

# Human Impacts on Coastal Environment

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For more than 50 years, human activities around the globe have continued to expand. Human activities on land, including lifestyles, agriculture, industry and the service sector, have intensified, ultimately placing a tremendous burden on the oceans in various ways. The effects are most visible in the environmental deterioration in the coastal zones where land and sea come in contact with one another. These coastal zones are the location for the marine products industry which provides valuable resources such as food for humanity. Coastal zones also play a vital role in maintaining a sound climate and ecosystems, and they provide various other services such as nurturing cultural activities.

We need to look at coastal zones as both something of our own and as a resource for sustainable use by future generations, and to view the current state of the oceans in terms of their connection with ever-expanding human activities. We are approaching the point at which we must think seriously about a path that will ensure effective use at the same time as we preserve our finite environmental resources. In this presentation, I will discuss the load placed on the oceans by human activities on land, and proceed from there to a consideration of the problems of nitrogen and plastics.

## SHORT REPORT OF EMECS 11-SEA COASTS XXVI JOINT CONFERENCE

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The EMECS' 11 – Sea Coasts 'XXVI Joint Conference “Managing Risks to Coastal Regions and Communities in a Changing World” was organized by the International Center for Environmental Management of Enclosed Coastal Seas (International EMECS Center) and the «Sea Coasts» Working Group of the Russian Academy of Science (RAS) Council on the World Ocean. This EMECS' 11 Conference was first which was held in Russia.

A rich scientific program of the Conference included 246 reports (130 oral and 116 posters) submitted by participants in the thematic sessions over four days and was covered a wide range of issues:

- Coastal systems and their dynamics;
- Coastal erosion and dynamical processes in the nearshore zone;
- GIS & marine spatial planning;
- Climate change and coastal adaptation to climate change;
- Construction and exploitation of hydraulic engineering structures and dredging in the coastal areas;
- Study and monitoring of coastal and marine ecosystems;
- Interactions between coastal zone and the open sea: impact on the ecosystems;
- Ecological sensitivity of coastal areas: anthropogenic loads and natural disasters;
- Sustainable use and development of coastal resources: effective management and approaches.

A large number of the world's leading experts in the field of studying of the World ocean and its coastal zone was attracted due to a wide range of the Conference topics. In the Joint Conference was attended by over 700 participants from more than 40 countries, including: Russia, Japan, India, China, Thailand, Brazil, Colombia, USA, Australia, Middle East, Southeast Asia, Africa and Europe. In St. Petersburg over 300 participants was attended directly.

The Conference was attended by official delegation of the Government and Parliament of the Hyogo Prefecture, which was headed by Vice-Governor Kazuo Kanazawa.

On the Conference, it was held the specialized session of the BRICS countries, combined with the 2nd Meeting of the BRICS officers in framework of the Priority Area «Prevention and Mitigation of Natural Disasters».

Specially needs to attention to the Students and Schools Partnership Session (SSP Session) organized in the framework of the Conference, which was attended by 11 senior high school students and first years University students of Russia, Japan and the USA. Their aim was developing vision for the sustainable development of the coastal regions of the world from point of view next generation.

As a result of work of scientists from different countries, on the Joint Conference adopted the Conference Declaration, which was presented at the Closing session.

## **Report of Students and Schools Partnership (SSP) Session in frame of EMECS 11-Sea Coasts XXVI Joint Conference**

**D.Ryabchuk, G.Gogoberidze**

The SSP Meeting has been an important event in frame of EMECS-11 - Sea Coasts XXVI Joint Conference. Organizing of Students and Schools Partnership (SSP) Session gave a unique opportunity to youngsters to be involved in fruitful discussions about multidisciplinary marine and coastal research and environmental friendly management within high-level international scientific community.

Students and Schools Partnership (SSP) Session was organized in forms of the panel discussions, oral presentations and posters sessions of three main topics: *Perspective on Climate Change and Coastal Environment*, *Environmental Education and Public Awareness* and *Coastal science*. Fifteen students and scholars from Japan, Russia and United States of America, highly motivated in environmental issues, and the world level scientists and educators have participated in SSP Session.

Opening ceremony and the first SSP Meeting session (August, 25<sup>th</sup>) took place in A.P.Karpinsky Russian Research Geological Institute (VSEGEI) – one of the leading national geological organization of Russia. The institute has inherited both the purpose-built historic mansion and best traditions of Russia's Geological Committee founded in 1882. Mr. Kazuo Kanazawa, Vice Governor of Hyogo Prefecture, opened the Meeting. In frame of first SSP session scientists and educators from Japan, USA, Russia and France presented the lectures, covered wide thematic and geographic spectrum of environmental issues – geology, biology, ecology and integrated coastal zone management of the Baltic Sea, the Chesapeake Bay, the Seto-inland Sea, and the North Sea.

Two other oral sessions (August 26<sup>th</sup> – 27<sup>th</sup>) of SSP meeting were organized in Russian State Hydrometeorological University (RSHU). Students and scholars presented results of their research. Sessions were supervised by Bell Wayne, Professor of Washington College (USA). Important and interesting topics of students' presentations initiated active and fruitful discussions. Besides, young scientists participated in the EMECS 11 - Sea Coasts XXVI Joint Conference poster session.

One of the SSP Meeting results is a SSP declaration with a young point of view that is parallel to the main Conference declaration. SSP Meeting participants noted that the EMECS-11 has been very successful in retaining strong international collaboration and proposed a larger student representation in both number and nationality in the conference in the future. Declaration ends with the words: "One person cannot change everything. But if millions of people make a little change together to protect our nature, the earth will be different. The young generation like us must take over the will and efforts to conserve our nature hand in hand for all the creatures sharing the earth. Let's think about what we can do together".

# **Environmental challenges of the Persian Gulf and Country's approach towards implementation of the Integrated Coastal Zone Management tool**

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The presentation shall be comprised of the following sections:

- ❖ General Characteristics of the Persian Gulf as a Semi-enclosed Sea.
- ❖ What are the main environmental challenges of the Persian Gulf?
- ❖ Why Persian Gulf is considered as a “Special Sea Area” by the International Maritime Organization?
- ❖ What are the measures taken to address the environmental challenges of the Persian Gulf at National and Regional Level?
- ❖ How the Concept of ICZM was initiated in the Islamic Republic of Iran?
- ❖ Who are the Stakeholders?
- ❖ What is the current status of ICZM?
- ❖ What are the implementation challenges?
- ❖ Why an updated ICZM was required?
- ❖ Lesson learnt!

# Eco-Environmental Changes and Driving Forces in the Bohai Sea

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## **Abstract:**

Generally, the Bohai Sea with a total area of 77,000 km<sup>2</sup> consists of five parts: Liaodong Bay, Bohai Bay, Laizhou bay, Central Bohai Sea and Bohai Strait. It is featured by a basin shape and is a shallow semi-closed marginal sea with an average depth of 18 m. The Bohai Strait, particularly the northern part of Strait with a deepest water depth of about 70 m, plays a key role in the water exchange between the Yellow Sea and the Bohai Sea. The Bohai Sea has been one of the most important marine fishing grounds in China and nowadays is surrounded with continental economic development zones of four provinces, namely Liaoning, Tianjin, Hebei and Shandong provinces. Thus, the Bohai Sea is of the highly dynamic and complex especially during last two decades due to natural and anthropogenic forcing, such as sea level rise, land reclamation, sediment reduction, nutrient enhancement, pollutant discharged from rivers and oil field exploitation. Those driving forces caused a rapid deterioration of the coastal and marine environmental quality and ecological functions in the Bohai Sea. Understanding the eco-environmental changes and their relation to the driving factors in the coastal zone and the marginal sea is essential to unveil the coastal natural evolution, restore coastal social-ecosystem and promote coastal sustainable development. In this presentation, the social and natural characteristics of the Bohai Sea and coastal land will be briefly introduced. The basic features and changes of hydrodynamic systems in the river mouth and coastal Sea such as external forces, thermohaline patterns, and substance transport processes will be generally described. The ecological and environmental changes in the Bohai Sea as influenced by the climate change and human activities will be discussed. Future researches in the hydrodynamic, ecological and environmental systems in the Bohai Sea and the coastal zone are proposed as follows: (1) the water exchange fluxes changes and their controlling factors across the Bohai Strait; (2) the transport processes and fluxes of the sediment, nutrients and chemicals (e.g., toxic metal, persistent organic pollutants, microplastics) in the river mouths, bays and Strait of Bohai Sea; (3) the biodiversity and productivity and their responses to living environment changes of the Bohai Sea; and (4) the Bohai Sea ecosystem dynamics, evolution and their relation to inputs from the Yellow Sea and the coastal land/rivers.

**Key words:** Bohai Sea, Driving Force, Eco-Environmental Changes, Hydrodynamic system, Sustainability

# Integrated Coastal Management in Japan

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Coastal zones are ocean regions that provide many benefits to humanity, and the source of these benefits is the biodiversity of the oceans. The East Asian ocean region in which Japan and South Korea are located is particularly rich in biodiversity. In recent years, however, various problems have arisen due to the impact of human activities. Various efforts are underway to ensure integrated coastal management (ICM) for coastal zones in order to resolve these problems and achieve sustainable development. The Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) has played a leading role in introducing ICM in East Asia. In Japan, ICM was provided with a legal basis in the Basic Act on Ocean Policy that was enacted in 2007. The 2nd Basic Plan on Ocean Policy that was approved by the Cabinet in 2013 clearly states:

“...make efforts to comprehensively manage land areas and marine zones together in accordance with regional peculiarities with the participation, coordination and collaboration of many different players based on independence of individual regions while building consensus among the parties concerned. Offer assistance to regions that strive to formulate their own plans.”

ICM encompasses ecosystems, social activities and the governmental sphere, and it is a technique for managing land and sea areas as an integrated whole. ICM must be considered based on a variety of regional characteristics: large city type ICM in places like Tokyo Bay and Osaka Bay, wide-area ICM as in Omura Bay, municipality type ICM such as in the city of Shima, and island type ICM as in Taketomi-cho. The procedure is to establish and standardize a plan-do-check-act (PDCA) cycle by determining the current status with the land and sea considered as a whole, initiate consensus-building by local relevant entities, formulate a plan for comprehensive management of coastal zones that takes into consideration consistency with related plans, implement the plan in an adaptive manner, and then revise the plan based on assessments and recommendations. It is essential for local residents to be involved proactively at all stages, as this will enhance the attractiveness of the region and achieve sustainable development.

## Development of Coastal Management Method to Realize the Sustainable Coastal Sea

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The Ministry of Environment, Japan has begun the new research project “Development of Coastal Management Method to Realize the Sustainable Coastal Sea” (2014-2018, PI: T. Yanagi) in 2014 and this project will continue until 2018. This project aims to propose the suitable ICM (Integrated Coastal Management) for realizing the sustainable coastal community. Three research fields (Seto Inland Sea as semi-enclosed coastal sea, Sanriku coastal seas for open character coastal sea and Japan Sea’s coastal sea where the international management is necessary) are selected to clarify their natural characteristics from the viewpoint of physical, chemical and biological oceanography. Social and human scientists are also included to this trans-disciplinary project in order to clarify the economic and cultural aspects of the coastal community. We will develop the integrated numerical model which is useful for the policy decision in the coastal areas.