

How can EMODNET engage in support to the marine environmental assessment

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Marine environmental assessment: a common task for both EU and non-EU countries.

EU countries agreed upon the Marine Strategy Framework Directive which aims to: **“take necessary measures to achieve or maintain good environmental status in the marine environment by 2020”**

11 Descriptors:

1. Biodiversity
2. Non-indigenous species
3. Commercially exploited fish
4. Marine food webs
5. Human-induced eutrophication
6. Sea floor integrity
7. Hydrographical conditions
8. Concentration of contaminants
9. Contaminants in fish & seafood
10. Marine litter
11. Energy



In the **EU Green Paper** on Future Maritime Policy for the European Union, the Commission proposed a new **European Marine Observation and Data Network** (EMODNET). **EMODNET** will provide data and suitable products, as required by EU environmental policies, and the parameters collated are among those required by the MSFD.

The pilot components of the EMODNET consisted in 4 lots:

Lot 1 – Hydrographic data

Lot 2 – Marine geological data

Lot 3 – Chemical data

Lot 4 – Biological data

+ Habitat Maps & Physics (activated separately)

Chemistry Lot Pilot Project:

25 partners, coordinated by OGS

June 2009 to June 2012

5. Human-induced eutrophication

8. Concentration of contaminants

9. Contaminants in fish & seafood



The Pilot Project: aim

- To assemble existing data and metadata of chemical parameters and process them into **interoperable** formats
- To collect already available and set up suitable QA/QC protocols
- To realize suitable **products for data visualization**
- To develop, operate and maintain a portal to allow public **access to all information** collected



The Pilot Project: where



- North Sea
- Black Sea
- 5 “hot spots” of the Med Sea



The Pilot Project: what

-parameters choice based on MSFD requirements, from 8 groups of compounds, in 3 matrices (**water**, **biota**, **sediment**),

→17 selected parameters for product generation.

Chemical group	Parameter	Chemical group	Parameter
Pesticides	Dichlorodiphenyltrichloroethane (DDT)	Hydrocarbons	Anthracene (C ₁₄ H ₁₀)
Pesticides	Hexachlorobenzene (HCB)	Hydrocarbons	Fluoranthene (C ₁₆ H ₁₀)
Antifoulants	Tributyltin (TBT)	Radionuclides	Tritium
Antifoulants	Triphenyltin (TPT)	Radionuclides	Cesium 137
Pharmaceuticals	Oxytetracycline (C ₂₂ H ₂₄ N ₂ O ₉)	Radionuclides	Plutonium 239
Heavy metals	Mercury (Hg)	Fertilisers/Nitrogen	Nitrate (NO ₃)
Heavy metals	Cadmium (Cd)	Fertilisers/Nitrogen	Phosphate (PO ₄)
Heavy metals	Lead (Pb)	Organic matter	Organic Carbon (C)
		Organic matter	Organic Nitrogen (N)



The Pilot Project: How

Based on **SeaDataNet (SDN)**:

- **distributed Marine Data Management Infrastructure** for large and diverse sets of data deriving from *in situ* and remote observations
- An european *de-facto standard* with: **44 partners** and **14 subcontractors** from **35 european and not-EU countries** .

Principle of “ADOPTED AND ADAPTED”:

SDN Standards for metadata, data and products

- for **metadata** (xml ISO 19115→ ISO 19139) **CDI**;
- for **common terms Standard Vocabs** (P021,P011,P061...);
- for background **data** exchange ASCII format **ODV**

SDN Infrastructure:

- to **access data** with **data policy** management
- Service for **users registrations** → **SDN Security Services**,
- Service for **discovery, visualization** and **downloading** of products → SDN Products viewing services
- Well accepted QA/QC protocols

SDN Softwares:

- **MIKADO** → metadata mapping and xml generator
- **NEMO** → data formatting tool
- **DIVA** software → **gridded data products** and error maps,
- **ODV** software → **for “time series” products** generation and **QC**



The Pilot Project: QC/QA

- collection of available guidelines already developed in the areas of interest;
- Definition of general EMODnet QA/QC Guidelines

QC For “more classic (SDN)” : eg. Fertilizers, dissolved gases (e.g.O₂), silicates...:

- SDN QC Protocols: automatic and specific /visual checks (ODV);

QC For “Exotic (not SDN)” parameters and contaminants it was highlighted that:

- Difficult to fit SDN classic QC protocol (eg: Sediment and biota **missing in SDN**)
- How to apply Range checks? **Not enough data availability** for a climatology;
- How to apply **Spike checks**? → The contaminants are more related to an “**event**” logic... high-values could be related to events, not necessary to errors (sampling/analytical)!
- Data below **detection limits**... (not specified!!!)



The Pilot Project: challenges to face along the path from **DATA** to **PRODUCTS**

Data complexity:

- from 8 groups of compounds;
- 3 matrices (sediment, water column and biota);
- 17 selected parameters for products generation;

Heterogeneity:

- Of the sampling/data distribution (coastal points time series vs homogenous sampling at basins level);
- Of measurement methods (instrument, method, target species, target basis, grain sizes).



The Pilot Project: data products:

Available data presented:

Homogeneous distribution
In time and space (basins)

Not homogeneous distribution
In time and space (basins)

Decisions for products generation based on **Expert workshop** with
representatives from Marine Conventions:

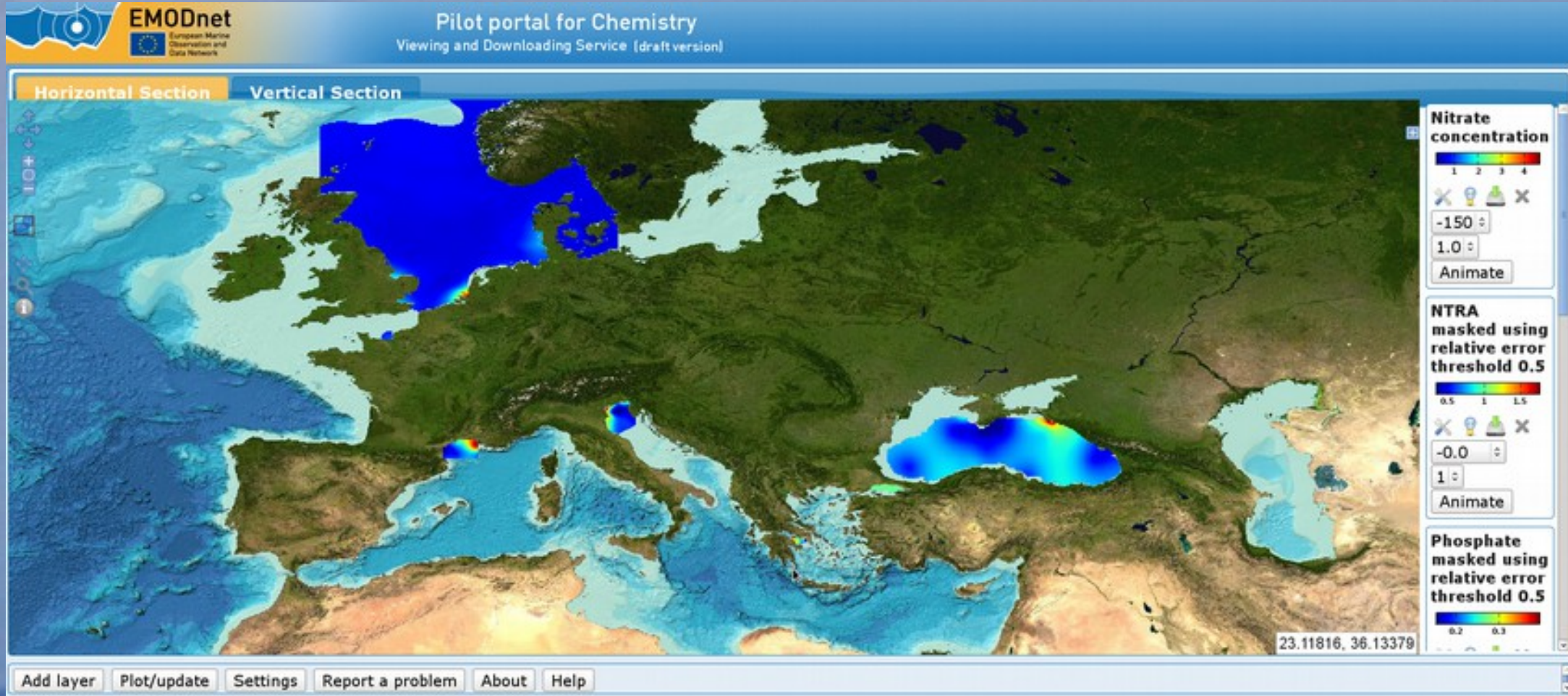
Standard Diva Interpolated maps for parameters with homogeneous distribution and suitable data coverage, measured at basin scale

Time series plots for coastal stations, linked with station position.



Examples of data products

DIVA interpolated maps



Ocean Browser (Gher group)

<http://www.emodnet-chemistry.eu/portal/portal/emodnet/Data+Products>



Time Series plots

Ocean Browser (Gher group)

The screenshot displays the EMODnet Ocean Browser interface. At the top, the logo for EMODnet (European Marine Observation and Data Network) is visible, along with the text "Pilot portal for Chemistry" and "Viewing and Downloading Service (draft version)". Below this, there are tabs for "Horizontal Section" and "Vertical Section". The main area shows a map of the Mediterranean region with a data point selected. A tooltip for this point shows the following information:

longitude	13.596667
latitude	45.758333
Concentration of anthracene (CAS 120-12-7) per unit	

At the bottom of the map, the coordinates 20.68909, 51.95650 are displayed. Below the map is a navigation bar with buttons for "Add layer", "Plot/update", "Settings", "Report a problem", "About", and "Help".

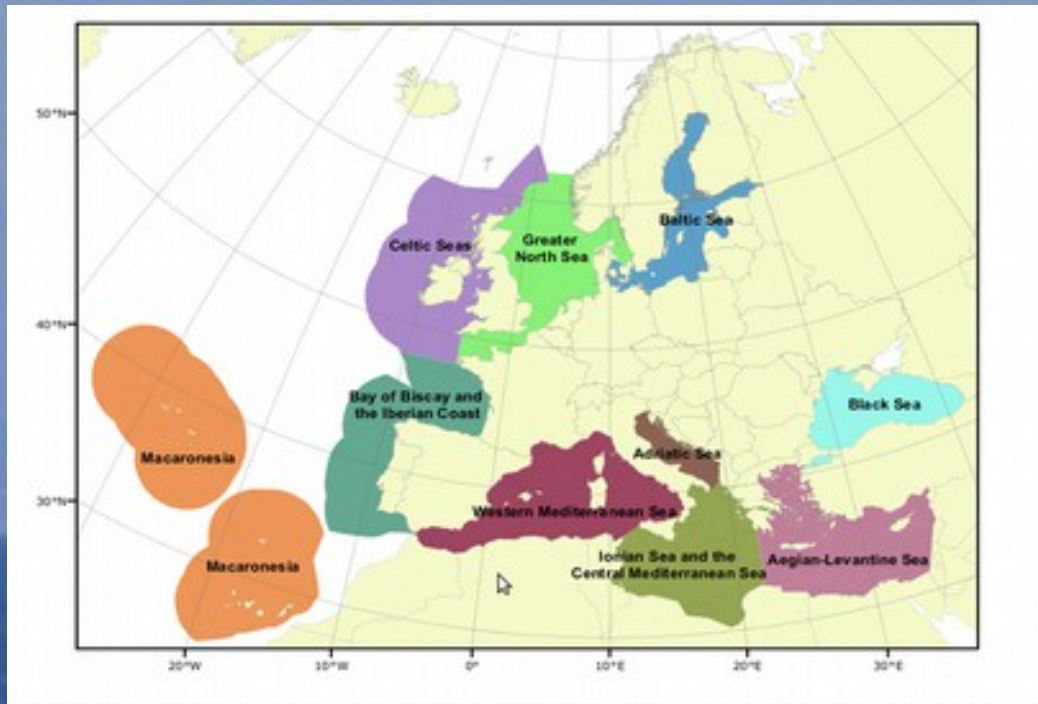
Overlaid on the right side of the screenshot is a time series plot. The plot title is "Available image formats: PNG" and "Depth= 5 m". The y-axis is labeled "MMUSANTH (Milligrams per kilogram)" and ranges from 0 to 0.05. The x-axis represents years from 2002 to 2010. The plot shows red circular data points representing the concentration of MMUSANTH at 5m depth over time.

Year	MMUSANTH (Milligrams per kilogram)
2002	0.001
2003	0.033
2004	0.010
2005	0.002
2006	0.001
2007	0.008
2008	0.007
2009	0.009
2010	0.003
2011	0.050



Chemistry Lot : 2nd Phase (2013-2015)

- The portal should cover all European waters, including the whole Mediterranean;
- Enlarged partnership: **32** partners + **14** sub-contractors = total of **46** participants (about twice!);



Chemistry Lot : 2nd Phase (2013-2015)

- New parameters: chlorophyll, silicates, partial pressure of dissolved gases, plastics, acidity;
- New WorkPackages, eg: **MSFD interactions**, technical development/coastal viewer, involvement of partners with specific expertise (ISPRA, ICES, DELTARES...)



Important additional contribution of the new project:

- Regular dialogue with the Working Group on Data, Information and Knowledge Exchange (WG DIKE), established under the Marine Strategy Framework Directive Common Implementation Strategy to support access to data used for MSFD assessments and monitoring;
- Improvement in QA/QC procedures based on collection of detailed information on analytical methods and on establishment of regional ranges for “exotic parameters”
- Open dialogue with MSFD requirements/guidelines and with Marine Convention experts
- Development of new visualization tools especially focused on coastal areas



Conclusion:

Through:

- Strong interaction with MSFD
- Extension of data collection from all European Seas
- Improvement of web portal for public access of QC data
- *Ad hoc* visualization products

EMODNet Chemistry is now recognised as one of the main systems to support the access to data and products to be used for the good environmental status (GES) assessments, a common goal not limited only to EU countries.

Thus, EMODNet is seen as a future component of the WISE (**W**ater **I**nformation **S**ystem for **E**urope) Marine system.





Horizontal Section

Vertical Section



Total nitrogen

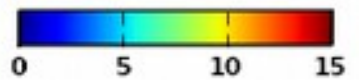


- 100 ▾

1.0 ▾

Animate

Nitrates



0 ▾

1.0 ▾

Stop

31.73223, 48.43076

