



SEA BASIN CHECKPOINT LOT4: BLACK SEA

D 17.2.2
(15.01.2016 – 15.07.2016)

Total number of pages:

Workpakage:	17	Project management
Author(s):	Atanas Palazov	IO-BAS
	Nadia Pinardi	CMCC
	Vladyslav Lyubartsev	CMCC
	Frederique Blanc	CLS
	Violeta Slabakova	IO-BAS
	George Galanis	NKUA
	Elisaveta Peneva	USOF
	Diego Bruciaferri	UPL
	Luminita Lazar	NIMRD
	Emanuela Mihailov	NIMRD
	Elitsa Stefanova	IO-BAS
	Hristo Stanchev	IO-BAS

	Magda Nenciu	NIMRD
	V.Raykov	IO-BAS

A project funded by:

EUROPEAN COMMISSION, EXECUTIVE AGENCY FOR SMALL AND MEDIUM ENTERPRISES



Document Log

Date	Author	Changes	Version	Status
12.07.2016	V. Slabakova	A. Palazov (WP 17)	V0	Completed
22.07.2016	V.Slabakova	V. Lyubartsev (WP1,15), G. Galanis (WP2) V.Raykov (WP3), E. Peneva(WP5), D. Bruciaferri (WP6), M. Nenciu (WP7,8), L. Lazar (WP9), E. Mihailov (WP10), H.Stanchev (WP11). E. Stefanova (WP12),F. Blanc (WP13)	V1	Completed
27.07.2016	A.Palazov	Final updates	V2	Completed

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Glossary

CLS - Collecte Localisation Satellites (FR)
CLU - CLU s.r.l. (IT)
FONDAZIONE CMCC- Foundation Euro-Mediterranean Center for Climate Change (IT)
IFREMER - Institut Français de Recherche pour l'Exploitation de la Mer (FR)
IMS- Middle East Technical University Institute of Marine Sciences (TR)
IO-BAS - Institute of oceanology, Bulgarian Academy of Sciences (BG)
NIMRD -National Institute for Marine Research and Development “Grigore Antipa”(RO)
NKUA - National and Kapodistrian University of Athens (GR)
ORION- Joint research and development centre (CY)
RES - Renewable Energy Systems Limited (UK)
SCMR - SC Marine Research SRL (RO)
SIO-RAS- P.P. Shirshov Institute of Oceanology, Russian Academy of Sciences (RU)
TSU-Ivane Javakhishvili Tbilisi State University (GE)
UkrSCES -Ukrainian Scientific Centre of Ecology of the Sea (UA)
UPL - Plymouth University (UK)
USOF -University of Sofia (BG)

Executive Summary

The present report provides an overview of the activities carried out by the Project “Sea Basin Checkpoint Lot 4: Black Sea”, in the period ranging from the 15th January 2016 till the 15th July 2016.

The document consist of seven sections: the first one concerns the progress on WP1 activities, section 2 is related to the activities carried out by the 11 Challenges (WP2-12), section 3 to 7 describe progress of WP13 to WP17 activities respectively.

In synthesis, the work is well underway and internal deadlines are appropriately considered by the project partners.

During the reporting period 2 projects outputs have been produced:

- 1) Oil Platform Leak Bulletin (WP4) has been delivered within 24 hours from the DG-MARE request;
- 2) The Literature Survey (WP1) has been produced and disseminated.

1.WP1: Literature Review (CMCC)

The Final Literature survey report was developed and delivered at month M9.

The Literature Survey contains the basic framework for input data collection in the Black Sea Checkpoint project, a basin overview of the existing monitoring systems and several Use Cases related to the Checkpoint Challenges.

The methodology which was used to carry out the Literature survey is based on three basic elements:

- 1) the definition of a common terminology and vocabulary for the discovery and analysis of input data sets characteristics for Challenges;
- 2) the collection of information using an internal project survey that started to characterize the number of thematic input data sets and their data sources;
- 3) the collection of literature Use case descriptions in substitution of Challenges Targeted Products.

The definition of “common vocabularies” is an important prerequisite to have consistency among the different challenges and interoperability with other information systems. Using standardised sets of terms solves the problem of ambiguities associated with data markup, and enables records to be interpreted by computers. This opens up data sets to a whole world of possibilities for computer aided manipulation, distribution and long term reuse.

This Literature survey has defined its vocabulary, following the SeaDataNet standards and most importantly, has defined the general means to map INSPIRE’s principles into ISO language for spatio-temporal data. The vocabulary and the procedures are the same as the ones used for the Mediterranean Sea Checkpoint and that will be used for the Atlantic Checkpoint. In the near future, this will allow us to have an intercomparison between the monitoring system’s specific structure and gaps in the three basins, browsing the metadata base built with the same SeaDataNet vocabulary.

A first list of characteristics needed by the EMODnet Black Sea Challenges has been produced with an overall analysis of the most requested input data sets and the potential data providers. It emerges that 48 different characteristics are needed by all Challenges and over 400 data sets are in principle available. A list of 56 data providers has been identified from International, European, EU Member State plus Russia and USA Institutions and projects (Fig. 1.1).

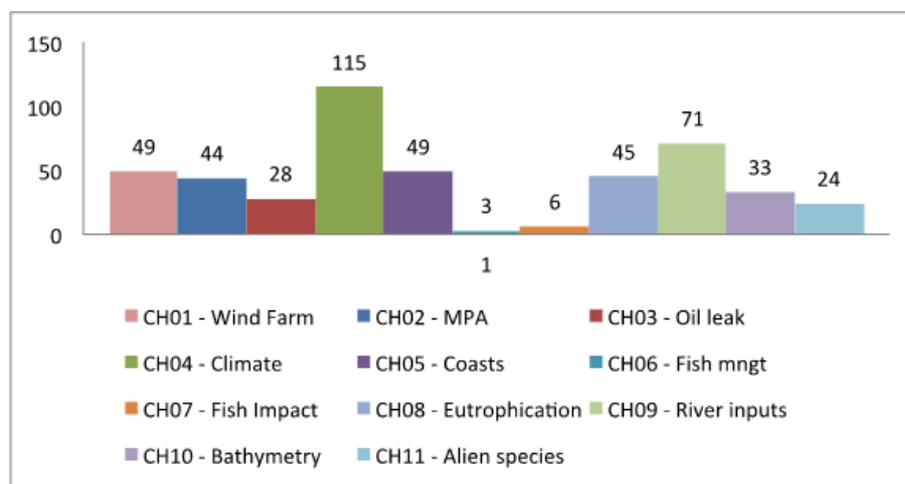


Figure 1.1. Number of input data sets for each challenge (total number is 467)

In order to have a first understanding of basin scale monitoring systems adequacy, we analysed several literature Use Cases that described similar products to the Checkpoint Targeted products. The literature Use Cases were chosen on the basis of the fact that they presented and evaluated the quality and availability of the input data sets required for the Use Case (Table 1.1).

Challenge	Number of Use Cases	Number of characteristics for each Environmental matrix						
		Air	Ice	Fresh water	Marine water	Biota/ Biology	Riverbed/ Seabed	Human activities
1. Windfarm siting	1	6			12	2	2	2
2. Marine Protected Areas	3	2			1	5	6	19
3. Oil Platform Leak	2	1	1		6	1		2
4. Climate	3	4	1		7	2		
5. Coasts	2				2		2	
6. Fishery Management	5					15		9
7. Fishery Impact	1					6		2
8. Eutrophication	2	1		1	4	3		2
9. River Inputs	1			7				
10. Bathymetry	2						2	
11. Alien Species	2				3	4		
TOTAL	24	14	2	8	35	38	12	36

Table 1.1. Use Cases statistics: number of Use cases by Challenge, number of Use Case characteristics subdivided in environmental matrices

The Literature survey shows that a large amount of input data sets exists at the basin scale level, so that a basin scale overview of the Black Sea monitoring system is available. At this stage, it can only be emphasized that assessments and Literature Surveys should be periodically carried out, because conclusions rapidly become obsolete in a changing marine environment and for the increasing needs of the 'blue' economy.

2. Challenges (WP 2- 12)

During the second six months of the project each challenge collected information on the upstream data. In the following subsections a summary of the work done is given for each challenge.

Challenge 1: Windfarm siting (NKUA)

WP2 (Challenge 1, Windfarm siting) has as main objective the determination of the suitability of offshore sites for wind farm development in the Black Sea. In particular, the regions of interest are

the border areas between Bulgarian-Romanian, Turkish-Bulgarian and Turkish-Georgian waters. To this end, three main tasks have been defined:

Task 1. Database building

Task 2. Database analysis and assessment for windfarm siting

Task 3. Web Portal definition, inputs and test

For the reporting period, the partners engaged in WP2 have been working for developing a detailed and high resolution data base that will support the site suitability characterization. More precisely, a detailed categorization has been organized for available, or potentially available, data suitable for the wind farm siting challenge from various sources. Basic information are provided concerning the corresponding specific characteristics such as accessibility, originating program/organization, quality, spatial/temporal coverage, description etc.

Towards this direction, a wide number of environmental or other associated parameters have been considered: The zonal and meridional wind components, air pressure, air density, specific humidity of the atmosphere and air temperature at different vertical levels (10, 40, 80, 120 and 180m) are the main atmospheric parameters that will be analysed; Sea level, water temperature (several depths), water salinity (several depths), water zonal velocity component (several depths), water meridional velocity component as well as the full 2 dimensional wave spectra over frequencies and directions, wave height (significant), mean wave direction, mean (energy) and peak wave period, swell wave height, maximum expected wave height and bathymetry form the wave parameters data sets. Moreover parameters like the temperature of the water body, current stress, and surface elevation are taken into account.

All this information have been compiled and delivered in specialized templates.

Moreover, four test/use cases that can be categorized into the wind farm challenge, have been provided by the partners based on previous experience - Table 2.1:

Use case	Environmental Matrix of interest	Related EMODNET challenges
MARINA (Marine Renewable Integrated Application Platform)	Air and Marine Waters	CH-1
MedSeA (European Mediterranean Sea Acidification in a changing climate)	Air and Marine Waters	CH-1
COCONET WebGIS Application	Biota/Biology Marine Waters Human Activities Riverbed/ Seabed	CH-1 CH-2
Evaluation of the Wind Energy Resources in the Black Sea Area	Air	CH-1

Table 2.1. List of Use cases studies of the Challenge 1, Windfarm siting

Information concerning the exact characteristics/parameters used as well as relevant bibliographic references supports this analysis.

On the other hand, and in the framework of Task 1 (database building), the National and Kapodistrian University of Athens (NKUA) is developing a Structured Query Language (SQL) database in which high resolution modeled data over the areas of interest has been stored. The atmospheric, wave and tidal parameters referred above will be covered utilizing the outputs of the FP7 MARINA project for a 10-year (2001-2010) of high resolution numerical model simulations. The numerical systems employed for these hindcast simulations are the state-of-the-art regional

atmospheric model SKIRON, the ocean wave model WAM, the tidal analysis global model Tidal Model Driver – TMD and the ocean circulation HYCOM (Hybrid Coordinate Ocean Model). Two geographic areas are covered according to the needs of the project and are presented in the following Table 2.2 and Figure 2.1:

Spatial Coverage	Area 1		Area 2	
Lat	41.1 N	45.0 N	41.0 N	43.0 N
Lon	27.2 E	29.5 E	40.0 E	42.0 E

Table 2.2: The coordinates of the regions of interest



Figure 2.1. The areas of interest over the Bulgarian-Romanian, Turkish-Bulgarian and Turkish-Georgian waters

Challenge 2: Marine Protected Areas (IO-BAS)

The objectives of Challenge 2 Marine protected areas are to:

- Analyse the existing Black Sea network of Marine Protected Areas.
- Determine whether the network constitutes a representative and coherent network as described in Article 13 in the Marine Strategy Framework Directive.
- Determine how MPAs are likely to be affected by climate change.

The following activities are carried out during the reporting period:

1. Analyzed the existing Black Sea network of Marine Protected Areas
2. Identification of available data sources: *T2 excel file* based on ISO 19157 Data Quality for the Geographic Information has been filled with 6 entries listing available datasets for the

Biota/Biology and Human activities concerning positioning, references and management, birds mammals and reptiles, cetaceans abundance, biota abundance, biomass and diversity habitat extent and fish- fishery and aquaculture zones.

3. Use Cases examples: 4 use cases examples of targeted products related to Challenge 2 MPAs and documented in the Literature Survey report - Table 2.3.

Use case	Environmental Matrix of interest	Related EMODNET challenges
SICRON Project “Integrated Management and Awareness Raising System of the Natura 2000 network in Romania:	Biota/ Biology Human Activities Riverbed/ Seabed	CH-2
Study of Integrated Coastal Zone Management	Biota/ Biology Human Activities Riverbed/ Seabed	CH-2
COCONET WebGIS Application	Biota/Biology Marine Waters Human Activities Riverbed/ Seabed	CH-2
MISIS Project “MSFD Guiding Improvements in the Black Sea Integrated Monitoring System”	Biota/Biology Marine Waters Human Activities Riverbed/ Seabed	CH-2

Table 2.3. List of Use cases studies of the Challenge 2, MPAs

Challenge 3: Oil platform leak (ORION)

The challenge “oil platform leaks” aims to issue an impact bulletin (within 24 and 72 hours) that determine the likely trajectory of the slick and the statistical likelihood of affecting sensitive coastal habitats, species or tourist areas.

- The challenge handles the ability to produce oil spill predictions in the entire Black Sea.
- An alert to a leak is generated on-line during the project by the Commission.

A first Bulletin request has been received on the 28/07/2014. The bulletins were produced using oil spill model (MEDSLIK) and different meteo-oceanographic data.

The request :

At 08:15 CET of the 10/05/2016 (same day of alert) an oil pipeline on the seabed was damaged at LAT: 44,2494; LON:29,47508. A total volume of 300m³ crude oil was released during a period of 2 days. It was asked to provide by email to DG MARE, EASME and Secretariat:

- an oil leak bulletin/report after 24 and 72 hours
- short daily summaries (each morning before 11:00 CET) with few illustrations of the results.

Currents, sea surface temperature, waves and wind forecasts are updated every day. They come from different models and have different time resolution, spatial resolution and forecast temporal horizon (days of prediction in the future).

The bulletins were produced using MEDSLIK oil spill models.

Description of the oil spill forecasting results :

1. Oil spill after 24 hours (11/05/2016 08:15 CET) - Fig. 2.2

- The sea surface currents in the area of incident are North-North-East, while the wind is South-West with intensity around 4.0 m/s ;
 - The oil spill 24 hours after the reported incident was at sea surface 65.23% of the total released oil at that time ;
 - The oil transport at sea surface follows the direction of winds and sea current, without any impact at the coastal zone ;
 - The evaporated oil constitutes the 34.17% of the oil released during the 1st day after the incident.

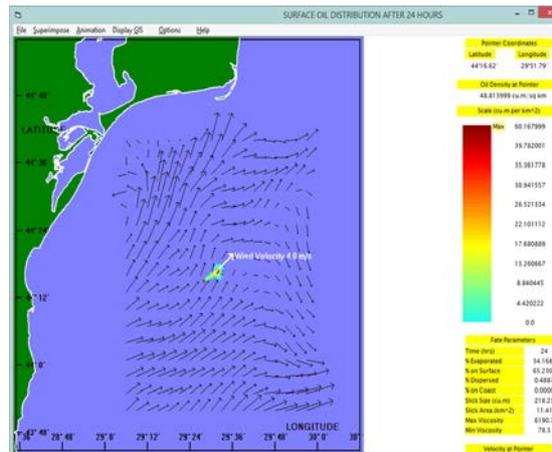


Figure 2.2. Surface currents (black arrows) and wind (white arrow), at 08:15 CET 11/05/2016. Position of the incident is highlighted with the dot.

2.Oil spill after 48 hours (12/05/2016 08:15 CET) - Fig. 2.3

- The surface currents are North-East, while the wind is South-West with intensity around 4.2 m/s.
 - The oil spill 48 hours after the incident was at sea surface 63.12% of the total released during the 2 days.
 - The oil transport following the direction of winds and of the sea currents, without any impact at the coastal zone.
 - The evaporated oil constitutes the 34.75% of the total oil spilled.

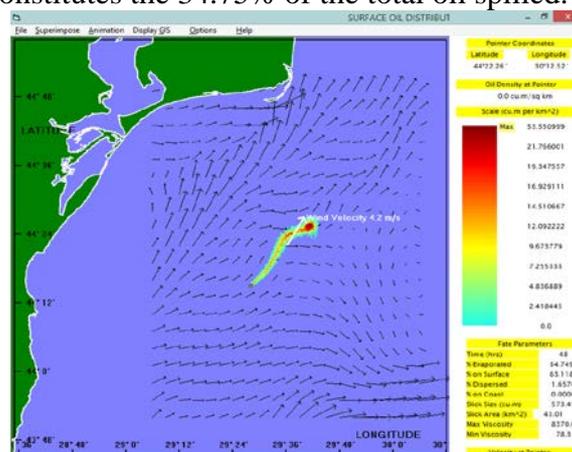


Figure 2.3. Position of the oil slick at 08:00 of 06/10/2015, oil concentration is given in m^3/km^2 . Surface currents (black arrows) and wind (white arrow).

- The dispersion of the oil in the water column constitutes only the 4.5% of the total oil released and follows the general direction of the sea surface oil transport, i.e. to the North-East Fig.2.4.
- In the water column constitutes a small fraction 4.5%. This is due mainly to the fact that the location of the subsurface source of the oil spill was at shallow water, i.e. at 50 m and the oil rise the surface very quickly. Moreover, the weak subsurface sea currents at the area of the oil spill source case an insignificant diversion of the oil plume from the vertical axis to the North-East, as the dominant sea currents - Fig 2.5.

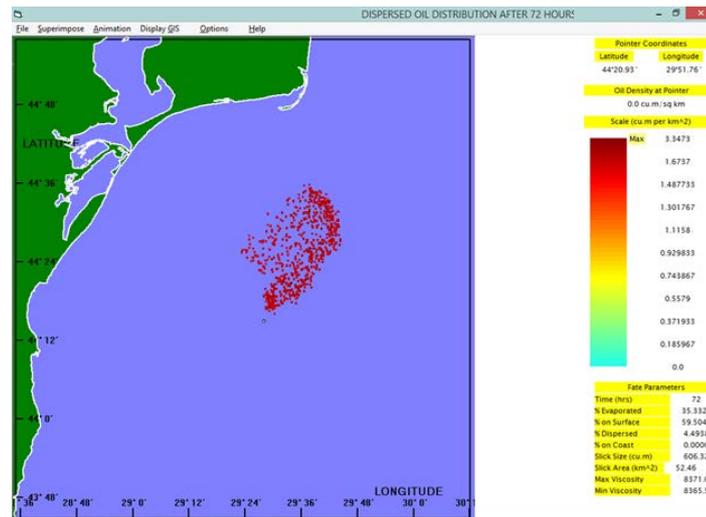


Figure 2.4. Position of the dispersed oil within the water column at 08:15 on 13/05/2016, oil concentration is given in m^3/km^2 . Location of the source is indicated as a small circle.

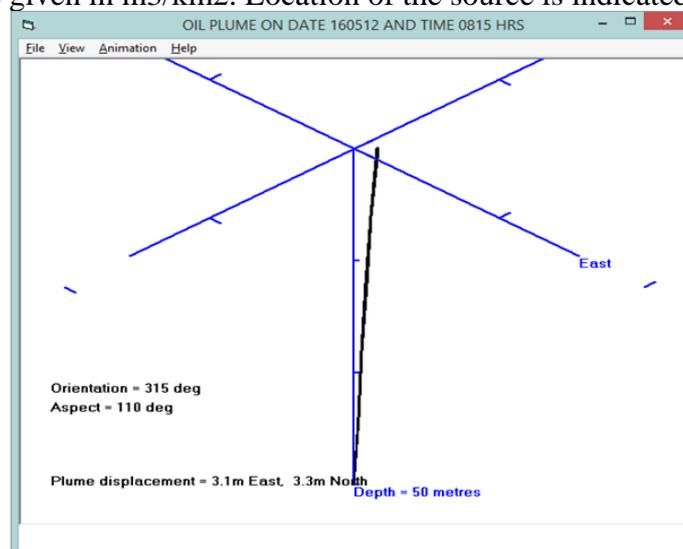


Figure 2.5. The plume of the oil spill from the depth of 50m

Challenge 4: Climate (USOF)

The focus of Challenge 4 is the identification of the trends for Black Sea temperature, the ice cover and the phytoplankton biodiversity. The survey on the available information in the literature and internet has identified 89 potential input data for the temperature (including SST and water

column temperature), 17 – for the area covered with ice, and 9 – for the different species of phytoplankton concentration. These potential data source for the investigation were evaluated in respect to their fitness for use, having in mind the information on quality control, time and space coverage and resolution, availability and the perspective for future continuation of the data service. Based on this evaluation several use cases were chosen as the most prominent for the estimation of the characteristics and trends in this challenge:

Use case 1: ARGO (Array for Real-time Geostrophic Oceanography) - One of the most valuable sources of information is the monitoring of the physical characteristics of the Black sea from the Argo program. For studying the temperature trend for the past 10 years and compare to other previous studies we have chosen this database. The Black Sea Argo program has been initiated in 2005 and since then 29 Argo floats have been deployed generating ~ 4000 profiles of the thermohaline properties of the sea in the 2000 m water column. The data from Argo floats include temperature, salinity and different biogeochemical parameters of the water in the recent years (dissolved oxygen concentration, phytoplankton concentration, nitrates).

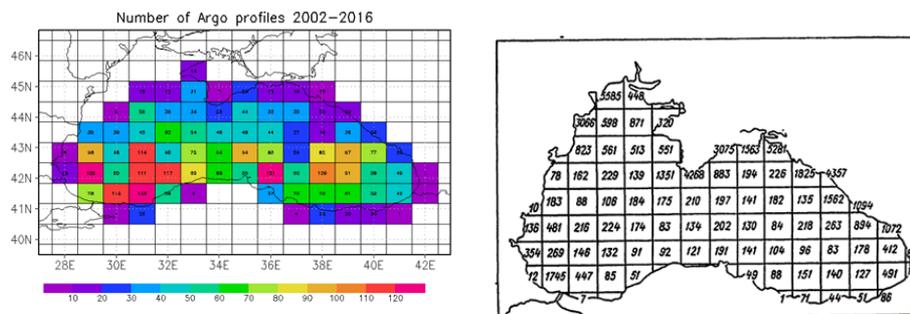


Figure. 2.6. Number of measurements from Argo autonomous profilers in the period 2005-2016 (left) and from historical database published by Simonov and Altman (1991) for the period 1903-1983 (right).

Use case 2: SO GOIN Black Sea - The data from multi-annual measurements in the Black Sea (expeditions from 1903 to 1982, more than 50000 profiles) are used to produce climatological thermohaline 3D fields. The data are published by the Russian State Oceanography Institute Sevastopol branch book “Black Sea” and refer to the years 1990s. They will be used to estimate the 50-years trend. The Fig. 1 shows the number of profiles gathered in a grid box of 0.5x0.33 deg from Argo floats (left panel) and to compare the same number from historical measurements (right panel) of Fig. 2.6.

Use case 3: AVHRR Pathfinder - The 4 km Advanced Very High Resolution Radiometer (AVHRR) Pathfinder Version 5 sea surface temperature (SST) dataset is a reanalysis of historical AVHRR data that have been improved using extensive calibration, validation and other information to yield a consistent research quality time series for global climate studies. For studying the sea surface temperature trend for the past 30 years we have chosen this product as it covers the period 1985-2009. The AVHRR (spatial and temperature resolution of about 4 km and precision 0.1 °C) is a radiation-detection imager that can be used for remotely determining the surface temperature.

Use case 4: MASIE-NH - The Multisensor Analyzed Sea Ice Extent - Northern Hemisphere (MASIE-NH) products provide measurements of daily sea ice extent and sea ice edge boundary for

the Northern Hemisphere. The input data comes from the 1 km and 4 km Interactive Multisensor Snow and Ice Mapping System (IMS) snow and ice product produced by the National Ice Center (NIC). NIC utilizes visible imagery, passive microwave data, and NIC weekly analysis products to create their data product. The MASIE-NH products are distributed in a number of formats including ASCII text, GeoTIFF, PNG, shapefiles, and Google Earth files. The data cover the period since 2006 and will be used to estimate the sea ice extend in the Black Sea over the last 10 years. Fig 2.7 shows the first results from the estimation of the averaged area covered with ice in the last 10 years from MASIE-NH (red line) compared with the historical data for the period 1945-1985 published in Simonov and Altman (1991).

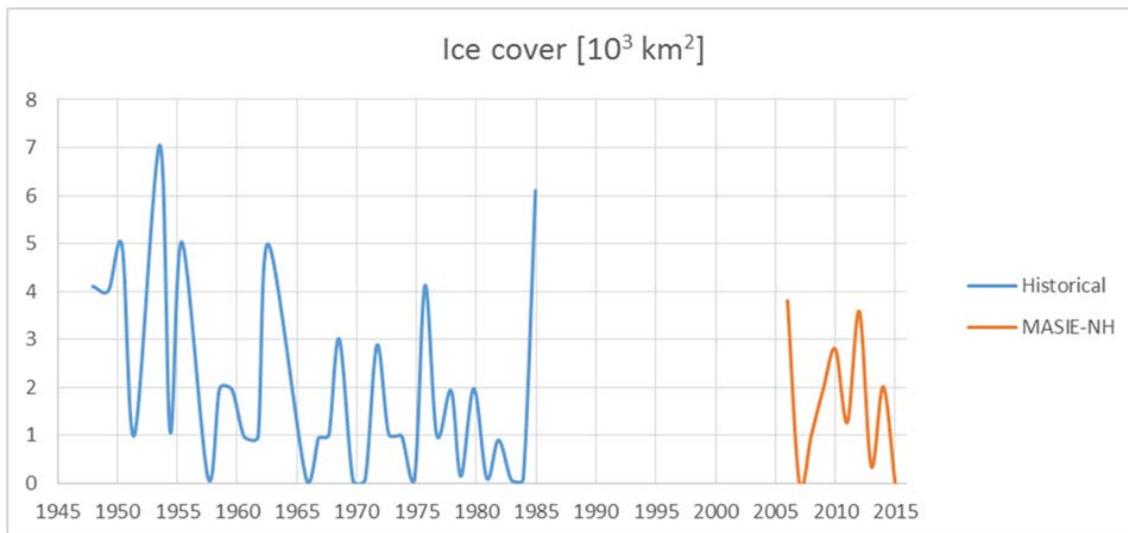


Figure 2.7. Averaged annual winter season ice cover from historical data and from MASIE-NH.

These preliminary results are described in more details in Damian Ivanov B.Sc. thesis “Study of the icing in the Black Sea” (2016), Sofia University “St. Kliment Ohridski”.

Use case 5: Mikaelyan A.S., Zatsepin, A.G., Chasovnikov, V.K., 2013. Long-term changes in nutrient supply of phytoplankton growth in the Black Sea. *J. Mar. Syst.* 117-118, 53-64. - In this research the long-term changes of the total phytoplankton biomass and taxonomic groups were analyzed during the last 40-year period (1969–2008) in the open waters of the Black Sea. The study was based on the Black Sea Database ODBMS prepared in the framework of the NATO SfP-971818 ODBMS Black Sea Project (Ivanov et al., 1998). The special goal of the research was also to trace the long-term dynamics in supply of nutrients and their ratios in the pycnocline, as well as changes in intensity of the upward flow of nutrients into the euphotic zone and impact of these factors on abundance and the taxonomic structure of phytoplankton. The spatial and temporal resolution of the used data base was not enough for analysis of year-to-year changes. Authors resolved this problem by averaging of data for the decadal periods. Based on changes of the total phytoplankton biomass three periods were revealed: Pre-eutrophication (PR) in 1969–1983, Eutrophication (EU) in 1984–1995 and Post-eutrophication (PS) in 1996–2008 (Fig. 2.8). Regarding the temperature these periods were warm, cold, warm.

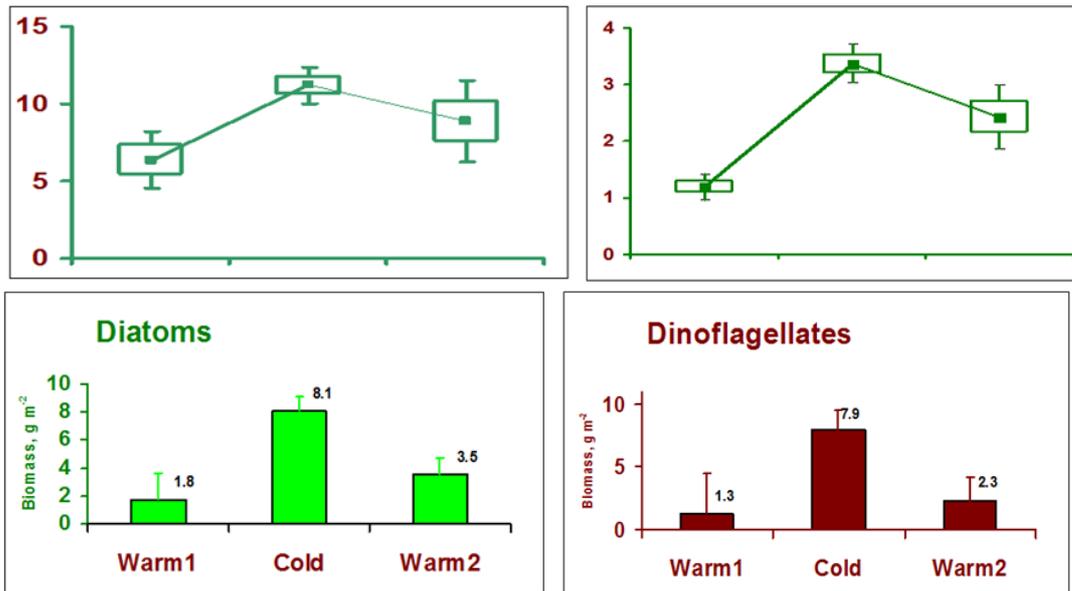


Figure 2.8. Concentration of nutrients (mM) in the Cold Intermediate Layer (April-November)

Challenge 5: Coasts (UPL)

The objectives of Challenge 5 - Coasts is to assess and document in several ways the temporal and spatial variability of sea level and sediment mass balance changes in the Black Sea by using all the available data for this basin. This will help to identify some of the major trends that could threaten the Black Sea ecosystem in the near future because of climate change and socioeconomic development. Furthermore, it will allow identification of major data and knowledge gaps which have to be solved by future research efforts in order to assess the potential impact of global change and human activity in the Black Sea region via sea level and sediment mass balance changes.

This section reports on the progress of WP6 achieved during the last six months, from the 15th January 2016 till the 15th July 2016.

The following are the activities carried out during this period:

1. Drafting of the Challenge 5 – Coasts (WP6) work plan: WP6 consists of three MAIN TASKS and several SUB-TASKS for each one of these. In order to distribute and harmonize the work between WP6 partners and sub-contractors, a TASK-LEADER for each MAIN TASK has been appointed. Then, for each SUB-TASK, RESPONSIBLE and CONTRIBUTING institutions have been identified.

2. Identification of available data sources: T2 excel file based on ISO 19157 Data Quality for the Geographic Information has been filled with 49 entries listing available datasets for the sea level and sediments balance from observations in the Black Sea (satellite and tide gauges) and numerical models outputs).

3. Use Cases examples: 4 use cases examples of targeted products related to Challenge 5 Coasts and documented in the Literature Survey report - Table 2.4.

Use case	Environmental Matrix of interest	Related EMODNET challenges
Black Sea level trends from tide gauges and satellite altimetry	Marine waters	CH-5
The lithodynamic progress in the seashore	Seabed	CH-5

zone of the Black Sea		
Monthly mean sea level trends from tide gauges in the Mediterranean and the Black Sea	Marine waters	CH-5
Investigation of the sea level change along the Black Sea coast from tide gauges and satellite altimetry	Marine waters	CH-5

Table 2.4. List of Use cases studies of the Challenge 5, Coast

Challenge 6: Fishery Management (NIMRD)

The objectives of Challenge 6 Fishery management are to:

- to construct the fishery data sets and information for the WP13;
- to deliver tables of mass and number of landings of fish by species and year and mass and number of discards and bycatch of fish, mammals, reptiles and seabirds by species and year using as long as possible time series. The final aim is to provide an overall picture of the trends over the years of landing, discard and bycatch by species.

The following activities are carried out during the reporting period:

1. Identification of existing data sets and the level of data availability (Template 2).
2. Use Cases examples: 17 use cases examples of targeted products related to Challenge

6 Fisheries Management and documented in the Literature survey report - Table 2.5.

Use case	Environmental Matrix of interest	Related EMODNET Challenge
Fishery Statistical Collections GFCM (Mediterranean and Black Sea) Capture Production	Biota/Biology Marine Waters Human Activities	CH6
Scientific, Technical and Economic Committee for Fisheries (STECF) – EC	Biota/Biology Marine Waters Human Activities	CH6
General Fisheries Commission for the Mediterranean (GFCM) - Working Group for the Black Sea	Biota/Biology Marine Waters Human Activities	CH6
Project Strengthening the Regional Capacity to Support the Sustainable Management of the Black Sea Fisheries (SRCSSMBSF) - 88	Biota/Biology Marine Waters Human Activities	CH6
FP7 Project MareFrame - Co-creating Ecosystem-based Fisheries Management Solutions	Biota/Biology Marine Waters Human Activities	CH6
FAO FISHERIES AND AQUACULTURE	Biota/Biology	CH6

PROCEEDINGS 39 First Regional Symposium on Sustainable Small-Scale Fisheries in the Mediterranean and Black Sea	Marine Waters Human Activities	
FAO/GFCM The State of Mediterranean and Black Sea Fisheries 2016	Biota/Biology Marine Waters Human Activities	CH6
Ivanov, L. and R.J.Beverton, 1985. The fisheries resources of the Mediterranean. Part two: Black Sea.	Marine Waters Biota/Biology Human Activities	CH6
Prodanov, K.; Mikhailov, K.; Daskalov, G.; Maxim, C.; Chashchin, A.; Arkhipov, A.; Shlyakhov, V.; Ozdamar, E., 1997. Environmental management of fish resources in the Black Sea and their rational exploitation. Studies and Reviews. General Fisheries Council for the Mediterranean.	Marine Waters Biota/Biology Human Activities	CH6
7 FP CREAM - Coordinating Research In Support To Application Of Ecosystem Approach To Fisheries And Management Advice In The Mediterranean And Black Seas.	Marine Waters Biota/Biology Human Activities	CH6
TurkStat – Turkish Statistical institute	Marine Waters Biota/Biology Human Activities	CH6
SeaAroundUs Project, University of British Columbia	Marine Waters Biota/Biology Human Activities	CH6
7 FP Policy-oriented marine Environmental Research in the Southern EUropean Seas (Perseus)	Marine Waters Biota/Biology Human Activities	CH6
Tender MARE/2014/27 Evaluation of specific management scenarios for the preparation of multi-annual management plans in the Mediterranean and the Black Sea	Marine Waters Biota/Biology Human Activities	CH6
EU FP7 Project Monitoring and Evaluation of Spatially Managed Areas MESMA	Marine Waters Biota/Biology Human Activities	CH6
SeaDataNet - Pan-European Infrastructure For Ocean & Marine Data Management	Marine Waters Biota/Biology Human Activities	CH6
7FP Project Knowledge-based Sustainable Management for Europe's Seas (KnowSeas)	Marine Waters Biota/Biology	CH6

	Human Activities	
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Table 2.5. List of Use cases studies of the Challenge 6, Fishery management

Challenge 7: Fishery Impact (NIMRD)

The objectives of Challenge 6 Fishery management are to:

- to construct the fishery data sets and information for the WP13;
- to deliver a set of data, points, gridded or polygons, that will be represented on maps showing the extent of the trawling fishing areas in order to identify the areas more disturbed by bottom trawling (number of disturbances per month), change in level of disturbance over the past ten years and damage to sea floor to both living and non-living components.

The following activities are carried out during the reporting period:

1. Identification of existing data sets and the level of data availability (Template 2).

The metadata for this challenge have been started to be uploaded on the Sextant portal (work in progress).

2. Use Cases examples: 4 use cases examples of targeted products related to Challenge 7 Fisheries Impact and documented in the Literature survey report - Table 2.6.

Use case	Environmental Matrix of interest	Related EMODNET Challenge
CoCoNet Project - Review of jellyfish blooms in the Mediterranean and Black Sea. Studies and Reviews. General Fisheries Commission for the Mediterranean	Biota/Biology Marine Waters Human Activities	CH7
Directorate General for Internal Policies Policy Department B: Structural and Cohesion Policies Fisheries - Fisheries In The Black Sea (2010)	Biota/Biology Marine Waters Human Activities	CH7
Adverse Fisheries Impacts on Cetacean Populations in the Black Sea - FINAL REPORT	Biota/Biology Marine Waters Human Activities	CH7
Black Sea Regional Activity Centre for Environmental Aspects of Fisheries and other Marine Living Resources Management (RAC FOMLRM) - Black Sea Commission	Biota/Biology Marine Waters Human Activities	CH7

Table 2.6. List of Use cases studies of the Challenge 7, Fishery impact

Challenge 8: Eutrophication (NIMRD)

The objectives of Challenge 8- Eutrophication (WP9) are to:

- To produce an overview of datasets on eutrophication in the entire Black Sea including remotely sensed surface chlorophyll, locally monitored nutrients, oxygen, ecosystem characteristics and chlorophyll profile concentrations.
 - To assess the extent and intensity of the eutrophication phenomenon in all areas known to be significantly affected by river and other discharges;
 - To evaluate the time evolution of eutrophication in the entire Black Sea over past 10 years;
 - To assess the performance of indicators such as the TRIX or EEA's CSI023 (<http://www.eea.europa.eu/data-and-maps/indicators/chlorophyll-in-transitional-coastal-and-chlorophyll-in-transitional-coastal-and-1>).

This section reports on the progress of WP9 achieved during the last six months, from January to June 2016. Two kinds of activities were carried out:

- Update databases on nutrient fluxes (nitrates, phosphates) and concentrations, dissolved oxygen and chlorophyll from observations and models being filled in the T2 excel file based on ISO 19157 Data Quality for the Geographic Information System.
- 4 Use Cases examples of targeted products related to Challenge 8 Eutrophication and documented in the Literature. Each Use Case documented the data sets that were used to construct the products Table 2.7.

Use Cases	Environmental Matrix of Interest	Related EMODNET challenges
State of Environment Report 2001 – 2006/7	Marine Waters, Biota/Biology	CH-8
Nutrient budgets for European seas: A measure of the effectiveness of nutrient reduction policies	Air, Marine waters, Fresh waters, Riverbed/Seabed, Human activities	CH-8
Black Sea coastal forecasting system	Marine waters	CH-8
Research paper “nutrient budget for European seas: A measure of the effectiveness of nutrient reduction policies”	Air, Marine waters, Fresh waters, Riverbed/Seabed,	CH-8

Table 2.7. List of Use cases studies of the Challenge 8, Eutrophication

Challenge 9: River inputs (NIMRD)

The objectives of WP10 – Challenge 9 River Inputs, is to give an overview on the temporal and spatial variability of riverine mass, material fluxes and eels distributions based on the collated data in the Black Sea from all the identified data bases described on Template 2. This will allow a better understanding of the peculiarities of the Black Sea ecosystems in terms of the strong climatic, geomorphological and cultural contrasts that characterise the Black Sea drainage basin. It will help on identification of the major trends that could threat these ecosystems in the near future because of

climate change and socioeconomic development. Finally, it will allow identification of major data and knowledge gaps which have to be solved by future research efforts in order to assess the potential impact of global change in the Black Sea region via the riverine fluxes.

This section reports on the progress of Challenges 10 achieved during the last six months, from January to June 2016. Two kinds of activities were carried out:

- a) Update databases (additional rivers and years) on water volume and temperature, TSS, nutrient fluxes (nitrates, phosphates) and eels abundance from observations and models that were filled in the *Template 2*
- b) 4 Use Cases examples of targeted products related to Challenge 9 River Inputs and documented in the Literature review - Table 2.8.

Use Case	Environmental Matrix of Interest	Related EMODNET challenges
European hydrological predictions for the environment – E-HYPE	Fresh Waters	CH-9
Hybrid Coordinate Ocean Model (HYCOM)	Fresh Waters	CH-9
Romanian Black Sea Coast MSFD Water Delamination	Fresh Waters	CH-9
Black Sea Forecasting system	Fresh Waters	CH-9

Table 2.8. List of Use cases studies of the Challenge 9 River input

Challenge 10: Bathymetry (IO-BAS)

Alongside assessment of the spatial coverage and quality of publicly available (both open- and paid-access) bathymetry grids and paper charts for the Black Sea, among the main objectives of WP11 – CH10 Bathymetry are also the creation and dissemination of topic-related GIS products, e.g. a bathymetric chart of the Black sea basin with contour intervals every 100 meters, a Digital Terrain Model (DTM) of the seafloor with cell size of 1 X 1 arc minute etc. Other important goals of the cited challenge are to identify marine sectors with data gaps and priority areas for surveying in order to provide conditions for safer navigation, to generate a basin-scale coastline using LandSat 7 images, as well as to facilitate GIS data dissemination through the Black-Sea-checkpoint Portal.

The following activities were carried out over the cited period:

1. Inventory of available bathymetric data sets: Presently, there are 41 bathymetric data sets enlisted at the EMODnet thematic portal, of which 20 are stored at Bulgarian institutions, 12 – at Romanian, 8 at French and 1 at Dutch data holding centers. Additional data sets worth considering are the GEBCO Digital, ETOPO1 (bedrock) and ETOPO2v2.
2. Use Cases examples: Five use cases for the Black Sea basin were considered. However, just two of them were included in the draft document of the Black Sea Checkpoint Literature Survey.

Challenge 11: Alien Species (IO-BAS)

The objectives of WP12 – CH11 Alien species are:

- To make an inventory of the Black Sea alien species, identification of pathways leading to unintentional introductions (e.g. the importance of ballast water vs. other vectors) and determination of their status (established, cryptogenic, etc.);

- To produce a catalogue of “key” alien species known to be engineer of the Black Sea ecosystem providing detailed information (taxonomy, reason and year of introduction, geographical area, impact on ecosystem and economy);
 - To produce an overview of datasets on key alien species, identification of gaps;
 - To assess impact of alien species on the Black Sea ecosystem and economy by up to ten indicators (extinction of native species, reduced income for fishermen, risk to aquaculture, risk to tourism);
 - To elaborate a “target species list” of harmful or potentially harmful alien species those are especially undesirable to be introduced to the Black Sea.

This section contents the progress of WP12 reached during the last six months (15th January 2016 till the 15th July 2016). The following activities were carried out:

- Update of Template 2- 24 input datasets which correspond with 2 categories of characteristics (zooplankton wet weight biomass; zooplankton taxonomy related abundance per unit volume of the water column) for 1 environmental matrix (Biota/Biology).
- 2 Use Cases examples of targeted products related to Challenge 11 Alien species and documented in the Literature review - Table 2.9.

Use case	Environmental Matrix of Interest	Related EMODNET challenges
A basin-wide Black Sea <i>Mnemiopsis leidyi</i> database	Biota/Biology	CH-11
Addressing the ecological issue of the invasive species, Special focus on the ctenophore <i>Mnemiopsis leidyi</i> (Agassiz, 1865) in the Black Sea	Marine Waters, Biota/Biology	CH-11

Table 2.9. List of Use cases studies of the Challenge9 River input

3. WP13: Web site development and operations (CLS)

This section reports on the progress of WP13 achieved during the last six months, from January to June 2016.

Three kinds of core activities are carried out:

- a) Development and set up;
- b) Expertise support (service);
- c) Operations of the web portal (service).

3.1 Activities performed during the last 6 months

The capabilities deployed are as follows:

- **Development and set up of project web site for project information**
 - V1 web site release on time (public and secured access) articulated with Emodnet portal, Twitter network communication and DG MARE forum (<http://emodnet-blacksea.eu/>);

- Updated for challenge 3 (Oil platform leaks) modus operation and results (<http://emodnet-blacksea.eu/portfolio/oil-platform-leaks/>);
- Release of template T2 for challenge partners to fill in part 1 and 2;
- Development of configuration of Sextant data base and web interface to ingest T2 elements;
- Edition of user guide.

Why for – Who for	General audience	Intermediate users	End Users	Upstream providers	Institutional Policy makers
1) General information	Emodnet familie		Clarify the observation landscape		
2) Inventory of input data		Catalogue Gateway			
3) Discover, view, download products			Show - Study cases (challenges)	Evaluate fitness for use	
4) How available are the input data sets to users				Main driver	
5) How appropriate are they for challenge use ?					Main driver



inadequate
partially adequate
totally adequate
not relevant

Identify gaps and priorities to optimize the monitoring systems

Data Adequacy Report

WP 13 – CLS – fblanc@cls.fr Atlantic Annual Meeting 1-3 June 2016

Figure 3.1: Scope of the web

Folder 1: Introduction-Identification

Folder 2: Characteristics

Folder 3: Data sources

Folder 4: Overview

Exploited From excel file for LS

1/Characteristics definition and category (M=Mandatory, C=conditional, O=Optional)							
Unique Identifier (Integer number for the combination)	Environmental matrix where characteristics are specified	SDN Discovery group code of Parameter (PSC) for variables	Variable characteristic code	Inquire topic category for characteristics	Processing level of characteristics	Production mode	Hierarchy data level
	Air...	(http://www.sea)	SDN parameter list	Use P22 list of SDN	A- Observation (raw...)	L-Delayed	1-dataset
2/Data sources							
Note : many datasets are missing in the existing catalogues such as the European Directory for Marine Environmental Data (http://www.eurodatanet.org/Metadata) or in the catalogue of the Geospatial http://inspire.geospatial.eu/wspgs/en/ . Please mention if your data set is missing in these catalogues.							
Unique Identifier (Integer number)	Programme/ Project name	SDN ECOMEP identifier (http://www.eurodatanet.org/Metadata) a/COMEP-projects	Data provider	SDN ECOMO identifier (http://www.eurodatanet.org/Metadata/ECOMO-Organisations)	Data set identifier	Data collection or data set name as given by the provider	Catalogue URL, Default URL
3/Overview elements of dataset							
Please specify the intended use for each characteristics at the moment of production.							
Identifier (M)	Purpose of Characteristics production (provider specification) (M)	Production and quality assessment specifications reference (C)	Challenge name and intended use by the Challenge (M)	Intended use description (objective, process description, output data) (M)			

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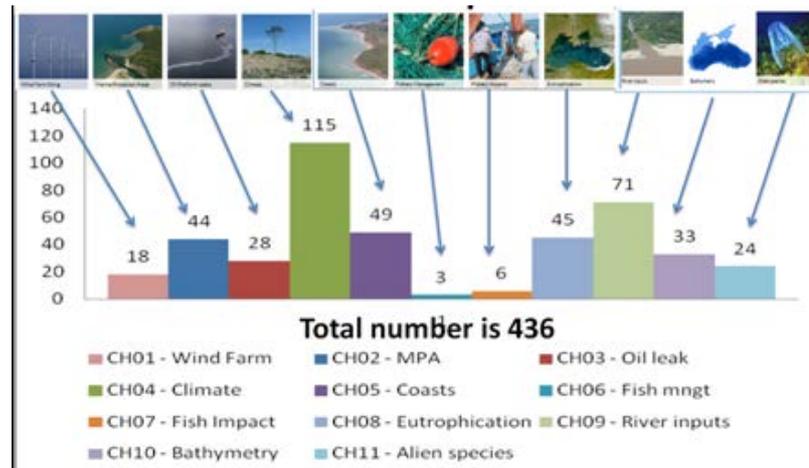


Figure 3.3: Number of input datasets identified by challenges

In the meantime of having Sextant interface implemented we have analysed the template filled in by each challenge work packages, consolidated vocabularies and organisation, project, programme names, and provided statistics and elements for the Literature Survey report. We have also performed crosschecking / statistics between checkpoints (Mediterranean Sea, Black Sea and Atlantic) and provided all elements for LS report (that is corresponding to first checkpoint activity).

	Challenges											
	All	01	02	03	04	05	06	07	08	09	10	11
Number of input data sets identified	436	18	44	28	115	49	3	6	45	71	33	24
Environmental matrices identified	6	2	4	5	3	3	1	1	3	2	1	1
Numbers of different P03 identified	26	5	9	10	3	3	1	1	5	7	1	1
Numbers of different P02 identified	48	11	14	12	5	3	1	3	10	13	1	3
Numbers of different INSPIRE spatial themes identified	14	4	6	9	1	3	1	2	2	3	1	1

Table 3.1: Number characteristics, aggregated with the three different vocabularies, as a function of Challenges

- Operations of the web portal (service)
 - Animation to get template 2 filled in by challenges
 - Maintain the web tools operational for external and internal use
 - Individual account management
 - Edit file logs every 6 months



Figure 3.4: Logs for January - April 2016



Figure 3.5: Logs for May - June 2016

3.2 Problems encountered and corrective actions

- V2 of web site released partially done (public & secured access). sextant is available but not filled in. The main issues was for partners to understand the methodology, technology, inventor the right input data sets and create meaningful metadata. To separate difficulties , we have prefer to keep the excel table to allow thinking and drafting. And work out a consolidation exercise to support the metadata qualification process.
- The qualification processe was enhanced thanks to the cross-exercise with the three checkpoints, MedSea, Black Sea and Atlantic. The methodolgy is benefiting from this work and is simplified with more operational processes.
- The web site is poor in visitors but the project doesn't have time to work out more visibility and is missing a communication plan. We propose that is work out a communication plan between

Emodnet secretariat and project manager to release regular news on our checkpoint pointing out to the web site.

3.3 Planned activities for the next six months



- Wait for LS revision to publish it online and prepare web tools to link on Sextant for data base for dynamical view of metadata
 - Animate challenge activities to adjust inventory of input data sets and ingest metadata in Sextant GIS technology.
 - Qualify content and edit new consolidated information and stats,
 - Process and visualize availability indicators and provide analysis elements for DAR 1 report
 - Make a validation review meeting with all partners
 - Release full web site V2
- Work on template to inventory challenge products



Figure 3.6: The different phases of checkpoint activities

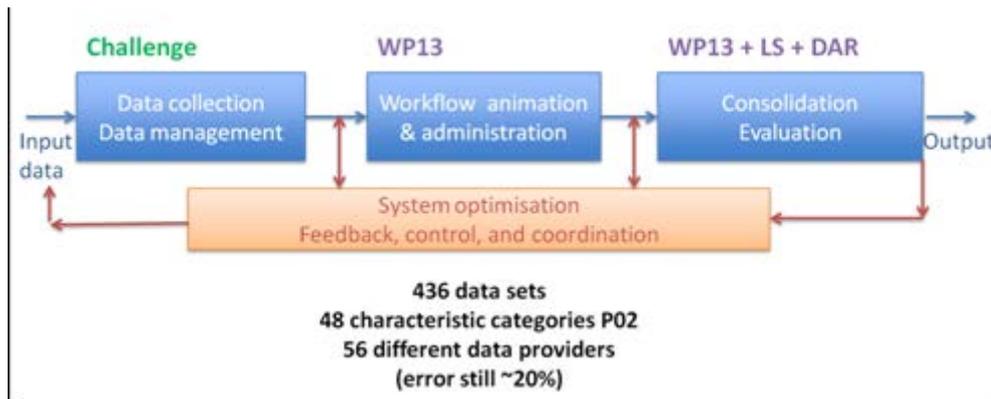


Figure 3.7: Process around metadata collation

WP13 team and Literature Survey / DAR team provide an important support to get the right information. Work is ongoing to better harmonize and consolidate the information from the LS/DAR feedback. Formation to technical partners is programmed to share workload and to challenges to propagate good practices.

4. WP14: Organisation of Panels (IO-BAS)

The objectives of WP14 are to: (i) organise two meetings of the Panel and external stakeholders where the Data Adequacy Reports are presented by the consortium and (ii) produce two evaluation reports of the Data Adequacy Reports. Five scientific experts plus representatives of offshore energy industry and Black Sea Commission have been identified by the consortium as specified in the technical tender proposal. During the 1st Annual Review meeting a tentative period for the first Panel meeting has been identified (first half of November 2016) in order to advertise the Black Sea Checkpoint project activity in due time to the experts.

5. WP15. Data adequacy reports (CMCC)

The alpha version of the First Data Adequacy Report is being developed basing on ‘Use Case’ descriptions collected for Literature survey. These ‘Use cases’ reference to the fitness for purpose of the input data and allow to make the first Data Adequacy assessment.

6. WP16: Organization of stakeholder workshop (IO-BAS)

Joint EMODnet Checkpoint Stakeholder Conference is scheduled for the period 13 to 15 February 2017. The meeting will be held in the Royal Flemish Academy of Science and Arts, Belgium, Brussel.

7. WP17: Project Management (IO-BAS)

Project meeting

During the reporting period four meetings have been carried out, as three of them has been organized on the web platform to reduce travelling costs and time. In the following the organized meetings are listed and briefly synthesized.

1st Annual Review Meeting 14-15 June 2016

The 1st Annual Review Meeting took place in Varna from 14 to 15 June 2016. All the partners and some subcontractors participated to the meeting. Main objectives of the meeting can be summarized as follows:

1. Agree on the Checkpoint GIS developments, structure and activity protocols
2. Define Indicators for Level 1, working groups and reference people from Challenges for the Checkpoint GIS

3. Understand how to start produce Checkpoint products

During the meeting the following points have been presented:

- The overall project progress and scheduling in order to share among the project partners the plan and the milestones scheduled in the technical tender proposal and to clarify all the deliverables (internal and compulsory)
- WP1: Literature Survey presentation and main outcomes with respect to data base and report
- WP2-12 (corresponding to Challenges 1-11) status of deliverables, work planned to input GIS
- Portal and Data Adequacy Report. Contributions from several subcontractors to the challenges have also been presented
- WP14 and WP16: Panel and stakeholder meeting have been discussed identifying possible dates for the 1st Panel meeting.

Web Meeting on “Use Cases” 19/02/2016

A web-meeting devoted to filing the “Use Case Template” has been held on 19. 02.2016 with participation of the WP1 leader, Coordinator and Challenges representatives.

1st Web Meeting on “Literature Survey Report” 13/04/2016

The aim of the meeting was to discuss the content of the Black Sea Checkpoint Literature Survey report and to assign the responsible people for each Chapter of the document.

2nd Web Meeting on “Literature Survey Report” 05/05/2016

The aim of the meeting was to discuss the final version of the Black Sea Checkpoint Literature Survey report before its submission to EASME for evaluation.

Meeting Participation

The Black Sea Checkpoint coordinator and partners took part in the following meetings:

- 6th EMODnet Steering Committee Meeting (21-22 June 2016, Brussels, Belgium: The aim of the meeting was to discuss progress, improve coherence of various activities, increase collaboration and guide the development of the Central EMODnet portal.