GROWTH AND INNOVATION IN OCEAN ECONOMY GAPS AND PRIORITIES IN SEA BASIN OBSERVATION AND DATA

THE MEDITERRANEAN SEA

D12.2.4 Six-monthly Progress Report (04/06/2015– 03/12/2015)

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Workpackage	**12**	Project Management
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03/12/2015	S.Simoncelli	First draft preparation with the inclusion of contributions from all challenges.	V1	draft
20/12/2015	N.Pinardi	Corrections to the initial version to be sent to partners for revisions	V2	draft
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30/12/2015	G. Galanis, S. Reizopoulou, S.Simoncelli	upgrade of CH1 and CH2 section.	V4	draft
30/12/2015	C. Panaroni	Last check	V5	Completed

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Executive Summary

During the fourth six months of the Project the main efforts were dedicated to:

1) the definition and the production of the targeted products by the seven challenges;
2) the development of the methodology for the collection of harmonized information on fitness for use of upstream data and enabling the building of fitness for use indicators;
3) a review of appropriateness quality elements;
4) the upgrade of the input metadatabase in order to include all input data sets for the targeted products and the availability elements.

The methodology for the fitness for use evaluation advanced in parallel to the production of the targeted products. It is based upon the definition of the expected Data Product Specification (DPS) and the actual Targeted Product Description (TPD). By comparing the expected and the realized products specifications it will be possible to extract the next DAR fitness for use indicators.

All the Challenges contributed very actively to the production of the targeted products, using the selected upstream datasets and upgraded the input Metadatabase on SEXTANT.

In conclusion, the project has shown to be capable to follow the major milestones and deliverables as expected from the tender and no major changes are foreseen for the next six months on the work plan schedule.

1. WP1: Literature Review (IFREMER)

This Workpackage was completed at month 10 (September 23, 2014) of the first year and the past reports have documented the development.

2. WP2 Challenge 1: Windfarm siting (NKUA)

The primary aim of the wind farm siting challenge is to assess whether the data currently available across the Mediterranean Sea are appropriate in undertaking the preliminary assessment required to identify potential new farm sites. It is important to consider a variety of factors used for wind farm siting even if one of those factors make the site unsuitable for the development.
The final relevant characteristics that will be also inserted in the Sextant Metadatabase are:

Table 2.1: Characteristics for Challenge 1

1. Zonal wind component 2. Meridional wind component 3. Air pressure 4. Air density 5. Specifid humidity of the atmosphere 6. Air temperature 7. Water temperature 8. Water salinity 9. Water zonal velocity component 10. Water meridional velocity component 11. Dimensional wave height model output 12. Significant wave height model output 13. Mean wave direction model output 14. Mean (energy) wave period model output 15. Peak wave period model output 16. Swell wave height odel output 17. Maximum expected wave height model output	18. Birds: species 19. Birds: abundance 20. Birds: migratory patterns 21. Birds: reproduction area 22. Marine mammals: species 23. Marie mammals: size 24. Marine mammals: migratory routes 25. Fishes: species 26. Fishes: abundance 27. Fishes: reproduction area 28. Bathymetry 29. Description of lithology of sediment by visual estimation 30. Biotopes and habitats 31. Physical Habitat 32. Seabed obstructions (wrecks) 33. Protected Marine Areas 34. Maritime trafic routes – shipping lines (concentration) 35. Cable and transmarine pipeline 36. Military activities: exercice area 37. Distance from grid/ supply chain 38. Fishing

The parameters 1-7 and 11-17 are covered by utilizing a 10-year (2001-2010) wind-wave database developed by the Atmospheric Modeling and Weather Forecasting Group of the University of Athens based on the outputs of the FP7 MARINA Platform project (http://www.marina-platform.info/).
The parameters 17- 43 had to be collected to contribute to the data adequacy analysis and their description had to be inserted into the Sextant catalogue, the **metadatabase**.
A broad range of datasets has been identified, downloaded where possible and reviewed for the challenge. The data was sourced primarily through online resources including:

- National and Kapodistrian University of Athens, Department of Physics, Atmospheric Modeling and Weather Forecasting group
- Agence des Aires Marines Protegees
- SHOM
- GEBCO

The discoverability and the accessibility of the data, format and usability vary a lot. Concerning the format, since wind farm site selection is based on spatial analysis, a shape file GIS is a preferably used format.

In parallel 3 targeted products have been defined as outputs of this challenge:

1. **Root component MEDSEA_CH1_product_1:**
   Title: Wind and wave data set (subsample of a larger dataset from MARINA project produced for EMODNET);
2. **Root component MEDSEA_CH1_product_2:**
   Title: Suitability index of a wind farm in the NWMed concerning the environmental resources;
3. **Root component MEDSEA_CH1_product_3:**
   Title: Suitability index of a wind farm in the NWMed concerning the environmental resources, the natural barriers, human activities, MPA and fisheries.

For those 3 products, Data Product Specification (DPS) and Targeted Product Description (TPD) tables have been fulfilled in consistency with the quality data assessment. DPS and TPD tables will be updated according with the new guidelines for DAR2 compilation.

Methodology to construct MEDSEA_CH1_product_1

A specific database, related to the area of interest, encompassing the borders between Spain and France and France and Italy in the North-Western Mediterranean, has been extracted from the larger database of the MARINA project, which covers a time period of 10 years (2001 – 2010) with hourly data. It consists of the 1-6 atmospheric characteristics and the 11-17 wave characteristics listed in Table 2.1. The atmospheric characteristics are available at different vertical levels (10, 40, 80, 120 and 180m). The data have been produced from the atmospheric modelling system SKIRON (*Kallos G. et al 1997, Spyrou C. et al, 2010*) and the 3rd generation spectral model WAM (*Bidlot et al., 2002, Komen G. et al, 1994, WAMDI Group, 1988*) and CY33R1 (*ECMWF*) have been utilized. The two models configurations are presented in Figures 2.1 and 2.2.

SKIRON

Horizontal Resolution 0.05° x 0.05°

Time-step 15 seconds

45 vertical levels up to 50 hPa

Initial and boundary conditions:

High-resolution reanalysis (15 x 15 Km)

Output at: {10, 40, 80, 120, 180} m a.s.l.

Full set of meteorological variables

Figure 2.1- The set up and the domains of the atmospheric model Skiron

WAM

Domain (20–75°N, 50°W–30°E)

Resolution: 0.05° x 0.05°

Number of frequencies: 25

Minimum frequency: 0.055 Hz

Number of directions: 24

Grid points: 1601 x 1101

Spectral output at selected locations

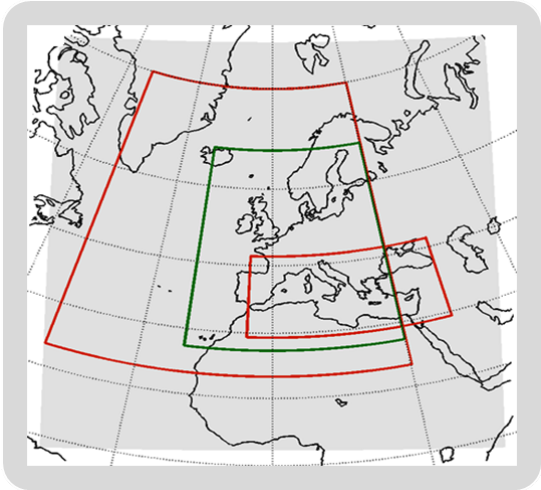

Figure 1.2 - The set up and the domains of the wave model WAM

It is important to note that the modeling system has been operated in a re-analysis mode, exploiting the advantages of data assimilation procedure, using the available observations in this area (satellite records, meteorological observations, ship reports). By this way, an optimum representation of the characteristics and an accurate wave climatology map of the area could be produced.

Methodology to construct MEDSEA_CH1_product_2 and MEDSEA_CH1_product_3

The objective of the two products is to show indices to assess whether or not a site is suitable for a wind farm. We used the HR Wallingford approach which classifies data by their level of suitability, ranging from a grade 5 for exclusion zones, to a grade 1 for areas deemed appropriate for wind farm development.

For the MEDSEA_CH1_product_2 the categorization is depicted in Table 2.2 based upon different studies (*Crill et al., 2010; Baban and Parry; 2001; Tegou et al. 2010; NYSERDA 2009 and NREL 2010).* For this suitability index, the wind speed and direction mean values as well as the associated variability were used at two different levels: 10 and 80m that are usually of interest for wind farm developing. The MEDSEA_CH1_product_2 targeted product contains the suitability index based only on natural resources.

The MEDSEA_CH1_product_3 targeted product will instead use a multivariate index taking into consideration the following parameters:

1) Water depth range: bathymetry was recalculated on the reference grid and classified according 5 depth classes i.e. sea depth: 0-25m, 25-60m, 60-200m, 200-500m, greater than 500m
2) Distance from shore: 4 categories of distances were calculated from shoreline on the reference grid (0-50km, 50-100km, 100-150km, 150-200km)
3) Marine Protected Areas;
4) Seabed characterization;
5) Traffic density;
6) Resources (?)

The information concerning the Resources has been integrated in the suitability index presented in Table 2.2 bellow. Analogously Table 2.3 presents the suitability index concerning the natural or

anthropogenic constrains. The two indexes have been merged – based on a "worst case scenario" approach leading to the MEDSEA_CH1_product_3 targeted product providing a description of the site availability (Table 2.4).

Tab. 2.2 Site suitability index based on the resources only

Mean wind speed (m/s)	Wind speed index of variation	Category	Site availability
0 - 3	-	5	Very low
3 - 3.25	>70%	5	Very low
3 - 3.25	<70%	4	Low
3.25 - 5	-	4	Low
5 - 5.25	>70%	4	Low
5 - 5.25	<70%	3	Medium
5.25 - 7	-	3	Medium
7 - 7.25	>70%	3	Medium
7 - 7.25	<70%	2	High
7.25 - 9	-	2	High
9 - 9.25	>70%	2	High
9 - 9.25	<70%	1	Very High
9.25 - …	-	1	Very High

Tab. 2.3 Site suitability index based on the constrains

Site availability	Water depth range (m)	Distance of shore (km)	Marine protected areas	Seabed
Very low	>500	>200 or <25	Included in the Natura 2000 that are Habitats and Birds Directive	Protected Seagrass: posidonia oceanica
Low	200-500	150-200		Coral presence, Hard substrate, Rock fragment, Seagrass
Medium	60-200	100-150		Silt, clay
High	25-60	50-100		Mud, gravelly sediment
Very high	0-25	25-50	-	Sand, Sediment

Tab. 2.4 Site availability category.

Site availability	Category	Symbol	Description

Very low	5		The presence of a variable makes the area unsuitable for wind farm development
Low	4		The proximity to a suitable receptor or marine activity is adversely affected by the new wind farm or may put the wind farm at risk
Medium	3		The marine activity or sensitive receptor may be adversely affected by the installation and presence of a wind farm although the site may be suitable for development
High	2		The site is suitable for development and there are only minor adverse impacts anticipated on the sensitive receptor or marine activity
Very high	1		The site is suitable for development and there are no adverse impacts anticipated on the sensitive receptor or marine activity

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3. WP3 Challenge 2: Marine Protected Areas (HCMR)

During the reporting period challenge 2 focused on the following tasks:

- Identification and description of the challenge targeted products
- Production of the targeted products
- Specification of targeted product descriptors: Creation of Data Product Specification (DPS) and Targeted Product Description (TPD) tables
- Correction of the Metadatabase for the input data sets.

In the tender No MARE/2012/11, the objectives of challenge 2 are:

- to analyze the existing European network of Marine Protected Areas (MPA), national and international sites
- to determine whether the network constitute a representative and coherent network as described in article 13 of the Marine Strategy Framework Directive (MSFD).

According to Article 13 of MSFD, spatial protection at EU level should be addressed to coherent and representative MPA networks that adequately cover the diversity of species and habitats and ecosystems. In order to establish representative and ecological coherent networks the MPAs should adequately cover the diversity of the constituent ecosystems, together with the existing MPAs designated under the Natura 2000, the Regional Sea Conventions or under national initiatives.

Identification and description of the challenge targeted products

A WebEx meeting was held to facilitate the description of products and six products were defined:

MEDSEA_CH2_product_1: Data set (excel file) containing information on the existing protected areas in the Mediterranean, such as the name of the protected area, country, legal status, year of establishment, protection initiative (Natura 2000, SPAMI, IBA, etc), IUCN category, management body, marine area (km2), zoning, special protection targets, etc. The dataset will be made available as a downloadable excel sheet from the CheckPoint GIS.

MEDSEA_CH2_product_2: Shape file with the above layers containing the information of MEDSEA_CH2_product-1

MEDSEA_CH2_product_3: In order to assess the connectivity oceanographic data will be overlaid on the MEDSEA_CH2_product-1. A shape file map was created combining data MPAs distribution and seasonal climatologies of temperature and currents. Connectivity will be shown considering the main current paths in the Mediterranean.

MEDSEA_CH2_product_4: Shape (map) combination of bathymetry, MPAs location distribution, extent, priority species distribution (seagrass, coralligenous etc), euphotic zone, and other information collected in order to estimate the representativity of the MPAs network. The proposed areas of MPAs designation will be also taken into account (e.g. RAC/SPA proposed MPAs)

MEDSEA_CH2_product_5: In collaboration with CLS compilation on ARGOS Metadata concerning the number of individuals tracked of different groups of animals (i.e. marine mammals, birds, fish) in the Mediterranean.

MEDSEA_CH2_product_6: Shape file combination of MPAs and biodiversity monitoring stations in order to assess the efficiency of monitoring in MPAs in the Mediterranean.

Figures 3.1 and 3.2 provide examples of targeted products MEDSEA_CH2_product-3 and MEDSEA_CH2_product-6.

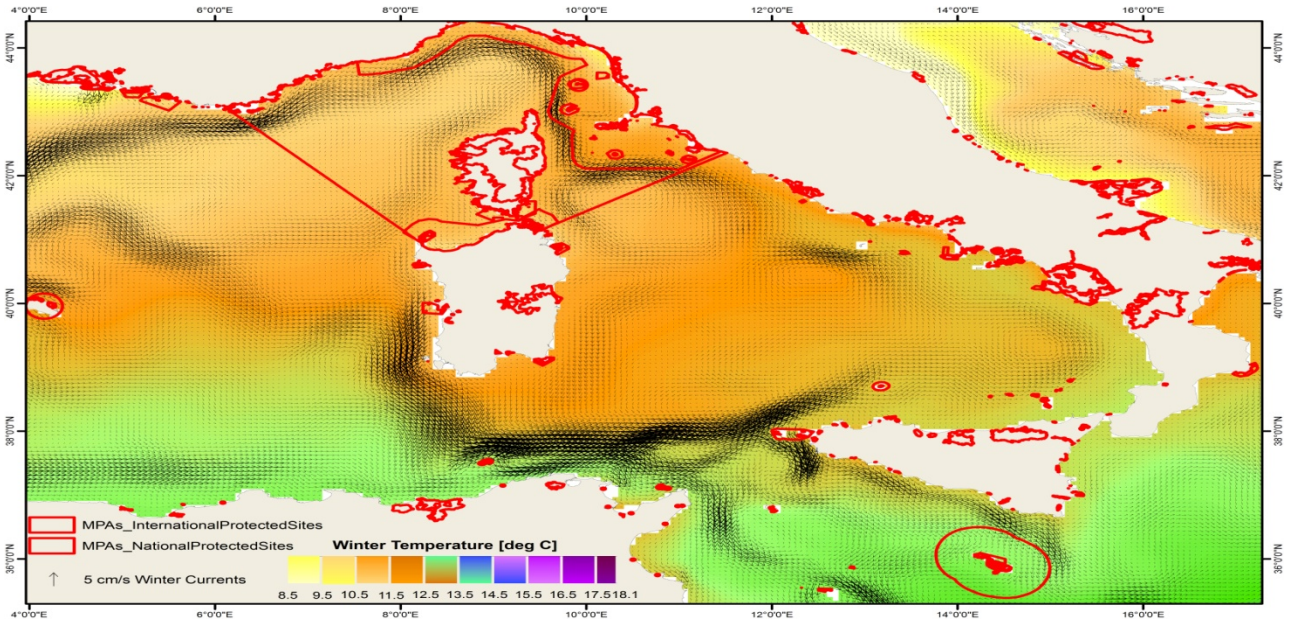

Figure 3.1 Example from MEDSEA_CH2_product-3: Winter data on currents and temperature for a part of the Mediterranean

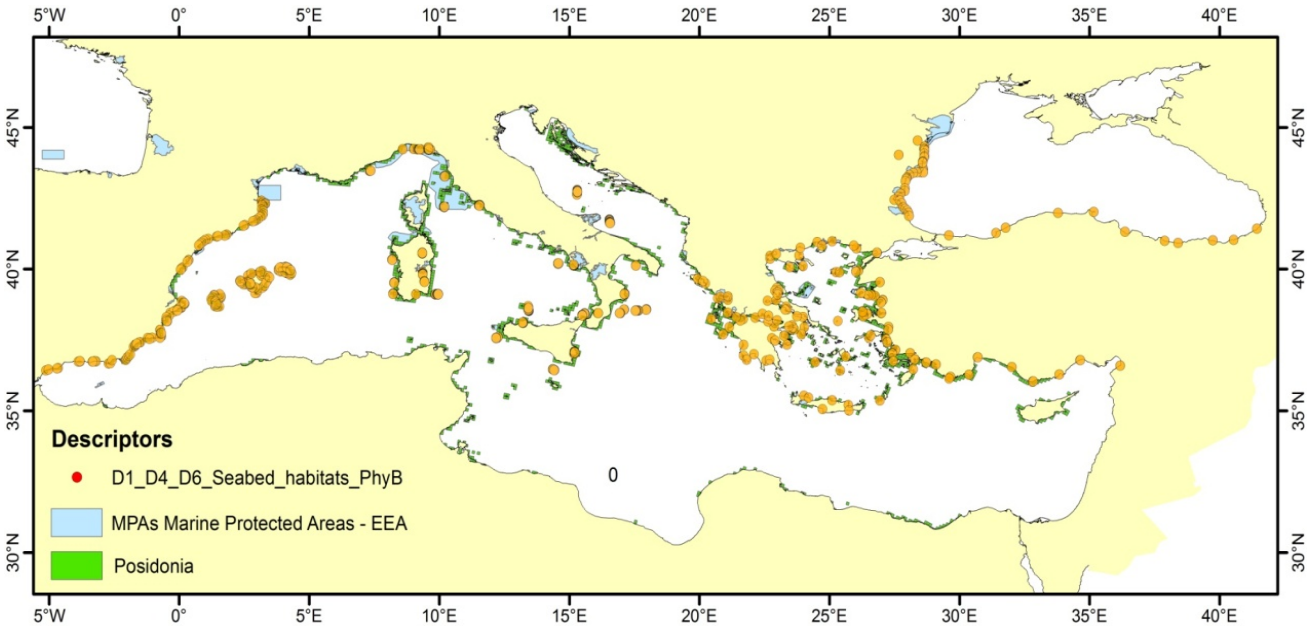

Figure 3.2 Example from MEDSEA_CH2_product-6 : Monitoring efficiency in key Mediterranean habitats, i.e. *Posidonia oceanica* meadows

Meta-database corrections

For Challenge 2, 75 characteristics have been uploaded into Sextant.

4. WP4 Challenge 3: Oil platform leak (INGV)

Challenge 3 contributed to the validation of the Metadatabase for the input data sets required by the CheckPoint Catalogue. This Challenge input information contributed to the evaluation of all the elements of the "availability" assessment criteria in the first DAR. The targeted product for this Challenge has been activated after the first six months and consists of an Oil Platform Leak Bulletin (http://www.emodnet-mediterranean.eu/emodnet-wp4-oil-platform-leak-bulletin/).

Challenge 3 contributed to the Data Product Specification (DPS) and Targeted Product Description (TPD) definitions, in order to select all the necessary metadata descriptors and be able to produce the appropriateness indicators for the next DAR. The fitness for use assessment will be made thanks to the comparison of the expected product specifications with the quality of the derived product from the selected input data.

This work needed the preparation of DPS and TPD template files to be filled from the other partners and the production of an example case for the CH3 targeted product, the OPL Bulletin to be inserted in the user guide document.

The challenge targeted products have been classified as it follows:

Root_component_MEDSEA_CH3_product_1
Title: 24hr EMODnet Oil spill Bulletin

Root_component MEDSEA_CH3_product_2
Title: 72hr EMODnet Oil spill Bulletin

5. WP5 Challenge 4: Climate and Coastal Protection (SOCIB)

During the last six months Challenge 4 has been focused on the targeted products compilation, revision and editing in order to obtain the spatial layers, time series and time plots that integrate the final products.

One of the main problems that arose early in September was a discrepancy between satellite and in situ derived sea level targeted products. In that way, challenge partners have been dealing with this revision until early December and the definition of Sea Internal Energy that according to literature have been addressed as Heat Content.

Our targeted products are given in 4 different forms: spatial layers related to a specific variable (i.e. surface sea temperature trend) (Fig. 5.1), the representation of this variable related to terrestrial administrative units (this subproduct was thought for managers and policy makers) (Fig. 5.2), and finally time series and time plots (Fig. 5.3).

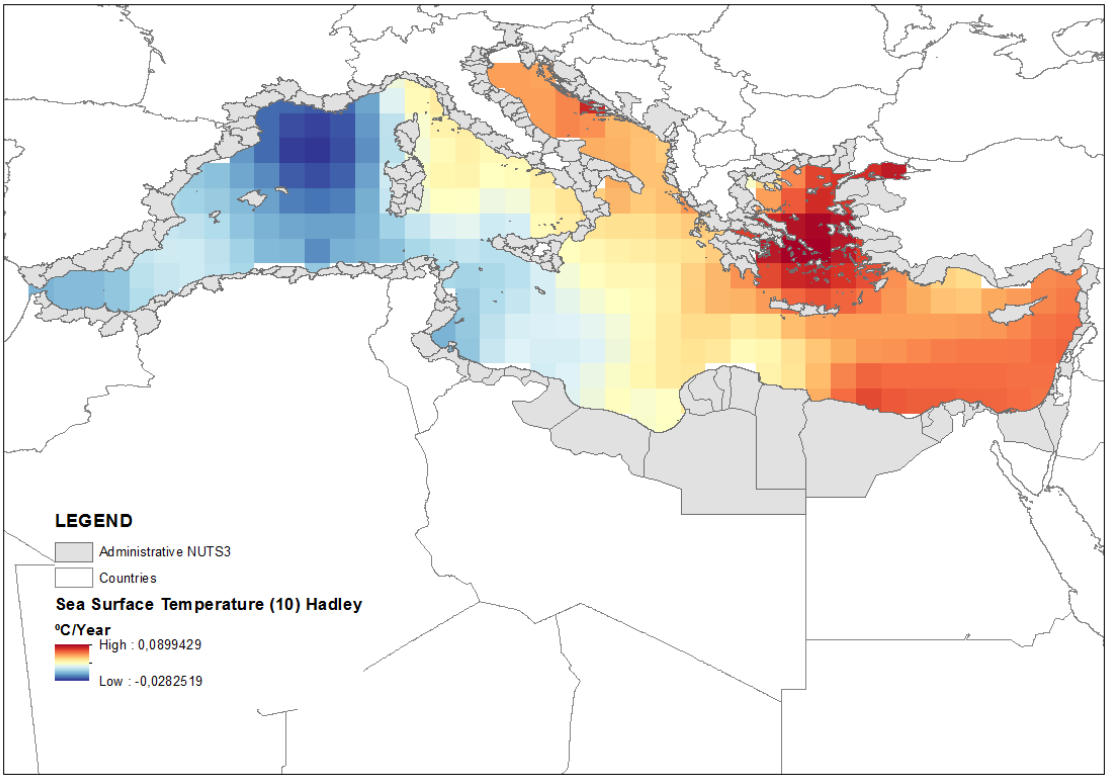

Figure 5.1 Sea surface temperature trend for the last 10 years from HadISS

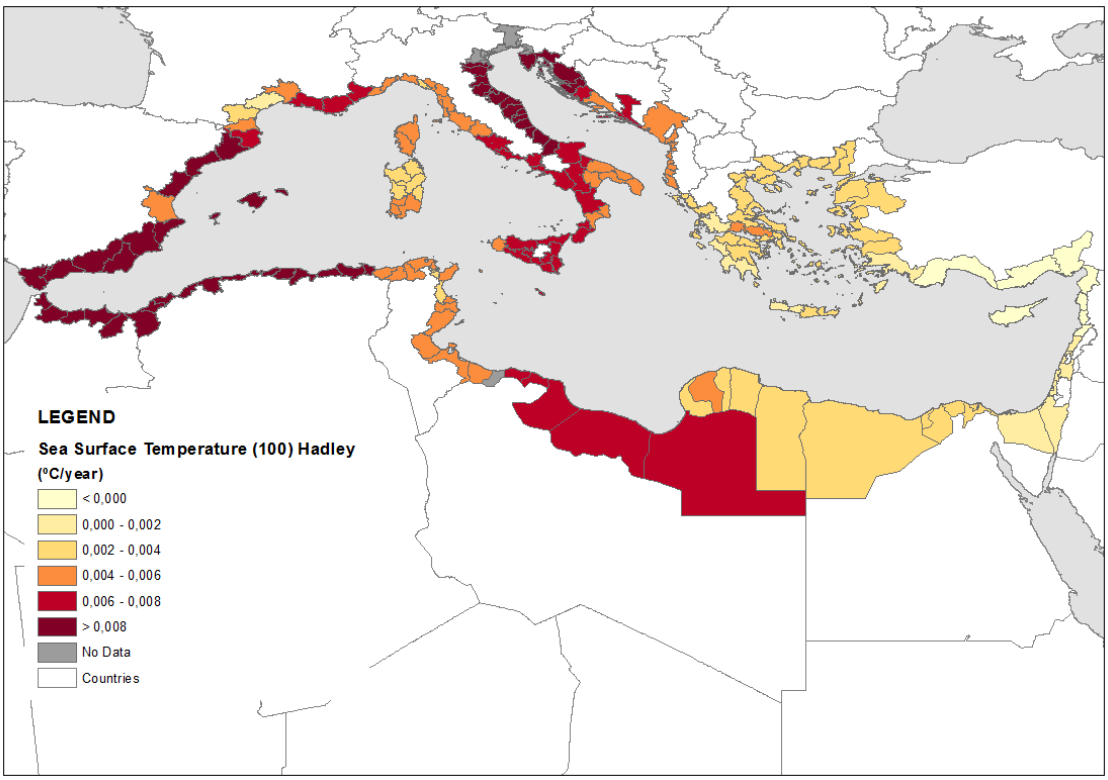

Figure 5.2 Sea surface temperature trend for the last 100 years from HadISST assigned to NUTS3 region coastal waters influence.

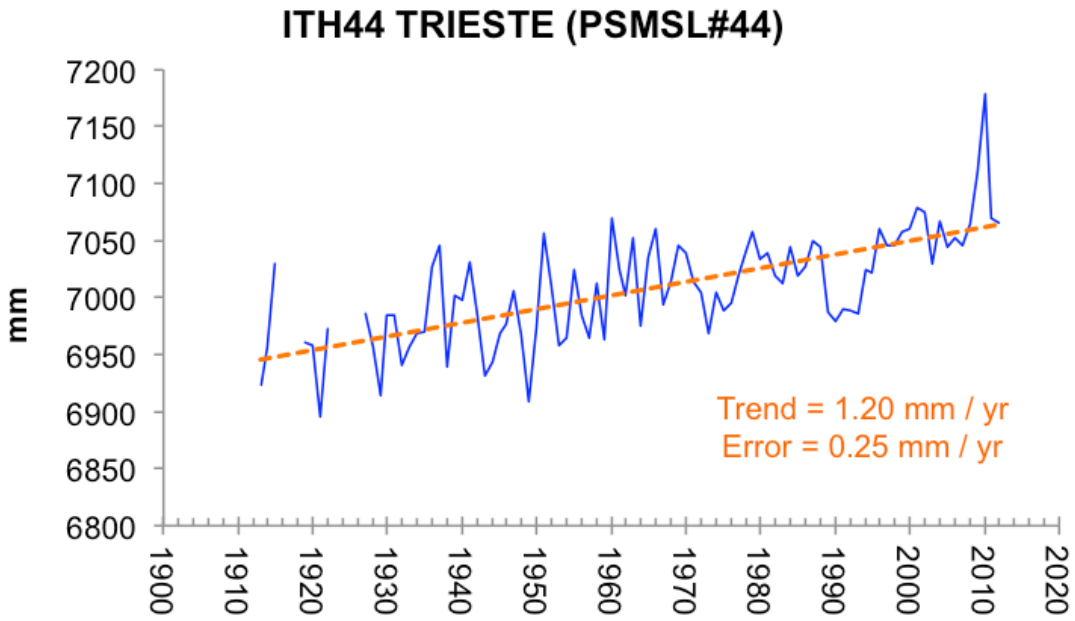

Figure 5.3 Sea level trend at Trieste from tide-gauges.

Additionally we have been addressing the final list of products following the indications presented in October at the 2nd Annual Meeting in Brussels. We have elaborated a first list of products according to the initial partners inputs, which has been carefully revised during a specific meeting

in Palma (November 2015). The number of products reduced and they were organized in order to achieve internal coherence as follows:

Root component MEDSEA_CH4_Product_1

Title: Sea Temperature Trend from HadISST

Child component MEDSEA_CH_4_Product_1_1 → 10yrs basin trend at the surface

Child component MEDSEA_CH_4_Product_1_2 → 50yrs basin trend at the surface

Child component MEDSEA_CH_4_Product_1_3 → 100yrs basin trend at the surface

Child component MEDSEA_CH_4_Product_1_4 → 10yrs NUTS3 trend at the surface

Child component MEDSEA_CH_4_Product_1_5 → 50yrs NUTS3 trend at the surface

Child component MEDSEA_CH_4_Product_1_6 → 100yrs NUTS3 trend at the surface

Root component MEDSEA_CH4_Product_2

Title: Sea Temperature Trend from Reconstruction

Child component MEDSEA_CH_4_Product_2_1 → 10yrs basin trend at mid-water

Child component MEDSEA_CH_4_Product_2_2 → 10yrs basin trend at the sea bottom

Child component MEDSEA_CH_4_Product_2_3 → 10yrs NUTS3 trend at the sea bottom

Root component MEDSEA_CH4_Product_3

Title: Sea Internal Energy Trend from Reanalysis (now HEAT CONTENT BUT check the meaning of internal energy)

Child component MEDSEA_CH_4_Product_3_1 → 20yrs basin trend at the surface

Child component MEDSEA_CH_4_Product_3_2 → 20yrs NUTS3 trend at the surface

Root component MEDSEA_CH4_Product_4

Title: Sea Level Trend from Reconstruction

Child component MEDSEA_CH_4_Product_4_1 → 50yrs basin trend

Child component MEDSEA_CH_4_Product_4_2 → 100yrs basin trend

Child component MEDSEA_CH_4_Product_4_3 → 50yrs NUTS3 trend

Child component MEDSEA_CH_4_Product_4_4 → 100yrs NUTS3 trend

Root component MEDSEA_CH4_Product_5

Title: Sea Level Trend from satellite

Child component MEDSEA_CH_4_Product_5_1 → 10yrs basin trend

Child component MEDSEA_CH_4_Product_5_2 → 10yrs NUTS3 trend

Root component MEDSEA_CH4_Product_6

Title: Sea Level Trend from Low Temporal Resolution Tide-Gauges

Child component MEDSEA_CH_4_Product_6_1 → 10yrs location trend
Child component MEDSEA_CH_4_Product_6_2 → 50yrs location trend
Child component MEDSEA_CH_4_Product_6_3 → 100yrs location trend
Child component MEDSEA_CH_4_Product_6_4 → 10yrs NUTS trend
Child component MEDSEA_CH_4_Product_6_5 → 50yrs NUTS3 trend
Child component MEDSEA_CH_4_Product_6_6 → 100yrs NUTS3 trend

Root component MEDSEA_CH4_Product_7
Title: Sediment Mass Balance from Survey

Root component MEDSEA_CH4_Product_8
Title: Annual Average Sea Temperature from reconstruction
Child component MEDSEA_CH_4_Product_8_1 → 50yrs basin average at the surface
Child component MEDSEA_CH_4_Product_8_2 → 100yrs basin average at the surface
Child component MEDSEA_CH_4_Product_8_3 → 50yrs NUTS3 average at the surface
Child component MEDSEA_CH_4_Product_8_4 → 100yrs NUTS3 average at the surface

Root component MEDSEA_CH4_Product_9
Title: Annual Average Sea Temperature from HadISST
Child component MEDSEA_CH_4_Product_9_1 → 10yrs basin average at the surface
Child component MEDSEA_CH_4_Product_9_2 → 10yrs basin average at mid-water
Child component MEDSEA_CH_4_Product_9_3 → 10yrs basin average at the sea-bottom
Child component MEDSEA_CH_4_Product_9_4 → 10yrs NUTS3 average at the surface
Child component MEDSEA_CH_4_Product_9_5 → 10yrs NUTS3 average at the sea-bottom

Root component MEDSEA_CH4_Product_10
Title: Annual Average Internal Energy from Models
Child component MEDSEA_CH_4_Product_10_1 → 20yrs basin annual average of internal energy
Child component MEDSEA_CH_4_Product_10_1 → 20yrs NUTS3 annual average of internal energy

Root component MEDSEA_CH4_Product_11
Title: Annual Average Sea Level from Reconstruction
Child component MEDSEA_CH_4_Product_11_1 → 50yrs basin average
Child component MEDSEA_CH_4_Product_11_2 → 100yrs basin average
Child component MEDSEA_CH_4_Product_11_3 → 50yrs NUTS3 average
Child component MEDSEA_CH_4_Product_11_4 → 100yrs NUTS3 average

Root component MEDSEA_CH4_Product_12

Title: Annual Average Sea Level from Low Temporal Resolution Tide Gauges
Child component MEDSEA_CH_4_Product_12_1 → 10yrs NUTS3 average
Child component MEDSEA_CH_4_Product_12_2 → 50yrs NUTS3 average
Child component MEDSEA_CH_4_Product_12_3 → 100yrs NUTS3 average

Root component MEDSEA_CH4_Product_13
Title: Annual Average Sea Level from Satellite
Child component MEDSEA_CH_4_Product_13_1 → 10yrs basin average
Child component MEDSEA_CH_4_Product_13_2 → 10yrs NUTS3 average

6. WP6 Challenge 5: Fishery Management (CNR-ISMAR)

During the third six months of the project this challenge has been collecting information and characterizing upstream data related to fishery catches (Task 1) and fishery (trawling) impact on the sea floor (Task 2).
The main efforts have been devoted to the standardization of the available information related to the two tasks and description of use cases related to fishery catches and fishery impact characteristics.
In the framework of Task 1 synoptic tables with FishStat FAO data, DCF data available from JRC and from ICCAT database have been produced. Moreover, a specific data call has been lunched by DGMARE in order to collect information to compile data products as specified by the present Tender in the framework of Challenge 5 for the countries involved in the data collection framework. Such data were not present in the datasets provided by JRC.
In the framework of Task 2 we defined the methodology to assess the available data coming from different sources (VMS, AIS, etc.). Specific requests of VMS maps have been sent to DCF national correspondent of the European countries using VMS data for fishery control.
Additionally, a workshop with officers of Maltese Ministry for Resources and Rural Affairs has been organized in CNR-ISMAR Ancona to describe them the methodology to analyse VMS data.
AIS data with 5 minutes resolution for the years 2012-2013-2014 relative to fishing vessels operating in the Mediterranean Sea have been purchased from Astra Paging Ltd (www.astrapaging.com).

The challenge targeted products have been classified as it follows:
Root Component MEDSEA_CH5_Product_1
Title: Collated data set of fish landings by species and year, for mass and number
→excel files

Root Component MEDSEA_CH5_Product_2
Title: Collated data set of fish discards by species and year, for mass and number
→excel files

Root Component MEDSEA_CH5_Product_3
Title: Collated data set of fish bycatch by species and year, for mass and number
→excel files

Root Component MEDSEA_CH5_Product_4
Title: Impact of fisheries on the bottom from VMS data combined with habitat vulnerability
→ shape files per month

Root Component MEDSEA_CH5_Product_5
Title: Change level of disturbance from VMS data combined with habitat vulnerability
→ shape files per year

Root Component MEDSEA_CH5_Product_6

Title: Impact of fisheries on the bottom from AIS data combined with habitat vulnerability
→ shape files per month

Root Component MEDSEA_CH5_Product_7
Title: Change level of disturbance from AIS data combined with habitat vulnerability
→ shape files per year

Root Component MEDSEA_CH5_Product_8
Title: Impact of fisheries on the bottom from Data Logger combined with habitat vulnerability
→ shape files per month

7. WP7 Challenge 6: Marine Environment (OCEANS-CAT)

During this period, Oceans Catalonia International has been developing the products relative to the in-situ data (nitrate, phosphate) and to the eutrophication index (TRIX).
Seasonal averages have been computed for nutrient data corresponding to the decade 2002-2011. Trends have also been computed between the periods 1997-2001 and 2007-2011.
With regard to the eutrophication index TRIX, average maps have been prepared for the periods 1993-1997, 1998-2002 and 2008-2012 as well as trends between 1998-2002 and 2008-2012, and between 1993-1997 and 2008-2012.
An increasing trend in eutrophication is observed in the western Adriatic Sea and off the northern African coast, while decreasing trends are observed in the Levantine basin and in the Ionian and Aegean Seas.
All the data have been obtained from the databases EMODNet, NOAA, PERSEUS and MEDAR-MEDATLAS.

The challenge targeted products have been defined and classified as it follows:

Root component MEDSEA_CH6_Product_1
Title: Chlorophyll seasonal maps [mg/m^3]

Root component MEDSEA_CH6_Product_2
Title: Chlorophyll trends map [mg/m^3/year]

Root component MEDSEA_CH6_Product_3
Title: Average TRIX maps

Root component MEDSEA_CH6_Product_4
Title: Map of TRIX trend

8. WP8 Challenge 7: River Inputs (HCMR)

During these six months, challenge 7 has been focusing in the following tasks:

- Identification and description of the challenge targeted products;
- Specification of targeted product descriptors: Creation of Data Product Specifications (DPS) and Targeted Product Description (TPD) tables;
- Correction of the Metadatabase for the input data sets.

Identification and description of the challenge final output

According to the points that are specifically requested for the Mediterranean in the tender No MARE/2012/11, the outputs of challenge 7 are described below:

a) For each river bordering the sea basin, the country where it enters the sea and a time series of annual inputs from rivers of
   - water
   - sediment
   - total nitrogen
   - phosphates
   - eels

b) Produce monthly averages, maxima and minima for these parameters over the past ten years

A WebEx meeting was held, in order to facilitate the description of products and the corrections of metadatabase. During the WebEx, six products were defined, using three kinds of data for the creation of the required time series: in situ, satellite and model data:

MEDSEA_CH7_Product_1: Annual time series in an excel Table (to be inserted as attributes on a shape file later) for the **in situ stations** and all the four environmental characteristics required (water, nitrogen, phosphorous and sediment).
MEDSEA_CH7_Product_2: Annual time series in an excel Table (to be inserted as attributes on a shape file later) from **satellite data** for sediments only.
MEDSEA_CH7_Product_3: Annual time series in an excel Table from **model data** for all the four environmental characteristics required (water, nitrogen, phosphorous and sediment).
MEDSEA_CH7_Product_4: Monthly mean time series, minima and maxima in an excel Table (to be inserted as attributes on a shape file later) for the **in situ stations** and all the four environmental characteristics required (water, nitrogen, phosphorous and sediment).
MEDSEA_CH7_Product_5: Monthly mean time series, minima and maxima in an excel Table (to be inserted as attributes on a shape file later) from **satellite data** for sediments only.
MEDSEA_CH7_Product_6: Monthly mean time series, minima and maxima in an excel Table from **model data** for all the four environmental characteristics required (water, nitrogen, phosphorous and sediment).

The major Mediterranean rivers (Figure 8.1), which contribute to about half of the total discharge inputs into Mediterranean Sea, were initially investigated in order to put a sample of work on the

repository of the project. Based on the water runoff, it was decided to put a threshold of 20 m^3/s corresponding to 0.63072 km^3/y, in order to define the final number of the rivers under investigation.

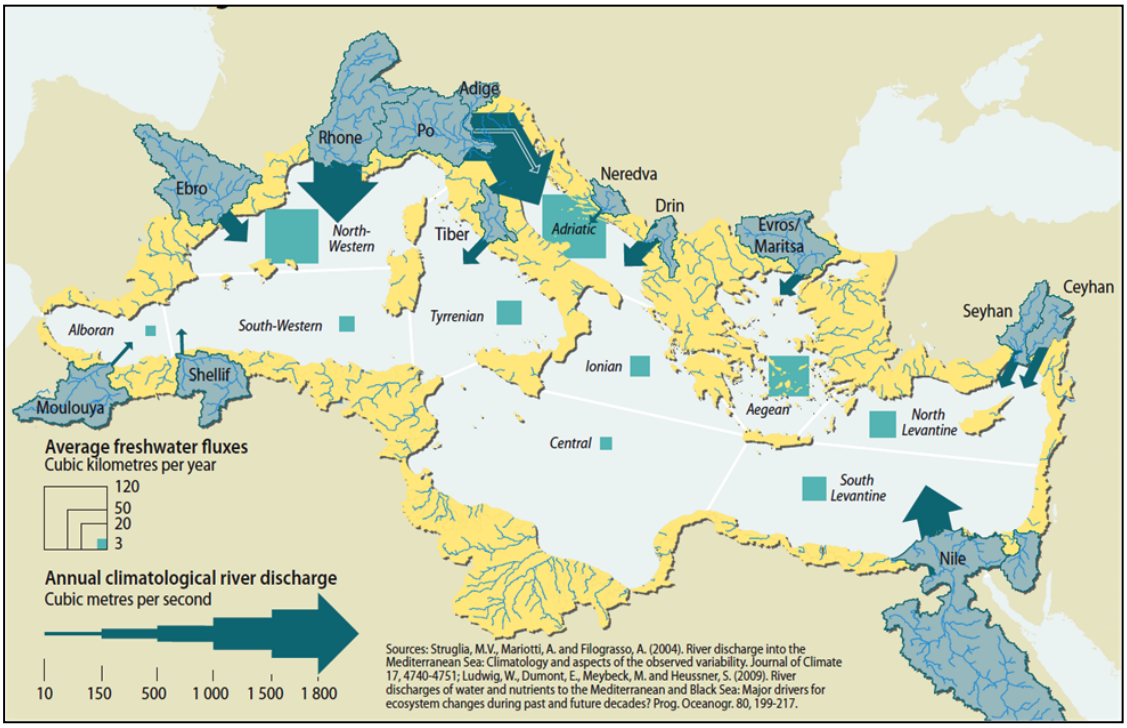

Figure 8.1 The major Mediterranean rivers

All targeted products have been delivered on the project repository.

DPS classification

The final Root and Component products of challenge 7 could be classified and described as it follows:

Root component MEDSEA_CH_7_Product_1
Title: Annual time series of Water Discharge (Q_w) [m^3/s]
Child component MEDSEA_CH_7_Product_1_1→ Annual time series of Q_w from in situ data
Child component MEDSEA_CH_7_Product_1_2→ Annual time series of Q_w from model data

Root component MEDSEA_CH_7_Product_2
Title: Monthly time series of Water Discharge (Q_w) [m^3/s]
Child component MEDSEA_CH_7_Product_2_1→ Monthly time series of Q_w from in situ data
Child component MEDSEA_CH_7_Product_2_2→ Monthly time series of Q_w from model data

Root component MEDSEA_CH_7_Product_3
Title: Annual time series of Total Suspended Matter (TSM) from satellite data [mg/l]

Root component MEDSEA_CH_7_Product_4
Title: Monthly time series of Total Suspended Matter (TSM) from satellite data [mg/l]

Root component MEDSEA_CH_7_Product_5

Title: Annual time series of Total Nitrogen [mg/l]
Child component MEDSEA_CH_7_Product_5_1→ Annual time series of Total Nitrogen from in situ data
Child component MEDSEA_CH_7_Product_5_2→ Annual time series of Total Nitrogen from model data

Root component MEDSEA_CH_7_Product_6
Title: Monthly time series of Total Nitrogen from model data [mg/l]

Root component MEDSEA_CH_7_Product_7
Title: Annual time series of Total Phosphorous [mg/l]
Child component MEDSEA_CH_7_Product_7_1→ Annual time series of Total Phosphorous from in situ data
Child component MEDSEA_CH_7_Product_7_2→ Annual time series of Total Phosphorous from model data

Root component MEDSEA_CH_7_Product_8
Title: Monthly time series of Total Phosphorous from model data [mg/l]

Root component MEDSEA_CH_7_Product_9
Title: Annual time series of Eels Production per country [tons]

The development of DPS and TPD tables for this challenge are in progress.

Meta-database corrections

Challenge 7 will not be dealing with the temperature characteristic, as it is not required from the tender. Therefore, all temperature data sets will be taken out. Furthermore, the Hypeweb Europe Time Series SMHI database should be added as the data source for the time series from model data for the discharge, total nitrogen and total phosphorous parameters.
Another important issue is that measurements on eels refer mainly to their production and not abundance. Therefore, the initial characteristic “eels abundance” will have to be converted to “eels production”, in Sextant Catalogue.

9. WP9: Web site development (CLS)

The activity during the last six months covered many activities:

- targeted products specification;
- maintenance of suite of tools (see Tab. 9.1 for a schematic of the main activities);
- high-level validation by SOCIB for usability (see Figure 9.1);
- adequacy and relevance
- review of the operations process and roles (see Figure 9.2).

The products specification and description were defined in order to produce the next quality assessment indicators on **appropriateness**. The principles adopted are guided by ISO 19131 standard for Data Product Specification (DPS). A metadata template has been produced and tested for challenge 3 sub-case for both DPS and Targeted Product Description (TPD). Some work on the DPS and TPD is still on going to allow generating the indicators from the targeted products taking into account also the input data selected.

Tab. 9.1 Maintenance of suite of tools.

Function deployed	Visibility of tools	Responsible	Change
Inventory of upstream data	Back-end system	Ifremer	• Development of a workflow to support metadata lifecycle; • Integration of new ISO 19115 version; • Specification of metadata registry to be coherent with DAR 1 outcomes;
Web Portal	Front-end and back-end system (web site to test and validate content & navigation before final publication)	CLU	• Review of web site contents from feedbacks from partners, review of English; • Review of look & feel to be better integrated in Emodnet family; • add of Emodnet social links; • Integration of checkpoint services (continuous); • Information and upload of deliverables (documents) (continuous); • Creation of an Extranet section to support checkpoint operations: Back-end tools and guides are available in this section;
Easy upstream data discovery & search for availability	Front-end system	CLU	• Add of title to "explain" checkpoint service; • Add tool in browser showing data coverage;

			• Sextant accessible now as a back-end service (checkpoint administration page)
Indicator dashboard (availability)	Front-end system	Ifremer	• Better performance; • Header hidden

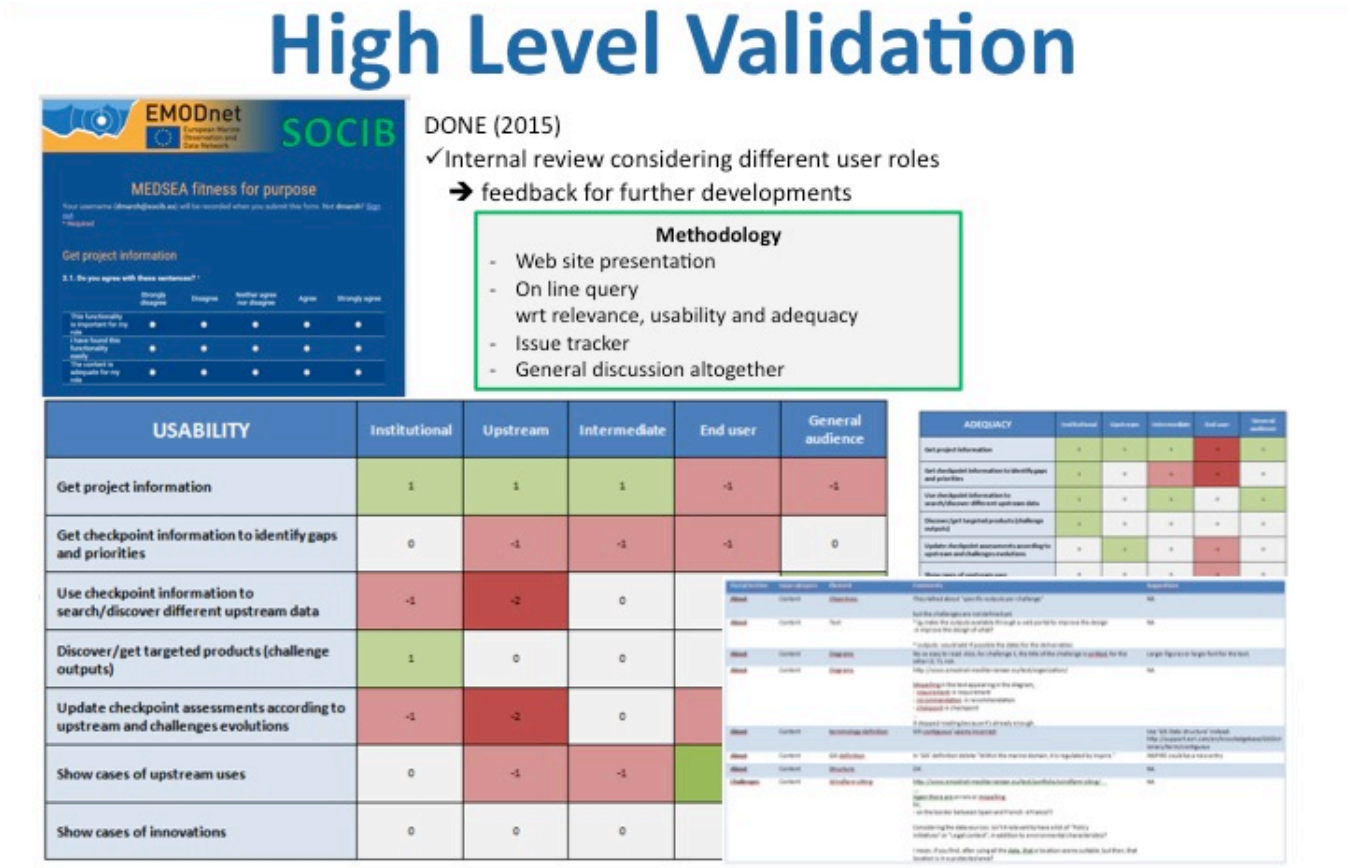

Figure 9.1 High level validation considering different user roles

The process for operations has been revised for clarifying roles and expectations (cf. Figure 9.2). The **role 1** is at the editor level, the **role 2** is a referent by challenge for workflow animation and first level of administration, the **role 3** is under Literature Survey and Data Adequacy reports responsibility to consolidate the information registered and sue for cross-thematic evaluation.

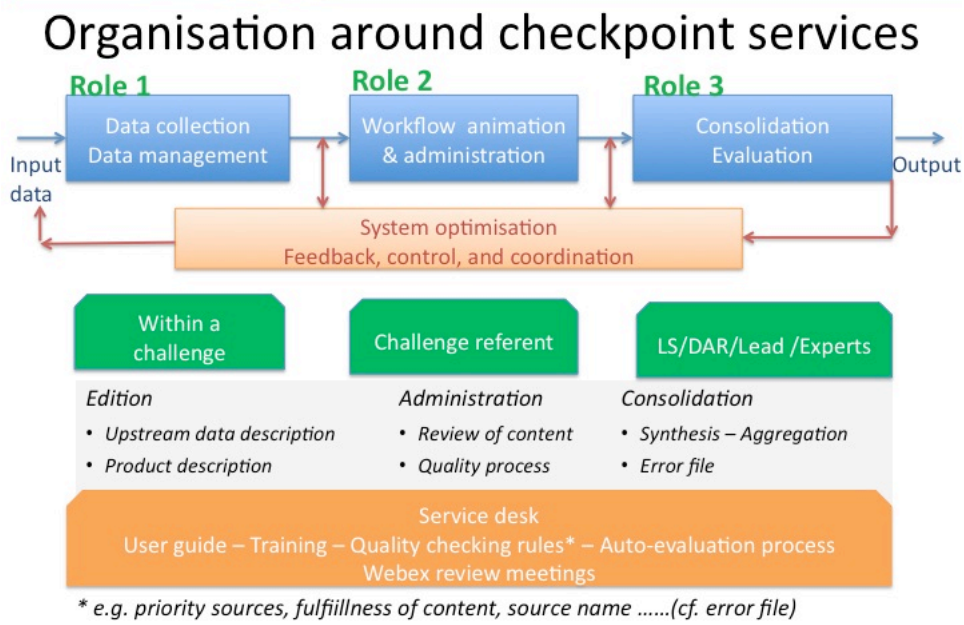

Figure 9.2 Checkpoint Operations

The first level service desk is supported by a second level, called community services as shown in the following table.

Service Desk	Community Services

• Contact: **front-end@** **back-end@**
• User management
• User support
• Administration page
• User guides
• User training
• Internal User meetings (webex per challenge)
• External user meeting (tutorial)
• Quality checking rules + List of problems
• Auto-evaluation process / query
• Feedback retrieval
• JIRA to follow up on actions
	• Operations
	  • CMS info
	  • Content monitoring
	  • Technical Maintenance
	  • Use monitoring (logs)
	• Hosting-Maintenance
	  • Project pages
	  • Metadatabase
	  • Indicators deft, algorithms & data
	  • Challenge data products

The monitoring of web site visitors (see Figure 9.3) has evidenced the leverage effect of the expert panel as well as the international network of Edmonet partners.

Figure 9.3 Monitoring of the web site visitors results.

10. WP10: Organization of Panels (INGV)

The e-newsletter n.3 (D10.2.3) was prepared and delivered on the website, while the e-newsletter n.4 (D10.3.4) is in preparation. Main topics of the new issue will be:

- Targeted products definition and generation;
- DPS (Data Product Specification) and TPD (Targeted Product Description);
- Web site and service upgrade.

None activity was dedicated to the next Panel Meeting organization, which will be one of the main activities in upcoming fifth period.

11. WP11: Data Adequacy Reports (INGV)

During the reporting period the WP11 was dedicated to the development of the methodology for the collection of harmonized information on fitness for use of upstream data and enabling the building of fitness for use indicators and report. In order to evaluate the adequacy of the input data used to build the targeted products we need three steps (see Figure 11.1):

I. to define the Data Product Specification (DPS) and its relationship to input data sets (reference or expected set of specifications);
II. to define the Targeted Product Description (TPD) and the specific data sets used (realized specification)
III. by comparing the expected and the realized specifications it will be possible to extract the next DAR fitness for use indicators.

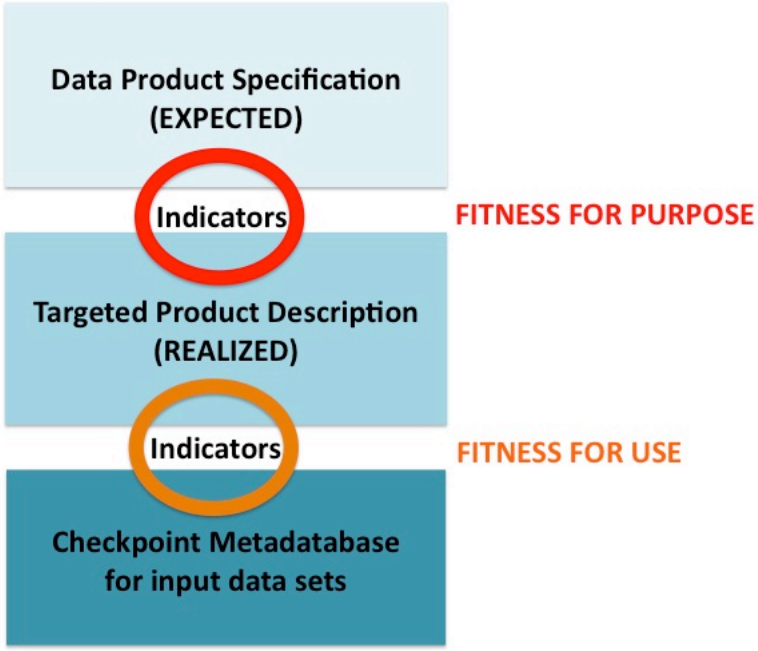

Figure 11.1 The information content of the complete Checkpoint Metadatabase and the processes.

In parallel it was done a review of the appropriateness quality elements to be assessed in the next DAR. The ISO quality elements selected and adapted for appropriateness evaluation are depicted in Figure 11.2.

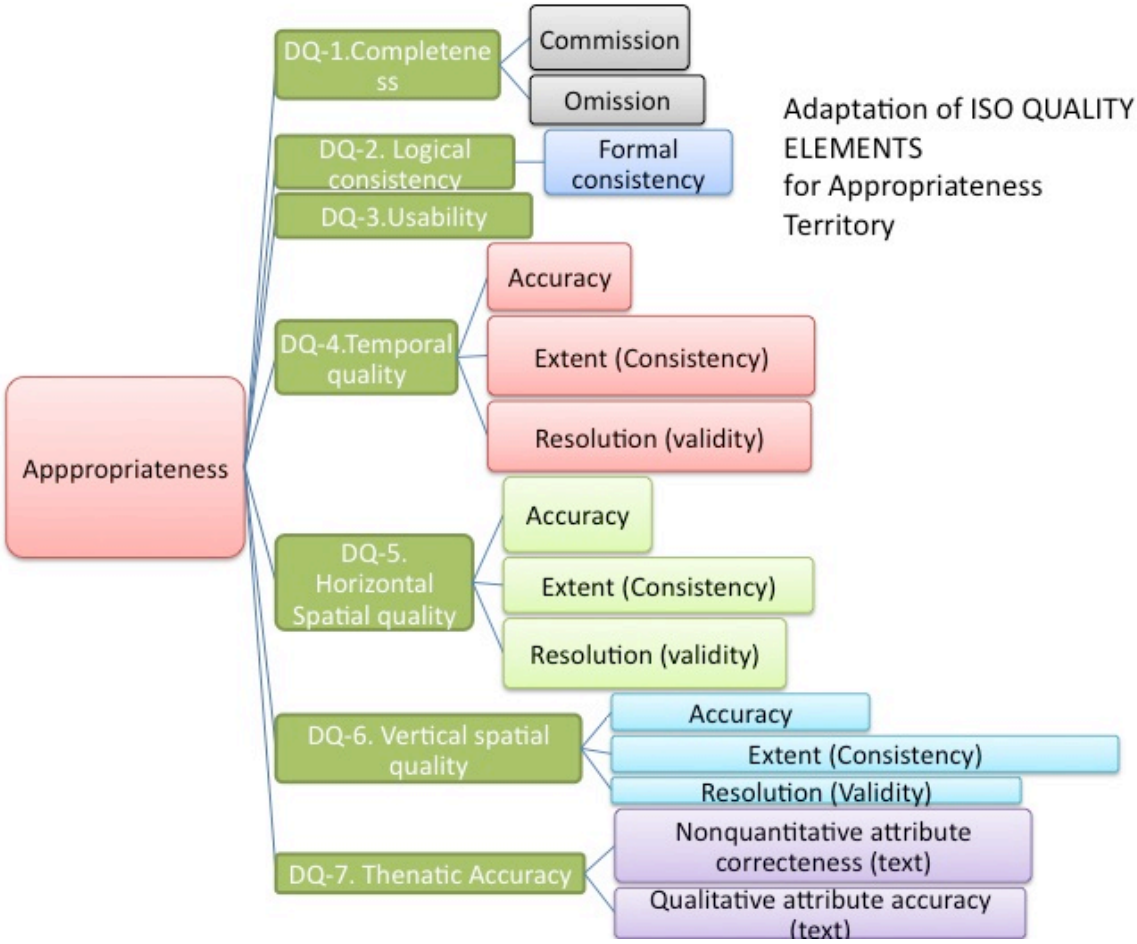

Figure 11.2 ISO quality elements selected and adapted for appropriateness evaluation.

Other collateral activities were dedicated to:

- the definition of the 7 challenges targeted products in collaboration with the WP2-WP8;
- the review of the input metadatabase in collaboration with the WP2-WP8;
- the upgrade of the input metadatabase in order to include all availability and appropriateness quality elements;
- the review of the produced targeted products;
- the preparation of template tables for DPS and TPD in order to retrieve the necessary information for the data adequacy evaluation;
- the preparation of a user guide for the partners to fill DPS and TPD tables.

These activities were done in collaboration with WP9.

During the 2nd Annual Meeting we decided to organize a splinter meeting at the next EGU general assembly 2016 (17-22 April) to promote the MedSea Checkpoint service and to submit a questionnaire survey on the user needs and to collect the results. The results of the survey will be

analyzed in D11.3 Report on questionnaire survey on user needs, due at M26 (3 Feb 2016) that we would postpone to M30 (June 2016).

12. WP12: Project management (INGV)

Project management continued uninterruptedly during the fourth six months of the project. Several Webex meetings were held between June and July 2015 having as topics of the discussion:

1) the definition of the list of targeted products for each challenge and the need to put the product samples in the project web repository;
2) the METADATABASE corrections.

It follows the list of webex meeting and participants per challenge:

WEBEX CH1 Windfarm Siting, June 17th, 2015
Participants: George Galanis, Platon Patlakas, (UOA), Simona Simoncelli, Nadia Pinardi, G.Manzella (INGV), E.Moussat (IFREMER).
WEBEX CH4 Climate and coastal protection, June 18th, 2015
Participants: Luis Gomez, Joan Vallespir (SOCIB), Vinca Rosmorduc (CLS), Fabio Raicich (CNR), Antonio Bonaduce, Rita Lecci (CMCC), Simona Simoncelli, Nadia Pinardi, G.Manzella (INGV)
WEBEX CH5 Fishery management, June 15th, 2015
Participants: Gianna Fabi (CNR), Giuseppe Scarcella (CNR), Simona Simoncelli, Nadia Pinardi, G.Manzella (INGV), E.Moussat (IFREMER), Vinca Rosmorduc (CLS)
WEBEX CH6 Marine Environment, July 3rd, 2015
Participants: Federico Falcini (CNR), Antonio Cruzado (OceanCAT), Simona Simoncelli, Nadia Pinardi, Giuseppe Manzella (INGV).
WEBEX CH7 River Inflow, July 3rd, 2015
Participants: Nik Skoul (HCMR) Dora Kouvarda (HCMR), Federico Falcini (CNR), Antonio Cruzado (OceanCAT), Simona Simoncelli, Nadia Pinardi, Giuseppe Manzella (INGV).
WEBEX CH2 MPA, July 8th, 2015
Participants: Chara Kyriakidou, Sofia Reizopoulou (HCMR), Simona Simoncelli, Nadia Pinardi, Giuseppe Manzella (INGV).
WEBEX CH3 Oil Platform Leaks, July 22nd, 2015
Participants: Nadia Pinardi, Simona Simoncelli, Diego Bruciaferri (INGV).

EMODnet coordinator participated to a Meeting in Paris on 23rd-24th June 2015
Participants: Nadia Pinardi, Eric Moussat, Giuseppe Manzella, Frederique Blanc
Topics: 1) overview of the challenge products status and links with Sextant; 2) discussion on products dissemination in the GIS; 3) how to connect products to the checkpoint descriptors and indicators; 4) the ISO-SeaData mapping and brainstorming for appropriateness indicators.

EMODnet scientific coordinator and manager participated to the **4th EMODnet Steering Committee Meeting** on 1st -2nd July 2015 at the Joint Research Centre (JRC), Via E. Fermi 2749, I-21027 Ispra (VA), Italy.

EMODnet scientific coordinator participated to the **New EMODnet Checkpoints Kick Off** (2nd-4th September 2015) HR Wallingford, Howbery Park, Wallingford, Oxfordshire, UK.

The **2nd MedSea Checkpoint Annual Meeting** was organized in Bruxelles from 5th to 7th October 2015 at EuroGOOS - AISBL Avenue Louise 231, 1050- Brussels Belgium.
The topics of the meeting were:

1. the presentation and discussion of the targeted products created by the challenges;
2. the Data Product Specification as targeted product requirements;
3. Metadata descriptors for targeted products;
4. appropriateness elements of input datasets;
5. Meta-database upgrade.

EMODnet scientific coordinator and manager participated to the **EMODnet Open Conference**: Consolidating the Foundations, Building the Future, 20 October 2015, De Grote Post, Oostende (Belgium).

EMODnet scientific coordinator and manager participated to the **EMODnet Info Day**, organized by OGS with the collaboration of INGV, Cogea and ETT, on 25th November in Rome, Viale Cristoforo Colombo 44.