EMODnet
European Marine Observation and Data Network

Your gateway to marine data in Europe

REPORTING ON DATA ADEQUACY

how different are
EMODnet Sea-Basin Checkpoints' approaches?

EMODnet Checkpoint Methods Workshop
Rome, 12-13 September 2017

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EMODnet Secretariat

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EMODnet Sea-basin Checkpoints
Data Adequacy Reports

Are they comparable?

1. MedSea 2013
2. North Sea 2013
3. Arctic 2015
4. Atlantic 2015
5. Baltic 2015
6. Black Sea 2015

EMODnet Sea-basin Checkpoints
Data Adequacy Reports

Can we suggest a common way forward?

a 2013
ea 2013
ctic 2015
4. Atlantic 2015
5. Baltic 2015
6. Black Sea 2015

Where are the differences between approaches?

- Method (concept)

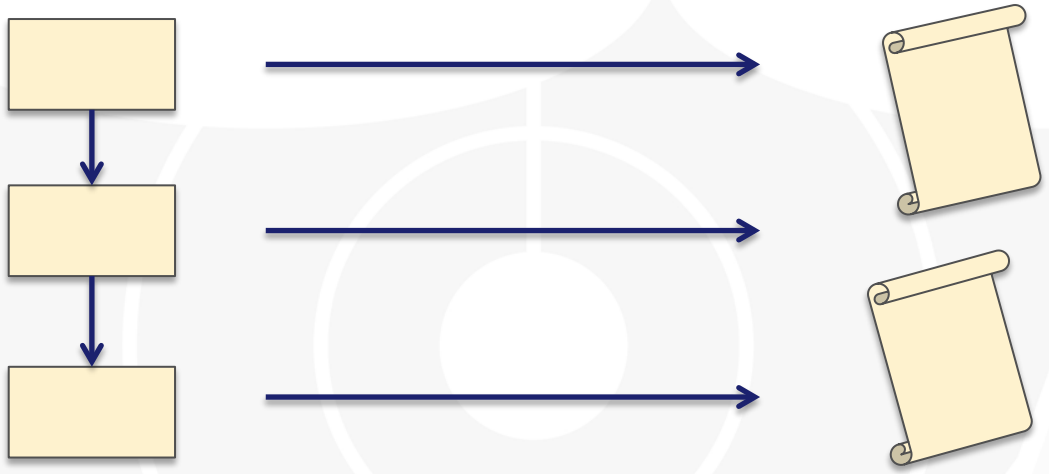
- Workflow (process)

- Presentation (results)

North Sea Checkpoint Method

1. **Agree** precise evaluation framework

2. **Attempt** the challenge (commercial style)



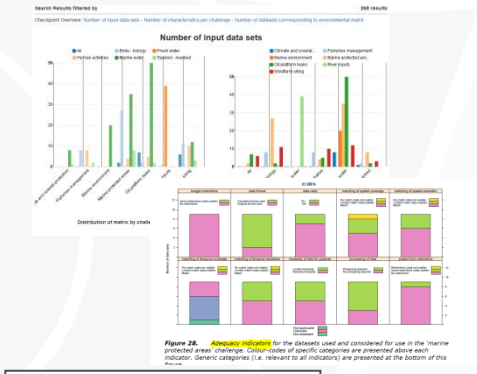
3. **Record** the results (mid and post process)

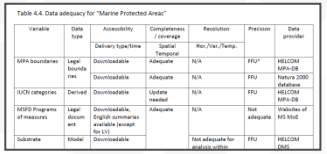
Where are the differences between approaches?

- Method *(evaluation method)*

- Workflow *(attempt the challenge)*

- Presentation *(recording of results)*





Where are the differences between approaches?

- **Method** (concept)

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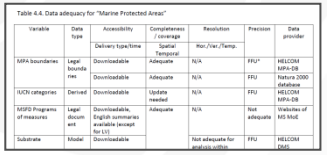
- Presentation (results)



METHOD
what does «data adequacy» mean?

- MedSea, Atlantic, Black Sea approach

Data adequacy = assessed through as a sum of **data availability** and **data appropriateness (**composed of indicators, 8 for availability and 8 for appropriateness**): SCORING**

The table below summarizes the relationships between the different concepts and terms.

Call for tender		ISO		Medsea / Black Sea / Atlantic	
Call term	**Call synonym**	**ISO term**	**ISO synonym**	**Checkpoint terms**	**Checkpoint synonym**
Data Adequacy	Fitness for purpose	Data quality (user's standpoint)	Usability (user's standpoint)	Appropriatness + Availibility	Fitness for use

METHOD (*concept*): what does «data adequacy» mean?

- North Sea

Data adequacy = «value assesment criteria» TRUE/FALSE

Table 1.1: Criteria for user evaluation of datasets

Criteria	Description
Contribution	Were the parameters offered by the dataset useful for solving the challenge?
Location	Were the temporal and spatial locations relevant?
Commercial	Do the prices and licences enable solving the challenge?
Attributes	Is the accuracy, precision and resolution sufficient?
Delivery	Can the data be supplied in time?
Usability	Is the format usable and the supporting metadata sufficient?

METHOD (*concept*): what does «data adequacy» mean?

- Arctic

Data adequacy = assessed through 10 quality and adequacy indicators, SCORES («matching»)

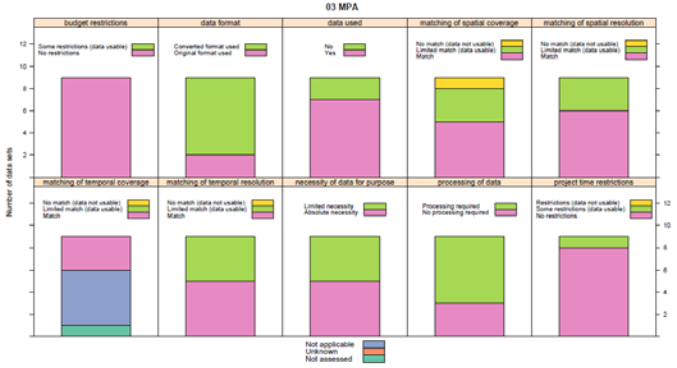


Figure 28. *Adequacy indicators for the datasets used and considered for use in the 'marine protected areas' challenge. Colour-codes of specific categories are presented above each indicator. Generic categories (i.e. relevant to all indicators) are presented at the bottom of this figure.*

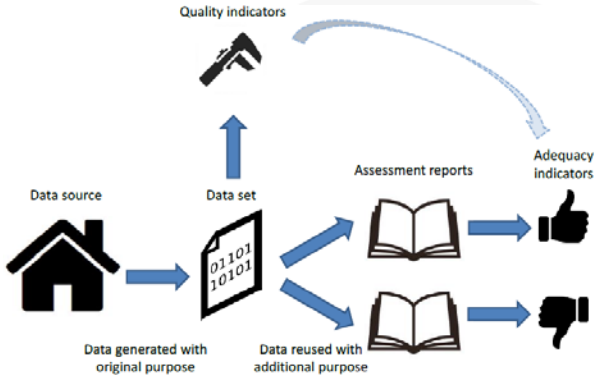
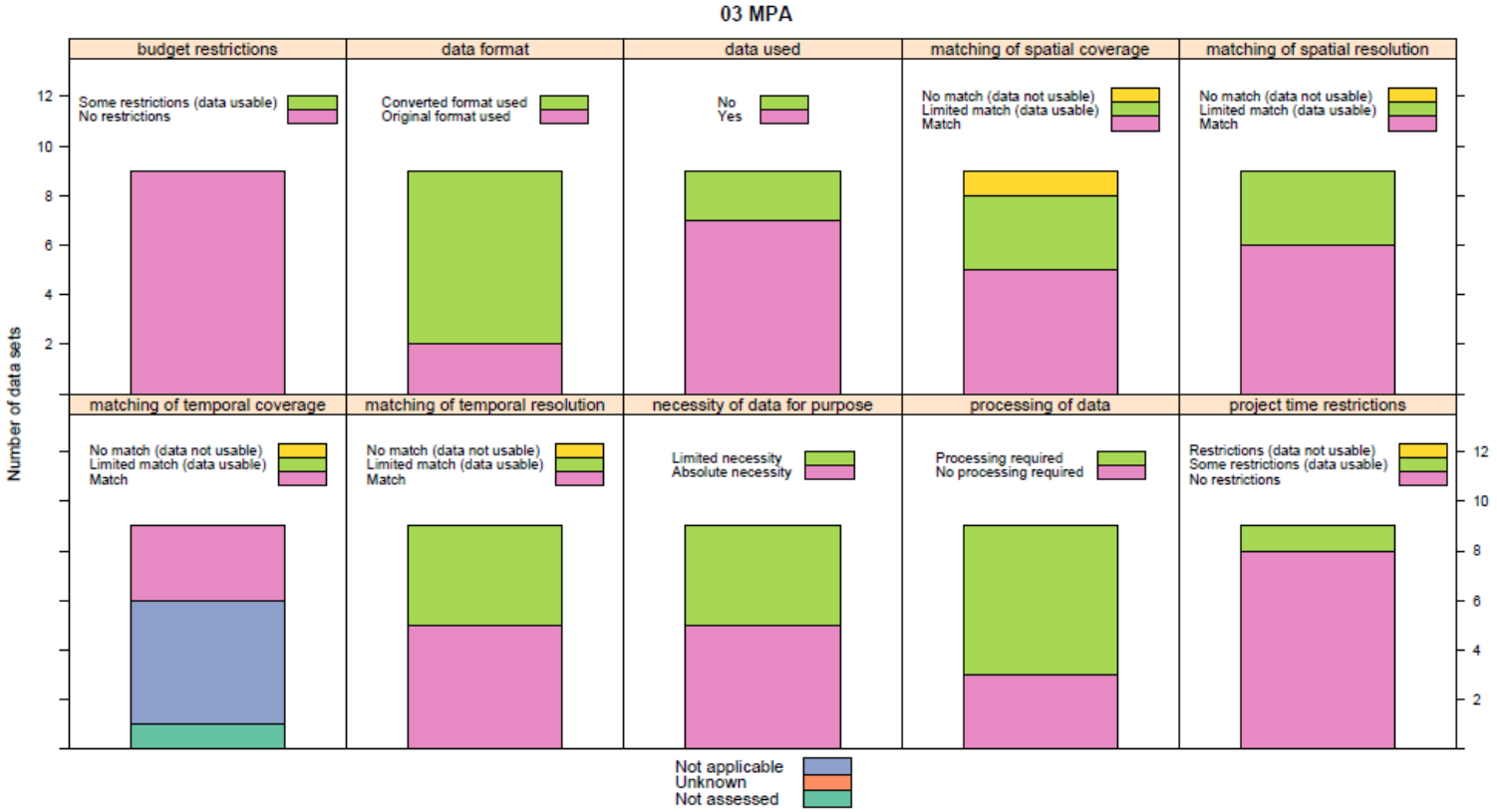


Figure 19. *A dataset is generated/published by a source with an (original) purpose. The quality is evaluated regardless of its (potential) use in assessment reports. For each time a dataset is used in an assessment(/WP challenge) report with an (additional) purpose, the adequacy of the data for that report is scored. The quality indicators are thus stored at a different level in the database as the adequacy indicators. However, the quality can be studied in relation to the adequacy. Note: for simplicity, this illustration only shows a single data source and a single dataset. However, the CMS holds multiple data sources where each data source can be linked to multiple datasets (Figure 18).*

METHOD (*concept*): what does «data adequacy» mean?



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METHOD (*concept*): what does «data adequacy» mean?

- Baltic Sea

Data adequacy = Fitness for use (FFU, binary) =assessed comparing the data requirements with the data availability

Table 4.2 Data requirements f

Variable	Data type	
MPA boundaries	Legal boundaries	O
IUCN categories	Derived	
MSFD Programs of measures	Legal document	
Bottom sediment	Model	

Table 4.3 Data availability for "Marine Protecte

Variable	Data type	Accessibility	
		Delivery type/time	Sp
MPA boundaries	Legal boundaries	Open, online	Ent Balt
IUCN categories	Derived		
MSFD Programs of measures	Legal document		All me stat
Substrate	Model	Open, online, ready for	Ent Balt

Table 4.4. Data adequacy for "Marine Protected Areas"

Variable	Data type	Accessibility	Completeness / coverage	Resolution	Precision	Data provider
		Delivery type/time	Spatial Temporal	Hor./Ver./Temp.		
MPA boundaries	Legal boundaries	Downloadable	Adequate	N/A	FFU*	HELCOM MPA-DB
		Downloadable	Adequate	N/A	FFU	Natura 2000 database
IUCN categories	Derived	Downloadable	Update needed	N/A	FFU	HELCOM MPA-DB
MSFD Programs of measures	Legal document	Downloadable, English summaries available (except for LV)	Adequate	N/A	Not adequate	Websites of MS MoE
Substrate	Model	Downloadable		Not adequate for analysis within	FFU	HELCOM DMS

Where are the differences between approaches?

- Assessment framework

- **Attempt the challenge *(workflow)***

- Presentation of results

WORKFLOW (*process*): how do teams work?

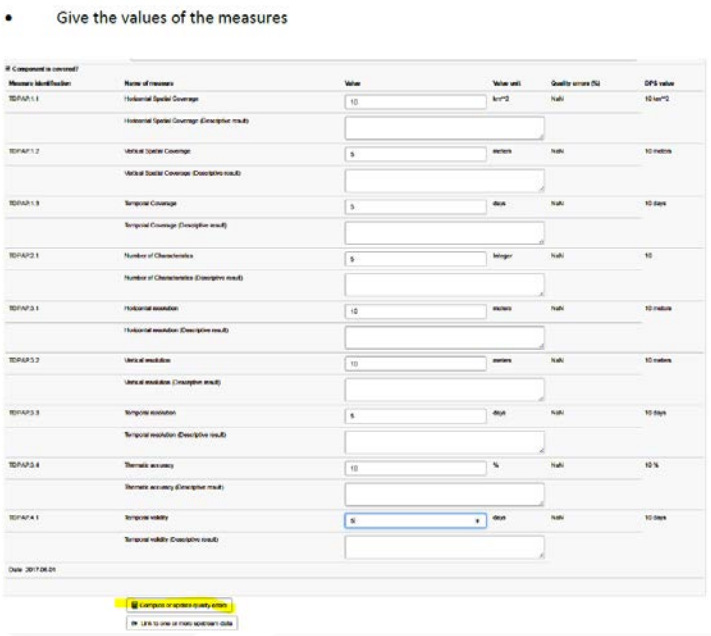
- MedSea, Atlantic, Black Sea approach: metadata

The process for contributors (challenges)

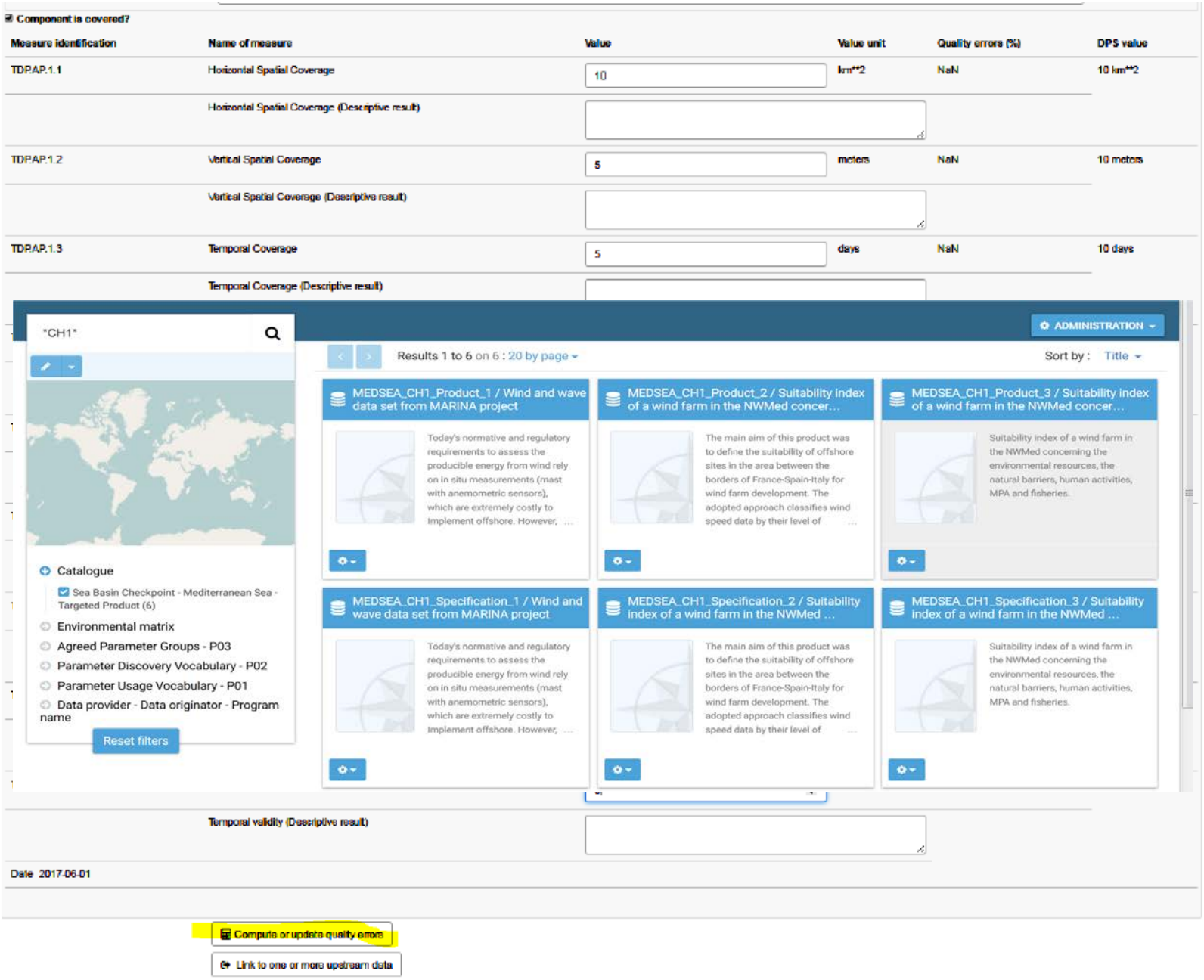
PROJECT TIMELINE	• DG MARE needs / terms of references • Other contract requirments (conosrtium proposal)
RECORD	• Specify methodology • Specify product (characteristics, intended use, data selection specifications)
RECORD	• Identify input data to meet challenge requirements • Inventory input datasets
RECORD	• Collect input datasets for challenge use • Release feedback on availability status
RECORD	• Generate products • Release feedback on appropriateness status of input data
REPORT	• Contribute to assessment reports (LS, DAR 1, DAR 2) • Correct after expert panel review

WORKFLOW (*process*): how do teams work?

- MedSea, Atlantic, Black Sea approach: metadata

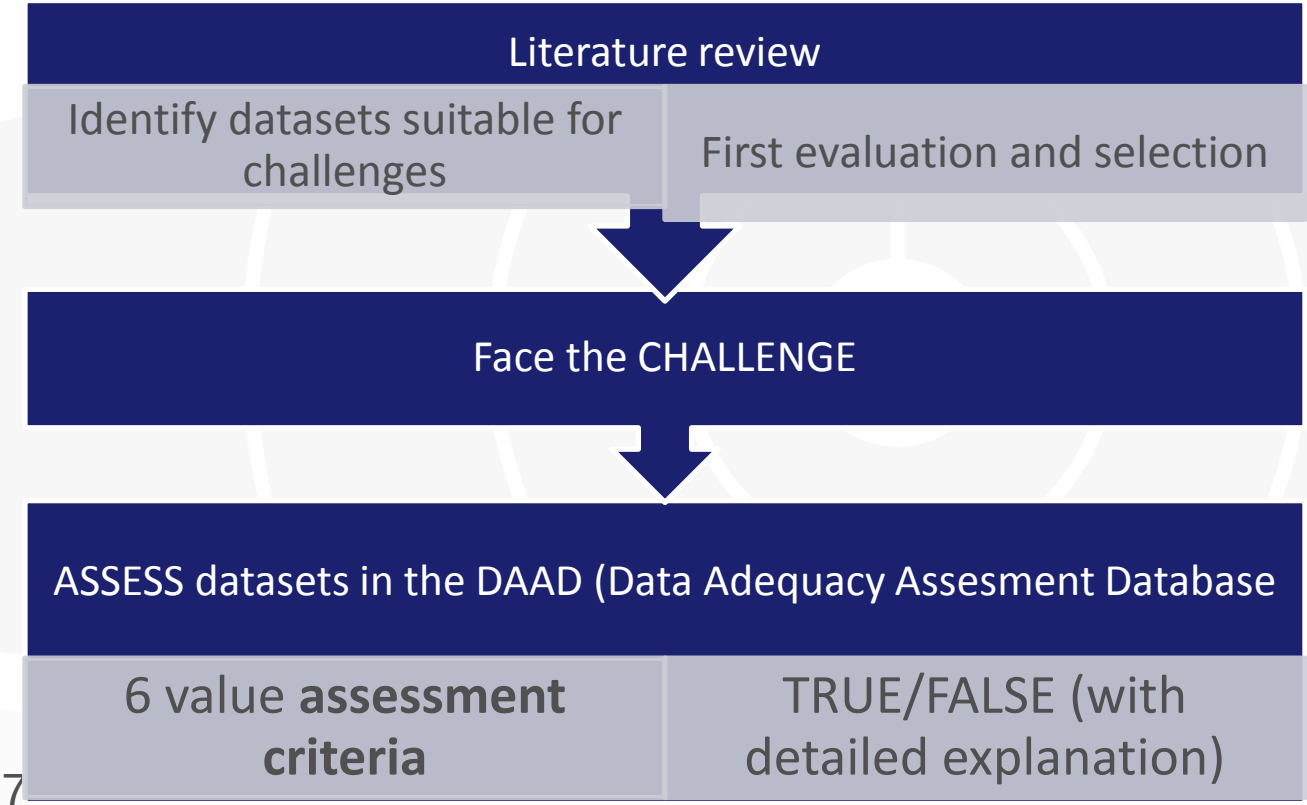


- Give the values of the measures



WORKFLOW (*process*): how do teams work?

- North Sea approach: TRUE/FALSE - Challenge driven



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WORKFLOW (*process*): how do teams work?

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Delivery	Can the data be supplied in time?
Usability	Is the format usable and the supporting metadata sufficient?

- North Sea approach: TR

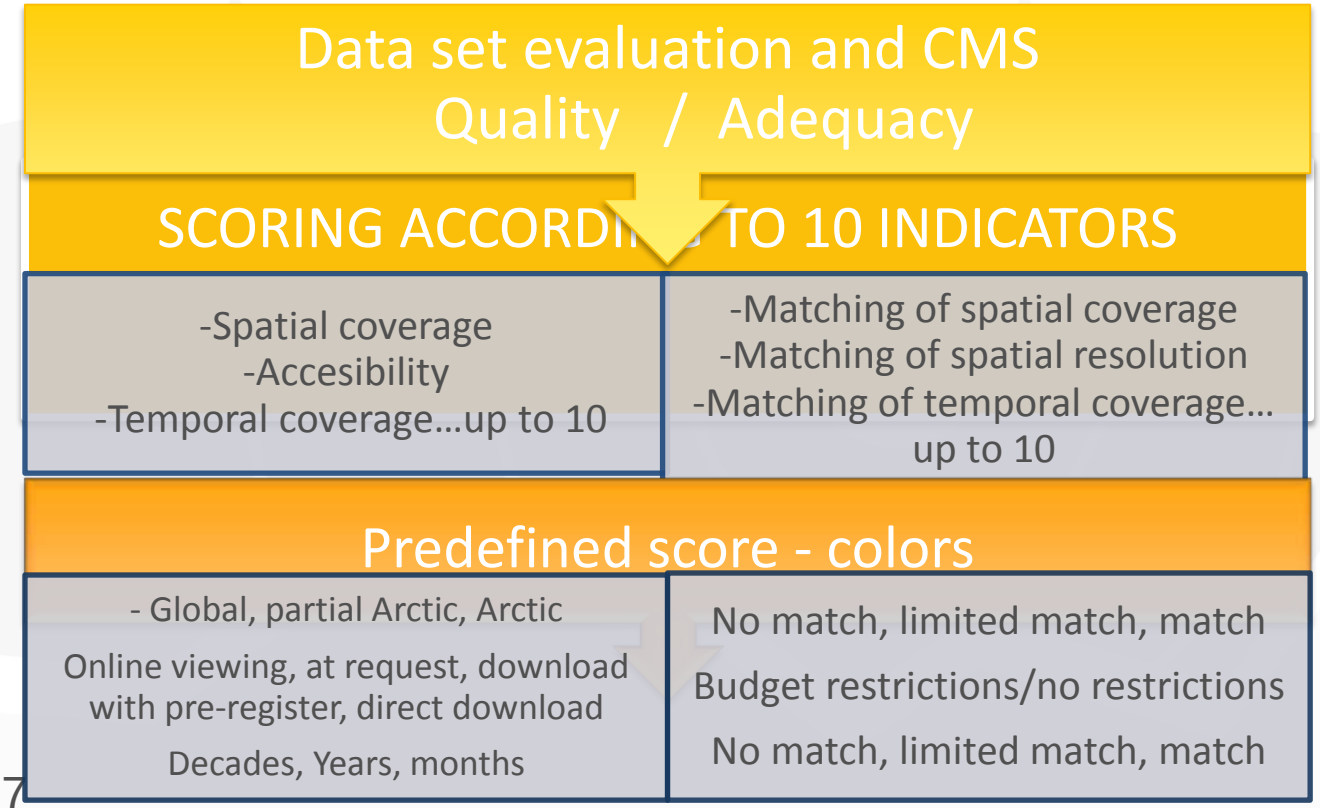
Valuation of the data to solving a challenge (a sheet per challenge)

NSC-001-Wind

Data Set	Consideration	ValueCriteria	VCFlag	ValueCrireriaReason
DT.Wind.NS001-ENTSO-E electroni	Used	Contribution	True	Map showing the locations of interconnected electrical network in Europe, including all sub-stations around the North sea
NSC-001-Wind		Location	True	All of Europe
		Commercial	True	Freely available - needed to be requested via an online form
		Attributes	True	Data was provided as a static map including a legend, showing plants, stations, existing high-voltage overhead lines and those under construction
		Delivery	True	Data was downloaded online via a link sent by email
		Usability	True	The map had to be georeferenced and the features of interest digitised. A shapefile or spreadsheet with co-ordinates would have been better.
DT.Wind.NS003-EMODNET Bathym	Considered	Contribution	True	Gridded bathymetry data need for windfarm siting
NSC-001-Wind		Location	True	Data set covers north sea region
		Commercial	True	Open government licence - no fee
		Attributes	True	Spatial resolution sufficient for windfarm citing
		Delivery	True	Data ca nbe downloaded from website
		Usability	True	XYZ files - bulky to use but ok
DT.Wind.NS004-National Grid Sub-s	Suitable	Contribution	True	Shapefiles containing data on electrical grid for the UK.
NSC-001-Wind		Location	False	Uk only. Better coverage was found via the information on the ENTSO-E website.
		Commercial	True	Freely available
		Attributes	True	Data included sub-stations, cables, gas sites, gas pipes, overhead lines and towers
		Delivery	True	Downloadable online
		Usability	True	Easy to use though when compared with the Entso-E data for the UK seemed incomplete
DT-NS007-23 Years of Wind Speed	NotConsidered	Contribution	True	Wind speed data available via the 4C Offshore website
NSChloe-001-Windfarm Siting		Location	True	global range unsure how many for the North Sea

WORKFLOW (*process*): how do teams work?

- Arctic approach: «matching» - Challenge driven



WORKFLOW (*process*): how do teams work?

- Arctic approach: «matching» - Challenge driven

Scoring «**Quality**» and «**Adequacy**» of data sets used to face the challenges. There are 10 indicators for each aspect and this is evaluated for each challenge

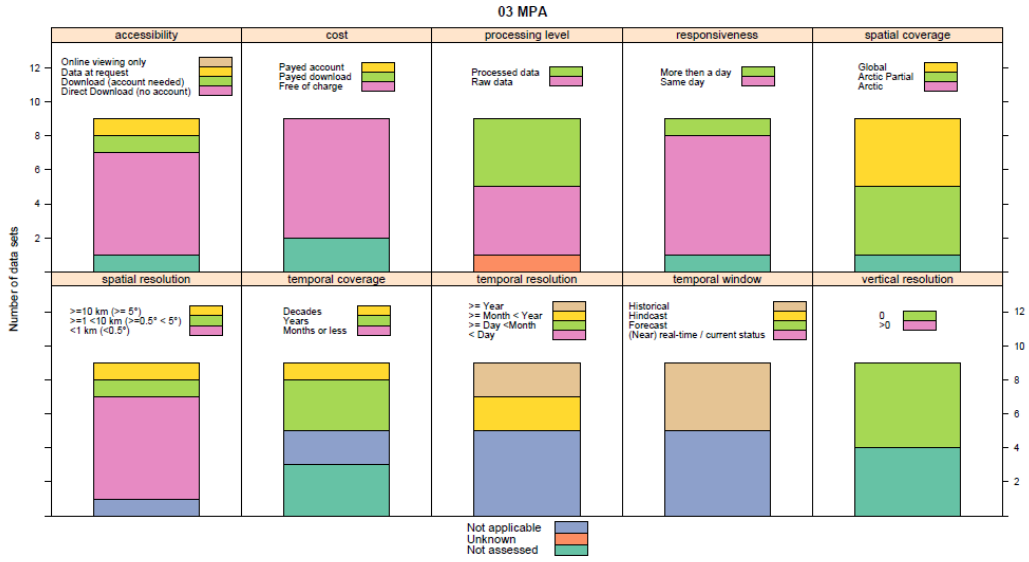


Figure 27. *Quality indicators for the datasets used and considered for use in the 'marine protected areas' challenge. Colour-codes of specific categories are presented above each indicator. Generic categories (i.e. relevant to all indicators) are presented at the bottom of this figure.*

WORKFLOW (*process*): how do teams work?

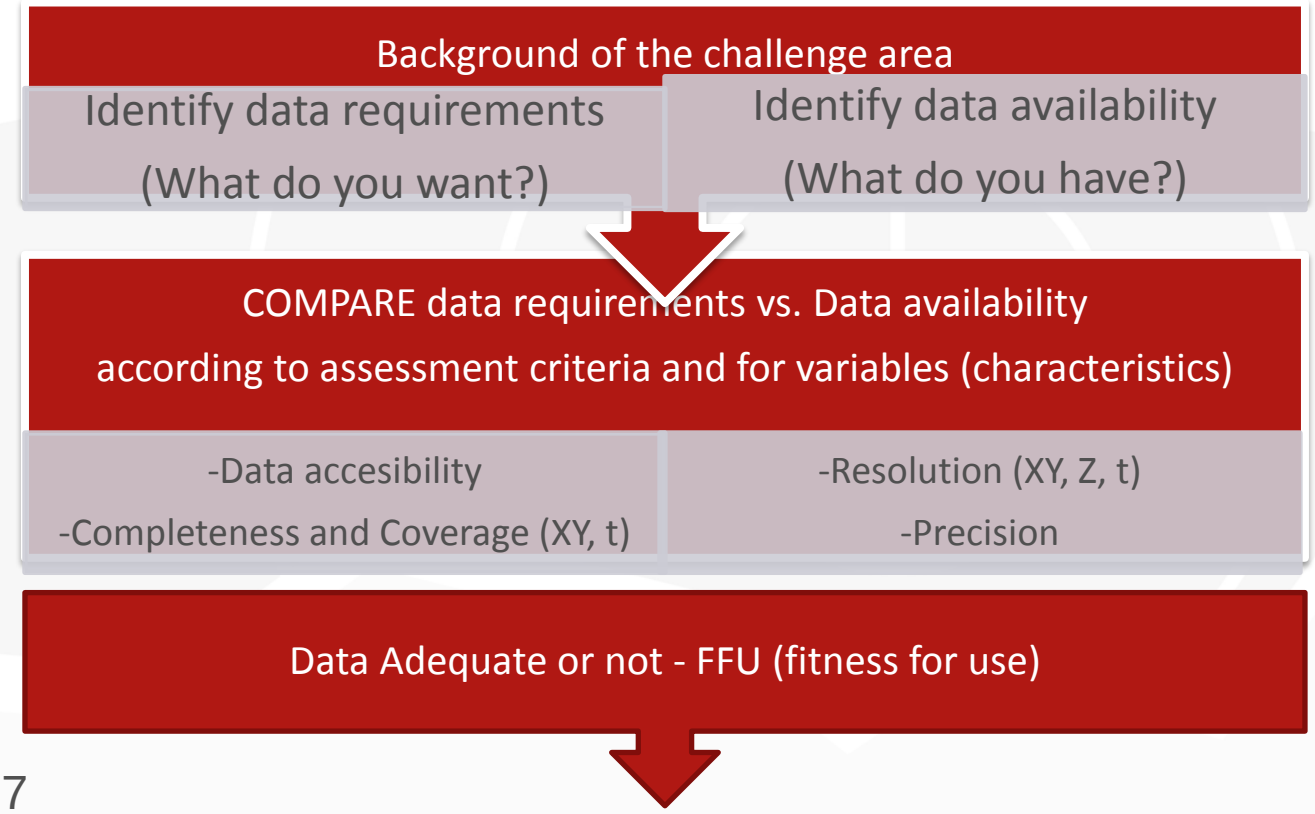
- Arctic approach: «matching»

Scoring «**Quality**» and «**Adequacy**» of data sets used to face the challenges. There are 10 indicators for each aspect and this is evaluated for each challenge

Figure 28. *Adequacy indicators for the datasets used and considered for use in the 'marine protected areas' challenge. Colour-codes of specific categories are presented above each*

WORKFLOW (*process*): how do teams work?

- Baltic Sea approach: FFU - Challenge driven



WORKFLOW (*process*): how do teams work?

- Baltic Sea approach: FFU - Challenge driven

Baltic Sea Checkpoint

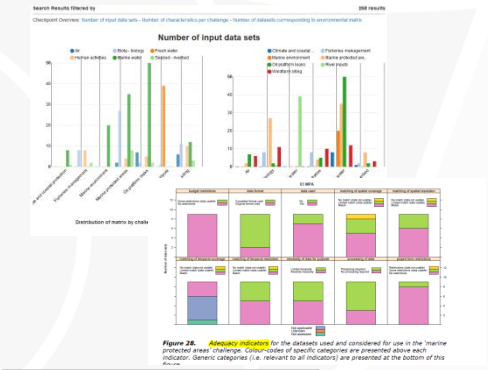
General information						Availability								Appropiateness					
							Accessability					Performance							
Matrix	Characteristic	Database name	URL	Data type	Challen	Visibility	Formats	Data policy	Pricing	Services	Inter-operability	responcive-ness	reliability	Spatial extent	Spatial resolution	Time extent	Time resolution	quality	usage
Challenge 1 Wind Farm Siting																			
Air	wind at heights	obs		in situ obs	Win	Farming													
Air	surface weather observations	DMI data base:	Operational data exchange v	land based weather stat	Win	5	special	3	6	7	5	5	2	local stati	3D point ob	3	7	4	1
Air	surface weather observations	DMI data base:	Operational data exchange v	ship based weather obs	Win	5	special	3	6	7	5	5	2	local stati	3D point ob	3	7	4	1
Air	surface weather observations	DMI data base:	Operational data exchange v	surface drifter, buoys	Win	5	special	3	6	7	5	5	2	local stati	3D point ob	3	7	4	1
Air	surface weather observations	DMI data base:	Operational data exchange v	ship based weather obs	Win	5	special	3	6	7	5	5	2	local stati	3D point ob	3	7	4	1
Air	surface weather observations	DMI data base:	Operational data exchange v	weather observations fr	Win	5	special	3	6	7	5	5	2	local stati	3D point ob	3	7	4	1
Air	surface weather observations	DMI data base:	DMI GPRS network, storage a	weather observations fr	Win	5	special	3	6	7	5	5	2	Øresund b	3D point ob	3	7	4	1
Air	air temperature: acars/amdar/as	DMI data base:	Operational data exchange v	air temperature profiles	Win	5	special	3	6	7	5	5	2	local stati	3D point ob	3	7	4	1
Air	weather report: airep aircraft rep	DMI data base:	Operational data exchange v	air craft report airep	Win	5	special	3	6	7	5	5	2	local stati	3D point ob	3	7	4	1
Air	air temperature profile from radio	DMI data base:	Operational data exchange v	temperatur obs.	Win	5	special	3	6	7	5	5	2	local stati	3D point ob	3	7	4	1
Air	pilot wind profiles from profiles	DMI data base:	Operational data exchange v	wind profiles	Win	5	special	3	6	7	5	5	2	local stati	3D point ob	3	7	4	1
Air	wind obs from satellite	DMI data base:	Operational data exchange v	wind profiles	Win	5	special	3	6	7	5	5	2	local stati	3D point ob	3	7	4	1
Air	weather data from Satellite	DMI data base:	Operational data exchange v	satellite data from EUME	Win	5	special	3	6	7	5	5	2	local stati	3D point ob	3	7	4	1
Air	weather radar data	DMI data base:	Operational data exchange v	weather radar data from	Win	5	special	3	6	7	5	5	2	local stati	3D point ob	3	7	4	1
Air	winds and met observations	BSH, MARNET s	http://www.bsh.de/de/Meeres	wind and met. Obs	Win	1	1	3	4	1	5	3							
Air	wind speed and direction at heig	DMI-Hirlam-T15	http://www.dmi.dk/laer-om/te	DMI-HIRLAM Model	Win	5,1 for invol	3	3	4	7	5	5	1	Baltic Sea	15km	since 199	5	extensive	1
Air	air pressure	DMI-Hirlam-T15	http://www.dmi.dk/laer-om/te	DMI-HIRLAM Model	Win	5,1 for invol	3	3	4	7	5	5	1	Baltic Sea	15km	since 199	5	extensive	1
Air	air density (derived)	DMI-Hirlam-T15	http://www.dmi.dk/laer-om/te	DMI-HIRLAM Model	Win	5,1 for invol	3	3	4	7	5	5	1	Baltic Sea	15km	since 199	5	extensive	1

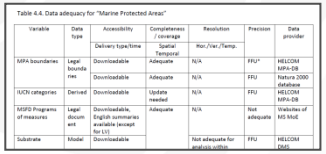
Where are the differences between approaches?

- Method *(concept)*

- Workflow *(process)*

- **Presentation** of results





PRESENTATION
how to communicate results?

- MedSea, Atlantic, Black Sea approach

Report on indicators (or elements) and characteristics

In the Mediterranean Sea information was collected for 266 input data sets, covering 47 different characteristics categories, 45 different Targeted products to satisfy 7 Challenges needs: CH1- Wind Farmi siting, CH2- Marine Protected Areas, CH3- Oil spill platform Leaks, CH4- Climate and coastal protection, CH5-Fishery management, CH6- Marine Environment, CH7-River inputs.

The 266 potential input data sets

The final metadatabase is available here: http://www.emodnet-mediterranean.eu/browser/ where all the information about input data sets can be accessed.

The Targeted data products are instead available from each Challenge web page: http://www.emodnet-mediterranean.eu/challenges/

and a visualization service is available with the Sextant GIS Portal technology.

The dashboard is still under final revisions and will be ready soon here: http://www.emodnet-mediterranean.eu/checkpoint-dashboard-new/

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PRESENTATION
how to communicate results?
.....In the DAR

MedSea Atlantic Black S

Table 5.4: Scores for the AV-AC-2 'Delivery me
function of Challenges for all input data

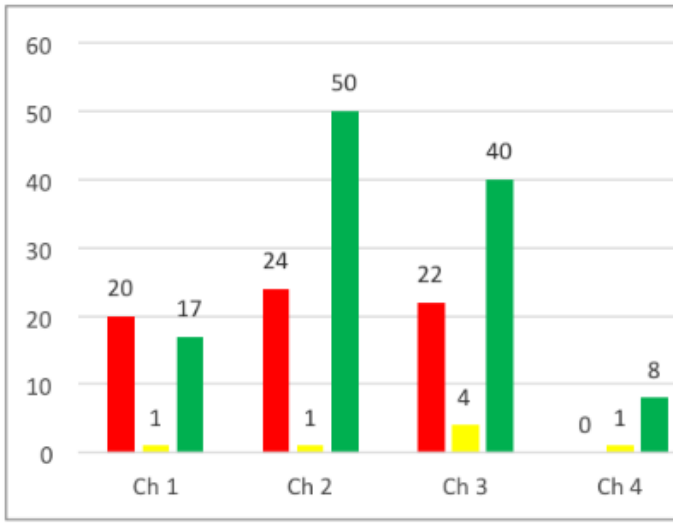
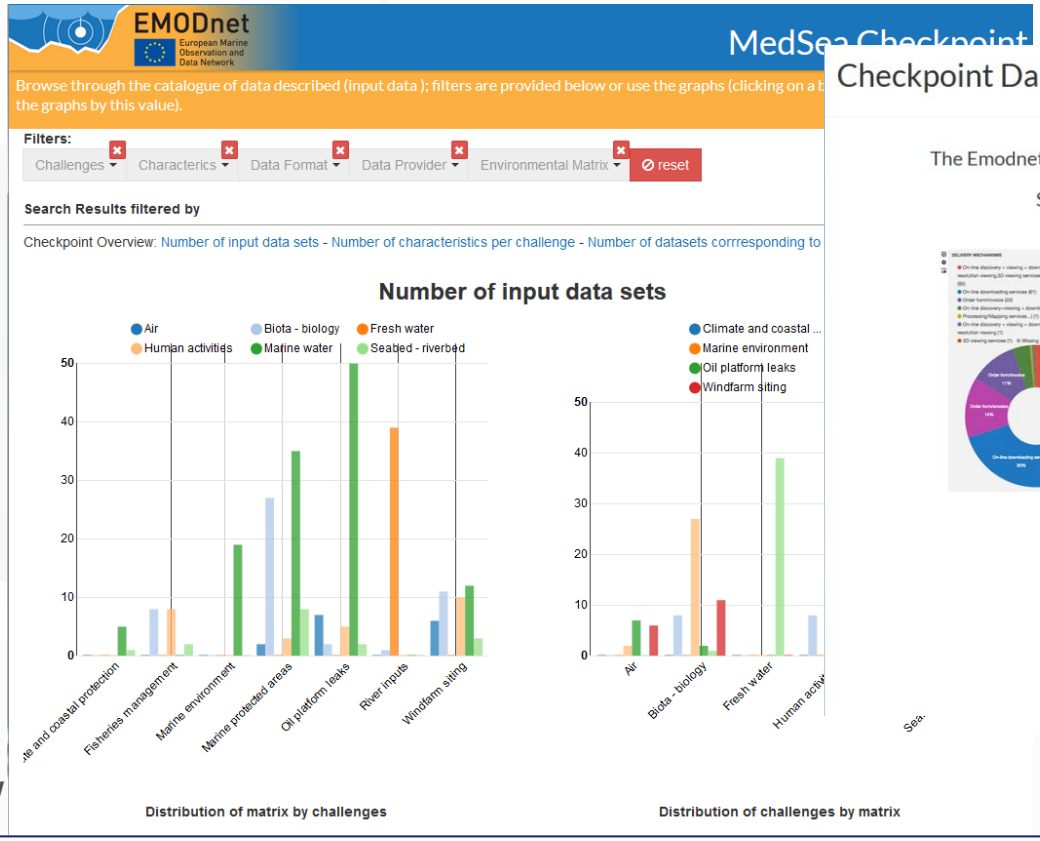


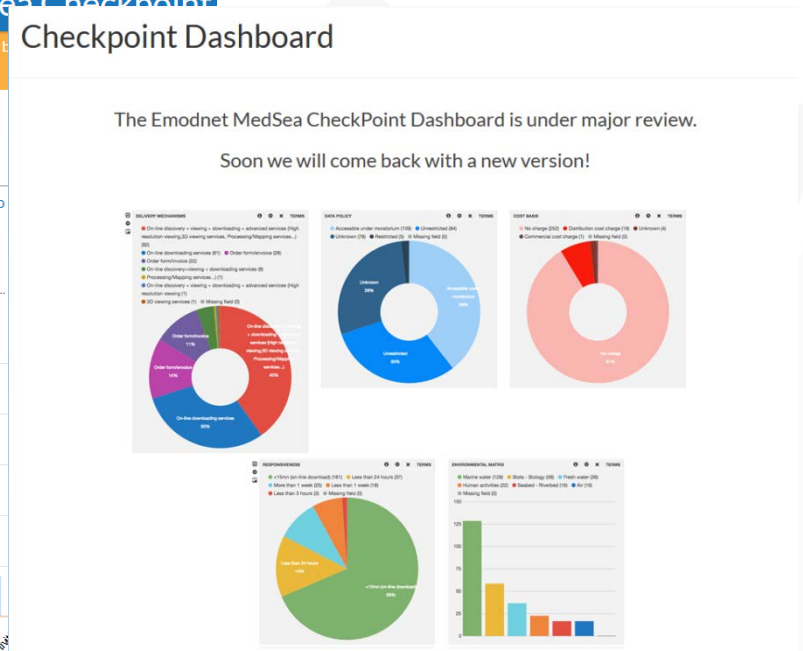
Figure 5.4: AV-AC-2 'Delivery mechanism

P02 characteristics category	# of data sets	Easily found	INSPIRE catalog service	Visibility of Data policy	Data delivery	Data policy	Pricing	Readiness	Responsiveness
1. Sedimentary structure	1								
2. Spectral wave data parameters	1								
3. Wave direction	8								
4. Wave height and period statistics	19								
5. Pollution events	1								
6. Bird reproduction	1								
7. Fauna abundance per unit area of the bed	4								
8. Fish abundance in water bodies	3								
9. Fish behaviour	1								
10. Fish reproduction	1								
11. Habitat extent	17								
12. Fish and shellfish catch statistics	6								
13. Fishing by-catch	1								
14. Horizontal platform movement	8								
15. Marine archaeology	1								
16. Marine environment leisure usage	2								
17. Air pressure	1								
18. Air temperature	1								

PRESENTATION
how to communicate results?
… On the Web (browser, dashboard)

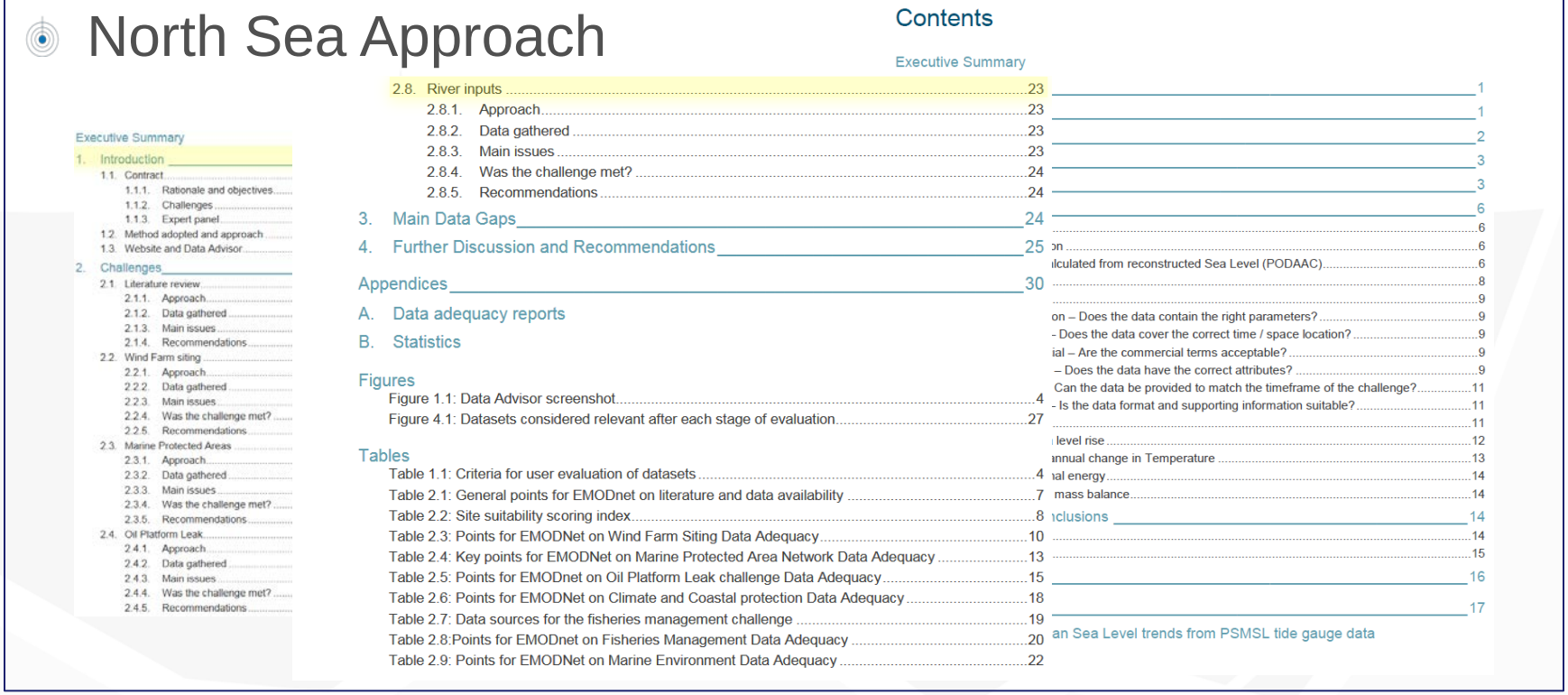
- MedSea, Atlantic, Black Sea approach





PRESENTATION
how to communicate results?
.....In the DARs

North Sea Approach



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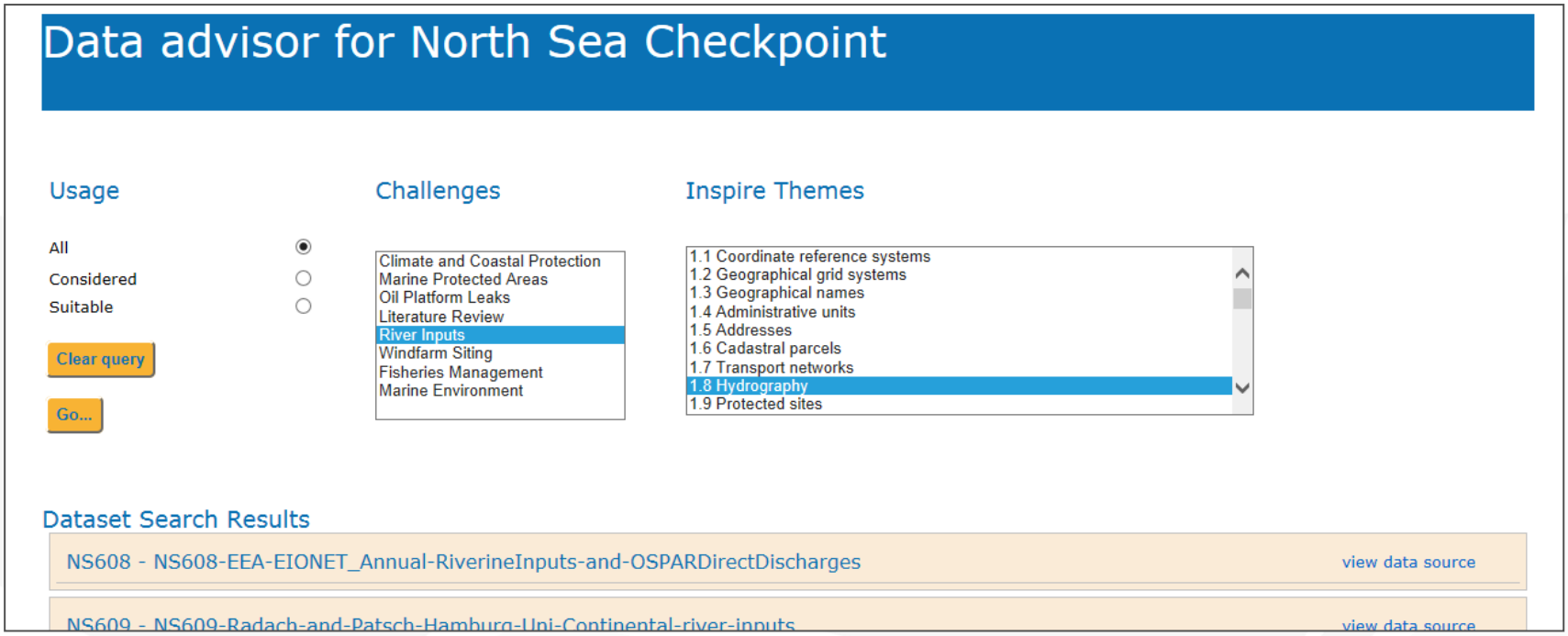
Harmonising Methods

'Data Advisor' Prototype



PRESENTATION
how to communicate results?
.....In the DAR

- North Sea Approach

DT.Clim.NS030-MyOcean - Atlantic - European North West Shelf-Ocean Physics NON ASSIMILATIVE Hindcast from NERCPOL (1960-2004)
NSC-004-Clim
DT.Clim.NS031-MyOcean - Atlantic- European North West Shelf-Ocean Physics NON ASSIMILATIVE Hindcast from IMR (1985-2008)
NSC-004-Clim

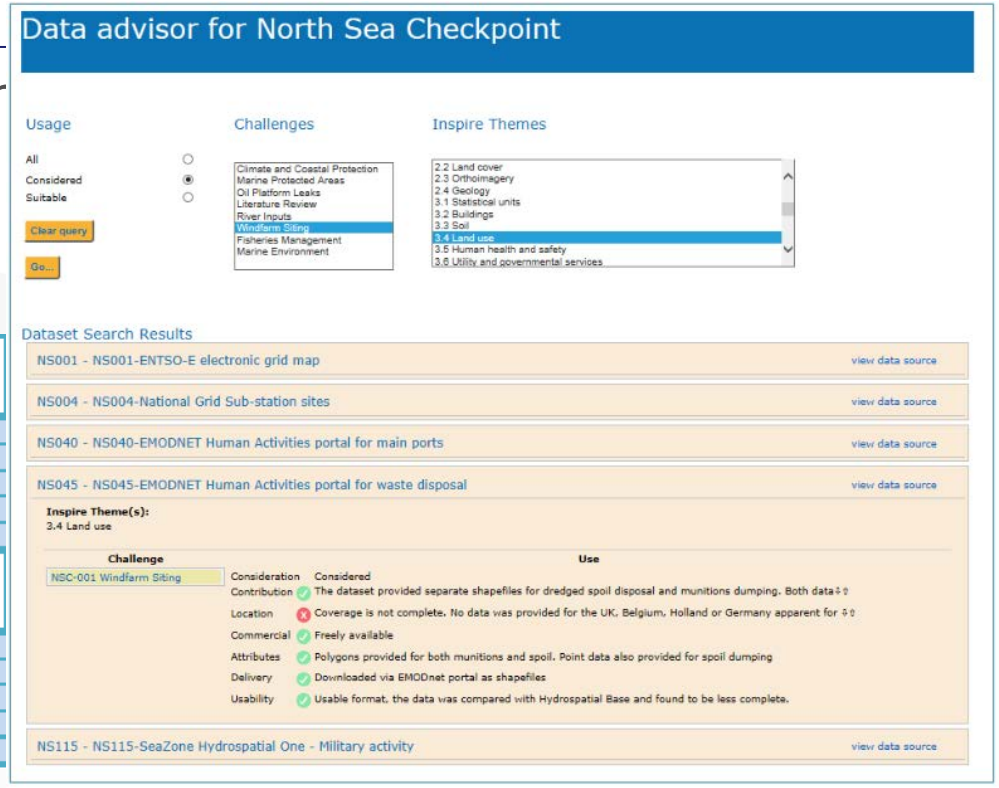


Figure 1.1: Data Advisor screenshot

Source: North Sea Checkpoint Data Advisor system

PRESENTATION
how to communicate results?
.....In the DARs

- Arctic approach:

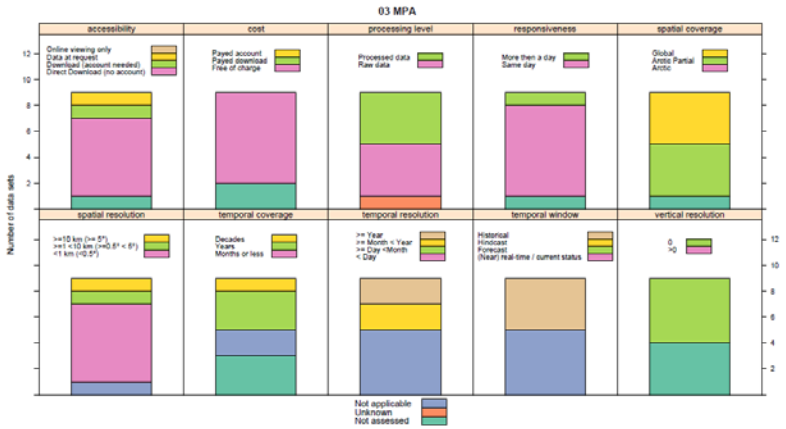


Figure 27. *Quality indicators for the datasets used and considered for use in the 'marine protected areas' challenge. Colour-codes of specific categories are presented above each indicator. Generic categories (i.e. relevant to all indicators) are presented at the bottom of this figure.*

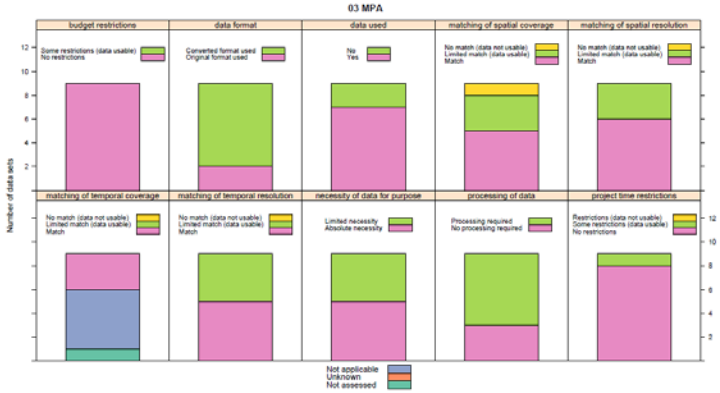


Figure 28. *Adequacy indicators for the datasets used and considered for use in the 'marine protected areas' challenge. Colour-codes of specific categories are presented above each indicator. Generic categories (i.e. relevant to all indicators) are presented at the bottom of this*

-Quality

-Adequacy

EMODnet
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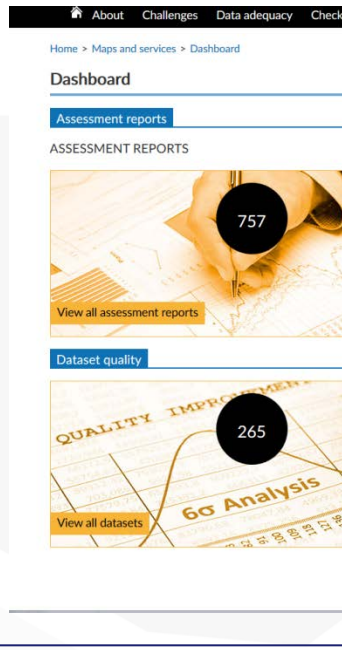
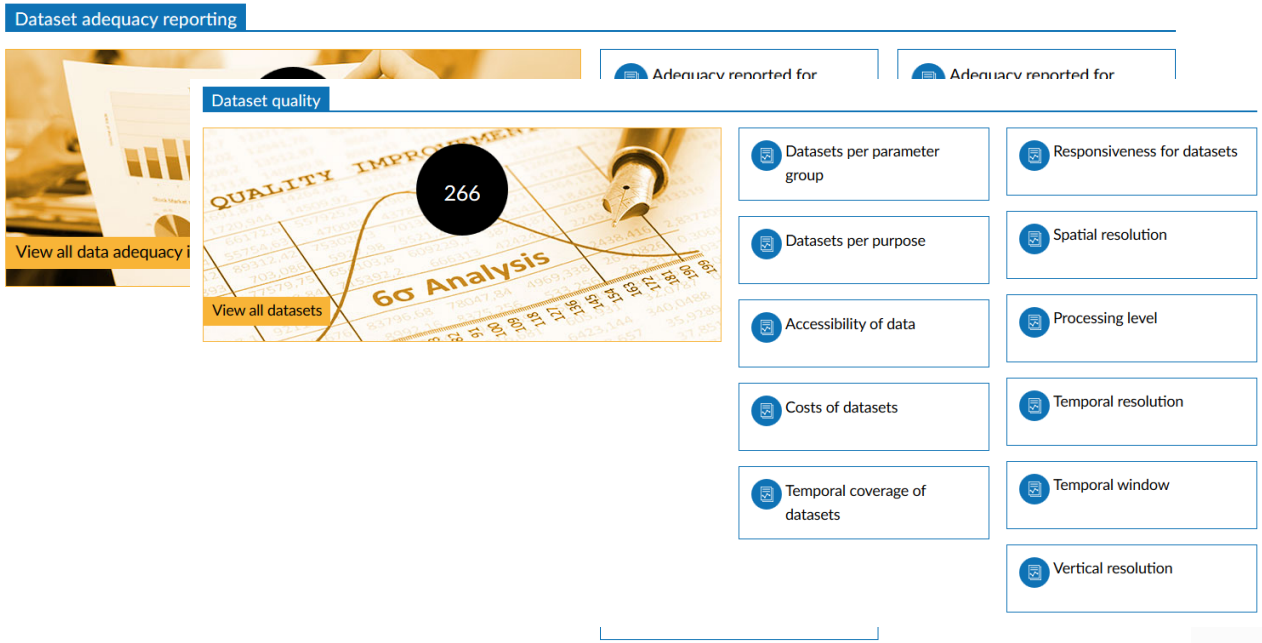
PRESENTATION
how to communicate results?
.....On the web: dashboard

- Arctic approach





EMODnet
European Marine Observation and Data Network

PRESENTATION
how to communicate results?
.....In the DARs

- Baltic approach: TABLES

Table 11.2. Data requirem

Variable	Data type	Ac
		Del Del
River tempera-ture	Obs.	Ope dow
	Model	
Discharge	Obs.	
	Model	
Nutrients	Obs.	
	Model	

Table 11.3. Data availability for Riverine inputs

Variable	Data type	Accessibility		Completeness/	Resolution		Precision	Data
River tempera-ture	Obs.							
	Mode							
Dis-charge	Obs.							
	Obs.							
	Mode							
Nutrient	Obs.							
	Model	Data-base	Excel	Free to down-load	1981-2014	N/A	N/A	gated to seasonal/ annual means	monthly		N EEA	SMHI

Table 11.4 Data adequacy for Riverine inputs

Variable	Data type	Accessibility	Completeness/ coverage	Resolution	Precision	Data provider
		Delivery type/time	Spatial/ Temporal	Hor./Ver./Temp.		
River tem-perature	Obs.	FFU*	More observations needed	More data needed	FFU	UNEP GEMS Water
	Model	FFU	FFU	FFU	To be improved	SMHI
Discharge	Obs.	FFU	More observations needed	More data needed	FFU	GRDC, EVA Baltex BHDC
	Model	FFU	FFU	FFU	Fit for use	SMHI
Nutrients	Obs.	FFU	More observations needed	More data needed	Quality needs to be improved	HELCOM, EEA
	Model	FFU	FFU	FFU	Data usable but quality to be improved	SMHI

*FFU: Fit-for-the-use

PRESENTATION
how to communicate results?
.....In the DARs

- Baltic approach:TABLES and narrative-

Description of the challenge...

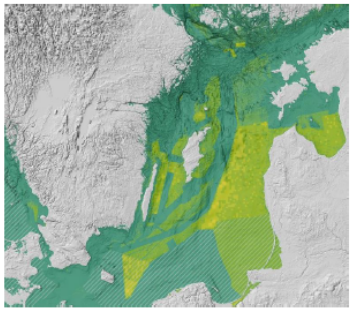


Figure 12.4. Display from Baltic Sea Bathymetry Database portraying source density for harmonised model

12.3 Conclusions and recommendations

A heterogeneous overall picture

There are 9 coastal nations around the Baltic Sea and the national regulations and policies concerning open geographic data in general and bathymetry in particular varies greatly between countries.

The existence of good quality bathymetric data sets is gradually improving but bathymetric surveys are expensive and time consuming operations. In a substantial area of the Baltic Sea the quality of available bathymetry is still low. This seems to be especially the case for shallower waters that are not of interest for commercial shipping.

For important aspects of bathymetric data such as availability, accessibility and data quality the situation in the Baltic Sea as a whole is heterogeneous and this may result in confusion and hindrance for the end user looking for suitable data.

Possible results of the BSCP Bathymetry challenge

This project as such cannot change the situation concerning available bathymetric data in the region. However, it is possible to improve the situation concerning available metadata and the visibility of metadata.

MORE THINGS TO COMPARE

	ARCTIC	ATLANTIC	BALTIC	BLACK SEA	MED SEA	NORTH SEA
Number of datasets screened	*234*	*566*	*557*	*452*	*266*	*370**
Number of datasets used in the products	*%50?*	*2nd DAR*	*N/A*	*2nd DAR*	*90*	*17% (60?)*
Reportable by parameters P02/P03	Y	Y	N	Y	Y	N
Specific section devoted to EMODnet	N	Y	N	Y	Y	Y
Replicable/Statistics	?	Y	?	Y	Y	?

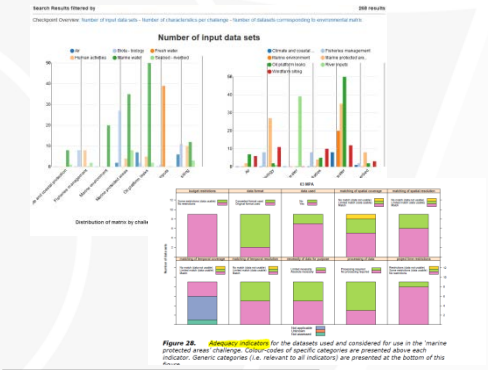
** Numbers are approximate*

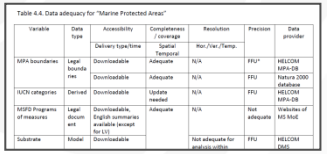
Where are the differences between approaches?

- Method *(concept)*

- Workflow *(process)*

- **Presentation** of results





SUGGESTIONS FOR STREAMLINING – METHODS

- Using the same indicators: can we agree on a list? How impenetrable is ISO? Answering Questions + Detailed List of Indicators
- Vocabulary can be misleading (adequacy, availability…): some harmonisations is possible and desirable

SUGGESTIONS FOR STREAMLINING – WORKFLOW

- Better definition of the products :
  - Include more challenges
  - **Be more specific about the product requirements (templates)**
  - Get to a sub-basin level

SUGGESTIONS FOR STREAMLINING – FUTURE STRESS- PRESENTATION

- Recording/giving acces to intermediate and final results (database, catalogue, viewer, dashboard)
- Showing results by challenge helps understanding the results
- Reportable by themes/characteristics (P02, P03)
- Key messages/anecdotes + Gaps are not highlighted enough
- “Virtuous circle”: reach the data providers and the project managers How??? --Papers/Newsletters/…

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