

MAIN NATIONAL ACTIVITIES FOR MARINE RESEARCH AND MARINE DATA MANAGEMENT IN VIETNAM

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I. INTRODUCTION

Marine research and investigation activities have been developed in the coastal zone and sea areas of Vietnam from 50 years ago.

Should be made 2 major period of marine research and investigative activities:

- The period before 1975: weak intensity of investigation, low technics level and limited area of investigation
- The period after 1975 up to now: Strong development, high technology, high tempo and large scale of marine investigations

For last 10 years: Intensive development of marine investigations including physical and chemical oceanography, biological resources, marine geology and geophysics, marine ecology and environment, marine data management

Investigative area is extended: *coastal water, continental shelf areas, Truongsa and Hoangsa areas, central and south-west areas of South China Sea.*

Increased international and regional cooperation.

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II. MAIN MARINE RESEARCH AND INVESTIGATIVE ORGANIZATIONS

1. National Institute of Oceanography (NIO). Founded 1930. Scientific staff: 150. Place: Nha Trang, central coast of Vietnam.
2. Hanoi Institute of Oceanography (HNIO). Founded 1993. Scientific staff: 100. Place: Hanoi Vietnam.
3. Haiphong Institute of Oceanography (HPIO). Founded 1993. Scientific staff: 60. Place: Haiphong Vietnam.
4. Marine Research Division of Institute of Mechanic (HPIO). Founded 1993. Scientific staff: 60. Place: Hanoi Vietnam.
5. Research Institute of Marine Products (RIMP). Founded 1962. Scientific staff: 200. Place: Haiphong Vietnam.
6. Marine Hydrometeorological Center (MHMC). Founded 1986. Scientific staff: 80. Place: Hanoi
7. Marine Geology and Mineral Center (MGMC). Founded 1995. Scientific staff: 50. Place: Hanoi
8. Vietnam Petroleum Institute (VPI). Founded 1978. Scientific staff: 200. Place: Hanoi
9. Research Institute of Vietsopetro. Founded 1986. Scientific staff: 100. Place: Vungtau, south coast of Vietnam.
10. Survey and Mapping Division of Navy (SMDN). Founded 1972. Scientific staff: 300. Place: Haiphong, Vietnam.
11. Faculty of Hydrometeorology and Oceanography of HN. Founded 1985. Scientific staff: 30. Place: Hanoi
12. Faculties: Oil and Gas, Geodesy and Mapping of University of Mining and Geology. Founded 1976. Scientific staff: 60. Place: Hanoi
13. University of Water Products (UWP). Founded 1992. Scientific staff: 200. Place: Nhatrang
14. Research Institute of Water Resources (RIWR). Founded 1978. Scientific staff: 150. Place: Hanoi

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III. NATIONAL MARINE RESEARCH PROGRAMS

1. Complex program of investigation in the coastal water area of **Thuanhai-Minhhai** (South Eastern shelf of Vietnam, 1978-1980). **16 topics** on physical oceanography, geological structure, oil and gas potential and perspectives
2. State marine research program **48-06** (1981-1985). **15 topics** on physical oceanography, biological and fisheries resources, geological and geophysical characteristics. Study area: **continental shelf** of Vietnam.
3. State marine research program **48-B** (1986-1990). **19 topics** on hydrometeorological conditions and marine dynamics, marine environment and pollution, geological structure and petroleum potential of continental shelf of Vietnam
4. State marine research program **KT-03** (1991-1995). **22 topics** on complex investigation in coastal water area of Central Vietnam, hydrometeorological characteristics, geology, geodynamic and mineral potential, biological resources, fisheries resources evaluation, coastal environment and resources protection. Study area: **Coastal water and continental shelf**.
5. State marine research program **KHCN-06** (1996-2000). **14 topics** on marine data management, geological structure, hydrometeorological condition, coastal zone management, marine ecology and environment. Study area: **Coastal zone continental shelf and Central area of South China Sea**
6. State marine research program **KC-09** (2001-2005). **13 topics** on establishment of National Marine Databank, construction of atlas of marine physical conditions and environment, prediction of fisheries resources, forecast of meteorological fields, prediction of coastal erosions and sedimentation.

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IV. INTERNATIONAL AND REGIONAL COOPERATION PROGRAMS AND PROJECTS FOR MARINE RESEARCH AND INVESTIGATION

- **NAGA Expedition** in the Southern shelf and Gulf of Thailand (1959-1961), **USA, Vietnam and Thailand**, physical and chemical oceanography, biological and fisheries resources, ecological and environment characteristics
- **Complex investigation program in Tokin Gulf** (1959-1962) **China, Vietnam**. Physical and Chemical oceanography, biological resources, ecological and environment characteristics.
- **Vietnam-Russian** Investigative project for typhoon and storm in the South China Sea (1981-1985)
- **Vietnam-Norwegian** cooperation project for establishment of satellite transmitting system to collect data for typhoon forecasting and warning in sea areas of Vietnam (1999-2001)
- **Vietnam-Philippines** Joint Marine scientific research expedition I (1996) and II (2000) in South China Sea: physical and chemical oceanography, biological resources and environment.
- **Vietnam-Thailand** cooperation research project in the Gulf of Thailand (1999): Investigation of hydrological and environment characteristics, biological and fisheries resources
- **Vietnam-SEAFDEC** cooperation expedition in the Shelf of Vietnam (2000): Investigation of physical oceanography and environment ecology resources, fisheries reserves
- **Vietnam-Russian** cooperation project for geological and geophysical study in the self of Vietnam and South China Sea (1981-1991)
- **Vietnam-French** cooperation project on evaluation of ecological condition of coastal zone and Mekong river mouth area related to aquaculture development (1996-2000)
- **Vietnam-Germany** cooperation project for environment and sediment in South China Sea with 3 expedition in the research vessel Sonne (1996,1999,2000)
- **Vietnam-French** cooperative expedition with the research vessel Atalante in the shelf area central Vietnam (1993)
- **ASEAN-Australia** cooperative project for coastal zone environment and resources management in Vietnam (1997-2000)
- **ASEAN-Canada** cooperative project for studying Red tide, environment criteria, toxicity in Vietnam shelf (1997-1999)

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V. MARINE METEOROLOGICAL AND HYDROLOGICAL INVESTIGATIONS

- Network of meteorological and hydrological stationary observation in the sea and coastal zone consist of **25 stations**.
- Network of tide and sea level observation that consists of **14 stations**.
- From 1995 up to now, Marine Hydrometeorological center conduct every year 1-2 expedition with the research vessel **Nghien Cuu Bien** in the continental shelf areas of Vietnam
- From 2001 the system of automatic oceanographic operates transmitting data via satellite to ground receiving station
- In 1980 Hydrometeorological Department of Vietnam published the series of maps of meteorological and hydrological characteristics in the sea areas and coastal water of Vietnam
- In 2000 Marine Hydrometeorological Center published the **directory** of marine meteorological and hydrometeorological characteristics in the shelf areas of Vietnam
- Cooperation with **International and Regional Data Centers** in the world and Southeast Asian countries to exchange and update data information

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VI. MARINE MAPPING ACTIVITIES

The different marine mapping works are conducted in the Navy, Ministry of Industry, Petro Vietnam, Geological service. Land Management Department, Ministry of Marine Products, Department of Meteorology and Hydrology, Department of Maritime Transportation.

In the coastal water areas the large number of bathymetric maps of big scales (1:25 000-1:1000 000) was developed and periodically updated.

In continental shelf areas different maps of scale (1:200 000-1:500 000) was developed.

New mapping technology was used as remote sensing and satellite data, GIS technics, MapInfor, ArcInfor software and others for marine data management.

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VII. MARINE GEOLOGICAL AND GEOPHYSICAL INVESTIGATIONS

- Gravity and magnetic survey have conducted in the all of continental shelf areas with different scales from **1:50 000** to **1:500 000**
- Seismic exploration profiles have been developed with high details and strong network, concentrated in the Cenozoic sediment basin: **Songhong, Phukhanh, Cuulong, Namconson, Malay**
- More **30** petroleum companies from **US, Russian, Europe and Asia, Australia** are operating for oil and gas exploration and production in the continental shelf of Vietnam
- About **150** drilling wells has been developed in the Cenozoic sedimentary basins for oil and gas exploration and production
- Many big oil and gas fields has been discovered for last years such as white tiger, Dragon, Daihung, Thanhlong, Dark tiger , PM3 and others.
- More **100 million tons** of oil has been produced in the continental shelf of Vietnam.

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VIII. INVESTIGATIONS OF MARINE ECOLOGY AND ENVIRONMENT

- **13 ecological systems** in the coastal water and sea areas of Vietnam
- Due to the high temp of economic development, pollution in the coastal water area is strongly increasing
- Different contaminants in the many areas of coastal water are: **Nutrient, heavy metals, toxicity, facilizer, pesticides, and sediment**. The areas with increasing pollution are: **Quang Ninh-Hai phong, Red river mouth, Khanhhoa coastal area, Vungtau, Saigon-Dongnai river mouth, Cuulong river mouth**.
- Investigation and study of distribution of Chlorophyll, biomass, phytoplankton, plankton, algae and coral reefs, sea grass beds, mangroves, fisheries resources
- Investigated and proposed marine protected areas and national marine park such as: **Baitulong bay, Halong bay, Catba island, Honmun island, Condao, Phuquoc** and others.
- Establishment of network of environment monitoring stations in the coastal zone and shelf areas of Vietnam
- Investigation of ecology and environment of upwelling area in the shelf of south central of Vietnam

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IX. COASTAL ZONE ENVIRONMENT AND RESOURCE MANAGEMENT

- Coastline length of 3260 km with complicated geological structure and geomorphology
- Fixed more 60 segments with strong erosion (5-10 m per year)
- Fixed areas with strong sedimentation in the river mouths and coastal areas
- Studied and developed an assessment of environment impact of marine pollution from tourism development, sea port construction, aquaculture farming
- Used and developed new technology such as integrated coastal management, information technology, remote sensing and GIS, environment impact assessment and others
- Established National Environment and Resources Information Center (NERIC) in the National Oceanographic data center with mandate to collect and process available data to provided necessary information to managers and decision makers in the field of marine environment and management in Vietnam.

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X. MARINE DATA MANAGEMENT

1. Operating different state owner marine data centers

- The center of petroleum data and information (Petro Vietnam) with major geological and geophysical data
- The center of hydrometeorological data and information (Hydrometeorological Department) with major data on physical and chemical oceanography
- The center of water product data and information (ministry of water products) with mainly marine biology and fishery data and resources (Department of Land Management and Mapping)
- National oceanographic data center (National center for science and technology of Vietnam)

2. NODC mandate and tasks

- Collection and management of available data resources in the coastal and Sea areas of Vietnam
- Establishment of National marine database with advanced technology for acquisition and processing of data of physical, chemical oceanography, marine biology and ecology, marine geology and mineral potential, marine environment and resources.
- Development of new technology and methods for marine data management and processing
- International and regional cooperation in the field of marine data and information management

3. Cruise and station inventory in South China Sea and adjacent (from 1956 to 2000, chosen area: 5° S-25° N; 99° E-125° E, after Vo Van Lanh and others, 2000)

- **Total 6731** oceanographic observation cruises from these: *Vietnam =679; USSR =191; USA =3977; Japan =624; Australia =316; UK =169; China =115; Thailand =54; Indonesia =68; Taiwan =45; Singapore =41; Canada =27; Netherland =16; Philippine =8; Denmark =7; France =6*
 - More 150 000 serial stations, 742 long time series of current and wave data
4. Further development of state policy for data and information management.

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XI. CONCLUSIONS

- For last 50 years developed many National activities and international and regional cooperation for marine research and investigation of Vietnam
- Marine research and investigation of Vietnam includes all specific fields of oceanography: physical, chemical, biological, geological, ecological and environment, data management.
- Investigation area is extended, including coastal water, continental shelf area and adjacent areas of SCS.
- Scale of marine investigation as well as quality of obtained data is increasing for last time.
- Continuously developed national marine data base with advanced technology for data management and processing