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User Tutorial

Service for water quality monitoring for sustainable fishing and aquaculture in the Romanian Coastal area (SkyFish)

SkyFISH

Prepared by TERRASIGNA
With contributions from the National Institute for Marine Research and Development "Grigore Antipa" (INCDM), Constanta, Romania

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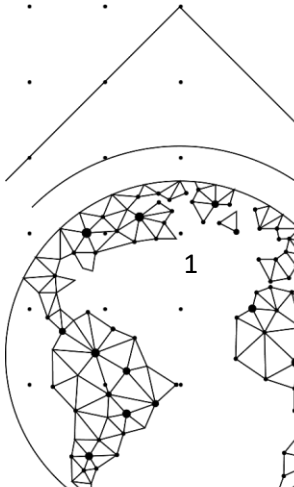
Prepared for:

Service for water quality monitoring for sustainable fishing and aquaculture in the Romanian Coastal area (SkyFISH) user's



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Revision History

Issue	Date	Revised by	Description
1.0	**01.10.2019**	**All**	**First edition**

Table of Content

1 General understanding

SkyFISH service aims is a dedicated, operational web-based service for end-users in fisheries and aquaculture which can help involved stakeholders in taking decisions when choosing the most favourable fishing and aquaculture zones. It makes use of advanced Geographic Information Systems (GIS), Remote Sensing and web-mapping technologies to offer users access to a wide variety of physical ocean parameters derived from Earth Observation imagery essential to identify potential fishing and aquaculture suitable zones.

SkyFISH use essential ocean parameters, mainly provided by the Copernicus Marine Environment Monitoring Service, derived from Earth Observation (EO) products and other available sources of information to determine the most probable areas favourable for fishing and aquaculture activities in the north-western Black Sea coastal area. Is a user-friendly collaborative platform that can be used by stakeholders engaged in fishing activities. This technology will help dissemination of the information for a better management of the resources associated to such activities.

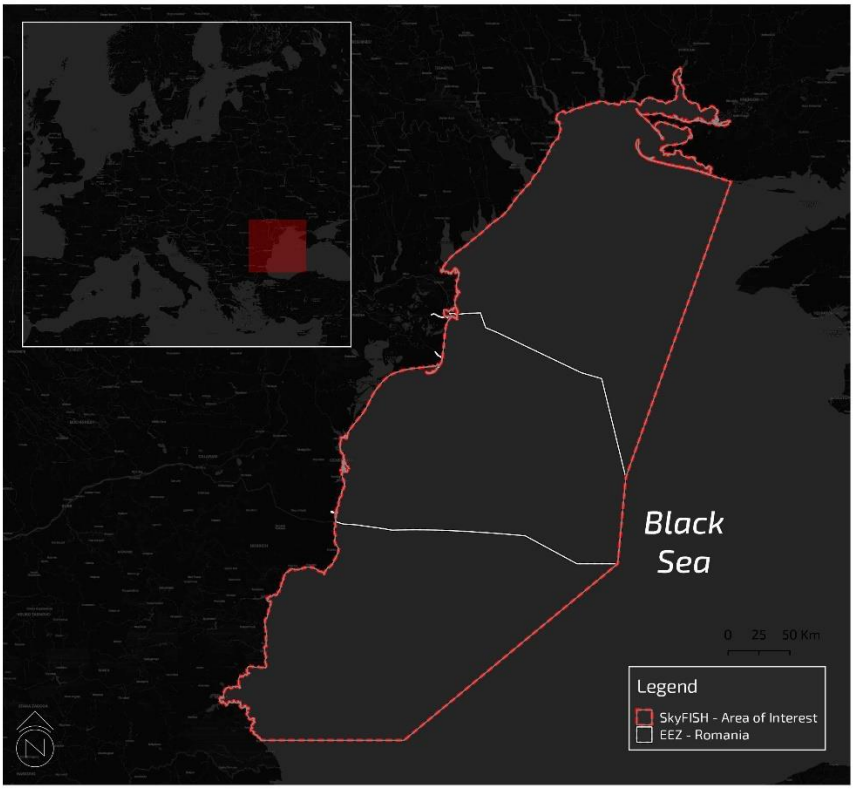

Fig. no. 1 – SkyFISH Area of Interest

2 SkyFISH landing point

SkyFISH project can be accessed at the following address: www.skyfish.terrasigna.com

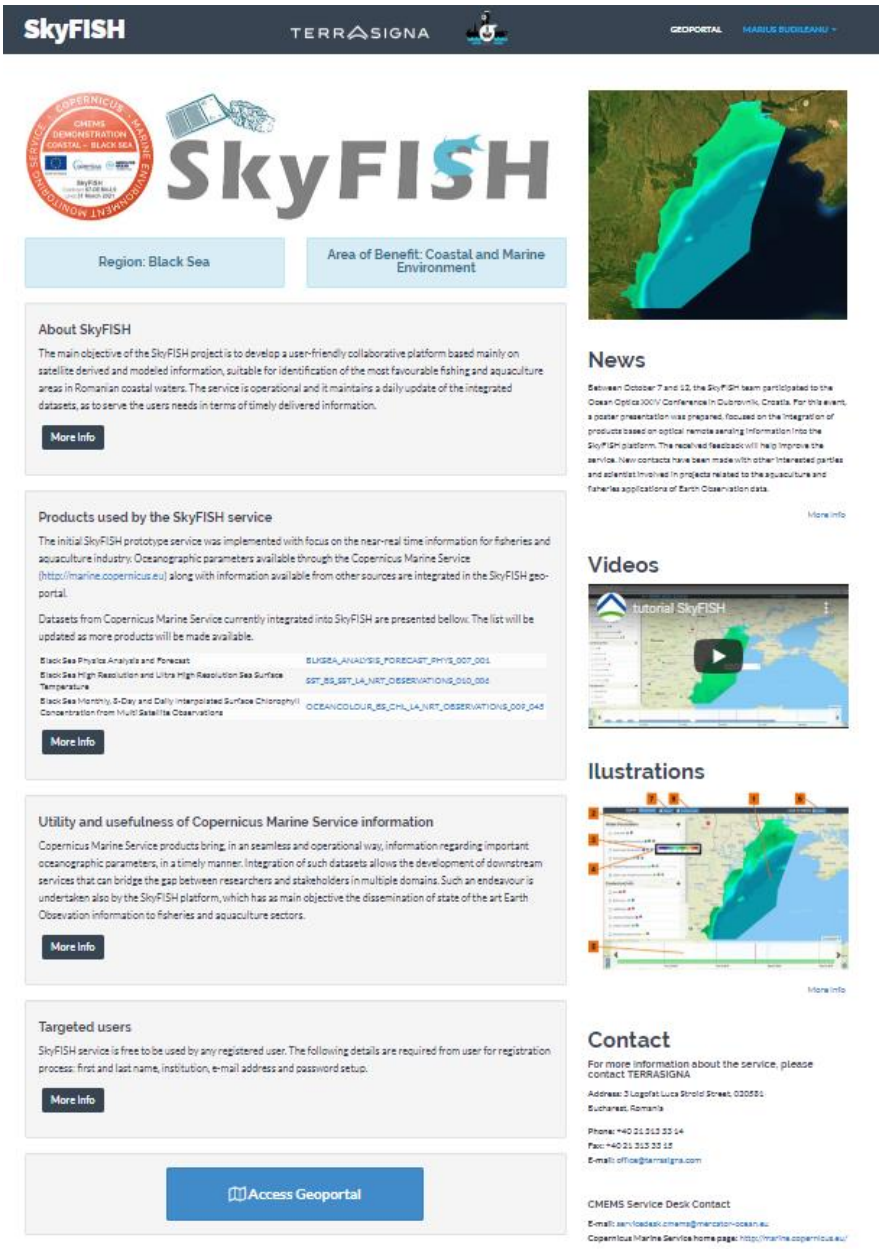

Fig no. 2 – Home page of SkyFISH

Here, can be found more general information about the project and is the place where you can create your user account for the geoportal. After the sing up process, one of the project members will approve your account – it's not possible to access the geoportal without an account.

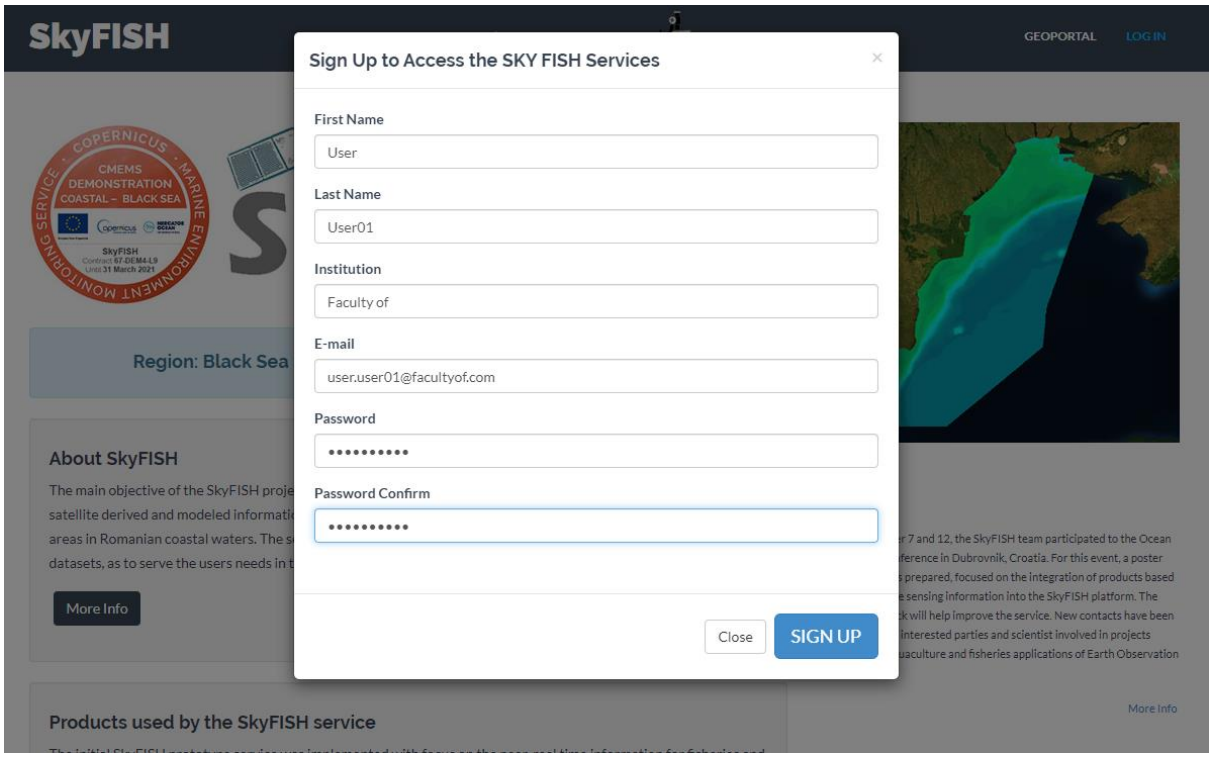

Fig. no. 3 – Sing Up

Beside the Sing Up function, here you can find written and video tutorials, news and more detailed information about the data used in the project. SkyFISH website and all the information inside it's available both in English and Romanian.

3 Geoportal

3.1 Main functionalities

SkyFISH geoportal integrate four main functionalities:

1) Thematic layers of information;
2) Map viewer;

3) Interactive analysis and statistics;
4) Calendar function.

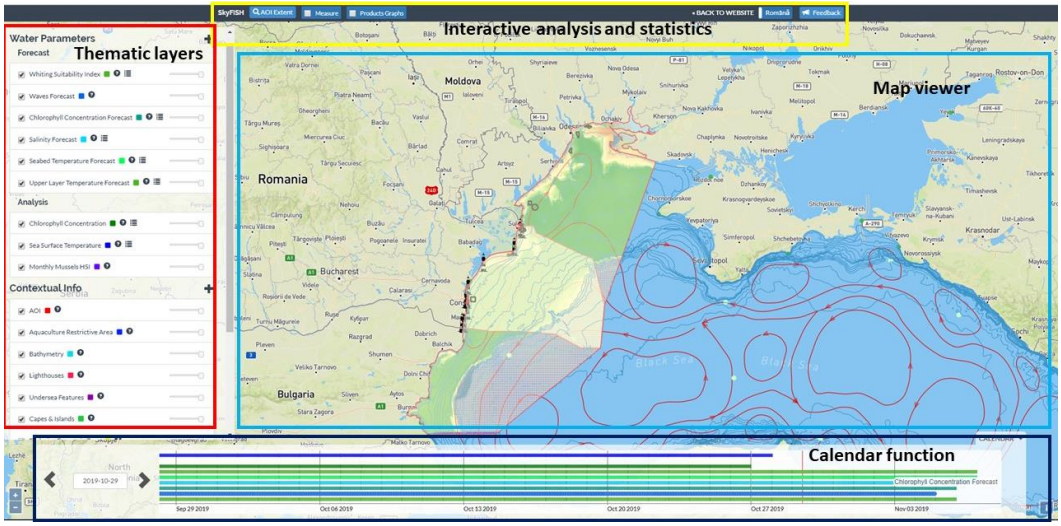

Fig. no. 4 Geoportal main view

3.2 Thematic layers of information

In this area of the geoportal, you can control all the information necessary in your work. Most of the layers are provided by Copernicus Marine Environment Monitoring Service (CMEMS). All the 17 layers of information are group in three main blocks: **Forecast** (up to 10 days ahead – very useful information for fishing campaigns planning), **Analysis** (daily or monthly products) and **Contextual information** (are mainly information regarding Romanian Coast of the Black Sea and general information about the Black Sea underwater environment e.g. currents).

All layers can be turned on or of and in the right side of the layer is a transparency button function.

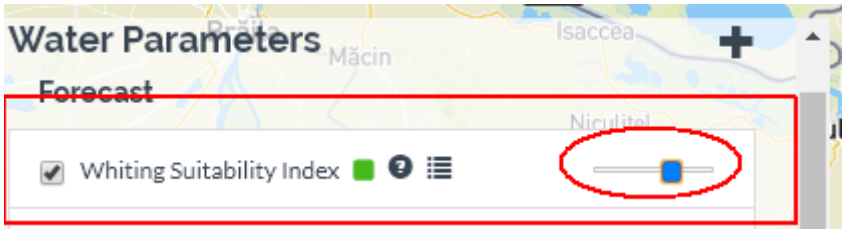

Fig. no. 5 – Turned on layer and transparency

Also, in the line with the layer you can find more detailed information about and the proper color scale for every layer. This information is interactive and is enabled on hover.

Fig. no. 6 – layer information and color scale

3.2.1 Water parameters

This category is split between **Forecast** and **Analysis** and provide information about water quality in the Black Sea, with focus on fishing and aquaculture activities.

3.2.1.1 Forecast

Whiting Suitability Index – This layer represents a derived forecast product and can be used in order to determine favorable conditions and to compute the areas where Whiting is more likely to be found at one moment in time. Values closer to 1 represent areas more suitable for Whiting fishing.

Wave forecast - This layer represents a 10-day forecast for chlorophyll concentration at surface of the sea.

Chlorophyll Concentration Forecast - The Black sea biogeochemical model (BS-Biogeochemistry) is the Biogeochemical Model for Hypoxic and Benthic Influenced areas. This layer represents a 10-day forecast for chlorophyll concentration at surface of the sea.

Salinity Forecast - The physical component of the Black Sea Forecasting System is a hydrodynamic model implemented over the whole Black Sea basin. This layer represents a 10-day forecast for salinity at 2.5 m depth.

Seabed Temperature Forecast - The physical component of the Black Sea Forecasting System is a hydrodynamic model implemented over the whole Black Sea basin. This layer represents a 10-day forecast for temperature at sea floor.

Upper Layer Temperature Forecast - The physical component of the Black Sea Forecasting System is a hydrodynamic model implemented over the whole Black Sea basin. This layer represents a 10-day forecast for potential temperature at 2.5 m depth.

3.2.1.2 Analysis

Sea Surface Temperature (SST) - can represent and indirect indicator of areas with higher concentrations of fish for operational fisheries. SST is also a good factor to determine the favourable zones for fishing since different species have different optimal temperatures ranges.

Chlorophyll concentration - variations of the plankton community have a direct effect on larger aquatic organisms. It can represent a food source but also a restrictive factor, when harmful algal blooms occur and eutrophication processes are favoured.

Monthly Mussels HSI – is a derived layer which can help stakeholders to install and conduct aquacultures facilities.

3.2.2 Contextual information

AOI – Area of interest for SkyFISH project

Bathymetry – general bathymetric contours for the Black Sea

Lighthouses – all lighthouses from Romanian shore

Undersea features – Geomorphological undersea features (e.g. canyon, trenches)

Capes & Islands – The most important Capes from the Black Sea and all the islands

Exclusive Economic Zone – EEZ of Romania

Current model – General Black Sea circulation model

3.3 Map viewer

This is the main area where user can interact with SkyFish Geoportal. In this area you can visually inspect layers and functions like pan, zoom in, zoom out can be used. Also, every layer that is turned in can be interrogate and a popup box with all required information will be returned.

Fig. no. 7 – Map viewer

These functions are directly connected with Calendar function and all the showed information's are showed for the selected date from the calendar.

3.4 Interactive analysis and statistics

Place in the top frame of the geoportal, here all the users can create their own analysis, statistics and measurements.

There are two available functions:

1) Measurements can be performed both in terms of area and length. After the measurement, this tool can be disable with a simple mouse click in the check box.

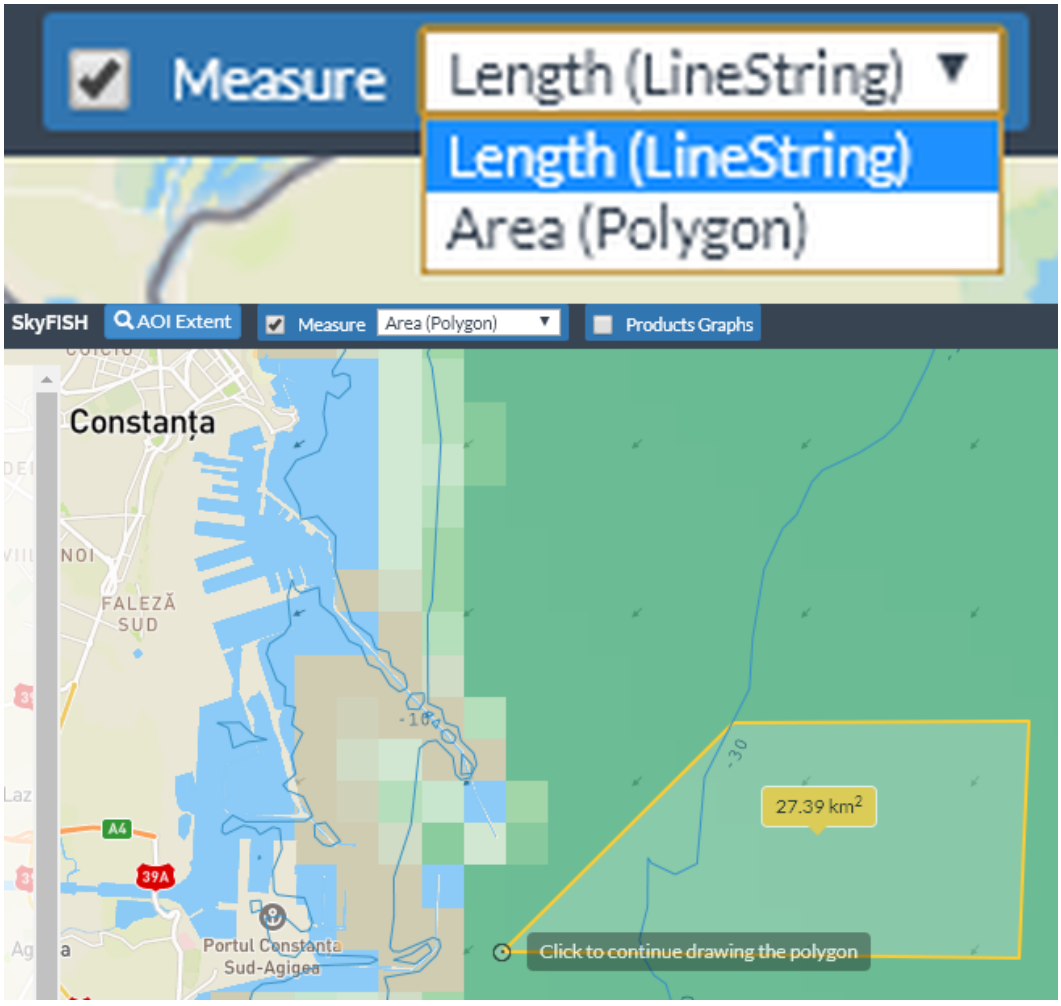

Fig. no. 8 – Measurement tool

2) Product Graphs are a very powerful decision supporting tool. From here you can perform complex analysis and statistics for every layer of information.

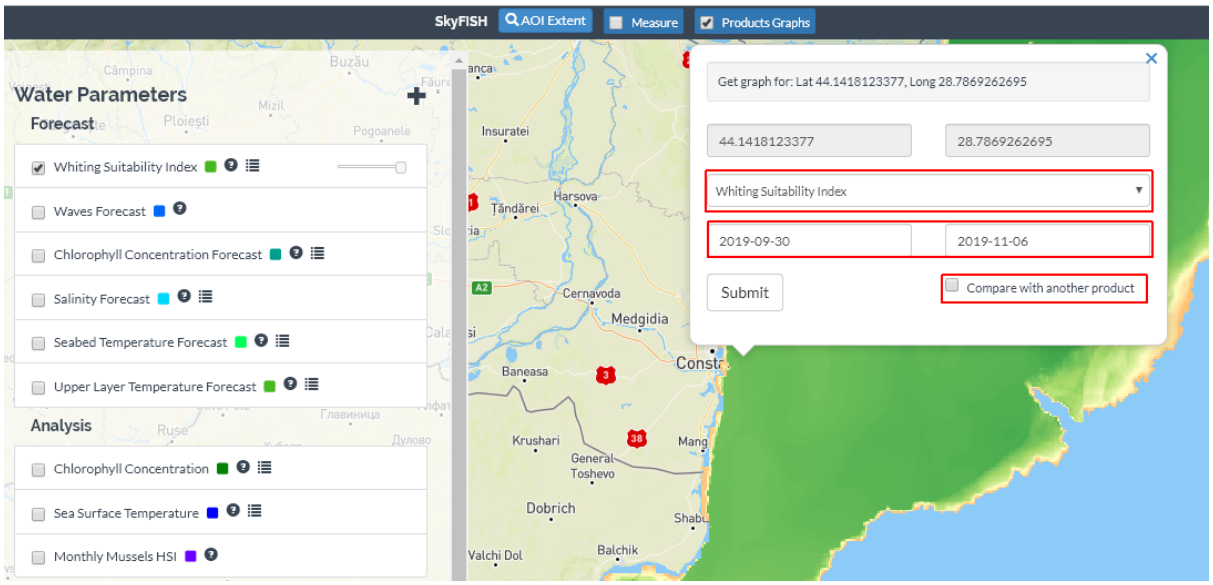

Fig. no. 9 – Product graphs

Product graphs are create using a pixel based algorithms – at click, the algorithm identifies the pixel requested and return all the statistics for the required layer of information and the time frame selected by the user.

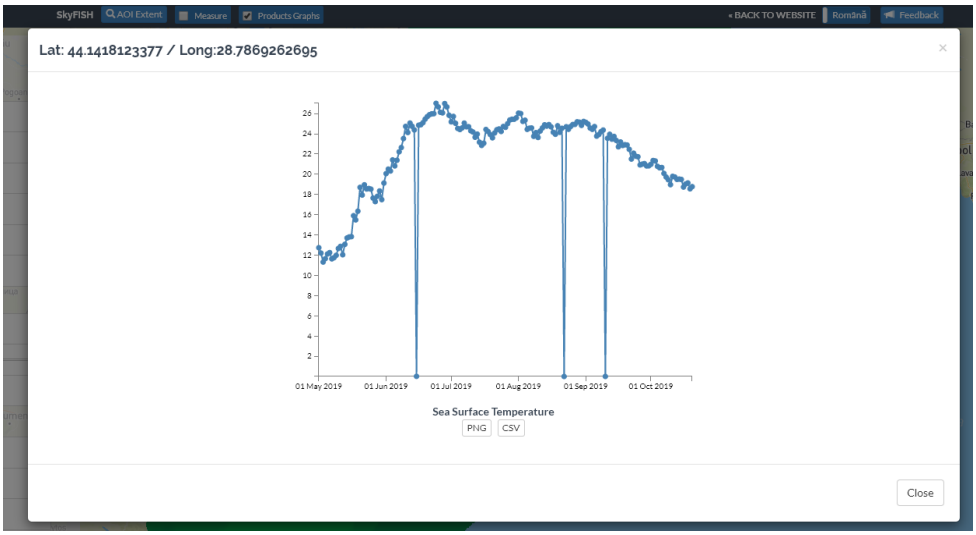

Fig. no. 10 – Statistics for Sea Surface Temperature between 01.05 2019 – 20.10.2019

Product graphs statistics can be performed between two layers of information, by choosing ***to compare with another product*** (see Fig. no. 9).

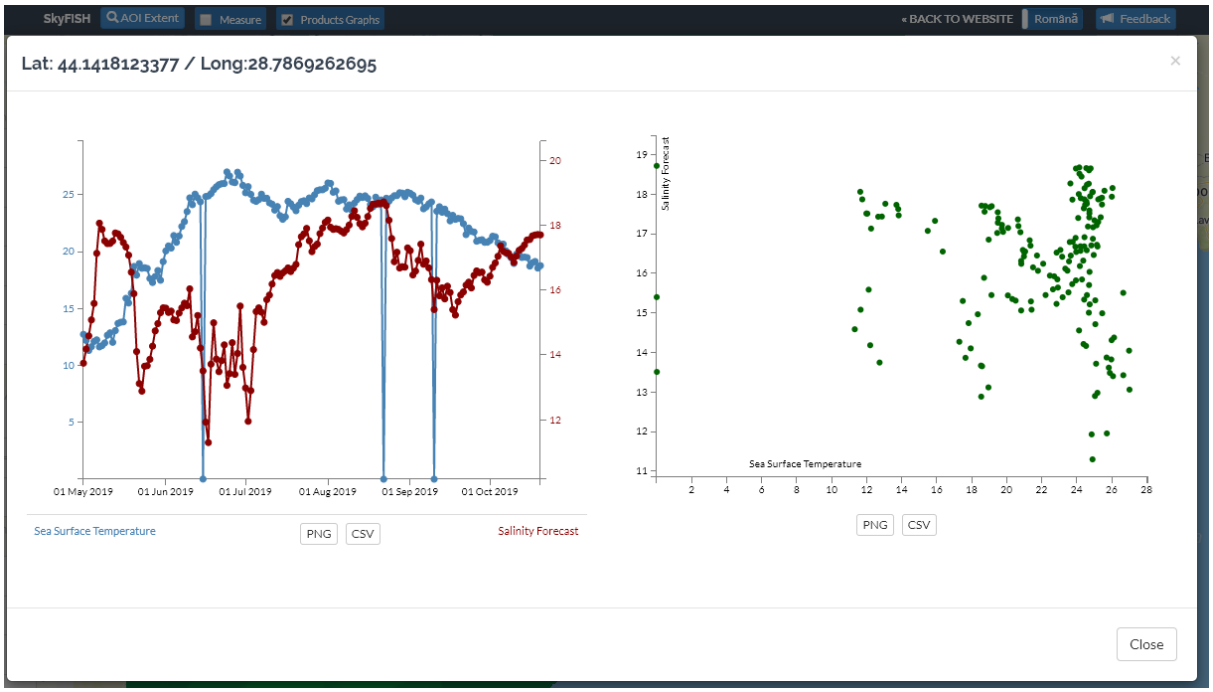

Fig. no. 11 – Comparation between Sea Surface Temperature and Salinity Forecast

The statistics results are presented in two graphics: left – comparation between layer evolution, right – scatter plot. All these statistics can be save as image file (PNG) or table file (CSV).

3.5 Calendar function

Calendar function allow users to select the desired date of any product. This function is dependent of the product life span and is in direct connection with the Map viewer (see 3.3).

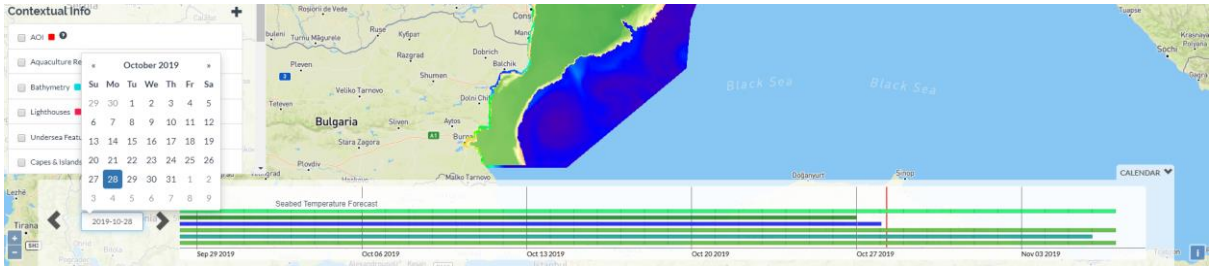

Fig. no. 12 – Calendar function

Users can go to any specific date using the calendar form the lest side of the menu or can simply browse through the products using arrows. In the layer calendar, where every layer is showed in different color, it is possible to zoom in or out in order to have a detailed or general view of the dates.

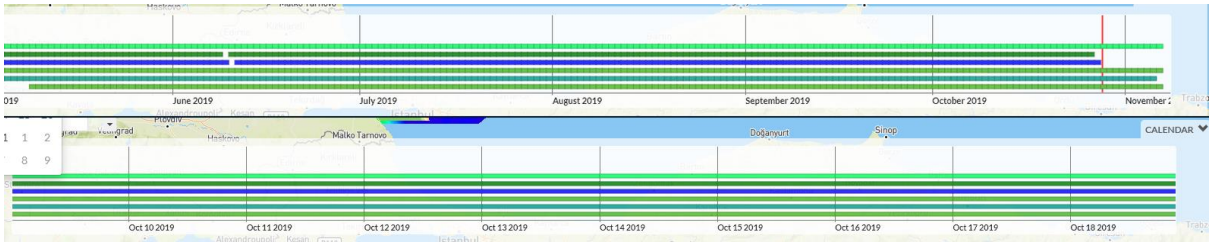

Fig. no. 13 – monthly and daily calendar view

4 Feedback

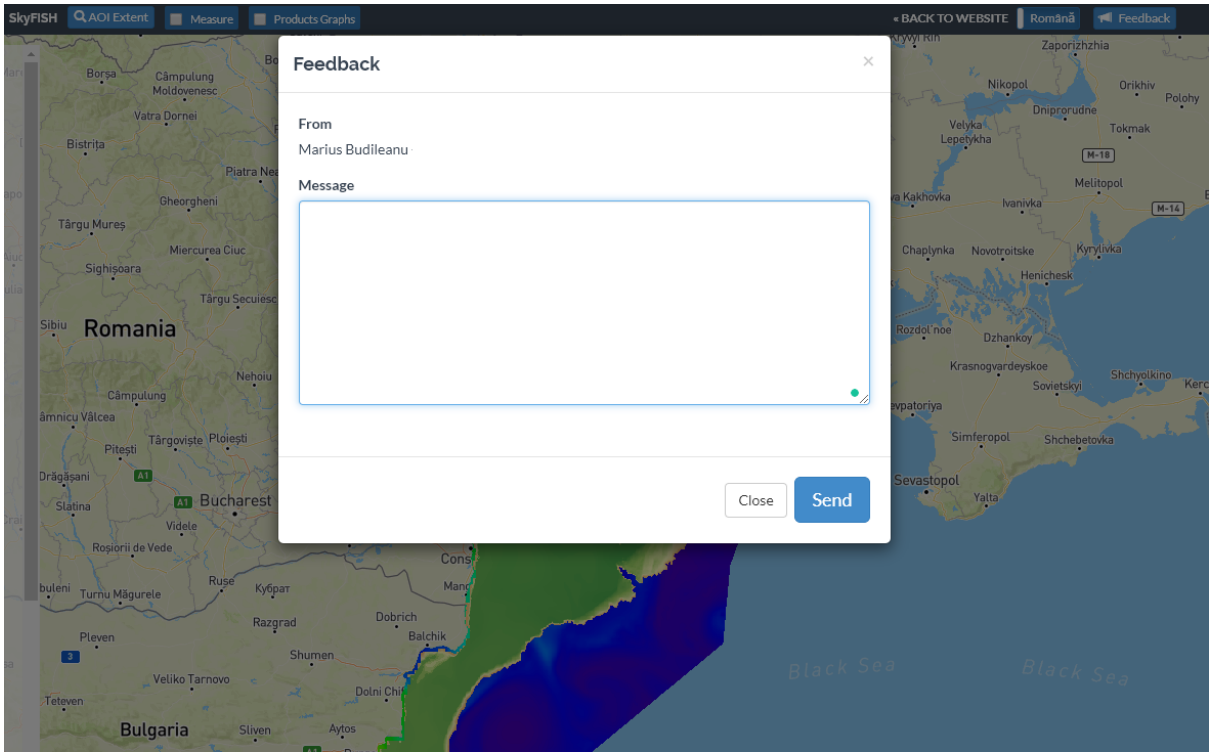

Fig. no. 14 – Feedback form

All users can send feedback, by clicking the **Feedback** button from the top right side of the geoportal.

This study has been conducted using E.U. Copernicus Marine Service Information.