

Mitko, Valery B.; Degtyarev, Vladimir P.; Minina, Marina V.

## Conference Paper

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53rd Congress of the European Regional Science Association: "Regional Integration: Europe, the Mediterranean and the World Economy", 27-31 August 2013, Palermo, Italy

## Provided in Cooperation with:

European Regional Science Association (ERSA)

*Suggested Citation:* Mitko, Valery B.; Degtyarev, Vladimir P.; Minina, Marina V. (2013) : Concept of the international programs monitoring the transboundary transport of pollution in the Black sea, 53rd Congress of the European Regional Science Association: "Regional Integration: Europe, the Mediterranean and the World Economy", 27-31 August 2013, Palermo, Italy, European Regional Science Association (ERSA), Louvain-la-Neuve

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## **CONCEPT OF INTERNATIONAL PROGRAMS MONITORING THE TRANSBOUNDARY TRANSPORT OF POLLUTION IN THE BLACK SEA**

**Valery B. Mitko**, President of Arctic Public Academy of sciences, Professor of Russian State Hydrometeorological University, T.Sc.D., Full Professor., Saint-Petersburg, Russia

**Vladimir P. Degtyarev**, Deputy Director of the Construction firm "Vector", Taganrog, Russia

**Marina V. Minina**, Scientific secretary of Arctic Public Academy of Sciences, CEO of Agency of the Scientific-Intensive and Innovative Technologies, T.Sc.D., associate professor, Saint-Petersburg, Russia

### **Abstract**

The article discusses proposals and the foundations for necessity of common system for monitoring cross-border transfer of contaminated water in the Black Sea installation. It is corresponding with Directive UN maritime strategy for the sea shelf. The task of developing a program of monitoring of the Black Sea region is the introduction of a system of rules on control technologies for cross-border transport of contaminated water for the regional community of scholars, experts and authorities for the application of these technologies in their countries. Scientific foundations can provide the basis for accession to Directive of other states.

### **Keywords**

Marine spatial planning, the Directive on Marine Strategy, monitoring, pollution rules, sea water, transboundary

### **INTRODUCTION**

From documents follows, that aim of the European Union's ambitious Marine Strategy Framework Directive (adopted in June 2008) is to protect more effectively the marine environment across Europe [1]. It aims to achieve good environmental status of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The Marine Strategy Framework Directive constitutes the vital environmental component of the Union's future maritime policy, designed to achieve the full economic potential of oceans and seas in harmony with the marine environment. On base of the Marine Strategy geographical and environmental criteria are foundation for determination of responsibility zones for each State. Each Member State must cooperate with other Member States and non-EU countries within a marine region. According to the Strategy each State must develop strategy for its marine waters, including a detailed assessment of the state of the environment, a definition of "good environmental status" at regional level and the establishment of clear environmental targets and monitoring programmes. Each Member State must draw up a programme of cost-effective measures. Prior to any new measure an impact assessment which contains a detailed cost-benefit analysis of the proposed measures is required. Where Member States cannot reach the environmental targets specific measures tailored to the particular context of the area and

situation will be drawn up. First stage - 2015 and that the first review of the River Basin Management Plans should take place in 2020.

There are some complexities of cooperation between Member States and non Member. This problem, for example, for Baltic sea is discussing during some years [2].

Shelf of the Black Sea is rich in oil deposits. Evaluation of hydrocarbon reserves only western Ukrainian shelf is 3.5 trillion. tons of standard fuel, oil shelf areas of Russia and Turkey may contain up to 1 billion tons of oil each. In a sea already installed dozens of platforms, realizing exploration drilling and production of oil and gas. The size of already made and planned for the near future investment is huge. For example, the cost of two new self-lifting drilling rigs (SLDR) to develop deposits in the Ukrainian shelf was approximately \$ 800 million, the cost of creating the platform of Turkish Sürmene totaled about \$ 4 billion planned investment together with Rosneft and ExxonMobil and Eni the development of the Russian part of the Black Sea shelf are estimated at 50 - 55 billion.

The pace of exploration suggest that a full-scale production of oil in the Black Sea will begin no later than 2017. Every year, tens of millions will be produced tons of oil and inevitable part of this flow will fall into the sea. Negative example is the situation in the Caspian Sea, where there are regular releases of oil and drilling fluids from mining platforms. About a thousand exhausted and seemingly suspended wells permanently poison the sea by oil and gas and in need of re-preservation every 20 years. It is significant that the Norwegian oil company Statoil, really observant environmental safety standards, does not work in this region. The lack of general security principles and norms of pollution of the marine environment has led to the loss of the Caspian Sea for its tourist and recreational attraction. [7]

The peculiarity of the Black Sea is the presence of hydrogen sulfide at depths of 100 - 150 m This factor significantly reduces the reliability and life of the subsea equipment. According to experts, the life of the underwater part of production platforms in the Black Sea could be reduced to six years instead of the usual 20-25.

Another feature of the Black Sea is to the direction of flow. As can be seen from Figure 1, the existing circular flow along the shelf will inevitably lead to transboundary transport of pollution of sea water in areas where there is no oil mining. This primarily refers to the coast of Bulgaria.



Figure 1. Map of currents in the Black Sea

The flow of contaminated water from the Romanian and Ukrainian sector of the sea shelf, where the oil will be produced on a large scale, can be deadly to the nature of the Bulgarian coast. A similar danger threatens and the nature of the southern coast of the Crimea. Even now, in the absence of production at the Pallas and in the Russian sector of the shelf, there are extensive oil slicks in the north-eastern part of the Black Sea (Fig. 2).

As for similar problems have been discussed for several years at the annual international fora on the day of the Baltic Sea [2]. Within the research project the BaltSeaPlan examined influence of branches policies on the Russian maritime spatial planning (MSP) the Baltic Sea. According to the methodology of the project was the analysis of 16 Russian regulations adopted strategic documents that influence on the use of the waters of the sea. Furthermore, the degrees was estimated the impact of each document to MSP, as follows:

To what extent are the objectives / priorities of the implementation will affect the use of the waters of the sea (direct or indirect effect);

What is the likelihood of their implementation (strong or weak effect).

As part of a thorough inventory of space inconsequences and potential conflicts of sectoral strategies, as well also identify opportunities and requirements of spatial planning in order to avoid these conflicts. Analysis of existing documents showed that the special policy "sea" orientation in Russia developed slightly. In separate documents sea direction is represented (for example transport, energy, tourism strategies), but some policies, such as a strategy for the preservation of cultural heritage and developing cluster initiatives are not allocated in the direction of the sea separate category. This fact demonstrates the underestimation of the role of marine nature-water use in developing countries, leading to a fragmented solutions in this sphere.

The absence of a distinct spatial policy at the state level leads to the fact that instead of a fullscale spatial planning realizes only a list of large-scale projects of national importance.

Pressure of departmental approach to spatial planning in return of territorial (which is noticeable in the analysis of branch policies), leads to the underestimation of the systems principle in developing, and is causing potential conflicts between natureuses. It is requiring centralized government intervention in the spontaneous process of restructuring of the space by separate departments.

In the current situation it is necessary to initiate and launch coordinated action of all Black Sea countries - Bulgaria, Romania, Ukraine, Russia, Georgia, Turkey and Greece, aimed at reducing the threat of pollution of the Black Sea in industrial production of hydrocarbons from the sea shelf. It is clear that each country will force to have a national system of monitoring pollution of sea water in its sector of the Black Sea. The first will be in demand monitoring of transboundary transport of pollution of sea water, allowing quick and around the clock to determine the volume of incoming contaminants, their composition and the degree of danger.

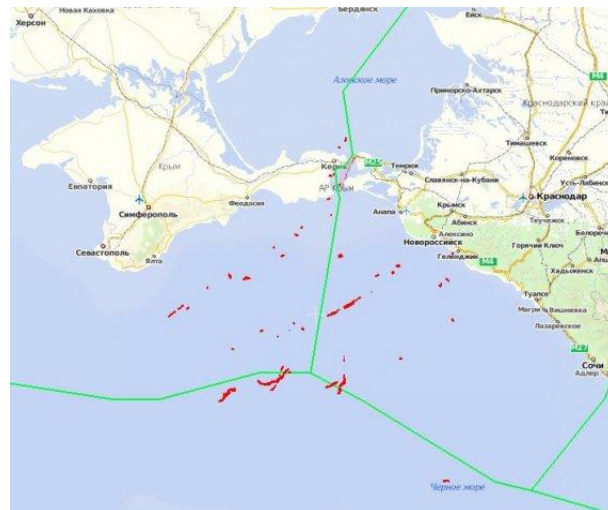


Figure 2. Oil slicks in the north-eastern part of the Black Sea (data from 2011)

The ideology of building a system of this kind is considered in a joint work of Russian and Ukrainian experts [4], and the methods of measuring the mass transfer of contaminants in the sediment has tested the waters of the Kerch Strait. Mandatory element of monitoring systems are underwater acoustic instruments ADCP for remote (from the bottom - up to the surface) measuring the direction and speed of currents at depth. These devices can detect the most dangerous pollution, extending under water and undetectable by aircraft and satellite survey. Due to the high cost of such devices, the total cost of creating a boundary line of the monitoring system can be 10 to 15 million dollars. Take into attention that the number of national sectors in the offshore Black Sea is 7 (including Abkhazia), the minimum number of systems for independent of national control of transboundary pollution is 14. Total investment in the creation of such systems around the Black Sea could be around \$ 200 million, which is significantly less

than the cost of one modern SLDR . However, these costs would be totally unjustified, if the creation of such systems will be carried out independently, without being tied to a single harmonized methods and means of measurements at sea.

Given the above, it seems urgent to begin work on regional harmonization of technical parameters of the systems for monitoring pollution in the sea, in order to support a single technology to create such systems for the Black Sea and the account of the most environmentally friendly standards and requirements. Another relevant area of international collaborative work is to validate the maximum allowable concentration of pollutants in the transboundary transport in the Black Sea. Such work will take into account the features of the terrain and hydrology of each part of the shelf, to differentiate rules on water pollution in marine areas. At present, while oil production is small, it is necessary to fix the background values of the transboundary transport of pollution of sea water. After two or three years it will be a completely different background, a less favorable to the environment and humans.

As the institutional framework of these works are encouraged to use the form of an international program like previously financed USAID Black Sea Environment Programme (BSEP). The concept and the general parameters of the new program (abbreviation - BSDMP, Black Sea Development Monitoring Programme) is described below.

The objectives of the Program Regional BSDMP are set of rules and techniques of control of transboundary transport of pollution of sea water, as well as regional community of scholars, professionals and government officials who are willing to implement these standards and technology in their respective countries. To achieve the objectives of the Programme shall be provided efficient solution to a complex problem (Table 1).

Table 1.

Maintenance tasks	Expected result
Education scholars, experts and representatives of the authorities modern requirements for the establishment and operation of systems for monitoring marine pollution, the study of the recommendations of the EU	Expected to train more than 300 people
Scientific justification of norms of maximum permissible concentrations of pollutants in the transboundary transport in the Black Sea, taking into account the	Scientific publications on standards harmonization with national environmental services

recommendations of the EU	
Development of recommendations for standards of inter-State interaction in controlling transboundary transport of pollution	A package of documents with recommendations for consideration by the Council of Ministers of Foreign Affairs of the BSEC and the EU
Competitions, examination and selection of the best projects for the model of monitoring system of pollution in the Black Sea	Documentation for 3-5 model of monitoring system of technical projects that match the conditions of the Black Sea
Certification of specialists in the field of development and operation of systems for monitoring pollution of marine waters in the Black Sea	Training and certification at the international level 40 experts from all the countries of the region
Collection and processing of data on background values of the transboundary transport of pollution in the Black Sea	The results of marine research, filling the open database
An international computer database on the transboundary transport of pollutants	Functioning of the open database, free access to users

The expected key results Programs BSDMP:

- the conditions for the introduction of advanced methods of monitoring pollution of marine waters in the Black Sea and the implementation of the recommendations of the EU in the field of environmental protection;
- savings countries of the region with the establishment of monitoring systems at the expense of type safety and standardization projects by applying a single coherent development technologies;
- reduction of pollution risks of holiday shores through administrative pressure on producers of hydrocarbons on the shelf and their application of more stringent protective measures;
- there will be tools for factual substantiation of environmental damage from pollution migration in the Black Sea;
- implementation of the results of the program in other regions, such as the Caspian Sea and offshore in the Eastern Mediterranean.

As example, can be used ideology of EMECO , many EMECO partners run complex coupled hydrodynamic models within North Sea and Celtic Sea domains that benefit from these observations and in return provide tools for improving understanding and predicting changes in

the ecosystem in this region. In order to create the data to information system (Figure 1), EMECO has developed a suite of web-based tools that enable rapid integration and visualisation of multi-platform, multi-parameter, and multi-national data. The purpose of the datatools is to deliver policy-relevant information products in a transparent and auditable manner that increases confidence in the outcome to formal environmental assessments at a regional scale. Users are able to select and view data from novel and traditional monitoring platforms as integrated data sets, time series charts, and maps (assessment maps). The assessment maps, currently of the greater North Sea and UK waters, are composed of a data "mash-up" displayed in set of policy-defined water bodies. These outputs are generated "on the fly". Figure 3 shows a schematic of the EMECO Datatool.

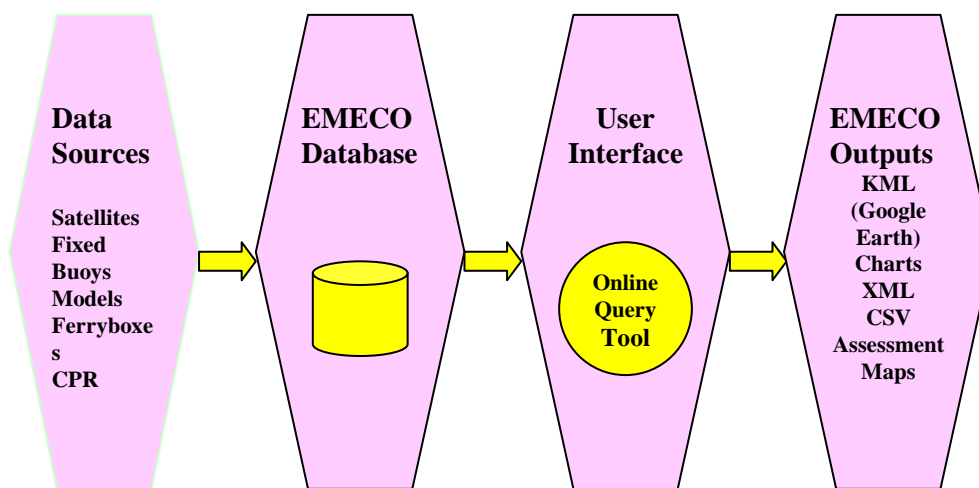


Figure 3. Schematic of the EMECO Datatool

Due to the most vulnerable of Bulgaria from the transboundary transport of pollution, it is advisable to place the main office and the center of the Program in Varna, which has scientific organizations and institutions working in the field of marine research and technology, as well as favorable conditions for foreign scientists and specialists. Main office to coordinate all the activities of the Programme, distribute and control the resources of the program. For the implementation of the Program in all participating countries (Romania, Ukraine, Russia, Georgia, Turkey, Greece) should be set up work centers operating activities of the Programme in its territory. These centers will be able to interact with the local and regional authorities, with the population to organize work on the local features of the transboundary transport of pollution in its territorial water, collect data on background levels of contamination.

According to experts, the implementation of such a program will require five years and about \$ 50 million main costs will be associated with the financing of training and conferences, marine scientific research, development of model projects monitoring systems for the Black Sea



(at the level of technical projects), equipment and support of the main office of the Program in Varna, implementation of working centers.

It can be assumed that the initiative to create and run a program in a timely manner will be supported by the Government of Bulgaria, the countries of the BSEC and the European Union, and the scientific basis of the program will have a stimulating effect on the States, still have not confirmed their commitment to the implementation of the directive.

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