

ATLAS HẢI DƯƠNG HỌC BIỂN ĐÔNG

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Tóm tắt Tập atlas điện tử tóm tắt nhiều lĩnh vực hải dương học chính của khu vực biển Đông (SCS). Phiên bản CD-ROM đầu tiên bao gồm phần mềm và dữ liệu lịch sử khái quát hiện có về các đặc điểm tự nhiên và địa lý, chế độ khí tượng thủy văn, vật lý và hóa học hải dương biển Đông, được trình bày dưới dạng bảng, hình và text. Nó dựa trên dữ liệu lưu trữ GDEM, WOA'2001 và POI về hải dương học, cũng như là các kết quả nghiên cứu thu thập được từ các kỷ yếu hội nghị hội thảo, tài liệu lưu trữ và từ các trang web khoa học.

Tập atlas bao gồm bảng, hình, dữ liệu và những mô tả tóm tắt về: 1) Đặc trưng địa lý và khí hậu; 2) Phân bố thẳng đứng và ngang của nhiệt độ, độ muối, tốc độ âm thanh và các nguyên tố hóa học theo tháng và theo mùa; 3) Các khối nước; 4) Hoàn lưu chung và dòng chảy tầng mặt theo mùa; 5) Các hiện tượng thủy triều; 6) Đường liên kết tới các thông tin và dữ liệu khác trên WEB.

Hệ thống này có thể truy cập nhanh chóng vào hệ thống dữ liệu thô, thông tin và dữ liệu mạng lưới đặc biệt được lựa chọn và lưu trữ trên các CD-ROMs, cũng như là vào các dữ liệu on-line khác.

OCEANOGRAPHIC ATLAS OF THE SOUTH CHINA SEA

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Abstract The electronic Atlas presents a summary of many of the most important aspects of the South-China Sea (SCS) regional oceanography. The first, Russian version of CD-ROM involves both software and the generalized available historical data on the SCS physical and geographical characteristics, hydrometeorological regime, physical and chemical oceanography, presented as tables, pictures and textual materials. It is based on the WOA'2005, GDEM and POI archival oceanographic data, as well as on the results of completed research studies scattered in numerous special scientific transactions, archives and web-pages.

It comprises figures, tables, data and short description of: 1) Geographical and climate features. 2) Horizontal and vertical

distribution of temperature, salinity, sound velocity and chemical elements by month and seasons. 3) Water masses. 4) General circulation and surface currents by seasons. 5) Tidal phenomena. 6) Links to other data and information on WEB.

The system provides quick access to raw data, gridded data and information specially selected and stored on CD-ROMs, as well as to other ones in the "on-line" mode.

I. INTRODUCTION

The South-China Sea occupies southern part in chain of Western Pacific marginal seas. Its water area stretching from south-west to the north-east of the area has about 3447 km². In the west and north its natural boundary is the continental coast of South Eastern Asia, and in the east and south - large island arcs. Differences in the geographical setting and morphology of the SCS predetermine the main peculiarities and distinctions in the climate characteristics and hydrological conditions of the basin. Main peculiarities of heat and water balance, water dynamics, horizontal, vertical distribution and different-scale variability of hydrological characteristics on the surface and in the water thickness are strongly dependent on the character of the atmospheric processes, are conditioned by intensity of interaction with the ocean and are considerably variable. In the water areas of the sea the tidal phenomena are distinctly expressed. The SCS is high-productive water basins exclusively important for fishery and mariculture.

As a whole, the SCS and the adjacent areas of the Pacific Ocean condition the hydrological mode, weather and climate of the whole South Eastern Asia region. Here are the richest biological and raw material resources, this is where the navigation routes pass, and this is the place of the fishery fleet activity. That is why, here it is expedient to investigate the nature environment, to accumulate and to use effectively the information resources on the structure and functioning of marine ecosystems, i.e. the nature systems involving both abiotic and biotic components. In some areas of the SCS, especially in the coastal zone, the marine biota changes and degradation under the impact of climate fluctuations and anthropogenic load have reached a level of the ecological crisis. To undertake practical measures under the given problem is a priority task for adjoining countries; this is related to the necessity of improving the system of management in the field of nature consumption. The basis for rational planning and effective functioning of such system is all-lateral consideration of abiotic factors of natural marine ecosystems.

II. MATERIALS AND METHODOLOGY

As result of the long-term studies performed by the international communities the main features of hydrometeorological regime, water structure and dynamics, the state of the coastal and marine ecosystems were determined. The main peculiarities of variability of marine environment characteristics, atmospheric and nature-technogenous processes were ascertained. As a result of these studies vast factual material comprising many tens of thousands of stations and points of oceanographic, hydrometeorological, hydrochemical, hydrobiological studies and other types of observations were accumulated. The some part of the oceanographic data was obtained in cruises of the research vessels by the Far Eastern Regional Hydrometeorological Research Institute, Pacific Research Institute of Fisheries and Oceanography, the Pacific Navy, VNIRO, Russian Academy of Sciences. Upon analysis and generalization of the material, numerous special research papers, monographs, atlases and reference books were published. Under research, economic and commercial needs, with regard to the problems to be solved, the information is used in general oceanography, hydrometeorological service, fisheries, ecology, hydrography and in a wide range of the applied problems. Regretfully, considerable part of the initial data is scattered among the data owners and it is not available for a wide circle of users in its complete form.

The CD-ROM contains a brief, annotated presentation of data on the main physical-geographical characteristics, peculiarities of hydrological regime, water masses, tidal phenomena, waters circulation and ice conditions in the SCS which are based on the modern scientific notions and archived data on the oceanography of the region. It is given vast graphic material characterizing the large-scale peculiarities of distribution and intra-annual variability of the sea water temperature, salinity, sound velocity, some hydrochemical elements and currents. The disk contains copies of several data sets on temperature, salinity, hydrochemistry and currents covering the whole water area of the sea:

- Integrated POI oceanographic historical data base on the Northern Pacific.
- Data base of observations carried out in research cruises of the POI.
- N.S. NODC World Ocean Atlas (WOD'01/05).

- Global data set of climate data on temperature, salinity and sound velocity - GDEM (Generalized Digital Environmental Model, Version 2.5, 1998) available by the Internet <https://128.160.23.42/gdemv/gdemv.html>.

- Gridded temperature and salinity observations data (POI).

- Archival moored current observation data.

A list of free-accessed data bases and web-sites which contain the additional operative and archived data on a wide specter of special questions and interrelated problems of investigation and exploration of the region is given. To compile the annotated description for each section of the atlas and to select the tables and illustrative material ready for electronic display, the authors used published research papers, monographs, reference books.

III. RESULTS

The given CD-ROM is the 9th volume (the 1st version, in Russian) of a series of information products of the POI FEB RAS under a title: "Information Resources of POI. Oceanography". The CD-ROM is based on the materials of integrated data bases of POI and other data, which are listed on a specialized web-site of the institute <http://pacificinfo.ru>.

Total number of stations for period 1919 – 2002 after control on duplications and QC are:

- with temperature: 100123;

- with salinity: 21229;

- with ocean currents (moored buoys): 47;

- with hydrochemistry: as it is in the WOD'05.

To plot the maps, sections, and schemes it was used special software - Ocean Data View (Schlitzer, R. Ocean Data View (ODV5.0, 2000) <http://www.awi-bremerhaven.de/GEO/ODV/>) and standard supplements. ODV contains the illustrative basis for constructing diagrams, special software, suitable interfaces, etc.

Main graphic material is represented in the Atlas as following:

- Average for-many-years annual, seasonal and monthly maps of temperature and salinity distribution are given for standard levels at 0-4000 m.
- Schemes of vertical sections of these characteristics along particular meridians and parallels are constructed in two scales, mainly, by the data averaged by main seasons.
- Selected curves of the vertical distribution of parameters for different areas are constructed by the average monthly data.
- Maps of spatial distribution of hydrochemical characteristics (dissolved oxygen, phosphates, nitrates, and silicates) are constructed by the average annual and seasonal data on the standard levels at 0-500 m.
- Characteristics of the water circulation are represented as generalized schemes and maps of currents for one month of separate seasons.

Auxiliary illustrations are included into some fragments of the descriptive part of the atlas as the references to the authors' copies of pictures taken from the originals as they are.

Software is presented as the loading modules.

The atlas will be available at the web-page <<http://pacificinfo.ru/data/cdrom/9/>>.

We are planning to prepare and issue 2nd version of the atlas in Vietnamese in collaboration with Institute of Oceanography, Nhatrang, Vietnam.

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