

The Black Sea GIS developed on basis of free software

Elena Zhuk, Marine Hydrophysical Institute RAS (Russian Federation), alenixx@gmail.com
Alexey Khaliulin, Marine Hydrophysical Institute RAS (Russian Federation), khaliulin@yahoo.com
George Zodiatis, Cyprus Oceanography Centre, UCY (Cyprus), gzodiac@ucy.ac.cy

Using and developing up-to-date methods, tools, and technologies as well as assuring automatic processing and representing oceanographic data and knowledge, with geoinformation systems (GIS) being in the first place, are the most efficient instrument of providing users with various oceanographic information [1].

System structure.

While creating the Black Sea GIS, the primary attention was paid to selecting free and platform independent software capable to provide necessary functionality [2].

The software for online data access and visualization was developed on the basis of client server architecture. Its server part includes:

- oceanographic database (ODB) developed at MySQL
- map service, which was made at Mapserver
- python-modules performing data processing
- php-modules providing interaction between server and client applications.

Functionality.

Client part is a user-friendly interface providing the following functions:

- Export of oceanographic data in ODV format.
- Selection of oceanographic data on rectangular region, temporal interval, season, cruises, type of measurements, hydrological and/or hydrochemical parameters; and visualization of required oceanographic data (presenting stations on the map, making profiles of oceanographic parameters, metadata and data output (Fig. 1).

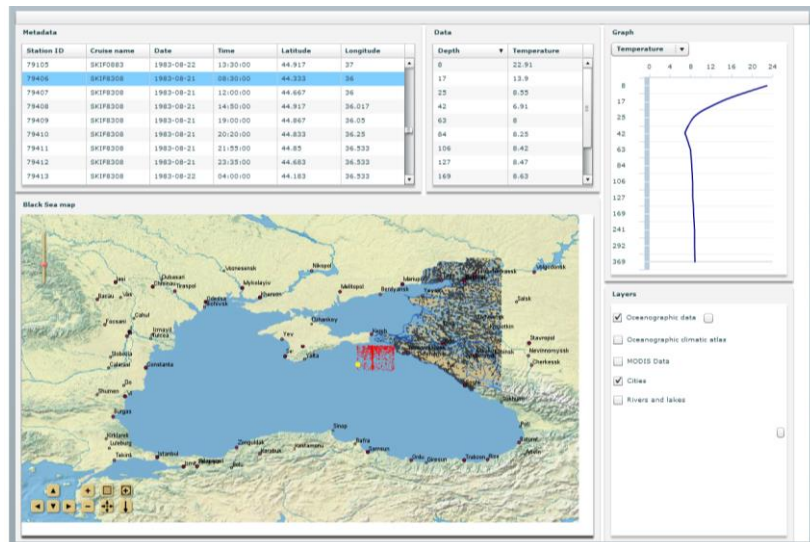


Fig. 1: An example of displaying the result of selecting oceanographic data.

- Selection and visualisation maps of the climatic atlas in shape formats. The maps can be selected on certain parameters (seawater temperature, salinity, density, heat storage, oxygen concentration in seawater, aerobic waters low boundary location, and hydrogen sulfide zone upper boundary location), levels, seasons, and years; and visualized as both bitmaps and isolines.

- Selection and display MODIS AQUA satellite images in GeoTiff format for any accessible date on the following parameters: sea surface temperature, chlorophyll a concentration, and water leaving radiation.
- Selection and displaying social and economic data for coastal regions.
- Overlay different data types (Fig. 2).

The openness of the Black Sea GIS architecture gives excellent capabilities for extending its functionality, adding parameters, updating the existing and connecting new databases. At present, the work on improving the Black Sea online GIS is continued.

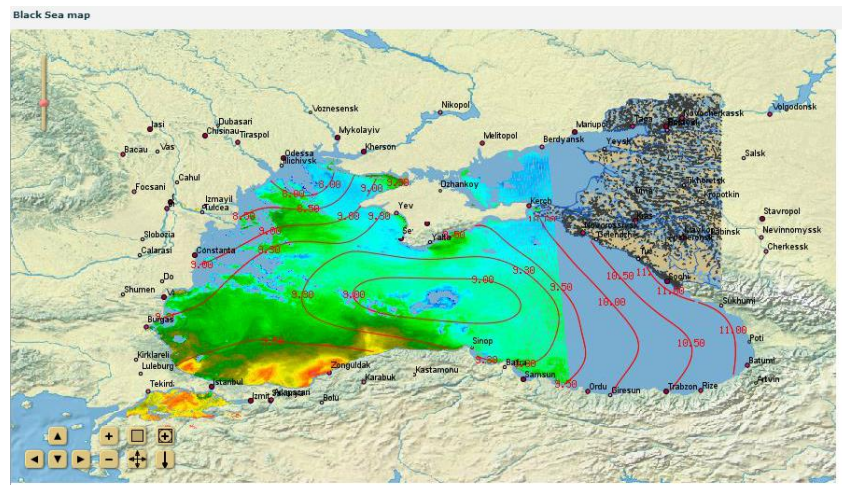


Fig. 2: Overlaying a climatic atlas map and a satellite image.

References.

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- [2] Zhuk E., Khaliulin A., Ingerov A., Godin E. "The experience of Black Sea GIS developing on basis of free software", *GEOPROFI*, Vol. 2, 2016, p. 36-39.