حكومة رأس الخيمة
Government of Ras Al Khaimah

هيئة حماية البيئة و التنمية
Environment Protection & Development Authority

UNESCO

المؤتمر الدولي السادس حول الاحتباس الحراري: أهمية المحيطات
رأس الخيمة،الإمارات العربية المتحدة
6th International Conference on Global Warming: The Critical Role of Oceans
Ras Alkhaimah,United Arab Emirates
December 4-7,2023

6TH INTERNATIONAL CONFERENCE ON GLOBAL WARMING

THE CRITICAL ROLE OF OCEANS

DECEMBER 4-7,2023

CONFERENCE AGENDA

VENUE: MÖVENPICK RESORT, AL MARJAN ISLAND, RAS AL KHAIMAH

SCIENTIFIC COMMITTEE

Dr. Saif Mohammad Al Ghais
Director General, EPDA, UAE
Eng. Mouza Obaid Al Mehairi
Assistant Director General, EPDA, UAE
Dr. Amrita Giles De Soyza
Director of Environmental Monitoring Department

Organizing Committee

Eng, Mouza Obaid Al Mehairi - Head of the Committee
Dr. Amrita Giles De Soyza
Ms. Maryam Ali Alshehhi
Eng. Mustafa Khalifa
Ms. Shamma Mohammed Alshamsi
Mr. Abdullah Mohammad Alhamadi
Eng. Akshay Mohan

Public Relations Committee

Ms. Nouf Jumah Altaweel - Head of the Committee
Ms. Shamma Mohammed Alshamsi
Eng. Fatema Rashed Alsuwidi
Ms. Maryam Abdulla AlMazrouei
Mr. Taleb Ebrahim Altamimi

Logistics Support Committee

Mrs. Maryam Ali Al Shehhi - Head of the Committee
Eng. Mohammed Tag Al Sair
Ms. Maryam Abdulla AlMazrouei
Ms. Mahra Yahya Yousef Al-Ali
Ms. Meirah Ali Alhindaasi
Ms. Mouza Meshal AlAli

Registration Committee

Mr. Amr Azzan Alsaadi - Head of the Committee
Eng. Ali Mohammed Al Hebsi
Ms. Maryam Abdulla AlMazrouei
Mr. Zayed Ali Al Naqbi
Ms. Amal Saif Al-Ali

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Message

It is a pleasure that the Environment Protection and Development Authority-Ras Al Khaimah (EPDA-RAK) is organizing **the 6th International Conference on Global Warming: The Critical Role of Oceans"** during December 4-7, 2023 in Ras Al Khaimah, United Arab Emirates.

Global warming is the most important environmental challenge facing humanity with adverse implications for ecosystem, natural resources, food production and health. Environment protection and development is an important factor for sustainable socio-economic growth. This goal can be achieved by adopting a multidirectional approach of encouraging and supporting the use of technological, educational, social and policy options at the global level.

I hope the deliberations of this conference would contribute to the understanding and advancement of the knowledge about the environmental and socio-economic impacts of global warming and their mitigation/adaptation measures.

Best wishes for the success of the conference.

H.H. Sheikh Saud Bin Saqr Al Qasimi
UAE Supreme Council Member and Ruler of Ras Al Khaimah

Message

It is a matter of immense pleasure that the Environment Protection and Development Authority-Ras Al Khaimah (EPDA-RAK) is organizing the **6th International Conference on Global Warming: The Critical Role of Oceans"** during December 4-7, 2023 in Ras Al Khaimah, United Arab Emirates, under the patronage of **His Highness Sheikh Saud Bin Saqr Al Qasimi, Supreme Council Member of the UAE and Ruler of Ras Al Khaimah**.

Climate change resulting from global warming is causing serious environmental crises affecting the ecosystem and its productivity. Projected harmful impacts of climate change are loss of natural resources and biodiversity, environmental degradation, food insecurity, spread of diseases, sea level rise and submerged coastal habitat. To develop and implement the impacts mitigation and adaptation programmes, there is a need for international partnership in research and study of climate science, impacts and their preventive measures.

I hope this conference will provide an opportunity for regional and international participants to discuss and share their knowledge on the environmental and socio-economic issues of climate change and their solutions needed for our well-being and security.

I welcome all the delegates and participants to this conference and extend my greetings and thankfulness for making it successful.

H.H. Sheikh Mohammed Bin Saud Bin Saqr Al Qasimi

Crown Prince of Ras Al Khaimah and Chairman of EPDA-RAK

Message

It is a matter of pleasure and privilege that after the success of 1st, 2nd, 3rd, 4th and 5th International Conferences on "Global Warming" in the years 2011, 2013, 2015, 2017 and 2019, respectively, the Environment Protection and Development Authority-Ras Al Khaimah (EPDA-RAK) is organizing the **6th International Conference on Global Warming: The Critical Role of Oceans**" during December 4-7, 2023 in Ras Al Khaimah, United Arab Emirates, under the patronage of **His Highness Sheikh Saud Bin Saqr Al Qasimi, Supreme Council Member of the UAE and Ruler of Ras Al Khaimah.**

Climate change caused by global warming has the potential to adversely impact natural ecosystem productivity and threaten all forms of life on earth. It is likely to increase fresh water scarcity and drought, heavy rainfall and flooding, threat to forests and biodiversity, decrease food production and cause health and disease problems. The impacts of Global Warming are further magnified when coupled with other anthropogenic factors like population growth and environmental pollution. The harmful impacts on marine ecosystem include sea level rise, eutrophication, toxic algal bloom and declining fish stock.

The conference will provide a forum for local and overseas experts and scholars to meet, discuss and share their research findings and the latest advancements in the understanding of the impacts of global warming on ecosystem productivity and their solutions.

I, on behalf of EPDA-RAK, welcome the distinguished delegates and eminent invitees, and express my gratefulness to them for making this conference successful.

I wish to express my heartfelt gratitude to His Highness for his patronage and support. I am grateful to H.H. Sheikh Mohammed Bin Saud Bin Saqr Al Qasimi for valuable guidance and encouragement.

Lastly, I acknowledge with appreciation the cooperation and support received from my office colleagues in organizing this conference.

Dr. Saif Mohamed Al Ghais
Director General, EPDA-RAK
Board Member, Island Conservation
Vice-Chairperson, UNESCO IOCINDIO

ENVIRONMENT PROTECTION AND DEVELOPMENT AUTHORITY (EPDA)

Ras Al Khaimah's Environment Protection and Development Authority (EPDA) was formerly known as the Environment Protection and Industrial Development Commission (EPIDC), originally established in 1999. In March 2007, EPIDC was restructured and renamed through Local Emiri Law No (2) of 2007.

EPDA is Ras Al Khaimah's nominated body (Competent Authority) responsible for implementing Federal Law No. 24 of 1999 for the Protection and Development of the Environment in collaboration with the UAE's Federal Environment Agency, Ministry of Environment and Water and other concerned parties and stakeholders at international, federal and local level.

EPDA MAIN OBJECTIVES ARE:

1. Protect and develop the environment of Ras Al Khaimah, from the negative impacts of activities that may cause damages to human health, agricultural crops, wildlife, marine life, other natural resources and climate by implementing necessary policies, plans and actions.

2. Promote the sustainable development of the Emirate and propose the necessary regulations to link environmental concerns to the planning and development policy of the entire Emirate, by coordinating between the Authority and different private and governmental organizations.

IMPORTANT RESPONSIBILITIES OF EPDA ARE:

1. Conduct scientific studies and researches related to natural resources, pollution, human settlement, industrial and economic development.
2. Suggest and offer projects, technical solutions, recommendations and contingency plans to issues related to environment for all the sectors of the Emirate. Prepare laws, rules, regulations, systems and procedures. As well as in force and execute federal and local environment rules.
3. Inspect and evaluate industrial, agriculture, economic developmental projects that have direct and indirect effect o the environment.
4. Establish a benchmark laboratory in the emirate for the purpose of scientific research & technologies.
5. Work in cooperation and coordination with official and non-official organizations and institutions inside and outside the country.

About the Former President of the Republic of Seychelles

James Alix Michel was born on the island of Mahé, Seychelles, on 16th August 1944.

He completed his secondary education in Victoria in 1959 and attended the teacher training college from 1960 to 1961. He taught for two years before joining the telecommunications company Cable & Wireless, the trade union movement and the hotel industry.

From 1974 to 1977, James Michel was a member of the Executive Committee of the Seychelles People's United Party (SPUP), and in 1978 a member of the Central Executive Committee of the newly formed Seychelles People's Progressive Front (SPPF), the successor to the SPUP. In 1978 He became deputy secretary general of the SPPF in 1984 and secretary-general in 1994, a party post which he occupied until June 2009. On June 2nd 2009, SPPF was rebranded as Parti Lepep (People's Party) and he was elected its president.

He was running mate in the presidential elections of 1998 and 2001 and was Vice-President from August 1996 to April 2004. He succeeded Mr. France Albert René as president upon the retirement of the latter in April 2004 and was elected to the highest office in the land in July 2006. President Michel was re-elected in May 2011 and again in December 2015 for a third and final term in office.

About the Former Minister of Environment & Water, UAE

H.E. Dr. Mohammed Saeed Al Kindi is a Senior Vice President at Invescore. He has had a distinguished career in the United Arab Emirates government which culminated in his appointment as Minister of Environment and Water. Dr. Al Kindi began his career as a diplomat in 1984 as Second Secretary at the Ministry of Foreign Affairs in Abu Dhabi. He was then transferred to the permanent mission of the UAE to the United Nations in New York, serving from 1986 to 1995. As a member of the UAE Mission, he represented the country at the UN Security Council from 1986 to 1987 and the UN General Assembly during his post. Dr Al Kindi served as Rapporteur of the Fourth Committee at the 45th Session of the UN General Assembly in 1988 and Vice Chairman of the Fourth Committee at the 46th Session of the UN General Assembly in 1989.

Subsequently, Dr. Al Kindi was appointed Chargé d'Affaires of the UAE Embassy in Jakarta, Indonesia from 1995 to 1997. He was appointed Director of Ruler's Office for the Government of Fujairah from 1997 to 2006 and also served in the Cabinet of the UAE Federal Government as Minister for Environment & Water from 2006 to 2008. He has attended meetings and conferences of Non-Alignment Countries and Economic Group of G7. Dr. Al Kindi actively participates in various domestic and international businesses, holding positions including Chairman, Director, Board Member and Proprietor. He represents the UAE at a wide variety of regional and international conference and is a member of several national and international institutions. He has a Doctorate in Public Administration, a Master, and Bachelor of Arts of Political Science from California University (United States).

About the Assistant Undersecretary - Biodiversity & Marine Life Sector, Ministry of Climate Change and Environment, UAE

H.E Dr. Mohammed Salman Alhammadi held a Ph.D. in Soil, Water, & Environment from the University of Arizona. He joined the College of Food and Agriculture at the United Arab Emirates University in 2006 as an Assistant Professor and Assistant Dean for Student Affairs. During the period 2011-2022, he worked as Director of the Research and Development Department at the Abu Dhabi Food Control Authority, then held several positions in the fields of legislation, communication, community service, and technical services. Since January 2023, he has been working in the Ministry of Climate Change and Environment as Assistant Undersecretary for the Biodiversity and Aquatic Life Sector. Dr. Al Hammadi chaired a number of supervisory and technical committees and through them contributed to the development of many standards, systems and procedures. He also implemented many initiatives and projects in the field of employee evaluation and development, and received many awards for his distinguished contributions.

AGENDA

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS

6TH INTERNATIONAL CONFERANCE ON GLOBAL WARMING

Day 1, Monday 04 December, 2023	
09:00 - 10:00	**Registration**
10:20 - 12:00	**Inaugural Session**
10:20 – 10:30	**Traditional Performance**
10:30 - 10:45	**Welcome Address** **H.E Dr. Saif M. AlGhais** **Director General, Environment Protection & Development Authority, RAK, UAE**
10:45 – 11:05	**Inaugural Address** **James Alix Michel** **Former President of Seychelles**
11:05 - 11:20	**Inaugural Address** **H.E. Mohammed S. AlKendi** **Former Minister of Environment & Water**
11:20 - 11:35	**Inaugural Address** **H.E Dr. Mohammed Salman Alhammadi** **Assistant Undersecretary - Biodiversity & Marine Life Sector, Ministry of Climate Change and Environment, UAE**
11:35 - 11:50	**Inaugural Address** **Dr. Justin AHANHANZO** **IOC Regional Liaison Officer for Latin America and the Carribbean, Asia and the Pacific and Africa, IOC-UNESCO**
11:50 - 12:00	**Film on Mangrove**

Session I: 12:00 - 14:10	**The Role of Oceans on Planet Earth**
Chairman	**Dr. Abdul Rahman AlShayeb AlNaqbi, Director General, Department of Economic Department**
12:00 - 12:30	**KEYNOTE** ***THE ROLE OF THE OCEAN ON PLANET EARTH: The 21st Century: The Sweet Spot in Time*** **Dr. Sylvia Earle,** President and Chairman, Mission Blue
12:30 - 12:45	***Effective Citizen Science: Playing A Role in Marine Life Restoration*** **Eng. Ahmad Nabil**, Alpha Shop, Jadaf View Dubai
12:45 - 13:00	***The Power of Healing the Ocean*** **Maximiliano Bello**, Partnership Liaisons - Island Conservation, Director of Policy - Mission Blue
13:00 - 13:15	***Implications of Global Warming on Oceans*** **Prof. Moustafa Fouda**, Minister Advisor of Environment, Egypt
13:15 - 13:30	***Advancing Blue Carbon Conservation: Integrating Seascape Metrics and Habitat Connectivity for Optimal Nature-Based Solutions*** **Dr. Stephen Carpenter**, Marine Ecologist and GIS Expert, Emirates Nature in Association with WWF, UAE
13:30 - 14:00	***Response to Global Warming & Climate Change via Space Technology Coordinated by UNESCO*** **Prof.h.c.Dr.-Ing. Guochang XU & Dr. Jia XU,** Harbin Institute of Technology - China

14:00 - 14:10	Discussion
14:10 - 15:00	PRAYER & LUNCH BREAK

Session II: 15:00 - 17:25	**Sustainable Ocean Transport and Coastal Development**
Chairman	**Mr. Lourens Jan Van Zyl, Health, Safety, Environment & Quality Manager, RAK Ports**
15:00-15:30	**KEYNOTE** ***Climate Change, Human Disturbance and The Threat to The Orchas Along the Pacific Coast of Washington State and British Columbia, Canada*** **Prof. Bradley F Smith,** Former Chair, Washington Fish and Wildlife
15:30 - 15:45	***A Remote Sensing Approach for Displaying the Changes in the Vegetation Cover at Az Zakhnuniyah Island at Arabian Gulf, Saudi Arabia*** **Dr. Wafa'a Abdulrahman Al-Taisan**, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia
15:45 - 16:00	***UNESCO Biosphere Reserves*** **Dr. Benno Boer,** Chief, Natural Sciences Unit, UNESCO New Delhi Multifunctional Regional Office
16:00 - 16:15	**COFFEE BREAK**
16:15 - 16:30	***Has the Northwest Arabian Sea Warmed Up? Evidences Or Speculations*** **Dr. Samina Kidwai**, National Institute of Oceanography (NIO), Pakistan
16:30 - 16:45	***Cultivating a Comprehensive Legal Framework for the Autonomous Navigation of Maritime Vessels*** **Dr. Mohammad Owais Farooqui,** Assistant Professor, Department of Public Law, College of Law, University of Sharjah, Sharjah, UAE
16:45 - 17:00	***Policies and Actions for Mangrove Conservation in Indonesia*** **Dr. Muhammad Abdul Kholiq**, National Research and Innovation Agency - Indonesia
17:00 - 17:15	Discussion
End of 1st Day Program	

Day 2, Tuesday 05 December, 2023	
08:30 - 09:30	**Registration & Assembly**
09:30 - 12:00	**Meeting IOCINDIO**
12:00 - 13:00	Lunch Break at Mövenpick Resort Al Marjan Island - RAK
13:30	**Visit to COP28 for EcoLabel Ceremony** **Expo 2020 City - Dubai**
13:30	Departure from Mövenpick Resort Al Marjan Island to COP28 - Expo 2020 City - Dubai Only for Green Pass Holder - The transportation will be provided
16:00 - 16:35	**EcoLabel Ceremony and Certification** **COP28 (House of Sustainability - Expo 2020)**
16:35	Sightseeing in the COP28 Green Zone Area
End of 2nd Day Program	

Day 3, Wednesday 06 December, 2023	
08:00 - 9:00	Registration
Session III: 09:00 - 11:20	**The Blue Economy**
Chairman	**Dr. Naceur Jabnoun, Senior Advisor, General Secretariat of the Executive Council, RAK**
09:00 -09:30	**KEYNOTE** ***Contribution of IOC of UNESCO to addressing global warming Achievement of the UN 2030 Agenda with its SDGs 13 on climate and 14 on the ocean is science intensive*** **Dr. Vladimir Ryabinin,** Executive Secretary, Intergovernmental Oceanographic Commission of UNESCO
09:30 - 09:45	***Blue Economy - the Challenges to Implement*** **Dr. M. A. Atmanand**, Visiting Professor, Indian Institute of Technology, Madras, Chennai, Director (Retd.), National Institute of Ocean Technology, India
09:45 - 10:00	***Ocean Information and Advisory Services for a Sustainable and Resilient Blue Economy*** **Dr T. Srinivasa Kumar**, Director of Indian National Centre for Ocean Information Services, Ministry of Earth sciences, India
10:00 - 10:15	***Challenges and Strategies for Sustainable Blue Economy in Africa*** **Prof. Amr Z. Hamouda**, National Institute of Oceanography and Fisheries (NIOF), Egypt
10:15 - 10:30	***Ocean Forecasting System for the development of blue economy in Bangladesh*** **Dr. K M Chowdhury**, Department of Oceanography, University of Dhaka, Bangladesh
10:30 - 10:45	***Blue Economy of Bangladesh: Potentialities and Challenges of Marine Fisheries for Sustainable Blue Growth: A Case Study of Cox's Bazar, Bangladesh*** **Prof. Shahina Akter**, Assistant Professor, Bangladesh Open University, Bangladesh
10:45 - 11:00	Discussion
11:00 - 11:15	**COFFEE BREAK**
Session IV: 11:15 - 13:40	**Future Voices for a Changing Climate: Exploring the Role of Oceans in Global Warming**
Chairman	Dr. Steven Reissig, Chief Academic Zone Officer, Ras Al Khaimah Economic Zone
11:15 - 11:45	**KEYNOTE** ***The Indian Ocean Observing System for Global Climate Science and Society*** **Dr. Sidney Thurston**, Director for Global Science and Technology, EarthX
11:45 - 11:55	***Blue Economy*** **Ali, Ahmed, Rowda, Zahra Abdul Wahid -** Al Rowad Private School Ras Al Khaimah
11:55 - 12:05	***Coastal Tourism as a Growth Sector in the Blue Economy*** **Maryam Alsuwaidi, Ibrahim Pasha -** The International School of Choueifat - Ras Al Khaimah
12:05 - 12:15	***Healthy Islands and Oceans*** **Sara Salamanca -** St. Mary Private High School RAK
12:15 - 12:25	***Ocean Production and Food Securitys*** **Amina Naqib, Tasnim Rabi, Shahed Na'el -** Alrawabi Private School
12:25 - 12:35	***Ocean Production and Food Security*** **Cherian James -** Indian School Ras Al Khamiah

12:25 - 12:45	***Climate change and the importance of oceans***
	Ban Ghasan, Joury Thaaer, Rimas Fayez, Sara Gamal - Dar Alsalam Private School
12:45 - 12:55	***Sustainable Ocean Transport and Coastal Development***
	Kripa Susan Baiju - Indian School Ras Al Khamiah
12:55 - 13:05	***The Role of Oceans on Planet Earth***
	Shaima Essam, Ola Ahmad, Yara Tariq - Al Manar Private School
13:05 - 13:15	***Role of Ocean***
	Saraboni Das - Al Bangladeshi Private English Private School Ras Al Khaimah
13:15 - 13:25	***Global Warming***
	Fatima Hussain, Malak Eyad - AlSalaf AlSaleh Private School Ras Al Khaimah
13:25 - 13:30	Discussion
13:30 - 14:30	**PRAYER & LUNCH BREAK**
15:00 - 18:00	**Site Visit to Khor Muzahmi Protected Area**
15:00	Departure from Mövenpick Resort Al Marjan Island to Khor Muzahmi Protected Area
18:00	Departure from Khor Muzahmi Protected Area to Mövenpick Resort Al Marjan Island
19:00	Dinner by Invitation

End of 3rd Day Program

Day 4, Thursday 07 December, 2023	
08:00 - 09:00	Registration
Session V: 09:00 - 11:20	**Healthy Island and Oceans: The Key to Climate Resilience**
Chairman	**Dr. Justin AHANHANZO, IOC Regional Liaison Officer for Latin America and the Carribbean, Asia and the Pacific and Africa, IOC-UNESCO**
09:00 - 09:30	**KEYNOTE** ***Healthy Islands and Oceans: The Key to Climate Resilience*** **Dr Penny Becker,** Vice President Conservation, Island Conservation
09:30 - 09: 45	***Promoting a healthy and sustainable marine ecosystem along the coastal regions by developing observing and modelling systems*** **Dr. Yuntao Wang**, Director of Satellite Ocean Environment Dynamics, Second Institute of Oceanography, MNR, China
09: 45 - 10:00	***Mangrove Conservation and Expansion in Saudi Arabia: A Vision for Coastal Ecosystem Sustainability*** **Dr. Saleh Al-Zamanan**, Director of Mangrove Forest, National Center for Vegetation Cover Department & Combating Desertification, Saudi Arabia
10:00 - 10:15	***Microplastics in Beach Sediments along the Coast of Dubai, UAE*** **Prof. Atta Gaffar Attaelmanan**, University of Khorfakkan, United Arab Emirates
10:15 - 10:30	***Resilience drivers in some coral reef sites in Wadi El-Gemal marine protected area, Southern Egyptian Red Sea*** **Prof. Abdulrahman Nassar**, Al Azhar University, Egypt
10:30 - 10:45	***Co-design of Digital DEPTH, an UN Ocean Decade Programme*** **Dr. Xuewei Xu**, Director of the Science & Technology Department, Second Institute of Oceanography, MNR, China
10:45 - 11:00	***Identification of Microplastics in Calanoid Copepod from the Sandwip Channel, Bay of Bengal, Bangladesh*** **Najmus Sakib Khan,** Head of the Department, Department of Oceanography, Noakhali Science and Technology University
11:00 - 11:15	***An official field trip to monitor and follow up the whale sharks(Rhincodon typus) in the north of the State of Qatar*** **Prof. John Wong**, Ministry of Environment and Climate Change, Qatar
11:15 – 11:30	***Assessment of Extreme Weather Events in the Changing Climate over the Indonesia Maritime Continent*** **Dr Erma Yulihastin,** National Research and Innovation Agency of Republic Indonesia (BRIN) – Indonesia
11:15 - 11:30	**Discussion**
11:30 - 11:45	**COFFEE BREAK**
11:45 - 12:45	**CLOSING SESSION**
12:45 - 14:30	**PRAYER & LUNCH BREAK**
End of 4th Day Program	

KEYNOTES

KEYNOTE

Dr. Sylvia Earle

President and Chairman of Mission Blue

Dr. Sylvia Earle is the President and Chairman of Mission Blue, an Explorer in Residence at the National Geographic Society, Founder of Deep Ocean Exploration and Research Inc. (DOER), Chair of the Advisory Council for the Harte Research Institute and former Chief Scientist of NOAA. Author of more than 225 publications and leader of more than 100 expeditions with over 7,500 hours underwater, Dr. Earle is a graduate of Florida State University with M.A. and PhD. degrees from Duke University and 32 honorary degrees. Her research concerns the ecology and conservation of marine ecosystems and development of technology for access to the deep sea. She is the subject of the Emmy® Award Winning Netflix documentary, Mission Blue, and the recipient of more than 100 national and international honors and awards including being named Time Magazine's first Hero for the Planet, a Living Legend by the Library of Congress, 2014 UNEP Champion of the Earth, Glamour Magazine's 2014 Woman of the Year, member of the Netherlands Order of the Golden Ark, and winner of the 2009 TED Prize, the Walter Cronkite Award, the 1996 Explorers Club Medal, the Royal Geographic Society 2011 Patron's Medal, and the National Geographic 2013 Hubbard Medal.

KEYNOTE

Prof. Bradley Smith

Former Chair of Washington State Fish & Wildlife Commission
Washington, USA
bradley.smith@wwu.edu

Bradley Smith is the Former Chairman of the Washington State Fish and Wildlife Commission. He is the Dean emeritus of Huxley College of the Environment at Western Washington University.

Before assuming the dean position Brad served in the Administrators office of the USEPA during the Bush and Clinton administrations serving as the first director of The Office of Environmental Education and as the acting Associate Administrator of the USEPA.

Brad has been a Fulbright Scholar. NATO Fellow and is a Fellow of the Royal Institute of Environmental Science. He currently serves on the North Pacific Research Board. He earned his Ph.D from the University of Michigan.

KEYNOTE

Dr. Vladimir Ryabinin

Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO)
Executive Secretary

Dr. Ryabinin is oceanographer, climatologist, marine engineer. At present he serves as Executive Secretary of the Intergovernmental Oceanographic Commission of UNESCO and Assistant Director-General of UNESCO. He graduated from the Oceanological Faculty of the then (1978) Leningrad Hydrometeorological Institute and was candidate of physical and mathematical sciences (equiv. to PhD 1982) and Doctor of Sciences (1995). He used to work as a postdoc, junior, senior, principal scientist and head of a laboratory at the Hydrometcentre of Russia, was a principal researcher at two European Commission projects in Malta, the Executive Director of the International Ocean Institute and senior scientific officer of the World Climate Research Programme (WCRP) at WMO. Dr. Ryabinin lectured at the Moscow State University. His most important research projects included studies of turbulence in stratified fluids, analytical research on the ocean thermocline and its variability, creation of the first soviet system for medium-range weather prediction, studies of bottom ice gouging in the Russian Arctic, a number of shelf engineering projects, development of a marine meteorological prediction system in Russia, and authoring of a third generation wind wave model. He participated in the development of the Russian Federal Program "World Ocean", supervised marine forecasting research in Russia, contributed to the initial design of the Global Ocean Observing System, JCOMM, International Polar Year, and a number of initiatives of WCRP such as some grand science challenges, International Polar Partnership Initiative, etc. The focus of coordination of climate research under WCRP was on polar matters, cryosphere, stratospheric processes, ocean, atmospheric chemistry, sea-level rise, climate services, observation and modelling, etc. Dr. Ryabinin authored a monograph and more than a hundred of publications.

KEYNOTE

Dr. Sidney Thurston
Director for Global Science and Technology, EarthX

After 28 years associated with NOAA Research, Dr. Sidney Thurston will retire from Federal service at NOAA on December 31, 2022 to accept the newly established position of Vice President for Global Science and Technology (S&T) at EarthX.org and EarthXTV.com.

Dr. Thurston joined NOAA's "Office of Global Programs" (OGP) in 1995 as a Knauss Sea Grant Fellow and continued in this role for two years. While residing in Japan during the next six years, he conducted ocean surface gravity wave research for two years at Japan's Port and Harbor Research Institute in Kurihama with the Japan Science and Technology Agency and Seoul National University. He then worked in Oppama as a visiting scientist for two years at Japan's Marine-Earth Science and Technology Center (JAMSTEC) while facilitating NOAA's ocean-climate cooperation with Indo-Pacific Partners. He served as OGP's Liaison in Tokyo for over two years to facilitate research, modeling and observations collaboration across the Indo-Pacific Region and coordinate DOC/NOAA VIP visits. In 2006 he was detailed to the American Embassy (Tokyo) Science Office for four months for NOAA's Leadership Competencies Development Program (LCDP-5 The Ambassadors).

KEYNOTE

Dr. Penny Becker
Vice President Conservation
Island Conservation

Penny received a BS in Biology from Willamette University and a PhD in Wildlife Management from the University of Pretoria in South Africa. Her graduate research focused on the conservation, genetics, and behavior of African wild dogs in collaboration with Smithsonian Institution. In addition to her time in South Africa, she has lived, traveled, and worked internationally, including spending several years in Tanzania. Penny settled back in the U.S. Pacific Northwest in 2011 and worked at the Department of Fish and Wildlife for 9 years focused on recovering at-risk wildlife species and keeping common species common. Penny has wide-ranging conservation and research experience working on topics and species as diverse as coastal community initiatives, seabird diets, pygmy rabbit reintroductions, wildebeest behavior, orca recovery, and fisher re-establishment, among others.

Penny also has a passion for learning and practicing leadership around the human aspects of conservation issues. She has experience building cooperation across diverse people for natural resource challenges and developing the social, political, and resource support necessary to achieve conservation of at-risk species. Her experience establishing partnerships with government agencies, non-government conservation organizations, interested citizens, and industries for wildlife is a major asset to the Island Conservation team. Penny joined Island Conservation in January 2020.

ABSTRACTS

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
6TH INTERNATIONAL CONFERANCE ON GLOBAL WARMING

THE ROLE OF THE OCEAN ON PLANET EARTH
The 21st Century: The Sweet Spot in Time

Dr. SYLVIA A. EARLE

National Geographic Society, Washington, DC, USA;
Mission Blue, Napa California, USA

ABSTRACT

Water is the single non-negotiable substance life requires and 97 per of Earth's water is ocean. No water, no life. No blue, no green. Without the living ocean, Earth would be as bleak and barren as the moon or Mars. During most of Earth's history, the planet was not habitable for humans, but for the past million years, and especially the past 11,000 years, planetary conditions have favored human prosperity enabling our numbers to grow from a few thousand early in our history to a billion two hundred years ago. In the 21st century, human population reached 8 billion, while the living systems that maintain Earth's habitability have drastically declined on the land and in the sea. We are the direct cause of the swift collapse of planetary health, but we are also the best hope for recovery. Now we know: The living ocean drives climate and weather, shapes planetary chemistry and is essential for the past, present and future of life on Earth. If the ocean is in trouble, so are we. It is and we are, but armed with technologies that enable us to assess the planet from space, to explore the ocean's greatest depths and as never before, analyze actions to secure planetary stability, we have the best chance there will ever be to achieve a harmonious relationship with the ocean – and an enduring future for humankind.

Keywords: OCEAN, EXPLORATION, BIOGEOCHEMISTRY, SECURITY

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
6TH INTERNATIONAL CONFERANCE ON GLOBAL WARMING

Communication, Education and Partnerships. Addressing Climate Change on a Regional Level for Salmon and Orcas in the Pacific Northwest

Prof. Bradley Smith
Former Chair of Washington State Fish & Wildlife Commission
Washington, USA

ABSTRACT

According to the UN roughly 40% of the global public do not agree that climate change is a global emergency. In order reduce that percentage we must enhance our avenues of communication, expand our channels of education and establish new and diverse partnerships. The pacific northwest of North America has witnessed a dramatic decline in both salmon and orca populations in large part due to climate change. Addressing this crisis required the establishment of new and dynamic venues of communication, education and partnerships and reaching out to new sectors. These new and diverse venues will be reviewed and discussed with regards to the health of the salmon and orca populations.

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
6TH INTERNATIONAL CONFERANCE ON GLOBAL WARMING

Contribution of IOC of UNESCO to addressing global warming Achievement of the UN 2030 Agenda with its SDGs 13 on climate and 14 on the ocean is science intensive.

Dr. Vladimir Ryabinin
Executive Secretary, Intergovernmental Oceanographic Commission of UNESCO

ABSTRACT

Ocean solutions can lead to notable reduction of greenhouse gas emissions and help the world in its aspirations to limit the global warming to 1.5oC. The IOC of UNESCO is making a key contribution to enabling such ocean solutions. The work includes observations, research on relevant aspects of ocean and climate nexus, provision of data and services, development of ocean assessments, policies, means of managing the ocean, training, and capacity development. Significant work is done in the regions including the Indian Ocean. IOC is coordinating the UN Decade of Ocean Science for Sustainable Development, 2021-2030, and its scope includes several programmes of direct relevance to the ocean and climate. The current state of the ocean, perspectives of developing a sustainable ocean economy, adaptation of marine activities to climate change and its mitigation will be discussed in the presentation.

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
6TH INTERNATIONAL CONFERANCE ON GLOBAL WARMING

The Indian Ocean Observing System for Global Climate Science and Society

Sidney Thurston
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Vice-Chair, World Meteorological Organization (WMO)
Standing Committee on Earth Observing Systems and Monitoring Networks

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ABSTRACT

The ocean affects us all. It covers over two-thirds of the earth's surface. It impacts our daily lives and a broad range of economic sectors – from agriculture, health, marine and coastal activities, tourism, construction, and insurance. As society faces the impacts of global warming, such as Indian Ocean cyclones tracking farther north and disrupting oil and gas production in the Gulf States, more ocean data will be needed to better adapt and forecast extreme weather and climate events including drought, flooding, wildfires, ocean acidification, urban and ocean heat waves, and sea-level rise. Variability in sea surface temperatures (SST) over the Indian Ocean, the earth's most rapidly heating ocean basin, influences global temperature and precipitation patterns and the variability of the monsoonal precipitation over Asia, Africa, and Australia, affecting the lives and livelihoods of one-third of the world's population. Sustained ocean observation data from the *Indian Ocean Observing System* (IndOOS), a regional alliance of the United Nations Intergovernmental Oceanographic Commission (IOC's) *Global Ocean Observing System* (GOOS), provide timely ocean and atmosphere data to global scientists and operational forecasts of extreme weather and climate events. This oral presentation will deliver over fifty years of combined authors' Indian Ocean experience to examine the fundamental role of bilateral partnerships and multilateral capacity development in designing, building and operating IndOOS, its vital contributions today for global science and society as the world adapts to the existential climate change crisis, and champion the *Six Principles of Ocean Sustainability* moving into the future.

Keywords: Indian Ocean, Climate Science, Ocean Sustainability, Partnerships

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
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Healthy Islands and Oceans: The Key to Climate Resilience

Dr. Penny Becker
Vice President, Conservation
Island Conservation, Santa Cruz, California USA

ABSTRACT

Islands and their surrounding marine ecosystems support 11% of all humanity, are home to some of the planet's greatest concentrations and diversity of animal and plant life, and they face a disproportionate burden from climate change. Rising sea levels, intensified storms, and ecological degradation threaten their very existence.

Islands and oceans play a critical role in climate resilience. Islands, as microcosms of larger ecological systems, provide invaluable insights into addressing the global climate crisis.

Examining the restoration of island ocean ecosystems, management of invasive species, and the recovery of native flora and fauna, uncovers the transformative potential of nature-based solutions. These approaches transcend ecological benefits, helping island communities achieve sustainable development goals while enhancing global climate resilience. Real-world examples demonstrate the power of these solutions to protect biodiversity and empower island communities.

Restoring and reconnecting islands and oceans is a largely unrecognized but is a powerful key to building climate resilience. We need collective action, investment, and global collaboration to ensure the long-term vitality of island communities and their ocean ecosystems. International initiatives such as the 30x30, Island-Ocean Connection Challenge, and the UN Decade of Ecosystem Restoration provide significant opportunities to come together. International cooperation, led by island community values and engagement, coupled with government leadership and ongoing science are critical to safeguarding island-ocean ecosystems. The first step in making this happen is to acknowledge the profound importance of healthy islands and oceans in our shared efforts to confront the climate crisis and secure a sustainable future for all.

Keywords: Island-Ocean Ecosystem, Climate Resilience, Nature-Based Solutions, Global Collaboration

Effective citizen science: playing a role in marine life restoration.

Presenting Author: Ahmed Nabil
Alpha Shop, JAdaf views, Dubai, UAE

Presentation

Great barrier reef of Australia lost around 65% of its corals, there are immense efforts exerted by scientists and marine biologists to protect and maintain the remaining 35%.
Red Sea and Arabian Gulf are highly threatened as well.
The philosophy of “protection is always preferred over restoration” is a luxury that no longer applies to most regions.

NOW Restoration is necessary to preserve the biodiversity and functionality of reefs and ensure the sustainability of their resources.

The abstract is about "Effective citizen science” for a Sustainable Future.
It consists of 2 directions:
a- Raising awareness
b- Practical efforts.

The Program is designed to give participants an introduction to Coral Reef Ecology & Restoration.

Participants should have full knowledge about climate change and its impact on marine life. Conservation strategies and how to contribute in restoration efforts. Participants should leave a positive impact by creating a new marine life. (Artificial and/or natural habitat) To present an effective Citizen science.

Program structure:
a- Raising Awareness Over workshops

b- Practical efforts Over field study and projects

Participants shall be capable of:
Identifying & Monitoring corals for health condition and status
Conducting advanced research and / or restoration projects
Identifying rare or endangered species of coral
Create new habitat for corals and marine animals –artificial and / or natural

It is a holistic approach regarding ecosystem, focusing on the long-term sustainability and adaptability of the ecosystem rather than just trying to add more corals into areas where they will not survive.

Keywords: citizen, science, marine, sustainability

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
6TH INTERNATIONAL CONFERANCE ON GLOBAL WARMING

The power of healing the ocean

Maximiliano Bello[1], Brittany Bello [2], Cristian Laborda [3]

[1]Mission Blue, Address, City, Country

[2]Island Conservation, Address, City, Country

Oral Presentation

The ocean is the source of life in this planet, the blue heart, however, only recently the ocean is need considered as part of the negotiations of Paris Agreement, also this last year the world reach an agreement that includes the 30% of protection of the ocean or the new agreement for a frame that will allow us to also protect the high seas. But what all that means, how can we continue protecting and securing a healthy ocean. There are areas in the planet that needs to be consider as climate refuges. Areas that are key to maybe, in the future secure the regeneration and rewilding of the ocean, once we have secure to stop the advance of the climate change, pollution of the ocean and loss of biodiversity.

The ocean need healing, the first step is to protect, we need to protect what is remaining, at this point, is urgent we use the 30% to create highly and fully protected areas, the golden standard. To understand more of the ocean, diversity and the role in the planet life system, diversity if the key, but also carbon sequestration, and other environmental services. Only allowing those systems to continue working, we have a chance to revert the crisis, we can't afford the destruction of the last pieces of this intricated puzzle call life. I will be showing some of the areas where we are working, the link with land and people, the need of more protection rapidly around the globe.

Keywords: Arial 11pt italics. No more than four keywords

IMLICATIONS OF GLOBAL WARMING ON OCEAONS

Professor Moustafa Fouda
Ministry of Environment, Egypt

ABSTRACT

Ocean ecosystems, diverse and essential to humanity, are increasingly imperiled by harmful human activities and the looming specter of climate change. These combined pressures are driving marine species toward the brink of extinction, eroding the very foundations of marine ecosystems, including their structure, function, productivity, and resilience.

Global warming, in particular, poses profound and multi-faceted threats to our oceans. These include rising sea levels, ocean acidification, warming waters, altered currents, intensifying storms, loss of biodiversity, coral reef degradation, deoxygenation, impacts on fisheries, and far-reaching economic and social consequences. To safeguard our oceans and the countless lives and ecosystems that depend on them, concerted action to reduce greenhouse gas emissions and prioritize conservation is paramount.

Recent efforts to combat global warming and protect ocean ecosystems manifest through various crucial initiatives. ICC Assessment Reports illuminate climate change impacts, while ongoing biodiversity assessments monitor marine health. Sustainable Development Goals, particularly Goal 14: Life Below Water, center on ocean conservation. Routine ocean assessments guide management and the Global Biodiversity Framework calls for safeguarding 30% of Earth's surface. Marine spatial planning and ecosystem-based management underpin sustainability, while Ecological and Biological Significant Marine Areas protect unique habitats. The blue economy emphasizes responsible resource utilization, and geoengineering experiments explore climate change solutions. The BBNJ treaty strives to safeguard international waters and UN Decades for Oceans and Ecosystem Restoration foster global action and knowledge sharing.

Nonetheless, the imperative for transformative change is undeniably urgent. This necessitates greenhouse gas emission reductions, research focus, capacity building, robust ocean governance, policy development, advanced ocean understanding, institutional reform, and scaling up endeavors to meet Sustainable Development Goals and Global Biodiversity Framework targets. Success hinges on establishing the right framework, local support, community ownership, widespread engagement, alternative livelihoods, the dissemination of success stories, the establishment of new standards, promotion of sustainable education, and the development of innovative solutions like the blue economy, integrated coastal zone management, marine spatial planning, and the integration of ecosystem services into development planning, all while effectively managing marine protected areas.

Advancing Blue Carbon Conservation: Integrating Seascape Metrics and Habitat Connectivity for Optimal Nature-Based Solutions

Dr Stephen Carpenter

Abstract

This study aims to explain the dynamics of carbon storage in arid coastal ecosystems, focusing on the diverse seascapes of the United Arab Emirates. We hypothesised that non-vegetated habitats significantly contribute to carbon storage, alongside vegetated areas, and that seascape metrics critically influence these carbon processes. Employing a multi-habitat spatial assessment, we quantified carbon stocks across various coastal habitats, including mangroves, saltmarshes, microbial mats, mudflats, seagrass, and coastal sabkha. We further analysed the impact of seascape metrics such as habitat configuration, connectivity, sediment grain size, and elevation on carbon storage processes. Our results validate the hypothesis, showing that non-vegetated habitats such as mudflats and microbial mats significantly contribute to carbon storage, with mangroves being the most substantial carbon-storing habitats. The study further reveals that habitats closely connected to primary vegetated areas enhance carbon storage. Key predictors of carbon storage include habitat type and sediment grain size, with fine sediments in seagrass habitats notably elevating carbon storage. The results underscore the importance of including non-vegetated habitats in carbon accounting and management strategies. They also highlight the need for a context-specific, holistic approach in designing Nature-based Solutions for effective coastal management. This approach should promote well-connected habitats and consider local environmental factors to maximise carbon storage and address climate change effectively. Our study contributes to the broader understanding of carbon storage dynamics in arid coastal ecosystems and the role of seascape metrics in enhancing carbon storage.

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
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The 6th International Conference on Global Warming: The Critical Role of Oceans

Section: The Role of Oceans on Planet Earth

Topic:

Response to Global Warming & Climate Change via Space Technology Coordinated by UNESCO

Prof. Dr.-Ing. Guochang Xu[1] & Chief Scientist Jia Xu[3]

Guochang Xu[1], Justin Ahanhanzo[2], Jia Xu[3], H Kaufmann[4], Xiaowen Luo[5], Luisa Bastos[6], Yan Xu[4], Pierre Rochus[9], Nan Jiang[4], JP Barriot[12], Zhiping Lv[8], Yufang He[8], Lifeng Niu[8], Guangzong Zhang[8], Hangyu Li[7], Yuyan Zhu[7], Mingyue Ma[7], Shujun Chen[7], Shanyu Zhou[10], Chaonan Ji[11]

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[9]University of Liege, Liege, Belgium
[10]University of València, València, Spain
[11]University of Leipzig, Leipzig, Germany
[12]University of Franch Polynesia, France

Oral Presentation

Summary (Abstract)
Who we are – International, Multi-Disciplinary Science & Engineering Team;
What we can do – Scientific-Technological Base;
What is the problem – Consequences of Global Warming & Climate Change;
Why UNESCO – Coordination & Cooperation;
Our suggestions – Action Now.

Keywords: Satellite Remote Sensing, Climate Change & Response, Africa, International

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
6TH INTERNATIONAL CONFERANCE ON GLOBAL WARMING

A Remote Sensing Approach for Displaying the Changes in the Vegetation Cover at Az Zakhnuniyah Island at Arabian Gulf, Saudi Arabia

Professor. Wafa'a Abdulrahman Al-Taisan
Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia Wafa'a A. Al-Taisan;

Oral Presentation

Abstract: Global warming is a phenomenon that causes the average surface temperature of the Earth to rise due to an increase in greenhouse gases. Terrestrial plants are sensitive indicators of global warming because their annual cycles of growth and senescence are changing as warming proceeds. The present study aimed to address the Changes in the Vegetation Cover at Az Zakhnuniyah Island by using remote sensing techniques. It includes vegetation analysis using normalized difference vegetation index (NDVI) while comparing with climatological data in cluding temperature, humidity, and precipitation. A clear trend was seen in climatological parameters where temperature and humidity were rising decade by decade although NDVI did not show. In addition, increasing soil salinization over the years was observed when soil salinity index was used. NDVI-based long-term decadal analysis on vegetation cover based on Landsat surface reflectance data showed increase of vegetation cover which was also linked to precipitation trends. However, Changes in vegetation reflectance is a useful basis for understanding feedbacks to global warming as the reflectance of vegetation in red and near-infrared (NIR)spectrum depends on the chemical and physical components in plants which provide a representation of photosynthetic. The study recommends conducting more environmental studies to verify the impact of environmental and geographical variables on plant and societal diversity in the Arabian Gulf islands, as well as paying attention to the Arabian Gulf's marine resources and habitats in order to achieve sustainable development.
Keywords: Global warming, temperature, Arabian Gulf, vegetation

UNESCO Biosphere Reserves Abstract: Coastal biosphere reserves need to be established to restore the balance between humankind and nature towards the conservation and restoration of ecosystem services

Benno Boer, Chief, Natural Sciences Unit, UNESCO New Delhi Multifunctional Regional Office

Oral Presentation

UNESCO Biosphere Reserves Abstract: Coastal biosphere reserves need to be established to restore the balance between humankind and nature towards the conservation and restoration of ecosystem services. It should be mandatory that all BR should be equipped with a visitor-education-and-interpretation center to promote awareness, science-based education, and community engagement. Efforts should be made jointly with UNEP & UNESCO, including management prescriptions in BRs, to reduce plastic pollution, via mobilize the youth through UNESCO Green Academy initiatives in support of Biosphere Reserves. UNESCO should mobilize the joint capacities of its three Natural Science Divisions, in particular through its STI capacity, to benefit Biosphere Reserves as demonstration sites for good coastal ecosystem management practices. Youth capacity building should be augmented via Biosphere Excursions in Germany, East Africa, India and the United Arab Emirates.

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
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Has the northwest Arabian Sea warmed up? evidences or speculations

Samina Kidwai, Ibrahim Zia, Waqar Ahmed, Tariq Mahmood, Tahreem Zafar, Maryam Khan

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As nations strive to achieve economic stability, natural environments struggle to survive and humanity gets trapped in this vicious circle of development versus the environment.

The oceans serve as an important CO_2 sink and play a significant role in regulating the climate, weather patterns as it warms up and their impacts are seen in the ocean drivers. Coastal ecosystems support habitats that contribute to important services and food web dynamics that sustains the coastal residents.

The repercussion of climate variability and unpredictability in the form of climate phenomenon are seen more rampant in the more populous and the struggling economies when making choices in more difficult and finding sustainable solutions is bigger challenges.

Our presentation shows the importance of physical, chemical processes that drive the biological productivity in the northwest Arabian Sea, the coastal waters of Pakistan. How the ocean phenomenon forms the nexus with the climate and drive the marine ecosystems, marine food web, bio-diversity and productivity and translates to the survival and livelihoods of urban and rural peoples.

Keywords: Pakistan, Ocean & Coasts, Drivers, Food security

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
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Title – Cultivating a Comprehensive Legal Framework for the Autonomous Navigation of Maritime Vessels

Mohammad Owais Farooqui[1]
[1]Department of Public Law, College of Law, University of Sharjah, R-14, Al Zahrawi Complex, University of Sharjah Residence, Al Juraina, Sharjah-27272, United Arab Emirates

Oral Presentation

Abstract: The use of autonomous navigation technologies in ship operations is experiencing a fundamental change in the maritime sector. This paper explores the critical requirement for a thorough legal framework to control the autonomous navigation of marine vessels. A hodgepodge of laws, frequently out-of-date or unsuitable for automation, has created significant difficulties for these ships as they travel across international seas. This study explores the complex web of issues surrounding the autonomy of maritime vessels, such as liability issues resulting from mishaps, the crucial issue of safety and collision avoidance, the impact on the environment, labour rights, and human welfare, and the complexities of intellectual property and technology transfer. This paper offers a complete and cogent proposal for a legal framework to regulate autonomous marine navigation based on a thorough review of current international and national rules, case studies, and comparative analyses. International standards, conventions, harmonization initiatives, certification methods, data privacy safeguards, cybersecurity measures, and ethical principles are all included in the proposed framework. The research assesses the possible efficacy of the proposed framework and pinpoints potential implementation issues by looking at successful regulatory frameworks from regions and by looking at real-world case studies. This study highlights the importance of developing a comprehensive legal system that can adapt to the fast-changing environment of autonomous maritime navigation. It emphasizes the need for global cooperation and aggressive regulatory measures to enable the safe, effective, and responsible integration of autonomous vessels into our waters and gives insightful information for politicians, industry stakeholders, and academics alike.

Keywords: Autonomous Navigation; Maritime Vessels; Legal Framework; Maritime Industry.

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
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Policies and Actions for Mangrove Conservation in Indonesia

Muhammad Abdul Kholiq,
Fitri Nurfatriani, Sepanie Putiamini, Yanto Rochmayanto, I Wayan Eka Dharmawan, Virni Budi Arifanti, Mego Pinandito

Oral Presentation

Despite being sensitive to climate change, mangroves provide valuable services that contribute to reducing damage, sequestering carbon, improving shoreline stability, and protecting coastal areas from waves and tropical storms. Additionally, the mangrove ecosystem supports diverse marine habitats, including fish, crabs, and shrimp. Indonesia is one of the countries with the longest coastline in the world, namely 99,083 kilometers. Based on national mangrove mapping in 2021, the existing mangrove area is 3,364,080 Ha, and the potential area of mangrove habitat is 756,183 Ha. The Indonesian Government has issued the National Mangrove Rehabilitation Roadmap 2021-2030 as reference for the government bodies and stakeholders in preparation of action plans according to their duties and respective authorities. At the end of this paper, several examples of actions and efforts taken, several technologies and innovations developed, as well as key factors for the success of mangrove conservation will be presented

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
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Blue Economy – the challenges to implement

Professor. Atmanand Malayath Aravindakshan
Atmanand M A1, Vedachalam2 1Indian Institute of Technology, Madras, Chennai 600 036, India
2National Institute of Ocean Technology, Chennai, 600 100, India

Oral Presentation

Abstract: Blue Economy refers to the sustainable use of ocean resources to benefit economies, livelihoods and ocean ecosystem health. While Blue Economy is being implemented by all countries in the last decade, there are multiple challenges in achieving sustainability. The major thrust areas considered under the Blue Economy include Ocean energy (green), shore protection, ports and harbours, tourism and fisheries. While the need for green energy need not be emphasised, the challenges in setting up economy-to-scale wave energy or Ocean Thermal Energy Conversion plants in the ocean are enormous. Beaches are receding due to natural and anthropological causes and conventional means of protecting the coast are far from being sustainable and the use of geo-synthetic tubes and other methods for shore protection is challenging. While water transport is known to be the cheapest and cleanest, smooth and sustainable transfer from surface to water transport is inevitable. With the ongoing ocean decade, the tourism industry has to advance without impacting the beach ecosystems. Sustainable fisheries and aquaculture are essential components as protein substitution for humans is majorly through the fisheries. Sustainable fishing is challenged due to excessive catch and overfishing. Effective cage culturing and fish aggregating systems are to be considered on a large scale for sustainability The detailed methods to circumvent the challenges in the above sectors shall be discussed as part of the presentation. Keywords: Ocean energy, shore protection, tourism, fisheries.
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Ocean Information and Advisory Services for a Sustainable and Resilient Blue Economy

Dr T. Srinivasa Kumar
Director, Indian National Centre for Ocean Information Services
Ministry of Earth sciences
Government of India

The global average concentration of CO2 in the atmosphere crossed 400 PPM recently and will remain more than 400 PPM throughout our lifetime. Global warming caused by these anthropogenic CO2 has an irreversible influence on all aspects of the Earth system, causing continuous changes in the ocean and atmosphere around us. As climate change exacerbates, the extremes such as heatwaves, sea level extremes and associated flooding driven by cyclones and storm surges, extreme waves, etc., become more prolonged and frequent. Further, this ocean warming and the associated changes in the water chemistry also impact marine-driven industries such as fisheries, shipping, tourism, oil and gas, etc. This makes the coastal population, their living and livelihood vulnerable, thereby imposing challenges for future sustainable economic development.

A part of the mitigation solution lies in informed policy decisions backed by ocean observations, ocean data, modelling and robust prediction systems underpinned by capacity development and research. Operational ocean services for blue economy stakeholders are the key to enhancing coastal resilience and developing policy frameworks for sustainable management of the oceans. The Indian National Centre for Ocean Information Services (INCOIS), under the Ministry of Earth Science, Government of India, aims to provide such operational services to society, industry, government agencies and the scientific community through sustained ocean observations and modelling systems.

In my presentation, I will highlight recent advances in our understanding of the impact of climate change on the Indian Ocean and present various programmes of INCOIS aimed at addressing these challenges. I will also talk about High-Level Principles adopted during India's G20 presidency and my views on the way forward for mitigating these climate challenges.

Challenges and Strategies for Sustainable Blue Economy in Africa

Amr Z. Hamouda and Suzan El Gharabawy National Institute of Oceanography and Fisheries (NIOF), Egypt

Abstract The Blue Economy is a global initiative that aims to promote sustainable economic development and environmental conservation in Africa. This research reviews the challenges and opportunities within the Blue Economy in Africa and summarizes the key strategies and measures that can be implemented to ensure sustainable management of marine resources in African countries. It is worth mentioning that, sustainability and environmental considerations should be integrated into all activities related to the Blue Economy in Africa to ensure long-term benefits and the preservation of marine ecosystems. Several successful stories in Africa have the potential for sustainable economic development and environmental conservation. Ghana has made strides in promoting sustainable fisheries management and combating illegal, unreported, and unregulated (IUU) fishing, Mozambique has prioritized the development of its maritime transport and logistics sector, while South Africa has significant renewable energy projects. Climate change impacts are significant challenges to marine ecosystems and coastal communities in Africa, and integrating climate change adaptation strategies into marine resource management plans is essential but can be complex and resource-intensive. Finding financial resources to secure adequate and sustained funding for marine resource management is another challenge for capacity building, monitoring systems, research, and infrastructure development in Africa. Collaboration between governments, civil society, the private sector, and international partners is crucial to overcome these challenges. Keywords: African Blue Economy, environmental conservation, sustainable fisheries management, Climate change impacts, marine ecosystems in Africa, marine resource management.

Title – Ocean Forecasting System for the development of blue economy in Bangladesh

Dr. K M Chowdhury
K M Azam Chowdhury Department of Oceanography, University of Dhaka, Dhaka-1000, Bangladesh

Oral Presentation

Abstract: Ocean Forecasting System for the development of blue economy in Bangladesh Bangladesh having sea area equivalent to its land area is still lack behind of an operational Ocean Forecasting System (OFS). The objective of the current study is to assess the feasibility of setting up an OFS for Bangladesh utilizing the secondary datasets. The output of a global OFS, First Institute of Oceanography Coupled Ocean Model (FIOCOM) is used to observe the forecasting accuracy during the cyclonic storm 'Titli'. Some successful applications of the operational OFS in ASIA are the Sanchi oil spill incident, search and rescue the passengers in the ship accident in Phuket, Thailand by FIOCOM; search and rescue and potential fishing zone forecasting system by the HOOFS, operated by India. These best practices of OFS indicate that setting up an operational OFS in Bangladesh is necessary and would be cost effective, as OFS would help to reduce the loss during cyclone in this disaster-prone country, the highest benefit from the sea area could be obtained, the sail of blue economy would be accelerated with the use of OFS. Although the regional river has not been considered in the global OFS, the forecasting accuracy is considerable. A regional OFS in the northern Bay of Bengal considering the small and big rivers, and regional climate conditions would give higher accuracy and the maximum benefit would be obtained.

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
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Blue Economy of Bangladesh: Potentialities and Challenges of Marine Fisheries for Sustainable Blue Growth: A Case Study of Cox's Bazar, Bangladesh

Shahina Akter [1]

For Oral Presentation

Abstract

Bangladesh, with its substantial Bay of Bengal coastline, is abode to diverse marine ecosystems and a rich array of fish species. Therefore, The fisheries sector is prime to the country's economy, offering employment and sustenance to millions of individuals, especially in coastal communities. The study's main objective is to ascertain the Potentialities and Challenges of Marine Fisheries and establish a Sustainable marine resource Management framework. This study used a mixed method with qualitative and quantitative data depending on data reliability and validity. This study collected qualitative data from the Focus Group Discussion (FGD) and Key Informant Interviews (KIIs), typically structured with predefined questions and from a comprehensive literature review of books, journals, websites, and relevant public and private authorities. For quantitative data, a questionnaire survey was conducted according to the sample size, which was randomly selected. Data were summarized by SPSS-22 and Geographic Information System (GIS) software. The study revealed that the marine fisheries sector in Bangladesh is a cornerstone of its economy, supporting the livelihoods of coastal people to contribute to the sustainable blue economy. Considering the marine environment's multifaceted aspects, a comprehensive and integrated framework also provided for sustainable blue growth. However, the sustainability of these fisheries is under severe challenges due to issues like overfishing, fishing gear, habitat degradation, and climate.

Key Words: Blue Economy, Marine Fisheries, Sustainable, Blue Growth

[1] Bangladesh Open University, Associate Professor (Geography and Environment), Gazipur, Bangladesh

Title – Promoting a healthy and sustainable marine ecosystem along the coastal regions by developing observing and modelling systems

Dr. Yuntao Wang
Yuntao Wang, Second Institute of Oceanography, Ministry of Natural Resources

Oral Presentation

Abstract: The ocean accounts for approximately 71% of the total area of the earth and supports nearly 8 billion people worldwide. However, affected by the dual pressures of human activities and global change, the offshore ecological environment continues to deteriorate. The UN endorsed project, Mitigation of Natural Incidence Toward increased Oceanic Resilience (MoNITOR), will make contributions to marine natural disaster prevention and the environmental value added of countries in the Indo-Pacific region. We believe that cross-sector partnerships, scientific innovation, and seamless knowledge transfer to enable the scaled application of models and systems are key to addressing these issues. Through the popularization and application of a physical–ecological coupled model and a high-precision ecological environment operational numerical prediction system, we can conduct multiscale and optimized parameter research on marine physical processes, deepen our understanding of marine dynamic processes, and subsequently implement solutions to deal with these threats at different ecological and socioeconomic levels. The project have major focus on education and intelligent collaborations among young scientists that summer course were offered to students from all participating institutions every year, together with personnel exchange program for 2-3 months visit to other institutions. The cutting-edge technology for developing regional physical-biological modeling will be introduced and the operational forecasting systems for regional environments are expected to be developed in all the coastal regions along the Indian and western Pacific Ocean. Therefore, the proposal cooperates with cross-sectoral stakeholders in countries in the Indo-Pacific region, including major academic institutions, nonprofit foundations and organizations, to promote the prevention and control of marine natural disasters and the value added of marine health to contribute to the sustainable development of the ocean, promote the flow of knowledge and talent in the marine field, and ensure the safety of human life.

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
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Mangrove Conservation and Expansion in Saudi Arabia: A Vision for Coastal Ecosystem Sustainability

Dr. Saleh Al-Zamanan

The National Center for Vegetation Development and Combating Desertification, KSA

Abstract

Mangroves in Saudi Arabia serve as vital components of the coastal ecosystem, particularly along the Red Sea coast, with a current count of 30 million trees spread over 15,140 hectares, predominantly on the Red Sea (95%) and a smaller portion along the Arabian Gulf (5%). To ensure the preservation of these ecosystems, several important steps have been identified. These include safeguarding existing mangrove sites to prevent deterioration, restoring damaged areas in coastal regions through plantation efforts, creating new mangrove communities in tidal zones, and significantly expanding plantation areas beyond tidal zones, which may require earthworks and seawater pumping. Further, efforts to enable mangrove expansion are linked to coastal land acquisition and access policies. With a vision for the future, Saudi Arabia has set targets for 2030, aiming to plant 200 million mangrove trees, and for 2100, an even more ambitious target of 1.4 billion mangrove trees, emphasizing the commitment of the nation to preserving and enhancing these critical coastal ecosystems.

Keywords: Coastal ecosystem, Red Sea coast, mangrove plantation, mangrove conservation

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
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Microplastics in Beach Sediments along the Coast of Dubai, UAE

Atta G. Attaelmanan[1], Tarig Ali[2], Huda Aslam[3]
[1] Professor, University of Khorfakkan, Khorfakkan, U.A.E
[2] Professor, American University of Sharjah, Sharjah, U.A.E
[3] Graduate student, American University of Sharjah, Sharjah, U.A.E

Oral Presentation

The adverse impact of microplastics on marine life is well documented. However, microplastic contamination in beach sediments along the UAE coast is un-documented. In this study, microplastic contamination in beach sediments collected from the wrack lines of 16 beaches in Dubai were studied. The number, colour, and shape of microplastics was documented. The polymer types of large fibres and strings were identified through FT-IR analysis. Heavy metals' contents were detected using XRF. The results showed that the average weight of microplastic is 0.33 mg per gram of dry sediment (or 953 $mg.m^{-2}$) and the number of microplastic is 59.71 items per kg of dry sediment (or 165 $items.m^{-2}$). Blue and fibrous microplastics were dominant. Polyethylene strings and fibres were abundantly found. XRF analysis confirmed the presence of 14 heavy metals in the samples: Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, Pb, Ce, Pr, Nd, Pd, and Co with different concentrations. Five of them (Cr, Ni, Cu, Zn, and Pb) are priority pollutants according to EPA. Their average concentrations were Cr_2O_3 (2.96%), NiO (0.32%), CuO (0.45%), ZnO (0.56%), and PbO (1.49%). Our findings were compared to similar results from coastal regions around the world.

Keywords: Marine; Microplastics; FTIR; XRF

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
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Resilience drivers in some coral reef sites in Wadi El-Gemal marine protected area, Southern Egyptian Red Sea

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This study aims to evaluate the resilience status of the coral reef ecosystem in Wadi El-Gemal-Hamata National park, Southern Red Sea. Six resilience drivers (coral diversity, coral diseases, anthropogenic impacts, herbivores biomass, recruitment, and algae) have been chosen to be assessed in the different sites. Data were collected seasonally in the period from August 2015 to July 2016 using SCUBA diving from three inshore and two offshore reef sites. Offshore sites, Wadi El-Gemal and Suyul Islands recorded higher coral cover, higher fish abundance, and biomass, fewer algae, than inshore sites. Coral cover recorded 82.3% in the exposed sites compared to 63% in the sheltered sites. The average abundance of hard and soft corals was higher in the exposed sites with 91 and 5.4 colonies/125m2, respectively. Massive corals were more abundant in the exposed sites (67) than in the sheltered sites (15). On contrary, branched corals had a higher number in sheltered sites (34 colonies/ 125m2) than the exposed sites (23 colonies/125m2). The average biomass of grazer, browser, and excavator fishes was higher in the exposed sites than in the sheltered sites with 9581g, 4601g, and 1029g/250m2, respectively. Whereas the average biomass of scrapers was higher in sheltered sites (902g/250m2) than in exposed sites (678g/250m2). The new coral colonies of different sizes had almost the same density in both exposed and sheltered sites. The analysis of variance (ANOVA) showed that resilience factors varied significantly among sites. Based on resilience factors evaluation in this study, offshore sites are more resilient than onshore sites.

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GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
6TH INTERNATIONAL CONFERANCE ON GLOBAL WARMING

Co-design of Digital DEPTH, an UN Ocean Decade Programme

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Oral Presentation

Deep-sea habitats have been irreversibly altered, and habitat loss has led to the extinction of organisms living therein, profoundly affecting the service functions of various deep-sea ecosystems. However, there are insufficient scientific knowledge to support the management of deep sea, and lack of a basis for assessing the response of deep-sea habitats to climate change and human activities. Recently, the IOC-UNESCO approved an Ocean Decade Programme, Digital Deep-sea Typical Habitats, which partners come from 59 institutions in 35 countries on 6 continents as well as 4 international organizations. It is expected to develop digital cooperative platform for deep sea governance, including global warming.

Keywords: Deep-sea habitats, management of deep sea, Ocean Decade

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
6TH INTERNATIONAL CONFERANCE ON GLOBAL WARMING

Identification of Microplastics in Calanoid Copepod from the Sandwip Channel, Bay of Bengal, Bangladesh

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Abstract

Sandwip channel is very important in fisheries, communication, and recreation. Sandwip channel divides Sandwip Island from Chittagong mainland, Bangladesh. The people of Chittagong and Sandwip Island both depend on this channel for living and transportation. Agriculture including paddy crops and aquaculture is facilitated by this channel. Sandwip channel is also recognized as a wild sanctuary of Hilsha. Recently, "Mirsarai Economic Zone" has achieved popularity as one of the largest economic zones in Bangladesh. Nowadays Sandwip channel is one of several threats as illegal sand extraction, ship scrapping, excess fishing, and frequent oil tankers sinking. Sandwip channel has also the potential for tourism. There is a 41 km long beach and mangrove forest along the Sandwip channel. The aquatic micro-communities are very vulnerable to microplastic pollution due to a lot of commercial activities conducted in this renowned channel. The Zooplankton community is the fundamental energy source of coastal and Ocean ecosystems. A group of zooplankton such as copepods is known as the most prominent and nutritious micro-community which supports higher trophic organisms (e.g. fisheries, crustaceans, and mammals). The present study focused on harmful microplastic identification in the Calanoid subgroup of copepod. Therefore, this study found evidence of microplastics such as fiber ingestion by Calanoids. Fundamentally, the acid digestion method was followed to digest and prepare Calanoid samples to identify fibers in them through the light stereo microscope and consequently Scanning Electron Microscope. Moreover, there were three colors: white, blue, and brown of fibers were estimated in digested copepod samples. The fiber encounter and ingestion rates were 14.16 and 0.071, respectively in copepod individuals. This result explains that there are 25 fibers were identified in a total of 354 individuals of copepods. We assumed that fibers are very bioavailable to the copepods because of their size and shape similarity to the algae and could be bio accumulated by higher trophic organisms.

GLOBAL WARMING: THE CRITICAL ROLE OF OCEANS
6TH INTERNATIONAL CONFERANCE ON GLOBAL WARMING

An official field trip to monitor and follow up the whale sharks (Rhincodon typus) in the north of the State of Qatar

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Oral Presentation

Marine scientists from the Ministry of Environment and Climate Change (MoECC) carried out a study on the aggregation of whale sharks in the north-east offshore on August 29, 2022. The team successfully tested new techniques and equipment to collect data on the local whale shark population. Aerial and underwater photography were used to record individual sharks. Population size and trend can be studied, and individual states of health can be observed through continuous monitoring using the new methods. Patterns of both the left and right shoulder and pectoral fin, as well as scars, were used to identify each whale shark. A catalogue for each whale shark in the entire population will be built up. This data can be used for the study of population trends and growth rates. We have started taking measurements of the dorsal fin, the width of the head, and the head-to-dorsal fin length. These data can be used to estimate the body length of a whale shark. The body length, weight, and age can then be estimated.

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