

EMODNET MedSea Checkpoint - Using ISO quality elements to assess the existing monitoring system at the Mediterranean Sea basin level

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http://www.emodnet-mediterranean.eu/



OUTLINE

- Context and aims of the project
- Project outputs
- Assessment process
- ✓ Main results
- Conclusions and way forward



Context

✓ The concept of sea-basin checkpoint was introduced within the « Marine Knowledge 2020 »



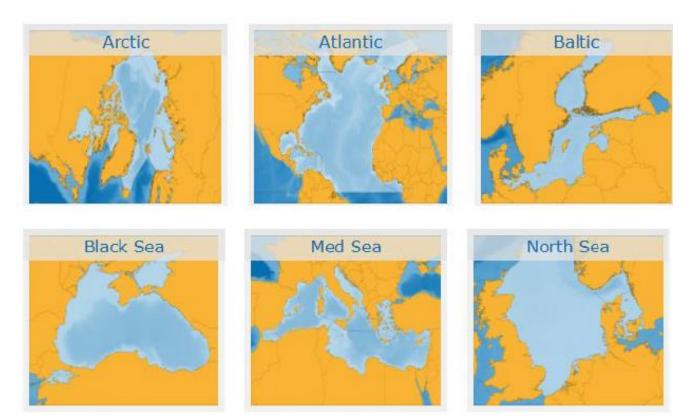
- Up to now observations of the seas have been made for specific purposes
- In order to save costs and improve marine knowledge, the EU is now moving to a new paradigm where data must be collected once to satisfy multiple uses
- This has led the Commission to establish a formal way of assessing these uses by launching the checkpoint concept





Context

✓ 6 ongoing checkpoint projects



Source : EMODnet Central portal => <u>http://www.emodnet.eu/checkpoints</u>



Context and aims

- Clarify the data collection landscape of all compartments of the marine environment and highlighting the existing programs at national, european and international level
- Develop fitness-for-use indicators to show the performance, the accessibility and usability of monitoring data for the production of Challenge targeted products
- Define priorities to make existing monitoring systems meeting present and future challenge needs

Assessment is the main objectif



Context and aims

 To do so, a series of end-user applications (called "challenges") of paramount importance have been selected by the DG MARE

 The purpose of these challenges is to develop innovative products from existing data sources and to assess the fitness for use of these data for these applications



Data

accessibility.

availability

Data efficiency, reliability, accuracy

space

consistency

of data



Project outputs

The practical outputs of the project are:

- 1) A literature survey on the existing Mediterranean Sea monitoring systems
- 2) A metadatabase containing (Geonetwork/Sextant):
 - the catalogue of the upstream datasets
 - the catalogue of the challenge targeted products
- 3) A WebGIS allowing to discover targeted products
- 4) Two Data Adequacy Reports (DARs) on the fitness for purpose of the monitoring with respect to the 7 Challenges
- 5) A **website** offering direct access to checkpoint services





Project outputs

- ✓ The results are designed for:
 - Institutional stakeholders for decision making on observation and monitoring systems
 - Data providers and producers to know how their data collected once for a given purpose could fit other user needs
 - End-users interested in a regional status and possible uses of existing monitoring data



MedSea Checkpoint

What are the challenge targeted products?



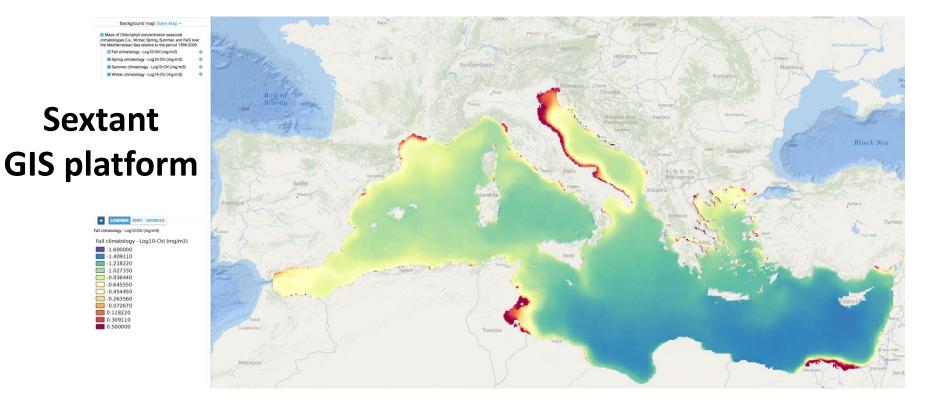
43 products available on the portal



MedSea Checkpoint

Looking at MEDSEA_CH6_Product_1, four spatial layers represent maps of seasonal Chlorophyll (mg/m3) from CMEMS L4 satellite ocean color data for the past 10 years (2005-2014).

fall Chlorophyll climatology



Colella, S., Falcini, F., Rinaldi, E., Sammartino, M., & Santoleri, R. (2016). Mediterranean Ocean Colour Chlorophyll Trends. PloS one, 11(6), e0155756.



Assessment process

- The approach initiated by the Medsea checkpoint involves the development of information and indicators based on a common reference framework :
 - ✓ the ISO TC 211 standards for Data Product Specifications (ISO 19131), Data Quality (ISO 19157) and Metadata (ISO 19115-3)
 - ✓ The Seadatanet Common Vocabularies agreed by the oceanographic community are used. This vocabulary adopt a hierarchical approach for the classification of terms, from disciplines (PO3), to parameter discovery (PO2), to parameter usage (PO1)



Assessment process

- In the assessment process the quality evaluation is carried out according to a series of selected criteria
- ✓ The criteria are focused on two basic questions :
 - What is made available to the challenge?
 - data appropriateness => the extent to which data ("what") fits the user needs in term of "completeness", "consistency" and "accuracy"
 - How the input data sets are made available to the challenge use?
 data availability => the extent to which data can be discovered and obtained by users ("how") in term of "visibility",
 - "accessibility" and "performance"



Assessment process - Availability Indicators

Availability measures the degree to which datasets are ready for use and obtainable

Identifier	Availability indicators	Definition			
AV-VI-1	Easily found	Can the data sets or series of data found easily?			
AV-VI-2	EU Inspire catalogue Level at which the d			ALA ALE ILIUEAEU	
AV-AC-1	Policy visibility	Visibility on data providers.	y adopted by data		
AV-AC-2	Delivery mechanism The services availal access data				
AV-AC-3	Data policy	Data policy	AC	CESSIBILITY	
AV-AC-4	Pricing	Cost basis / price poli		су	
AV-AC-5	Readiness	Format for use			
AV-PE-1	Responsiveness	Ability to pro amount of time	PER	FORMANCE	



MedSea Checkpoint

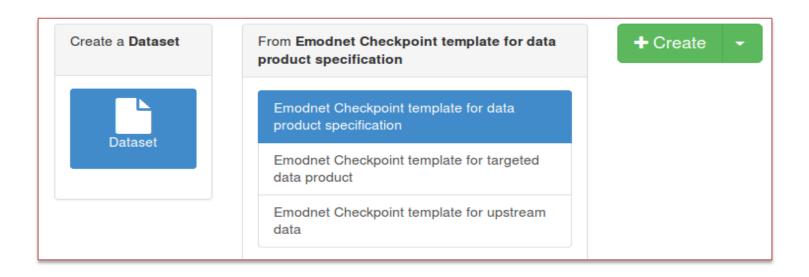
Assessment process – Appropriateness indicators

ISO 19157				MEDSEA			
Quality Elements	Selected Sub-Elts	Definitions		Rank and Identifier XXX being DPS,TDP, or UD (QM)			
		The degree of absence of data in a dataset		XXX.AP.1.1	Horizontal Spatial Coverage		
Completeness	IOmission I			XXX.AP.1.2	Vertical Spatial Coverage		
			3	XXX.AP.1.3	Temporal Coverage		
Logical consistency	Conceptual consistency	Adherence to rules of the conceptual schema	4	XXX.AP.2.1	Number of Characteristics		
	Classification	The classification correctness of the smallest object or event that can be resolved		XXX. AP.3.1	Horizontal resolution		
	correcteness			XXX.AP.3.2	Vertical resolution		
Thematic accuracy				XXX.AP.3.3	Temporal resolution		
	Quantitative attribute accuracy	Closeness of measurements to values accepted as or known to being true		XXX.AP.3.4	Thematic accuracy		
Temporal quality	Temporal validity	Validity of data with respect to time	9	XXX. AP.4.1	Temporal validity		



Assessment process – metadatabase

- ✓A catalogue for upstream data (298 entries)
- ✓ A catalogue for targeted product (being filled by challenges)





Assessment process for appropriateness

✓ STEP 1 : Create metadata for DPS (ISO 19131:2007)

- ✓ General informations : date/abstract/purpose/contact...
- ✓ Quality measures for DPS (how the product should be?)

Measure identification	Name of measure	Value	Value unit
AP.1.1	Horizontal Spatial Coverage	1000000	km**2 🗙
AP.1.2	Vertical Spatial Coverage	200	meters 🗙
AP.1.3	Temporal Coverage	7300	days 🗙
AP.2.1	Number of Characteristics	20	Integer 🗙
AP.3.1	Horizontal resolution	50	meters 🗙
AP.3.2	Vertical resolution	4	meters 🗙
	Vertical resolution (Descriptive result)	Ideal proc	luct 🦳
AP.3.3	Temporal resolution	0,041667	days 🗙
AP.3.4	Thematic accuracy	70	%
	Thematic accuracy (Descriptive result)		
AP.4.1	Temporal validity	7300	days 🗙



Assessment process for appropriateness

✓ STEP 2 : Create metadata for TDP

Product created

✓ General information : date/abstract/purpose/contact...

✓ Quality measures for TDP and computation of Quality errors

 \checkmark TDP QE_i= (DPS QM_i – TDP Qm_i)x 100 / DPS QM_i

✓ Link the TDP to the corresponding DPS

✓ Link the TDP to UD used to create this TDP

Component is covered?					
Measure identification	Name of measure	Value	Value unit	Quality errors (%)	DPS value
AP.1.1	Horizontal Spatial Coverage	100	km**2	0	100 km**2
AP.1.2	Vertical Spatial Coverage	5	meters	0	5 meters
AP.1.3	Temporal Coverage	5	days	-50	10 days
AP.2.1	Number of Characteristics	4	Integer	0	4
AP.3.1	Horizontal resolution	6500	meters	-1200	500 meters
AP.3.2	Vertical resolution	1	meters	0	1 meters
	Vertical resolution (Descriptive result)	approximate resolution of data use model to forecast	approximate resolution of data used in the model to forecast		
AP.3.3	Temporal resolution	0,1666	days	-300	0.041667 days
AP.3.4	Thematic accuracy	10	%	10	10 %
	Thematic accuracy (Descriptive result)		Å		
AP.4.1	Temporal validity	2	days	-100	1 days

Other resources +
upstreamData
Upsizental uplacity of the upstreachurge (oursent of the upstreachurge).

Horizontal velocity of the water column (currents) | Current velocity in the water body (E and N components) | Copernicus Marine Environment Monitoring Service | Mediterranean Sea Physics Analysis and Forecast (UPSTREAMDATA)

specification

Associated resources +-

MEDSEA_CH3_Specification_1 / Oil Platform Leak Bulletin released after X/ a DG MARE request received by email on the 28th of July 2014 (SPECIFICATION)

Compute or update quality errorsLink to one or more upstream data



Assessment process for appropriateness

✓ STEP 3 : Create metadata for Upstream data

- ✓ General information : Characteristics/Data sources/Overview...
- ✓ Availability information : visibility/accessibility/performance
- \checkmark Quality measures for UD and computation of Quality errors
- ✓ The fitness for use (usability class of ISO) for UD is determined by the aggregation of the criteria selected as relevant to evaluate the ability of the dataset to satisfy challenge needs

Measure identification	Name of measure	Value	Value unit	Quality errors (%)	Fitness for use	DPS value	TDP value
AP.1.1	Horizontal Spatial Coverage	2500000	km**2	2499900	0	100 km**2	100 km**2
AP.1.2	Vertical Spatial Coverage	4000	meters	79900	0	5 meters	5 meters
AP.1.3	Temporal Coverage	10	days	0	0	10 days	5 days
AP.2.1	Number of Characteristics		Integer	NaN	NaN	4	4
AP.3.1	Horizontal resolution	6500	meters	-1200	-849	500 meters	6500 meters
AP.3.2	Vertical resolution		meters	NaN	NaN	1 meters	1 meters
	Vertical resolution (Descriptive result)	model resolution is v	, ,	<mark>Note: f</mark>	ormula	<mark>are not</mark>	correct





Main results - 1

✓ A catalogue describing almost 300 upstream data

EMODnet	MedSea Checkpoint
Browse through the catalogue of data described (input data); filters are provided below or use the graphs (clicking on a bar/sector on a graph will filter all the graphs by this value).	
ELIST CRAPH ETABLES Search	Q
Filters: X X X X Challenges × Characterics × Data Format × Environmental Matrix × Grouped by "Datasets" Ø reset	
Search Results filtered by	25 results shown out of 248 - page 8 of 10
Habitat characterisation Posidonia oceanica EMODnet Seabed Habitat Modelled Spatial Distributions of Posidonia oceanica	< >
Oil spill impact on human activitites and environment impact of oil on coastal environment INPUT DATASET INFORMATION	
Challenges Oil platform feaks Characterics Habitat characterisation Data Provider Regional activity centre for specially protected areas (racspa) Environmental Matrix Biota - biology Policy Visibility There is no information at all on data policy adopted by data providers Processing Level Of High level analyzed Purpose Of Characte Marine habitat mapping Readyness Format not proprietary and content clearly specified (eg autodescriptive like odv netcdf cf) or at least with appropriate document describing the content	
Visibility Use of open search engines searching by name either the data provider or the characteristics	Environmental Matrix
ACCESSIBILITY EU catalogue service The datasets are provided through an eu inspire catalogue service (ogc) Data Delivery Mecha Manual process order forminvoice is requested Data policy	Air Biota - biology Fresh water Human activities Marine water Seabed - riverbed
Pricing Data formats Open full description Habitat extent Coralligenous formations Ecoregion-Based Conservation Planning in the Mediterranean: Dealing with Large-Scale Heterogeneity list sync at 2016-09-27 14:16:1	



Main results - 2

Dashboard on availability indicators. They are constructed directly on the metadatabase of upstream datas

Metadata fields are used to release indicator information !

9	iashboards x 🔪 Challenges Emodnet x 👌 🔤 Med Sea Checkpoints En x 🖉 Eneckpoint Browser - EMI x 🖞 🖬 Maritime forum - Europeal x 🔪	ا ف	
	C 🗅 sextant.ifremer.fr/dashboard/dashboard/#/dashboard/solr/Medsea		5 x
Me	dsea NUMBER OF INPUT DATA:	4 B 🗲	B
Ā	SEARCH 🕘 🔅 🗙 QUERY	TOTAL HITS 🔞 🌣 🗙 H	HITS
	(• ·	298	
Ð	NUMBER OF RECORD PER CHALLENGES	CHALLENGES	
	100		
	• Oil platform leaks (94) + filter dashboard per challenge	Windfarm siting 3	30
	[®] + filter udshbodru per challenge	 River inputs 3 	36
		 Oil platform leaks 9 	94
		Marine protected areas 7	75
		 Marine environment 3 	3
			26
		 Climate and coastal protection 3 	
	50		55
	40		
	20		



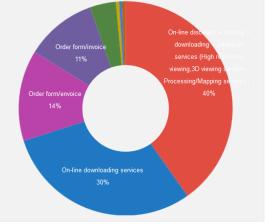
MedSea Checkpoint

Main results - 2

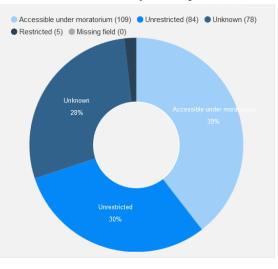
Dynamic plots displaying availability indicators

Delivery mechanism

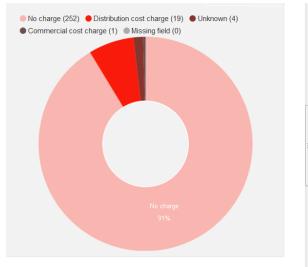
- •
- On-line discovery + viewing + downloading + advanced services (High resolution viewing,3D viewing services, Processing/Mapping services...) (82)
- On-line downloading services (61)
 Order form/envoice (28)
- Order form/invoice (22)
- On-line discovery+viewing + downloading services (8)
- Processing/Mapping services...) (1)
- On-line discovery + viewing + downloading + advanced services (High resolution viewing (1)
- 3D viewing services (1)
 Missing field (0)



Data policy



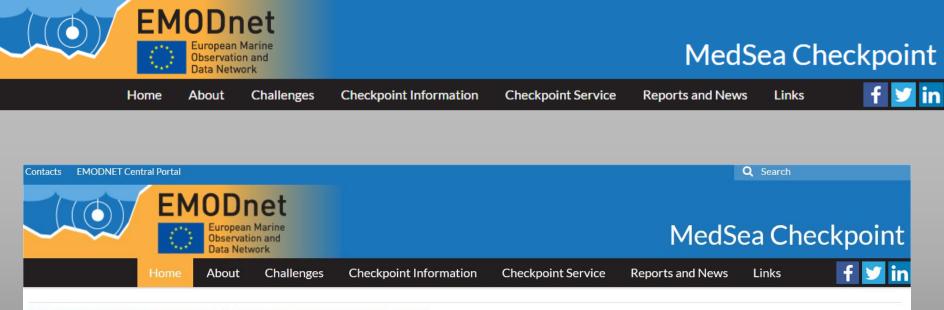
Pricing

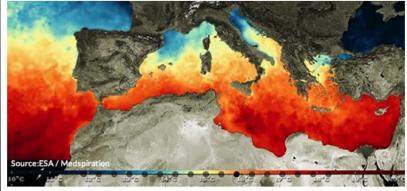




Preliminary conclusions

- The originality of the Med CheckPoint approach is to adopt a new method to assess monitoring systems by end-users based on the quality principles of the ISO standards. We also offer a visual representation of metadata catalogue allowing a non expert to easily assess the fitness for use without spending a lot of time looking at metadata and reports.
- ✓ This is in line with the INSPIRE Directive to establish the European Spatial Data Infrastructure and takes benefit of the efforts made by data centres and networks such as SeaDataNet to implement the Directive (Catalogues based on ISO19115/ISO19139).
- ✓ Way forward: develop the Checkpoint Service for all input data sets, in all basins in Europe and make a global assessment => Atlantic and Black Sea Checkpoints are implementing the same methodology.





The EMODnet MedSea Checkpoint evaluates the quality of the data from current monitoring systems in terms of their accessibility, availability, multiple-use, efficiency, reliability, time consistency, space consistency, as well as the planning of technological advancements, new accessibility, new assembly protocols and observational priorities required to meet Challenges described below.

More inside...



Checkpoint Services are now available. Try and get feedback on our Checkpoint Browser and GIS! Try the new services.

http://www.emodnet-mediterranean.eu/

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