



Le scienze naturali,
economiche e giuridiche
nello studio e per la gestione
degli ambienti acquatici

Incontro scientifico congiunto
CoNISMa - AIOL

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ARCHEOEGADI

A GIS FOR MARINE ARCHAEOLOGICAL SURVEYS IN THE EGADI ISLANDS

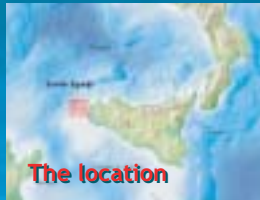
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Assessorato Beni Culturali e Ambientali
Servizio Coordinamento Ricerche Archeologiche Sottomarine

ARCHEOEGADI is a GIS application developed during a project carried out to verify the possibility of using electroacoustic and magnetometric equipment for marine archaeological research. This project was developed by CEOM and Regione Sicilia. In particular CEOM is an ENI's company and it provided all the geophysics equipment that was involved in the survey. The Regione Sicilia is the authority that is carrying out a global project to search for and recover the archaeological heritage (remains) along and around the Sicilian coast. Up to now the marine archaeological surveys have been carried out through direct observation. Using divers in shallow waters or mini-submarines (AUV/ROV) equipped with cameras in deep waters. Over the last few years it's becoming more common to use geophysics equipment normally used for geological and geophysical surveys in offshore operations (e.g. laying and installation of submarine pipelines for oil or gas).



The location

Why Geophysics equipment?

Archaeological remains often under the seabed
Covers very large areas in a short time
Reduction of management costs compared with
Traditional visual methods

Geophysics Equipment



Direct observation



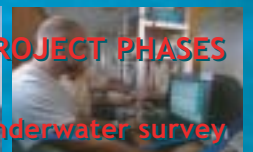
Remoted Operate Vehicle

Why GIS tools?

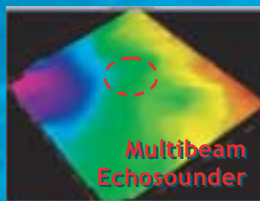
Essential role in planning and managing purposes
Aggregation of information to identify target



Planning of the underwater survey



PROJECT PHASES



Multibeam Echosounder

The "ArcheoEgadi" campaign took place in the marine area of Egadi Islands (western coast of Sicily or in Western Sicily). This site was selected for historical and geographic reasons. In fact it was the main scene of several battles between the Romans and the Phoenicians and it was a central point on the trading routes in the Mediterranean Sea. The choice of this area was very good because we discovered several archaeological sites. The most important result was the discovery of the wreck of an Arabic ship, which probably sank during a storm. It is dated XI century AD and it is in a very good state. The wreck is about 25 m long and 5 m wide and it is located at about 70 meters. It transported several terracotta storage vessels (amphorae) and tiles. The project was developed in 4 phases:

Planning (March - June 2000)

The first phase of the research was based on the study of historical and bibliographic information to find data about possible archaeological sites. We used the GIS to aggregate, in a geographic environment, this information and to define the search area and for planning the underwater survey.

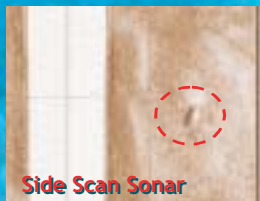
Survey and processing data (June - July 2000)

Once the search area was defined (about 40 km² around Favignana and Levanzo islands) and once the campaign was planned, the characteristics of the seafloor have been surveyed using acoustic and magnetic equipment. In particular, we used a Side Scan Sonar for geomorphologic relieves, a Sub Bottom profiler for stratigraphic analysis, a Multibeam Echosounder for bathymetric relieves and finally a differential gradiometer for differential magnetometric relieves.

In this phase GIS allows to aggregate, compare and overlay every information acquired to identify possible conformation anomalies of the sea floor which could hide archaeological sites.

Visual inspections (December 2000)

Once the target points were defined we could plan fast visual inspections using a class ACHILLES ROV (Remoted Operate Vehicle) equipped with a camera.



Side Scan Sonar



Visual inspection of the identified targets

Managing data

Cartography

Results

Managing data, cartography and results (January - March 2001)

All the data was entered into the GIS "ArcheoEgadi". This GIS was used for the management of the data but firstly to produce thematic charts to give evidence of the archaeological sites identified and to give detailed information about the geomorphologic, stratigraphic, bathymetric and magnetic characteristics of the Egadi Islands area.

So, in this project we had to manage information from different and heterogeneous sources. Every information was georeferenced using a positioning system based on a Differential GPS and inserted in the GIS to produce different kinds of output: Thematic maps, 3D elaboration, video sequences. With the ArcheoEgadi GIS an user can have access, in a transparent way, to the cartographic information acquired and produced during the project, to the historical and bibliographic data recorded in an Oracle Database and to the other descriptive information produced during the project and recorded in a file system.

ArcheoEgadi GIS was realised using the ArcView 3.2 ESRI GIS. The ArcView programming language Avenue and the Dialog Designer extension were used to personalise the user interface. The 3D and Spatial Analyst were used for the geographic and spatial analyses of the seafloor.

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