

EMODnet Chemistry History

2007-2022

1 Pilot Phase

The European Commission, in its EU's Maritime Policy Blue Book, in 2007, undertook to take steps towards EMODnet in order to improve availability of high quality data.

Four service contracts were launched for creating pilot components of EMODnet, including discipline-based thematic portals:

Lot 1 Hydrographic data

Lot 2 Marine geological data

Lot 3 Chemical data

Lot 4 Biological data

EMODnet Chemistry pilot phase was coordinated by OGS and involved **25 partner**.

Institute	Country	Status	Institute	Country	Status
OGS	IT	Coordinator	VLIZ	BE	Partner
MARIS	NL	Partner	NIOZ	NL	Partner
IFREMER	FR	Partner	IO-BAS	BG	Partner
IMR	NO	Partner	IEO	ES	Partner
RBINS	BE	Partner	RIHMI-WDC	RU	Partner
SMHI	SE	Partner	TSU-DNA	GE	Partner
HCMR	GR	Partner	SIO-RAS	RU	Partner
NIMRD	RO	Partner	BSH-DOD	DE	Partner
ICES	INT	Partner	NERI-MAR	DK	Partner
AWI	DE	Partner	MHI	UA	Partner
Ulg	BE	Partner	CLS	FR	Partner
MI	IE	Partner	OC-UCY	CY	Partner
NOC-BODC	UK	Partner	Partners from SeaDataNet network of NODC's		

The project was focused on **groups of chemical variables** required for the MSFD monitoring programs related to descriptors 5 (eutrophication), 8 (contaminants) and 9 (contaminants in fish/seafood for human consumption):

Group of variables	Example of used parameters
Antifoulants	Organometallic species concentration
Fertilisers	Ammonium, Phosphate, Nutrient concentration parameters
Hydrocarbons	Concentration of polycyclic aromatic hydrocarbons
Heavy metals	Metal concentration, Inorganic chemical composition
Organic matter	Carbon concentrations
Pesticides and biocides	Pesticide concentrations
Radionuclides	Radioactivity
Pharmaceuticals	Oxytetracycline concentration

The **coverage area** included: the Black Sea, the Greater North Sea and some spots of the Mediterranean Sea.



Figure 1. Coverage area

SeaDataNet infrastructure was used to ensure interoperability and harmonization between the four EMODnet pilots.

In detail, EMODnet adopted:

SDN Standards for background data and metadata, and for product data and metadata,

- CDI mechanism to access background data with data policy,
- ODV format for background data exchange,
- SDN Security Services for users registrations, and SDN Delivery Services for background data access and downloading,
- DIVA software tool to produce gridded data products and error maps products from the background data as NetCDF files.
- SDN Products catalogue (CAMIOON system) and SDN Products viewing services for free unlimited discovery, access, visualization and downloading of data products.

The **total budget** was EUR 699,000 for both development and maintenance.

2 Second Phase

The European Commission, in 2012, launched the tender MARE/2012/10 for developing and maintaining the EMODnet initiative as part of its Marine Knowledge 2020 strategy. The contract had a duration of three years starting from November 2013.

Seven thematic portals were launched; three more than the ones developed in the pilot phase.

Lot 1 Bathymetry

Lot 2 Geology

Lot 3 Seabed habitats

Lot 4 Chemistry

Lot 5 Biology

Lot 6 Physics

Lot 7 Human activities

EMODnet Chemistry second phase was coordinated by OGS and involved **32 partners**.

Institute	Country	Status	Institute	Country	Status
OGS	IT	Coordinator	VLIZ	BE	Partner
MARIS	NL	Partner	NIOZ	NL	Partner
IFREMER	FR	Partner	IO-BAS	BG	Partner
IMR	NO	Partner	IEO	ES	Partner
RBINS	BE	Partner	ISPRA	IT	Partner
SMHI	SE	Partner	Deltares	NL	Partner
HCMR	GR	Partner	IHPT	PT	Partner
NIMRD	RO	Partner	BSH-DOD	DE	Partner
ICES	INT	Partner	IOF	HR	Partner
AWI	DE	Partner	CNR	IT	Partner
Ulg	BE	Partner	IMGW-NRI	PL	Partner
NOC-BODC	UK	Partner	OC-UCY	CY	Partner
AU-DCE	DK	Partner	LHEI	LV	Partner
MSI	EE	Partner	UniHB	DE	Partner
BK	ME	Partner	FMI	FI	Partner
LR	IL	Partner	NIB	SI	Partner

The project was focused on the following **groups of chemical variables**:

Group of variables	Example of used parameters
Antifoulants	Organometallic species concentration
Fertilisers	Ammonium, Phosphate, Nutrient concentration parameters
Hydrocarbons	Concentration of polycyclic aromatic hydrocarbons
Heavy metals	Metal concentration, Inorganic chemical composition
Organic matter	Carbon concentrations
Pesticides and biocides	Pesticide concentrations
Radionuclides	Radioactivity
Chlorophyll	Chl. pigment concentrations in sediment
Silicates	Concentration of silicon species in the water column
Plastics	Polyethylene, polypropylene concentrations
Acidity	pH, PCO ₂ , alkalinity
Pharmaceuticals	Oxytetracycline concentration
Dissolved gases	Dissolved oxygen for sediments

The **coverage area** included: the Black Sea, the Greater North Sea, **full coverage of the Mediterranean Sea**, the Baltic Sea, the **Celtic Seas**, **Iberian Coast and Bay of Biscay**, **Macaronesia**, the **Norwegian Sea**. (in bold implementations with respect to the previous phase)

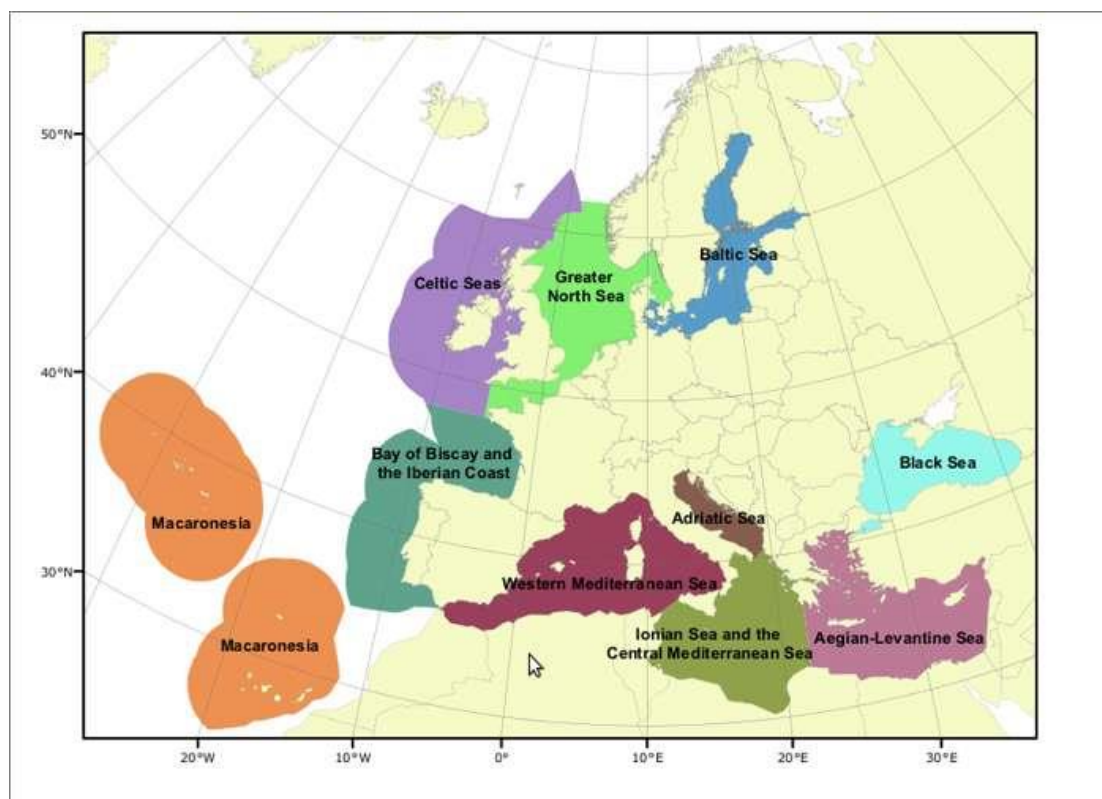


Figure 2. Coverage area

Note: This map is derived from the EU Tender document but lacks the Norwegian Sea.

EMODnet Chemistry second phase adopted SeaDataNet infrastructure for the technical set-up.

Some of the most **relevant implementations** carried out in this phase are:

The CDI Data Discovery and Access service was improved and expanded the functionality for handling large data requests in an efficient way not only by human users but also for machine to machine interaction;

The **Ocean Data View (ODV)** and **statistical processing software (DIVA)** were further developed to meet specific needs for products;

The **OceanBrowser data products viewing service** was implemented with specific features for querying and displaying data products and further integrating the CDI data access service. The visualization functionality was also extended;

The **Sextant data products catalogue service** was further deployed in functionality and coverage; the integration with the OceanBrowser viewer was also established.

The **total budget** was EUR 3,999,999.

3 Third Phase

The European Commission, in 2016, launched the tender EASME/EMFF/2016/006 for developing and maintaining the EMODnet initiative as part of its Marine Knowledge 2020 strategy. The contract had a duration of two years starting from March 2017.

With different timing, all of the seven thematic portals launched in the previous phase were confirmed and further implemented:

Lot 1 Bathymetry

Lot 2 Geology

Lot 3 Seabed habitats

Lot 4 Chemistry

Lot 5 Biology

Lot 6 Physics

Lot 7 Human activities

EMODnet Chemistry third phase was coordinated by OGS and involved **27 partners** and **16 subcontractors**. In addition to ICES, the International Council for the Exploration of the Sea, two further international organizations representing the interests of the Regional Sea Conventions (RSCs) for the Black Sea and Mediterranean Sea were directly involved, while OSPAR (Oslo Paris Commission) and HELCOM (Helsinki Commission) provided a Letter of Support.

Institute	Country	Status	Institute	Count	Status
OGS	IT	Coordinator	VLIZ	BE	Partner
MARIS	NL	Partner	NIOZ	NL	Partner
IFREMER	FR	Partner	IO-BAS	BG	Partner
IMR	NO	Partner	IEO	ES	Partner
RBINS	BE	Partner	IHPT	PT	Partner
SMHI	SE	Partner	AU-DCE	DK	Partner
HCMR	GR	Partner	IOF	HR	Partner
NIMRD	RO	Partner	ISPRA	IT	Partner
ICES	INT	Partner	LHEI	LV	Partner
AWI	DE	Partner	FMI	FI	Partner
Ulg	BE	Partner	TUT	EE	Partner
MI	IE	Partner	NIB	SI	Partner
SYKE	FI	Partner	IOLR	IL	Partner
CNR-ISMAR	IT	Partner			
NOC-BODC	UK	Subcontractor	NEA	GE	Subcontractor
ORION	CY	Subcontractor	IMS-METU	TR	Subcontractor
IMBK	ME	Subcontractor	BSC	INT	Subcontractor
RIHMI-WDC	RU	Subcontractor	UNEP/MAP	INT	Subcontractor
TSU-DNA	GE	Subcontractor	RWS	NL	Subcontractor
UkrSCES	UA	Subcontractor	Deltares	NL	Subcontractor
SOI	RU	Subcontractor	SIO-RAS	RU	Subcontractor
IU-IMSM	TU	Subcontractor	MHI	RU	Subcontractor
IMBR		Subcontractor	UHI-MB	UA	Subcontractor

The project was focused on the following **groups of chemical variables**:

Group of variables	Example of used parameters
Antifoulants	Organometallic species concentration
Fertilisers	Ammonium, Phosphate, Nutrient concentration parameters
Hydrocarbons	Concentration of polycyclic aromatic hydrocarbons
Heavy metals	Metal concentration, Inorganic chemical composition
Organic matter	Carbon concentrations
Pesticides and biocides	Pesticide concentrations
Radionuclides	Radioactivity
Chlorophyll	Chl. pigment concentrations in sediment
Silicates	Concentration of silicon species in the water column
Plastics	Polyethylene, polypropylene concentrations
Acidity	pH, PCO ₂ alkalinity
Pharmaceuticals	Oxytetracycline concentration
Dissolved gases	Dissolved oxygen for sediments
Marine litter	Beach Litter abundance and type
Nutrient loads	Nitrogen and phosphorus concentration

The **coverage area** included: the Black Sea, the Greater North Sea, the Mediterranean Sea, the Baltic Sea, the Norwegian Sea **including Barents Sea**, North East Atlantic (Celtic Seas, Iberian coast and Bay of Biscay, and Macaronesia) (in bold implementations with respect to the previous phase).



Figure 3. Coverage area

EMODnet Chemistry third phase adopted SeaDataNet infrastructure for the technical set-up. In this phase, EMODnet Chemistry approach was continued, upgraded where needed, and expanded to fulfill new requirements, such as management of marine litter data collected in open sea and on beaches.

Some of the **most relevant implementations** carried out by EMODnet Chemistry in this phase are:

Inclusion of **quality information about QA/QC procedures** applied for sampling and laboratory analysis;

DIVA maps of **eutrophication** parameters at basin scales for seasons in time;

DIVA maps of **contaminant** distribution near coasts;

Development of the **Map viewer service** to integrate viewing systems for time series and profiles;

New **dedicated database system and map layers** for **marine litter**;

New **dedicated tools** to manage **seafloor and beach litter data**;

Set up and made operative the **help desk**.

The **total budget** was EUR 2,805,000 for both development and maintenance.

4 Fourth Phase

The European Commission, in 2019, launched the tender EASME/2019/OP/0003 for developing and maintaining the EMODnet initiative. The contract had a duration of two years starting from October 2019.

EMODnet Chemistry fourth phase was coordinated by OGS and involved **13 partners, 3 subcontractors** and **32 advisories**. Due to the consistent budget cut, the partnership was considerably reduced and an open advisory forum was created to keep involvement with the wider network.

Institute	Country	Status	Institute	Country	Status
OGS	IT	Partner	SMHI	SE	Partner
MARIS	NL	Partner	HCMR	GR	Partner
IFREMER	FR	Partner	NIMRD	RO	Partner
IMR	NO	Partner	ICES	INT	Partner
AU-DCE	DK	Partner	AWI	DE	Partner
RBINS	BE	Partner	Ulg	BE	Partner
ISPRA	IT	Partner	MI	IE	Subcontractor
NOC-BODC ¹	UK	Subcontractor	Deltares	NL	Subcontractor
VLIZ	BE	Advisory	IOF	HR	Advisory
NIOZ	NL	Advisory	LHEI	LV	Advisory
IO-BAS	BG	Advisory	TUT	EE	Advisory
IEO	ES	Advisory	FMI	FI	Advisory
CNR	IT	Advisory	NIB	SI	Advisory
IH ²	PT	Advisory	IOLR	IL	Advisory
SYKE	FI	Advisory	IU-IMSM	TU	Advisory
NEA	GE	Advisory	IMS-	TR	Advisory
ORION	CY	Advisory	SIO-RAS	RU	Advisory
IMBK	ME	Advisory	UHI-MB	UA	Advisory
RIHMI-WDC	RU	Advisory	SOCIB	ES	Advisory
TSU-DNA	GE	Advisory	IMGW	PL	Advisory
UkrSCES	UA	Advisory	UNEP-	INT	Advisory
SOI	RU	Advisory	OSPAR	INT	Advisory
INGV	IT	Advisory	HELCOM	INT	Advisory
RWS	NL	Advisory	BSC	INT	Advisory

¹ former NERC-BODC

² former IHPT

The project was focused on the following **groups of chemical variables**:

Group of variables	Example of used parameters
Antifoulants	Organometallic species concentration
Fertilisers	Ammonium, Phosphate, Nutrient concentration parameters
Hydrocarbons	Concentration of polycyclic aromatic hydrocarbons
Heavy metals	Metal concentration, Inorganic chemical composition
Organic matter	Carbon concentrations
Pesticides and biocides	Pesticide concentrations
Radionuclides	Radioactivity
Chlorophyll	Chl. pigment concentrations in sediment
Silicates	Concentration of silicon species in the water column
Plastics	Polyethylene, polypropylene concentrations
Acidity	pH, PCO ₂ , alkalinity
Pharmaceuticals	Oxytetracycline concentration
Dissolved gases	Dissolved oxygen for sediments
Marine litter	Floating macro litter abundance and type
Nutrient loads	Nitrogen and phosphorus concentration

The coverage area included: the Black Sea, the Greater North Sea, the Mediterranean Sea, the Baltic Sea, the Norwegian Sea including Barents Sea, North East Atlantic (Celtic Seas, Iberian coast and Bay of Biscay, and Macaronesia).



Figure 4. Coverage area

EMODnet Chemistry fourth phase adopted SeaDataNet infrastructure for the technical set-up. In this phase, EMODnet Chemistry approach was continued, upgraded where needed, and expanded.

Some of the most **achievements** obtained in this phase were:

Gathering and managing **new marine litter types**, such as floating micro litter, and imaging in the seafloor;
Closer engagement and cooperation with **MSFD process and Copernicus Marine Environment Monitoring Service (CMEMS)**;

Overall enrichment of metadata;

A first use of the **Collaborative Virtual Environment (CVE)** to streamline data processing with online ODV software;

The interpolated **DIVA maps of eutrophication** parameters at European scale, per sea basin and per specific coastal areas;

The overall portal and structure of services improved.

The **total budget** was EUR 1,399,000.

5 Fifth Phase

On behalf of the European Commission, the European Climate, Infrastructure and Environment Executive Agency (CINEA), in July 2020, launched the tender EASME/2020/OP/0006 with a view to further developing and maintaining the European Marine Observation and Data Network (EMODnet).

The EMODnet Chemistry Fifth Phase brings together **a core group of 16 organizations**, as partners and subcontractors, from 11 countries bordering European seas, mostly national marine monitoring agencies and major marine research institutes, complemented by experts in information technology and marine data management. **The National Institute of Oceanography and Experimental Geophysics (OGS, Italy)** has been confirmed as the **Project Coordinator**, as well as the **Marine Information Service (MARIS, Netherlands)** as the **Technical Coordinator**. **5 international organizations** are also engaged: ICES – International Council for the Exploration of the Sea, and the four organizations representing the interests of the Regional Sea Conventions (RSCs): BSCS - Black Sea Commission Secretariat, UNEP/MAP - United Nation Environment Programme/Coordinating Unit for the Mediterranean Action Plan, OSPAR (Oslo Paris Commission) and HELCOM (Helsinki Commission). The open advisory forum was maintained to keep involvement with the wider network. The forum includes 28 advisors

Institute	Country	Status	Institute	Country	Status
OGS	IT	Partner	HCMR	GR	Partner
MARIS	NL	Partner	NIMRD	RO	Partner
IFREMER	FR	Partner	ICES	INT	Partner
IMR	NO	Partner	AWI	DE	Partner
AU-DCE	DK	Partner	ULg	BE	Partner
SMHI	SE	Partner	ISPRA	IT	Partner
MI	IE	Partner	VLIZ	BE	Partner
NODC-BODC	UK	Subcontractor	ETT	IT	Subcontractor
RBINS	BE	Advisory	IOF	HR	Advisory
NIOZ	NL	Advisory	LHEI	LV	Advisory
IO-BAS	BG	Advisory	TalTech (MSI)	EE	Advisory
IEO	ES	Advisory	FMI	FI	Advisory
CNR	IT	Advisory	NIB	SI	Advisory
IH	PT	Advisory	IOLR	IL	Advisory
SYKE	FI	Advisory	IU-IMSM	TU	Advisory
NEA	GE	Advisory	IMS-METU	TR	Advisory
ORION	CY	Advisory	SIO-RAS	RU	Advisory
IMBK	ME	Advisory	UHI-MB	UA	Advisory
RIHMI-WDC	RU	Advisory	SOCIB	ES	Advisory
TSU-DNA	GE	Advisory	IMGW	PL	Advisory
UkrSCES	UA	Advisory	UNEP-MAP	INT	Regional expert
SOI	RU	Advisory	OSPAR	INT	Regional expert
INGV	IT	Advisory	HELCOM	INT	Regional expert
CEDRE	FR	Advisory	BSCS	INT	Regional expert

The project aims to maintain and develop a more coherent, effective, and efficient EMODnet by means of the integration and centralization of the different thematic portals. For this purpose, a process of repatriation under europa.eu domain of all lot portals has been progressively taking place. Huge efforts are going to be dedicated to providing more service oriented outcomes and to stimulating their use by industry, policy and scientific data users.

The project is focused on the following **groups of chemical variables**:

Group of variables	Example of used parameters
Antifoulants	Organometallic species concentration
Fertilisers	Ammonium, Phosphate, Nutrient concentration parameters
Hydrocarbons	Concentration of polycyclic aromatic hydrocarbons
Heavy metals	Metal concentration, Inorganic chemical composition
Organic matter	Carbon concentrations
Pesticides and biocides	Pesticide concentrations
Radionuclides	Radioactivity
Chlorophyll	Chl. pigment concentrations in sediment
Silicates	Concentration of silicon species in the water column
Plastics	Polyethylene, polypropylene concentrations
Acidity	pH, PCO ₂ , alkalinity
Pharmaceuticals	Oxytetracycline concentration
Dissolved gases	Dissolved oxygen for sediments
Marine litter	Floating macro litter abundance and type
Nutrient loads	Nitrogen and phosphorus concentration

The coverage area includes: the Black Sea, the Greater North Sea, the Mediterranean Sea, the Baltic Sea, the Norwegian Sea including Barents Sea, North East Atlantic (Celtic Seas, Iberian coast and Bay of Biscay, and Macaronesia).



Figure 5. Coverage area

Some of the most **relevant implementations** foreseen in this phase are:

Maintaining and improving a method of access to data chemistry observations held in repositories, in particular measurements of concentration of chemicals in seawater, sediments and biota, particularly those relevant to the Marine Strategy Framework Directive, the Water Framework Directive, the Nitrates Directive or to global climate change;

Constructing products from one or more data sources that provide users with information about the distribution and quality of parameters in time and space;

Maintaining and improving procedures for machine-to-machine connections for all data and data products while ensuring a common approach along the different lots;

Interacting with the administrators of the EMODnet central portal to ensure that the data and data products can be found, viewed and downloaded with ease from that central portal;

Providing content for a reserved space for the chemistry thematic group within the EMODnet central portal;

Ensuring coherence with efforts of regional sea conventions and other relevant local actors;

Engaging with EU reporting mechanisms (e.g. through participation in working groups TG-DATA);

Exploiting opportunities for interoperability with data distributed by non-EU organisations;

Actively participating in the INSPIRE Directive and Digital Earth processes and ensuring compliance;

Monitoring quality and performance and dealing with user feedback through a help desk service;

Maintaining continuity with the thematic portals for a maximum of six months from the start of the contract.

The **total budget** is EUR 2,234,000.