

PHIÊN TOÀN THỂ
Plenary Session

MỘT SỐ THÀNH TỰU VÀ ĐỊNH HƯỚNG NGHIÊN CỨU KHOA HỌC CỦA VIỆN HẢI DƯƠNG HỌC

Võ Sĩ Tuấn, Bùi Hồng Long, Nguyễn Thị Thanh Thủy
Viện Hải dương học

Trong suốt lịch sử hoạt động, Viện Hải dương học luôn khẳng định vị thế là một trong những cơ quan đầu ngành của Việt Nam trong nghiên cứu cơ bản về biển như đa dạng sinh học của các hệ sinh thái, các quá trình hải dương học; tài nguyên sinh vật và phi sinh vật; sinh lý – sinh thái của sinh vật biển. Hướng nghiên cứu ứng dụng đã đóng góp cho xây dựng chiến lược quản lý tổng hợp đới bờ Việt Nam; xây dựng và quản lý các khu bảo tồn biển; cơ sở khoa học cho quản lý nguồn lợi và nuôi trồng thủy sản bền vững; nâng cao hiểu biết và đề xuất giải pháp quản lý các sinh vật gây hại, nguy hiểm; tăng cường tri thức về tương tác giữa lục địa và biển phục vụ cho khắc phục và giảm nhẹ thiên tai, xây dựng công trình bờ. Theo yêu cầu của thực tiễn, Viện đã xây dựng cơ sở để khai thác, quản lý và phát triển bền vững các nguồn tài nguyên và bảo vệ môi trường biển ở nhiều địa phương cũng như phát triển các đối tượng nuôi trồng mới phục vụ kinh tế dân sinh và xuất khẩu. Phương hướng phát triển Viện Hải dương học được xây dựng nhằm khẳng định vị trí là viện nghiên cứu khoa học - công nghệ biển hàng đầu của Việt Nam và khu vực; duy trì và nâng tầm hoạt động nghiên cứu cơ bản về hải dương học, tài nguyên và môi trường để đạt được những hiểu biết toàn diện về biển Đông, và tăng cường hướng khoa học ứng dụng trong quản lý và công nghệ, bảo vệ môi trường biển phục vụ phát triển kinh tế và bảo vệ chủ quyền quốc gia.

Từ khóa: *Viện Hải dương học, Thành tựu, Nghiên cứu biển.*

HIGHLIGHTS ON THE ACHIEVEMENTS AND WAYS FORWARD OF INSTITUTE OF OCEANOGRAPHY

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The Institute of Oceanography has been considered as a leading institution of Viet Nam in fundamental researches on marine science, providing understanding on oceanographic processes, marine biodiversity, living and non-living resources; and biology of marine living resources. The applied researches have conducted to support integrated coastal management, MPA development and management, sustainable aquaculture; management of harmful and dangerous living creatures; mitigation of natural hazards; coastal construction. In recent years, more researches for new target species in aquaculture for domestic and export markets and for support to local government and business in resource management, environment protection and sustainable exploitation of resources have been implemented. The strategy for further activities has been developed aiming to confirm the leading role in marine science at the national and regional levels; maintain and upgrade fundamental researches on oceanography, marine resources and environment of Bien Dong; improve applied researches and technology application for effective management and sustainable uses in order to ensure economic development, environment management and national sovereignty protection.

Key words: *Institute of Oceanography, Achievement, Marine researches.*

EXPERIENCES FROM REGIONAL CLIMATE FORECASTS FOR THE 21ST CENTURY FOR THE NORTH SEA AND ITS APPLICATION TO VIETNAMESE AND ADJACENT WATERS

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A mesoscale resolution version of the Hamburg Shelf Ocean Model (HAMSOM) was developed at the Institute of Oceanography, University of Hamburg for the North Sea region. Based on the Intergovernmental Panel on Climate Change (IPCC) scenario A1B (SRES), a forecast of hydrodynamic conditions in this region will be simulated by HAMSOM for the 21st century. Various processes will be analysed in order to gain insight into the hydrodynamic response of the North Sea to a possible future climate scenario.

In order to force the HAMSOM model, results from two other models which have already been run for the IPCC scenario are used as open boundary condition and surface forcing, respectively. Thereby, results from the global ocean model MPI-OM (Max Planck Institute - Ocean Model) are used at the open lateral boundaries of the North Sea domain and results from the regional atmospheric model REMO (Max Planck Institute - Regional Model) are used for the meteorological forcing at the air-sea interface. In addition to the scenario period 2000-2100, the control period 1950-2000 is also analysed and used as a reference. To be consistent with the scenario period, the two models MPI-OM and REMO were run in free mode without any data assimilation for the control period, too. In the course of evaluating the REMO data, climatological monthly means of the REMO Control Run were compared with ERA40 reanalysis data. This comparison revealed a model bias inherent in REMO which is partially strong enough to yield unrealistic values of certain atmospheric variables and in turn, unrealistic behavior of the North Sea dynamics simulated by HAMSOM. Therefore, a bias correction method is introduced and applied to five atmospheric variables used to drive the HAMSOM model (air temperature, total cloud cover, wind speed, relative humidity and precipitation).

Climatological monthly means (2050-2100) of sea surface temperature and relative frequency, depth and intensity of the thermocline demonstrate various spatio-temporal characteristics of the thermocline. In the relative frequency plots the growth of the thermocline in spring, its presence over the summer and the decay of the thermocline in autumn can be considered, whereas the depth and intensity plots indicate, respectively, the deepening of the thermocline in autumn caused by increasing wind speeds and the strongest vertical temperature gradients to occur around June and July. Further comparisons with respective plots from the Control Run indicate no significant change in the spatial structure of the exhibited thermocline parameters due to the climate change scenario.

At the end of the presentation it will be discussed to which degree experiences obtained for the North Sea can be transferred to Vietnamese Waters.

Key words: *Climate forecasts, ocean models, North Sea.*

NEW TECHNOLOGIES FOR HARMFUL ALGAL BLOOM (HAB) RESEARCH
AND MANAGEMENT: THE EXPANDING ROLE OF NEW SENSORS AND
BIOTECHNOLOGY

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Harmful algal blooms (HABs), commonly called “red tides”, are a diverse group of phenomena caused by the growth and proliferation of microscopic algae, some of which produce potent toxins. HABs take many forms, affecting coastal countries with impacts that include poisonous shellfish, dead fish, aerosolized toxin that drives tourists and residents from beach areas, and ecosystem changes such as the destruction of submerged aquatic vegetation or mortality of marine mammals and other organisms at all levels of the food web. The human health and economic impacts of HABs are significant, and thus there is strong incentive to develop capabilities for forecasting these events and mitigating their effects.

The diversity in HAB species and their impacts presents a significant challenge to those responsible for the management of coastal resources. Furthermore, HABs are complex oceanographic phenomena that require multidisciplinary study ranging from molecular and cell biology to large-scale field surveys, numerical modelling, and remote sensing from space. Our understanding of these phenomena is increasing dramatically, and with this understanding come technologies and management tools that can reduce HAB incidence and impact.

This talk will summarize the global HAB problem and highlight several new technologies and approaches to monitoring, control, and management. These will include molecular probe-based methods for cell detection, rapid and sensitive toxin assays, and large-scale physical/biological numerical models to analyze past blooms and forecast future ones. Problems encountered with field or operational application of some of these methods will be discussed, as will the prospects for incorporating these new technologies into moored instrument arrays for in situ detection of cells and toxins as part of the rapidly growing ocean observing system.

Key words: *Harmful algae bloom, Molecular probe-based methods.*

THE NATURAL HISTORY MUSEUMS AND PUBLIC AWARENESS ON BIODIVERSITY INFORMATION AND CONSERVATION IN THAILAND

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It is imperative that Natural History Museums play a role promoting the cause to conserve our natural resources and environment, and such unique institutions in that they can provide information to the general public through exhibitions. Exhibitions (permanent, temporary, traveling) offer individuals an opportunity to dialogue with exhibits. Through enhancements of exhibitions with multimedia, visitors have a long lasting impression of an exhibition. Therefore, the role that museum plays in the promotion of conservation of biodiversity is immense.

Natural History Museums, including marine biodiversity, located in different part of Thailand are based on Institution and University. They mostly develop adaptive strategies as response to climate change and biodiversity conservation and play a key role in disseminating information to the general public through exhibitions.

The Natural History Museum, National Science Museum, Thailand was established as a Science Museum Project which was launched on the auspicious occasion of the 5th cycle anniversary of Her Majesty the Queen, August 12th, 1992. The objectives of the Natural History Museum are to act as a National Reference Collection on Biodiversity, as a Centre of Natural Science Exhibition and Science Communication, as a Research Centre on Biodiversity in Thailand and neighboring countries. NSM is committed to promote science communication on biodiversity conservation. We all need to sustainably use our biodiversity if we want to live in harmony with nature. We only have one earth and it is our duty to protect it for future generation. Let us work together and save our earth.

Key words: *Natural History Museum, National Science Museum Thailand, Public Awareness, Biodiversity Conservation.*

VỀ VIỆC LỒNG GHÉP CÁC NỘI DUNG, NHIỆM VỤ NGHIÊN CỨU BIỂN CỦA
VIỆT NAM VÀO KHUNG CHIẾN LƯỢC TRUNG HẠN CỦA ỦY BAN
HẢI DƯƠNG HỌC LIÊN CHÍNH PHỦ

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Báo cáo tập trung phân tích, giới thiệu, trao đổi một số nội dung, nhiệm vụ và sản phẩm dự kiến trong việc lồng ghép các nhiệm vụ nghiên cứu biển của Việt Nam vào khung chiến lược trung hạn của IOC, đặc biệt là việc liên kết, phối hợp với các chương trình nghiên cứu khu vực Tây Thái Bình Dương (IOC/WESTPAC) trong những năm đến, bao gồm (1) Giảm nhẹ những tác động do sự biến đổi khí hậu toàn cầu và thích ứng; (2) Cảnh báo và giảm thiểu tác hại của thiên tai; (3) Giữ gìn sức khỏe của các hệ sinh thái đại dương và (4) Xây dựng thể thức và chính sách phục vụ quản lý bền vững môi trường, tài nguyên vùng ven bờ, vùng biển và đại dương. Việc lồng ghép các nhiệm vụ nghiên cứu, triển khai, điều tra trên biển Đông của Việt Nam vào 4 nhiệm vụ chiến lược trung hạn của Ủy ban Hải dương học liên chính phủ (IOC) không chỉ mang lại những giá trị thực tiễn, mà còn tạo ra vị thế, nâng cao tầm vóc, uy tín của Việt Nam trong nghiên cứu hải dương học ở khu vực và quốc tế. Có thể coi đây là một trong những nội dung quan trọng của chính sách quốc gia về biển.

Từ khóa: *IOC, Việt Nam, Chương trình nghiên cứu.*

MAINSTREAMING VIETNAM MARINE RESEARCH ACTIVITIES
AND PROGRAMS INTO IOC MEDIUM-TERM STRATEGIC FRAMEWORK

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This paper analyses, introduces and discusses some national missions and targeted programs on marine research and their expected outcomes to be integrated into IOC medium-term strategies, especially under the co-operation with IOC/WESTPAC research programs in years to come:

1. Mitigation of the impacts of climate change and adaptation
2. Prevention and reduction of the impacts of natural hazards
3. Safeguarding the health of ocean ecosystems
4. Management procedures and policies leading to the sustainability of coastal and ocean environment and resources.

The combination and mainstreaming of Vietnam marine research activities and programs into IOC four medium-term strategies not only bring practical values, but also enhance Vietnam's position, stature and prestige in the regional and international oceanographic research circles, which can be regarded as one of the important contents in the national marine policy.

Key words: *IOC, Viet Nam, Research programme.*

RESPONSE OF SOUTHEAST ASIA'S MARINE BIODIVERSITY TO THE COMBINED IMPACTS OF HUMAN-INDUCED DEGRADATION AND CLIMATE CHANGE

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Southeast Asia is recognized as a global marine biodiversity hotspot because of its richly endowed marine natural heritage. However, heavy anthropogenic pressure on the marine environment driven by rapid economic expansion and a fast-growing population, have resulted in widespread environmental quality decline and ecosystem degradation. Awareness of the erosion of marine ecosystem integrity increased in the past few decades but management response remained sluggish and with limited effect. Climate change impacts are expected to exacerbate biodiversity loss particularly when ecosystem resiliency has already been largely compromised by human pressure. Equatorial biodiversity, subjected to the higher extreme of the temperature range is expected to shift towards the higher latitudes in the most simplistic scenario as the earth warms further. Range shifts will not be a direct movement of complete marine ecosystems from the equator to the higher latitudes as individual species differ in thermal tolerance ability and behavioral responses, and migrate over varying temporal and spatial scales. Trophic disruptions and interference of ecosystem processes are likely to result in significant modification of presently established ecosystem community structures. What will happen to present equatorial marine biodiversity and whether it can continue to function effectively under further temperature elevation are open to interpretation. Apart from temperature elevation, other climate change impacts such as increased frequency of extreme weather, sea-level rise, and ocean acidification will also affect marine biodiversity. This can be seen from some current real events that simulate the impacts of climate change, but the situation becomes complicated as these parameters act in synergy rather than in isolation. Despite the uncertainties, a suitable mitigation response is to reduce present anthropogenic pressures so that ecosystem resiliency can improve and strengthen against the impacts of climate change.

Key words: *Southeast Asia, Climate change, Human-induced degradation.*