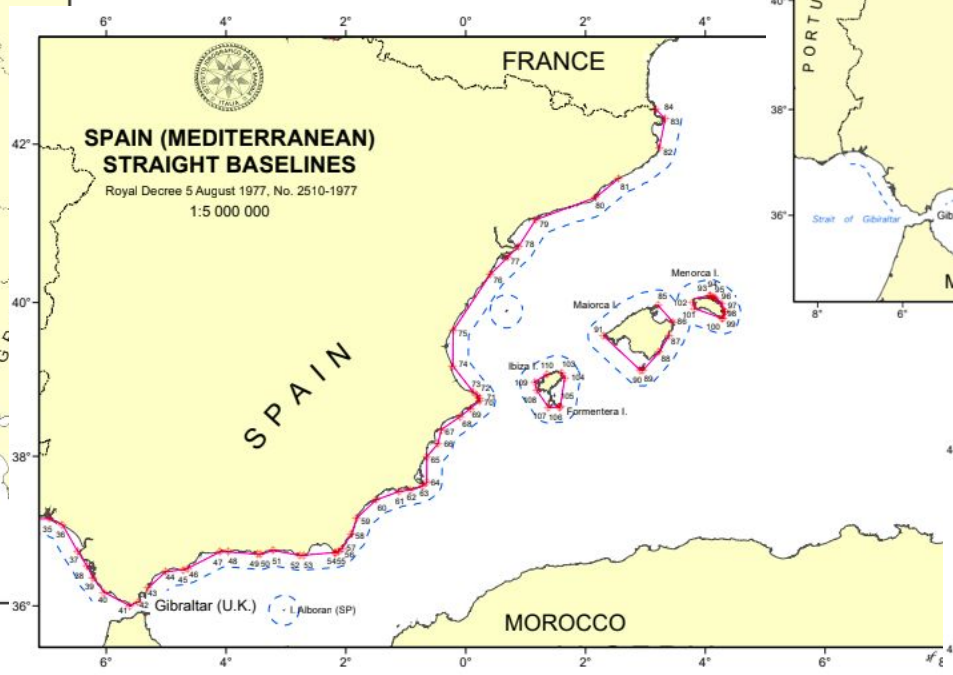
2.3 Support the Committee of Experts in the development of norms, principles, guides and standards to increase significantly the availability of high-quality, timely and reliable geospatial information including any regional capacity development initiatives.

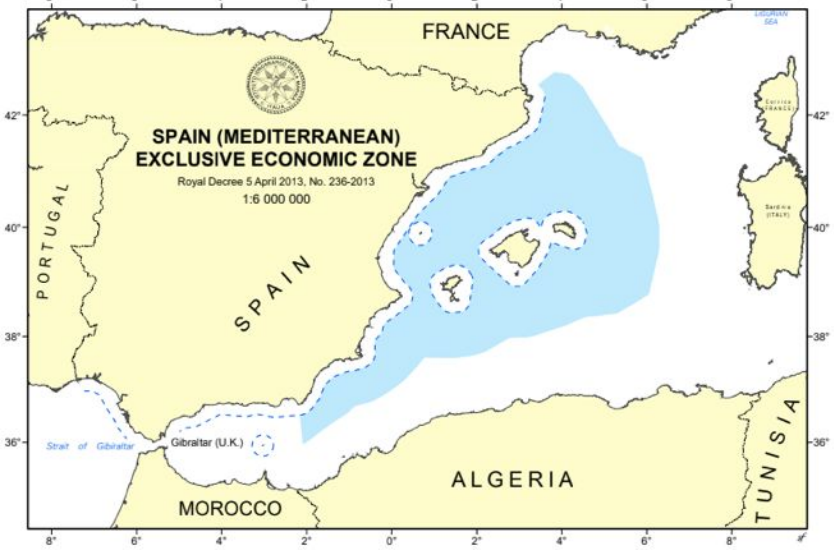


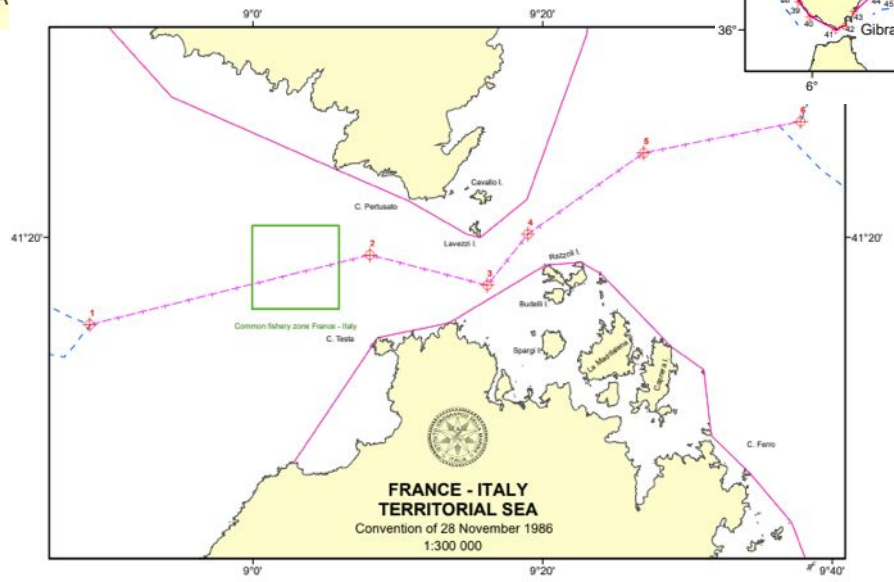
as of Sept. 2020

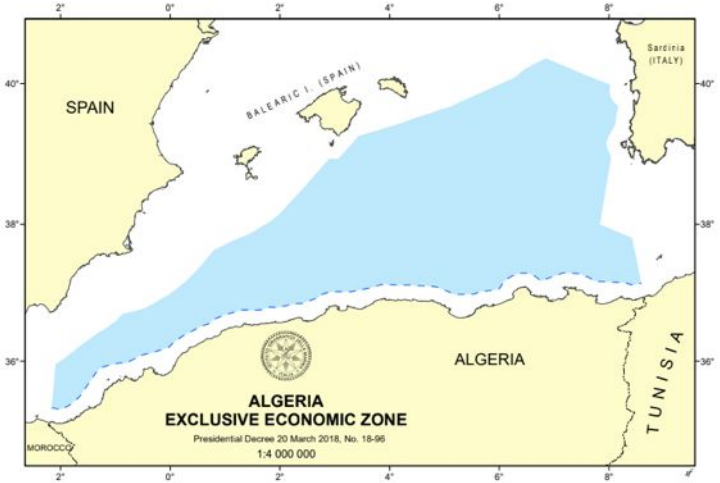
NOTICE: This map represents the lines resulting from the relevant national legislation and does not imply the expression of any opinion on whether they comply with the applicable provisions of international law

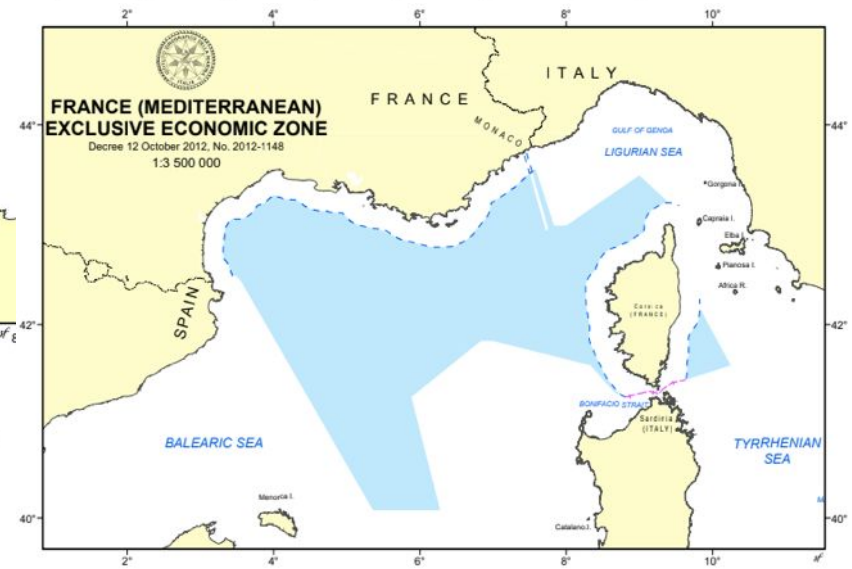












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United Nations A/RES/77/248

General Assembly

Distr.: General
9 January 2023

Seventy-seventh session
Agenda item 72 (a)
Oceans and the law of the sea: oceans and the law of the sea

Resolution adopted by the General Assembly on 30 December 2022

[*without reference to a Main Committee (A/77/L.36)*]

77/248. Oceans and the law of the sea

The General Assembly,

5. *Calls upon* States Parties to the Convention that have not yet done so to deposit with the Secretary-General charts or lists of geographical coordinates, as provided for in the Convention, preferably using the generally accepted and most recent geodetic datums;

Division for Ocean Affairs and the Law of the Sea Office of Legal Affairs

The Law *of the* Sea

Guidelines on deposit with the Secretary-General of charts and lists of geographical coordinates of points under the United Nations Convention on the Law of the Sea

United Nations
New York, 2021

MAR MEDITERRÁNEO

Costa Sur y Este de España

a número		Latitud N	Longitud W
	De Pta. Carbonera	36° 14,70	05° 18,00
	a Pta. de Baños	36° 27,61	05° 00,35
	De Pta. de Baños		
	a Torre de Calahonda	36° 29,32	04° 42,60
	De Torre de Calahonda		
	a Pta. de Calaburras	36° 30,50	04° 38,30
	De Pta. de Calaburras		
	a Pta. de Vélez-Málaga	36° 43,60	04° 06,20
	De Pta. de Vélez-Málaga		
	a Pta. de Torrox	36° 43,66	03° 57,36
	De Pta. de Torrox		
	a C. Sacratif		
	De C. Sacratif		
	a Pta. del Llano		
	De Pta. del Llano		
	a Pta. Negra		
	De Pta. Negra		
	a Pta. de las Entinas		

projection Mercator) ou par la limite des eaux territoriales définie à partir des lignes de base décrites par le décret du 19 octobre 1967 susvisé. Les coordonnées sont exprimées dans le système géodésique WGS 84.

Partie Ouest

NUM.	COMMENTAIRE	LATITUDE N	LONGITUDE E	NATURE DU
0	Point situé à la latitude de la frontière terrestre avec l'Espagne, sur la limite extérieure des eaux territoriales françaises	42° 26,12'	3° 26,88'	Loxodr
		42° 26,12'	3° 33,50'	Loxodrom
		40° 05,00'	5° 21,50'	
		40° 05,00'	6° 16,67'	Loxodromi

zone della piattaforma continentale, proprie a ciascuno dei due Stati, [illegible] che seguono gli archi di geodetica che uniscono i punti le cui coordinate riferite al sistema geodetico European Datum 1950, sono le seguenti:

Punto	Latitudine Nord	Longitudine Est
1	41° 16' 39"	18° 27' 43"
2	41° 11' 37"	18° 32' 34"
3	41° 08' 01"	18° 34' 37"
4	41° 06' 29"	18° 35' 42"
5	40° 55' 03"	18° 39' 31"
6	40° 53' 06"	18° 39' 34"

Fait à Alger, le 2 Rajab 1439 co

ANNEXE

Coordonnées de la zone économique exclusive algérienne

N°	Latitude	Degré — Minute Longitude
	Frontière algéro-marocaine	
1	35°57,46'N	002°05,31'W
2	36°02,98'N	001°55,06'W
3	36°05,88'N	001°50,74'W
4	36°17,08'N	001°32,82'W
5	36°19,21'N	001°29,06'W
	36°25,63'N	001°18,16'W
		001°12,18'W
		000°59,86'W
		40'W

On the North: the line connecting the points identified by the following coordinates:

Point	Longitude (East)	Latitude (North)
1	12°15'17.29" E	34°14'40.01" N
2	12°30'49.61" E	34°08'56.76" N
3	12°41'26.86" E	34°04'07.06" N
4	12°42'09.53" E	34°03'43.62" N
5	13°22'37.37" E	34°07'46.21" N
6	13°40'12.47" E	34°05'21.22" N
7	13°58'45.78" E	34°00'37.39" N
8	14°08'15.01" E	33°59'10.99" N
	14°18'22.42" E	33°57'03.69" N
	[illegible] E	33°56'03.88" N
		[illegible]'36.05" N

Endeavors similar to the one that we undertook by compiling the *Atlas* would be facilitated if States followed the Guidelines:

Lists of geographical coordinates of points (*con't*)

29. When preparing their deposits, especially those of lists of geographical coordinates of points, it is recommended that coastal States:[9]

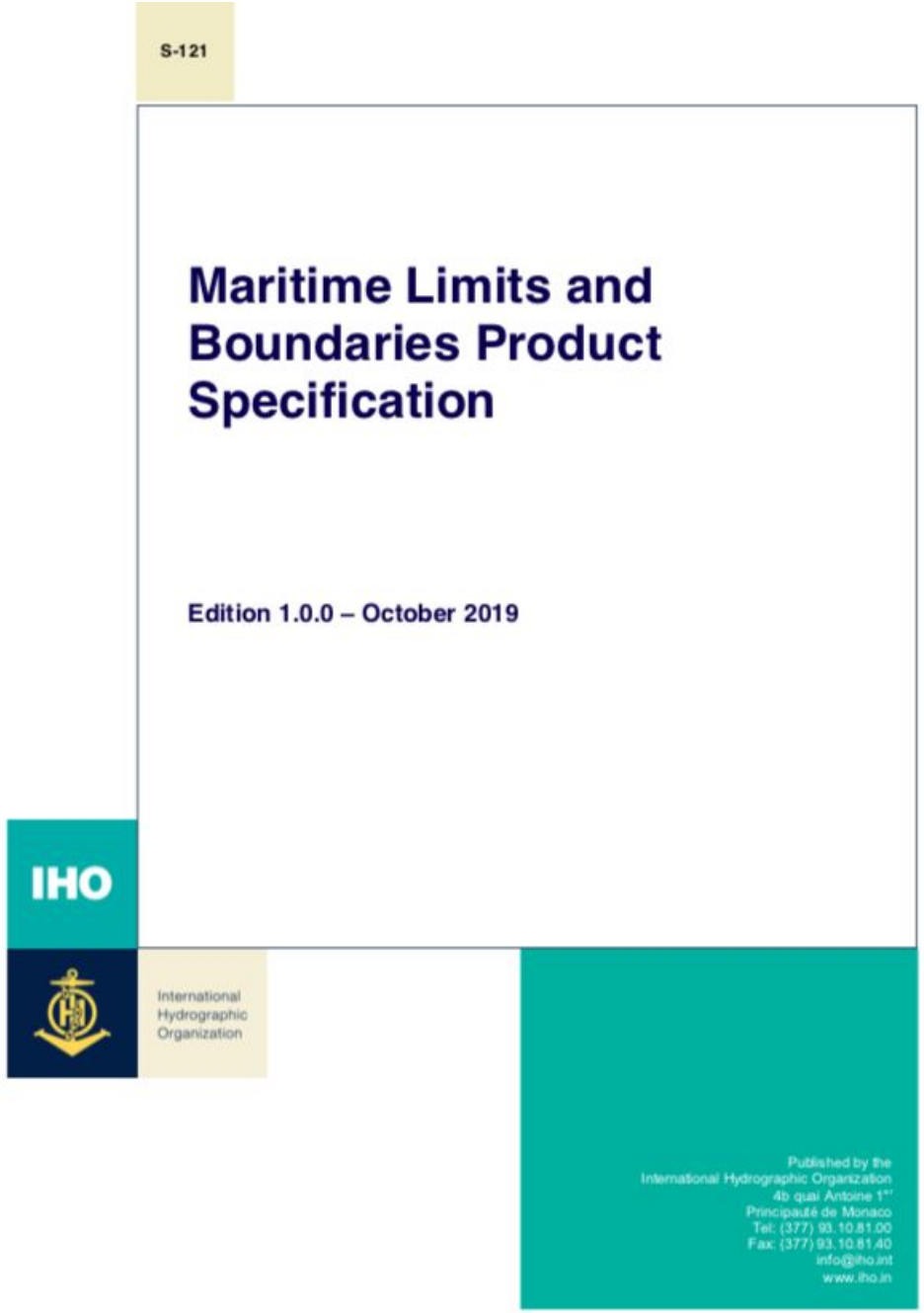
(a) Provide the list of geographical coordinates of points referenced to the World Geodetic System 1984 (WGS 84), or provide all necessary parameters for the conversion of the deposited geographical coordinates from the original datum into WGS 84;

(b) Specify which sets of points in the lists are to be connected and constitute single lines. This is particularly useful in the case of separate straight baseline segments, which may be interrupted by segments of normal baseline, and in the case of baselines or limits of maritime zones around islands, to ensure that the last point in the list connects back to the first point, if applicable. This is also useful where a deposit may include points on the normal baseline;

(c) Specify how the points included in a list of geographical coordinates of points are to be connected, that is, whether by geodesics, loxodromes (also known as "rhumb lines") or arcs constructed at a specific distance from defined centre points on the baseline, which would also need to be included in the deposit. Alternatively, coastal States may consider depositing a list of geographical coordinates of points extrapolated from the geodesics, loxodromes or arcs, located at short distances, so that, when connected, the resulting line will be the same as the geodesic, loxodrome or arc from which they were extrapolated.

As a matter of fact, all listed requirements would be entirely covered if coastal States followed the ***Maritime Limits and Boundaries Product Specification (S-121), version 1.0.0,*** of the International Hydrographic Organization.

Available at:
iho.int/en/standards-and-specifications



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Resolution adopted by the General Assembly on 17 November 2004

[*without reference to a Main Committee (A/59/L.22 and Add.1)*]

59/24. Oceans and the law of the sea

The General Assembly,

6. *Requests* the Secretary-General to improve the existing Geographic Information System for the deposit by States of charts and geographical coordinates concerning maritime zones, including lines of delimitation, submitted in compliance with the Convention, and to give due publicity thereto, in particular by implementing, in cooperation with relevant international organizations, such as the International Hydrographic Organization, the technical standards for the collection, storage and dissemination of the information deposited, in order to ensure compatibility among the Geographic Information System, electronic nautical charts and other systems developed by these organizations;

United Nations A/RES/77/248

General Assembly

Distr.: General
9 January 2023

Seventy-seventh session
Agenda item 72 (a)
Oceans and the law of the sea: oceans and the law of the sea

Resolution adopted by the General Assembly on 30 December 2022

[*without reference to a Main Committee (A/77/L.36)*]

77/248. Oceans and the law of the sea

The General Assembly,

6. *Notes*, in this regard, the ongoing efforts of the Secretary-General to improve the existing geographic information system for the deposit by States of charts and geographical coordinates concerning maritime zones, including lines of delimitation, submitted pursuant to the Convention, and to give due publicity thereto, also notes the ongoing cooperation and progress achieved in the development by the International Hydrographic Organization, in cooperation with the Division, of the technical standards for the collection, storage and dissemination of the information deposited, which are not legally binding, in order to ensure compatibility among geographic information systems, electronic nautical charts and other systems, and re-emphasizes the importance of the completion of these efforts through wide participation and reviews by Member States;

7. *Recalls* the note on the practice of the Secretary-General in respect of the deposit of charts and/or lists of geographical coordinates of points under the Convention[26] and the *Guidelines on deposit with the Secretary-General of charts and lists of geographical coordinates of points under the United Nations Convention on the Law of the Sea* prepared by the Secretariat;[27]

White Paper
on
Readily Available and Accessible (Open) Marine Geospatial Information

A reference on the benefits and challenges of managing and providing accessible marine geospatial information

Recommendations

While the Working Group makes many suggestions throughout this paper, the Working Group's main recommendations are summarized below.

1. **Develop data-sharing partnerships** to facilitate the timely sharing of data between Member States, government agencies, research and academia, private data-providers, and other stakeholders.

Working Group on Marine Geospatial Information
United Nations Committee of Experts on Global Geospatial Information Management
July 2020

United Nations A/RES/77/248

General Assembly

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Resolution adopted by the General Assembly on 30 December 2022

[*without reference to a Main Committee (A/77/L.36)*]

77/248. Oceans and the law of the sea

The General Assembly,

388. *Requests* the Secretary-General to continue the publication activities of the Division, in particular through a publication on marine geospatial information management[159] and the publication of the *Law of the Sea Bulletin*;