

OCEANOGRAPHIC DATA ARCHEOLOGY: CONTRIBUTION TO THE PRESERVATION OF ECUADORIAN OCEANOGRAPHIC RESEARCH

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ABSTRACT: The project “Oceanographic Data Archeology” developed by INOCAR (Oceanographic Institute of Ecuadorian Navy) has as a main objective to recover and to preserve the oceanographic data recorded in 30 years of research. The process starts with searching for data recorded on paper, by which was obtained a general inventory classified by research field, dates and study zones, which were registered in digital format for further migration to the database of the National Oceanographic Data Center of Ecuador. As a result, the data are under a secure format that allows backups for preservation, organization through the database scheme, and a recovery facility. The methodology used in data archeology contributed to recovering and preserving the disseminated, non-used, and under-risk data, which did not contribute statistics to the Ecuadorian oceanography.

KEYWORDS: Data Archeology, Preserve, Oceanographic Data, Digital Format, Metadata, Database, Data Collection.

INTRODUCTION

For many years the oceanographic data collected by INOCAR was stored on paper with risk of losing the efforts of many researchers and costs involved. The Institute has collected measurements of waves, currents, nutrients, and biological parameters from all the coastline of Ecuador; for different reasons those data was not stored in digital format, consequently they did not contribute to the environmental statistics. As a way to recover and preserve this information, an oceanographic data archeology project was developed by the Sea Science Department of INOCAR and the National Oceanographic Data Center.

The final objective of this project is to save all historical and future data in a relational database according to oceanographic standards to warrant the data exchange with international institutions and to facilitate data products projects to distribute to the scientific community. In this work certain steps are followed to reach the objective, the problems, and the final results.

METHODOLOGY

Data searching

The first step was to search and identify data stored on paper, at any place, data format, and source; there were some problems encountered on the way, because some datasets did not have any kind of reference or date or location. In most cases these problems were solved by asking people who worked in dataset acquisition and then reviewing technical reports; a few datasets without reference were not considered for archeology.

The Inventory

Once the sources of data on paper were located and grouped in the same place, the inventory work started; a team of researchers, specialized in oceanography, marine biology and marine chemistry, reviewed and classified each dataset by defined metadata (project, type of data, year, location, measurement units, and data)

From paper to computer

The next step was to create spreadsheet files to serve for input of recovered data. Experts defined labels as headers to fill and organize recovered data classified by research fields. It was necessary to hire some people to digitize data to the computer due to the quantity of data involved and time scheduled.

A data quality control process was carried out to warrant reliability of the data, using software for physical, meteorological and chemical data; experts applied permissible range for waves and currents.

The Database

To give this digitized data a format that facilitates queries from users, INOCAR developed a relational database to support all historical data and new data. Tables in this database were made according to the oceanographic standards to warrant international data exchange.

The metadata process started to define general information about data. Software was used which worked directly with the database developed at INOCAR; this way, data definition was made to prepare the system to the migration of data, which is the current process. At the end of migration, INOCAR will have a robust and standardized database that will facilitate exchange and use of data.

Use of data

The next step is to develop some interfaces to manipulate data, which will work directly with the database and will allow retrieval of saved data in user-defined formats. These interfaces will interact with scientific software to obtain graphic data products

Data Products

Using database applications and scientific software, INOCAR will be able to give to the scientific community a complete data product such as data catalogs, statistics, different kind of atlas, time series of some parameters and others researches based on data analysis.

CONCLUSIONS

Archaeology and oceanographic database represent rescue of valuable data collected over 30 years, which is an effort that carry out INOCAR in spite of economical limits on marine science.

Manipulated data organized in a database format will be more easily available to the researchers; they will use recovered data to apply statistics, extrapolate the data to determine the climatology of the region, develop oceanographic and meteorological atlases with better resolution and other types of data research.

INOCAR will produce and share standardized Ecuadorian data and data products to the scientific community.