

MACISTE-PS: a web-based information system to manage environmental data from the dredging of the Port of Genoa (Italy)

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MACISTE-PS (MARine Coastal Information SysTEm – Port Section) is an advanced information system addressed to manage environmental data collected during the dredging monitoring of a Port. In particular you can insert, analyze and manage all the environmental information through a WEB Portal, interfaced with a geodatabase with spatial extension and a WebGIS viewer (Fig. 1). Data can be acquired using real-time instruments (buoy or ship mounted) or collecting discrete samples.

MACISTE-PS can be used to display data or maps and it can work as a Decision Supporting System (DSS). MACISTE-PS allows to make complex researches of heterogeneous data, aggregate results and share data through the web using OGC® standard protocol Web Map or Web Feature Services (WMS/WFS).

The marine-coastal ecosystem model used has been developed using RODBMS PostgreSQL with PostGIS spatial extension. Data are inserted into MACISTE using automated procedures or dedicated input forms. The web-portal can manage user generated contents (e.g. documents, images, multimedia information) and can provide the access to linked applications or software (e.g. R software), depending on the access rights.



Fig. 1: MACISTE architecture diagram, presented at the GFOSS conference 2009.

MACISTE-PS works as a client in client/server model and allows the user to explore maps and associated data stored in database; moreover it offers through "GISClient" an advanced authoring tool to create thematic maps and to build complex and performing query. A query builder allows defining the fields for research, formatting of data output, calculating values on the aggregated data and at last generating dynamic reports and charts (Fig. 2).

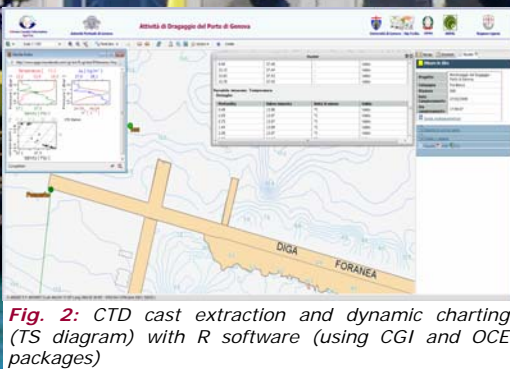


Fig. 2: CTD cast extraction and dynamic charting (TS diagram) with R software (using CGI and OCE packages)

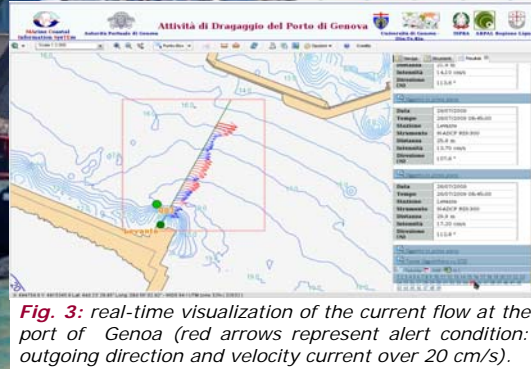


Fig. 3: real-time visualization of the current flow at the port of Genoa (red arrows represent alert condition: outgoing direction and velocity current over 20 cm/s).

MACISTE-PS provides a functional real-time data view enabling a continuous and detailed monitoring of the area (Fig. 3) by including decision-makers not experts in the use of GIS or in oceanography. Moreover it is useful to manage such a high amount of data. It offers tools to perform advanced queries on the database and to download data using an intuitive reports.

MACISTE-PS also provides to send alert messages about sensor warning, exceeding alert condition or down behavior using SMS alert service..

MACISTE-PS contains all data and metadata relative to the samples since the beginning of the dredging of the Port of Genoa (sampling station position, investigated variables, investigated compartments): presently it contains measures of ADCP and CTD collected from automated fixed stations each 15 minutes and the results of physical, chemical and biological analyses of water and sediment samples conducted in more than 200 sampling points by the University of Genoa, the Ligurian/Regional Environmental Agency (ARPAL) and the Italian/National Environmental Agency (ISPRA).



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