

HỆ THỐNG THÔNG TIN HẢI DƯƠNG HỌC CỦA CÁC BIỂN PHÍA ĐÔNG CHÂU Á

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Tóm tắt Nhiều năm qua Viện Hải dương học Thái Bình Dương (POI) đã cung cấp, phát triển công nghệ về thu thập, tích lũy, xử lý và lưu trữ các dữ liệu về môi trường biển phục vụ việc nghiên cứu vùng biển tây Thái Bình Dương của POI. Với sự trợ giúp của hệ thống quản lý DB, một vài cơ sở dữ liệu hải dương học được định hướng và xây dựng. Việc sử dụng công nghệ thông tin hiện đại bảo đảm khả năng xây dựng một hệ thống thông tin tham khảo điện tử về hải dương học có dung lượng lớn, các cơ sở dữ liệu chuyên đề, các tập bản đồ và cung cấp chúng đến người sử dụng qua mạng máy tính và CD-ROM.

INFORMATION SYSTEMS ON OCEANOGRAPHY OF THE EASTERN ASIA SEAS

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Abstract During many years POI has provided and developed the technologies for the collection, accumulation, processing and long-time storage of the data on the ocean environment to maintain the outputs of POI studies in the Northwestern Pacific. Several oceanographic data bases (DB) have been created and oriented with the help of the relational data base management system. The use of modern information technologies ensures possibility of making the capacious electronic oceanographic information systems, thematic data bases, atlases and their delivery to users through internet and CD-ROM.

I. INTRODUCTION

Well-timed and effective provision with the data and information on the state of nature is one of the most important conditions for carrying out the environmental planning and taking decisions. This requires the integration of large volumes of data and development of effective methods and models to present results. On the basis of integrating data sets from all available sources

several specialized oceanographic data bases are created. Information on the data bases is placed on a specialized site of POI <<http://pacificinfo.ru>> in form of textual and graphic files, and the users' access to some data and information products is available.

Technologies developed while forming the oceanographic DBs provide a necessary basis for creating the information product with a higher level, which is intended both for highly specialized use and for a wide circle of specialists in adjacent fields of knowledge. Examples of the most demanded kinds of such production which can be created on the basis of the primary basic data very often not available for the users at all. They are the high-accuracy files of oceanographic data on a uniform grid of spatial coordinates, long-term observations, fields of generalized or calculated characteristics, electronic manuals and atlases. In the world practice the computer networks and CDs are widely used. We still need to establish a fact that for the Russian Far East as a whole the analogues of such information products of the national production on CD are not yet being replicated and are unknown for the users.

II. INFORMATION PRODUCTS CREATED ON BASIS OF THE DB

Series of thematic CD-ROM under the joint name "Information Resources of the POI", and also specialized web-site "Oceanography and state of marine environment in the Russian Far East" to place there the information resources on the domain <<http://pacificinfo.ru>> being created. The site contains the information on the data bases maintained by POI and also on other available information resources and products on different aspects of oceanography, hydrometeorology and ecology of the Northern Pacific and Far Eastern Seas. It is created DINRAC/NOWPAP portal for access to the information resources on marine environment in the NOWPAP area <http://pacificinfo.ru/nowpap_demo/>. To create the sites the technology of HTML, JavaScript, PHP and DBMS MySQL was used. The PHP scripts and DB MySQL application allowed us to choose the best and the most reliable method of realizing the set problems. For instance, to renew the information on the web-site the web-forms can be used, so an user who doesn't know the HTML can make changes of page content.

A family of electronic information systems and atlases on CD-ROM involves the following volumes:

- Volume 1. Observation data from POI cruises.
- Volume 2. Oceanographic atlas of the Bering Sea, Okhotsk Sea, and Japan/East Sea.

- Volume 3. Marine environmental atlas of the Russian coastal zone in the Japan/East Sea (is being developed).
- Volume 4. Moored observations on currents in North Pacific.
- Volume 6. Oceanographic atlas for the coastal ocean off the northeastern Kamchatka Peninsula.
- Volume 7. Guide on identity of Pacific marine mammal species off Russia.
- Volume 8. Atlas of typical surface wind and vorticity fields over the Japan/East Sea and adjacent land.
- Volume 9. Oceanographic atlas of the South-China Sea.
- Volume 10. Tidal atlas of the Bering, Okhotsk, Japan/East and East-China seas.

The CD-ROMs are presented in the separate section of site <<http://pacificinfo.ru/en/cdrom/>>. They are adapted for being used by specialists unprepared to work in the sphere of information technologies.

Special software for different kinds of oceanographic data visualization has been created. The first versions of POI information products were created as static systems and electronic atlases. Evolution of information and development technologies (World Wide Web, programming languages and relational DB management systems) provide effective methods to develop tools for data processing in dynamic mode and presentation its in comfortable electronic format. These tools are web-based applications and released on PHP-technology with support of DB management system MySQL. The tools allow rationally users to query and search data, to select different variables such as time and location. All of these actions could be executed in interactive mode within Internet browser.

Creation of dynamic web-systems means development of information products, which have complicated structure and make multistage data processing. The dynamic web-system of data shows demand of using various web-technologies, means of processing vector and raster graphics, languages web-programming, DB-management systems and others special tools. System development is conducted by principle of "modules" which allows

improvement of a product for service. Now the dynamic web-systems are at a stage of development. However developers already have an experience of creation and use of similar system. System "Ice conditions in the Far Eastern Marginal Seas" has been developed in 2006-2007. It is presented in the separate section of site <<http://pacificinfo.ru/en/climate/>>. The developed system allows building dynamic images of maps on the basis of characteristics specified by the users.

III. CONCLUSIONS

On the whole, the developed systems are to provide the informational support for solving a wide circle of problems of the fundamental and applied studies in the field of oceanography, hydrometeorology, ecology, and nature management. They can be applied in the education system by research and economic organizations, and administrative board, which activity is related to the use of information on the environment, exploitation of marine and coastal water resources, development of the nature-conservative measures in the region, including the extraordinary situations. It is planned to develop a calculated-model block for creating the complex information-analytical system of diagnostics and forecast of the state and variability of parameters in the marine environment of the region.