CoCoNet Project
Collaborative project
Theme: OCEAN.2011-4
Grant agreement no: 287844

CoCoNet

Towards COast to Coast NETworks of marine protected areas (from the shore to the high and deep sea), coupled with sea-based wind energy potential.

WP10 Interim Progress Report

January 2012 - June 2013

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WP10 Participants: INCDM, IBSS NASU, IBER-BAS, METU, IU, OBIBSS, IO-BAS, USOF, UROS, NEA, SIO-RAS, GEOECOMAR, 3E, SNU-FF, NENUPHAR

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WP NUMBER AND NAME	WP10- Black Sea Pilot Project
WP LEADER	Dragos Micu (INCDM)
TYPE OF ACTIVITY	RTD
START MONTH	13

Objectives:

1. Acquisition of new geological, biological, oceanographic data in the Black Sea pilot area relevant for MPAs implementation;
2. Identification, within the pilot area, of key variables regarding connectivity (distance, size, strength and direction of currents, genetic connectivity, propagule supply) to be considered in the design of MPA network.
3. Definition of what is specific to the Black Sea and what can be generalised at larger scale within management plans in terms of connectivity processes.
4. Examination of the main natural and human driven causes of changes, potentially affecting the functioning and dynamics of the Pilot Areas ecosystems and description of potential implications for establishment of MPA networks.
5. Assessment of ecosystem vulnerability and implications for MPA network design and management in the Pilot area.
6. Evaluation of the impacts of offshore wind farm development on ocean circulation, wave action, bottom morphology and marine life near or within the pilot network of MPAs in the pilot area.
7. Identification of socio-economic impacts caused by offshore wind farm development within the network of MPAs
8. Transfer of the field data generated by WP10 to the WP9 Geodatabase, and to contribute via other WPs to the final synthesis

Significant results

During the first year of the COCONET project, the work within the WP10 was essentially focused on Task 1 (Multi scale mapping of geological, biological, oceanographic features characteristic for different habitats), with some activities also dedicated to tasks 2 (Mapping of physical and biochemical variables in the sea surface layer based on Remote Sensing), 3 (Sensitivity of the marine ecosystems in Pilot Area to natural and anthropogenic drivers. Implications for MPA networks), 4 (Ecosystem vulnerability and implications for MPA network design and management in the Black Sea), 5 (Site selection for OWF installation within the pilot project areas), 6 (Impacts of OWF development on wild-life in the selected sites), 7 (Socio-economic impacts from OWFs planning/siting within or near MPAs), as well as other activities which developed from close cooperation with WP 3 and WP 8.

WP 10 is generally progressing on time towards its objectives.

Significant results:

1. A new classification of marine habitats, integrating the Mediterranean and Black Sea (work in progress). Certain WP10 partners have already started to map and sample habitats.
2. Genetic sampling has started all around the Black Sea. It is already completed in Ukraine, due to the success of the first joint WP3-WP10 expeditions around the Black Sea. Help has been provided to WP11 for sampling certain species in 3 MPAs located around the Salento peninsula.
3. Work on D 10.3 "Report on field measurements of currents" was started ahead of schedule (Vladimir Malinovski, MHI).
4. 71 scientific publications which acknowledge COCONET have been published or submitted until now by WP 10 partners.
5. The COCONET summer course "GIS and MARXAN Training, 9-15 September 2013, Constanta, Romania " was organized in cooperation with WP 8 and will be hosted by INCDM.

Details for each task

Task 1 Multi scale mapping of geological, biological, oceanographic features characteristic for different habitats

<u>Subtask 1.1 Geological, geophysical and biological mapping</u>

Existing relevant information on geology/geomorphology of the seafloor and benthic biology has been compiled, digitized in shapefile format and are ready for uploading in the COCONET geodatabase:

- Bathymetry of the Black Sea (1:750000); bathymetry layers from the Nautical Charts (UkrMorKartographia) in the scale 1:5000, 1:10000, 1:25000, 1:50000, 1:100000, 1:200000, 1:750000;
- Bathymetry of Black Sea Romanian sector: compilation of GeoEcoMar data collected in the last 30 years
- Substantial-genetic types of bottom sediments of the Black Sea
- Distribution of carbonates in bottom sediments of the Black Sea
- Soils of the Black Sea
- Mineral resources of the Black Sea
- Historical and present trends of changes in the Zernov's Phyllophora Field and Small Phyllophora Field (Karkinitsky Bay) between 1954 and 2013 (data received from IBSS, OB IBSS, GEOECOMAR)
- Distribution of the main types of bottom vegetation along Ukrainian shelf zone
- Distribution of benthic communities for the Romanian part of the Black Sea according to Bacescu et al., 1971
- Detailed georeferenced habitat maps for 6 Romanian MPAs (provided by INCDM)
- Database for macrobenthos, microbenthos and microplankton taxonomy and abundance from the Romanian MPA Sf. Gheorghe (2012 cruise of R/V Mare Nigrum of GeoEcoMar***)***
- GIS database of the pilot site Ropotamo-Kiten MPA in Bulgaria, with basic cartography data (coastline, isobaths, geology) and information on presence of marine habitats, with focus on infralittoral phytobenthic communities. Data includes visual census of dominant phytobenthic communities (2004-2005), detailed seasonal sampling and photo surveys of selected transects (2009-2010) and a complete CARLIT mapping of the dominant phytobenthic communities in

the upper infralittoral (0-1 m depth, 2011). (data received from IBER-BAS and IO-BAS)

- Ukrainian MPAs: the polygonal layer with the Ukrainian Marine Protected Areas was uploaded to the COCONET geodatabase

Electronic georeferenced files (shapefile format) are generally lacking in most Black Sea countries. Information is more frequently available only in the form of paper maps in .jpeg file or text in .pdf or.doc. The efforts done within this subtask aim at digitizing existing information to make it more available for use within WPs 2, 3, 4 and 5.
Among the difficulties encountered in the process are worth mentioning: sifting through the great amount of information which occurs geographically scattered and comes from all kinds of sources (scientific papers, reports, grey literature, websites, etc.); existing maps are using various geographical projections and chart datum; the scales of digitized maps are very heterogenous.

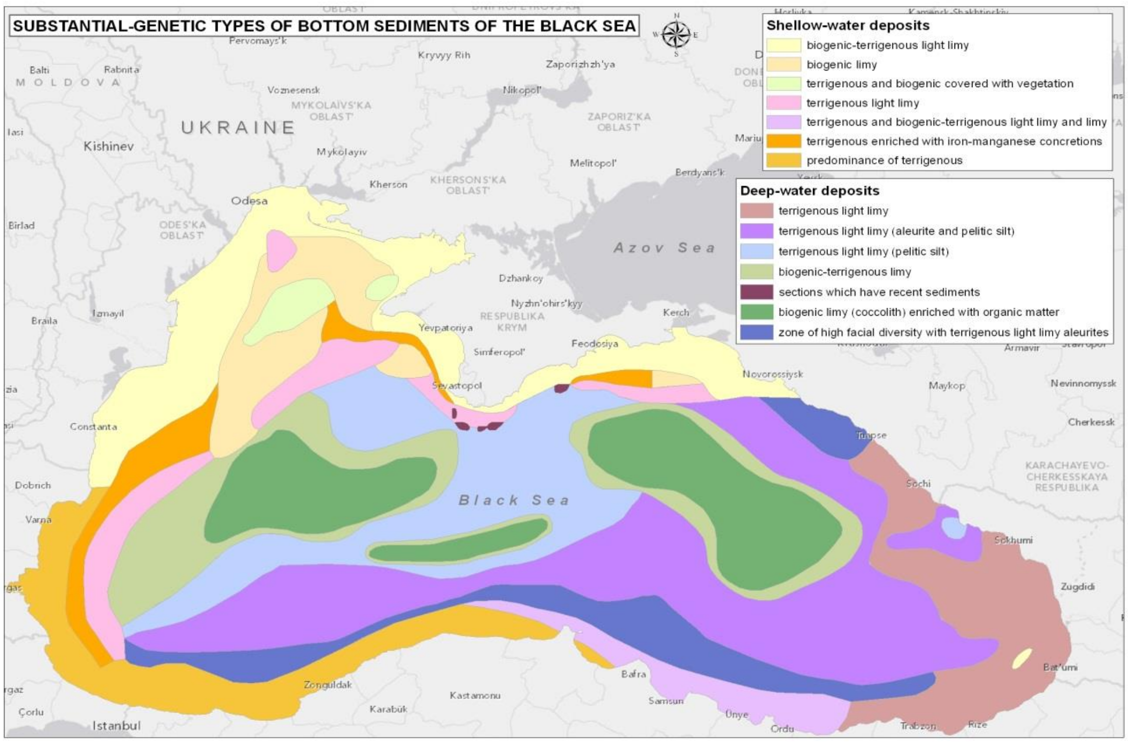

Fig. 1.1 Digitized map of substantial-genetic types of bottom sediments of the Black Sea

Efforts are being done to improve and harmonize habitat classification, integrating the Mediterranean and Black Sea. In the Black Sea a unified concept, let alone classification of marine habitats, does not exist yet at basin scale.
In the 1960-70s national faunal monographic studies and the first comprehensive inventories of zoobenthic communities were started by Black Sea countries (Bacescu ,1971; Marinov, 1990).They were marked by opposing views between Romanian (based on the work of Peres & Picard in the Mediterranean) and Soviet-styled classifications of shore zonation and benthic communities in the Black Sea. Bacescu drew maps of distribution for benthic communities based on a large grid of sampling points (Van Veen grab), covering the Black Sea shelf from Odessa Bay to the Bosphorus. Qualitative and semi-quantitative sampling inbetween the grid points was done with dredges, trawls and, where possible, scientific divers.

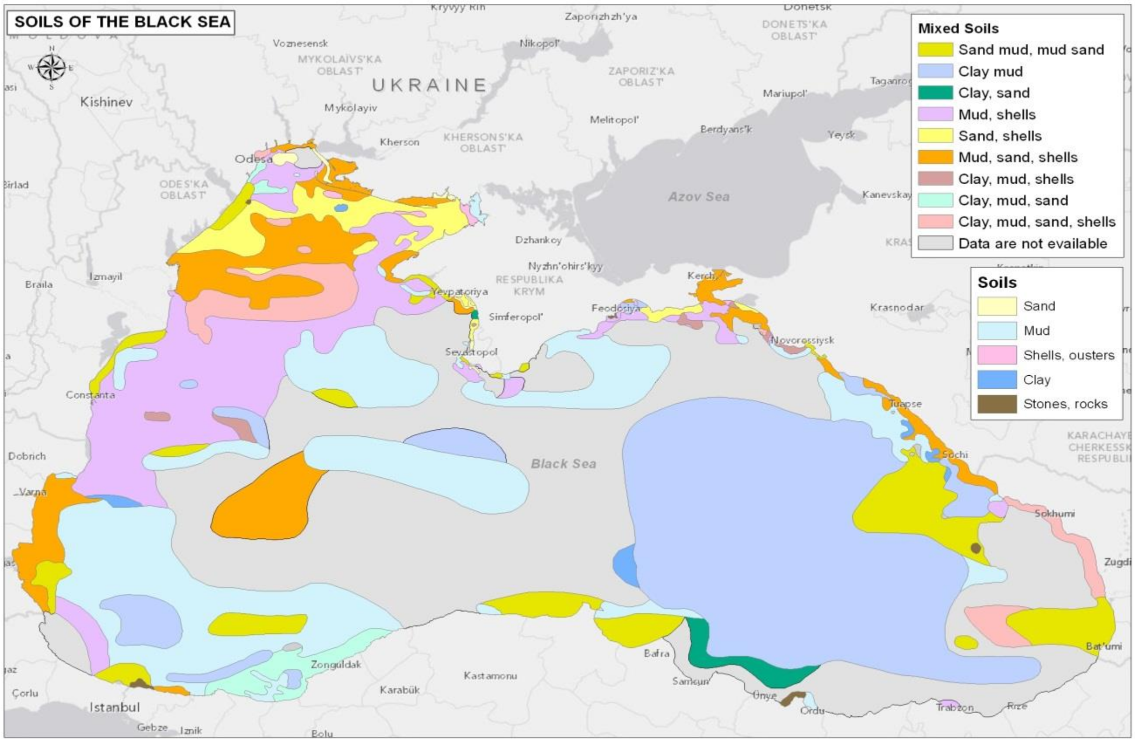

Fig. 1.2 Digitized map of soils of the Black Sea

At present, in the EU part of the Black Sea there are two habitat classification systems in different stages of development: Natura 2000 and EUNIS. The most advanced is by far the Natura 2000 classification. The Romanian Natura 2000 marine habitat classification was the first to be developed in the Black Sea in 2006 (Micu et al., 2007) and it is being updated continuously (Micu, 2008; Micu et al.2008; Micu, 2012 unpublished data). The Romanian classification is based on the Habitats Directive and the Interpretation Manual of European Union Habitats (EUR 27, EUR 25) and provides correct interpretation and comprehensive coverage of EU habitat types and subtypes present in the Romanian Black Sea. In drawing up the Romanian classification, the existing classification systems for marine habitats in the Mediterranean, Baltic and Atlantic were carefully considered. Although there are a few types unique to the Black Sea, most types have easily recognizable Mediterranean counterparts, making this classification more prone to integration. The Romanian classification has already been used for complete mapping of 6 marine SCI sites in 2010-2012. Habitat mapping of another site will be completed within the scope of COCONET.

In Bulgaria, the Natura 2000 marine habitats reference list initially (at the Biogeographic Seminar 2008) comprised EU habitats 1110,1130, 1150, 1160, 1170 and 8330, of which 1170 was misinterpreted; while 1140 was wrongly regarded as absent from the Black Sea. There was no classification of types and subtypes belonging to these EU habitats in Bulgaria.After the Marine Biogeographic Seminar (Brindisi, 2010) a classification of marine habitat types existent in Bulgaria under 1110 and 1170 was developed (Todorova et al., 2012). It is based on Micu et al., 2008, but not identical to the Romanian classification. This classification scheme shall be used for habitat mapping of NATURA 2000 marine SCIs in Bulgaria, inclusive within CoCoNET. The EU habitat 1180 was missing from the Bulgarian reference list, but it was included during the the Marine Biogeographic Seminar (Brindisi, 2010). In Bulgaria no entirely marine site has been designated yet, all marine areas under Natura 2000 network are relatively short seaward extensions of land-based SCI sites. At present redesignation and extension of marine parts of SCI's are underway in order to improve the situation, in accord with the conclusions of the Marine Biogeographic Seminar (Brindisi 2010).

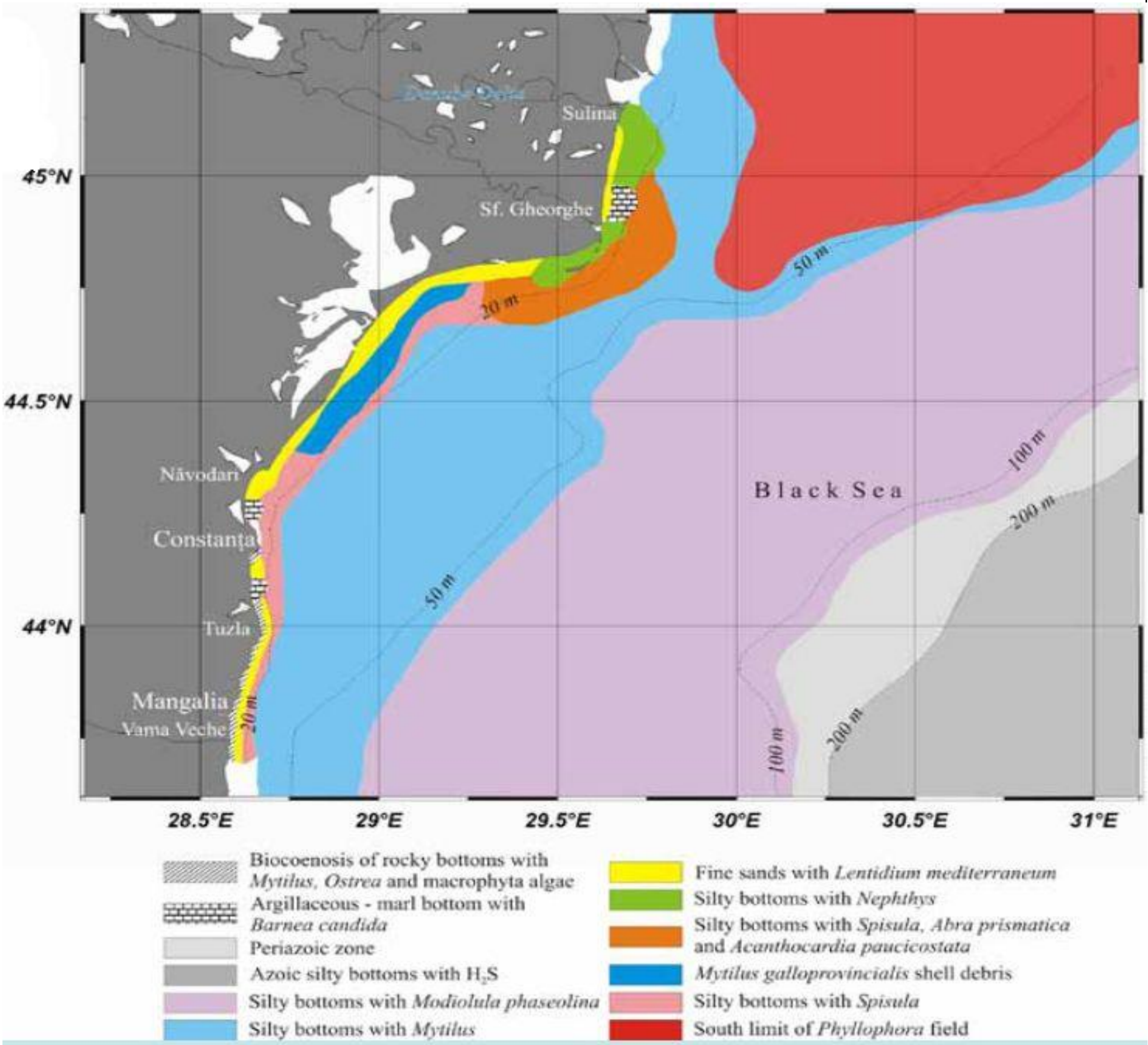

Fig. 1.3 Shape files for distribution of benthic communities in the Romanian part of the Black Sea according to Bacescu et al., 1971

An initial attempt to produce a list of Black Sea habitats under the EUNIS classification system and integrate them with the existing Mediterranean and Atlantic habitats occurred in 2007-2008 at the initiative of ETC-BD. A list of over 150 EUNIS habitats was produced by Black Sea experts (Micu & Todorova), but an agreement over administrative issues could not be reached with ETC-BD and the contract was never finalised. Recently another attempt was made to integrate certain Black Sea habitats into EUNIS classification system within MESMA 7FP EC project (Salomidi et al. 2010, Salomidi et al. 2012). However the few descriptions and classification of Black Sea habitats in Salomidi et al. 2010 contain some misrepresentations and should be reconsidered. Within this task of COCONET, we strive to integrate the existing classifications into a new one that will cover the whole basin.

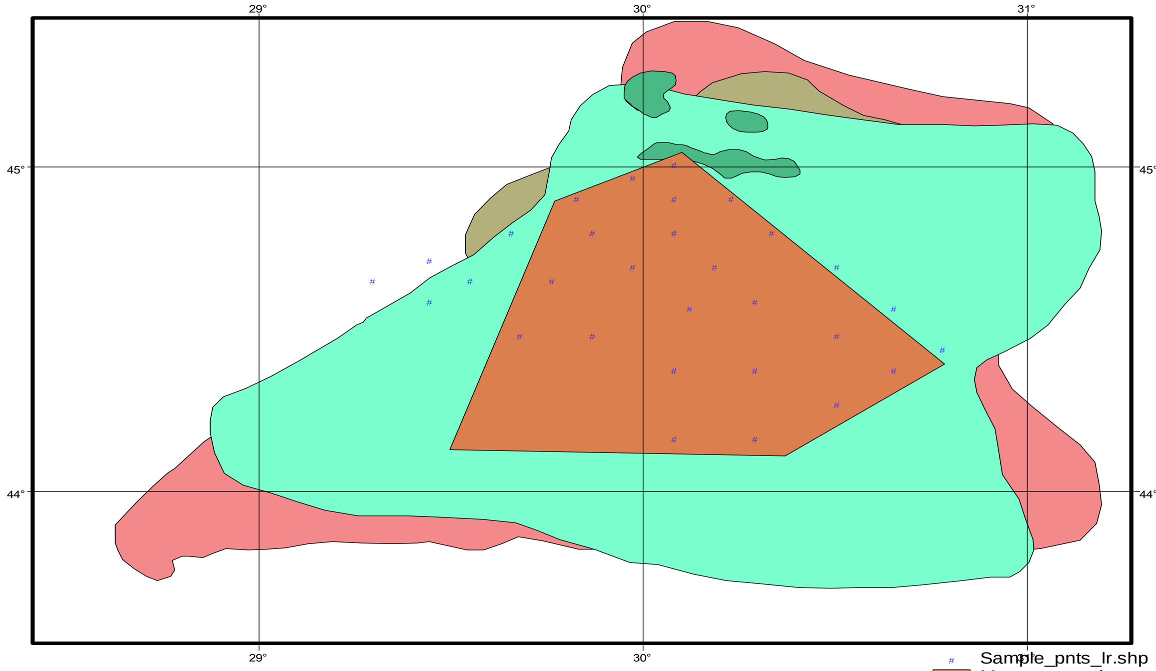

Fig. 1.4 Shape files illustrating changes in the extent of Zernov's Phyllophora Field during 1950s, 60s, 70s and 80s, as well as the borders of the existing MPA (pentagon) (from GEOECOMAR)

Even before the integrating classification is finalized, some of the WP 10 partners have started de novo mapping of marine habitats at pilot sites in the Black Sea. In Bulgaria, at the pilot-site Ropotamo-Kiten, a multibeam survey was carried out to characterize the seafloor bathymetry and morphology in the area shown on Figure 2. The ensonified area has a total surface of 106 km^2 (Figure 1.5). Currently the multibeam survey continues in the nearshore area of the pilot site Ropotamo-Kiten. Geological sampling was carried out at 20 stations for characterization of the sediments and validation of the acoustic images produced by the multi beam. The samples collected will be analyzed in the lab for sediment grain size.
Benthic sampling (Van Veen grab) for infauna biodiversity inventory and community analysis was carried out at 76 locations. The samples will be processed in the lab to provide primary data on the taxonomic composition, biomass and abundance of macrozoobenthos in sediments. The results will be used in conjunction with bathymetry and sediment data to characterize the sedimentary habitats (the physical biotope and the associated biological community) in the pilot site Ropotamo-Kiten.
Beam trawl sampling was carried out at 7 locations for characterization of epifauna biomass (CPUA) and *Mytilus galloprovincialis* size structure. The results will be used to validate the presence of mussel beds presumed by multi beam images, as well as to correlate the % cover of mussel beds estimated by the acoustic images with the mussels biomass. Size structure is an important characteristic of the population status of *Mytilus galloprovincialis* – the habitat structuring species of the mussel beds.
All activities within this task are running to schedule.

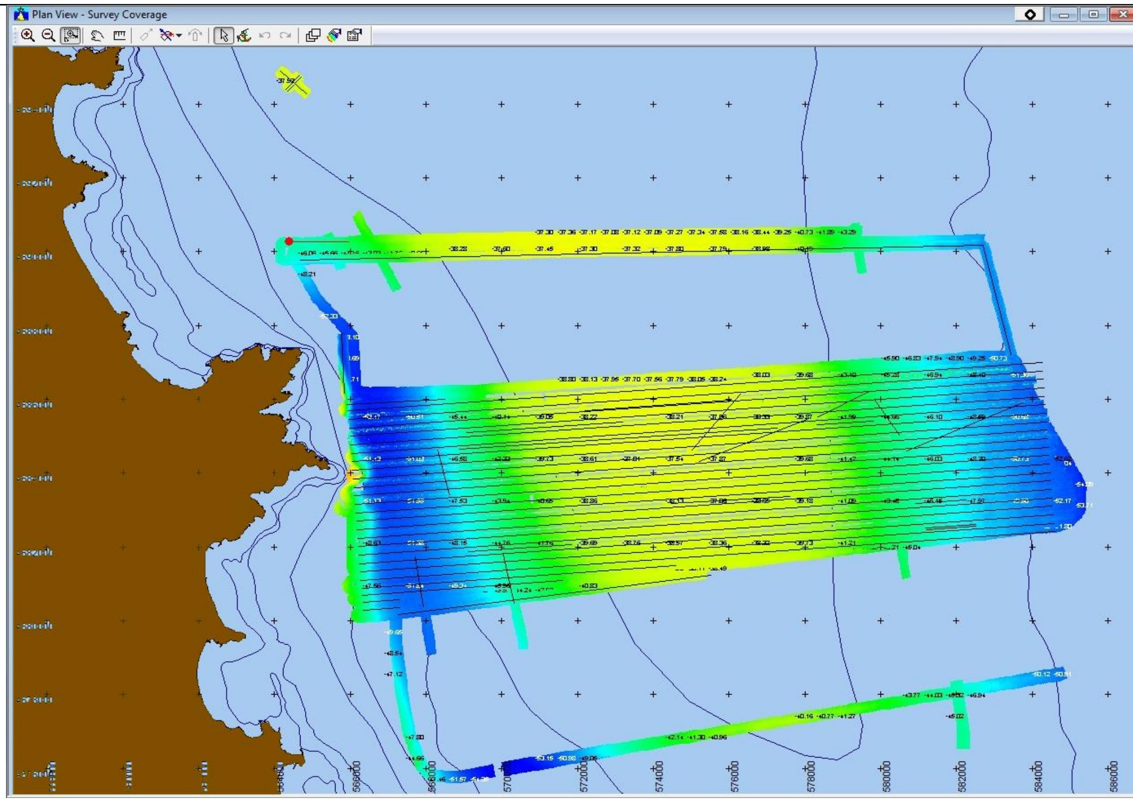

Figure 1.5 Area within Ropotamo-kiten pilot site surveyed with multibeam SeaBat 7111.

<u>Subtask 1.2 Biological sampling of offshore and coastal areas</u>

GENETIC SAMPLING. Genetic analysis of certain species will be performed to test for population structure and gene flow but also to identify origin of migrants, when possible. Testing for genetic heterogeneity is done on the assumption that genetic differentiation indicates breaks in connectivity within the metapopulation of a species. A number of species was selected for genetic analysis, based on the coverage of a broad number of taxa, their role in the ecosystems functioning (priority to habitat formers or characteristic species), their presence in the two pilot areas (Black Sea and Adriatic Sea) and life-history traits that maximize the amount of useful information which can be inferred through their analysis. The list of species has reached its final form after prolonged discussions among partners, which were held during:

- workshop "Synthesis on knowledge on genetic connectivity in Mediterranean and Black Sea" was held in Barcelona, Spain (11-13 June 2012)
- workshop "Species distribution, beta diversity and connectivity in Mediterranean and Black Sea" was held in Castiglioncello, Italy (16-18 October 2012)
- coordination meeting in Paris (Dec 2012)
- General Assembly in Rome (Jan 2013)

Table 1.1 Species list, sampling area and team agreed to be in charge of the genetic analysis

	Taxon group	Scientific name	Sampling (BS=Black Sea AS=Adriatic Sea)	Analysis team assignment
1	Algae	*Cystoseira barbata*	BS and AS	CNRS (Nice)

2	Seagrass	*Zostera noltii*	BS and AS	CoNISMa (SZU)
3	Mollusca	*Mytilus galloprovincialis*	BS and AS	CoNISMa
4	Mollusca	*Donacilla cornea*	BS and AS	CNRS
5	Mollusca	*Gibbula divaricata*	BS and AS	CSIC
6	Mollusca	*Cyclope neritea*	BS and AS	CNRS
7	Crustacea	*Pachygrapsus marmoratus*	BS and AS	CoNISMa
8	Fish	*Scorpaena porcus*	BS and AS	CNRS
9	Fish	*Symphodus tinca*	BS and AS	CSIC
10	Algae	*Phyllophora crispa*	BS	IO-BAS
11	Seagrass	*Posidonia oceanica*	AS	CoNISMa (SZU)
12	Sponge	*Hemimycale columella*	AS	CSIC
13	Cnidaria	*Desmophyllum dianthus*	AS	CSIC
14	Echinodermata	*Paracentrotus lividus*	AS	CoNISMa
15	Cnidaria	*Cladocora caespitosa*	AS	CSIC
16	Cnidaria	*Paramuricea clavata*	AS	CNRS
17	Echinodermata	*Arbacia lixula*	AS	CSIC
18	Fish	*Tripterygion delaisi*	AS	CSIC

For the Black Sea sampling only the first 10 species are of interest; 50 specimens will be collected for each species from each sampling site. The number of sampling sites has been increased in order to better be able to discern genetic connectivity at different scales, as well as breaks in connectivity around the Black Sea basin. There are now two kinds of sampling sites:
- pilot sites where, besides genetic sampling, benthic sampling for habitat mapping, as well as other WPs will also be done – these are the same as in the DOW
- secondary, non-pilot sites, where only genetic sampling will take place – additional non-DOW sites were designated for Bulgaria, Ukraine, Russia, Georgia and Turkey, preferentially in MPAs, where possible.

Taking into consideration the uneven distribution of genetic sampling capacity among the Black Sea partners, it was agreed during the WP3-WP10 coordination meeting in Paris (Dec 2012) that the WP3 and WP10 leaders will conduct a series of sampling expeditions around the Black Sea. The main aim of the expeditions is to make sure that the sampling collection is completed, but there is also the aspect of direct cooperation with local partners, knowledge transfer and capacity building during these expeditions.
Due to extreme difficulty in obtaining visas, diving and sampling permits for Russia and lack of support from local partners, the secondary sampling site in Russia has been dropped from the sampling plan.
At the time of this report the first joint expedition by WP3 and WP10 leaders to Ukraine has been just finished. The expedition has been a complete success, both in terms of the sampling plan (objectives achieved 100%), and of the flawless collaboration with the local partner (IBSS Sevastopol, team of Nataliya Milchakova) who has provided excellent support.

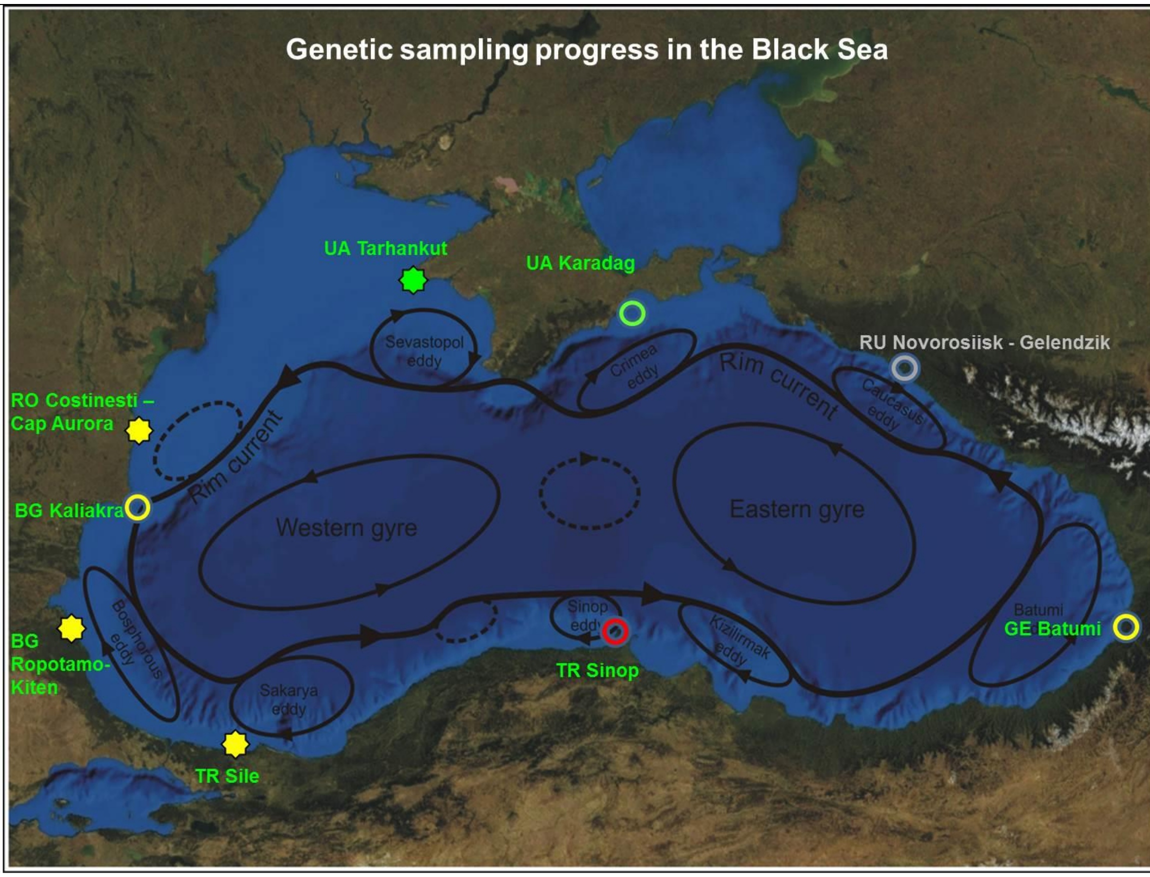

Fig 1.6 Genetic sampling progress in the Black Sea in July 2013 (stars=pilot sites, rings=secondary sites). Green sites are those with sampling already completed, yellow sites are with sampling in progress, red sites are with sampling not yet started and the grey site is dropped.

OCEANOGRAPHIC CONSTRAINTS FOR CONNECTIVITY IN THE BLACK SEA. During the Virtual Focus Workshop “Multi scale basin-wide circulations” Bettina Fach of IMS-METU together with Marcello Vichi of INGV, Italy were chairs of the session on “Modelling impacts of climate change and climate variability on ocean circulation and ocean ecological properties (Scenarios for the next 30 years based on the most recent IPCC indications)”. The main outcome of day 3 of the workshop was that the state of the art of model available for both the Mediterranean and Black Seas were assessed, models to be used within the framework of task 1 were defined (for the Black Sea the BIMS model developed at IMS-METU), projected impacts of climate change scenarios and relevance for CoCoNet as well as known limitations of modeling approaches were discussed. The outcomes of the workshop are detailed in the Deliverable 8.6 “Report on Focus Workshop Multi scale basin-wide circulations” which was due in month 9. The coupled circulation-ecosystem modeling system (BIMS) defined within above mentioned workshop to be used for modeling of the Black Sea currents and biogeochemistry has been developed and extensively validated within the 7th framework EU project MEECE (Marine Ecosystem Evolution in a Changing Environment) and multiple IPCC climate change scenarios have been run.Using both, the above-mentioned BIMS model as well as satellite remote sensing data, the connectivity of different regions in the Black Sea (Fig. 2) was assessed using a Lagrangian particle-tracking model. This was done to understand how propagules may be dispersed within the Black Sea by ocean currents.

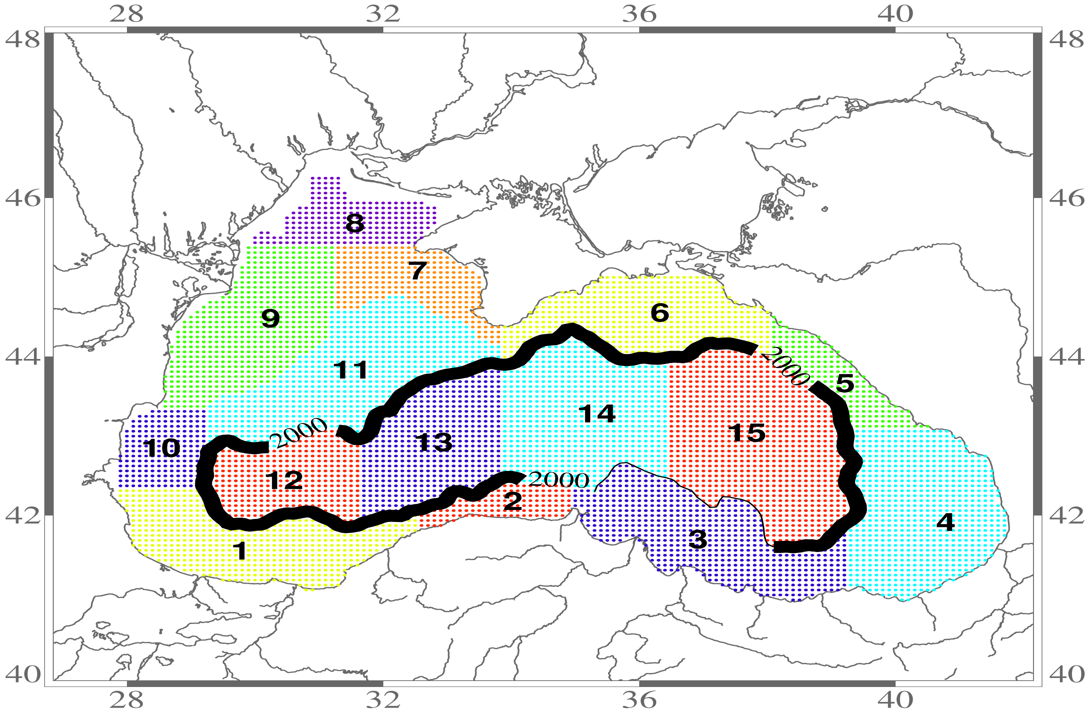

Fig 1.7 Different regions defined for connectivity study. Colored dots mark the release points belonging to each area. Thick black line marks the 2000m isobath.

Model results indicate that propagule dispersal is strongly controlled by advection through the Rim Current circulation around the periphery of the basin as well as the two cyclonic basin-wide gyres and is locally controlled by mesoscale eddies spinning off this rim current. The north-western shelf is connected to the regions on the south-western shelf off the Bosphorus, while the southern shelf off Samsun is connected to the north-east region off the Azov Sea (Fig 3). However, the southern shelf and the north-east areas are much more isolated. Interannual variability in the dispersal of larvae is considerable when comparing warm (e.g. 2001) and cold years (e.g. 2003). A paper of the work is being prepared, but has not yet been submitted.

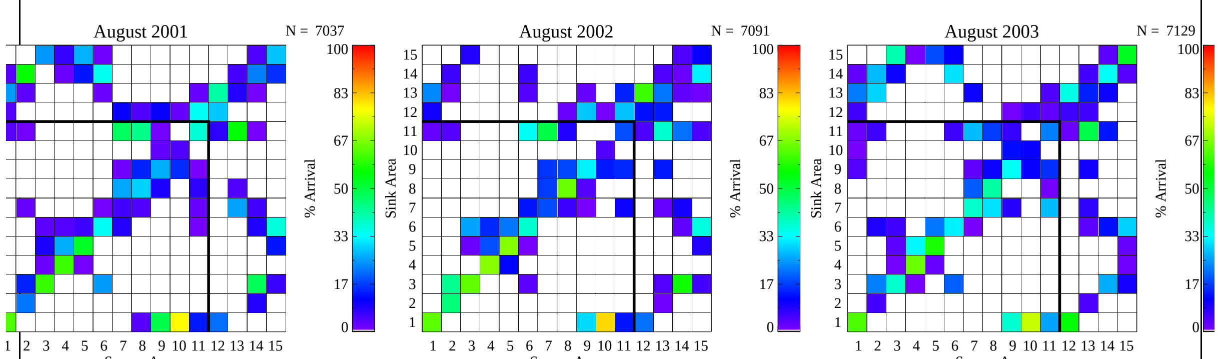

Fig 1.8 Connectivity matrices for particles released in August of 2001, 2002, and 2003 indicating the probability (%) for particles originating from a source area (x-axis) to be transported to a sink area (y-axis) estimated from individual 36-day trajectories

Of specific relevance to WP 10 is the advection of particles form area 1 that includes the Sile area and environment, which is one of the Black Sea pilot study areas. Of propagules released in area 1 only 55% tend to stay in the area (those originating close to shore) while 45% get transported northward into the deep Black Sea of the inner basin - regions 11-14 (Fig 1.9).

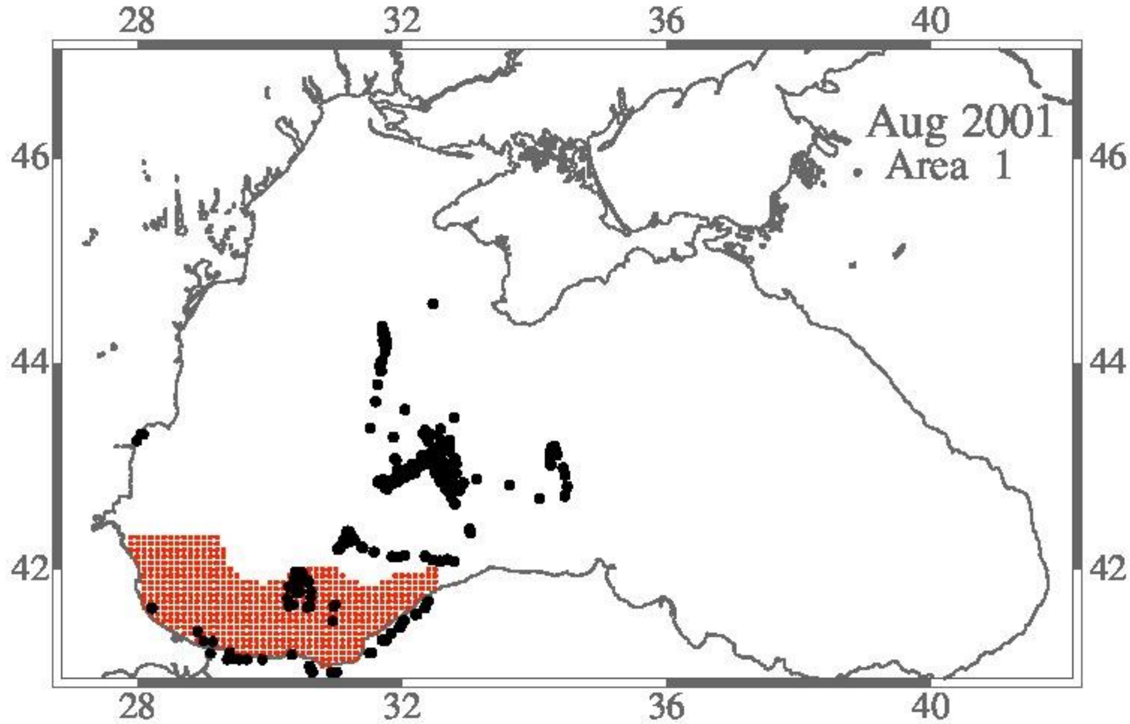

Fig 1.9 End points of propagule drift estimated from individual 36-day trajectories. Red dots mark the release points belonging to area 1 including study region Sile.

BIOLOGICAL SAMPLING FOR HABITAT DESCRIPTION AND DIVERSITY ANALYSIS.

In Bulgaria, at the pilot site Ropotamo-Kiten sampling with fishing gear was conducted for assessment of ichthyofauna diversity and collection of target species for genetic analyses. Marine ichthyofauna in shallow areas (sandy and rocky bottoms) up to 30 m was sampled by installing stationary bottom gillnets. Gillnets are often used for sampling fish stocks because they are easy to use, catch a wide variety of species, and their use can be standardized. The obtained data will be used for fish biodiversity studies and for abundance/biomass estimates in terms of catches per unit effort per habitat type and depth. Fish populations in the pilot site “Ropotamo - Kiten” were sampled by using of capron gillnets with mesh size of 22 mm. The total number of settled gillnets was 19, at depths between 2 and 30 meters, covering both sand and rocky bottoms in different locations.

In Turkey, METU is taking R/V Bilim-2 to the Sile pilot site for oceanographic (currents) and plankton sampling. Six plankton net hauls will be done (red flags) at depths of 20 (station 1, 2, 3) and 40 m (station 4, 5, 6).

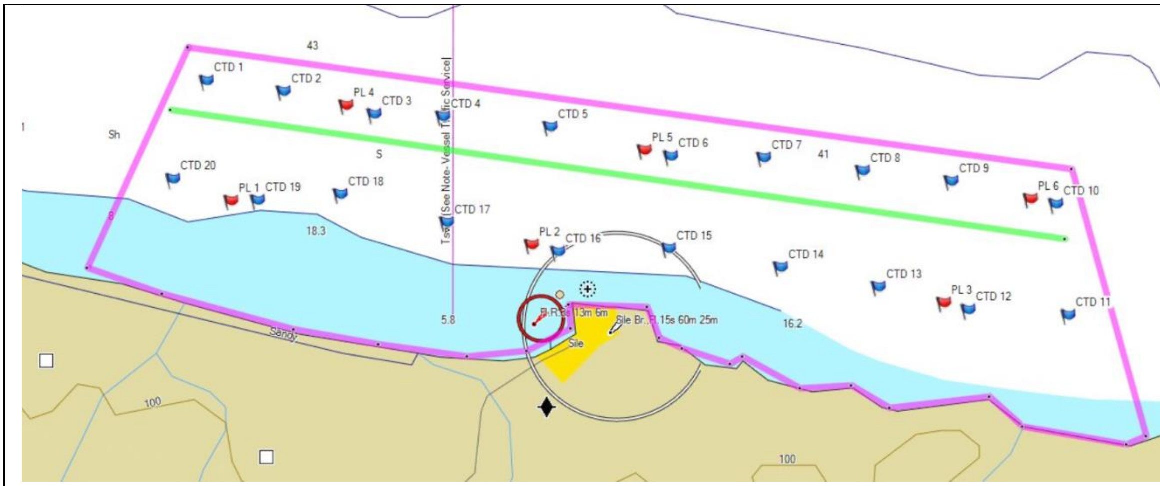

Fig 1.10 Map with CTD stations (blue flags), Plankton hauls (red flags) and trawl locations (green line)

Methodology: Mesozooplankton and ichtyoplankton samples are collected by using a WP-2 closing net (200 micron mesh size and 57 cm mouth diameter) and/or Hensen Net (300 micron mesh size) at 6 stations in the Şile area. Vertical tows are performed including the whole water column (20 to 40m depending on location). Hauls are made with a speed of 1 m/s to minimize the spilling out of water. Samples are preserved with 5% borax-buffered formaldehyde in 250 ml bottles and kept in dark. Folsom splitter is used to divide samples into subsamples and at least 400-500 organisms are counted for each sample under stereo-microscope. Samples will be analyzed by IMS-METU for mesozooplankton and ichtyoplankton down to the species level. In addition, bottom trawling for fish diversity study will be done.
In Romania, a cruise with R/V Mare Nigrum to the southern lobe of Zernov's Phyllophora Field, which extends into Romanian waters, will be conducted in August with participants from GEOECOMAR, INCDM and NatureBureau. Benthic sampling (Van Veen grab, boxcorer, dredge) and video surveys using ROV or drop-down cameras will be conducted, assessing the current extent and diversity of this area of the ZPF.
In Georgia, during May-June 2013 two expeditions were organized to the Gonio-Qobuleti and Supsa-Poti coastal areas for plankton and benthos sampling. Five benthos samples 15 plankton samples were taken at different depths: 0m, 0-5m, 0-20m. From the rocky coast in Sarpi 10 samples of epifauna were taken by diving.

In Russia, SIO-RAS performed its regular collection of new abiotic and biotic data during 2012-2013. This monitoring program is targeted at the whole ecosystem of the shelf and the open waters and uses a multidisciplinary approach to ecosystem monitoring, which includes physical, chemical and biological parameters.Data were collected on 3 stations located on the inner shelf, outer shelf and in pelagic waters.

Fig 1.11 Map of sampling points in Georgia: Sarpi-Gonio, Batumi, Kobuleti, Supsa, Poti.

Table 1.2 Sampling stations of SIO-RAS

Station	Lat	Lon	Sea bottom, m	Position
1	44°33.75	37°58.48	30	inner shelf
2	44°31.97	37°56.85	100	outer shelf
3	44°30.87	37°56.00	500	open waters

Sampling is performed 1-2 times per month during the warm season of the year (April-November). The following parameters are measured:

I. Abiotic
   1. CTD profiles
   2. Secchi disc
   3. dissolved oxygen

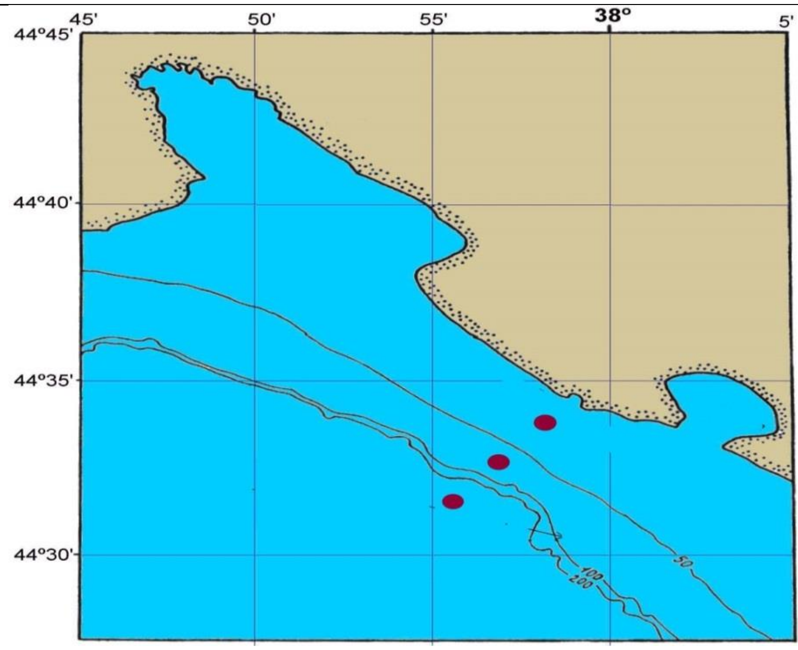

Fig 1.12 Locations of sampling stations in Russia

II. Biotic

1. Bacterioplankton
2. Phytoplankton
3. Mesozooplankton
4. Gelatinous plankton
5. Ichthyoplankton

Table 1.3 Samples collected by SIO-RAS

Parameter	Unit	Total number
Stations	Number	30
CTD	profile	30
Chemical analyses	set	650
Bacterioplankton	sample	450
Phytoplankton	sample	450
Mesozooplankton	sample	30
Gelatinous plankton	sample	30
Ichthyoplankton	sample	30

Currently, the samples are being processed. Preliminary results will be available at the end of the year. This program will be continued in 2013-2014 at the same scale.

In Ukraine OBIBSS conducted a hydrobiological expedition on the northwestern Black Sea Ukrainian MPA: National Nature Park "Beloberezhe Svyatoslava" (Kinburskaya Spit and Yagorlytskiy Bay) and Chernomorskiy Biosphere Reserve (Yagorlytskiy and Tendrovskiy Bay), sampling 26 stations between 17-22 June 2013.

All activities within this task are running to schedule.

Task 2 Mapping of physical and biochemical variables in the sea surface layer based on Remote Sensing

The MHI team (Vladimir Malinovsky, Evgeny Lemeshko, Aleksandr Korinenko, Sergey Motyzhev, Anatoly Tolstosheev, Evgeny Lunev) has started to upload contributions for the deliverable D 10.3 “Report on field measurements of currents” ahead of schedule (due date of deliverable was 28-02-2014, actual submission date is 25-07-2013).
Conception of the general circulation pattern in the Black Sea as a cyclonic motion with two large gyres has already been developed in the late 19th, early 20th centuries, as shown in works of F.F. Wrangell, I.B. Spindler, N. Andrusov, S. Zernov. The cyclonic wind rotation over the sea and the river runoff were proposed as the main reasons for the circulation. Based on field research of the 1920s–1930s, N.M. Knipovich offered a scheme of circulation which was generally accepted to this day; he explained the dome-shaped distribution of hydrographic properties by adaptation of the density field to cyclonic rotation (Knipovich, 1932, 1938). Since then, the scheme of general circulation has not been revised, but only refined.
Very similar patterns of circulation can be found in (Neumann, 1942; Leonov, 1960; Filippov, 1968; Bogatko et al, 1979; Blatov et al, 1984). The most recent general circulation pattern based on oceanographic surveys of the 1980s–1990s and altimetry data was given in (Oguz et al, 1993; Korotaev, Oguz et al, 2003), Fig.1.
All known schemes suggest the following main features of general circulation: the Main Black Sea Current (or Rim Current), located over the continental slope, and two large-scale cyclonic gyres in the eastern and western parts of the sea; quasi-stationary anticyclonic eddies in the coastal zone, such as Batumi, Sevastopol, Caucasian, Sakarya, Sinop, etc.
In contrast to the sufficiently consistent views on general pattern of circulation in the Black Sea, there is a wide variety of opinions about its seasonal variability. Seasonal variability of circulation in the Black Sea is characterized not only by change in the velocity of general flow of the basin, but also with fluctuations in the intensity separately for the main cyclonic gyres and quasi-stationary anticyclonic eddies.
One of the views of the spatial structure of the seasonal cycle of currents is the maintenance of the general circulation pattern throughout the year with little change in the position and size of its individual components (Bogatko et al, 1979; Blatov et al, 1984, 1989, Simonov, Altman et al, 1991; Eremeev, Kochergin, 1991).
Another view is that during the seasonal cycle, a qualitative change in the circulation pattern of the sea takes place (Oguz, Malanotte-Rizzoli, 1996; Trukhchev, Ibrayev, 1997; Stanev and Beckers, 1999; Stanev and Staneva, 2000; Staneva et al, 2001; Belokopytov, 2003, 2004; Korotaev et al, 2001, 2003; Tuzhilkin 2008b; Knysh et al, 2011; Demyshev et al, 2005, 2007; Polonsky, Shokurova, 2010). Circulation may look like a single cyclonic movement centered in the western or eastern part of the sea, or it may consists of well-defined cyclonic gyres.
At present the most prominent features of the deep-water circulation were displayed by the ARGO floats. The information about seven ARGO floats in the Black Sea for period 2002-2009 are collected in Tab 2.1 and Fig 2.2 (Gerasimova, Lemeshko, 2011). The averaged float life-time is about 2-3 years, with a maximum of around 4 years. Argo trajectories are concentrated in the areas of intensive meanders and eddies.

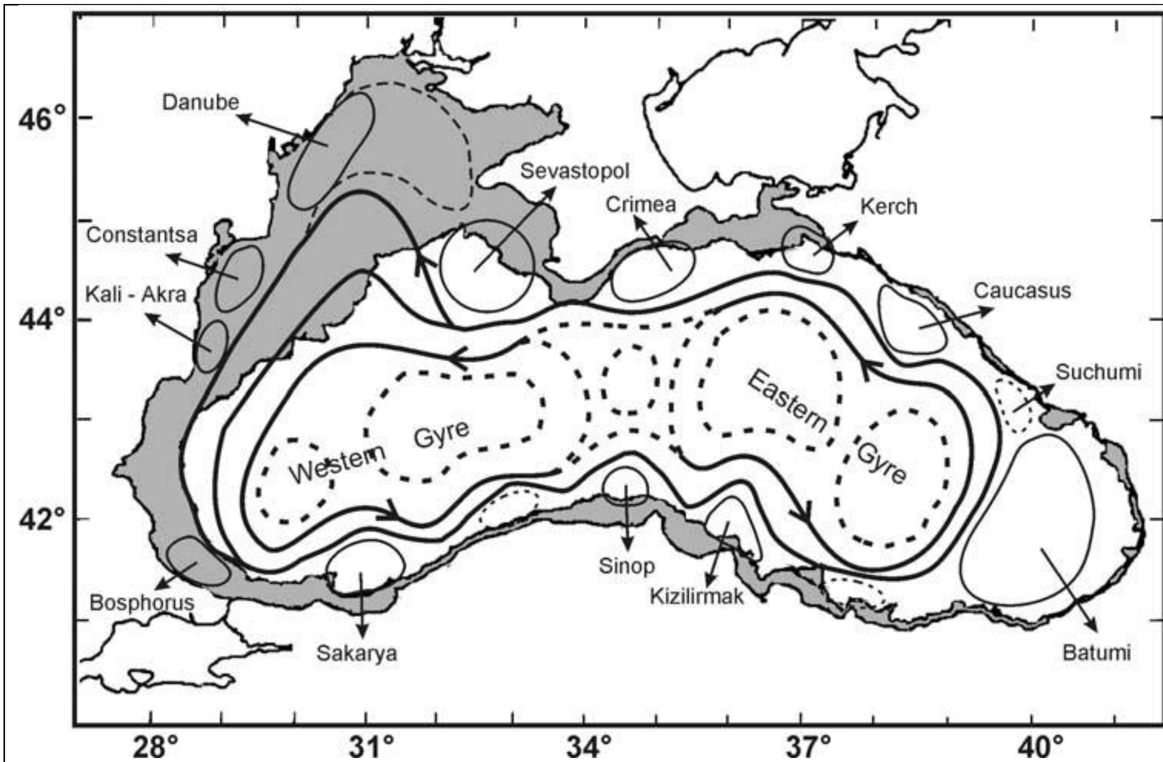

Fig 2.1 Circulation pattern of the surface layer of the Black Sea (*Oguz et al*, 1993; *Korotaev, Oguz et al*, 2003

The overall floats trajectories corresponds and confirms to the Black Sea circulation system possessing a set of quasi-persistent and/or recurrent coastally attached anticyclonic eddies around the basin. Their persistence varies regionally and seasonally depending on the large-scale forcing of the circulation as well as on internal processes controlling the mesoscale dynamics. The most notable features include (i) the weakly meandering Rim Current system cyclonically encircling the basin, (ii) two cyclonic cells formed by four gyres distributed within the interior, (iii) the Bosphorus, Batumi, Sukhumi, Caucasus, Kerch, Crimea, Sevastopol, Danube, Constantsa, and Kaliakra anticyclonic eddies on the coastal side of the Rim Current zone, (iv) bifurcation of the Rim Current near the southern tip of the Crimea.

The standard hydrological field surveys reveal more pronounced variations of the spatial and time scales of water dynamics. Only the direct measurements of current velocity capable of giving unbiased description of circulation patterns The best possibility to get the actual spatial and vertical structures of current field is to perform the direct measurements of current profiles by Acoustic Doppler Current Profile (ADCP) mounted on the vessels and lowered ADCP. At present LADCP were used for solution of broad range of oceanographic problems in various regions of the Black Sea (Morozov & Lemeshko, 2006; Lemeshko et.al., 2008).

The analysis of the direct measurements of current profiles by ADCP enables us to describe the dynamic structure of an anticyclonic eddy and establish the presence of currents with velocities of up to ~ 5 cm / sec at depths of 450–500 m. The comparison of the data of ADCP measurements with the results of evaluation of the velocities by the dynamic method relative to the reference surface of 500 dbar reveals, in general, good agreement between the corresponding vertical structures of the eddy in the 0–300-m layer. Moreover, the values of the geostrophic velocity are lower than values of the velocity established according to the LADCP data by 5–10 cm / sec. In view of the specific acoustic characteristics of the Black Sea, the data on the structure of currents obtained earlier according to the data of vessel-mounted ADCP does not enable us to get information on the field of currents at depths greater than 300 m.

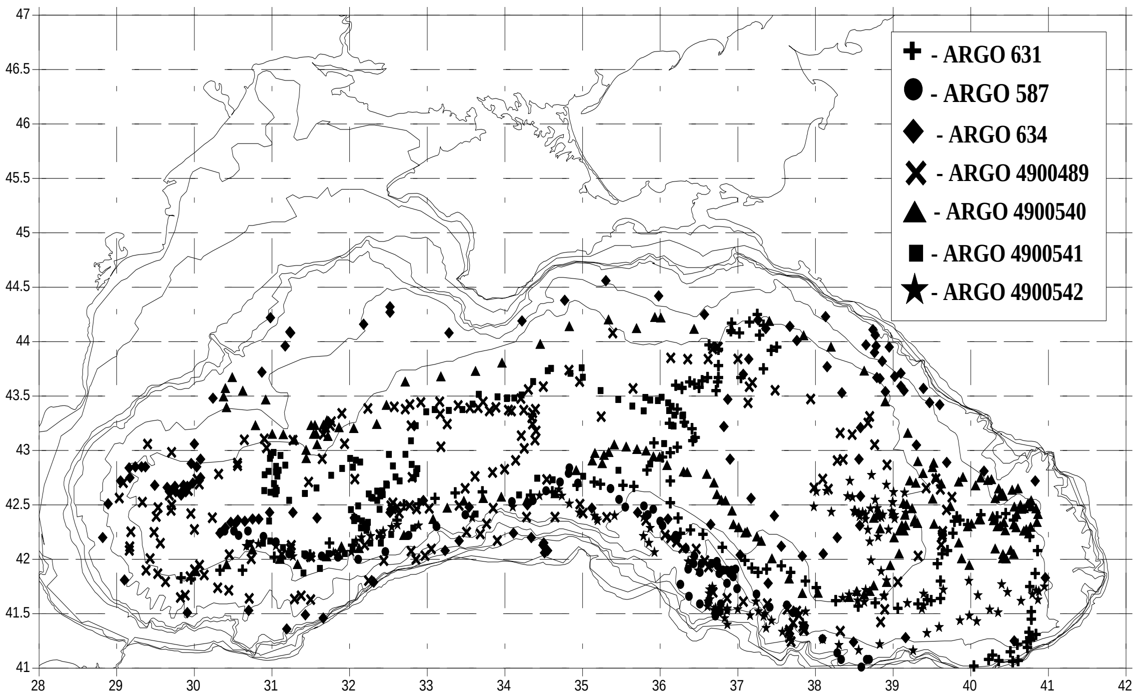

Fig 2.2 ARGO floats trajectories in the Black Sea for period 2002-2009 (see also Table 2.1)

Table 2.1 Information about ARGO floats in the Black Sea

ARGO float #	(Zp), [m] – parking Depth level	«life-time», [year]	Averaged velocity, [cm/s]
METU0634	200	2,5	5,1
4900489	500	~4	4,0
METU0631	750	2	2,7
4900540	1010	3,5	2,6
4900542	1500	~3	2,2
4900541	1525	2,5	2,4
METU0587	1550	1,5	2,3

Drifter technologies are one of the main modern tools for operational observations in the Ocean. Autonomous drifting data platforms (drifters), equipped with satellite telemetry, have become most effective instrument for investigation of the ocean's active layer and near-surface atmosphere. For a few last years the drifters have been supplying the operational and regular information about circulation of surface water in the Black Sea area. The experiments were carried out according to the plans of Black Sea Global Ocean Observing System and EUCOS Surface Marine Programme. More than 70 different drifting buoys, developed in Marine Hydrophysical institute (MHI) NAS of

Ukraine and produced by Marlin-Yug Ltd company (Ukraine) were deployed in the Black Sea. The map of trajectories, built on the basis of data from drifters, is shown on the Fig 2.3.

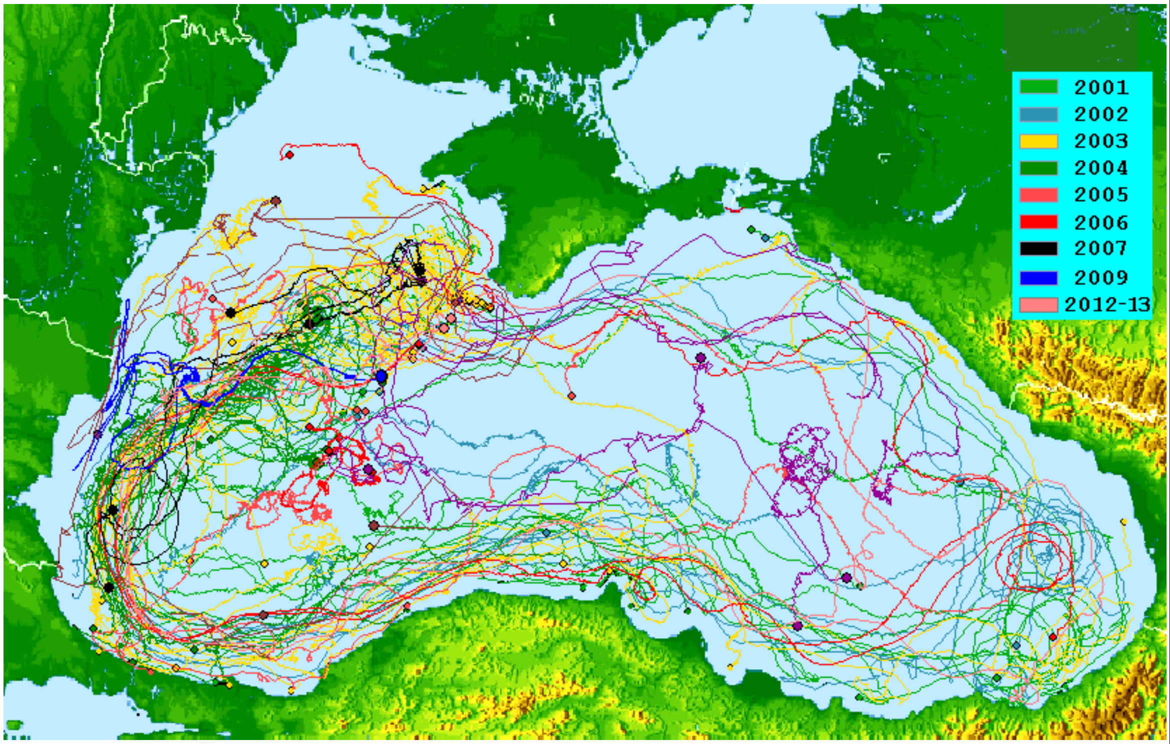

Fig 2.3 The trajectories of drifters during 2001 – 2013 the Black Sea experiments

Visual analysis of drifter trajectories allows identification of the main types of buoy movements: large-scale cyclonic circulation; quasistationary anticyclonic vortexes; inertial oscillations.

USOF has started the first analyses on water mass distribution and pathways of biogeochemical characteristics along their travel towards Black Sea. Data from the three dimensional hydrodynamical model of USOF for the Black Sea are analysed and provided in CoCoNET . Additional coupled biogeochemical model data ill be used to for mapping physical and biochemical variables for the Black Sea Within the CoCoNET Projects those models will be additionally coupled with tracer transport models to study the water masses dynamics and transports .

GEOECOMAR has contributed a database for wind, waves, water and air parameters at the offshore oil rig Gloria (years 2003-2010).

All activities within this task are running to schedule.

Task 3 Sensitivity of the marine ecosystems in Pilot Area to natural and anthropogenic drivers. Implications forMPA networks.

The deliverable D10.1 Workplan (report) regarding the Black sea pilot sites analysis for connectivity has been completed by Dragos Micu and Joanna Staneva.

A virtual workshop on “Case Study on Quick–Response Models and Strategies in Case of Accidents Impacting on MPAs” was held on 17 – 23 April 2013. The workshop focused on modelling of oil spills and accident simulations. Case studies included two simulated oil spills in the Black Sea (Zernov’s Phyllophora fiel and Sevastopol shelf break zone). Details are available in Deliverable 8.10.

An assessment of extreme meteorological and ocean conditions in the Black Sea has been delivered by MHI ahead of schedule (due date of deliverable was 30-06-2014, actual submission date is 09-07-2013). The American MM5 model adapted to Black Sea region by the Marine Hydrophysical Institute of National Academy of Sciences of Ukraine (MHI of NASU) was used for retrospective studies of individual mesoscale atmospheric processes and extreme events namely quasi-tropical cyclone of 25-30 September 2005, the breeze circulation , precipitation leading to extreme floods in the Crimean rivers. The results of calculations using the MM5 and WAM models were applyed to analyze the conditions of formation of a 12-meter freak waves February 1, 2003 near Gelendzhik. Validation of models by means of field measurements in the Black Sea region was discussed in. D5.1 CoCoNet Project: FP7 - OCEAN.2011-4 - GA no: 287844 5
As from 2007 the MHI has been fulfilling operational forecast for the Black Sea region using the MM5 model. The spatial resolution for the entire Black Sea region is 10 km, and the forecast includes 3 days. Since early 2011 the forecast is performed for the Crimean region with a resolution of 3 km and from the middle of 2011 the forecast was extended to 5 days. Forecast results in graphical and digital formats are available in the public domain on the Internet at the following address: http://vao.hydrophys.org. In addition to the weather forecast wind waves are predicted across the Black Sea using wind-wave model WAM.
Two major natural disasters (the strongest storm in the Crimean coast on November 11, 2007 and the flooding on July 6-7, 2012 in Krymsk, Russia) took place during the period of operational forecast in the Black Sea Region. The predictions of both disasters in the form of prognostic fields of wind speed, wave height and intensity of rainfall were received and displayed on the Internet in the public domain. Catastrophic storm information was submitted 3 days before the event and the catastrophic rainfall – 5 days before. However this did not result in the adoption of proactive measures.
The fact that the Black Sea region has a model that can successfully predict extreme weather events deserves attention and consideration in order to mitigate the effects of disasters. In this paper the examples of two catastrophes show a comparison of the results of the regional forecast with available measurements at meteorological stations and satellite data as well as with the results of a global operational forecasting. The purpose of the article is to show that the results of the forecast available on the site definitely comprise the prediction of disasters and extreme values of wind speed and precipitation were predicted correctly.

With regard to distribution of potential threats and invasive species, a number of actions have been carried out by WP 10 partners.
A map of distribution of alien macrophyte algae and seagrasses around the Black Sea

has been drawn by IBSS, digitized by UkrSCES and is ready for upload in the COCONET geodatabase.
The punctual layer of the threats within the Ukrainian Black Sea coastal zone was uploaded to the COCONET geodatabase. These data were taken from the Risk Assessment Indexes (RAI) maps prepared in UkrSCES
SIO-RAS submitted to MEPS the paper "Invasive ctenophores *Beroe ovata* and *Mnemiopsis leidyi* in the Black Sea: field observations and modelling". The paper uses results of >25 years of observations and experiments in the northeastern Black Sea, combined with a novel population dynamics model. The first assumption that since its arrival, *B. ovata* controlled the period of the year during which *M. leidyi* was present in sizable numbers is supported by both the observation that significant occurrence of *M leidyi* was restricted to summer months after the arrival of *B. ovata*, and model simulations showing that when *B. ovata* reaches its annual maximum, it almost wipes out *M. leidyi*.
The second assumption that the same sequence of predator-prey mechanisms led *B. ovata* to take control of *M. leidyi* year after year irrespective of interannual environmental variability is supported by both repetition of the same reproductive sequence of the two ctenophores yearly since 1999, and model evidence that this resulted from predation of *M. leidyi* by *B. ovata*.
The third assumption (i.e. environmental conditions determined the joint abundances of the two species) is supported by the observed covariability between the two species each year following the arrival of *B. ovata*. Experimental and field results identified temperature and food as the key environmental factors influencing *M. leidyi*, and model analysis indicated that interannual environmental variations that affect *M. leidyi* abundance cascade to proportional changes in *B. ovata* abundance.
All activities within this task are running to schedule.

Task 4 Ecosystem vulnerability and implications for MPA network design and management in the Black Sea

During spring and summer 2012 IBSS sampled plants of *Cystoseira* spp. in five regions of the coastal zone of Crimea at the depths of 0,5–1,5 m. The sampling sites are characterized by different levels of anthropogenic stress; some of them are located within marine protected areas: National Park "Charivna Gavan", Tarkhankut; coastal aquatic complex near Cape Fiolent (Sevastopol); Nature Reserve "Cape Martyan" (near Yalta); Nature Reserve Karadag). A total of 206 samples were prepared for analysis, the concentrations of 26 macro- and microelements were determined by means of instrumental neutron activation analysis during the trainings at Joint Institute for Nuclear Research (Dubna, Russia).

IBER-BAS carried out a pilot study in June 2013. Macrozoobenthic communities in *Zostera spp.* habitats from the Ropotamo National Reserve area were sampled and other research methods tested.

INCDM is undertaking GIS mapping of all *Cystoseira* belts/canopies and seagrass meadows from Romania (work in progress).

OBIBSS has provided to COCONET relevant analyses and methods:

- New approaches to integrated ecological assessment of marine protected areas - Alexandrov B.G., Minicheva G.G., Zaitsev Yu. P.;
- Methodical recommendations on the determination of a number of morphofunctional indexes of unicellular and multicellular forms of aquatic vegetation. -Minicheva G., Zotov A., Kosenko M.

All activities within this task are running to schedule.

Task 5 Site selection for OWF installation within the pilot project area (MPAs networks)

Several WP 10 partners (MHI, METU, INCDM, GEOECOMAR) contributed data to WP5. Most notably MHI was directly involved in the timely preparation of the following WP5 deliverables:

- Milestone 25 "Atmospheric model results for the Mediterranean and Black Seas"
- D 5.2.2 "Assessment of extreme met-ocean conditions in the Black Sea"

Details can be found in these deliverables.
All activities within this task are running to schedule.

Task 6: Impacts of OWF development on wild-life in the selected sites.

Subtask 6.1 Impacts of OWF installations on benthos and plankton

This task is focussed on assessing and analysing the impacts of OWFs on the benthic and plankton communities. Introduction of artificial features on the sea floor, such as OWF turbine bases, can influence the benthic and plankton communities by altering existing or creating new habitats. New structures can also destroy existing habitats. A change or increase in benthic communities can have an influence on other species in the area, which in turn, can alter the wider ecosystem. As a result, it is important to understand the impacts that OWF developments will have on these communities.

INCDM will assess the potential impacts of OWF on benthos and plankton by biological sampling and performing in-situ experiments on an already existing artificial reef which are present in or around the Romanian pilot site "Costinesti – Cap Aurora".

INCDM has already conducted a diving survey covering the pilot site and its vicinities and located a suitable site on a wreck. The precise GPS coordinates are N 43 51 02.7, E 028 40 45.1 and the depth is 32m. Background data is available for bathymetry and biology (benthos, plankton, fish), while side-scan sonar mosaics will be available at the end of 2014.

The experiment will be carried out in 2014 by scientific diving. A large number of experimental plates simulating the material of the foundations of the offshore wind turbines will be affixed on the wreck and left there to be colonized by benthic organisms. The site around the wreck will be monitored at 3 months intervals (3^{rd}m, 6^{th}m, 9^{th}, 12^{th}m) for diversity of benthos and plankton using both visual methods and destructive sampling. Each time a fixed number of replicates (plates) will be removed from the experimental set-up and colonization by marine biota will be analyzed in the laboratory.

Subtask 6.2 Impacts of OWF installations on fisheries

Levent Bat, Murat Sezgin, Fatih Şahin from SNU-FF have compiled a literature review on the Impacts of OWF installations on fisheries.The installation of an OWF has the potential to have positive and negative impacts on the ability of the ecosystem. SWOT analysis of OWFs has been shown in Table 1.

SWOT analysis shows that the wind power generation industry has the potential to become very significant in the attempt to reduce greenhouse gas emissions. The large-scale wind resource makes it a more attractive source of power than hydropower or fossil fuels.

Wind power is generated from a free energy source and generates zero emissions. During construction many jobs will also be created during the development, manufacture and assembly of the turbine components (Parkinson, 2001).

Studies have shown that any adverse environmental consequences that occur during the exploration and construction phases will be relatively short lived. Once the construction is complete the system should return to its original state. Local effects on fish communities can be reduced or mitigated for by carrying out the construction at a carefully chosen time of year. It would appear that the operation phase does not cause many significant problems (Parkinson, 2001).

The presence of an OWF site will also modify the behaviour of fishermen, whether this will be an exclusion of trawler activity within a site, or alternatively, a more intensive linear trawling pattern between turbines, is unknown, but may have additional impacts to the benthic community. An additional point is that fishing activity may be displaced to reference sites, thus potentially masking any deleterious impacts within the OWF area as they are negated by such changes in fishing effort (Cefas, 2009). It is needed to good communication so that fishermen know where they can still work once the turbines are in operation (Parkinson, 2001).

The environmental impacts of an OWF are listed below: Sources: Forward 2005, Hansen 2012, Wilhelmsson et al. 2006, Leonhard et al. 2011, Wilson 2007,Klaustrup et al 2007, Mee 2006, Petersen & Malm 2006.

- The construction and operation of OWFs do have some environmental impact, such as disruption of the seabed and noise pollution, but many of these impacts are to a lesser extent than originally predicted.
- The effects of noise from the turbines on commercial fish species are not clearly established.
- Despite the loss of the existing seabed habitat to make way for the installation of the turbines, this loss is relatively small when compared to the remaining undisturbed habitat surrounding the wind farm.
- Through careful design of the required scour protection, new habitats can actually be created, which may be beneficial not only to the surrounding ecosystems and environment, but also potentially to local fishermen. These new habitats may act as artificial reefs.
- A range of scour protection methods to be used within any individual OWF, including synthetic fronds, gravel and large boulders. This will mimic a broader range of natural habitats and increase habitat heterogeneity, which has been proven to aid increased biodiversity and abundance.
- Ensure that a large range of hydrodynamic niches are created for a wider range of species. This will allow both fast-flowing current and shelter preferring species to find habitats within the scour protection.
- Maximisation of surface area to allow maximum levels of colonisation of benthic organisms, which will then allow the development of a food web, leading up to supporting a diverse species community. The use of specially designed materials, such as reef balls, to maximise habitats and abundance.
- The matching of dominant scour protection methods to the existing local ecosystems and communities.
- Good planning in terms of timing, to ensure that the turbine foundations are in place to capture plankton and allow development of the earliest stages of the desired food webs.

Table 6.1 SWOT analysis for OWFs (from Mee, 2006).

Strengths	Weaknesses
Free and inexhaustible energy source. Emission free helps to reduce greenhouse gases. Technology is available, OWFs already up and running. Improvements in wind turbine technology promises to produce more electricity at a cheaper rate.	Conflict with fishing, shipping, marine aggregate extraction, communication cables, sailing, marine archaeology, radar, oil and gas, tourism Impact on organisms (fish, marine mammals, benthos, birds etc.) especially from noise, construction debris. Re-piling can destroy the benthic habitat multiple times during the lease of an OWF Intermittency in wind and wind speed changes
Opportunity	**Threat**
Most suited for islands which do not have many other sources of energy due to logistics problems Reduction in cost of construction due to improvements in technology and scale could result in more OWFs Decrease in fossil fuels creates a need for alternative energy Climate change scenarios creates a need for clean energy Employment for people trained in offshore and marine sciences	Decrease in costs is envisaged not guaranteed. Rough seas, cyclonic conditions can damage the infrastructure. Intermittency in wind creates gaps in supply to the grid. Navigational accidents can damage the infrastructure. Energy policy in the UK is being reviewed at present to compensate for the energy gap with a shift towards nuclear energy. Repayment of debt may not reduce production costs over time

- Aquaculture in OWFs will reduce the impact of OWFs on fisheries.
- The lack of inshore sites for aquaculture has necessitated moving to offshore regions. The infrastructure available with OWF developments would become a site of choice without any disturbance to the main purpose.
- Artificial reefs have positive local effects on the species richness and the biodiversity in the OWF area.
- A consequence of that extended influence may be that OWFs of the future, containing tens to hundreds of turbines, will have additional synergistic effects on the fish community structure, with biological interactions between the biota around the turbines.
- If fishing effort is limited around the OWFs, they may act as marine protected areas (MPAs), which worldwide are used to manage fishery resources.
- In areas with little or no hard substrate, OWFs will provide not only new habitats, but also create a stepping stone for the spread of hard substrate organisms and thereby facilitate the spread of non-native and invasive species.
- An area with homogeneous sand sediment has a higher impact on the fish fauna compared to OWF in areas with heterogonous sediment.
- Despite the fact, that OWF's will be an intrusion in a natural system, it can be

assumed that several benefits arise from the construction.

The combination of all these factors should ensure that the construction of OWF need not necessarily have a detrimental impact on their surrounding environments, and actually have the potential to contribute to the environment. Their application could also potentially make the development of future, larger OWFs easier to gain consent for, as their environmental argument would be strengthened (Wilson 2007). Thus, regarding fish the installation of the OWF is not believed to impose any significant negative effects on the fish fauna (Klaustrup et al 2007).

Elliott said that “Scientists will be increasingly required to consider the whole marine system, to continue to derive conceptual models and to attempt quantitative, numerical predictive models and decision support systems. However, they will have to educate managers and politicians to the view that the marine system is so complex that it is unlikely that we will ever be able to fully and quantitatively predict all natural and anthropogenic changes and so best (expert) judgement will have to be relied on for decision making.”

Under this task, SNU-FF have also conducted a literature review of the fisheries at Sinop. This has identified the species present, the number and type of fishing vessels and the socio-economic demographic of the fishing community.

The literature review found that there are 94 species of fish present in the region, belonging to 44 families. The study also looked at the species of commercial interest which are found in the region and reviewed biological parameters and population dynamics alongside the total amount of fish caught (tonnes) per species. The main species of economic interest in the region are:

- Anchovy
- Horse mackerel
- Blue fish (small)
- Whiting
- Atlantic bonito
- Allis shad
- Turbot
- Garfish

All activities within this task are running to schedule.

<u>Subtask 6.3 Impacts of OWF installations on other vertebrates</u>

The final group of wildlife to be analysed with respect to the impacts from OWFs are other vertebrates. The main groups of other vertebrates to be assessed are birds and marine mammals.

Literature reviews are currently being conducted to identify the following:

- Sea bird species present in pilot area
- Marine mammal species present in pilot area
- Feeding areas for each species
- Breeding grounds for each species
- Migration routes for each species

By combining the knowledge gained from the literature reviews and the visual surveys, it will be possible to assess how the hypothetical OWF in the pilot area would most likely affect these species.

In order to accurately assess the data collected via literature reviews, ground truthing studies will be carried out. Standardised pre-OWF development sea bird and marine

mammal monitoring surveys will be carried out. The results of these surveys will be incorporated into the final output.
All activities within this task are running to schedule.

Task 7: Socio-economic impacts from OWFs planning/siting within or near MPAs

Task 7 is closely linked to WP6 (MPA socio-economic issues, management and legislation) which is also being led by NatureBureau. As a result, some of the work completed for this task has been undertaken during WP6 activities.

Subtask 7.1 Review on strategies and plans
The review of strategies and plans looks at national regional strategies for developing offshore wind energy. There will be a comparison and critical review of strategies which will identify strengths and weaknesses.
There is a close link between this task and WP6 Task 6.4 – Legislative implications of an integrated MPA/ OWF network in the Mediterranean and Black Sea.
Within this WP6 Task 1 work has been carried out to collect data on MPA guidelines/laws and OWF development plans. A virtual workshop was held between 27th February – 4th March, which brought together experts with knowledge on MPAs, OWF developments and environmental law. The workshop discussed the practicalities of producing a national inventory relating to laws, strategies and plans.
It concluded that data was easily available for the following countries:

- Greece
- Spain
- Italy
- France
- Black Sea nations

A data collection plan was discussed and data currently being collected by participants will be incorporated into the physical workshop to be held in December 2013.

UROS contributed significantly to the deliverables**:**
D 8.5: Report on Focus Workshop (virtual) Best practices for the management of MPAs
D 8.8: Report on Focus Workshop (virtual) Analysis of legislation

In addition to the activities being conducted within WP6, NENUPHAR contributed an extensive review of National, European and Pan-European strategies and plans (Regulations, Laws, Conventions, Directives, Action Plans) to develop offshore wind energy, critically reviewing and comparing all these, with emphasis on the type of policies envisaged (economic instruments and/or direct regulation). This report also compares strategies within the project region to northern Europe, where OWFs are in active use. An analysis of the strategies and plans used for onshore wind farms in neighboring countries of the Black and Mediterranean Seas, has also been conducted to assess differences between onshore and offshore windfarms. Finally, an analysis of strategies and plans in North America and Japan has been conducted, as there is a focus on developing floating OWF technologies in these regions. This allows for an interesting comparison and identifies potential areas of future development with the Mediterranean and Black Sea.
As the report is very extensive, we will include herein only the information pertaining to

Black Sea countries.
Bulgaria, which introduced a feed-in system for wind installations in 2007, increased its wind power capacity to 180 MW in 2009.
In Bulgaria, electricity from renewable sources is mainly promoted through a feed-in tariff. Producers of electricity from renewable sources are contractually entitled against the grid operator to the purchase and payment of electricity at a guaranteed price. The feed-in tariff may not be received on top of other incentives.
The payment is a guaranteed payment in terms of minimum payment rates. The tariffs are set by the regulatory authority on 30 June every year. Systems and plants put into operation prior to or on 3 May 2011 are eligible for the tariffs applicable until 3 May. Systems and plants for which a connection agreement was concluded prior to 3 May 2011 will receive the feed-in tariff applicable on the date the system/plant was put into operation.
Wind energy :

- New plants with an efficiency of 2,250 earned hours: 191 BGN per MWh (9.77 €ct per kWh)
- New plants whose efficiency exceeds 2,250 earned hours: 173 BGN per MWh (8.85 €ct per kWh)
- Plants that are not covered by this definition: 137 BGN per MWh (7.01 €ct per kWh)

The tariffs are revised and set by the regulatory authority for energy on 30 June every year. The rule that the feed-in tariffs may not be reduced by more than 5% per year (introduced on 03.05.2011) was abolished. In pursuance of the amendment, the feed-in tariff may not be changed during the entire term of the subsidy agreement. The feed-in tariff applicable is the one in force on the date on which the plant/system was put into operation.
The period of the obligation to purchase and dispatch electricity is 12 years for wind power plants.
The costs arising from the feed-in tariff scheme are borne by the consumers through the electricity price.
The grid operators have the right to request compensation for the costs resulting from the purchase of electricity from renewable sources. The costs resulting from the purchase of electricity from renewable sources are added to the electricity price and thus passed on to the final consumers.

In **Romania**, electricity from renewable sources is mainly promoted through a quota system. Electricity suppliers are obliged to present a certain number of so-called "green certificates", which are issued for electricity from renewable sources. This quota system has not yet been applied as it is currently probed for state aid by the European Commission. In addition to support through the quota system, renewable energy is subsidised by the Romanian Environmental Fund.
<u>*Quota system*</u>: In Romania, the main means of promotion is a quota system based on quota obligations, tradeable certificates, and minimum and maximum prices. Electricity suppliers are obliged to present a quota of green certificates. These tradeable certificates are allocated to the producers of electricity from renewable sources. This quota system has not yet been applied as it is currently probed for state aid by the European Commission. According to the regulatory authority ANRE, the law in question is expected to be authorised by the European Commission within the next few months. However, certain changes to the Law may be necessary to obtain the Commission's authorisation.

Wind energy is eligible. In general, eligibility ends after 15 years. Wind power stations that are no more than 10 years old, and have already been used for electricity generation within the territory of another state or were in operation before the Law came into effect become ineligible after 7 years.
Amount of quota per year: The percentage of electricity from renewable sources promoted under the green certificates scheme is as follows:

- in 2011:10%
- in 2012: 12%
- in 2013: 14%
- in 2014: 15%
- in 2015: 16%
- in 2016: 17%
- in 2017: 18%
- in 2018: 19%
- in 2019: 19.5%
- in 2020: 20%
- from 2020 to 2030: at least 20%

of the total annual electricity sold by an obligated person.
The quota for 2020–2030 will be determined upon resolution by the ministry in charge. The adjustment of the quotas applicable from 2010 to 2020 is not explicitly regulated by law.
The number of green certificate issued for wind energy is:

- until 2017: 2 certificates,
- from 2018: 1 certificate per MWh of electricity generated

The amount of subsidy corresponds to the price per certificate achieved in the market. During the years 2008–2025 the transaction value of a green certificate will be at least 27 Euros and at maximum 55 Euros. The certificate price will not differ according to technology. If a supplier fails to meet the annual quota, he will be obliged to purchase the missing certificates at a higher price of 110 Euros each
Furthermore, certificates may be traded on the international market only if the applicable national quota for green certificates has been met. The costs of the quota system are borne by the consumers through the electricity price.
Subsidies: The Romanian Environmental Fund provides funding for projects for environmental protection. One of the schemes under the Fund is the "Programme for the Promotion of Electricity Generation from Renewable Sources“, which also applies to electricity generation projects.
There is at least one call for applications per year. The last call was open from 15 June to 15 July 2010. The application period for 2011 has not yet been set.
Wind energy is eligible. The maximum subsidy is 50% of the eligible project costs. An exception is the region of Bucharest-Ilfov, where the maximum subsidy is 40% of the eligible project costs. The subsidy is subject to a maximum of 30 m Lei (approx. 7.13 m Euro) per project. The total budget for the 2010 application round was 900 m Lei (approx. 214 m Euro). The costs are covered by the state.

Ukraine has introduced tariff differentiation by technology. This policy relies on a series of multipliers of the retail rate.
However, to avoid exchange risk, Ukraine's new "Green Tariffs" provide a minimum tariff denominated in Euros based on the official exchange rate by the National Bank of Ukraine on January 1, 2009.
There is also a domestic content requirement of 30 percent to qualify for the tariff and

the requirement increases to 50 percent in 2014.
The tariffs, which went into effect on April 22, 2009 apply through 2030.
The Green Tariff Law differentiates the Green Tariff depending on the source of alternative energy and the type and capacity of the generation facilities. To address the risk of devaluation of Ukraine's currency, the Green Tariff Law also introduces a fixed minimal Green Tariff nominated in euros pursuant to the official euro/UAH exchange rate as of January 1, 2009. In addition, the Green Tariff Law stimulates manufacturing and consumption of materials from Ukraine, as well as works and services required for construction of the generation facilities that use alternative sources of energy.
As of July 2011 the following tariffs per kWh were applied: wind – UAH 1.23 (EUR 0.12)
The Green Tariff Law sets a mechanism for protection of investors from devaluation of Ukraine's currency during construction and exploitation of generation facilities based on alternative sources of energy. In particular, the law specifies that in any event the Green Tariff approved by NERC for a particular company may not be less than a fixed minimal Green Tariff. The minimal Green Tariff is nominated in euros and equal to the Green Tariff calculated using the Basic Tariff and coefficients valid as of January 1, 2009 and the official euro/UAH exchange rate set by the National Bank of Ukraine as of January 1, 2009 (1 euro = 1085.546 UAH). Through the mechanisms of the Green Tariff, Ukraine's parliament stimulates consumption of materials, works and services from Ukraine during construction of generation facilities based on alternative sources of energy. The Green Tariff Law provides that a generation company has the right to charge its customers the Green Tariff only if, starting from January 1, 2012, the share of materials, works and services from Ukraine used for construction of a generation facility based on alternative sources of energy is not less than 30 percent of its total value, and starting from January 1, 2014 – not less than 50 percent.
By means of a separate provision of the Green Tariff Law, the state of Ukraine guarantees companies that generate electricity from alternative sources at the constructed generation facilities will have the right to follow the Green Tariff rules valid at the date the generation facilities were put into use, even in case of further change to the Green Tariff rules. In such a case, however, the companies may decide to follow new Green Tariff rules.

Russia- its vast geography includes every type of condition favourable to renewable generation. Yet that potential remains almost completely unrealised. At the end of 2009 just 13 MW of wind and negligible solar capacity was present in a country with a total installed generation base of 220 GW. And, if large hydropower is excluded from the equation, only around 1% of Russia's power is currently generated from renewables.
Energy in Russia is dominated by oil, coal and above all, gas and has huge reserves, allowing it to supply its consumers with relatively cheap energy and wield the power that comes from being a key exporter to Eastern Europe and beyond.
A decree supported by current President Dmitry Medvedev set a target for a 4.5% share in electricity generation by 2020. As part of the decree, Russia's energy ministry is charged with developing support mechanisms to bring renewables into a power economy that needs massive investment to bring large parts of its creaking, Soviet-era, infrastructure up to date. KPMG estimates that Russia will require US$320 billion of investment in generation alone, creating a significant market for renewables.
The presidential decree and 4.5% renewables target is highly promising but needs to be underpinned by rigorous, specific policies of the type seen elsewhere. , it is more likely to remain a figure on paper than a reality. Willems cites grid access as an example of the type of measures he has in mind. 'In most European countries there is priority access for renewables and an offtake obligation on the part of wholesalers to get

electricity produced by renewables to the end consumer,' he says. A full, European feed-in tariff system is not necessarily expected to emerge in Russia, but maybe some sort of feed-in support system, perhaps based on generation capacity.
The first stage of the 4.5% by 2020 target required Russia to achieve 1.5% by the end of 2010. This was not met, yet there is a lack of urgency by the authorities.
Wind and biomass have a tremendous opportunity to make an impact within 10 years, especially for the 10% or so of Russians who are not connected to the grid.

Turkey has had a limited feed-in tariff policy since 2005. The previous policy paid the equivalent of $0.07 per kWh for wind energy for a period of seven years. By international standards, the policy was a failure.
Early in 2011, the Turkish parliament adopted a new feed-in tariff policy of equally limited duration, ten years, and equally limited objectives, 600 MW of total capacity. As before, tariffs are limited as well.
The new tariff for wind energy is 0.056 €/ kWh (0.073 USD/kWh). (Payment in US cents, not Euro cents). Program cap 600 MW/year through 2013.
One departure from previous policy, Turkey will now offer incentives or bonus payments for hardware "Made in Turkey".
In the case of wind turbines, the bonus payments will be as follow:

- Blades: 0.006 €/kWh (0.008 USD)
- Generator & power electronics: 0.008 €/kWh (0.010 USD)
- Tower: 0.005 €/kWh (0.006 USD)
- All other mechanical components: 0.010 €/kWh (0.013 USD)

Industry observers have widely panned the new program as insufficient to create the volume necessary to attract manufacturing.
Turkey has a goal of shifting 30% of its power generation to renewables by 2023. Yet, instead of fully supporting a fledgling renewables sector, Turkey's new program limits production and places bureaucratic barriers in the way of small-scale operators that could deter investors even if Turkey has excellent potential for wind, solar, and hydro power production.

The current political and economic climate in **Georgia** is unstable, resulting in a paucity of investment in the country's renewable energy resources.
The most promising renewable energy resources in Georgia are geothermal, wind, and hydro power. Wind power potential is estimated to be at least 2,000 MW.

In 2010, the European wind energy market entered a new development phase, as its focus will increasingly turn to the offshore wind farm market in the countries of Northern Europe, and to new emerging markets. The mature markets will continue to wield influence but their growth will flatten out.
The National Renewable Energy Action Plans (NREAP), implemented under the terms of the Renewable Energies Directive, has set out a development roadmap for each renewable sector. EU Member State governments are now bound to adapt their legislation to incorporate the Directive's objectives.
The outline of the sector's development is thus fairly clear up to the 2020 dateline even if for economic reasons the roadmaps are not fully adhered to in the first years. Most of the national experts we surveyed reckon that their national target will be achieved, which means that our forecast resembles the NREAP forecast. These action plans can only be good news for the wind power sector because they safeguard the production capacity increases for the next decade.
The flipside of the coin is that some of the Member States are inclined to control the

development of their sector, if not rein it in if they feel the market is overheating. In actual fact, the wind power industry can rapidly respond to high rises in demand and thus will enable the national targets to be achieved well before the 2020 deadline. This unbridled growth poses the problem of manufacturing industry support costs.
The example of Spain illustrates this eloquently as the country had to instigate emergency measures to check its runaway domestic market in its stride before the implementation of a new legal framework scheduled for 2013. Other countries such as Italy and Belgium are planning to overhaul their incentive systems as part of the transposition of the Renewable Energies Directive into national legislation.
France has repeatedly changed its legal framework to control the pace of its installations. The EU Member States also want to be certain that their investments serve their national interests in terms of new factories and job creations.
Considerable investments in grid infrastructures are called for in response to the development of production capacities, which will entail the creation of offshore infrastructures in the North and Baltic Seas, the strengthening of existing power lines and enhanced major transnational power grid interconnections in Europe.
Last November the European Commission published a communication entitled “Energy infrastructure priorities for 2020 and beyond” which aims to create a real European electricity market, increase security of supply, lower prices and increase the grids’ capacities to incorporate renewable electricity.
This smart grid would optimise the balance between consumption and decentralised and intermittent electricity production inflows. Its purpose would be to link the major offshore wind farms in the North and Baltic Seas with the concentrated solar power plants in North Africa or Spain, routed via the major hydropower dams in Scandinavia and the Alps.
The stumbling blocks strewn along this path are legion –funding, the legal framework, technical innovation and most of all public acceptance of high voltage power lines – and the venture is colossal. According to this blueprint, the liquidation of the investments required for the energy infrastructures (electricity and gas distribution, energy storage, smart grids) could create another 775 000 jobs over the 2011-2020 period and add 19 billion euros to the EU’s GDP in 2020. Europe was built in 1952 on the European Coal and Steel Community. The setting-up of this major grid in the 2010s could be tantamount to a new founding act of European construction. In December 2010, ten countries bordering the North Sea signed a memorandum of understanding on joint coordination of an offshore grid in Europe’s northern seas.
Under this intergovernmental initiative Belgium, Denmark, France, Germany, Ireland, Luxembourg, the Netherlands, Norway, Sweden and the UK agreed to work together to coordinate investments in interconnections, setting out deliverables with deadlines up to 2012.

The following abstracts were submitted by UROS for presentations during workshops:
-What are the key components for management and / or monitoring marine protected areas and why? (Key approaches, principles and instruments / Legal aspects of MPA management / Management tactics / Management plans)
-Overview: The Black Sea legal system with regard to MPAs and OWFs
(Marine Protected Areas: The key international legal framework / The key EU legal framework / The key regional legal framework / Offshore Wind Farms)
Several dissemination activities have been performed by UROS:
- Presentation of the project on the website of the University of Rostock (http://www.jura.uni-rostock.de/Czybulka/forschung/coconet.html);
- Creation of a poster about CoCoNET;

- Translation of the CoCoNET-brochure and poster into German for the CoCoNET-website;
- Distribution of calendars, brochures and posters;
- In progress: abstract on the "Bucharest Convention" for the website www.meeresnaturschutz.de.

Currently UROS is evaluating the current state of the law and preparing an inventory on national, regional and international legal regulations regarding Marine Spatial Planning, The establishment of networks of MPAs and the establishment of Offshore Wind Farms in the Black Sea area;

Other Activities relevant for the project:

- Organization of a doctoral seminar on legal strategies and approaches to preserve ecosystem- and biodiversity;
- Presentation on the topic "Placing Marine Protected Areas in a broader perspective – the first steps towards Marine Spatial Planning in the Black Sea: the example of Romania";
- Publication of an article on the zonation of the western Mediterranean and its consequences for the protection of ecosystems and biodiversity (Prof. Dr. Detlef Czybulka / Daniel Braun "Die Zonierung des westlichen Mittelmeers und ihre Bedeutung für den Ökosystem- und Biodiversitätsschutz durch Meeresschutzgebiete", EurUP 6, 2012, p. 290-303 / EurUP 1, 2013, p. 17-35);
- Publication of book reviews on books about the third internal energy market package and marine nature conservation and management at the borders of the European Union.

<u>Subtask 7.2 Analysis of the social dynamics in Southern Europe compared to Northern Europe and of lay people perceptions</u>

A critical element influencing OWF developments are public perceptions and the influence of cultural dynamics on the decision making process. If the weight of public opinion is firmly against an OWF development, this can influence political decisions and block developments. Similarly, strong public support for a development can positively influence the decision making process.

This task will compare the perceptions and dynamics between northern Europe (where OWF developments already exist) and southern Europe (where no OWF developments exist and which includes the project areas of the Mediterranean and Black Sea's).

Existing studies will be analysed and fuzzy-cognitive mapping techniques applied to understand the conflicts generation, escalation and resolutions.

A literature review has been conducted on the social impacts of OWFs. The following papers were reviewed in this study:

- OSPAR – "Problems and Benefits associated with OWFs"
- Krohn, S. and Damborg, S. 1999. On public attitudes towards wind power.
- Socio-economic impacts of Special Environmental Protected Areas (SEPA) - Fethiye - Göcek case study.

The OSPAR report found that OWFs can have either a positive or negative socio-economic impacts, by either encouraging or discouraging tourism in the region. The report also discussed that the noise emitted from OWFs can be heard up to 1km away, which could negatively affect those living in coastal areas.

Krohn and Damborg stated that the public attitudes towards windfarms are:

Those in favour of wind energy tend to believe:

- Renewable energy is an alternative to other energy sources

- The climate change argument must be taken seriously
- Wind energy is unlimited, unlike fossil fuels
- Wind energy is non-polluting
- Wind energy is safe

Those against wind energy tend to believe:

- Renewable energy cannot solve energy problems
- Wind turbines are unreliable and dependant on the wind
- Wind energy is expensive
- Wind turbines spoil the scenery
- Wind turbines are noisy

The review of the socio-economic impacts of SEPA's, found that local people identify that there are potential benefits from working and living in a protected area. These are mostly experienced through increased tourism. However, residents did not identify this as a main source of income and only saw it as an opportunity to acquire supplementary earnings.

Further literature reviews are now being conducted to identify additional relevant studies. A comparison of two case studies (one in northern Europe and one is southern Europe) may be conducted if sufficient data for two sites is available.

<u>Subtask 7.3 Economic Impact Assessment of the costs and benefits of OWFs in the study site</u>

This taskwill assess which economic sectors are most likely to be affected by OWF developments.

A paper has been produced for WP5 entitled: *Scenarios and feasibility study for local manufacturing options in countries around the Mediterranean and Black Sea*.

The paper analysed potential economic impacts in the following countries:

- Greece
- Italy
- Spain
- Turkey
- Romania

The analysis found that Romania had the greatest potential to benefit from OWF development with 121.4 man years of additional employment per MW of energy produced. Most of these economic benefits would be experienced in the machinery and construction industries.

A SWOT analysis of the synergy between OWFs and aquaculture has also been conducted as part of this task in WP10. The literature review carried out by SNU-FF, found that the main advantages of combining OWFs and aquaculture are:

- Reduces impacts on fisheries
- OWFs operation not effected
- Creation of jobs

Whilst the main disadvantages are:

- New concept, needs testing
- Legal issues relating to leasing sea floor
- Equipment needs developing for OWF locations

Further research into the economies of the countries involved in the Black Sea Pilot Project is currently being conducted at both national and local scales. Data collection forms are being designed which will be distributed amongst partners in the region in order to collect information from local stakeholders. Once collected, the data will be analysed to assess the strengths and potential gains for each national and local economy.

Subtask 7.4 Cost and benefits of impacts on non-market marine goods and services

This task has a strong link with Task 7.3 and will supplement it by providing information on non-market marine goods and services. Non-market goods and services are aspects such as the enjoyment that people derive from spending time near to the sea. These can be affected by OWF development and therefore it is important to understand:

a) What non-market goods and services exist in the pilot project areas
b) How these might be affected by an OWF development

Work on this task is linked to the ‘Marine Economic Instrument Index’ which is being developed in WP6 Task 1. Once this tool has been produced it will be possible to assess the value of these non-market marine goods and services.

The stakeholder position paper currently in development in WP6 will seek to identify some of these goods and services which can then have a value applied to them using the index tool.

All activities within this task are running to schedule.

Publications by WP 10 partners acknowledging COCONET

Scientific papers (published, in press or submitted)

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58.The 45th International Liege Colloquium on Ocean Dynamics, Liege, Belgium, 13-17 May, 2013http://modb.oce.ulg.ac.be/colloquium/2013/ColloquiumSchedule.pdfweb .Milchakova N.A., Mironova N.V., Alexandrov V.V. Causes and effects of the long-term changes in the bottom vegetation of Kazachya Bay (Crimea, the Black Sea)

59.International Seminar "Nature Reserve Fund of the Crimea: problems, the present and the future", Crimean Scientific Center, Simferopol (5 July, 2013) - 3 participators and presentations (Dr. N. Milchakova, Dr. L. Bondareva, Dr. T. Pankeeva), http://crimean-center.com/?cat=3

60.21th International Seminar on Interaction of Neutrons with Nuclei (May 20 –25, 2013, Alushta, Ukraine) -Fundamental Interactions & Neutrons, Nuclear Structure, Ultracold Neutrons, Kravtsova A.V., Frontasyeva M.V., Milchakova N.A., Dmitriev A.Yu. Multielement instrumental activation analysis of macroalgae *Cystoseira* used as biomonitor of the Black Sea coastal waters pollution in Sevastopol region.

61.The 38th meeting of the Joint Institute for Nuclear Research, Programme Advisory Committee for Nuclear Physics (20-21 June, 2013, Dubna, Russia), PhD student Kravtsova A.V., Frontasyeva M.V., Milchakova N.A. Peculiarities of macro- and microelements accumulation in *Cystoseir*a spp. in the coastal waters of south-western Crimea (the Black Sea).

62.The changes in the Ecosystem of the Northwestern Black Sea Region over a period of 1955 - 2010 years (Komorin V, Ykrairisky V, Popov Y, Matygin A, Kovalyshyna S.)

63.Long-term Structural Changes in the Phytoplankton Community of NWBS (Terenko G, Kovalyshyna S, Grandova M)

64.Way of creating a new marine object of nature reserve fund of Ukraine - "Small Phyllophora Field " (Eduard F. Kostylev, Feodor P. Tkachenko and Irina P. Tretiak)

65.Polycyclic aromatic hydrocarbons in bottom sediments of the Danube estuarine coast (K.K. Tsymbaliuk, Y.M. Denga1, N.A. Berlinsky1, V.P. Antonovich)

66.Modern information technologies of environmental monitoring of the Black Sea (Dovgyi S, Krasovskyi G, Radchuk V, Trofimchuk O, Andreyev S, Berezina C, Butenko O, Vishniakov V, Kreta D, Klochko T, Lisovskyi R, Slobodian V)

67.A.S.Mikaelyan."Long-term changes of phytoplankton in the Black Sea". Scientific council, South Branch of Institute of Oceanology, Gelendzhik, June 2012

68.T.A. Shiganova “Adaptive strategy of invader ctenophore Mnemiopsis leidyi in the seas of Europe. Scientific council, South Branch of Institute of Oceanology, Gelendzhik, June 2012

69.A.S.Mikaelyan. "Populations of dinoflagellate Noctiluca scintillans (Macartney) in the Black Sea and the northern Adriatic Sea". Scientific council, Laboratory of structure and dynamics of plankton communities, South Institute of Oceanology, Moscow, May 2013

70.T.A. Shiganova “ Non-native species in the Southern seas of Eurasia”. Scientific council, Laboratory of structure and dynamics of plankton communities, South Institute of Oceanology, Moscow, January 2013

71.Detlef Czybulka .Placing Marine Protected Areas in a broader perspective – the first steps towards Marine Spatial Planning in the Black Sea: the example of Romania”;

Other

72.HYPOX Meeting, Ecosystem model for the Black ea and CoConNet activities, Staneva Rome, Italy, 05, 2012

73.Joanna Staneva HZG Research Center, Germany “Response of the Black Sea ecosystem to climate and antropogenic changes”, 10.2012

74.Joanna Staneva University of Oldenburg, Germany , “The Black Sea ecosystem variability” 01,2013

75.Invited Lecture “The Black Sea“, ICBM, University of Oldenburg.

76.Observing System Evaluation for the Black Sea: Focus on ARGOfloats and altimetry during 2005-2012H (Grayek et al.); Ocean Surface Topography Science Team Meeting Venice Convention Centre Palazzo del Casinò; Venice-Lido, Italy; September 27-28, 2012

77.Data Assimilation in European Regional and Coastal Seas (Black Sea and German Bight); (Grayek et al.); 2012 Exeter MetOffice

78.Berov, D., 2013. Structure of *Cystoseira* spp. macroalgal communities and the influence of anthropogenic factors on their distribution. Macroalgae as an indicator of the ecological state of coastal marine ecosystems in the Black Sea. PhD Thessis.

79.January 16, 2013, First Sevastopol TV, **TV Program "in the know",** Dr. N. Milchakova was represented the IBSS activities in the CoCoNet project**",** http://www.1sev.tv/story/id/4791

80.May 21, 2013, Sevastopol Independent Television, **TV program "News",** "Professor Vodyanitsky" again in the expedition**",** interview Dr. N. Milchakova about macrophytobenthos research in the NW of the Black Sea during the R/V expedition, May, 21 to June,1, 2013. http://nts-tv.com/sciense/14294-professor-vodjanickijj-snova-v-jekspedicii.html

81.June 1, 2013, Sevastopol Regional State TV and Radio Company TV program "News" of June 1, 2013 "It appears at a depth of more than two thousand meters in the Black Sea is life". http://www.stv.gov.ua/index.php/novosti/v-sevastopole/1539-okazyvaetsya-na-glubine-svyshe-dvukhtysyach-metrov-v-chernom-more-est-zhizn.

82.June 7, 2013, Sevastopol State Regional TV and Radio Company, TV program "In essence", Dr. N. Milchakova and IBSS researchers have presented the results of the 72 R/V expedition on "Professor Vodyanitsky", http://youtu.be/jb7qCHmdTKE

83. June 5, 2013, Crimean Scientific Center, Simferopol, «The World Environment Day, June 5», the information about seminar, http://crimean-center.com/?cat=3

84. July, 3 to 12, 2013, A scientific workshop on the preparation of underwater explorers level Diver-Research, Advanced Diver Research, Scientific Diving Instructor (CMAS), the National Nature Park "Charivna Gavan" from 3 to 12 July 2013 (Crimea, Ukraine), http://naturalpark.info/index.php/jquery-submenu1, Dr. N. Milchakova**,** Head of the Scientific Programme, lectors - Dr. N. Milchakova, Dr. T. Pankeeva, Dr. V. Alexandrov, MSc. D. Shamrey.

Deviations from Annex I

In the WP 10 DOW we had planned for a joint research cruise with R/V Mare Nigrum (owned by GEOECOMAR, Romania) to Zernov's Phyllophora Field (which lay in Ukrainian waters) in September 2013.
Starting in spring 2013, GEOECOMAR, the owner of R/V Mare Nigrum, has applied for all necessary permits from Ukrainian governmental agencies (mainly belonging to Ministry of Foreign Affairs and Ministry of Defense). The application was handled through the Romanian Ministry of Foreign Affairs.
In spite of the efforts made by GEOECOMAR, the Romanian Ministry of Foreign Affairs and of the good support received from all WP 10 partners involved (IBSS Sevastopol, OBIBSS, MHI, UkrSCES, NatureBureau) the approval of Ukrainian state authorities could not be obtained.
Given this situation, we have decided to cancel the cruise as it was planned in the DOW and implement corrective actions, so that a negative impact on the scientific goals of COCONETand on the use of resources will be avoided.

Reasons for failing to achieve critical objectives and/or not being on schedule and explain the impact on other tasks as well as on available resources and planning

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Use of resources and potential deviations

There is no deviation from the actual use and planned person-months in WP 10.

Corrective actions

To compensate for cancellation of the joint research cruise with R/V Mare Nigrum to the Ukrainian part of Zernov's Phyllophora Field planned for September 2013, the following corrective actions were devised:

1.A shorter joint research cruise of 3 days, to the southern lobe of Zernov's Phyllophora Field, which lay in Romanian waters, will be conducted with R/V "Mare Nigrum" in August 2013.

2. Another, longer joint research cruise with R/V “Mare Nigrum” will take place during summer 2014. During this cruise interdisciplinary research of marine habitats will be conducted either on the inner Romanian shelf or in the Viteaz Canyon (shelf break area).

These measures are already put in action, we are having the first cruise on 16-19th of August, with certain participation from GEOECOMAR, INCDM and NatureBureau. The participation of scientists from the same Ukrainian partners as planned is still sought.

For the cruise in 2014 many COCONET partners have already expressed their intent to participate. As a consequence, international participation in this cruise will be wider than anticipated, with scientists from Romania, Bulgaria, Ukraine, Italy, Turkey, Belgium and Great Britain.

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