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TIMMOD

Black Sea CROSS BORDER COOPERATION

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**www.timmod.org**

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## Joint Operational Programme Black Sea Basin 2014 – 2020

# TIMMOD

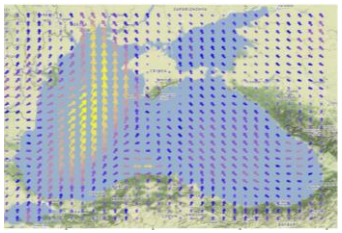

## TECHNOLOGY INNOVATION IN ENVIRONMENTAL MONITORING AND MODELLING FOR ASSESSMENT OF FISH STOCK AND NON-FISH RESOURCES

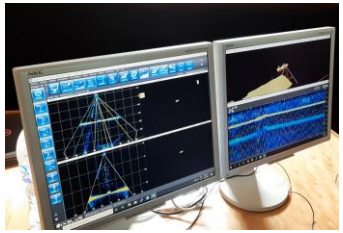
**INNOVATION WE NEED FOR THE BLACK SEA WE WANT!**

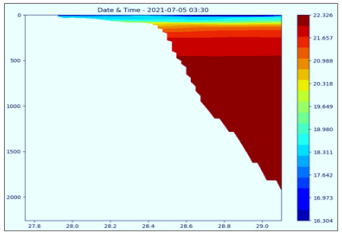
**TWO YEARS OF COOPERATION (MAY 2020 – MAY 2022)**

Common borders. Common solutions.

CROSS BORDER COOPERATION





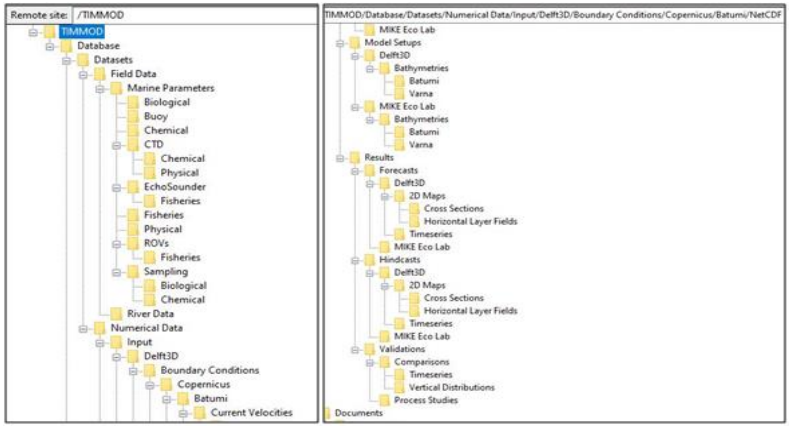


## TIMMOD Data Sharing

The primary objective of TIMMOD project is to improve environmental monitoring and data sharing at Basin Scale. To assist data-sharing processes between members of TIMMOD project and relevant stakeholders a FTP repository has been created part of the Monitoring & Modelling Data Sharing Platform (MMDSP).

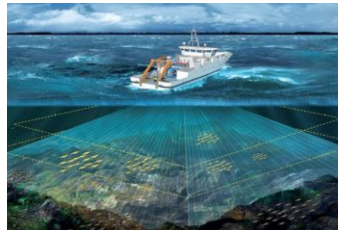
The Database is one of the four TIMMOD ICT tools (Open GIS Tool, Operational Forecast Tool, Mobile Data Tool and Data Base Tool) integrated in the MMDSP for hydro-environmental and modelling data sharing, and dissemination of project results. The Database includes several types of parameters, including hydrodynamic and meteorological data, ecological data in coastal areas, as well as fish and non-fish stock data.

Access to the database through the created FTP repository is open using a FileZilla FTP Client software. Georeferenced files and information for any kind of environmental datasets in the Black Sea Basin may be downloaded/uploaded by stakeholders and end-users. Access for interested parties, public end-users, and stakeholders is available after registration via the TIMMOD website: http://timmod.org/index.php/en/ict-tools/timmod-data-bas




In the respective folders, shared raw data of monitoring and modelling results is concurrently uploaded by all TIMMOD partners. Datasets refer to modelling input/ and Demonstration Pilot Surveys in Varna and Batumi. Extra historically available datasets about river discharges, etc. can also be found in the TIMMMOD Database.





## TIMMOD - two years of cooperation

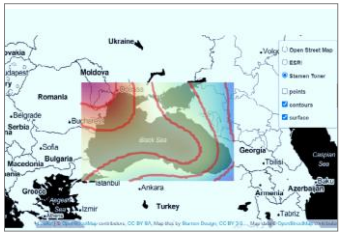
**TIMMOD** - *Promoting Technology Innovation in Environmental Monitoring and Modelling for Assessment of Fish Stock and Non-fish Resources* is an EU funded project financed within the Black Sea Basin Program 2014-2020, under Priority 2: *Promote coordination of environmental protection and joint reduction of marine litter in the Black Sea Basin*, Objective 2.1: *Improve joint environmental monitoring*.

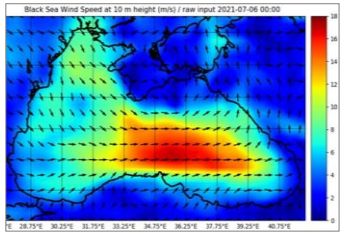
The project duration is two years, starting in May 2020 until May 2022. The joint work of the project partners is distributed in 4 group of activities and despite all restrictions by COVID-19 pandemic in the last two years, the project implementation went smoothly and in line with the workplan.


During the second year of the project implementation, two Dissemination events together with two digital promotional campaigns took place in July 2021 in Varna, Bulgaria and in October 2021 in Batumi, Georgia. Two Thematic Transboundary Meetings (TTM3 & TTM4) on innovative environmental monitoring technologies and joint application of innovative systems in marine environment monitoring services were organized in July 2021 in Varna, Bulgaria and in October 2021 in Batumi, Georgia. Several important technical reports have been delivered and the Draft TIMMOD Innovation Strategy had been validated during 4 national validation workshops in Bulgaria, Greece, Georgia and Romania.

Two Pilot demonstration projects on innovative monitoring using advance methods and instruments had been conducted in two pilot test sites in Black Sea waters - Varna, Bulgaria and Batumi, Georgia.

In the second project year all partners continued their active collaboration and involvement of stakeholders in project tasks.


## TIMMOD ICT Tools

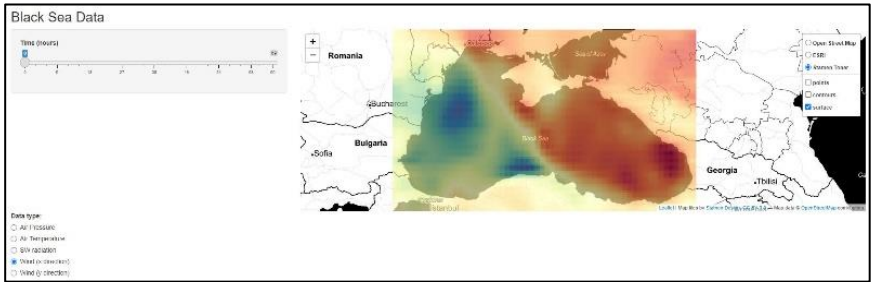
One of the key results of the TIMMOD project implementation is a set of ICT tools for data handling and numerical modelling of the marine environment, including high-level implementation of ocean dynamics modelling, and development of web-based data tools.

The base ICT tool is a **web-GIS platform** integrated in the TIMMOD pilot demonstration Monitoring and Modelling Data Sharing Platform (MMDSP) on the project website: [www.timmod.org.](http://www.timmod.org)

The web-GIS tool presents a modern solution for handling and sharing three types of data:

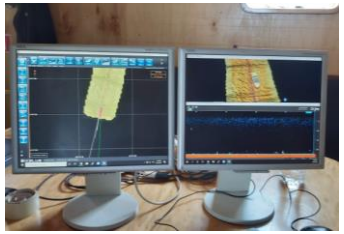
- Hydrodynamic and meteorological data (wind, waves, water levels, littoral currents, salinity transport, temperature).
- Ecological data (biological, chemical, and physical parameters of seawater).
- Data of fish stocks and non-fish living resources.

The forecasting of several marine environmental parameters in two coastal areas around – Varna in Bulgaria and Batumi in Georgia - is accomplished by using complex datasets feeding and forcing the models' setups by proper meteorological input (by NOAA/ECMWF) and oceanographic boundary conditions (by Copernicus) about the local hydrodynamics.




The atmospheric forcing input configuration that feeds the TIMMOD operational simulations of sub-mesoscale hydrodynamic circulation is post-processed and reproduced within the entire study area's domain of the Black Sea Basin; examples of wind speed raster fields in contour surface maps is provided on TIMMOD web page.





## Demo tests & training at sea - Varna, Bulgaria

The 1st Pilot Demonstrations Tests, Training and Sea-survey using innovative monitoring equipment started on 22nd June 2021 in Varna, Bulgaria and lasted 14 days. The event was organized and hosted by the Black Sea - Danube Association for Research and Development (BDCA) together with the Lead Beneficiary – the Institute of Fish Resources - Varna (IFR), who provided a research vessel and the set of advanced monitoring sensors and instruments.

Despite the uncertainties and certain travel restrictions due to Covid-19, experts from all project partners arrived in Bulgaria, and participated in the survey.

The program included demonstration and trainings on innovative hydroacoustic and underwater observation equipment, together with trawling and biological sample collection for validation of the measurements, that were carried out in the western Black Sea coast (Bulgarian coast).

TIMMOD team successfully completed all tasks included in the survey programmes overpassing challenges like bad weather conditions and exploration of first-time-use devices. It was concluded that the main objectives of the demonstration and training programme were successfully achieved, providing excellent basis for further implementation of TIMMOD work plan.



## Demo tests & training at sea - Batumi, Georgia

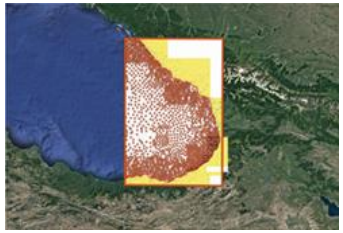
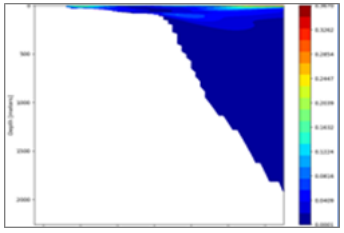
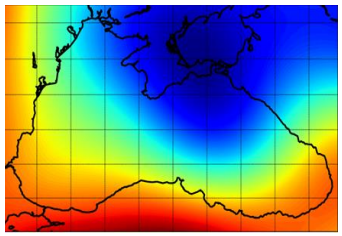
Starting from the 11th till the 25th of October, the National Environment Agency of the Ministry of Environment and Agriculture of Georgia has implemented an important 2-week 2nd Pilot Demonstration Tests, Training and Marine Surveys using Innovative Monitoring Equipment in the Batumi-Gonio Bay. In addition a second Phase of the demo tests and trainings took place in April 2022 obtaining spring measurements data serving as comparison base for the autumn results.

NEA, with the financial support of the European Union within the BSB JOP 2014-2020, has purchased a portable water-based CTD buoy platform that is an independent system, first located in the Black Sea of Georgia and designed to monitor water quality.

The device will measure three main marine parameters: water electrical conductivity, temperature and depth, online via GPRS communication, and continuously share data to the Project Partners. Demonstrations and trainings also included Biological and Chemical Sampling Surveys with Multi-sensor water-quality probe, BioSonics Echosounder Hydroacoustic data collection for fish assessment, Sealion-2 Survey, trawling and sample collection, the ICT modelling/forecasting and GIS tools.

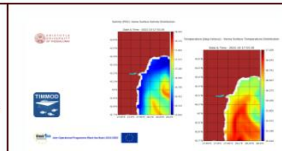
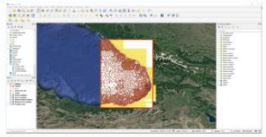
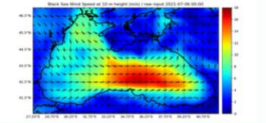
Despite the challenges due to the COVID-19, the experts from TIMMOD project partners successfully participated in the Georgian surveys, alongside with the NEA top management and Deputy Minister of Environment and Agriculture. Facing several challenges like bad weather conditions and exploration of unknown devices the team successfully completed all tasks included in the survey programme.



## TIMMOD Web GIS Tool

The TIMMOD Web-GIS tool incorporates 3 levels of implementation.

| | | |
|---|---|---|
| **Pilot test site 1:** broader coastal area of Varna, Bulgaria |  | Monitoring datasets<br>Modelling dataset |
| **Pilot test site 2:** broader coastal area of Batumi, Georgia |  | Monitoring datasets<br>Modelling dataset |
| **Black Sea Basin** |  | Bathymetric data<br>Fishing harbours and fish stock data<br>*(Under construction)* |

An example of a) raster fields for BSB seawater Sea Surface Salinity (SSS) and Temperature (SST) with contour surface maps (upper graph), and b) vertical distributions over the water column on points along the computational domain boundaries (lower graph), in the Varna coastal area (*pilot test case in Bulgarian waters*), is available on the project web page.

After processing the results to the following depiction outcome about Chemical and Phytoplankton parameters (PO4 and NO3 concentrations' timeseries are shown here) in the Batumi coastal area's part of the web-GIS app, supported in terms of dataset feeding by the TIMMOD Survey Pilot Demonstrations.

For the Varna pilot test site, the TIMMOD web-GIS app offers the following monitoring field georeferenced datasets:

a) dual map representation of physicochemical datasets,

b) abundance of Turbot fish stock by Catch Per Unit Effort (CPUE; kg/km2,

c) vertical distribution of pH and other physicochemical parameters,

d) SSS and SST point values,

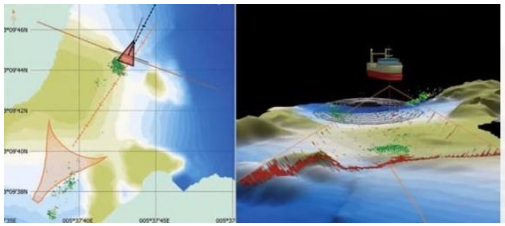
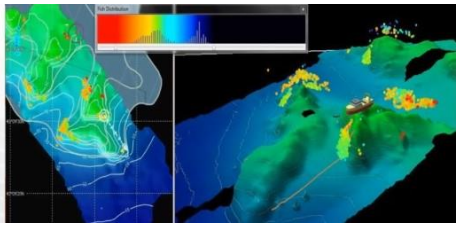
e) Spatial polygons and spatial points projected for Rapana Venosa fields and Natura2000 areas.



## Thematic Trans-boundary Meetings 3 & 4

The 3rd Thematic Transboundary Meeting (TTM#3) on innovative environmental monitoring and modelling technologies for assessment of fish stock and non-fish resources was organized on 5th and 6th July in Varna, Bulgaria. The meeting was hosted by Black Sea Danube Association for research and development (BDCA) as a hybrid event with live participation of involved partners, stakeholders and guests in Art Saloon Radio Varna, Varna, Bulgaria, as well as online in MS Teams platform.

The main goal of TTM#3 was to raise awareness of researchers, surveyors and decision makers in innovative technologies for monitoring of environmental parameters and assessment of fish stock & non-fish resources at Black Sea. An overview of the first pilot demonstration survey and training, organized in Varna, Bulgaria in the period from 22 June 2021 until 5 July 2021 was presented. Focus was given on the main survey outputs, the used equipment, the research vessel, survey programme and participants, main challenges and first conclusions. The preliminary results from the demonstration and trainings on innovative equipment in the western Black Sea coast were discussed.

The 4th Thematic Transboundary Meeting (TTM#4) on innovative environmental monitoring and modelling technologies for assessment of fish stock and non-fish resources was hosted on 25th and 26th October in Batumi, Georgia by the LEPL National Environmental Agency (NEA). The event took place in hybrid environment onsite in Hotel Radisson Blu - Batumi, Georgia, and online in the MS Teams platform.

The main goal of TTM#4 was to present a review of the Demo Tests Survey organized in Georgia in the period from 11 October 2021 until 26 October 2021, and to discuss practical issues and further steps for adoption of demonstrated ICT tools, sensors and methodologies. A special seminar part of the event included also presentations and demonstrations (testing) on data handling tools, GIS tools, visualisation software. Raised expertise of researchers and better understanding among performers and decision makers about innovative solutions have been achieved.





## TIMMOD Innovation Strategy

Promoting technology innovations is the main focus of TIMMOD activities. Combining the efforts of all project partners an Innovation Strategy for further adoption and implementation of innovative environmental monitoring methodologies and tools has been developed.

The Innovation Strategy is designed to bring together national, regional, EU policies and regulations, combined with new monitoring and information technology, expanded transparency, and innovative enforcement.

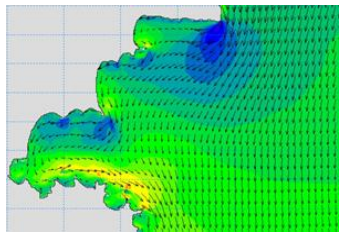
The Vision that defines the Strategy is to make Black Sea cleaner, to increase fish abundance, and provide sustainable use of fish and non-fish resources by using advanced monitoring and modeling tools. It is shortly expressed in the slogan of TIMMOD project: Innovation we need, for the Black Sea we want!


National workshops for discussion and validation of the Strategy by the key stakeholders in the water monitoring sector were carried out in first quarter of 2022. The workshops took place in four project partner countries having planned the final regional strategy validation to take place in May 2022 in Romania.

The analyses, conclusions and recommendations drafted in the Strategy are primarily intended to draw efforts of TIMMOD partners toward the involvement of key national stakeholders in the discussions during National Validation Workshops, and most important – in the implementation of this Strategy in short-term and long-term prospective. In the same time most of the main findings and conclusions can be widely used by researchers, surveyors, decision makers, as well as by a wide range of public institutions, industry companies and the general public.

The final version of the Strategy will take into account all considerations and recommendations from stakeholders and feedback from the 5 National validation workshops. It will be will be published and disseminated after final discussions and approval at the International Validation Meeting in Tulcea, Romania.





## Project Partnership


Institute of Fish Resources (Lead Beneficiary)
**IFR**, BULGARIA
www.ifrvarna.com

Black Sea - Danube Association for Research and Development, **BDCA,** BULGARIA
www.bdcabg.org

Aristotle University of Thessaloniki
**AUTh**, GREECE
www.auth.gr

LEPL National Environmental Agency
**NEA**, GEORGIA
www.nea.gov.ge

Regional Environmental Centre - Moldova
**RECM**, MOLDOVA
www.rec.md

Danube Delta National Institute
**DDNI,** ROMANIA
www.ddni.ro





## TIMMOD Final Conference and Project Conclusion

TIMMOD project is coming to its end in May 2022. For the final stage of the project implementation several very important activities and events are planned.

The project official closing will be organized in Tulcea, Romania from 4th till 7th of May 2022. Host of the events will be the Romanian project partner- Danube Delta National Institute – DDNI.

The project conclusion will be marked with meetings and digital campaigns, highlighting the main project outputs and results:

Final **Regional validation workshop** will be organized in order to have final feedback and input to the TIMMOD Innovation Strategy.

The fifth project **Thematic Transboundary Meeting (TTM #5)** will take place to present the results and achievements of the two demo surveys, conducted in Varna, Bulgaria and Batumi, Georgia.

**TV promotional cam**paign in Romanian will serve as additional tool for promoting of the results of the project targeting the local public.

Final **dissemination event** will be organized along the Strategy Validation Event in Romania gathering executives and policy makers from the regions and from other relevant institutions. The aim is to promote the project achievements and to disseminate the results of pilot demonstration activities and strategy to a larger audience.

**Digital promotional campaign** will be held in online environment with modern interactive tools for questioning/interviewing and providing relevant feedback from Stakeholders and general public.

The final project events have been linked with the European Maritime Day 2022 - **#EMD In My Country** initiative and will be promoted via the Directorate-General for Maritime Affairs and Fisheries' information channels. Several campaigns on maritime affairs and sustainable blue growth are taking place all over Europe from 1 April till 31 October 2022.

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