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Development and implementation of the ANEMONE WEB-GIS and Database interface

Yuriy Denga, Oleksandr Leposhkin, Artem Kruhlov
UkrSCES, Ukraine

ANEMONE Project - Final Meeting –
4th – 5th of March 2021

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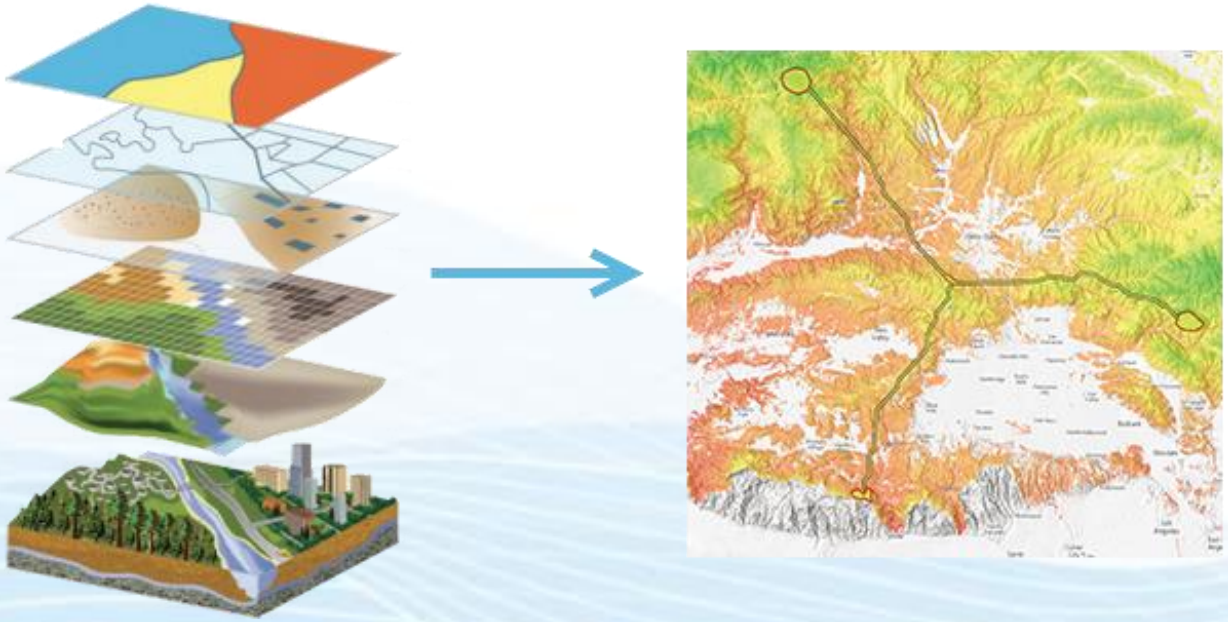
Goals and Tasks

- To deploy WEB-GIS system to get interactive access to the spatial data collected during the project
- To create a tool that analyses the effort of the data monitoring - Monitoring Effort Tool
- To develop the ANEMONE Database with all the data of the ANEMONE project and web-interface to access this data.

What is WEB-GIS?

An interactive mapping service (IMS) is a formation of layers containing images of reference or thematic maps of various contents and purposes, obtained as a result of interaction of a user on a Website with a specialized mapping server. The main components of the conceptual diagram of the IMS organization are the client's computer with a Web browser and a specialized server with the appropriate software. The modern Web-GIS server is a technology for displaying geographic maps on the Internet, which is carried out by specialized interactive mapping services. This technology allows the user to work with electronic geographical maps practically in the same way as with desktop geographic information systems (GIS) of the end user through standard means of viewing web pages - a Web browser.

What is WEB-GIS?



By combining layers and using operators and displays, GIS enables you to work with these layers to explore questions and find answers

What is WEB-GIS?

The main advantage of Web-GIS technology lies in the fact that this technology interconnects and makes available worldwide and shared usage of the geodata dispersed across different parts of the globe. The most important property of the currently developed Web-GIS technologies is that using them, Internet users get the opportunity to actively work with geodata (up to the implementation of their own GIS projects) without purchasing geoinformation software. Only Internet browser remains the main tool of work. Thus, Web-GIS technologies make it possible to practically add geoinformation functions to a wide range of applications based on network access and used in business, management, and education.

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ANEMONE WEB-GIS

Within the framework of the ANEMONE project, a modern interactive mapping system was developed, which contains the necessary set of utilities and tools for full-fledged work with spatial data, which were collected during the exploration of the Black Sea by marine Joint Scientific Cruises and by the contribution of all the participants of the project.

Also, for deep analysis of the spatial data – a Monitoring Effort Tool was developed for this interactive mapping system which allows user to get a visual representation of the number of stations with a selected parameter in the required quadrant.

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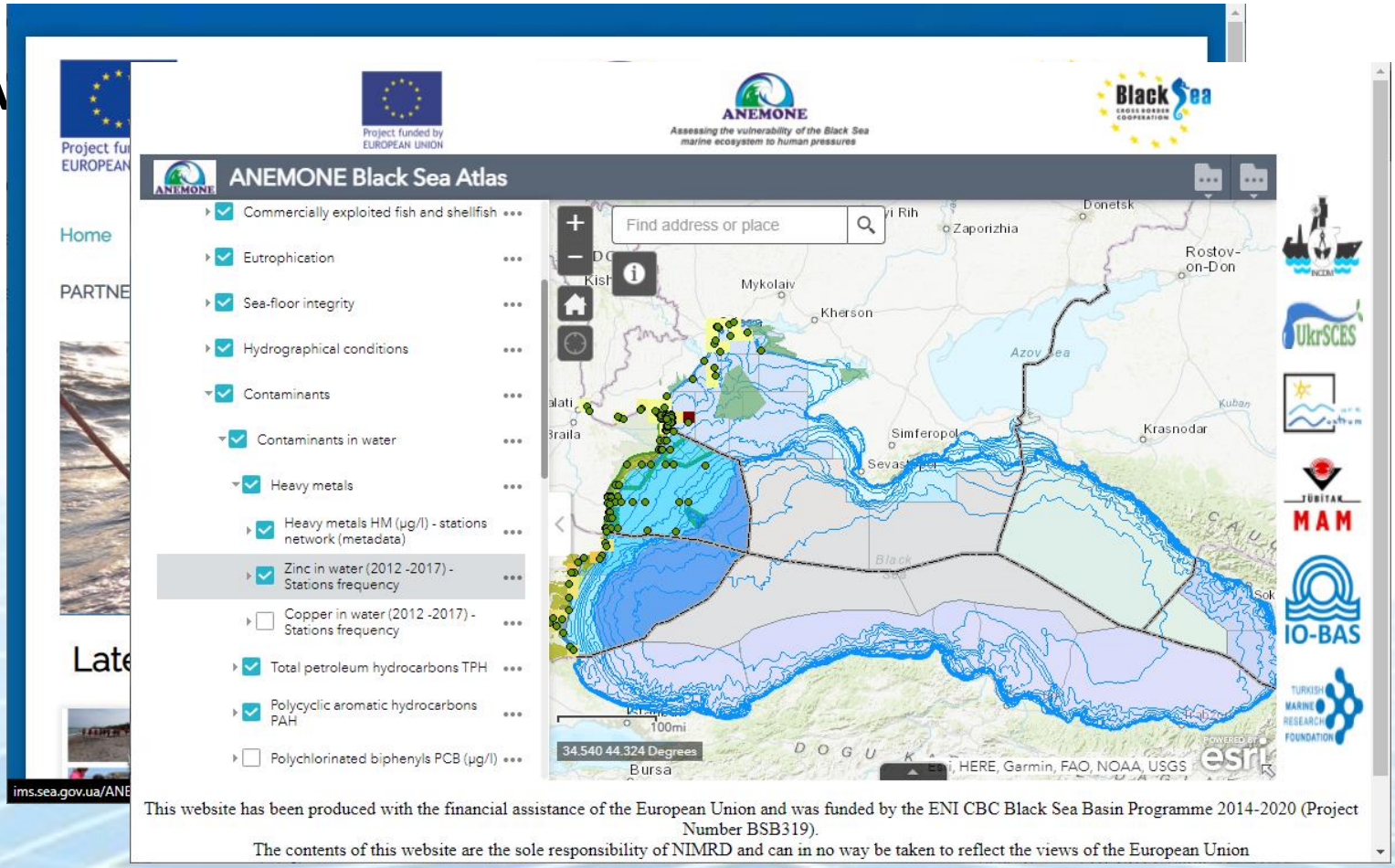

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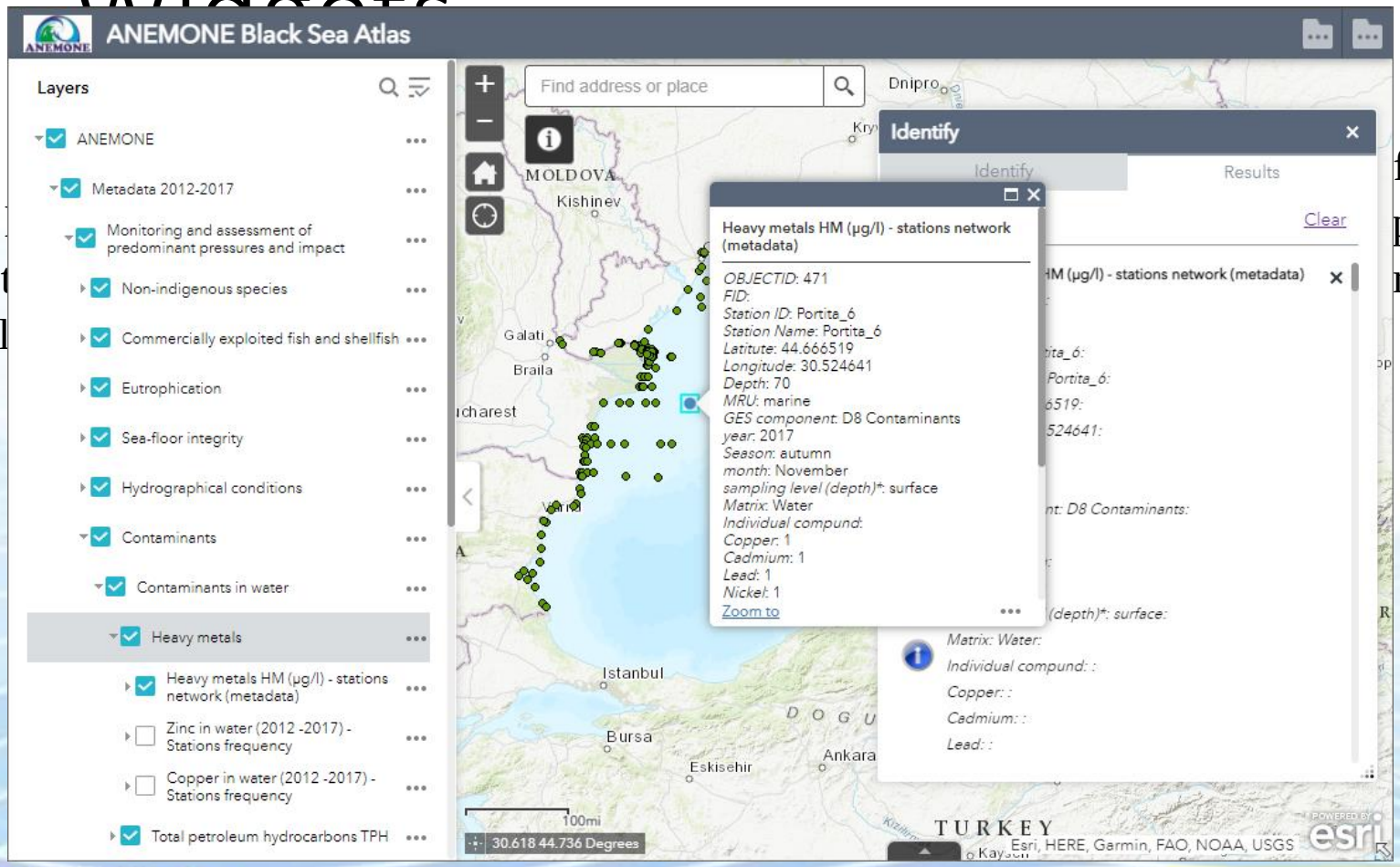

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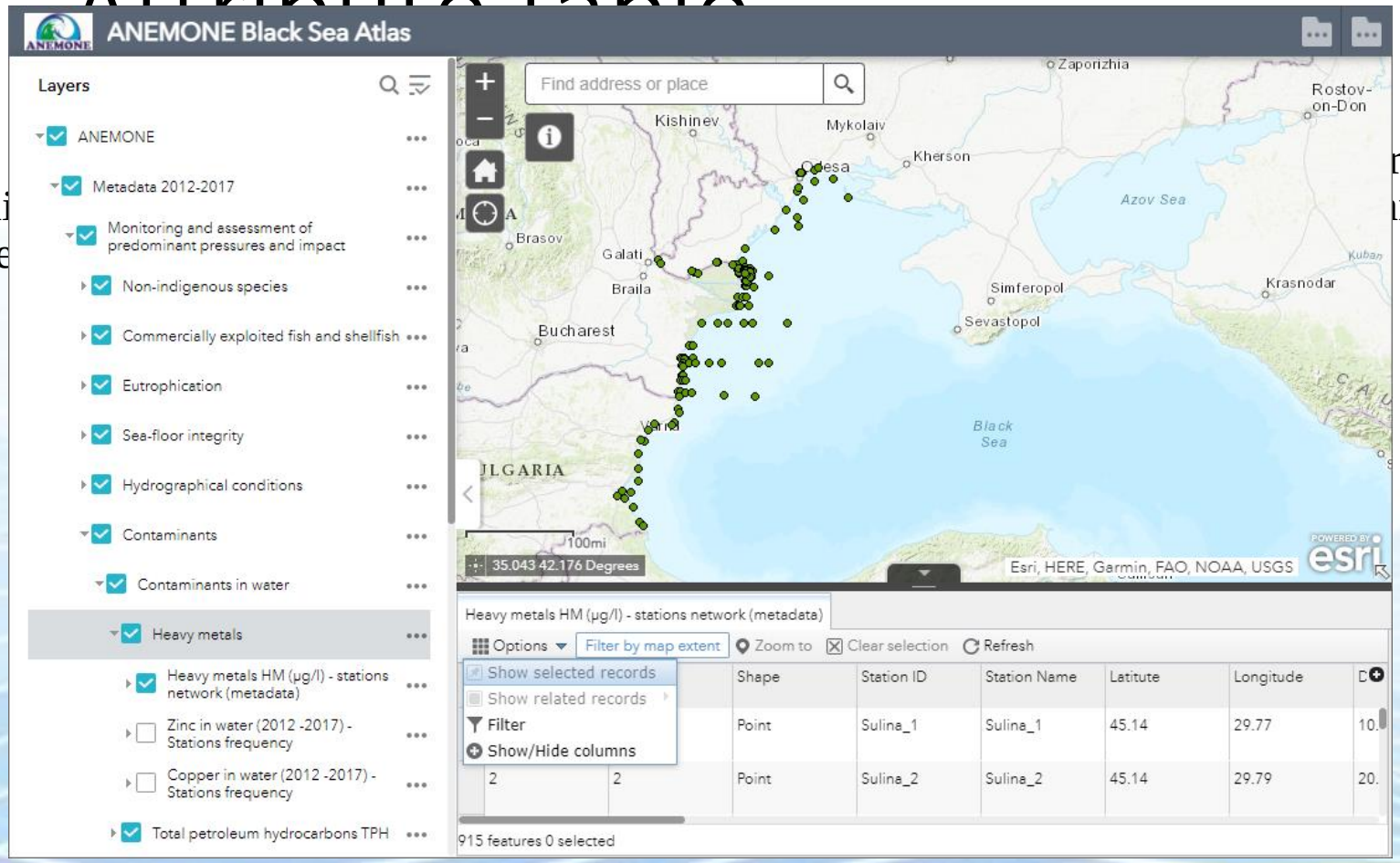

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Monitoring Effort Tool

The Monitoring Effort Tool prompts the user to select a layer and a parameter for which the analysis will be performed. During the calculation, the tool generates a grid for a layer with cells of 25 km^2 each. After all options are selected, the tool summarizes the number of the stations in each cell of the grid, where samplings for the selected parameter were taken.

For clarity of the analysis for the end user, the tool visualizes the result; the lighter the cells are, the fewer stations with samplings for this parameter, and vice versa.

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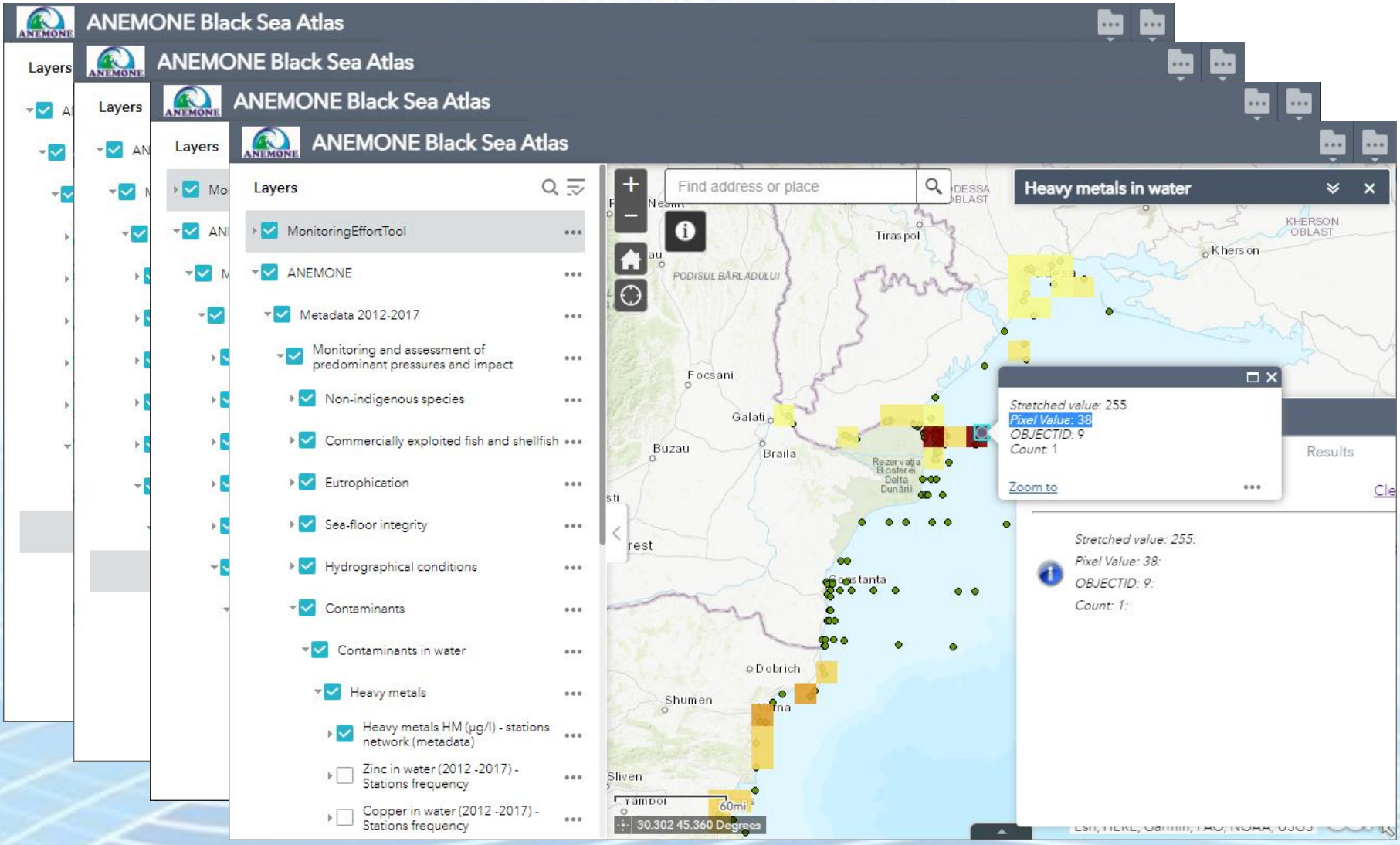

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Water Quality Database

Water Quality database development started within the EMBLAS Project (2nd phase) and was continued in EMBLAS Plus with the overall need of fine-tune and improvement according to EU Marine Strategy Framework Directive (MSFD), EU Water Framework Directive (WFD) and Black Sea Strategic Action Plan (2009). The essential data collected during the monitoring activities triple of the EMBLAS Project (2nd phase), EMBLAS Plus and ANEMONE were collected, processed and organized to the Water Quality database (WQDB).

The logical structure of the database was built according to the data collection templates (DCT) developed jointly with the scientists, responsible for appropriate descriptors.

How does it work?

The database platform remained unchanged and built on the Microsoft SQL Server 2016. The standalone software (parsers for the syntax recognition) development was conducted to automate the WQDB data export from the DCTs. The process based on the object-oriented programming using C#. programming language and the Microsoft.net Framework 4.7.1. as a software framework. Software upgrade includes functions for different calculations (Quality markers, etc), function for data synchronization between main DB and GeoDB and function for manual fields selection (in case when column header has not specified name).

The web-interface upgrade based on the PHP 7.1 for the standard features and web-elements. For the interface extensions like scientific analytical tools, interface optimization and web-pages auto update were used AJAX, Java-Script and DB statistics, and GOOGLE maps API for the mapping features.

E-TRIX as additional feature

The advantages of the TRIX index over other integral values are due to the use of standard and most frequently measured hydro chemical and hydrobiological characteristics of marine waters. The amount of these waters does not change which makes it possible to compare water trophic level estimates different seas and oceans TRIX index. TRIX is widely used by EU countries in assessing the trophic status and quality of Mediterranean waters.

TRIX is calculated by the formula:

$$TRIX = \left[\log\left(Ch \cdot D\%O \cdot N_M \cdot P3\right) + 1{,}5\right] / 1{,}2$$

Ch is the concentration of chlorophyll-a, μg / dm3;

D% O - deviation in absolute values of dissolved oxygen from 100% saturation;

Nm - concentration of the sum of dissolved forms of mineral nitrogen, μg / dm3;

P3 - concentration of total phosphorus, μg / dm3.

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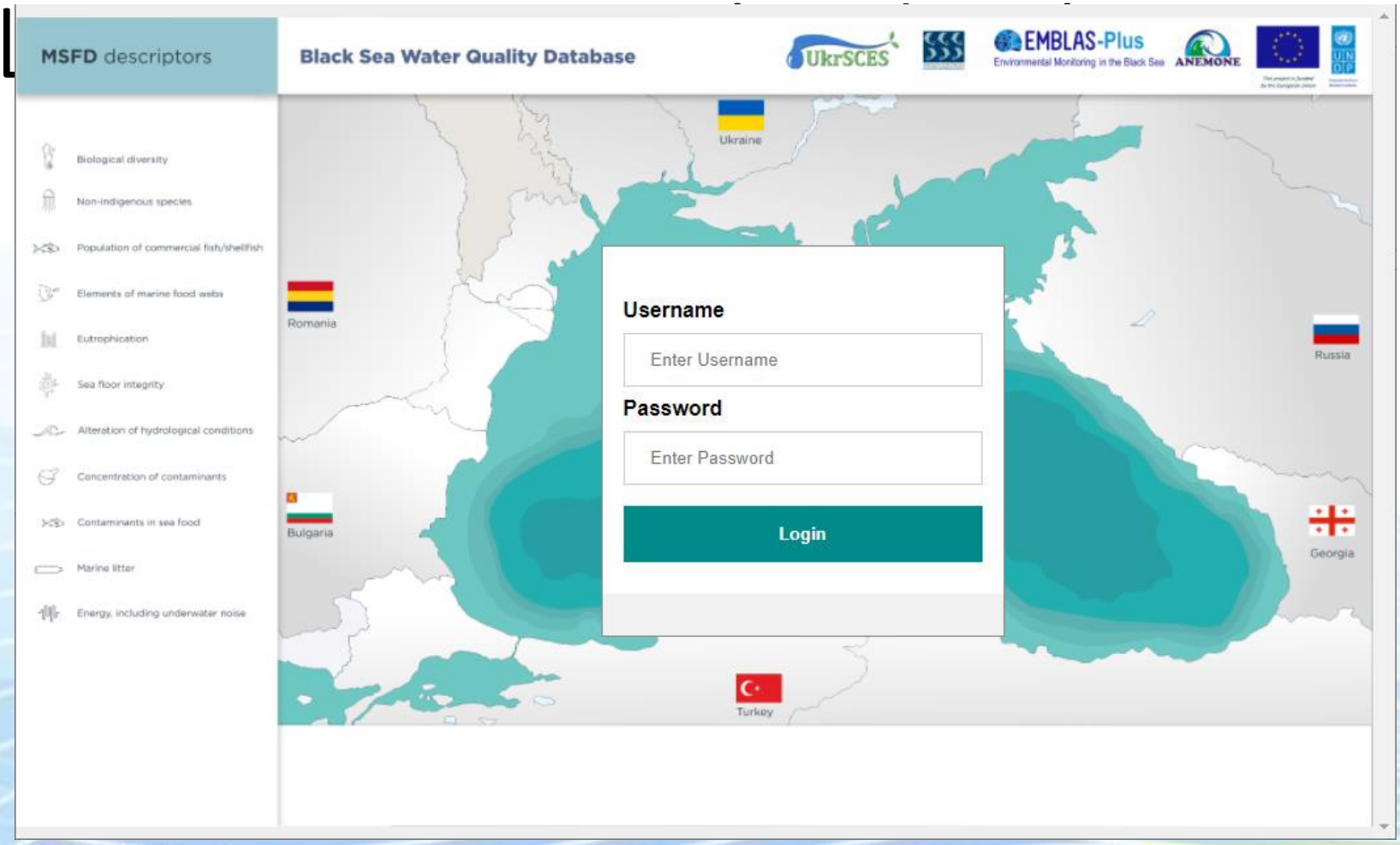

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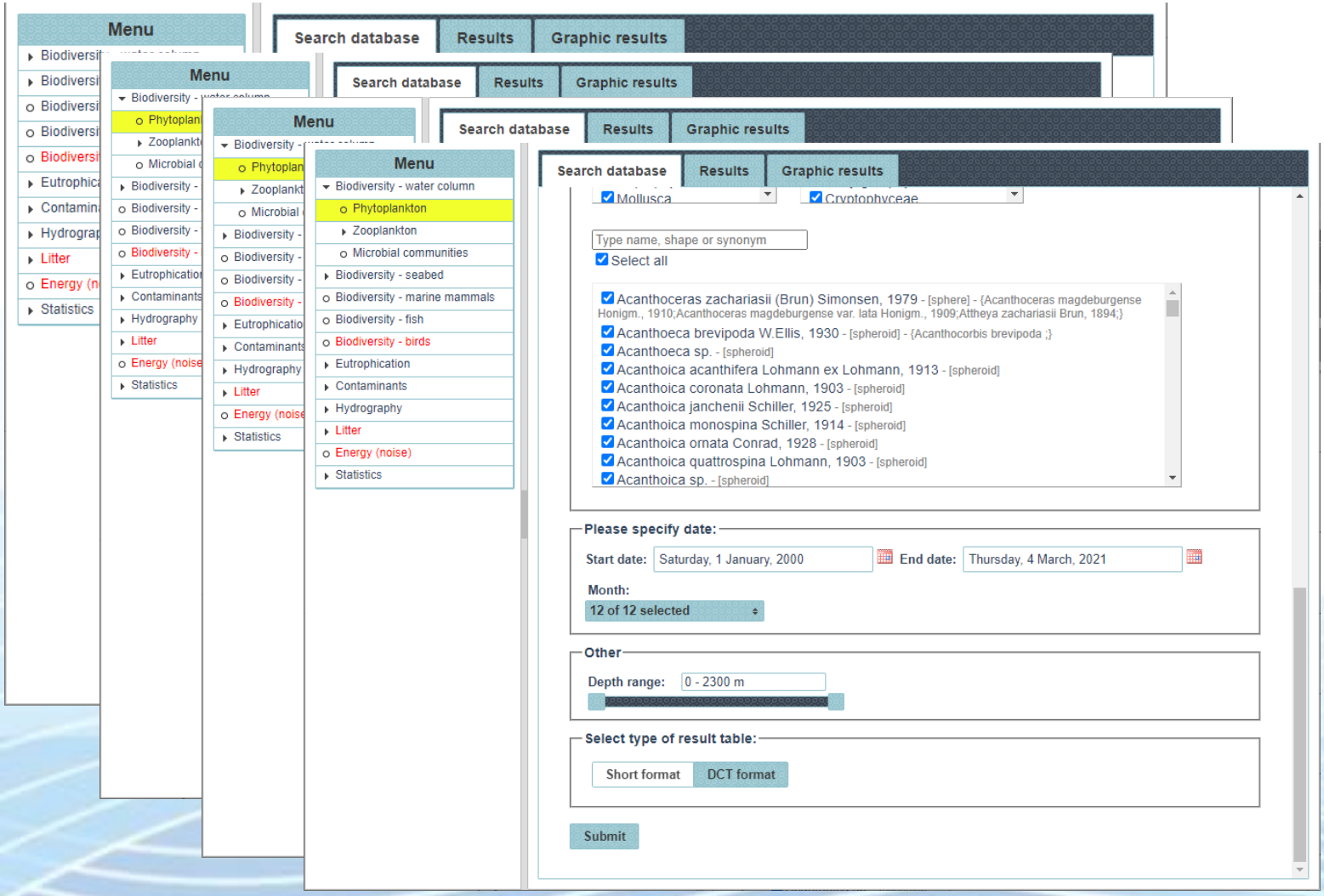

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Menu

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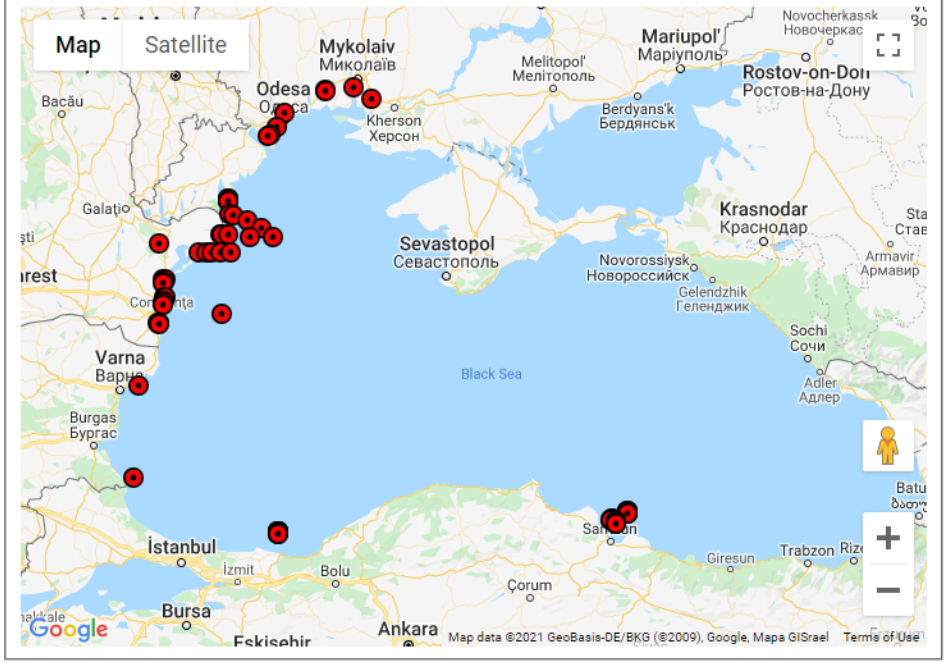
  - Zooplankton
  - Microbial communities
- Biodiversity - seabed
- Biodiversity - marine mammals
- Biodiversity - fish
- Biodiversity - birds
- Eutrophication
- Contaminants
- Hydrography
- Litter
- Energy (noise)
- Statistics

Search database | Results | Graphic results

Location of stations:



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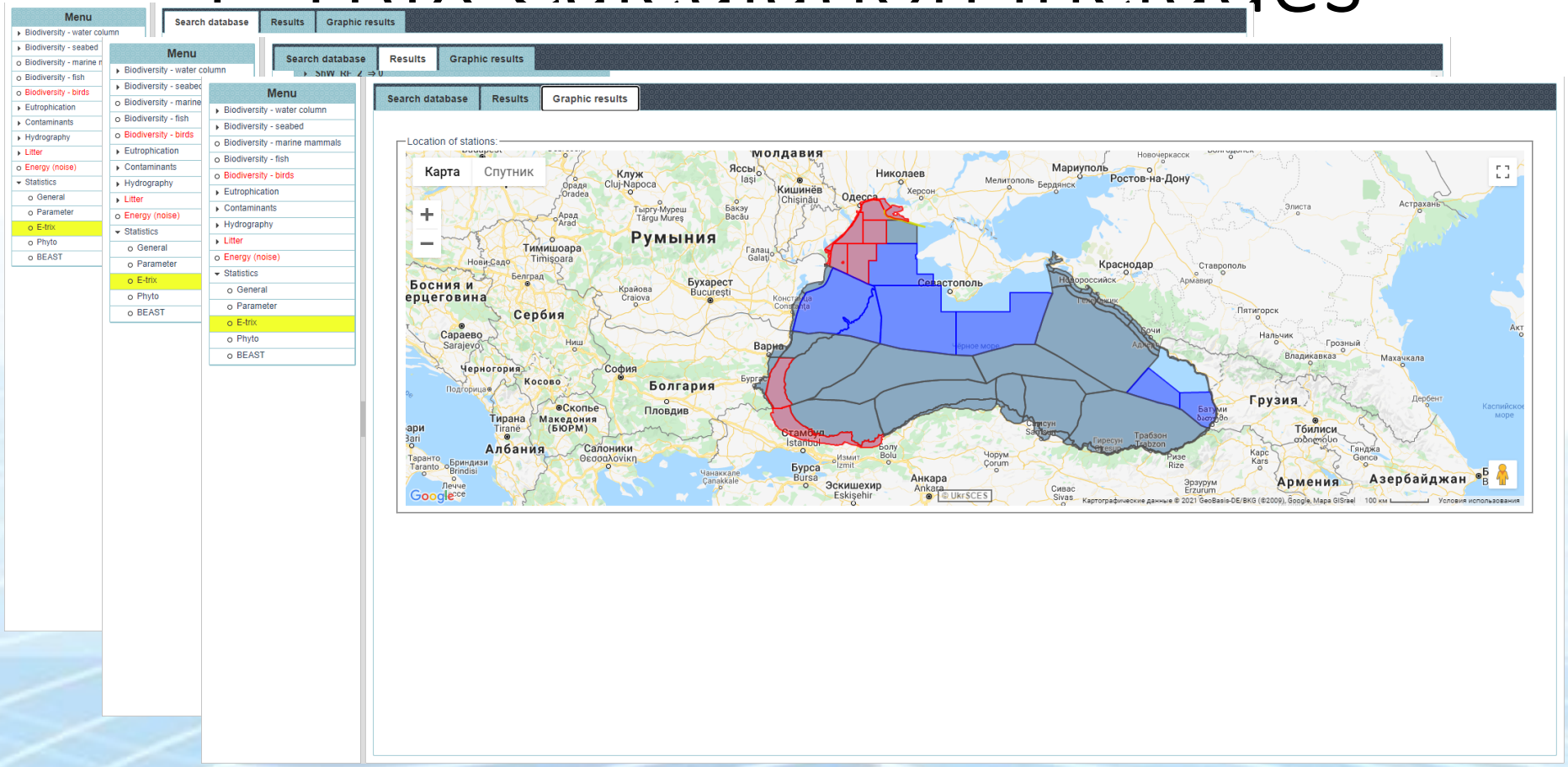
E-TRIX Calculation includes



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Thank you for your attention!

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