CoAStal and marine waters integrated monitoring systems for ecosystems proteCtion AnD managemEnt

CASCADE

Project ID: 10255941

Priority Axis: Environment and cultural heritage

Specific objective: Improve the environmental quality conditions of the sea and coastal area by use of sustainable and innovative technologies and approaches

D3.1.1
REPORT ON THE REVIEW OF EXISTING OBSERVING AND MODELLING SYSTEMS

PP in charge: PP10 – Institute of Oceanography and Fisheries

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Project acronym	**CASCADE**
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Project title	**CoAStal and marine waters integrated monitoring systems for ecosystems protection AnD managemEnt**
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Activity number	**Activity 3.1**
Activity title	**Review of existing observing and modelling systems**
Partner in charge	**PP 10 – Institute of Oceanography and Fisheries**
Partners involved	**All PPs**

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Chapter 1 Introduction

Within the activities defined by the work plan of the Interreg Italy-Croatia project "CoAStal and marine waters integrated monitoring systems for ecosystems proteCtion AnD managemEnt" (CASCADE), the deliverable D.3.1.1 - Report on the review of existing observing and modelling systems carried out in Work Package 3 aims to:

- gather information in **metadata catalogue** and review existing monitoring activities in the Pilot areas such as institutional (e.g. MFSD, Bathing water) monitoring strategies, available species occurrence and traits;

- gather biodiversity and ecosystem data from research initiatives and data from previous and current international projects, including Interreg IT-HR standard projects;

- gather information related to existing modelling tools and results available for the Pilot areas:

- present existing observing and forecasting systems which will reveal gaps and deficiencies.

Information on available existing observations (eg. chemical, physical, biodiversity, ecological, ecosystems characteristic), existing datasets and modelling results (ocean hydrodynamics, waves and biogeochemistry) are collected, analyzed, and harmonized on the following pilot (P) areas with the contribution of the following partners in order to assess present strategies and plan optimal monitoring and modelling strategies:

- **P1:** Grado and Marano Lagoon and Gulf of Trieste (Italy);

PP4 - AGENZIA REGIONALE PER LA PROTEZIONE DELL'AMBIENTE DEL FRIULI VENEZIA GIULIA (ARPA FVG)

PP6 - ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA (UNIBO)

- **P2:** Transitional (e.g. Goro area and Bevano Mouth) and Coastal areas in Emilia Romagna (Italy);

PP7 - AGENZIA REGIONALE PREVENZIONE AMBIENTE ENERGIA EMILIA ROMAGNA (ARPAE)

PP6 - ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA (UNIBO)

PP1 - FONDAZIONE CENTRO EURO-MEDITERRANEO SUI CAMBIAMENTI CLIMATICI (CMCC)

PP8 - DELTA 2000 – SOCIETA 'CONSORTILE A R.L.

- **P3:** Torre Guaceto - Canale Reale, Punta della Contessa, Melendugno in Puglia (Italy);

LP - REGIONE PUGLIA

PP1 - FONDAZIONE CENTRO EURO-MEDITERRANEO SUI CAMBIAMENTI CLIMATICI (CMCC)

PP9 - UNIVERSITÀ DEL SALENTO (UNISALENTO)

- **P4:** Neretva river mouth (Croatia);

PP10 - INSTITUTE OF OCEANOGRAPHY AND FISHERIES (IOF)

PP3 - DUBROVNIK-NERETVA COUNTY (DNC)

PP1 - FONDAZIONE CENTRO EURO-MEDITERRANEO SUI CAMBIAMENTI CLIMATICI (CMCC)

- **P5:** Coastal area in Veneto (Italy);

PP5 - UNIVERSITÀ IUAV DI VENEZIA (IUAV) with the support of CORILA

- **P6:** Miljašić Jaruga river mouth, Nin Bay (Croatia);

PP12 - CITY OF NIN

PP10 - INSTITUTE OF OCEANOGRAPHY AND FISHERIES (IOF)

- **P7:** Coastal area in Molise (Biferno river mouth, Campomarino Coast and Bonifica Ramitelli SAC) (Italy);

PP13 - UNIVERSITÀ DEGLI STUDI DEL MOLISE (UNIMOLISE)

- **P8:** Northern-eastern Adriatic (Croatia);

PP2 - INSTITUTE RUĐER BOŠKOVIĆ (IRB)

- **P9:** Cetina river mouth (Croatia);

PP15 - PUBLIC INSTITUTION FOR MANAGEMENT OF PROTECTED PARTS OF NATURE IN THE AREA OF SPLIT-DALMATIA COUNTY "SEA AND KARST"

- **P10:** Torre del Cerrano, Pineto Abruzzo (Italy);

PP13 - UNIVERSITÀ DEGLI STUDI DEL MOLISE (UNIMOLISE)

- **P11:** Marche coastal area (Italy);

PP14 - REGIONE MARCHE

Data and models collected in the Activity 3.1 will be available through the information system of WP4. Interaction with stakeholders and institutions not participating in the project also allowed gathering information.

Chapter 2 Mediterranean Sea environmental and climate changes

The Mediterranean is surrounded by three continents: Africa, Asia and Europe. The Mediterranean is also distinguished by the richness and diversity of its landscapes, which range from subtropical deserts to temperate mid-latitude regions. It is a hotspot of biodiversity. The Mediterranean Sea

hosts 4% to 18% of all identified marine species, which is remarkable considering that it represents only 0.82% of the global ocean surface (Coll et al. 2010).

It is an ideal place to study marine processes of global importance. The Mediterranean Sea is one of the most vulnerable regions in the world due to the effects of climate change and its precarious socio-economic conditions.

In addition to the direct consequences of climate change, there are numerous combined consequences of various environmental changes due to human pressures, such as landscape and ecosystem degradation due to industrialization, urbanization and transport (pollution of air, water, soil and living resources) and unsustainable use of mineral and living resources of the land and sea, which pose numerous risks to ecosystems and human well-being. As a result, significant and probably irreversible changes are occurring in Mediterranean waters, including warming of deep waters, increased anthropogenic carbon dioxide inputs and uptake, acidification and loss of biodiversity. These factors are severely damaging ecosystems.

Observation and modeling systems can serve as the basis for the development of an integrated global ocean observing system.

Better knowledge and understanding of the extent of variability of the Mediterranean Sea will allow subsequent assessment of the impacts of human activities and climate change on biodiversity and the ecosystem, which will contribute to a better understanding of the complex relationships between climate, environment and societal parameters.

All these issues require urgent updating and consolidation of monitoring data and other scientific knowledge on climate and environmental changes in the Mediterranean Sea. Public and private decision makers therefore have inadequate access to existing knowledge. The existing monitoring and forecasting system developed over the last 20 years for operational oceanography needs to be expanded. For all these reasons, as part of the CASCADE project, all Project Partners have prepared their first report on the review of the existing monitoring and modeling systems to analyze the existing monitoring activities and critically review the modeling systems in the pilot areas.

2.1. Metadata catalogue

Metadata refers to the information that is used to describe a dataset (i.e., data about data) and it typically includes the information that is necessary to understand the origin, organization and characteristics of a data set. Simply put, metadata describes the: who, what, when, where, why and how of the dataset and such information is necessary for one to discover, acquire, understand, and use the data.

In order to define a common scheme for the description and classification of data derived from inputs gathered and collated from national monitoring efforts and research activities, a common metadata catalogue has been developed. The Metadata catalogue contains a list of metadata on

relevant environmental and biodiversity data, including operational modeling, observing, ancillary, in-situ and added value datasets related to about 20 existing observing and forecasting systems present in the Mediterranean Sea.

The CASCADE Metadata Catalogue includes metadata related to five kinds of data resources (model, satellite, in-situ, ancillary and added value) and for each of these we selected a metadata standard/schema:

- Model: simulated data generated via numerical algorithms;

- Satellite: satellite data generated via remote sensing technologies;

- In-situ, by using Ecological Metadata Language 2.2.0 (https://eml.ecoinformatics.org)

- Ancillary: data from different sources used to assist in data analysis (e.g. bathymetry, coastline);

- Added Value: data derived from an analysis on model or observational data (e.g. environmental indicators).

The selected metadata standards/schemas have attributes that can be optional/mandatory and can require single/multiple values (attributes marked in red are mandatory and those marked in black are not mandatory).

1) **Model (forecasting and reanalysis systems)**

- Product Reference (ID)

- Short Description

- Model Version

- Atmospheric Forcings

- Assimilation Scheme

- Assimilated Observations

- Initial Conditions

- Bathymetry

- Geographical Coverage (Southward Latitude, Northward Latitude, Westward Longitude, Eastward Longitude)

- Vertical Coverage [m] (Top, Bottom)

- Product Type

- Data Assimilation

- Processing Level

- Product User Manual Reference
- Quality Information Document Reference
- Institution
- Contact
- Data Policy
- Dataset
- Variable
- Variable name into file
- Variable long name
- Variable standard name
- Spatial Resolution [deg]
- Unit of measure
- Number of vertical levels
- Temporal Resolution
- Horizontal Resolution Latitudinal
- Horizontal Resolution Longitudinal
- Available time series (Temporal Coverage Start, Temporal Coverage End)
- File Format
- Convention
- Coordinate Reference System
- Feature type
- File nomenclature
- File Size
- Missing Value
- Delivery mechanism (FTP Server Address, WMS Server Address)
- Update time [UTC]
- Update frequency

2) **Satellite (observing systems), Ancillary (auxiliary data) and Added value**

- Product Reference (ID)

- Short Description

- Geographical Coverage (Southward Latitude; Northward Latitude; Westward Longitude; Eastward Longitude)

- Vertical Coverage [m] (Top; Bottom)

- Product Type

- Processing Level

- Product User Manual Reference

- Quality Information Document Reference

- Institution

- Contact

- Data Policy

- Dataset

- Variable

- Variable name into file

- Variable long name

- Variable standard name

- Spatial Resolution [deg] (Horizontal Resolution Latitudinal; Horizontal Resolution Longitudinal)

- Unit of measure

- Number of vertical levels

- Temporal Resolution

- Available time series (Temporal Coverage Start; Temporal Coverage End)

- File Format

- Convention

- Coordinate Reference System

- Feature type

- File nomenclature

- File Size

- Missing Value

- Delivery mechanism (FTP Server Address; WMS Server Address)
- Update time [UTC]
- Update frequency

3) In-situ

The selected Metadata Schema is Ecological Metadata Language 2.2.0 (https://eml.ecoinformatics.org) LifeWatch ERIC Profile, which defines a comprehensive vocabulary and a readable XML markup syntax for documenting research data in the earth and environmental sciences, and increasingly in other research disciplines as well. EML includes modules for identifying and citing data packages, for describing the spatial, temporal, taxonomic, and thematic extent of data, for describing research methods and protocols, for describing the structure and content of data within sometimes complex packages of data, and for precisely annotating data with semantic vocabularies.

EML/Dataset

- Identification (*Id* - a globally unique identifier for the dataset that can be used to cite it elsewhere. It must be globally unique within a particular data management system, which should be specified in the system attribute as a URI. Typically a DOI or other identifier that is both citable and resolvable is used for published data packages; *Title* - a title for this dataset. Include the topic, geographic location, dates, and if applicable, the scale of the data, e.g. Vernal pool amphibian density data, Isla Vista, 1990-1996)

- Description/Overview (*Abstract* - brief overview that summarizes the specific contents and purpose of this dataset; *Keywords* - keywords that accurately categorize these data; *Dataset Language* - the language in which the resource is written; *Funding* - to link this dataset to your research project, identify the appropriate funding identification; *Publication Date* - citation date for this data set. This can be a year (YYYY) or an exact date (YYYY-MM-DD; *Usage Rights* – rights regarding usage and licensing of this dataset)

- Person/Organization (*Dataset Creators* - Authors/Owners/Originators; Each person or organization listed as a Creator will be listed in the data citation. At least one person, organization, or position with a 'Creator' role is required; *Contact* - the contact people or organizations for this dataset; *Metadata Provider* - the people or organizations who created provided documentation and other metadata for this dataset)

- Temporal Coverage (*Begin Date*; *End Date* – the exact date and time of the collection or creation of this data set. Specify a year only (YYYY) or a year, month, and date (YYYY-MM-DD) and optionally, an exact time (HH:MM:SS).

- Geographic Coverage (*Geographic Description* - short and comprehensive geographic description of the sampling site(s) or location(s) where these data were collected; *Bounding*

Coordinates – west - western-most limit of a bounding box, expressed in degrees of longitude, east – eastern-most limit of a bounding box, expressed in degrees of longitude, north - northern-most limit of a bounding box expressed in degrees of latitude, south - southern-most limit of a bounding box expressed in degrees of latitude)

- Taxonomic Coverage (*General Taxonomic Coverage* - identified the range of taxa addressed in dataset.; *Taxon Classification (s) Rank name* - the level in the taxonomic hierarchy, e.g. phylum, class, order etc.; *Taxon Classification (s) Rank Value* - the scientific name for this rank, e.g. animalia, chordata, mammalia, etc.)

- Methods & Sampling (*Method Description* - description of the methods employed in collecting or generating a data set or in quality control and assurance; *Instrumentation* - description of any instruments used in the data collection or quality control and quality assurance. The description should include vendor, model number, optional equipment, etc.; *Sampling Description* - description of the sampling procedures used in the research project. The content of this element would be similar to a description of sampling procedures found in the methods section of a journal article)

- Data Table (*Entity Name* - unique name for this file; *Format Name* - e.g. XSL, Text, CSV, etc.; *Description* - general description of this file and its contents. Include how this file differs from all other files in this data set, e.g. event data, species occurrence data, extended measurement or fact; *Attribute Name* - the name of the attribute (i.e., field or variable) as it appears in the data. It is usually found in the column header of a tabular data table; *Attribute Label* - a descriptive label that can be used to display the name of an attribute, e.g. an attribute might have the attribute name 'Temp_P2' and a corresponding attribute label 'Temperature, probe 2.'; *Attribute Definition* - definition of attribute (i.e. variable) that has to be as specific and complete as possible so the data can be interpreted and reused by other scientists not familiar with your research or field of study. Example: 'Water temperature in degrees Kelvin, measured with the backup of two [manufacturer name] probes.; *Attribute Standard Unit* - the unit of measurement (if available, otherwise dimensionless; *Attribute Missing Value Code*; *Attribute Annotation* - the persistent URI used to identify the attribute (i.e. variable) from a vocabulary; *Attribute Value Annotation* - the persistent URI used to identify the attribute value (i.e. variable) from a vocabulary.

The full metadata catalogue may be found at the project web pages (https://www.italy-croatia.eu/web/cascade).

2.2. Basic systems and services

This chapter is reviewing existing observing, forecasting and data assembly systems in the Mediterranean Sea, for which the data is acquired within the framework of the Activity 3.1 - Review of existing observing and modelling systems.

A great number of listed projects is connected either to:

1. monitoring for EU Directives (Marine Strategy Framework Directive (MSFD) 2008/56/EC (EU, 2008) - aims to protect the marine environment across Europe aiming to reach and maintain a Good Environmental Status (GES) of the EU's marine waters by 2020; Water Framework Directive (WFD); Maritime Spatial Planning (MSP); Habitats Directive (HD); Birds Directive (BD); or Long Term Ecological Research (LTER) networks,

2. water quality monitoring,

3. seabed habitats monitoring,

4. offshore observational towers, pylons and buoy, or some specific observational networks (parameter-oriented or process-oriented).

The Mediterranean observing and forecasting systems are part of a larger sea value chain that links observations to applications of societal benefit. This value chain can be subdivided into the "basic" or "core" systems/services, which are mainly related to observations and forecasting products/infrastructures, and "downstream" services that generate customized products for policy makers, industry and the general public.

The basic system infrastructure is composed of observing systems, forecasting and data assembly systems. In the following we describe components of the Mediterranean Sea infrastructure listed in metadata catalogue. Most of the present European regional observing and forecasting systems described in this report have their origin in the coordinated efforts that started in the early nineties in the Mediterranean Sea, due to EU strategic planning and associated funded projects.

Existing observing and modelling systems for the whole Adriatic region and for specific pilot areas are described.

2.2.1. Existing Observing systems – whole Adriatic Region

2.2.1.1. PP1 CMCC

SST_MED_SST_L4_NRT_OBSERVATIONS_010_004 - For the Mediterranean Sea - The CNR MED Sea Surface Temperature provides daily gap-free maps (L4) at high (HR 0.0625°) and ultra-high (UHR 0.01°) spatial resolution over the Mediterranean Sea. Remotely-sensed L4 Sea Surface Temperature (SST) datasets are operationally produced and distributed in near-real time by the Consiglio Nazionale delle Ricerche - Gruppo di Oceanografia da Satellite (CNR-GOS). These SST products are based on the night-time images collected by the infrared sensors mounted on different satellite platforms, and cover the Southern European Seas. The CNR-GOS processing chain includes several modules, from the data extraction and preliminary quality control, to cloudy pixel removal and satellite images collating/merging. A two-step algorithm finally allows to interpolate SST data at high (HR 0.0625°) and ultra-high (UHR 0.01°) spatial resolution, applying statistical techniques. These L4

data are also used to estimate the SST anomaly with respect to a pentad climatology. The most recent CNR MED L4 products are directly accessible to CMEMS users. Data older than 2 years can be accessed by specific request via CMEMS Service Desk servicedesk.cmems@mercator-ocean.eu

OCEANCOLOUR_MED_OPTICS_L4_NRT_OBSERVATIONS_009_039 - The Global Ocean Satellite monitoring and marine ecosystem study group (GOS) of the Italian National Research Council (CNR), in Rome operationally produces Level-4 product of monthly averages of the diffuse attenuation coefficient of light at 490 nm. NRT multi-sensor products (MODIS+VIIRS+OLCI) incorporate OLCI in the processing chain. For consistency with the MODIS and VIIRS NASA L2 dataset BRDF correction was applied to OLCI prior to band shifting and multi sensor merging. Hence, the single sensor OLCI data set is also distributed after BRDF correction. Data derive from the merging exercise of MODIS-Aqua and NPP-VIIRS data and separately for Sentinel3-OLCI. Kd490 is the diffuse attenuation coefficient of light at 490 nm, and is a measure of the turbidity of the water column, i.e., how visible light in the blue-green region of the spectrum penetrates the water column. It is directly related to the presence of absorbing and scattering matter in the water column and is estimated through the ratio between Rrs at 490 and 555 nm. Single sensor Rrs fields are band-shifted, over the SeaWiFS native bands (using the QAAv6 model, Lee et al., 2002) and merged with a technique aimed at smoothing the differences among different sensors. This technique is developed by the GOS. The QAA allows the inversion of the radiative transfer equations to compute the Inherent Optical Properties. Level-4 product includes monthly averages at 1 km spatial resolution along with the respective standard deviation and the number of observations in the period of integration.

OCEANCOLOUR_MED_CHL_L4_NRT_OBSERVATIONS_009_041 - The Global Ocean Satellite monitoring and marine ecosystem study group (GOS) of the Italian National Research Council (CNR), in Rome, distributes Level-4 product including the daily interpolated chlorophyll field with no data voids starting from the multi-sensor (MODIS-Aqua, NOAA-20-VIIRS, NPP-VIIRS, Sentinel3A-OLCI) and the monthly averaged chlorophyll concentration for the multi-sensor and Sentinel3A-OLCI Level-3, all at 1 km resolution. Chlorophyll fields are obtained by means of the Mediterranean regional algorithms: an updated version of the MedOC4 (Case 1 waters, Volpe et al., 2019, with new coefficients) and AD4 (Case 2 waters, Berthon and Zibordi, 2004). Discrimination between the two water types is performed by comparing the satellite spectrum with the average water type spectral signature from in situ measurements for both water types. Reference in-situ dataset is MedBiOp (Volpe et al., 2019) where pure Case II spectra are selected using a k-mean cluster analysis (Melin et al., 2015). Merging of Case I and Case II information is performed estimating the Mahalanobis distance between the observed and reference spectra and using it as weight for the final merged value. The interpolated gap-free Level-4 Chl concentration is estimated by means of a modified version of the DINEOF algorithm by GOS (Volpe et al., 2018). DINEOF is an iterative procedure in which EOF are used to reconstruct the entire field domain. As first guess, it uses the SeaWiFS-derived daily climatological values at missing pixels and satellite observations at valid pixels. The other Level-4 dataset is the time averages of the L3 fields and includes the standard deviation and the number of observations in the monthly period of integration.

OCEANCOLOUR_MED_CHL_L4_REP_OBSERVATIONS_009_078 - The Global Ocean Satellite monitoring and marine ecosystem study group (GOS) of the Italian National Research Council (CNR), in Rome, distributes Level-4 product includes both monthly averaged datasets and climatological fields, all at 1 km spatial resolution. This version has the qualification of the fully reprocessed time series (1997-2018) based on CCIv4 that incorporates NASA R2018.0 reprocessing for MODIS-AQUA, SeaWiFS and VIIRS, and POLYMER atmospheric correction for MERIS R2012.0. Rrs input spectra are provided by the Plymouth Marine Laboratory using an ad-hoc configuration of the ESA-CCI processor for CMEMS at high resolution, and they are the result of state-of-the-art algorithms for multi-sensor merging. The Chl dataset is obtained by means of the Mediterranean Ocean Colour regional algorithm: an updated version of the MedOC4 (Case 1 water, Volpe et al., 2018) and the AD4 (Case 2 water, Dalimonte and Zibordi, 2003). These are empirical algorithms that use the blue-to-green Maximum Reflectance ratio (443, 490 and 510 nm for the blue and 555 nm for the green). Discrimination between the two water types is performed by comparing the satellite spectrum at pixel-by-pixel level with the average water type spectral signature computed from the MedOC4 insitu dataset (Volpe et al., 2007) for Case 1 waters and from the CoASTS in-situ dataset (Berthon et al., 2002) for Case 2. Merging of Case 1 and Case 2 information is performed following DAlimonte et al. (2003). SeaWiFS daily climatology provides reference for the calculation of Quality Indices (QI) for Chl observations. These products identify the average chlorophyll content of the surface layer as defined by the first optical depth (roughly one fifth of the euphotic depth).

SEALEVEL_MED_PHY_L4_NRT_OBSERVATIONS_008_050;
SEALEVEL_EUR_PHY_L4_NRT_OBSERVATIONS_008_060;
SEALEVEL_MED_PHY_L4_REP_OBSERVATIONS_008_051 - Altimeter satellite gridded Sea Level Anomalies (SLA) computed with respect to a twenty-year [1993, 2012] mean. The SLA is estimated by Optimal Interpolation, merging the measurement from the different altimeter missions available (see QUID document or http://duacs.cls.fr [http://duacs.cls.fr] pages for processing details). The product gives additional variables (i.e. Absolute Dynamic Topography and geostrophic currents (absolute and anomalies)).

This product is processed by the DUACS multimission altimeter data processing system. It serves in near-real time the main operational oceanography and climate forecasting centers in Europe and worldwide. It processes data from all altimeter missions: Jason-3, Sentinel-3A, HY-2A, Saral/AltiKa, Cryosat-2, Jason-2, Jason-1, T/P, ENVISAT, GFO, ERS1/2. It provides a consistent and homogeneous catalogue of products for varied applications, both for near real time applications and offline studies.

SEALEVEL_MED_PHY_L4_REP_OBSERVATIONS_008_051 produce maps of Sea Level Anomalies (SLA) and Absolute Dynamic Topography (ADT) in delayed-time (REPROCESSED), while **SEALEVEL_MED_PHY_L4_NRT_OBSERVATIONS_008_050;**

SEALEVEL_EUR_PHY_L4_NRT_OBSERVATIONS_008_060 produce maps of Sea Level Anomalies (SLA) and Absolute Dynamic Topography (ADT) in near-real-time. The systems use the along-track

altimeter missions from products called SEALEVEL*_PHY_L3_NRT_ OBSERVATIONS_008_*. Finally, an Optimal Interpolation is made merging all the flying satellites in order to compute gridded SLA and ADT. The geostrophic currents are derived from sla (geostrophic velocities anomalies, ugosa and vgosa variables) and from adt (absolute geostrophic velicities, ugos and vgos variables). Note that the gridded products can be visualized on the LAS (Live Access Data) Aviso+ web page

http://www.aviso.altimetry.fr/en/data/data-access/las-live-access-server.html

SST_MED_SST_L4_REP_OBSERVATIONS_010_021 - The CMEMS reprocessed Mediterranean SST dataset provides 37 years of daily (nighttime) optimally interpolated (L4) satellite-based estimates of the foundation SST in the Mediterranean Sea and adjacent North Atlantic box over a 0.05° resolution grid, covering the period 1982-2018. This product is built from a consistent reprocessing of the level-3 (merged multi-sensor, L3) climate data record provided by the ESA Climate Change Initiative (CCI) and Copernicus Climate Change Service (C3S) initiatives, but also include in input an adjusted version of the AVHRR Pathfinder dataset version 5.3 to increase the input observation coverage.

2.2.2. Existing Forecasting systems – whole Adriatic Region

2.2.2.1. PP1 CMCC

MEDSEA_ANALYSIS_FORECAST_PHY_006_013 (Model version: NEMO v3.6-WW3) - The physical component of the Mediterranean Forecasting System (Med-Currents) is a coupled hydrodynamic-wave model implemented over the whole Mediterranean Basin. The model horizontal grid resolution is 1/24° (ca. 4 km) and has 141 unevenly spaced vertical levels. The hydrodynamics are supplied by the Nucleous for European Modelling of the Ocean (NEMO v3.6) while the wave component is provided by Wave Watch-III; the model solutions are corrected by a variational data assimilation scheme (3DVAR) of temperature and salinity vertical profiles and along track satellite Sea Level Anomaly observations (N.B. A new version of the mentioned product has been released on 4th May 2021 with nomenclature MEDSEA_ANALYSISFORECAST_PHY_006_013. Please check the CMEMS website for more info:

https://resources.marine.copernicus.eu/?Option=com_csw&view=details&product_id=MEDSEA_A NALYSISFORECAST_PHY_006_013).

MEDSEA_ANALYSIS_FORECAST_BIO_006_014 (Model version: MedBFM3.1) - The biogeochemical analysis and forecasts for the Mediterranean Sea at 1/24 degree are produced by means of the MedBFM model system (i.e. the physical-biogeochemical OGSTM-BFM model coupled with the 3DVarBio assimilation scheme). MedBFM model is run by OGS and uses as physical forcing the outputs of the NEMO-OceanVar model system (Med-PHY managed by CMCC). Seven days of analysis are weekly produced on Tuesday, with the assimilation of surface chlorophyll concentration from satellite observations (provided by the CMEMS-OCTAC) and chlorophyll plus

nitrate from Biogeochemical Argo floats (provided by CORIOLIS and LOV). One day of hindcast and ten days of forecast are produced daily (N.B. A new version of the mentioned product has been released on 4th May 2021 with nomenclature MEDSEA_ANALYSISFORECAST_BGC_006_014. Please check the CMEMS website for more info:

https://resources.marine.copernicus.eu/?option=com_csw&view=details&product_id=MEDSEA_ANALYSISFORECAST_BGC_006_014).

MEDSEA_ANALYSIS_FORECAST_WAV_006_017 (Model version: WAM 4.6.2) - MEDSEA_ANALYSIS_FORECAST_WAV_006_017 is the nominal product of the Mediterranean Sea Waves Forecasting system, composed by hourly wave parameters at 1/24º horizontal resolution covering the Mediterranean Sea and extending up to - 18.125W into the Atlantic Ocean. The waves forecast component (Med-Waves system) is a wave model based on the upgraded WAM Cycle 4.6.2. In the wave model the continuous wave spectrum is approximated by means of step functions which are constant in a frequency-direction bin. The Med-Waves modelling system resolves the prognostic part of the wave spectrum with 24 directional and 32 logarithmically distributed frequency bins and the model solutions are corrected by an optimal interpolation data assimilation scheme of all available along track satellite significant wave height observations. The Med-Waves set up includes a coarse grid domain with a resolution of 1/6° covering the North Atlantic Ocean from 75° W to 10° E and from 70° N to 10° S and a nested fine grid domain with a resolution of 1/24° covering the Mediterranean Sea from 18.125° W to 36.2917° E and from 30.1875° N to 45.9792° N. The system provides a Mediterranean wave analysis and 10 days Mediterranean wave forecasts updated daily (N.B. A new version of the mentioned product has been released on 4th May 2021 with nomenclature MEDSEA_ANALYSISFORECAST_WAV_006_017. Please check the CMEMS website for more info:

https://resources.marine.copernicus.eu/?option=com_csw&view=details&product_id=MEDSEA_ANALYSISFORECAST_WAV_006_017).

MEDSEA_MULTIYEAR_PHY_006_004 (Model version: NEMO v3.6) - The Med MFC physical reanalysis product is generated by a numerical system composed of a hydrodynamic model, supplied by the Nucleous for European Modelling of the Ocean (NEMO) and a variational data assimilation scheme (OceanVAR) for temperature and salinity vertical profiles and satellite Sea Level Anomaly along track data. The model horizontal grid resolution is 1/24˚ (ca. 4-5 km) and the unevenly spaced vertical levels are 141.

MEDSEA_REANALYSIS_BIO_006_008 (Model version: MedBFM1) - A reanalysis of Mediterranean Sea biogeochemistry at 1/16 degree was carried out along a time period starting from 1999, using the MedBFM biogeochemical model and data assimilation of surface chlorophyll concentration. MedBFM was driven by physical forcing fields produced as output by the Med-PHY model. The ESA-CCI database of surface chlorophyll concentration estimated by satellite and delivered within CMEMS-OCTAC was used for data assimilation. This reanalysis provides monthly means of 3D fields of chlorophyll, nutrients (phosphate and nitrate) and dissolved oxygen concentrations, net primary

production, phytoplankton biomass, ocean pH and ocean pCO2. (N.B. A new version of the mentioned product has been released on 4th May 2021 with nomenclature MEDSEA_MULTIYEAR_BGC_006_008. Please check the CMEMS website for more info: https://resources.marine.copernicus.eu/?option=com_csw&view=details&product_id=MEDSEA_MULTIYEAR_BGC_006_008).

MEDSEA_HINDCAST_WAV_006_012 - MEDSEA_HINDCAST_WAV_006_012 is the multi-year product of the Mediterranean Sea Waves forecasting system. It is a multi-year wave hindcast starting from February 2006, composed by hourly wave parameters at 1/24° horizontal resolution, covering the Mediterranean Sea and extending up to -18.125W into the Atlantic Ocean. It is produced by the Mediterranean Sea Waves forecasting system, which is a wave model based on WAM Cycle 4.5.4, which has been developed as a nested sequence of two computational grids (coarse and fine) to ensure that swell propagating from the North Atlantic (NA) towards the strait of Gibraltar is correctly entering the Mediterranean Sea (MED). The coarse grid covers the North Atlantic Ocean from 75°W to 10°E and from 70° N to 10° S in 1/6° resolution while the nested fine grid covers the Mediterranean Sea from 18.125° W to 36.2917° E and from 30.1875° N to 45.9792° N with a 1/24° (~4.6km) resolution. The Med-Waves modelling system resolves the prognostic part of the wave spectrum with 24 directional and 32 logarithmically distributed frequency bins (N.B. A new version of the mentioned product has been released on 4th May 2021 with nomenclature MEDSEA_MULTIYEAR_WAV_006 _012. Please check the CMEMS website for more info:

https://resources.marine.copernicus.eu/?option=com_csw&view=details&product_id=MEDSEA_MULTIYEAR_WAV_006_012).

2.2.2.2. PP7 ARPAE

AdriaROMS (Model version: ADROMS2K) - AdriaROMS is an Adriatic implementation of the Regional Ocean Modelling System (ROMS) that is a community, three-dimensional, hydrostatic, free-surface, finite difference model resolving the Reynolds Averaged Navier-Stokes equations. AdriaROMS is operational at ARPA-SIMC since 2005 (Russo et al., 2013).

SWANITA (Model version: Version 40.51, patch A e B), SWANMED (Model version: Version 40.51, patch A e B) - SWAN is a third-generation wave action model in which waves are described with the two-dimensional wave action density spectrum. The evolution of the wave spectrum is described in terms of action density spectrum N rather than energy density spectrum E since in the presence of currents, action density is conserved whereas energy density is not. The operational system is designed in three steps: the first one over the whole Mediterranean (~25km) with the Italian surrounding seas nested into it (~8km). The final step is designed to achieve even higher resolutions (about 800 meters) in small coastal domains by means of a further nesting technique (Valentini et al., 2007).

2.2.3. Existing Forecasting systems – pilot areas

2.2.3.1. P3 - Torre Guaceto - Canale Reale, Punta della Contessa, Melendugno in Puglia (IT)

PP1 CMCC

SANIFS (Model version: SHYFEM) - SANIFS (Southern Adriatic Northern Ionian coastal Forecasting System, Federico et al., 2017) is an operational system providing short-term forecasts of 3D currents, temperature, salinity and sea level. The horizontal resolution ranges from 3km in open sea to 100 m in overall Apulian coastal waters with higher refinement (~20m) in specific hotspots (e.g. harbors). The operational chain is based on a downscaling approach starting from the large-scale model for the entire Mediterranean basin (MEDSEA_ANALYSIS_FORECAST_PHY_006_013, operated by CMCC, e.g. Clementi et al., 2019), which provides the open-sea fields.

2.2.3.2. P2 - Transitional (e.g. Goro area and Bevano Mouth) and Coastal areas in Emilia Romagna (IT)

PP7 ARPAE

ADRIAC (Model version: COAWST) - Adriac is a coupled hydrodynamic-wave model, an implementation of COAWST in the Adriatic Sea (2-way coupling ROMS+SWAN). The model horizontal grid is ~1km, while the vertical domain is described by 30 sigma layers. The hydrodynamics is computed by the Ocean Modelling Tool (ROMS) model, while the waves are computed by the Simulating Waves Neashore (SWAN) model.

SWANEMR (Model version: Version 40.51, patch A e B) - see description of SWAN models in 2.2.2.2. PP7 ARPAE.

2.2.3.3. P11 - Marche coastal area (IT)

PP7 ARPAE

SWANMAR (Model version: Version 40.51, patch A e B) – see description of SWAN models in 2.2.2.2. PP7 ARPAE.

2.2.4. In-situ and ancillary systems

In this section, parts of in-situ data such as Abstract, Geographic Description, General Taxonomic Coverage, Taxon Classification (s) Rank Name, Taxon Classification (s) Rank Value, Method description, Sampling description and Ancillary systems are listed and described. The full metadata catalogue may be found at the project web pages (https://www.italy-croatia.eu/web/cascade).

2.2.4.1. In situ – pilot areas

2.2.4.1.1. P1 - Grado and Marano Lagoon and Gulf of Trieste (IT)
PP4 ARPAE FVG

CHEMICAL DATA COLLECTED IN GULF OF TRIESTE AND MARANO AND GRADO LAGOON_2006-2019

Abstract

The dataset contains nutrients and priority and priority hazardous substances concentrations data analyzed on water samples collected in the Gulf of Trieste and Marano and Grado lagoon, in accordance with the EU Water Framework Directive 2000/60/EC (WFD) and Italian law decree D.Lgs. 152/2006.

Geographic Description

The Gulf of Trieste is a shallow (25 m of depth), semienclosed continental shelf area of the North Adriatic basin. Atmospheric processes, discharges of continental waters and exchange of seawater at the western open boundary cause large oscillations of the salinity (10–38.5 ^{0}C) and temperature (4–29.2 ^{0}C) in the coastal waters. Water column conditions seasonally change from a persistent stratification in summer to a complete mixing in winter, but events of strong climatic circulation of shelf waters can rapidly change them in all the seasons. The lagoon of Marano and Grado is delimited by the Tagliamento river delta on west side, and by the Isonzo river delta in the eastside. The lagoon area has a long arched development parallel to the coastline. It extends for about 32 km in length, with an average distance between the coastline and the barrier islands of about 5 km, covering an area of about 160 km^2. Seawater sampling stations cover coastal-marine areas and Lagoon areas.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Samples were collected following technical methods of: Directive WFD/2000/60/CE; D.Lgs 152/06; D.M 131/08; D.M. 56/09; D.M.260/10.

Sampling description

Samples were collected following technical methods of: Directive WFD/2000/60/CE; D.Lgs 152/06; D.M 131/08; D.M. 56/09; D.M.260/10. In particular, the water samples were collected in the surface layer of the sea and transitional waters using a 2000 ml borosilicate glass vial with "Schott Duran" blue PP cap associated with HD polyethylene plastic rod without any metal details or by Niskin bottles. Next subsamples were been divided in appropriate bottles related to the nutrients analisys and priority and priority hazardous substances specific analisys. Samples were been stored in dark and cold.

PHYTOPLANCTON DATA GULF OF TRIESTE_2009-2019

Abstract

The dataset contains phytoplankton abundance data collected in the Gulf of Trieste and Marano and Grado lagoon.

Geographic Description

The Gulf of Trieste (see geographic description in **CHEMICAL DATA COLLECTED IN GULF OF TRIESTE AND MARANO AND GRADO LAGOON_2006-2019)**

General Taxonomic Coverage

All the microalgae were identified to the genera/species level.

Taxon Classification (s) Rank Name

General/species

Taxon Classification (s) Rank Value

Algae

Method description

Samples were collected following technical methods of: Directive WFD/2000/60/CE; D.Lgs 152/06; D.M 131/08; D.M. 56/09; D.M.260/10.

Sampling description

Samples were collected following technical methods of: Directive WFD/2000/60/CE; D.Lgs 152/06; D.M 131/08; D.M. 56/09; D.M.260/10. In particular, the water samples were collected in the surface layer of the sea and transitional waters using a 2000 ml borosilicate glass vial with "Schott Duran" blue PP cap associated with HD polyethylene plastic rod without any metal details, or by Niskin bottles, or by vertical profile performed by a 20 micron phytoplancton net. The samples collected were been fixed using 1.8-2.0 ml of Lugol solution and stored in dark and cold. The following phytoplancton analisys were been performed in one, two weeks.

PHYSICAL AND CHEMICAL DATA COLLECTED IN THE GULF OF TRIESTE AND MARANO AND GRADO LAGOON_2009-2019

Abstract

The dataset contains physical and chemical data obtained by multiparametric probe vertical profiles collected in the Gulf of Trieste and Marano and Grado lagoon during monitoring monthly activities.

Geographic Description

The Gulf of Trieste (see geographic description in **CHEMICAL DATA COLLECTED IN GULF OF TRIESTE AND MARANO AND GRADO LAGOON_2006-2019)**

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

High frequency vertical profile along the water column.

Sampling description

During the monitoring it was use the following sampling protocol: the route to the stations and the subsequent correct boat positioning were determined by GPS; at the first station pressure (in air) and oxygen calibration (in air) were carried out according to the probe manufacturer protocols (Idronaut 316 multiparameter probe was equipped to measure the following parameters: pressure/depth, temperature, conductivity, dissolved oxygen, pH, chlorophyll). Then the probe was positioned in the sea at about 2 m depth for hydratation and stabilization of the sensors, after about 2 minutes the probe was positioned at the surface (0.30-0.50 m depth) and the data were collected at a lowering speed of about 0.3 ms-1 at a sampling frequency of 4-10 Hz. At the other stations the pressure and oxygen calibrations were repeated only in case of uncertainty about data reliability and more profiles were performed only in cases of bad data acquisition.

The quality check procedure started soon after data acquisition. First ASCII raw data were checked by visual inspection, in order to remove blatant outliers. Then data underwent a semiautomatic procedure performed by means of a computer program that linearly interpolated possible data gaps and then computed mean values at 0.25 m depth intervals.

CONTINUOUS MONITORING SYSTEM IN THE MARANO AND GRADO LAGOON_2013-2020

Abstract

The dataset contains physical and chemical data obtained by several multiparametric probes. Data collected by monitoring stations from surface water layer. Stations are located in the Marano and Grado lagoon.

Geographic Description

The lagoon of Marano and Grado is delimited by the Tagliamento river delta on westside, and by the Isonzo river delta in the eastside. The lagoon area has a long-arched development parallel to the coastline. It extends for about 32 km in length, with an average distance between the coastline and the barrier islands of about 5 km, covering an area of about 160 km^2. Mooring sampling stations collected seasonally hydrological data from summer 2013 to autumn 2020.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Physical and chemical data collected in continuous by multiparametric probe in surface water layer.

Sampling description

Between 2013 and 2020, 5 multiparametric probes were installed on protective buoys inside the Grado and Marano Lagoon and, every hot season, re-deployed in differ location in order to cover differ key spots of the lagoon. The instruments run on batteries that can power them for 4-5 months and during this time they are completely autonomous, collecting physical-chemical data collected every 30 minutes. Data set covers summer and autumn period. Overall 18 sites have been investigated.

2.2.4.1.2. P2 - Transitional (e.g. Goro area and Bevano Mouth) and Coastal areas in Emilia Romagna (IT)

PP6 University of Bologna

PHYTOPLANKTON ABUDANCE, PHYSICAL AND CHEMICAL PARAMETERS OF GORO LAGOON 2019 - 2020

<u>Abstract</u>

The dataset contains the total phytoplankton abundances and the concentrations of: dissolved nutrients, chlorophyll a and phaeopigments, particulate carbon and total particulate nitrogen.

<u>Geographic Description</u>

Sacca di Goro, Ferrara, Emilia-Romagna, Italy. Goro lagoon is a shallow-water embayment located in the southern part of the Po River Delta, approximately triangular in shape with a surface area of 26 km^2 and an average depth of 1.5 m.

<u>General Taxonomic Coverage</u>

The phytoplankton assemblages were identified to the genus level, and, whenever possible, to species level

<u>Taxon Classification (s) Rank Name</u>

Species

<u>Taxon Classification (s) Rank Value</u>

Chromista; Plantae

<u>Method description</u>

Samples were filtered on glass fiber filters (Whatman GF/F, 47 mm) for chlorophyll a determination: extraction with acetone 90% and spectrophotometric absorbance at 750 and 665 nm; determination of phaeopigments through acidification with HCl 0,66 M (Lorenzen, 1967). Samples were filtered on glass fiber filters (Whatman GF/F, 25 mm) for Particulate Organic Carbon (POC) and Total Particulate Nitrogen (PTN) determinations: filters were oven-dried (60°C), acidified with HCl 1M and dried again (60°C, over-night), filters were individually prepared in aluminum vials and introduced in the analyzer (Menzel and Vaccaro, 1964; Gordon, 1969; Strickland and Parsons, 1972). Filtered water of each sample was collected for nutrients analysis. Nitrates and nitrites ware determinate with the colorimetric method by cadmium reduction (absorbance 543nm). The total phosphate was determinate with the colorimetric reaction of orthophosphate with molybdate ions (absorbance 885nm) (Strickland and Parsons, 1972). Total abundances of cells were determined with the Utermohl method on inverted microscope (Utermöhl, 1931).

Sampling description

Water sampling were collected each month in 4 sites of the lagoon. Samples were always taken in three replicates, transported to Ravenna and processed through several filtration within few hours from the sampling time. All the samples were stored in freezer for further analysis.

PHYTOPLANKTON ABUNDANCE, PHYSICAL AND CHEMICAL PARAMETERS OF THE LAGO DELLE NAZIONI 2019 - 2020

Abstract

The dataset contains the total phytoplankton abundances and the concentrations of: dissolved nutrients, chlorophyll a and phaeopigments, particulate carbon and total particulate nitrogen.

Geographic Description

Lago delle Nazioni, Ferrara, Emilia-Romagna, Italy. It is a semi-artificial big brackish lake, located in the seaside town of Lido delle Nazioni, with a surface area of 0,9 km^2 and an average depth of 4m. A channel regulated by a siphon ensures the water exchange through a dewatering pump connected with the terminal section of the mouth of the Po di Volano.

General Taxonomic Coverage

The phytoplankton assemblages were identified to the genus level, and, whenever possible, to species level.

Taxon Classification (s) Rank Name

Species

Taxon Classification (s) Rank Value

Chromista; Plantae

Method description

Samples were filtered on glass fiber filters (Whatman GF/F, 47 mm) for chlorophyll a determination: extraction with acetone 90% and spectrophotometric absorbance at 750 and 665 nm; determination of phaeopigments through acidification with HCl 0,66 M (Lorenzen, 1967). Samples were filtered on glass fiber filters (Whatman GF/F, 25 mm) for Particulate Organic Carbon (POC) and Total Particulate Nitrogen (PTN) determinations: filters were oven-dried (60°C), acidified with HCl 1M and dried again (60°C, over-night), filters were individually prepared in aluminum vials and introduced in the analyzer (Menzel and Vaccaro, 1964; Gordon, 1969; Strickland and Parsons, 1972). Filtered water of each sample was collected for nutrients analysis. Nitrates and nitrites ware determinate with the colorimetric method by cadmium reduction (absorbance 543nm). The total phosphate was determinate with the colorimetric reaction of orthophosphate with molybdate ions (absorbance 885nm) (Strickland and Parsons, 1972). Total abundances of cells was determined with the Utermohl method on inverted microscope (Utermöhl, 1931).

Sampling description

Water sampling were collected each month and afterwards to a bloom event were collected weekly. Samples were always taken in three replicates, carried in Ravenna and processed through several filtration within few hours from the sampling time. All the samples were stored in freezer for further analysis.

PP7 ARPAE

OCEANOGRAPHIC AND BIOGEOCHEMICAL DATA, PORTO GARIBALDI STATION, EMILIA-ROMAGNA, 2009-2021

Abstract

The Porto Garibaldi station is composed of radar tide gauge (Kalesto), a float tide gauge (Encoder) and a multiparametric sensor. It is located at Porto Garibaldi (Emilia-Romagna, Italy) providing in-situ measurements of physical parameters (temperature, salinity, sea-level, atmospheric pressure) and bio-geochemical parameters (pH, oxygen dissolved (% sat), oxygen dissolved).

Geographic Description

Porto Garibaldi, Emilia-Romagna, Italy

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Oceanographic data are measured by 2 tide gauges (radar and float) located at the Porto Garibaldi station. The bio-geochemical data are provided by a multiparametric sensor added to the station. The data provided are processed and they are also available online on the Arpae platform (https://simc.arpae.it/dext3r/). The data are provided in .xls or .csv formats.

Sampling description

The Porto Garibaldi tide gauge provides in-situ measurements of Sea level with a sampling interval of 10 minutes, sea surface temperature, pH, salinity, oxygen dissolved (% sat), oxygen dissolved with a sampling interval of 1 hour and air temperature and atmospheric pressure at a sampling interval of 15 minutes.

WAVE PARAMETERS, NAUSICAA BUOY, CESENATICO, EMILIA-ROMAGNA, 2007-2021

Abstract

Wave Buoy located off Cesenatico municipality (Emilia-Romagna, Italy) at about 10m depth (named Nausicaa) providing in-situ measurements of wave parameters (wave height, wave period, wave direction, sea surface temperature).

Geographic Description

Cesenatico, Emilia-Romagna, Italy

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Wave parameters and sea surface temperature are measured by the Nausicaa buoy located offshore of Cesenatico at about 10m depth. The data provided are processed and they are also available online on the Arpae platform (https://simc.arpae.it/dext3r/). The data are provided in .xls or .csv formats.

Sampling description

The wave buoy provides in-situ measurements of wave parameters (direction, period and wave height) and sea surface temperature with a sampling interval of 30 minutes.

BIOGEOCHEMICAL DATA, MULTIPARAMETRIC PROBES, EMILIA-ROMAGNA, 2009-2021

Abstract

Coastal observing system composed of 6 multiparametric probes providing in-situ measurements of water temperature, salinity, pH, oxygen dissolved and oxygen dissolved (% sat).

Geographic Description

Goro Lagoon and Comacchio Valleys, Emilia-Romagna, Italy.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Biogeochemical parameters are gathered by 6 multiparametric probe stations located in the Goro Lagoon and in the Bellocchio transition area (Comacchio Valleys).

The data provided are processed and they are also available online on the Arpae platform (https://simc.arpae.it/dext3r/). The data are provided in .xls or. csv formats.

Sampling description

The 6 multiparameter probe stations provide in-situ measurements of water temperature, salinity, pH and oxygen dissolved (% sat) with a sampling interval of 1 hour.

2.2.4.1.3. P3 - Torre Guaceto - Canale Reale, Punta della Contessa, Melendugno in Puglia (IT)
LP APULIA REGION

DIATOMS_RIVERS_ 2010-2019

MACROPHYTE_RIVERS_ 2010-2019

FISH FAUNA_RIVERS_2010-2017

MACROINVERTEBRATES_CA_AT_MC_2010-2019

CHEMICAL-PHYSICAL PARAMETERS_CA_LA_AT_MC_VP_2010-2019

PHANEROGAMS_AT_MC_2010-2019

PHYTOPLANKTON_LA_AT_MC_2010-2019

MACROALGAE_AT_MC_2010-2019

Abstract

The dataset contains data collected in the framework of the Monitoring of Apulian Surface Waters in accordance with the provisions of WFD: EC 2000/60, and D.Lgs 152/2006. The monitored categories are: rivers (CA), lakes/reservoirs (LA), transition waters (AT), coastal waters (MC), fish waters (VP).
In particular, data are related to:
- benthic diatoms expressed in number of individuals/reference total, monitoring conducted on rivers, Canale Reale and Fiume Grande, between 2010 and 2019;
- macrophyte expressed in % coverage/ 100, monitoring conducted in collected on river Canale Reale between 2010 and 2019;
- fish fauna expressed in Abundance: n/100 m river section; Biomass: g/100 m river section, monitoring conducted on river Fiume Grande between 2010 and 2017;

- macroinvertebrates expressed as abundance in individuals/m2, monitoring conducted on rivers (CA), transitional waters (AT) and coastal waters (MC) in the area between Torre Canne and Alimini between 2010 and 2019.
- chemical and physical parameters on waters, sediments and biota, monitoring conducted on rivers (CA), lakes/reservoirs (LA), transitional waters (AT), coastal waters (MC) and fish waters (VP), in the area between Torre Canne and Alimini between 2010 and 2019.
- phanerogams, in particular, for AT Ruppia cirrhosa an for MC Posidonia Oceanica, monitoring conducted on transitional waters (AT) and coastal waters (MC) in the area between Torre Canne and Alimini, between 2010 and 2019.
- phytoplankton, for AT and MC (diatoms, dinoflagellates, other phytoplankton) expressed in cell/l; for LA (diatoms, dinoflagellates, cyanobacteria, other phytoplankton) expressed in abundance (cell./l) and in biovolume (mm3/L); monitoring conducted on lakes/reservoirs (LA), transitional waters (AT) and coastal waters (MC) in the area between Torre Canne and Alimini, between 2010 and 2019;
- macroalgae, for AT (Chlorophyta, Charophyta,Rhodophyta) data about abundance,presence of epiphyte, tetrasporophyte, female gametofite, carposporophyte, propagulis; pleustophyte biomass expressed in g dry weight/0.25 m2; for MC macroalgae CARLIT Community, % of presence/sectors % of dominance/sectors; monitoring conducted on transitional waters (AT) and coastal waters (MC) collected in the area between Torre Canne and Cesine between 2010 and 2019

Geographic Description

Areas between Torre Canne and Torre Guaceto, Marine Protected Area of Torre Guaceto, Canale Reale and Punta della Contessa; Melendugno, Apulia Region, Italy.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The sampling methods and analytical procedures are reported in the Final Monitoring Reports of the individual years, available at the following links:

- https://www.arpa.puglia.it/pagina2976_i-ciclo-sessennale-2010-2015.html
- https://www.arpa.puglia.it/pagina2975_ii-ciclo-sessennale-2016-2021.html

Sampling description

Samples were collected following technical methods of: Directive WFD/2000/60/CE; D.Lgs 152/06; D.M. 56/09; D.M.260/10 (monitoring of Biological Quality Elements (EQB) and chemical monitoring according to Table 1/A and Table 1/B

The sampling design was:

- diatoms in rivers: one sampling site for each station, half-yearly sampling
- macrophyte in rivers: one sampling site, half-yearly sampling for
- fauna in rivers: one sampling site, annual sampling for fish
- macroinvertebrates: for rivers one sampling site for each station, quarterly sampling. For transitional waters three replicates for each sampling site, half-yearly sampling. For coastal waters two sampling site for each station, one or three replicates for each site, half-yearly sampling
- chemical-physical parameters: for CA one sampling site for each station, monthly sampling on waters; for LA one sampling site for each station, bimonthly sampling on waters; for AT one sampling site for each station, quarterly sampling on waters, annual sampling on sediments; for MC two sampling sites for each station, bimonthly sampling on waters, annual sampling on sediments, annual sampling and one sampling site on biota; for VP one sampling site for each station, annual mean value of monthly sampling
- phanerogams: for transitional waters one or two replicates for each sampling site, annual sampling. For coastal waters picking at two different depths for each sampling site, annual sampling
- phytoplankton: for lakes/reservoirs for each sampling site, three different depths (surface, intermediate, bottom), bimonthly sampling; for transitional waters one sampling site for each station, quarterly sampling; for coastal waters one sampling site for each station, bimonthly sampling
- macroalgae: for transitional waters one sampling site for each station, half-yearly sampling in spring and autumn; one, two or three replicates for each site. For coastal waters three sampling site for each station (A,B,C) with different morphology of the coast; annual sampling.

BATHING WATERS_2010-2020

Abstract

The dataset contains data related to bathing waters collected in the framework of the Monitoring of Apulian Bathing Waters_2010-2020 in the area between Fasano and Melendugno. The monitored parameters are: Intestinal enterococci and Escherichia coli, expressed in CFU/ml (colony forming units/ml).

Geographic Description

Area between Torre Canne and Torre Guaceto, Punta della Contessa-Brindisi, Melendugno, Apulia Region, Italy

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Sampling was carried out in accordance with the D.lgs. 30/05/2008 n. 116 and D.M. 30/3/2010 (G. U. del 24/05/2010 S.O. 97), implementing the European Directive 2006/7/CE on Bathing Waters. For sampling analysis: ISO 7899-2 for Intestinal enterococci and ISO 9308-1 for Escherichia coli

Sampling description

Samples were collected following technical methods of: D.lgs. 30/05/2008 n. 116 and D.M. 30/3/2010 (G. U. del 24/05/2010 S.O. 97), implementing the European Directive 2006/7/CE on Bathing Waters. Monthly sampling frequency over the bathing season (starting from April until the end of September). One established monitoring point within each bathing area.

OSTREOPSIS OVATA_2010-2020

Abstract

The dataset contains data collected as part of the management of the proliferation of potentially toxic algal species in the framework of the Monitoring of Bathing Waters. The monitored parameter was *Ostreopsis ovata* occurrence, expressed in cells/l in Apulia Region (Italy).

Geographic Description

Area of Torre Canne, monitoring station in front of the lighthouse, Fasano, Apulia Region, Italy.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The analytical method for the determination of Ostreopsis ovata was: method Utermöhl (Zingone et al., 2010)

Sampling description

One monitoring point for each sampling site. The monitoring of *Ostreopsis ovata* was carried out during the summer season, from June to September, sampling every 15 days (increased frequency in case of flowering), picking at two different depths for each sampling site: ground water and column water.

REGIONAL GROUNDWATER BODIES_2015-2018

Abstract

The dataset contains data collected in the framework of the project of monitoring of groundwater bodies of Apulia, called "ProgettoMaggiore". The monitored parameters are: Field parameters, Ionic species, Metals, Aliphatic compounds, Chlorinated Carcinogenic Aliphatic compounds, Non-carcinogenic Aliphatic Chlorinated Compounds, Halogenated Aliphatic Compounds Carcinogenic, Organic Aromatic Compounds, Chlorobenzenes, Nitrobenzenes, Polycyclic Aromatic Hydrocarbons, Total Hydrocarbons, Pesticides, PCB, PCDF and PCDD in groundwater bodies, Apulia Region (Italy).

Geographic Description

Area from Fasano to Brindisi and from Vernole to Carpignano Salentino, Apulia Region, Italy.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The methods applied for the determination of analytical parameters on groundwater bodies are available at the link:

https://drive.google.com/file/d/15Mes2j-yTspyWdqdRaEHINYKJVKExA8K/view?usp=sharing

Sampling description

Samples were collected following technical methods of: Directive WFD/2000/60/CE; D.Lgs 152/06; D.Lgs. 30/2009. One sampling site for each station, three-year sampling cycle, six-monthly monitoring campaigns.

CONTINUOUS MAREOGRAPHIC MONITORING IN BRINDISI FROM 2006 TO 2020

Abstract

The dataset contains data collected in the framework of Oceanographic Weather Information System of the Apulian Coast (SIMOP). The monitored parameters are air temperature (in °C) and upper sea level (in m).

Geographic Description

Brindisi, Apulia Region, Italy.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Data acquisition 10 seconds; data memorization 15 minutes

Sampling description

Continuous sampling

MARINE STRATEGY_APULIA REGION_2015-2017_MODULE1

MARINE STRATEGY_APULIA REGION_2015-2017_MODULE2

MARINE STRATEGY_APULIA REGION_2015-2017_MODULE3

MARINE STRATEGY_APULIA REGION_2015-2017_MODULE4

MARINE STRATEGY_APULIA REGION_2015-2017_MODULE5

http://www.db-strategiamarina.isprambiente.it/app/#/data_consultation

Abstract

The dataset contains data collected in the framework of the Monitoring program "Marine Strategy" in Apulia Region (Italy).
Data are related to:
- Module 1 - chemical / physical parameters, pelagic habitats, water contaminants. The monitored parameters are: Salinity, Temperature (water), Electrical conductivity, Dissolved oxygen, Oxygen saturation, pH, Chlorophylla, Secchi depth, Nitrate, Nitrite, Ammonium,

Total phosphorus, Orthophosphates,Total nitrogen, Silicate, Phytoplankton, Mesozooplankton, Plankton_CD, Macrozooplankton, Macrozooplankton_oss,

- Module 2- Microplastics. The monitored parameters are: Microplastics with fishing net, Microplastics sampling
- Module 3 - Non-indigenous species chemical / physical parameters, Phytoplankton, Mesozooplankton. The monitored parameters are: Salinity, Temperature (water), Secchi depth, Phytoplankton Net, Phytoplankton Niskin, Mesozooplankton
- Module 4 - Waste. The monitored parameters are: presence of the waste, beached or dropped from the ground
- Module 5I and 5T - Contamination. The monitored parameters are: metals, organometals, polycyclic aromatic hydrocarbons, pesticides, Pcbs and dioxins

Geographic Description

Apulia Region, Italy.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The methods applied at sampling and analytical determination of parameters are available at the link:https://drive.google.com/drive/folders/15PkhOOmQz_wWq0GLIP2paBwT1zHhVTDd?usp=sharing

Sampling description

Samples were collected according to technical methods of: Directive 2008/56/CE ; D.Lgs 190/2010 and D.M. 11/02/2015. Monitoring activities have been organised at the level of marine sub-regions (for Apulia Adriatic Sea region) and carried out by the Regional Environmental Agencies (ARPA) of the coastal regions.

PP1 CMCC

PHYSICAL-CHEMICAL-BIOTICAL PARAMETERS_ TORRE GUACETO_2019

Abstract

The dataset contains data of temperature, conductivity, fluorescence, dissolved oxygen acquired in the surface water in Torre Guaceto Marine Protected Area.

Geographic Description

The Torre Guaceto Marine Protected Area (MPA) coastline, despite being relatively short, is characterized by a high degree of diversity. The seabed is characterized by both sandy bottom, coralligenous and *Posidonia oceanica* meadows. The MPA is delimited by a series of signal buoys, which are useful to test innovative low-cost measuring systems and sensors, in order to study physical-chemical and bio-optical features of marine water.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Temperature, Conductivity, Dissolved Oxygen, Fluorescence sensors were installed for short periods on a buoy in the Torre Guaceto Marine Protected Area.

Sampling description

The sampling will be in continuous.

PP9 University of Salento

MACROZOOBENTHOS TORRE GUACETO 2001-2002

Abstract

The dataset contains abundance and body size data of the benthic macroinvertebrates community of Torre Guaceto (Apulia, Italy). Data refer to 34 taxa and 11342 individuals.

Geographic Description

Torre Guageto brackish coastal lagoon

General Taxonomic Coverage

All macroinvertebrates were identified to the genus level, and, whenever possible, to species level.

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Animals were collected in 17 sites of Torre Guaceto (Italy), in summer and winter, using the leaf pack technique. Before sampling, leaf packs (5 mm mesh size) were filled with 3.000 + 0.005 g of oven-dried leaves (60 °C, 72 h). For each sampling site, three leaf packs were placed and retrieved after 7, 18 and 46 days (the sampling time is reported in the field measurementRemarks of the dataset) of continuous submersion from each site and in the two seasons considered. Leaf packs were placed in separate plastic containers and rapidly brought to the laboratory, where the leaves were gently washed with tap water to remove sediments and animals. All animals were identified to the genus level, and, whenever possible, to species level, counted, measured (body length) and their body mass determined.

Sampling description

The sampling design was as follows: 2 seasons, 3 sampling times, 17 sampling sites, 3 leaf packs for sampling site.

MACROZOOBENTHOS_CADSES PROJECT_2004-2005_BOXCORER

Abstract

The dataset contains abundance and body size data of the benthic macroinvertebrates communities of 12 coastal lagoons located in five different countries (Italy, Albania, Greece, Bulgaria and Romania) in the context of the INTERREG IIIB. Data refer to 262 taxa and 53637 individuals.

Geographic Description

Transitional water ecosystems located in Albania, Bulgaria, Italy, Greece, Romany.

General Taxonomic Coverage

All macroinvertebrates were identified to the genus level, and, whenever possible, to species level.

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Data were collected from different habitat types in each lagoon in two seasons (autumn 2004 and spring 2005). A factorial combination of three categories of bottom substrate (rock, sand, mud) and four categories of vegetation cover (bare sediments, seagrasses, seaweeds, emergent macrophytes) was used to classify benthic habitats into twelve types. In every lagoon, the two or three most

important habitat types were sampled, with two sampling stations per habitat type and 5 replicates per station (i.e., from 40 to 60 samples per ecosystem; TWReferenceNET, Technical Report on the Biotic Indices of Natural Heritage Safety in Transitional Waters, www.twreferencenet.eu/ Products section). All samples were collected by box-corer (0.03 m^2), sieved through a 0.5 mm mesh sieve and stored in 4% buffered formalin solution. Within six months of collection, all invertebrates were identified to the lowest possible taxon, measured (body length) and their body mass determined. Individuals larger than 20 mm were measured with callipers to the nearest 0.5 mm. Body length measurements were performed in accordance with standard procedures available in the literature for the different taxa sampled in this study. Total body length was measured for Hirudinea, Oligochaeta, Nematoda and Nematomorpha. For Insecta, Crustacea and Polichaeta body length was measured as the distance from the anterior part of the head to the end of the last abdominal segment (excluding cerci, antennae and other appendages). Body length was measured as total shell height for Gastropoda and as valve length at the longest point for Bivalvia. All individuals were then oven-dried to constant weight for at least 72 h at 60^{0}C and then weighed to the nearest ± 1g on a Sartorius (MC 5) micro-analytic balance. All individuals in the same taxonomic category and geographic location were pooled inside numbered crucibles and burned in a muffle furnace at 500^{0}C for 6h. Mass data were then expressed as ash-free dry mass (AFDM).

Sampling description

The sampling design was as follows: 2 times, 12 ecosystems, 2/3 habitat types for ecosystem, 2 stations for habitat type and 5 replicates for station.

MACROZOOBENTHOS_CADSES PROJECT_2004-2005_LEAFPACK

Abstract

The dataset contains taxonomic and body size data of benthic macroinvertebrates collected during the spring 2005 in 15 Mediterranean and Black Sea transitional water ecosystems Data refer to 188 taxa and 34492 individuals.

Geographic Description

Transitional water ecosystems located in Albania, Bulgaria, Italy, Greece, Romany.

General Taxonomic Coverage

All macroinvertebrates were identified to the genus level, and, whenever possible, to species level.

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The study was carried out during spring 2005 in 15 ecosystems, each with four sampling sites, selected according to an intra-habitat typology classification, and with five replicates per site. The sampling strategy was based on leaf pack technique. Leaves were collected simultaneously and from the same area at the beginning of autumn; the basal and apical parts of all leaves were cut off and only the central leaf section was used for leaf packs. An estimate of the initial ash free dry weight of leaves was determined on sub-samples of leaves. In spring, litter bags (0.5 cm mesh size) were filled with 3.000 + 0.005 g of oven-dried leaves (60^0C, 72 h), five leaf bags being placed at each sampling site. It was planned to retrieve all bags after 30 days immersion but because of poor weather conditions, the immersion period varied slightly among ecosystems. Six ecosystems were sampled after 30 days (Kalloni, Karavasta, Narta, Pialassa, Sinoe, Varna); seven after 35 days (Alimini, Cesine, Grado Marano, Grado fish farm, Leahova, Margherita di Savoia and Torre Guaceto); and two after 40 days (Grado Cavanata and Patok). In the laboratory, the leaves were gently washed with tap water to remove sediments and macroinvertebrate colonizers. All animals were identified to the lowest possible taxon, counted, measured (body length) and their body mass determined.

Sampling description

The sampling design was as follows: 15 ecosystems, 4 sampling sites for ecosystem and 5 replicates for site.

MACROZOOBENTHOS_BRINDISI_2003-2004

Abstract

The dataset contains taxonomic and morphological data of the macroinvertebrates community of a Nationally designated area in South Italy (Brindisi, Apulia). Data refer to 19504 individuals.

Geographic Description

Nationally designated area in South Italy (Brindisi, Apulian).

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The sampling strategy was based on leaf pack technique. The leaves used as detritus were *Phragmites australis* being the most representative species of riparian flora and therefore widely

distributed in the study area. Leaves were collected from the study site; the basal and apical parts of all leaves were cut off and only the central section was used. Before sampling, leaf packs (5 mm mesh size) were filled with 3.000 + 0.005 g of oven-dried leaves (60 ^{0}C, 72 h). Samplings were carried out from September 2003 to August 2004 in 9 sampling sites located in 7 water bodies of Brindisi area. For each sampling site, three leaf packs with leaves of *Phragmites australis* were placed. The packs were retrieved after 30 days of continuous submersion from each site and in 8 times placed in separate plastic containers and rapidly brought to the laboratory, where the leaves were gently washed with tap water to remove sediments and macroinvertebrate colonizers. All animals were identified to the genus level, and, whenever possible, to species level, counted, measured (body length) and their body mass determined.

Sampling description

The sampling design was as follows: 8 times, 9 sampling sites and 3 leaf bags for sampling site.

PHYTOPLANKTON TORRE GUACETO 2005-2006

Abstract

The dataset is part of a Master degree study, developed by Dr. Luigi Palmisano, with a thesis titled "Evaluation of transitional coastal environment health status: Torre Guaceto" in 2005. Taxonomic and morphological phytoplankton data are related to organisms collected in an Apulian marine protected area (MPA), Torre Guaceto, located 15km to the North of Brindisi (Puglia region) in the Adriatic Sea. Considering its naturalistic importance, Torre Guaceto was awarded as Site of Community Importance (SIC) and Special Protected Area. The aim of this work is to analyze phytoplankton communities structure of Torre Guaceto bay (Italy), taking into account the effect of freshwater (Canale Reale) and brackish water inputs.

Geographic Description

Torre Guageto brackish coastal lagoon.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Water phytoplankton samples were preserved with Lugol (15 ml/L of sample). These samples were observed with a Nikon Diaphot T300E inverted-microscope following Utermöhl's (1985) method, at 400x magnification. Samples were divided into sub-samples and 400 organisms were counted for

taxonomic identification and cell size / abundance computations in each of them. Phytoplankton counts and morphometric measurements were performed semi-automatically using a video-interactive image analysis system (L.U.C.I.A, Laboratory Imaging) connected to the microscope. Taxonomic identification was carried out using several references.

Sampling description

Samples were collected during September and November 2005 and January 2006 using a Niskin bottle. The sampling design was as follows: 2 sampling ecosystems (M=within the bay, L=offshore the bay), 2 stations for ecosystem (1,2).

PHYTOPLANKTON_BR_CE_C_2014_2017

Abstract

This dataset provides broad information on taxonomic and morphological (shape, linear dimensions, biovolume, cell abundance, cell size) structure of phytoplankton communities, in an impacted marine coastal area. The study was conducted in order to understand the role of anthropogenic pollution on phytoplankton community. For this reason, 3 different areas, along a pollution gradient, were considering. Data were collected at different spatial and temporal scales, in marine ecosystems, located in South Adriatic Sea, close to an industrial area and a marine protected area, in Brindisi, along Salento Peninsula (Puglia region, Italy).

Geographic Description

South Adriatic Sea

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Water phytoplankton samples were preserved with Lugol (15 ml/l of sample). These samples were observed with a Nikon Eclipse Ti-S inverted-microscope following Utermöhl's (1985) method, at 400-600x magnification. 400 organisms were counted for taxonomic identification and cell size / abundance computations. Phytoplankton counts and morphometric measurements were performed semi-automatically using a video-interactive image analysis system (L.U.C.I.A Version 4.8, Laboratory Imaging) connected to the microscope. Taxonomic identification was carried out using several references. The calculation of organism biovolume was based on geometric

approximations assigning a geometric shape for determination of volume following Vadrucci et al. (2007) and Atlas of geometric shape

(http://phytoplankton.lifewatch.unisalento.it/en-us/products/AtlasOfShapes.aspx?ID_Tipo=0).

Biovolume was converted in biomass using Menden Deur e Lessard (2000) equations.

Sampling description

Samples were collected during March, May, October 2014, April 2016 and March, May, July 2017 using a Niskin bottle. The sampling design was as follows: 3 sampling ecosystems, 3 stations for ecosystem and 2 depths for stations. Cerano (industrial area), Brindisi, and a Reference site are the 3-sampling marine coastal ecosystems. In each ecosystem, samples were collected along 2 transect, in 3 station located at 200, 1000 and 3000 meters from the coastal zone, respectively mentioned as N(near), M (medium) and F(far). For each station, samples at surface (T=top) and bottom (D=down) depth were collected.

CHECKLIST OF FLORA AND FAUNA NATURA 2000 APULIA

Abstract

The dataset provides data on the flora and fauna of the Natura 2000 of Apulia region. The dataset is a collection of bibliographic data on the presence of species of fauna and flora belonging to the red list and not present in Natura 2000 sites. The data was collected considering everything that has been published locally, regionally and nationally. This research included not only data included in the literature but also to the so-called "gray literature". For this research were consulted articles published in local magazines, dissertations, brochures and data published in journals of higher knowledge.

Geographic Description

Natura 2000 sites of Apulia region.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Collection of data on the presence of species of fauna and flora belonging and not belonging to the Red List of Natura 2000 sites, especially in coastal wetlands. Data collected both at a regional and national level, but also data from papers published both in literature, from other INTERREG projects

and not, both in gray literature concerning the coastal wetlands. The collected data were used to make a data-set that includes the name of the species, the group of each species, type of preservation if they belong to the Red List, Habitats Directives or CITES, and finally the data on the origin of publications.

Sampling description

N/A

DATASET_BIODIVERSITY_ALIENSPECIES_TRANSITIONALWATERS_LIFEWATCH_2015

Abstract

The dataset contains more than 3800 occurrence data divided among 9 Eunis species groups (Algae, Amphibian, Birds, Cyanobacteria, Fishes, Flowering Plants, Invertebrates, Protists, Reptiles). Data refer to alien species and native species distributed within 23 sites and 4 Eunis habitats (level 2) all around Italy.

Geographic Description

Transitional water ecosystems of Italy

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Taxonomic records were gathered from specific datasets belonging to several research institutions, both public and private. These data were shared within the context of the Alien Species Showcase created within the framework of the infrastructure LifeWatch. The definition of Alien Species adopted is available within "Alien Species Thesaurus" produced by LifeWatch Italy community.

Sampling description

N/A

CHEMICAL PARAMETERS 2016-2018_WATERECOSYSTEMS_APULIA_ITALY

Abstract

The dataset contains concentrations data of heavy metals and chlorinates pesticides.

Geographic Description

Coastal waters, transitional waters and rivers of Apulian region (Brindisi, Italy)

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Heavy metals determination were carried out following the UNI ISO 17294 CON HIGH MATRIX INT. E CELLA DI COLLISIONE procedure while to analyze pesticide the EPA 3510C- EPA 8270D procedure was used.

Sampling description

Water matrix: sampling were carried out collecting water every month in riverine and transitional water environment; in marine coastal waters water was sampled every two month in the Torre Guaceto Marine Protected Area and every three months in the stations located at Northern and Southern MPA boundaries. Sediment matrix: the sediment matrix was sampled annually in all the environments.

Biota matrix: monitoring regarding heavy metals and pesticides in biota matrix were conducted just in two stations located 1) at the northenr boundary of Torre Guaceto MPA and 2) inside the MPA. The sampling were carried out annually also for this matrix.

HEAVY METALS IN TORRE GUACETO AND SALINE PUNTA DELLA CONTESSA SEDIMENTS

Abstract

The dataset contains data about concentration of bioavailable heavy metals (Cr, Cd, Pb and Cu) in coastal marine sediments collected in March 2000 and heavy metals concentration data in "Saline Punta della Contessa" area referred to two sampling period June and November 2009.

Geographic Description

Torre Guaceto MPA; Punta della contessa salt flat ecosystem

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Sediment samples were collected using a multicorer (6-cm inner core diameter) on sand–muddy sediments or using a modified VanVeen grab for sampling detritic coarse bottoms. The cores were horizontally sliced and the surface 1-cm sediment was used for heavy metal analyses, bacterial abundance and biomass determinations and b-glucosidase and bacterial secondary production measurements. Sediments collected for heavy metal and organic matter determination were stored at 20°C. For total heavy metal analyses, 0.2 g of dried sediment was added with 4 ml of 'aqua regia' and treated in Teflon PTFE vessels for 5 min at 250 W, followed by 5 min at 320 W and 10 min at 380 W in a microwave oven. After centrifugation, the supernatant was analyzed by atomic emission spectroscopy (ICP-AES) for Cu, Pb and Cr determinations, and by atomic absorption spectroscopy (ETA-AAS) for Cd measurements. Heavy metal speciation in the sediments was determined by means of a selective extraction procedure, which utilized, sequentially, specific chemical reagents to extract the different geo-chemical phases;

Sediment samples were collected using Van Veen grab. The surface sediments (first 2 cm) resulting from the grab were homogenized, transferred into HDPE containers and stored at -20°C for next laboratories analysis. To metal determination sub-aliquots of surface sediments (0-2 cm layer) were completely dissolved using acid digestion and analyzed by ICP-AES (Al, As, Cd, total Cr, Cu, Fe, Pb, Zn).

Sampling description

The sampling area included eight transects and each transect included three stations at 10, 20 and 50m water depth. Sampling strategy included five transects along putative pollution gradients or from anthropogenically impacted areas, while the remaining transects, without any evident anthropogenic impact, were utilized as control; 2. Samples of seawater and sediments were collected at 9 stations placed on 3 coast-orthogonal transects. The transects were 1000 m apart from each other, on each transect, 3 stations were investigated (located at 500, 1000 and 3000 m from the coast, respectively M1, M2, M3). At each station, a synoptical acquisition of physico-chemical, chemical and biological data was performed. Sampling was performed in June 2009 and in November 2009.

HEAVY METALS CANALE REALE 2007-2008 ECODO-NET PROJECT

Abstract

The dataset contains concentration data of heavy metals analysed in 2007/2008 and collected in 8 sampling sites along Canale Reale River, inside and outside the Torre Guaceto MPA (Apulia, Italy) during "ECODO-NET" INTERREG IIIA/ Greece – Italy project. This project had the aim to develop a virtual observatory model - via web (ecodo) - of ecosystems of Acherontas, Kalamas and Torre Guaceto and it application both as a mobile exhibition and as a permanent kiosk for public use for the sustainable development of coastal ecosystems. Data refers to lead, cadmium, copper and zinc.

Geographic Description

Canale Reale is a water body flowing along the Torre Guaceto MPA. Sampling point were located along the river inside and outside the reserve.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The water samples were transferred into the laboratory where pH was measured for each sample, filtered using Whatman Schleicher & Schuell 0.45 µm syringe filters and labeled with F. Part of the filtered samples were then acidified with concentrated HNO_3 to pH ≤ 2 (specifically, 100 µl of acid per 100 ml of sample), designated as FA. All the samples were stored in the refrigerator (t ≈ 4 °C). The Metrohm 231 method (Metrohm Application Bulletin 231-E) was adopted for the simultaneous determination of Zn, Cd, Pb, Cu by ASV in pulsed differential mode in the F and FA fractions of the samples taken. For the measurement, 10 ml of sample were added with 1 ml of 0.5 M acetate buffer (pH = 4.6 ± 0.2) with 1.5 M KCl as support electrolyte. The concentrations of the individual metals were determined by the method of standard additions of a multi-element solution of Zn (10 mg/L), Cd (0.1 mg/L), Pb (0.5 mg/L), Cu (2.5 mg/L) in 0.014 M HNO_3, prepared from stock solutions of Cu, Zn, Cd and Pb 1 g/L. Three standard and three replicate additions were performed per measurement.

A classic three-electrode cell configuration was used with a pendant drop mercury electrode (HMDE) as working electrode, a Pt counter-electrode and an Ag/AgCl reference (KCl 3.5 M). The Metrohm VA 797 Computrace polarograph with 813 Compact Autosampler and 800 Dosino computerized dosing system was used. All Fluka TraceSelect reagents and ultrapure water (18.2 MΩ) were used using the Millipore Milli Q system.

P

P

Sampling description

Water samples were collected in 8 sites along Canale Reale water body between April 2008 and September 2007 using polyethylene flasks. 5 sites were located inside the Torre Guaceto MPA boundaries and 3 were located outside the MPA.

2.2.4.1.4. P4 - Neretva river mouth (HR)

PP10 Institute of Oceanography and Fisheries (IOF)

CHEMICAL INDICATORS NERETVA 1996-2019

Abstract

The dataset contains concentrations of metals (Cd, Pb, Cu, Hg, Cr), Lindan, DDTx, PCBx, TSM, O2, ORG, NeORG in Neretva river (Ploče, Croatia).

Geographic Description

Naron is the Roman name for Neretva, the longest affluent river entering the Adriatic Sea in the Western Balkans and with the biggest discharge. The Neretva river is the largest tributary (225 km) entering the Adriatic Sea, and it covers 20% of the total water basin of Bosnia and Herzegovina. By its characteristics, Neretva is a typical mountain river with strong hydropower potential. Today, Neretva is the only river in this region with a delta at its mouth. In Croatia the Delta area is recognized as very significant for protection of nature and biodiversity, so that in last few years there are activities undertaken by Government to protect the Neretva delta and its population as a future Nature Park from further devastation. Seawater, sediment and biota samples were collected from different locations of the Neretva River (Saint Ivan - mouth of river Neretva - OT04; Port of Ploče - OT06a; Ploče (port) - OT06, OT05, OT35, OC03).

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Method description for determination of metals in sediment samples: Sediment samples are freeze-dried and sieved. Sediment fraction <2 mm is used for further trace metal analysis. Closed vessel microwave digestion with nitric acid and hydrofluoric acid is used for sample wet digestion.

Method description for determination of metals in shellfish samples: Whole body tissue samples are freeze-dried. Closed vessel microwave digestion with nitric acid is used for sample digestion.

Method description for determination of suspended matter: During oceanographic cruises, samples are taken to determine the concentration of suspended solids at selected stations, at a depth of 10 m, and in the bottom layer. Two dm^3 of sea water are sampled at stations where the transparency exceeds 10 m and 1 dm^3 of sea water if the transparency at the station is less than 10 m.

In period before 2014 samples are filtered through (pre-weighed) glass fiber filters (Whatman GF/F) with 0.45 μm pore size. After 2014. total suspended matter for the Central Adriatic station - OC03 was made according to the standard for the determination of suspended solids "Water quality - Determination of suspended solids - Method by filtration through a glass fiber filter (EN 872: 2005)" using a glass filter of pore size (0.6 - 0.8) micrometers (Whatman GF/F filter).The filters are washed after filtration with 200 ml of distilled water. Determination of DDTs and PCBs in sediment samples: At each station, one sample of surface sediment (layer 0-3 cm) was sampled by diving into an Al-vessel. After sampling, sediments were transferred to the laboratory, frozen at -20 °, lyophilized and sieved through a stainless steel sieve (<250 μm). Samples of sieved sediment (10 g) were extracted by the Soxhlet method, with removal of sulfur, and separation of components into fractions using a column with activated florisil. The mass fractions of lindane, DDT compounds (p, p`-DDE + p, p`-DDD + p, p`-DDT) and PCB compounds (arochlor 1254 + arochlor 1260) were determined by gas chromatography with electron capture detector (GC-ECD) on the capillary column (UNEP/FAO/IOC/IAEA, 1988). The internal standard and reference material IAEA-408 were used to verify the analytical procedure. The mass fractions of hazardous substances are expressed in μg kg-1 in relation to the dry weight (d.w.).

Determination of Lindan, DDTs and PCBs in shellfish samples: After sampling, the mussels were cleaned, washed in seawater, and transferred to a laboratory where soft tissue was dissected (UNEP/FAO/IAEA/IOC, 1991). The weight and length of the shell and the mass of the total soft tissue were determined for each individual. After dissection, the soft tissue composite samples were lyophilized and homogenized. Lyophilized tissue samples (~5g) were extracted by the Soxhlet method and purified with sulfuric acid. The mass fractions of lindane, DDT compounds (p, p'-DDE + p, p'-DDD + p, p'-DDT) and PCB compounds (arochlor 1254 + arochlor 1260) were determined by gas chromatography with electron capture detector (GC-ECD) on the capillary column (UNEP/FAO/IOC/IAEA, 1986). The internal standard and reference material IAEA-406 were used to verify the analytical procedure. The mass fractions of chlorinated hydrocarbons in the shellfish samples were expressed in μg kg-1 in relation to the dry weight (d.w.) of the sample. The limit of detection (LOD) of the applied method for lindane is 0.05 μg kg-1 d.w., DDT compounds 0.09 (g kg-1 s.m. and PCB compounds 0.11 μg kg-1 d.w.

The dissolved oxygen content in seawater samples was determined titrimetrically with thiosulfate (Marasović et al., 2013).

Sampling description

Sampling of sediment is carried out once per year. Surface sediment samples (0-2 cm) are collected in plastic sampling bags and stored at -20 °C until arrival at the processing laboratory. Sampling of

biota is carried out once per year (UNEP/FAO/IOC/IAEA, 1993). Shellfish (*Mytilus galloprovincialis*) samples are collected in plastic sampling bags and stored at -20 °C until arrival at the processing laboratory. Measurements for determination of suspended matter are performed 4 times a year. Sampling of sediment for determination of DDTs and PCBs is carried out once per year. Surface sediment samples (0-2 cm) are collected in plastic sampling bags and stored at -20 °C until arrival at the processing laboratory. Shellfish sampling for determination of Lindan, DDTs and PCBs is carried out once per year. Seawater samples for measurements of dissolved oxygen content were sampled at 3 relevant depths (usually 0, 5 and 10 m) once a month (Marasović et al., 2013).

2.2.4.1.5. P5 - Coastal area in Veneto (IT)

PP5 IUAV

PHYSICO-CHEMICAL PARAMETERS OF COASTAL AND TRANSITIONAL WATERS IN THE VENETO REGION (ITALY) FROM 2008 TO 2020

Abstract

The files contain the data of the main chemical-physical parameters detected by a multiparameter probe in the sea and in the transition waters during the monitoring campaigns carried out in accordance with current legislation. The parameters measured in water are: Temperature, Conductivity, Salinity, pH, Dissolved Oxygen, Redox Potential, Chlorophyll and Turbidity. The updates of the data files take place quarterly.

Geographic Description

Veneto Region Coastal waters, surrounding Tegnue of Chioggia.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Chemical-physical parameters were detected by a multiparameter probe in the sea and in the transition waters.

Sampling description

Data obtained in 29 sampling stations in open water; several samplings undertaken all over the year.

NUTRIENTS AND SUSPENDED SOLIDS CONCENTRATIONS IN MARINE WATERS FROM 2008 TO 2020 (2019 FOR AMC)

Abstract

Concentrations of nutrient salts (ammonia, nitric and nitrous nitrogen; phosphorus from orthophosphates; silicon from orthosilicates), total nitrogen and total phosphorus and suspended solids measured in water samples taken as part of the monitoring in marine waters.

Geographic Description

Veneto Region Coastal waters, surrounding Tegnue of Chioggia.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Nutrients and suspended solid measured in water samples.

Sampling description

Data obtained in 29 sampling stations in open water; several sampling undertaken all over the year.

PHYTOPLANKTON AND CHL-A IN MARINE, COASTAL AND TRANSITIONAL WATERS FROM 2008 TO 2019 (2019 FOR AMC)

Abstract

Phytoplankton is made up of generally microscopic plant organisms and is mainly responsible for photosynthetic processes and for the production of the organic substance necessary for zooplankton. Chlorophyll a is qualitatively and quantitatively the most important pigment in the process of chlorophyll photosynthesis; Based on the relationship between chlorophyll a and primary production, the evaluation of the chlorophyll a content is generally used as an index of phytoplankton biomass.

Geographic Description

Veneto Region Coastal waters, surrounding Tegnue of Chioggia.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Chlorophyll a concentration measured in water samples.

Sampling description

Data obtained in 11 sampling stations in open water; several samplings undertaken all over the year.

MACROZOOBENTHOS AND FISH BIODIVERSITY OF THE ROCKY HABITATS ALONG THE VENETIAN COAST

Abstract

This database was one of the outputs of of the project GHOST - co-funded under the LIFE + Biodiversity Instrument of the European Union, to promote concrete measures to preserve and improve the ecological status of the rocky habitats (Tegnùe) in the north Adriatic Sea. The bibliographic collection of all available information on benthic and fish communities of the rocky habitats (both natural and artificial) located along the Veneto marine coastal area was the first step to set up the database, thus completing various tables through Access software (Microsoft Office). The bibliographic research, carried out by quering electronic data archives, websites, libraries, has allowed to collect various scientific articles, conference proceedings, newsletters / bulletins. Data were gathered also from technical reports of local projects, mainly founded by the Regional Agency for Environmental Prevention and Protection of the Veneto Region (ARPAV) and the Veneto Water Authority (Magistrato alle Acque).

Geographic Description

Veneto Region Coastal waters, within Tegnue of Chioggia SIC.

General Taxonomic Coverage

Genus level, and, whenever possible, to species level

Taxon Classification (s) Rank Name

Phylum, class (order), genus, species

Taxon Classification (s) Rank Value

Anellida, crustacea, cnidaria, ctenofora, echinodermata, echiurida, mollusca, porifera, sipuncula, tunicata, vertebrata

Method description

Based on bibliographic collection of available information.

Sampling description

Data obtained from several sampling campaigns from 1973 to 2011 (grattage, visual census, coverage) as nInd/m^2 or %.

MACROALGAL ASSEMBLAGES SAMPLING RESULTS ON BIOGENIC REEFS IN THE NORTHERN ADRIATIC SEA 2011-2012

Abstract

Number of species per sample, total percentage coverage, Shannon diversity, coverage of encrusting, erect and turf algae and coverage of green, brown and red algae at each of the sampling stations.
Data are averages of three replicates.

Geographic Description

Northern Adriatic Sea, outside and inside Tegnue of Chioggia SIC.

General Taxonomic Coverage

Phylum level

Taxon Classification (s) Rank Name

Phylum

Taxon Classification (s) Rank Value

Chlorophyta, Ochrophyta, Rhodophyta

Method description

Based on data the data collected over approximately 15 years on 37 rocky outcrops that were collated and re-analyzed by the authors. Samples were collected in spring through early summer on the upper horizontal surfaces of the outcrops by scraping and collecting all macroalgae with a vacuum lift on three randomly selected quadrats of 2500 cm^2.

Sampling description

37 sites sampled over 15 years, 3 replicates each during spring and early summer. Scraping and collecting with a vacuum lift from a random area of 2500 cm^2.

SPECIES OF INVERTEBRATES FOR THE NORTH ADRIATIC CORALLIGENOUS ASSEMBLAGES 1992-2007

Abstract

Species of invertebrates reported by different authors for the North Adriatic coralligenous assemblages. Species of invertebrates reported by different authors for the North Adriatic coralligenous assemblages. Species names are according to the last check-list of the Italian marine fauna (SIBM 2006).

Geographic Description

North Adriatic coralligenous assemblages inside and outside the Tegnue of Chioggia SIC.

General Taxonomic Coverage

Genus level, and, whenever possible, to species level.

Taxon Classification (s) Rank Name

Phylum, genus, species

Taxon Classification (s) Rank Value

Invertebrates

Method description

Based on available data from previous studies.

Sampling description

Several sampling campaigns over 40 years from 1960 in 25 sites from Venice Gulf to Grado Marano; environmental data and biotic composition.

FISH FAUNA REPORTED FROM SOME CORALLIGENOUS ASSEMBLAGES IN THE NORTH ADRIATIC 2006-2007

Abstract

Fish fauna reported from some coralligenous assemblages in the North Adriatic. Thirty-five species of ostheicthyes were reported for the Northern Adriatic coralligenous habitats.

Geographic Description

North Adriatic coralligenous assemblages inside and outside the Tegnue of Chioggia SIC.

General Taxonomic Coverage

Genus level, and, whenever possible, to species level

Taxon Classification (s) Rank Name

Genus, species

Taxon Classification (s) Rank Value

Osteichthyes

Method description

Based on available data from previous studies.

Sampling description

Several sampling campaigns over 40 years from 1960 in 25 sites from Venice Gulf to Grado Marano; environmental data and biotic composition.

GEO-MORPHOLOGICAL FEATURES, SURROUNDING SEDIMENT AND WATER CHARACTERISTICS OF NORTH ADRIATIC CORALLIGENOUS ASSEMBLAGES 2003-2006

Abstract

Location (geographical coordinates, datum wgs84), geo-morphological features (depth, distance from the coast, extent and height of relief, habitat complexity), surrounding sediment and water characteristics (mud (i.e. silt, clay), organic matter, mean temperature and salinity) of the study sites.

Geographic Description

North Adriatic coralligenous assemblages inside and outside the Tegnue of Chioggia SIC.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Spatial distribution and temporal variation of epibenthic assemblages of coralligenous biogenic rocky
outcrops were investigated by photographic sampling from 2003 to 2006 at 12 randomly selected sites.

Sampling description

12 random sites photographic samples for epibenthic composition and abundances taken annually from 2003 to 2006 (10 photos for each sites at each sampling date). DGPS and single beam sonar survey for location and morphology Hci. Temperature and salinity from ASHELF models.

P

P

EPIBENTHIC SESSILE flORA AND FAUNA REFERENCE COLLECTION NORTH ADRIATIC CORALLIGENOUS ASSEMBLAGES 2006

Abstract

Epibenthic sessile flora and fauna reference collection (* new records for the northern Adriatic Sea).

Geographic Description

North Adriatic coralligenous assemblages inside and outside the Tegnue of Chioggia SIC.

General Taxonomic Coverage

Species level

Taxon Classification (s) Rank Name

Class, family, species

Taxon Classification (s) Rank Value

Animalia, Chlorophyta, Ochrophyta, Rhodophyta

Method description

Species checklist.

Sampling description

12 random sites photographic samples for epibenthic composition and abundances taken annually from 2003 to 2006 (10 photos for each sites at each sampling date). DGPS and single beam sonar survey for location and morphology Hci. Temperature and salinity from ASHELF models.

LIST OF FISH SPECIES DETECTED NORTHERN ADRIATIC SEA, WITHIN TEGNUE OF CHIOGGIA SIC 2003-2004

Abstract

List of fish species detected during the 2003 and 2004 sampling campaigns. For the species surveyed in the transects, the following are reported: mean, standard deviation (stdev), percentage variation coefficient (CV%) and percentage of occurrence (OCC.%)).

Geographic Description

Northern Adriatic Sea, within Tegnue of Chioggia SIC.

General Taxonomic Coverage

Species level

Taxon Classification (s) Rank Name

Family, genus, species

Taxon Classification (s) Rank Value

Osteichthyes

Method description

Underwater visual census on 10m transects through scuba diving.

Sampling description

A first campaign was carried out on sumeer and autumn of 2003, further a main campaign was undertaken during summer-autumn of 2004. 12 sites were sampled: 8 inside and 4 outside the Tegnue di Chioggia SCI.

NUMBER OF TAXA BELONGING TO THE DIFFERENT CLASSES, NORTHERN ADRIATIC SEA, WITHIN TEGNUE OF CHIOGGIA SIC, 2006-2008

Abstract

Number of taxa belonging to the different classes found on experimental tiles for each site and date.

Geographic Description

Northern Adriatic Sea, within Tegnue of Chioggia SIC

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Four randomly selected photo-samples, of the 16 available for each experimental plot and sampling date were analysed.

Sampling description

3 study sites (1 for each benthic assemblages) with 3 random experimental plot each. Each plot had 16 travertine tiles that were photographed in January, June, August and October 2006, August 2007 and August 2008.

SINGLE-BEAM BATHYMETRY DATA (ESRI ASCII GRID FORMAT) OF SELECTED MESOPHOTIC BIOGENIC REEFS FROM THE NORTHERN ADRIATIC SEA

Abstract

Processed bathymetry grids generated from single-beam sonar data collected in 2003-2007 as a part of ecological surveys.

Geographic Description

North Adriatic coralligenous assemblages inside and outside the Tegnue of Chioggia SIC

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The bathymetry data was acquired using a Lowrance HDS sonar operating at 200 kHz coupled with a WAAS-enabled D-GPS for navigation, and was processed by means of the kriging interpolation method using Surfer Golden Software. In most cases, the XY grid spacing was set at 0.5 m, but, in some cases according to areal coverage of data, was set to finer or coarser spacings: 1 m for TC2, Term14, TM1, TM4; 2 m for P208; and, 0.1 m for TSO. Depth values were tide-corrected and referred to the Mean Lower Low Water (MLLW) based on astronomical tide prediction (calculated by WXTide32 software using harmonic data for the nearest available station, i.e. Chioggia or Malamocco).

Sampling description

31 sites were sampled.

SINGLE-BEAM BATHYMETRY DATA (GEOTIFF IMAGE FORMAT) OF SELECTED MESOPHOTIC BIOGENIC REEFS FROM THE NORTHERN ADRIATIC SEA

Abstract

Processed bathymetry were generated from single-beam sonar data collected in 2003-2007 as a part of ecological surveys carried out by the University of Bologna, Italy.

Geographic Description

North Adriatic coralligenous assemblages inside and outside the Tegnue of Chioggia SIC.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The bathymetry data was acquired using a Lowrance HDS sonar operating at 200 kHz coupled with a WAAS-enabled D-GPS for navigation, and was processed by means of the kriging interpolation method using Surfer Golden Software. In most cases, the XY grid spacing was set at 0.5 m, but, in some cases according to areal coverage of data, was set to finer or coarser spacings: 1 m for TC2, Term14, TM1, TM4); 2 m for P208; and, 0.1 m for TSO. Depth values were tide-corrected and referred to the Mean Lower Low Water (MLLW) based on astronomical tide prediction (calculated by WXTide32 software using harmonic data for the nearest available station, i.e. Chioggia or Malamocco). The grid projection is in WGS84 / UTM Zone 33N (EPSG:32633).

Sampling description

31 sites were sampled.

BATHYMETRY DATA (GEOTIFF IMAGE FORMAT) OF THE NORTHERN ADRIATIC TEGNÙE DI CHIOGGIA SITE COLLECTED IN 2014-2015 FOR THE DEFISHGEAR PROJECT

Abstract

Data collected in the framework of the IPA Adriatic DeFishGear project (Derelict Fishing Gear Management System in the Adriatic region, www.defishgear.net), a two-year campaign for monitoring the typologies, abundance and distribution of marine litter in the Natura 2000 site "Tegnùe di Chioggia". The site is characterized by the presence of localized coralligenous buildups, widespread along the northwestern Adriatic Sea inner shelf between 10 and 40 m depths. These rocky buildups rise up to 3–4 m above the sandy-mud seafloor and have a patchy distribution. A variety of benthic calcareous constituents contribute to their growth, including bryozoans, molluscs, serpulid polychaetes, scleractinians and calcareous algae, the latter acting as the main bio-constructors. According to the European Habitats Directive (92/43/EEC), the marine rocky outcrop classification is included in the Annex I habitat types as "1170-Reefs" and "1180-Submarine structures made by leaking gases".

Geographic Description

North Adriatic coralligenous assemblages inside and outside the Tegnue of Chioggia SIC

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The study area was mapped using a Kongsberg EM 2040 Multibeam (Kongsberg, Norway) to localize the rocky outcrops and to distinguish between soft and hard substrates. Here we present the maps of the main outcrops monitored in the site "Tegnùe di Chioggia" as well as other scattered outcrops in the area nearby. The processed data files were gridded at 0.5m resolution.

Sampling description

32 sites were sampled.

BATHYMETRY DATA (GEOTIFF GRID FORMAT) OF THE NORTHERN ADRIATIC TEGNÙE DI CHIOGGIA SITE COLLECTED IN 2014-2015 FOR THE DEFISHGEAR PROJECT

Abstract

Data collected in the framework of the IPA Adriatic DeFishGear project (Derelict Fishing Gear Management System in the Adriatic region, www.defishgear.net), a two-year campaign for monitoring the typologies, abundance and distribution of marine litter in the Natura 2000 site "Tegnùe di Chioggia" (https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IT3250047) was performed. The site is characterized by the presence of localized coralligenous buildups, widespread along the northwestern Adriatic Sea inner shelf between 10 and 40 m depths. These rocky buildups rise up to 3–4 m above the sandy-mud seafloor and have a patchy distribution. A variety of benthic calcareous constituents contribute to their growth, including bryozoans, molluscs, serpulid polychaetes, scleractinians and calcareous algae, the latter acting as the main bio-constructors. According to the European Habitats Directive (92/43/EEC), the marine rocky outcrop classification is included in the Annex I habitat types as "1170-Reefs" and "1180-Submarine structures made by leaking gases.

Geographic Description

North Adriatic coralligenous assemblages inside and outside the Tegnue of Chioggia SIC.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The study area was mapped using a Kongsberg EM 2040 Multibeam (Kongsberg, Norway) to localize the rocky outcrops and to distinguish between soft and hard substrates. Here we present the maps of the main outcrops monitored in the site "Tegnùe di Chioggia" as well as other scattered outcrops in the area nearby. The processed data files were gridded at 0.5m resolution.

Sampling description

31 sites were sampled.

BATHYMETRY DATA (GEOTIFF GRID FORMAT) OF THE NORTHERN-MOST ADRIATIC AREA: INTERREG ITA-SLO 2007-2013 TRECORALA PROJECT

Abstract

Data collected in the framework of the Interreg Ita-Slo 2007-2013 TRECORALA Project, a two-year research and data collection campaign was performed (2012-2014). The purpose of the TRECORALA project was to broaden the biological knowledge of the "Trezze"/"Grebeni" and coralligenous seabeds of the Gulf of Trieste and to identify guidelines for the management, protection and enhancement of this natural environment, strengthening the attractiveness and competitiveness of the area and contributing to safeguarding biodiversity. Through the collected information on professional fishing activities, management proposals were made regarding some resources of particular commercial interest. As a final product, the project provided the necessary tools for the joint cross-border management of marine areas, also developing the tourism sector.This multidisciplinary study presents the major characteristics of a set of submarine rock outcrops in the Northern Adriatic Sea: the rock occurrence, embedded down to about 1 m from the seafloor in the bottom sediments; several gas accumulations in the proximity of the outcrops (e.g., bubbling gas from the sediment–water interface); small-scale mud volcanoes; and microbial mats around the seepage site. Geochemical analysis revealed that these features are related to the seepage of CH_4-rich fluids, which causes the precipitation of methane-derived calcium carbonate as a cement. A variety of benthic specimens contributes to their growth, including bryozoans, molluscs, serpulid polychaetes, scleractinians and calcareous algae, the latter acting as the main bio-constructors. The site is characterized by the presence of localized coralligenous buildups, widespread along the northwestern Adriatic Sea inner shelf between depths of 10-27 m. These rocky build-ups rise to 3 m above the sandy-mud seafloor and have a patchy distribution.

Geographic Description

North Adriatic coralligenous assemblages inside and outside the Tegnue of Chioggia SIC.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The study area was mapped using Reson SeaBat 7125 and 8125 multibeam systems to localize the rocky outcrops and to distinguish between soft and hard substrates. The multibeam surveys were conducted from a small boat, named Anthea, using differential GPS for navigation. Sea waves were not perfectly corrected by the inertial system. Here we present the maps of the main outcrops monitored in the Northern-most Adriatic area. The processed data files were gridded at 2 m resolution.

Sampling description

12 sites were sampled.

SIDE SCAN SONAR MOSAICS OF SELECTED NORTHERN ADRIATIC MESOPHOTIC BIOGENIC REEFS OFF VENICE

Abstract

Georeferenced images (GeoTIFF image, UTM33 WGS84) of the Side Scan Sonar mosaics of selected northern Adriatic mesophotic biogenic reefs off Venice, provided as supplementary of the open access publication: Andreoli E, Boscolo F, Carlin A, Curiel D, Gordini E, Mizzan L, Molin E, Ombrelli M, Pessa G, Rismondo A, Rizzardi S, Vanin S, Zanetto M (2010) Le tegnùe dell'Alto Adriatico: Valorizzazione della risorsa marina attraverso lo studio di aree di pregio ambientale, Agenzia Regionale per la Prevenzione e Protezione Ambientale del Veneto - ARPAV, Fondazione dei Musei Civici di Venezia ISBN: 978-88-7504-151-9.

Geographic Description

North Adriatic coralligenous assemblages inside and outside the Tegnue of Chioggia SIC.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Side Scan Sonar mosaics.

Sampling description

7 sites were sampled.

3D WIREFRAME PLOT OF THE NORTHERN ADRIATIC MESOPHOTIC BIOGENIC REEFS

Abstract

Tridimensional distribution of Northern Adriatic biogenic reefs.

Geographic Description

North Adriatic coralligenous assemblages.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Single beam echo sounding.

Sampling description

9 sites were sampled.

2.2.4.1.6. P6 - Miljašić Jaruga river mouth, Nin bay (HR)
PP12 City of Nin

TESTING OF THE QUALITY OF THE SEA FOR SWIMMING ON THE BEACHES OF ZADAR COUNTY FOR THE PERIOD 2015 TO 2019)

Abstract

Criteria for assessing the quality of the sea on sea beaches, test methods, test frequency, sampling points, sampling method and seawater analysis prescribed are the Bathing Sea Quality Regulation ("Official Gazette" No. 73/08) based on the Directive 2006/7 EC of the European Parliament and of the Council of 15.02.2006 years. Testing the quality of the sea on sea beaches is complex and includes recording and analysis of physical, chemical and bacteriological properties of sea water, meteorological conditions and hydrographic properties of the sea. Microbiological indicators are considered to be the most important indicators marine pollution by fecal wastewater.

Geographic Description

The mouth of the river Miljašić-beach Ždrijac, City of Nin, Croatia.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

HRN EN ISO 7899-1 or HRN EN ISO 7899-2 – Membrane filtration method

HRN EN ISO 9308-1 or HRN EN ISO 9308-3 - Miniaturized method (Most Probable Number) for the detection and enumeration of *E. coli* in surface and waste water

Sampling description

HRN EN ISO 19458:2008 - sampling method for testing microbiological indicators

HRN EN ISO 5667-9:2001 - sampling method for testing chemical indicators

2.2.4.1.7. P7 - Coastal area in Molise (Biferno river mouth, Campomarino Coast and Bonifica Ramitelli SAC) (IT) and P10 - Torre del Cerrano, Pineto Abruzzo (IT)

PP13 University of Molise

VASCULAR PLANTS BIFERNO - SACCIONE - RAMITELLI 2012-2020

Abstract

The dataset contains cover data of the vascular plants communities, sand dunes and halophilous habitats (Molise, Italy). Data refer to ca. 150 taxa.

Geographic Description

Sand dunes and Salt marshes of Foce Biferno; Sand dunes of Foce Saccione and Bonifica Ramitelli.

General Taxonomic Coverage

All the vascular plants were identified to the species level.

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Georeferenced 4-m^2 vegetation plots randomly located along coastal dunes. For each vegetation plot, a list of vascular plant species recorded following the "shoot presence" criterion is available, together with relative cover values measured on a percentage scale. Each plot is assigned to a level-3 EUNIS category according to the EUNIS habitat classification system.

Sampling description

Plots were repeatedly sampled since 2002 according to a stratified random protocol (EC habitats were used as strata), during the vegetative season.

VASCULAR PLANTS AND EC COASTAL-MARINE HABITATS TORRE DEL CERRANO 2018-2020

Abstract

The dataset contains cover data of the vascular plants communities, sand dunes and EC marine habitats (Abruzzo, Italy). Data refer to 70 vascular plant species, ca. 40 marine species and 2 EC marine habitats.

Geographic Description

Sand dunes and sand banks of Torre del Cerrano

General Taxonomic Coverage

All the flora and fauna biodiversity were identified to the species level.

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Georeferenced 4-m^2 vegetation plots randomly located along coastal dunes. For each vegetation plot, a list of vascular plant species recorded following the "shoot presence" criterion is available, together with relative cover values measured on a percentage scale. Each plot is assigned to a level-3 EUNIS category according to the EUNIS habitat classification system. For marine biodiversity, sampling was carried out along 11 transects of 500 meters parallel of coastline (from -1 to -10 meters in depth), through visual census method (specimens/minutes; Coastal Environment Monitoring Protocol, CEM). For each transect, we recorded the occurrence of diagnostic species for marine EC habitats, along with their count and frequency. Each transect was also classified according with marine EC habitats, CORINE Biotopes and EUNIS typologies.

Sampling description

Plots were sampled according to a stratified random protocol (EC habitats were used as strata), during the vegetative season. For marine biodiversity, data were sampled by transects parallel to the seashore.

2.2.4.1.8. P8 – Northern Adriatic Sea (HR)
PP2 IRB

OCEANOGRAPHIC PARAMETERS_BUOYS_NORTHERNADRIATICSEA

Abstract

Oceanographic parameters measured at oceanographic buoys RV001 and RV004, transmitted in near real time (sea surface temperature, sea surface current, air pressure, ADCP water column currents wind, air temperature, wave, sea surface salinity, dissolved oxygen, chlorophyll a).

Geographic Description

The northern Adriatic Sea, 1 nm off the eastern coast. The sampling station and buoy position is called RV001.

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The data are collected by automatic sensors installed on an oceanographic buoy. Dana is transferred in near real time to the Center for marine research. The data are inter-calibrated biweekly with results from laboratory analysis from Niskin samples from the same station.

Sampling description

N/A

2.2.4.1.9. P9 - Cetina river mouth (HR)
PP15 Sea and Karst

LOAD / LOAD INPUT BY RIVERS WEU7

Abstract

Annual quantities of nutrients and hazardous substances introduced by watercourses into the coastal part of the sea. These inputs have a strong impact on the quality of the coastal sea and, among other things, can affect the increase of nutrient concentrations in the sea, which can lead to eutrophication and the occurrence of sea blooms.

Method description

Surface water quality monitoring is carried out on the basis of the Regulation on water quality standards. The ecological status of surface waters is assessed on the basis of; biological, hydromorphological, basic physico-chemical and chemical elements that accompany biological elements. The assessment of the chemical status is based on a comparison of the measured concentrations of priority and other pollutants and their prescribed concentrations. The condition of a surface water body is assessed on the basis of the ecological or chemical condition, whichever is worse.

Geographic Description

Cetina Mouth

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Sampling description

Sampling is performed on 1 station at Cetina Estuary.

BIOLOGICAL QUALITY OF TRANSITIONAL WATERS - PHYTOPLANKTON WEC1A

Abstract

Assessment of water quality based on biomass, and the number and composition of the phytoplankton community is a very good indicator since any disturbance of the balance in the marine ecosystem is first reflected in this first trophic stage. The simplest and most commonly used method for assessing phytoplankton biomass is to determine the concentration of chlorophyll a. This method is also the only method (of the methods used to assess biomass and phytoplankton community composition) that is in the intercalibration process of the MED GIG group.

Geographic Description

Cetina Mouth

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

Fluorimetric method for measuring the concentration of chlorophyll a; Microscopic analysis of phytoplankton by Utermohl method.

Sampling description

Sampling is performed on 1 station at Cetina Estuary.

BIOLOGICAL QUALITY OF TRANSITIONAL WATERS - FISH WEC1D

Abstract

Spatial and temporal distribution of ichthyofauna composition in the marine ecosystem in transitional waters with regard to the number of species, representation of dominant families, their trophic composition, resident status and indicators of habitat changes such as the number of

diadromous, new and indicator fish species. Given the above distribution, 6 transitional water types have been defined.

Geographic Description

Cetina Mouth

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The mentioned scoring system based on the EFI index was used for the classification of Croatian transitional waters. The data are based on the mean values of the samples, calculated as the average catch per tool for each area. The areas included in the research are divided into 4 main groups: the Adriatic basin 4 rivers: Zrmanja, Krka, Cetina, Neretva. The wider area of the Krka estuary is considered a reference area due to its central geographical position in the Adriatic, the river's impact, which is significant and obvious on the wider area, and its relatively unchanged status in terms of anthropogenic impact. Data for the transition area of the rivers Mirna, Raša and Rječina in the coastal-Istrian basin, and the rivers Jadro, Žrnovnica and Ombla in the Dalmatian basin are also presented.0

Sampling description

Sampling is performed on 1 station at Cetina Estuary. Sampling is performed with small special tugs for catching juvenile fish, triple standing nets - poponica, trawl with a trawl and a special fishing technique - tramat (ludar). The results are supplemented by data obtained by diving because the majority of small cryptobenty species cannot be sampled with the above fishing gear.

HAZARDOUS SUBSTANCES IN MARINE ORGANISMS WHS6

Abstract

The indicator monitors the spatial and temporal distribution of concentrations of heavy metals and organic pollutants in marine organisms. Hazardous substances (pesticides, industrial chemicals, metals, etc.) that enter the marine organisms from the environment pose a danger to human health.

Geographic Description

Cetina Mouth

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

According to the recommendations of the international organization MED-POL (UNEP), shellfish are sampled once a year, in the period before the sexual maturation of individuals (in the Adriatic no later than the end of March), to avoid the effects of biological factors on the content of contaminants in the tissue. After sampling, the mussels were cleaned of coarse offspring, washed in seawater, and transferred to a laboratory where soft tissue was dissected (2). The weight and length of the shell and the mass of the total soft tissue were determined for each individual. After dissection, the soft tissue composite samples were lyophilized and homogenized. Lyophilized tissue samples (~5g) for analysis of traces of chlorinated hydrocarbons were extracted by the Soxhlet method, purified with sulfuric acid and using a column of activated florisil, separating the components into fractions. The mass fractions of lindane, DDT compounds (p, p'-DDE + p, p'-DDD + p, p'-DDT) and PCB compounds (arochlor 1254 + arochlor 1260) were determined by gas chromatography with an electron capture detector (GC-ECD) on the capillary column (3). The internal standard and reference material IAEA-406 were used to verify the analytical procedure. The mass fractions of chlorinated hydrocarbons in the shellfish samples are expressed in µg kg-1 in relation to the dry weight (d.w.) of the sample. The limit of detection (GD) of the applied method is for lindane 0.05 µg kg^{-1} d.w., DDT compounds 0.09 (g kg-1 d.w. and PCB compounds 0.11 µg kg-1 d.w. (1) UNEP/FAO/IOC/IAEA (1993) Guidelines for monitoring chemical contaminants in the sea using marine organisms. Reference Methods for Marine Pollution Studies No. 6, UNEP 1993, p. 1-14.

(2) UNEP/FAO/IAEA/IOC (1991) Sampling of selected marine organisms and simple preparation for the analysis of chlorinated hydrocarbons. Reference Methods for Marine Pollution Studies No. 12 Rev. 2, UNEP 1991, p. 1-17.

(3) UNEP/FAO/IOC/IAEA (1986) Determination of DDTs and PCBs in selected marine organisms by packed column gas chromatography. Reference Methods for Marine Pollution Studies No. 14 Rev. 1, UNEP 1986, p. 1-19.

Sampling description

Sampling is performed on 2 stations at Cetina Estuary provided that at the time of sampling at the station there is a colony of shellfish of satisfactory size (4-5 cm) and quantity (20-25 individuals).

STATE OF EUTROPHICATION

Abstract

Demonstration of the state of excessive saturation of water masses with nutrients, which results in the appearance of uncontrolled effects on the biological population.

Geographic Description

Cetina Mouth

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The methodology of the work is described in detail in the Interim Report (Marasović et al., 2013)

Sampling description

Sampling is performed on 1 station at Cetina Estuary. Details of the sampling procedure are described in the Interim Report (Marasović et al., 2013).

FREQUENCY OF LOW OXYGEN CONCENTRATIONS IN THE BOTTOM LAYER OXYGEN SATURATION WEU15

Abstract

The oxygen concentration is monitored in the water column and the bottom layer. A condition of low oxygen concentrations (below 2 mg / L in the bottom layer) is called hypoxia. In areas where the oxygen concentration is low, the so-called "suffocation" of sensitive species of organisms on the seabed but also migrations of other species. The degree of oxygen saturation is defined as the ratio of the measured volume fraction of oxygen and the volume saturation at a given temperature and salinity.

Geographic Description

Cetina Mouth

General Taxonomic Coverage

N/A

Taxon Classification (s) Rank Name

N/A

Taxon Classification (s) Rank Value

N/A

Method description

The dissolved oxygen content in seawater (mg / L) was determined by the classical Winkler method (iodometric titration with sodium thiosulfate), and the proportion of oxygen saturation was calculated from the ratio of established and theoretical oxygen content at a given temperature and salinity. Details of the sampling procedure are described in the Interim Report (Marasović et al., 2013).

Sampling description

Sampling is performed on 1 station at Cetina Estuary. Details of the sampling procedure are described in the Interim Report (Marasović et al., 2013.).

2.2.4.2. Existing Ancillary systems – whole Adriatic Region

2.2.4.2.1. PP1 CMCC

EMODNET DIGITAL BATHYMETRY - The European Commission in response to the EU Green Paper for an integrated maritime policy has initiated the European Marine Observation and Data Network (EMODnet) to improve Europe's marine data infrastructure, increase the availability of high- quality data and assemble them under a common framework.

Seven service contracts for bathymetry, geology, physical habitats, chemistry, biology, physics and human activities were launched by DG-MARE for creating the pilot components of the network and setting up thematic web portals covering selected marine basins.

A harmonized EMODnet Digital Terrain Model (DTM) has been generated for European sea regions (36W, 15N; 43E, 90N) from selected bathymetric survey data sets, composite DTMs, Satellite Derive Bathymetry (SDB) data products, while gaps with no data coverage are completed by integrating the GEBCO Digital Bathymetry.

2.2.4.2.2. PP10 IOF, PP7 IRB

EMODNET chemistry - EMODnet Chemistry main task is to provide interoperable, high quality and publicly available data and products on marine water quality issues. Its activity is firstly to collect, validate, and guarantee access to marine pollution data streams, and secondly generate and publish corresponding data products.

EMODnet Chemistry (www.emodnet-chemistry.eu/) is focusing on measurement data for groups of chemical variables in water, sediments and biota with relevance to the Marine Strategy Framework Directive (MSFD) and to global climate change. EMODNet Chemistry proposal has been prepared and submitted by the SeaDataNet consortium which is the leading data management network in Europe, covering all sea basins in European waters with data input from almost all coastal states.
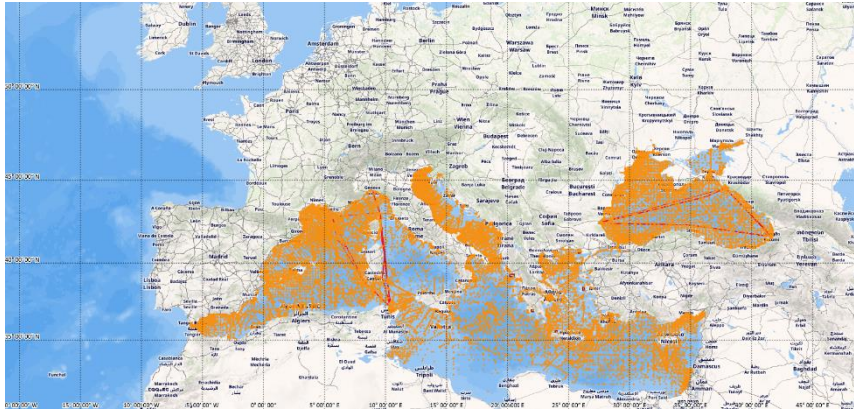

Figure 1. Snapshot of the sampling platforms in the Mediterranean region on EMODnet Chemistry Portal.

Currently six major European sea regions are covered by EMODnet Chemistry: Arctic Ocean (Norwegian Sea including Barents Sea), Baltic Sea, Northeast Atlantic Ocean (Celtic Sea, Iberian coast and Bay of Biscay, Macaronesia), North Sea, Black Sea, Mediterranean Sea. They are performing quality control and aggregation on the data gathered from many distributed data providers of the SeaDataNet infrastructure in order to generate regional harmonized, aggregated and validated data sets for selected groups of chemicals variables. Then these data sets are used to prepare interpolated maps of chemical variables per region over time and graphics of station time series.

Detailed information on EMODnet Chemistry are accessible through:

- Guidelines,
- Reports to EU and
- Project meetings

EMODnet Chemistry Portal gives free and open access to measurement data, as delivered by the originators, for groups of chemical variables. Data collections are available in ODV csv spreadsheet format (www.seadatanet.org/Software/ODV).

P

P

2.2.4.3.   Existing Anciliary systems – pilot areas

2.2.4.3.1. P1 - Grado and Marano Lagoon and Gulf of Trieste (IT)

PP4 ARPAE FVG

GOT_BAT_ARPAFVG - Bathymetry of the Gulf of Trieste (low resolution).

CARTA BATIMETRICA DELLA LAGUNA DI MARANO E GRADO - Bathymetry of the Marano and Grado lagoon (high resolution).

2.2.4.3.2. P2 - Transitional (e.g. Goro area and Bevano Mouth) and Coastal areas in Emilia Romagna (IT)

PP7 ARPAE

REGIONAL TOPO-BATHYMETRIC NETWORK OF EMILIA-ROMAGNA - Topographic and Bathymetric measurements conducted along the coast of Emilia-Romagna using RTK-DGPS, and both single beam and multi-beam sensors, respectively. Topo-bathymetric campaigns were conducted in the context of specific projects with a non-constant sampling interval.

2.2.4.3.3. P3 - Torre Guaceto - Canale Reale, Punta della Contessa, Melendugno in Puglia (IT)

LP Regione Puglia

URBAN WASTE WATER TREATMENT PLANTS IN APULIA REGION 2012-2020 - Data of urban waste water treatment plants monitoring in different location of Apulia Region. Chemical and physical parameters. Data from 2012 to 2020.

2.2.4.3.4. P5 - Coastal area in Veneto (IT)

PP5 IUAV

Northern Adriatic mesophotic biogenic reefs (2007) - 3D wireframe plot of the northern Adriatic mesophotic biogenic reefs obtained from single beam echo sounding bathymetry.

2.2.4.3.5. P9 - Cetina river mouth (HR)

PP15 Sea and Karst

MARINE BENTHOS - Identification of marine benthos habitats according to National Classification System.

PINNA NOBILIS - Reports on *Pinna nobilis* observations.

MONITORING OF *PINNA NOBILIS* POPULATION IN NATURA 2000 SITE CETINA ESTUARY - Recording of population structure and tracking of mass mortality event of *Pinna nobilis* in Natura 2000 site Cetina Estuary.

BATHING SEA QUALITY ASSESSMENTS - Sea quality for bathing on the sea beach, which determines the limit values of microbiological indicators and other characteristics of the sea. Microbiological indicators monitored in the sea are intestinal enterococci and *Escherichia coli*. Other features of sea quality that are monitored are meteorological conditions, sea temperature and salinity, and visible pollution.

2.2.4.3.6. P11 - Marche coastal area (IT)

PP14 Regione Marche

TOPOGRAPHIC LIDAR – NORTH - topographic lidar coastal area - Marche Region NORTH.

TOPOGRAPHIC AND BATHYMETRIC LIDAR – CENTER - topographic and bathymetric coastal area - Marche Region CENTER.

TOPOGRAPHIC LIDAR – SOUTH - topographic lidar coastal area - Marche Region SOUTH.

2.2.4.4.   Added value – whole Adriatic Region

2.2.4.4.1. PP1 CMCC

NATURA 2000 - Special protection areas (SPA) and Special conservation interest (SCI).

2.2.4.5.   Added value – pilot areas

2.2.4.5.1. P2 - Transitional (e.g. Goro area and Bevano Mouth) and Coastal areas in Emilia Romagna (IT)

PP8 Delta 2000

COSTA_76 - shapefile containing the land use geometry of Romagna coastal area and the Emilia-Romagna Region land use categories of year 1976, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

COSTA_94 - shapefile containing the land use geometry of Romagna coastal area and the Emilia-Romagna Region land use categories of year 1994, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

COSTA_03 - shapefile containing the land use geometry of Romagna coastal area and the Emilia-Romagna Region land use categories of year 2003, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

COSTAN_76 - shapefile containing the land use geometry of Northern Romagna coastal area and the Emilia-Romagna Region land use categories of year 1976, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

COSTAN_94 - shapefile containing the land use geometry of Northern Romagna coastal area and the Emilia-Romagna Region land use categories of year 1994, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

COSTAN_03 - shapefile containing the land use geometry of Northern Romagna coastal area and the Emilia-Romagna Region land use categories of year 2003, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

COSTAS_76 - shapefile containing the land use geometry of Southern Romagna coastal area and the Emilia-Romagna Region land use categories of year 1976, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

COSTAS_94 - shapefile containing the land use geometry of Southern Romagna coastal area and the Emilia-Romagna Region land use categories of year 1994, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

COSTAS_03 - shapefile containing the land use geometry of Southern Romagna coastal area and the Emilia-Romagna Region land use categories of year 2003, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

RENO_76 - shapefile containing the land use geometry of Reno river mouth area and the Emilia-Romagna Region land use categories of year 1976, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

RENO_94 - shapefile containing the land use geometry of Reno river mouth area and the Emilia-Romagna Region land use categories of year 1994, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

RENO_03 - shapefile containing the land use geometry of Reno river mouth area and the Emilia-Romagna Region land use categories of year 2003, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

BEVANO_76 - shapefile containing the land use geometry of Bevano river mouth area and the Emilia-Romagna Region land use categories of year 1976, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

BEVANO_94 - shapefile containing the land use geometry of Bevano river mouth area and the Emilia-Romagna Region land use categories of year 1994, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

BEVANO_03 - shapefile containing the land use geometry of Bevano river mouth area and the Emilia-Romagna Region land use categories of year 2003, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

CONCA_76 - shapefile containing the land use geometry of Conca river mouth area and the Emilia-Romagna Region land use categories of year 1976, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

CONCA_94 - shapefile containing the land use geometry of Conca river mouth area and the Emilia-Romagna Region land use categories of year 1994, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

CONCA_03 - shapefile containing the land use geometry of Conca river mouth area and the Emilia-Romagna Region land use categories of year 2003, and the values useful for the calculation of various ecosystem quality indicators relating to that year.

RMFI_RENO - shapefile containing a representative geometry of Reno river mouth, and the values of the River Mouth Functionality Index (RMFI) related to year 2008.

RMFI_BEVANO - shapefile containing a representative geometry of Bevano river mouth, and the values of the River Mouth Functionality Index (RMFI) related to year 2008.

RMFI_CONCA - shapefile containing a representative geometry of Conca river mouth, and the values of the River Mouth Functionality Index (RMFI) related to year 2008.

Origin: Master's Degree thesis in Environmental and Territorial Sciences of the University of Bologna. Title: "Analysis of the mouths and terminal sections of river courses through indices calculated on different spatial and temporal scales". Author: Luciano Vogli.

The objective of this thesis work is the development of a method to analyze natural processes and the impact of human activities on coastal ecosystems, through an evaluation model derived from an emerging discipline in the field of environmental sciences: Landscape Science. The quality and functionality of ecosystems have been assessed on different areas of different sizes, in a region heavily modified by human activities such as the Romagna coast. The sustainability indicators regarding the various aspects - the environmental impact, biodiversity, health (understood as integrity and resilience) of ecosystems - have been measured over a period of time from 1976 to 2008, in order to estimate the direction and the speed of changes that affected the study area over more than 30 years. In addition, an index called River Mouth Functionality Index (RMFI) has been specially developed.

2.2.4.5.2. P3 - Torre Guaceto - Canale Reale, Punta della Contessa, Melendugno in Puglia (IT)
LP Regione Puglia

TRANS ADRIATIC PIPELINE - GAS PIPELINE ALBANIA-ITALY - Documents concerning the Environmental Impact Assessment of the Trans Adriatic Pipeline from 2012 to 2019. Documents concerning the Environmental Impact Assessment of the Trans Adriatic Pipeline from 2012 to 2019. Data and maps of air quality, surface waters, groundwaters and top soils in Melendugno area.

RIVER CONTRACT OF ROYAL CHANNEL – started at April 2020 - This knowledge dossier is part of the formation process of the River Contract of Royal Channel. The document contains an integrated preliminary cognitive analysis on the environmental, social and economic aspects of the territory covered by the River Contract of Royal Channel. In particular, the dossier contains the environmental characterization (including a qualitative analysis of the main ones ecological functions), territorial and socio-economic (system of knowledge), the collection of existing plans and programs (programmatic framework), the preliminary analysis on the stakeholders and the networks existing between them.

TIZIANO AND MAGGIORE PROJECT - The Tiziano Project - "Qualitative and quantitative monitoring of Puglia's groundwater", implemented from the end of 2006 to the first half of 2011, has allowed to create a stable and widespread monitoring network and to greatly improve the hydrogeological and hydrogeochemical knowledge of the regional groundwater resources. The new monitoring network consists of 541 measuring stations, of which 127 (126 wells and one source) instrumented for continuous monitoring of the level and the main quality parameters (temperature, dissolved oxygen, redox, pH, conductivity) and 439 not instrumented. The new monitoring network designed was defined starting from the existing network, on the basis of considerations on its current consistency and suitability for use, as well as with respect to the supervening legislative requirements.

LANDSCAPE TERRITORIAL PLAN - Landscape territorial Plan concerns all the landscapes of Apulia, not only those that can be considered exceptional, but also the landscapes of everyday life and those degraded. This plan recognizes the landscape characteristics, the aspects and the peculiar characters deriving from the action of natural and human factors and their interrelations.

PROTECTED AREAS - Torre Guaceto/canale reale, Punta della Contessa (Brindisi), Melendugno - Protected areas of the Apulian region include Parks, natural reserves, areas of respect, areas SIC, SIC MARE and ZPS. It is possible to download the areas protected shapefile of entire Region or the maps referring to a single area. In this case the map refers to a Pilot area - Torre Guaceto/canale reale, Punta della Contessa (Brindisi) and Melendugno.

HYDROGEOLOGICAL PLAN (PAI) - basin authority of the Southern Apennines - The Hydrogeological Plan (PAI) is aimed at improving the hydraulic regime conditions and the geomorphological stability necessary to reduce the current levels of danger and to allow sustainable development of the territory, the evolutionary tendency and the potential of use. The Plan defines the hydraulic and geomorphological hazard areas. These areas are available for consultation online on web gis. Hydraulic hazard areas are defined for return periods equal to 30, 200 and 500 years. Geomorphological hazard identifies very high, high and medium hazard areas.

2.2.4.5.3. P4 - Neretva river mouth (HR)

PP3 DNC

NATURA 2000 - Special conservation interest (SCI)" Delta Neretve", 23814.3088 HA, marine area: 3.68%; Special protection Area (SPA)" Delta Neretve", 23814.3088 HA, marine area 3.68%

NATIONAL SPECIAL NATURE RESERVE- Special Nature Reserve "Delta Neretve - Jugoistočni dio" (498.98 ha) and "Ušće Neretve" (775,82 ha) - ichthyological and ornithological nature reserve.

2.2.4.5.4. P5 - Coastal area in Veneto (IT)

PP IUAV

AA.VV. (2005) ATTI DEL CONVEGNO SUBACQUEA E AMBIENTE: LE TEGNÙE DI CHIOGGIA. A CURA DI PONTI, M, MESCALCHIN, P, GUERRA, A. ASSOCIAZIONE TEGNÙE DI CHIOGGIA. 130 P. ECOLOGICAL INDICES CALCULATED IN THE 12 SAMPLED SITES. 12,364673, 12,523967, 45,255362, 45, 162184.CSV; NA DIPARTIMENTO DI BIOLOGIA – SEDE DI CHIOGGIA - UNIVERSITÀ DI PADOVA CARLOTTA.MAZZOLDI@UNIPD.IT "CREATIVE COMMONS ATTRIBUTION 3.0 UNPORTED "RICHNESS S RICHNESS ECOLOGICAL INDEX: S200 - Ecological indices calculated in the 12 sampled sites.

MARICULTURE - ADRIATIC SEA - Marine areas relating to the bivalve molluscs breeding, the shellfish breeding and open sea aquaculture. The longer farmed species are *Mithylus galloprovincialis* (mussels) and *Tapes spp.* (clams). Regarding fish species, the most common ones are *Mugil cephalus* and *Anguilla anguilla*.

SMALL SCALE FISHERY (LOW ≤12 M) - This map shows the distribution of the fishing pressure of small-scale fisheries for vessels with Loa (length overall) ≤12 m (Kavadas and Maina, PERSEUS Project). On the basis of data available in the framework of ADRIAMED WG on Small-scale fisheries it is possible to assume that more than 90% of vessels have Loa ≤12 m. The classification of fishering effort is: 5 very low, 4 low, 3 medium, 2 high and 1 very high. The method used is the Multi-criteria Decision Analysis (MCDA) combined with GIS.

BOTTOM OTTER TRAWL FISHERY – 2013 - Fishing effort (hours of activity) of Bottom Otter Trawlers targeting demersals has been assessed using Vessel Monitoring System (VMS), that is a collection system of fishing activity data in space and time. Each fishing vessel is equipped with a blue box that periodically sends signals (pings) containing data about position, speed and course of the vessel. Each signal sent by the blue box is a VMS ping. The layer collects data from 3 different areas:

- Italian Adriatic: Fao statistical areas 17 and 18
- Italian Ionio: Fao statistical areas 19
- Greek Ionio and Egeo: Fao statistical areas 20

The values of different areas cannot be compared. Values are divided in 5 classes:

- 5: very low; minimum value in 2013 for each area
- 4: low
- 3: medium
- 2: high
- 1: very high: maximum value in 2013 for each area

Values range: from 1 (minimum value for 2013) to 100 (maximum value for 2013).

PAIR PELAGIC TRAWL FISHERY – 2013 - Fishing effort (hours of activity) of Pair Pelagic Trawlers targeting small-pelagics has been assessed using Vessel Monitoring System (VMS), that is a collection system of fishing activity data in space and time. Each fishing vessel is equipped with a blue box that periodically sends signals (pings) containing data about position, speed and course of the vessel. Each signal sent by the blue box is a VMS ping.

Values are divided in 5 classes:

- 5: very low; minimum value in 2013 for Adriatic area
- 4: low
- 3: medium
- 2: high
- 1: very high: maximum value in 2013 for Adriatic area

MILITARY PRACTICE AREAS - Military training areas (land to sea and sea to land) according to the 2013 prefaction of the notice to Mariners (PREMESSA AGLI AVVISI AI NAVIGANTI 2013 Iistituto Idrografico della Marina).

OFFSHORE SAND DEPOSITS (REQUESTS OF CONCESSION) - The Adriatic studied sand deposits map with two layers: a) The potentially sand resources (offshore sand deposits); b) the dredged areas already exploited (offshore sand dredged). During the last decades the increasing amount of data acquired by ISMAR CNR provides unique opportunities to summarize knowledge of geology and shelf geomorphology with existing geotechnical and geophysical data that facilitate identification of sand resources. The volume of the entire potential fine sand available reservoir outcropping in the Italian portion of the Adriatic shelf seafloor has been estimated in ca. 270 x106 cubic meters. The amount of dredged material used costal nourishment in Adriatic since 1996 is 9.9 x106 cubic meters.

FERRY ROUTES - Major ferry routes according to travel agencies (no GPS data) and Opens Street Data (GPS data).

PROPOSED PIPELINE CONNECTION VENICE PORT OFFSHORE - Proposed connection pipeline between future Venice Terminal Offshore and the depot island.

VENICE PORT OFFSHORE - PROPOSED LOCATION - Planning of a Venice Terminal Offshore, proposed location of the future Terminal Offshore: https://www.port.venice.it/en/the-offshore-terminal-and-the-development-of-porto-marghera.html

MARINAS – ITALY - Ports and Marinas of Italy area, Slovenia and Istria (and few more of Croatia) with name and number of boats.

PORTS AND HARBOURS - Data on major ports and harbors in the Adriatic Sea. Additional information:

http://atlas.shape-ipaproject.eu/shape/getMetadata.php?LAYER=bs_port_and_harbour_pt

PORTS - This dataset should be bibliographically referred to as the "GISCO Ports 2013 dataset". It contains a point feature class with the location of 2440 pan-European ports, plus one attribute table and 3 domain tables. The ports are identified following the UN Locode list. The dataset is based on the list "Ports Estat 2010" from Eurostat. All ports are represented by a point location in PORT_PT_2013. Point coordinates and Locodes are derived from several input sources, including ports lists from EMSA, Lloyds, Norie's Seaports of the World, the GISCO Ports 2010 dataset and the UN/LOCODE 2007 list. Attributes in PORT_AT_2013 include the port name, Locode Status Indicator, and reliability flags for the positional and Locode accuracy. Dataset coverage is global. The dataset has been created for cartographic purposes and for appropriate analysis. Port statistics can be geo-referenced to this high quality pan-European dataset, especially when based on UN Locode.

2.2.4.5.5.   P6 - Miljašić Jaruga river mouth, Nin bay (HR)

PP12 City of Nin

NATURA 2000 - Special conservation interest (SCI) "Solana Nin", Special protection Area (SPA) "Solana Nin"; 58.9496 ha, marine area: 0.00%; Special conservation interest (SCI) "Ninski stanovi - livade", Special protection Area (SPA) "Ninski stanovi - livade"; 403.7810 ha, marine area: 0.00%

2.2.4.5.6.   P9 - Cetina river mouth (HR)

PP15 Sea and Karst

ENVIRONMENTAL PROTECTION STUDY WITH A REQUEST FOR ASSESSMENT OF THE NEED FOR AN ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROJECT: "Port of nautical tourism - marina Omis-Ribnjak and part of the beach west of the port area (cp 3912/3, 3918 and 3919 K.O. Omiš)" - The project owner plans to build a nautical tourism port and arrange a part of the beach west of the port area, all in the area of the town of Omiš, in the Split-Dalmatia County. The project is planned in the coastal zone on the part of cp no. 3912/3, 3918 and 3919, all K.O. Omiš and partly in the sea.

BIOLOGICAL QUALITY OF TRANSITIONAL WATERS - FISH WEC1D - Spatial and temporal distribution of ichthyofauna composition in the marine ecosystem in transitional waters with regard to the number of species, representation of dominant families, their trophic composition, resident status

and indicators of habitat changes such as the number of diadromous, new and indicator fish species. Given the above distribution, 6 transitional water types have been defined.

TRANSITIONAL WATER BIOLOGICAL QUALITY - CLASSIFICATION OF TRANSITIONAL WATERS (ECOLOGICAL STATUS) WEC1E - Classification of transitional waters according to ecological status

HR3000126 - Cetina estuary (Ušće Cetine) is part of Natura 2000 network. The site is located in south of Croatia, near the town Omiš and includes the estuary of river Cetina. Area is characterized by a brackish lagoon, coastal marine area with sandy and muddy bottoms. The whole area (wider than the site) is very much under human impacts because the city of Omiš which is situated on the shore of the estuary is a touristic place. Lithostratigraphic unit represented around this area are cretaceous rudist limestone and eocene flysch sediments. Near the town of Omiš the Cetina River flows into the sea. It is typical karst river. This is an important site for estuaries and for *Petromyzon marinus* reproduction.

2.2.4.5.7.   P11 - Marche coastal area (IT)

PP14 Regione Marche

Coastal line 2010 - coastal line 2010 coastal line (from satellite images acquired at HOC).

Coastal line 2012 - coastal line 2012 (from satellite images acquired at HOC).

Coastal line 2015 - coastal line 2015 coastal line 2015 (from satellite images acquired at HOC).

Coastal line 2019 - coastal line 2019 coastal line 2019 (from satellite images acquired at HOC).

Reference coast - reference coastal definition of the project beach as per LL.GG, national (TNEC).

Advancement and retreat of the Marche coastal line 2008-2019 - advancement retreat of the Marche coastal line 2008-2019 advancement retreat of the Marche coastal from 2008 to 2019.

Dune areas - dune areas perimeter dune areas within the maritime state property area.

Crossings census - census of crossings census of crossing points affected by the perimeters of the flood directive.

Census of water outflows into the sea - census of water outflows into the sea census of points of water outflows into the sea (natural and anthropogenic).

Topo-bathymetric sections - topo-bathymetric sections Summer and winter profiles, detected by dual frequency gps and marine drone.

Secondary coastal physiographic units (ufcs) - delimitation of National Physiographic Units as per LL.GG (TNEC).

Coastal management units (ugc) - delimitation of Management Units as per LL.GG, national (TNEC).

Coastal sedimentology - emerged and submerged beach sedimentology (1999 and 2015 campaigns).

Chapter 3 Recommendations for observing and modeling systems

In situ measurements and other accompanying observations are considered in this report. In terms of baseline/core products that can be derived from the observations, we have highlighted some gaps in the spatial and temporal coverage of the different platforms, mainly due to the lack of observation planning at the Mediterranean Sea catchment scale.

The UN Barcelona Convention has attempted to monitor pollution and develop an ecosystem approach to fisheries conservation and management over the past 30 years, but much more work is needed. Other challenges to pollution monitoring in the Mediterranean Sea include the rapidly increasing activities of the oil/gas industry in the last 5 years and the increase in maritime traffic.

Gaps in monitoring systems are to cope with the complexity of heterogeneity, quality and large volume of data sets resulting from the different characteristics of the sampled matrix (pollutants are collected in water, sediments and biota) and to process these input data into harmonized data collections. Samples were collected using a variety of instruments for in situ measurements and analyzed using different analytical protocols with varying method accuracy and precision. Aforementioned protocols and methods need to be described in programs to enable data reusability and scientific analysis. Historical data are often devoid of detailed information and analytical procedures.

Also, the input of data sets (core products) is partially or totally inadequate for policy visibility, delivery mechanism, data policy, and responsiveness (most partners are not used to managing data in a standardized way - FAIR principles).

Chapter 4 Conclusions

This report has provided an overview of the status of the Observation and Forecasting Network Mediterranean Sea. The sustainability of this core infrastructure at the Mediterranean Sea basin level requires a larger and more intensive framework of collaboration between some research groups and research institutes, researching organizations, agencies and regional/local authorities to be established over the next decade. There is a need to strengthen the existing monitoring and forecasting marine infrastructure by complementing or upgrading it with innovative monitoring technologies and numerical models.

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