Pacem in Maribus XXXIV

3rd to 8th September 2013
Bangkok, Thailand

INTERNATIONAL FORUM ON SUSTAINABLE GOVERNANCE OF THE OCEAN:

IMPACTS OF CLIMATE CHANGE & OCEAN RELATED HAZARDS: WATER & FLOOD MANAGEMENT POLICY IMPLICATIONS, PROTECTION, MITIGATION & ADAPTATION; & FOLLOW UP OF THE OUTCOME OF RIO +20: IMPLEMENTATION OF UNCLOS & RELATED INSTRUMENTS IN THE SOUTHEAST ASIAN REGION; AND INTERNET WEB-BASED GEOGRAPHICAL INFORMATION SYSTEM

Centara Grand at Central Plaza Ladprao
Bangkok, Thailand
3rd to 8th September 2013

HANDBOOK & PROGRAMME

PARTNERS

Aquatic Resources Research Institute (ARRI)
Chulalongkorn University;

Association of Natural Disaster Prevention Industry (ANDPI);

Bay of Bengal Large Marine Ecosystem Project (BOBLME),
Thailand;

Coastal Development Center (CDC),
Faculty of Fisheries, Kasetsart University;

Department of Fisheries (DOF),
Ministry of Agriculture and Cooperatives;

Department of Marine and Coastal Resources (DMCR),
Ministry of Natural Resources;

Fondation de Malte;

Foundation of National Disaster Warning Council (FNDWC);

High Seas Alliance;

Institute of Earth Systems (IES), University of Malta;

Future Ocean Kiel Marine Sciences;

Miyamoto International, Inc.;

Office of National Water and Flood Management Policy (ONWF), Office of the Prime Minister's Secretariat;

Pacific Disaster Center (PDC);

Partnerships in Environmental Management for the Seas of East Asia (PEMSEA);

Southeast Asian Fisheries Development Center (SEAFDEC);

Thailand's National Disaster Warning Center (NDWC), Ministry of Information and Communication Technology;

The International Emergency Management Society (TIEMS);

Tsunami Society International

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Office of National Water and Flood Management Policy (ONWF),
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Introduction

The 34rd *Pacem in Maribus* is taking place at a time of great challenge to the international community. There is no doubt that the existing international legal regime for the ocean has failed to protect the sustainability of ocean resources and services. The reason is not for lack of instruments, but a failure in implementation, enforcement and compliance.

Since the late founder of IOI, Elisabeth Mann Borgese convened the first PIM, and Arvid Pardo declared the Common Heritage of Mankind, we have experienced waves of change bordering on a tsunami, which are unravelling many of the perceived moral and ethical values and aspirations of the founding fathers of UNCLOS.

Important steps towards a relationship for humanity to sustainably coexist and interact with the ocean were the most recent commitments to the Rio+20 outcomes contained in The Future We Want and the United Nations Secretary General's Ocean Compact: Healthy Oceans for Prosperity (http://www.un.org/Depts/los/ocean_compact/oceans_compact.htm). We have charted in those two historic documents a clear path to a Blue Economy – a better and more implementable regime of ocean policies and governance, embedded in UNCLOS and mirroring the eternal vision of our founder Elisabeth Mann Borgese, mother of the ocean. IOI is her legacy: an aspiration and an inspiration for healthy oceans and universal prosperity.

A major example is the governance deficit in areas beyond national jurisdiction. The threat to marine biodiversity and the rise of industrial and destructive fishing practices, fishing subsidies, land and marine-based pollution, exploitation and exploration of marine resources beyond areas of national jurisdiction have all posed a formidable challenge to the fuller implementation of UNCLOS. This critical situation has been compounded by the impact of climate change, thus bringing to the fore the cause and effects relationship in the nexus of oceans and climate change.

The lack of an effective compliance and enforcement regime based on the political consensus of the world community has become intolerable and turbulent.

There is, however, increasing evidence of an emerging consensus for a new implementation agreement to be negotiated under the auspices of the United Nations. Such an agreement should be aimed at filling the gaps in the governance deficit, but not to rewrite UNCLOS. It is my hope that these presentations and the pursuant debates at the 34rd PIM will make significant contribution to meeting the current and emerging challenges as well as to our comprehension of its scientific, economic and social dimensions as a curtain raiser to any future interaction at the United Nations forums.

I wish to thank the Government of Thailand in hosting this important event. I also thank all the contributors and presenters for giving their time so generously to make such as valuable contribution to *Pacem in Maribus*. As can be seen from the abstracts, five thematic topics have been addressed which augur well for the rich debates and future actions that are expected at the PIM International Forum.

Dr. Awni Behnam
President IOI

H.E. Dr. Plodprasop Suraswadi,
Deputy Prime Minister of Thailand

- Dr. Awni Behnam, President of the International Ocean Institute;
- Dr. Wendy Watson-Wright, Executive Secretary and Assistant Director-General of UNESCO;
- Ambassador Salvino Busuttil, Representative of Malta to the IOI Governing Board and President, Fondation de Malte,

Distinguished experts, Ladies and Gentlemen,

I am very pleased to have the opportunity to extend a very warm welcome to this distinguished gathering of high level persons, friends, partners and distinguished experts from all parts of the world on the occasion of the Pacem in Maribus International Forum on Sustainable Governance of the Ocean co-hosted by the International Ocean Institute (IOI) in cooperation with the Government of Thailand.

I wish to convey my sincere appreciation and congratulations to the International Ocean Institute's important role and efforts over the years in promoting ocean governance and sustainable development and the successful implementation of significant ocean related activities in Thailand and around the globe. The IOI in Thailand was established in 2000 under the Office of the Thai Marine Policy and Restoration Committee, the Office of the Prime Minister to promote integrated and sustainable management of the Thai seas. I had a great opportunity to welcome Prof. Elisabeth Mann Borgese in March 2001 at the Royal Forest Department during her visit to Thailand to attend the Maritime Security Conference organized by SEAPOL in Bangkok to convey her message at the official ceremony of the establishment of the IOI Centre in Thailand.

Today, the IOI-Thailand has grown and continues to implement its mission in supporting Thai senior officials to attend the IOI training courses in Canada, Malta and China as well as the organization of conferences, workshops and meetings, institution building and partnerships including advice on the formulation of national marine policy and projects for Thailand, coastal community projects in the aftermath of the 2004 Indian Ocean tsunami, and promotion of school children and women to actively participate in ocean related activities including the World Ocean Day celebrations.

Talking about ocean governance, I look around and don't see any schools anywhere that offer a course or a syllabus dealing with ocean governance such as the courses being offered by the IOI. I hope that IOI continues to produce knowledge-based and ocean leaders for our country and other countries around the world. This will ensure that good ocean governance principles will be well understood and effectively structured from states to the rural community. This is to meet today's challenges of the global dynamic environment, turbulences, instability and uncertainty.

As reported by the IOI, the PIMXXXIV will address emerging issues relevant to climate change and ocean related hazards; the follow up of the outcome of Rio+20, implementation of UNCLOS and related instruments in the Southeast Asian region; tsunami and youth dialogue. On the issue of Climate change and ocean related hazards, Thailand's flood crisis in 2011 caused very severe damage to our economy and society. However, this crisis provided an important opportunity to re-evaluate and introduce a holistic and integrated approach to water management and flood prevention. This includes the establishment of a single command authority to coordinate all water management works which is capable of making prompt decisions which monitor day-to-day situations and during times of crisis. Thailand has dedicated 350 billion Thai Baht or 11.5 billion U.S. Dollars to invest in a well-integrated water management infrastructure and flood prevention system

to prevent future floods. The country just successfully hosted the 2nd Asia Pacific Water Summit during 19-20 May 2013 in Chiang Mai under the theme "Water Security and Water Related Disaster Challenges: Leadership and Commitment".

As for the issue of tsunamis, Thailand established the National Disaster Warning Centre under the Office of Prime Minister's Secretariat in May 2005 when I was the first Executive Director of the Centre. IOI in Thailand has played an important role in assisting Thailand on such an establishment, and develops project proposals and implements various coastal community activities for end-to-end tsunami early warning and mitigation systems. Thailand has also supported regional cooperation on disaster management. In 2005, Thailand contributed 10 million U.S. Dollars to establish the Multi-Donor Voluntary Trust Fund for Tsunami, Disaster and Climate Preparedness in the Indian Ocean and Southeast Asian countries. The trust Fund has been used to strengthen regional capacity and resilience and promotes south-south and triangular cooperation for multi-hazard risk reduction and related climate adaptation measures

Thailand acknowledges the outcome of the meeting at the Rio + 20 Summit in 2012 in which the global community renewed its commitments to sustainable development and to ensure the promotion of an economically, socially and environmentally sustainable future for the present and future generations. It also acknowledges poverty eradication as the greatest global challenges confronting the world today and as an indispensable requirement for sustainable development.

With regards to the Youth, I am pleased to learn that IOI has implemented initiatives under the programme, 'Women, Youth and the Sea' to address capacity development activities at the grass-root level. With children in particular, it is not enough to ensure that every child can go to school for a life-long learning experience. Children must be nurtured by activity-based learning which promotes learning by doing. A good example may be seen from a British 10-year old girl called Tilly Smith, who raised the alarm to save about 100 tourists at the Maikhao Beach in Phuket on the 26th December 2004 tsunamis. She spotted key signs in the sea that she remembered from a geography lesson a few weeks earlier. She persuaded her parents, seven-year-old sister and other tourists to flee from the beach and hotel towards safety. When the tsunami struck, no-one was killed on that beach.

Excellencies, Ladies and Gentlemen,

I am sure that the PIMXXXIV forum will address and discuss emerging issues facing us including climate change, natural disasters such as floods, tsunamis, coastal erosion, pollution, oil spills, and over-exploitation of fishery resources.

I wish the Forum every success. Thank you.

H.E. Dr. Phiraphan Phalusuk,
Minister of Science and Technology, Thailand

Distinguished experts, Ladies and Gentlemen,

It is a great honour and pleasure to be invited by the International Ocean Institute to address the Pacem in Maribus International Forum on Sustainable Governance of the Ocean organised by the International Ocean Institute (IOI) in cooperation with the Government of Thailand. The Ministry of Science and Technology is a principle agency in developing science, technology and innovation for the purposes of solving the country's socio economic problems and enhancing its long term competitive capacity. The Ministry recognizes important aspects in the development of human resources capacity in science, technology and innovation at all levels and raises public awareness of science, technology and innovation which will eventually manage our world resources and in particular "the Ocean".

As the Forum will address several issues related to the sustainable governance of the Ocean, namely impacts of climate change and ocean related hazards, implementation of United Nations Convention on the Law of the Sea (UNCLOS) & related instruments in Southeast Asia, Internet Web-based GIS and the Ocean We Want from youth perspectives, I would like to recall the Panel discussion entitled "Water: Preserving Our Oceans" organized within the framework of the 122nd Assembly of the Inter Parliamentary Union (IPU) held in Bangkok, Thailand on 30th March 2010 in which I was the Chairperson of the Working Group on Waters and the Moderator. The panellists included Dr. Wendy Watson-Wright, Executive Secretary of IOC/UNESCO and Dr. Cherdsak Virapat, Executive Director of the IOI who are also here. I think that the outcome of the panel discussion are valid and can be pursued further at this Forum.

The Panel discussed emerging issues on maritime security and ocean governance. The panel agreed that the United Nations Convention on the Law of the Sea and Agenda 21 had helped promote sustainable development of ocean resources and the marine environment. For the participants, however, while visible progress had been made in the economic, social and environmental spheres, it had lagged behind in the institutional field. They agreed that that was undermining the capacity to respond to the crisis in living resources and fisheries management and in other uses of the oceans, which had been exacerbated by climate change. Failure to strengthen the institutions involved would compromise the UN system's ability to achieve the One UN objective.

The panel recommended that the opportunity afforded by the UN General Assembly to promote measures aimed at identifying a common approach by Member States and interested stakeholders should be seized. The participants hoped for a serious commitment from national executives to the "assessment of assessments" of the regular process for global reporting and assessment of the state of the marine environment, including socioeconomic aspects. They underscored the importance of strengthening institutional arrangements on ocean affairs in an integrated manner, and expressed support for the commitments established under UN General Assembly resolution 60/30 of 29 November 2005 (Oceans and the law of the sea). The panel further recommended that parliaments consider establishing a parliamentary committee on ocean affairs or an equivalent mechanism in order to promote integrated oversight and management of ocean affairs.

Excellency, Ladies and Gentlemen, I would like to thank IOI in organising this useful forum in Thailand. The Ministry would like to follow up with the outcome of the Forum and would be pleased to cooperate and collaborate with the IOI in supporting further actions in particular on supporting

scholarships from the Ministry of Science and Technology for Thai officials to attend the IOI training programme and Master Degree programme in ocean governance in Malta.

I wish the Forum all the success. Thank you.

Prof. Salvino Busuttil
Representative of Malta to the IOI Governing Board and President, Fondation de Malte

Malta welcomes the holding of the 34th Session of Pacem in Maribus in Bangkok, Thailand.

Having hosted the very first PIM Conference in Malta more than 40 years ago, Malta is proud to embrace the International Ocean Institute on its University campus.

Malta and Thailand, both maritime nations, are in the forefront of endeavors to protect the ocean and for the rational and sustainable use of its rich resources. As Malta, through our UN ambassador Arvid Pardo, had argued in 1967 for a commitment by the UN whereby seabed resources beyond national jurisdiction would be harnessed for peaceful purposes for the common good of humanity to whose heritage they belong, so today Malta, in association with Thailand and all countries sharing the same values, celebrates the ocean as a perennial depository of humankind's hopes and aspirations.

Mr. Chamnong Kaeochada,
Deputy Permanent Secretary,
Ministry of Information and Communication Technology, Thailand

Distinguished experts, Ladies and Gentlemen,

I have the honor and pleasure to extend to you my sincere appreciation for your participation at the Pacem in Maribus International Forum on Sustainable Governance of the Ocean organised by the International Ocean Institute (IOI) in cooperation with National Disaster Warning Center, Ministry of Information and Communication Technology of Thailand.

Under Thailand's Information and Communication Technology policy framework from 2011 to 2020, the Ministry of Information and Communication Technology has given priority on the role of ICT in social and economic development by emphasizing the improvement of the quality of life and society through developing a knowledge-based society.

As a target, at least 50 percent of the population should have the knowledge and capacity to access, create and use information in an information-literate way in order to reap benefits in education, work and everyday life. ICT education outside the formal education system should be developed in order to promote life-long learning. The government, in cooperation with the Telecommunications and Broadcasting Regulatory Agency, are to provide telecommunication resources and ICT networks to serve the key social service sectors, including public health, monitoring, disaster warning and post-disaster management.

Under the Ministry, two organizations are now working closely to protect life and property of the Thai people and foreign visitors from natural disasters, namely; the National Disaster Warning Center (NDWC) which provides cover 24 hours a day, all year round, and is a national focal point for the coordination on the multi-hazard early warning system under the framework of the Intergovernmental Coordination Group of the Indian Ocean Tsunami Warning System (ICG/IOTWS) and the ICG/PTWS of the Pacific Tsunami Warning System; and Thai Meteorological Department (TMD) which works around the clock to improve the accuracy of information on weather, the atmosphere, water and climate and ensures that the relevant information is widely available for the public and is also responsible for activities contributing to the safety of communities. The TMD detects and monitors earthquakes through their broadband seismic network around the country. Both NDWC and TMD will share with international experts the two day tsunami seminar to propose to the Ministry on strategic actions and measures for the effective coordination and implementation within their scope of responsibilities.

Excellency, Ladies and Gentlemen, I would like to take this opportunity to wish you a constructive and successful forum. Thank you.

Mr. Suphot Tovichakchaikul,
Secretary-General, Office of Natural Water and Flood Management Policy (ONWF), Office of the Prime Minister's Secretariat, Thailand

Distinguished experts, Ladies and Gentlemen,

On behalf of the Office of Natural Water and Flood Management Policy, Office of the Prime Minister's Secretariat, it gives me great honour and pleasure to collaborate with the International Ocean Institute to organize the Pacem in Maribus International Forum on Sustainable Governance of the Ocean.

I would like to address the Forum with regards to the issue of water and flood management which is one of the Government of Thailand's top priorities on the agenda. In the aftermath of the 2011 floods, the Thai Government had geared its efforts towards the evaluation and development of integrated water resource management, strategic plans in flood prevention, early warning and mitigation, interagency coordination under the single command authority, and stakeholder participation at all levels to promote sustainable development and security.

Thailand just hosted the 2nd Asia Pacific Water Summit under the theme "Water Security and Water-Related Disaster Challenges: Leadership and Commitment" in Chiang Mai, Thailand during 19-20 May 2013 in collaboration with the Ministry of Foreign Affairs, and Ministry of Natural Resources and Environment of Thailand and regional and international partners, namely, the Asia-Pacific Water Forum (APWF), the Global Water Partnership of UNESCO, UN-Habitat, FAO, UN-ESCAP, ADB, IUCN and the Network of Asian River Basin Organizations (NARBO).

Attended by ten Heads of States, Ministers and around 300 delegates from governmental agencies, international organizations, academic institutions, non-governmental organizations, and the private sector, the Summit was successfully organized to present the Royal Initiatives of His Majesty the King of Thailand as best practices for sustainable water resources management; to promote active dialogues among regional leaders on water-related policy priorities and commitments; and to facilitate more effective regional cooperation in water security in Asia and the Pacific.

The Chiang Mai declaration acknowledges and reiterates the importance of water for human security, environment, and economy by outlining specific recommendations, namely; prioritizing water and sanitation and integrated water resource management on the national agenda; including disaster risk reduction and water issues in the post-2015 agenda; enhancing regional and international cooperation; and improving the efficiency in the agricultural sector. The Chiang Mai Declaration invites the APWF to mobilize initiatives to support the recommendations and consider establishing an Asian Water Information System.

Excellencies, Ladies and Gentlemen,

The PIMXXXIV International Forum on Sustainable Governance of the Ocean will discuss in the parallel session on water and flood policy implications, protection, mitigation and adaptation as part of the impacts of climate change and ocean related hazards component. I wish you all a successful Forum and look forward to future collaboration. Thank you.

Message from
Department of Marine and Coastal Resources,
Ministry of Natural Resources and Environment, Thailand

It is a great honour and pleasure to be invited by the International Ocean Institute to address the Pacem in Maribus International Forum on Sustainable Governance of the Ocean organised by the International Ocean Institute (IOI) in cooperation with the Government of Thailand.

The Department of Marine and Coastal Resources plays an important role in implementing national policy and plans for promoting sustainable management of coastal and marine resources in Thailand. This includes marine resources and biodiversity conservation, management of coastal erosion, enforcement of conservation measures and regulations, research and development on marine endanger species, international cooperation, public participation for awareness raising and community-based activities in marine and coastal management.

Excellency, Ladies and Gentlemen, we should take this opportunity to share our common concerns on the current situation and to make our best efforts to promote sustainable governance of the ocean. I would like to thank IOI in organising this useful forum in Thailand. The Department would like to follow up with the outcome of the Forum and would be pleased to cooperate and collaborate with the IOI in the areas of capacity building in ocean governance. I wish the Forum all the success. Thank you.

Dr. Chumnarn Pongsri,
Secretary-General
Southeast Asian Fisheries Development Center (SEAFDEC)

SEAFDEC is indeed honored to be part of this "Pacem in Maribus XXXIV International Forum on Sustainable Governance of the Ocean", considering that this Forum is an important venue that brings people from different backgrounds and experiences together to address issues and challenges on how the sustainability of the ocean could be achieved in the current situation with a wide range of sectors and stakeholders with different priorities, coupled with threats and hazards that could be posed by climate change and other natural incidences.

At this juncture, I would like to highlight specifically issues that are closely relevant to the fisheries sector, particularly on the sustainable utilization of marine fishery resources. It is not exaggerated to say that the adoption of the United Nations Convention on the Law of the Seas (UNCLOS) over three decades ago had been a big milestone that paved the basis for subsequent initiatives to achieve the sustainable utilization of marine living resources. One of the very important aspects of UNCLOS that could not be ignored is that it has extended the coastal States' jurisdiction to have rights and responsibilities for the management and use of fishery resources within their EEZs, which embrace most of the world's marine fisheries. Since the adoption of the UNCLOS, there had been a number of Agreements and Instruments developed and put into practice to ensure the sustainability of marine resources, among which include the Agreement for the Implementation of the Provisions of the UNCLOS Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and the Code of Conduct for Responsible Fisheries.

In the global context, there has been a wide-range of subsequent initiatives undertaken in corresponding to these instruments. Several regional fisheries management organizations (RFMOs) were established to optimize the utilization of resources, particularly for international fisheries and high seas areas; while the management of fisheries within the EEZs of the countries is subject to their respective national policy and plan. For SEAFDEC, we have been supporting our Member Countries in Southeast Asia towards the sustainable development of fisheries along with the broad framework of the Code of Conduct for Responsible Fisheries, which had in early 2000 been regionalized to take into consideration the regional specificity and situation, particularly to address the nature of fisheries that are undertaken mostly by small-scale fishers that are marginalized and vulnerable, with a catch that comprises a large number of species but comparatively small in size.

I believe that this "Pacem in Maribus XXXIV International Forum" would be a very good opportunity for relevant countries to meet once again and share information on what has been done so far in respect of UNCLOS, and to learn about the activities undertaken by other sectors that are sharing the same ocean. At the same time, we could also be updated on the imposing challenges including the possible impacts from climate change and other natural phenomenon/disasters. I therefore wish the Forum would come up with tangible outputs and strategic plans that are implementable and would enhance the concerted efforts among countries and across sectors, including regional collaboration for the sustainable utilization of the oceans in the future.

Thank you very much.

Mr. Pran Siamwalla
President, Association of Natural Disaster Prevention Industry

Distinguished experts, Ladies and Gentlemen,

Man in our shape & form started to roam the earth around 50,000 years ago and our civilization blossomed across the world, fascinatingly about the same time from China to Mayan around 10,000 years back. Have we ever wondered why civilization didn't start around the time man appeared? The reason is that we came out of the Ice Age only around 10,000 years back as well. Clearly, the climate has a significant influence on man & civilization. The level of CO2 cumulated in the atmosphere was never beyond 300 ppm for the past 400,000 years (the last time when CO2 reached close to 300 ppm, the sea level was 7 meters higher than it is today!). Today, it is **399 ppm**! Our earth is auto-adjusting bringing down CO2 and moving towards the Ice Age (per long range Climate Change study by Dr. Hubert Lamp) which has been repeated many times over in the past and through such a process ***world population could shrink dramatically and civilization might disappear***. The reaction is being experienced worldwide through ever increasing & severe natural disasters including; magnitude >9 earthquakes which caused a 30-meter Tsunami, category 5 hurricanes & tornados, climate anomalies which caused a pandemic of new strains of deadly diseases, droughts, floods, coastal erosion, etc.

With inadequate actions for natural disasters prevention, the Association of Natural Disasters Prevention Industry (ANDPI) was formed to play a pivotal role in orchestrating industries to move towards a natural disaster proofed economy which includes lowering CO2 release as well as creating prevention from all calamities for society. ANDPI is dedicated to spreading knowledge on natural disaster prevention knowledge & technologies as the directive to form regulations and the way of life in order to effectively prevent disasters.

ANDPI received substantial media support both from printed materials & TV. ANDPI held several successful international & local seminars such as School Safety from Earthquakes, Multi-Hazards drills for Hotels, World 1st Natural Disasters Prevention, Long-Distant Large Quakes, etc., having several high-ranking Government meetings, etc., with one very accomplished task of linking G2G between the Netherlands and Thailand in providing a Water Management study for the country to prevent future floods/droughts. The President has been invited to give talks on various occasions both locally & overseas.

With the **Pacem in Maribus XXXIV International Forum on Sustainable Governance of the Ocean**, Bangkok, Thailand, 4th - 6th September, 2013, organized by the International Ocean Institute (IOI), it is indeed an honour for ANDPI to be a partner of this significant event and thankful to IOI and its members, in particular, Dr. Cherdsak Virapat, who has been so dedicated to making the world a safer place. ANDPI hopes this event will bring about collaboration and positive changes in Thailand and the world to prevent the loss of life due to ever severe & ever increasing natural disasters to come.

Pacem in Maribus XXXIV

INTERNATIONAL FORUM ON SUSTAINABLE GOVERNANCE OF THE OCEAN:

IMPACTS OF CLIMATE CHANGE & OCEAN RELATED HAZARDS: WATER & FLOOD MANAGEMENT POLICY IMPLICATIONS, PROTECTION, MITIGATION & ADAPTATION; & FOLLOW UP OF THE OUTCOME OF RIO +20: IMPLEMENTATION OF UNCLOS & RELATED INSTRUMENTS IN THE SOUTHEAST ASIAN REGION; AND INTERNET WEB-BASED GEOGRAPHICAL INFORMATION SYSTEM

Centara Grand at Central Plaza Ladprao Bangkok, Thailand

3rd – 8th September 2013

BACKGROUND

The ocean covers almost three-quarters of the Earth's surface and by 2025 about 75 percent of the world's population could be living within 100km of its coasts. While the total economic and social value of the ocean can never be fully or accurately estimated, humankind has an economic and social dependency on goods, services and uses provided by the oceans. It is the largest source of protein for humankind and more than 90 percent of the planet's living biomass is found in the ocean (IUCN, 1997).

The *Pacem in Maribus* (PIM) Conference is one of the flagship activities of International Ocean Institute (IOI); the PIM Conference series is titled from the Latin for "Peace in the Oceans". PIM Conferences have played a crucial role in the formulation and promotion of UNCLOS and provide a forum where the challenges of ocean space can be considered in their interconnectedness. Thirty-three such conferences have been held to date around the globe. PIM Conferences have become respected as important events in understanding threats to the world's oceans as well as the potential of oceans resources to sustain humankind.

The IOI will be organizing the *Pacem in Maribus* (PIM) XXXIV entitled "International Forum on Sustainable Governance of the Ocean of the UNESCO/IOC – International Conference on Ocean" to be held in Bangkok, Thailand from the 4th to 6th September 2013. The Forum is to be co-hosted by the International Ocean Institute (I.O.I), the Office of National Water and Flood Management (ONWF), Office of the Prime Minister's Secretariat; Department of Marine and Coastal Resources (DMCR), Ministry of Natural Resources and Environment; the National Disaster Warning Center (NDWC), Ministry of Information, Communication and Technology; Department of Fisheries (DOF), Ministry of Agriculture and Cooperatives; the Southeast Asian Fisheries Development Center (SEAFDEC); and the Association of Natural Disaster Prevention Industries (ANDPI). PIM Conferences have played a crucial role in the formulation and promotion of UNCLOS and provide a forum where the challenges of ocean space can be considered in their interconnectedness. The Conferences have become respected as important events in understanding threats to the world's oceans as well as the potential of ocean resources to sustain humankind.

AIMS OF THE FORUM

The PIMXXXIV will address important and emerging global, regional and national issues on the impacts of climate change and ocean related hazards, water and flood management policy implications, protection, mitigation and adaptation; follow up of the outcome of Rio+20, implementation of UNCLOS and related instruments in the Southeast Asian region; integrated ocean web-based geographical information system; leadership seminar on science on tsunami for today's society and its input to society security and sustainability; and the youth dialogue 'The Ocean We Want' on the rights of youth in sustainable development.

OUTCOMES

It is expected that the Forum will make a major contribution to oceans, climate change and ocean related hazards and sustainable development, implementation of UNCLOS and its related instruments, internet web-based GIS, and right of youth in sustainable development as a result of the deliberations by scientists, experts and managers having addressed the specificity of ocean, climate change and ocean related hazards, sustainable development, UNCLOS & its related instruments, and challenges to oceans and coastal communities. In particular, Thailand will benefit from being the host country for PIMXXXIV to discuss and to share lessons learned with international experts on relevant issues such as climate change and ocean related hazards focused on coastal erosion, floods, oil spills and tsunamis, and implementation of UNCLOS and its related instruments in Thailand.

MAJOR THEMES

- Impacts of Climate Change and Ocean Related Hazards, Water and Flood Management Policy Implications, Protection, Mitigation and Adaptation

- Follow up of the Outcome of Rio+20, Implementation of UNCLOS and Related Instruments in the Southeast Asian Region

- Integrated Ocean Web-based Geographical Information System

- Leadership Seminar on Science on Tsunami for Today's Society and Its Input to Society Security and Sustainability

- Youth Dialogue 'The Ocean We Want' on the Rights of Youth in Sustainable Development.

SOCIAL EVENTS

- Dinner in the evening of September 3rd , 2013
- Welcome reception in the evening of September 4th , 2013
- Dinner in the evening of September 5th, 2013
- Dinner in the evening of September 6th, 2013

ORGANISERS

- International Ocean Institute
- Government of Thailand
    - Office of the National Flood and Water Management, Office of the Prime Minister's Secretariat
    - Department of Marine and Coastal Resources, Ministry of Natural Resources and Environment
    - National Disaster Warning Center, Ministry of Information and Communication Technology
    - Department of Fisheries, Ministry of Agriculture and Cooperatives
- Regional Organisation
    - Southeast Asian Fisheries Development Centre
- Private Sector/NGOs
    - Association of Natural Disaster Prevention Industry

PARTNERS

- Aquatic Resources Research Institute (ARRI), Chulalongkorn University;
- Association of Natural Disaster Prevention Industry (ANDPI);
- Bay of Bengal Large Marine Ecosystem Project (BOBLME);
- Coastal Development Center (CDC), Faculty of Fisheries, Kasetsart University;
- Department of Fisheries (DOF), Ministry of Agriculture and Cooperatives;
- Department of Marine and Coastal Resources (DMCR), Ministry of Natural Resources and Environment;
- Fondation de Malte
- Foundation of National Disaster Warning Council (FNDWC);
- High Seas Alliance
- Institute of Earth Systems (IES), University of Malta;
- Future Ocean Kiel Marine Sciences;
- Miyamoto International, Inc.;
- Office of National Water and Flood Management Policy (ONWF), Office of the Prime Minister's Secretariat;
- Pacific Disaster Center (PDC);
- Partnerships in Environmental Management for the Seas of East Asia (PEMSEA);
- Southeast Asian Fisheries Development Center (SEAFDEC);
- Thailand's National Disaster Warning Center (NDWC), Ministry of Information and Communication Technology;
- The International Emergency Management Society (TIEMS);
- Tsunami Society International

SPONSORS

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- Centara Grand at Central Ladprao Plaza Hotel, Bangkok
- Department of Marine and Coastal Resources (DMCR), Ministry of Natural Resources and Environment;
- Electricity Generating Authority of Thailand (EGAT)
- Office of National Water and Flood Management Policy (ONWF), Office of the Prime Minister's Secretariat;
- LPN Dock & Engineering Co. Ltd. (บริษัทอู่เรือแอลพีเอ็นวิศวกรรม จำกัด)

- PTT Exploration and Production Public Company Limited
- Southeast Asian Fisheries Development Center (SEAFDEC);
- Thai Airways International Public Company Limited
- Thailand's National Disaster Warning Center (NDWC), Ministry of Information and Communication Technology

FORUM CO-CHAIRS

H.E. Dr. Plodprasop Suraswadi, Deputy Prime Minister, Thailand
Dr. Awni Behnam, President of IOI

PLENARY SESSION CO-CHAIRS

Prof. Alfred J. Vella, Pro-Rector (Academic Affairs), University of Malta, Malta
Prof. Jin Yongxing, Vice President (International Affairs), Shanghai Maritime University, People's Republic of China

PARALLEL SESSION CO-CHAIRS & RAPPORTEURS

Theme 1: IMPACTS OF CLIMATE CHANGE & OCEAN RELATED HAZARDS: WATER & FLOOD MANAGEMENT POLICY IMPLICATIONS, PROTECTION, MITIGATION AND ADAPTATION

Co-Chair: Prof. Wong Poh Poh, Visiting Associate Professor, University of Adelaide
Co-Chair: Prof. Salvino Busuttil, Representative of Malta to the IOI Governing Board and President of Fondation de Malte
Rapporteur: Dr. Elisabeth Conrad, Institute of Earth Systems, University of Malta

Theme 2: FOLLOW UP OF THE OUTCOME OF RIO +20: IMPLEMENTATION OF UNCLOS & RELATED INSTRUMENTS IN THE SOUTHEAST ASIAN REGION

Co-Chair: Dr. Chua Thia-Eng, Former Council Chair of PEMSEA
Co-Chair: Associate Prof. Robert C. Beckman, National University of Singapore
Rapporteur: Ms. Youna Lyons, Senior Research Fellow, Centre for International Law (CIL)
Ms. Antonella Vassallo, Programme Officer, IOI Headquarters

Theme 3: INTEGRATED OCEAN WEB-BASED GEOGRAPHICAL INFORMATION SYSTEM

Co-Chair: Ms. Lata Iyer, Director of IOI-India
Co-Chair: Mr. Chris Chiesa, Deputy Executive Director, Pacific Disaster Center (PDC) Hawaii, U.S.A.
Rapporteur: Dr. Gabriel Ion, GEOECOMAR, Director, IOI-Black Sea (Romania)
Mr. Todd Bosse, Senior Geospatial Information Analyst, PDC, U.S.A.

Theme 4: LEADERSHIP SEMINAR: SCIENCE ON TSUNAMI FOR TODAY'S SOCIETY AND ITS INPUT TO SOCIETY SECURITY AND SUSTAINABILITY

Co-Chair: Rear Admiral Thavorn Charoendee, Thailand's National Disaster Warning Center (NDWC), Thailand
Co-Chair: Dr. Harkunti Rahayu, Chair, ICG/IOTWS Working Group 3: Mitigation, Preparedness and Response, Indonesia
Co-Chair: Dr. Iouri Oliounine, IOC/UNESCO Consultant, France

Theme 5: YOUTH ONLINE DIALOGUE, Right of Youth in Sustainable Development of the Ocean, "THE OCEAN WE WANT". The Youth Online Dialogue at the PIM34 International Forum on World Ocean Review entitled "*Right of Youth in Sustainable Development of the Oceans*"
Project Manager: Mr. Gonzalo Garcia de Arboleya de la Quintana

SPECIAL SESSION: EXPERT CONSULTATION ON THAILAND'S IMPLEMENTATION OF UNCLOS & ITS RELATED INSTRUMENTS

Co-Chair: H.E. Prof. Dr. Kriangsak kittichaisaree
Rapporteurs: Ms. Salynn Phudtapitug, Department of Treaties and Legal Affairs, Ministry of Foreign Affairs, Thailand

LOCAL ORGANISING COMMITTEE

- Aquatic Resources and Research Institute, Chulalongkorn University
- Association of Natural Disaster Prevention Industry
- Coastal Development Center, Faculty of Fisheries, Kasetsart University
- Department of Marine and Coastal Resources (DMCR), Ministry of Natural Resources and Environment;
- Department of Fisheries, Ministry of Agriculture and Cooperatives;
- Department of Treaties and Legal Affairs, Ministry of Foreign Affairs;
- International Ocean Institute Thailand Operational Centre
- Marine Department, Ministry of Natural Resources and Environment
- Office of National Water and Flood Management Policy (ONWF), Office of the Prime Minister's Secretariat;
- Southeast Asian Fisheries Development Center (SEAFDEC);
- Thailand's National Disaster Warning Center (NDWC), Ministry of Information and Communication Technology;

DATE AND PLACE OF THE FORUM

3-8 September 2013, Centara Grand at Central Plaza Ladprao Hotel, 1695 Phaholyothin Road, Chatuchak, Bangkok 10900, Thailand

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PROGRAMME

Tuesday 3rd September, 2013

Arrival of International Experts

Wednesday 4th September, 2013

08:00 – 09:00 hrs **Registration**

CONFERENCE OPENING CEREMONY

09:00 – 10:20 hrs **Opening Ceremony**

- **H.E. Dr. Plodprasop Suraswadi, Deputy Prime Minister, Thailand & Founder of IOI-Thailand**
- **H.E. Dr. Phiraphan Phalusuk, Minister of Science and Technology, Thailand**
- **Dr. Awni Behnam, President IOI**
- **Dr. Wendy Watson-Wright, Executive Secretary, Intergovernmental Oceanographic Commission (IOC) and Assistant Director-General of UNESCO**
- **Prof. Salvino Busuttil, Representative of Malta to the IOI Governing Board and President, Fondation de Malte**
- **Mr. Chamnong Kaeochada, Deputy Permanent Secretary, Ministry of Information and Communication Technology, Thailand**
- **Mr. Suphot Tovichakchaikul, Secretary-General, Office of The National Water and Flood Management Policy (ONWF), Office the Prime Minister's Secretariat, Thailand**
- **Dr. Wimol Jantrarotai, Director-General, Department of Fisheries (DOF), Ministry of Agriculture and Cooperatives, Thailand**
- **Dr. Chumnarn Pongsri, Secretary-General, Southeast Asian Fisheries Development Center (SEAFDEC)**
- **Mr. Pran Siamwalla, President, Association of Natural Disaster Prevention Industry (ANDPI), Thailand**

10:20 – 11:00 hrs **Group Photo/Coffee Break**

MEMORIAL LECTURES: Chaired by Dr. Awni Behnam, President of IOI

11:00 – 11:30 hrs **ELISABETH MANN BORGESE LECTURE:**
Global Governance of the Changing Ocean: RiskTolerance and the Science-Policy Gap
by Dr. Wendy Watson-Wright, Executive Secretary, Intergovernmental Oceanographic Commission (IOC) and Assistant Director-General of UNESCO

11:30 – 11:45 hrs **The award of the Elisabeth Mann Borgese Medal by Dr. Awni Behnam, President of IOI**

11:45 – 12:30 hrs **Tour of Exhibitions**

12:30 – 14:00 hrs ***LUNCH BREAK***

PLENARY PRESENTATIONS:

14:00 – 14.10 hrs **Co-Chair: Prof. Alfred J. Vella, Pro-Rector, University of Malta**
Co-Chair: Prof. Jin Yongxing, Vice-President, Shanghai Maritime University

14:10 – 14:25 hrs **Keynote Speaker 1: Outcome of Rio +20 and Understanding the Blue Economy by Dr. Awni Behnam, IOI President**

14:25 – 14:40 hrs **Keynote Speaker 2: The Progress achieved by the IOC in the Development of a Global Tsunami Warning System by Dr. Wendy Watson-Wright, Executive Secretary, Intergovernmental Oceanographic Commission (IOC) and Assistant Director-General of UNESCO**

14.40 – 14.55 hrs **Keynote Speaker 3: Multi-Cooperation in Natural Hazards Warning and Mitigation by Mr. K. Harald Drager, President of The International Emergency Management Society (TIEMS), Norway**

14.55 – 15.10 hrs **Keynote Speaker 4: Tsunami Disaster Risk Reduction and Reconstruction of East Japan Earthquake by Dr. Kit Miyamoto, President & CEO Miyamoto International, Inc.**

15.10 – 15.25 hrs **Keynote Speaker 5: Implementation of UNCLOS & Its Related Instruments in Southeast Asian Region by Mr. Voradet Viravakin, Director-General, Department of Treaties and Legal Affairs, Ministry of Foreign Affairs of Thailand**

15:25 – 16:00 hrs ***COFFEE BREAK***

PARALLEL SESSION:

Theme 1: IMPACTS OF CLIMATE CHANGE & OCEAN RELATED HAZARDS: WATER & FLOOD MANAGEMENT POLICY IMPLICATIONS, PROTECTION, MITIGATION AND ADAPTATION

16:00 – 18.00 hrs **Co-Chair: Prof. Wong Poh Poh, Visiting Associate Professor, University of Adelaide**
Co-Chair: Prof. Salvino Busuttil, Representative of Malta to the IOI Governing Board and President , Fondation de Malte
Rapporteur: Dr. Elisabeth Conrad, Institute of Earth Systems, University of Malta

Theme 1: Cluster/Component 1: Overview on climate change impacts and ocean related hazards including perspectives on ocean acidification and climate extremes, effects of ice-melting, and changing ocean currents pattern

- Cause and Effects of Climate Change by **Mr. Pran Siamwalla,** President, Association of Natural Disaster Prevention Industry, Thailand
- Hypoxia as a growing threat to coastal waters by **Dr. Werner Ekau**, Director of IOI Germany

- Jellyfish and their impacts as related to climate change and anthropogenic activities by **Dr. Alenka Malej**, Director, Marine Biological Station, Piran, National Institute of Biology, Director, IOI Slovenia

Theme 2: FOLLOW UP OF THE OUTCOME OF RIO +20: IMPLEMENTATION OF UNCLOS & RELATED INSTRUMENTS IN THE SOUTHEAST ASIAN REGION

16:00 – 18:00 hrs **Co-Chair: Dr. Chua Thia-Eng, Former Council Chair of PEMSEA;**
Co-Chair: Associate Prof. Robert C. Beckman, National University of Singapore;
Rapporteur: Ms. Youna Lyons, Senior Research Fellow, Centre for International Law (CIL);
Ms. Antonella Vassallo, Programme Officer, IOI Headquarters

Theme 2: Cluster/Component 1: Progress in the Implementation of UNCLOS and Related International Instruments "with special reference" to the Southeast Asian Region

- The Precautionary Approach in International Fisheries Law: Beacon of Hope, Sea of Confusion and Challenges by **Prof. David VanderZwaag,** Dalhousie University, Canada
- Maritime Boundaries: Addressing the Challenges in the Central Mediterranean by **Dr. Albert Caruana,** Director-General, Continental Shelf, Ministry for Transport and Infrastructure, Malta (presenting in his personal capacity)
- Revised Continental Shelf Claims in the South China Sea and the Future of Regional Cooperation Amidst A Scramble for Seabed Resources by **Mr. Jay L. Batongbacal**, Director, UP Institute for Maritime Affairs and Law of the Sea, the Philippines
- Implementation Of UNCLOS And The Practices Of States In The Southeast Asian Region by **Prof. Hasjim Djalal,** Member of the Indonesian Maritime Council, Senior Advisor to the Indonesian Minister for Maritime Affairs and Fisheries, and to Indonesian Naval Chief of Staff
- Marine Environment Protection in Malaysia: from the Earth Summit to Rio+20 by **Mr. Mohd Nizam Basiron,** Research Fellow and Head of the Centre for the Straits of Malacca at the Maritime Institute of Malaysia (MIMA)

Theme 3: INTEGRATED OCEAN WEB-BASED GEOGRAPHICAL INFORMATION SYSTEM

16:00 – 18:00 hrs **Co-Chair: Ms. Lata Iyer, Director of IOI-India;**
Co-Chair: Mr. Chris Chiesa, Deputy Executive Director, Pacific Disaster Center (PDC), Hawaii, U.S.A.
Rapporteur: Dr. Gabriel Ion, GEOECOMAR, Director, IOI-Black Sea (Romania);
Mr. Todd Bosse, Senior Geospatial Information Analyst, PDC, U.S.A.

Theme 3: Cluster 1: Content

a. Map-based content: This relates to all the mapping content that different organizations have and are creating every day. The participants would be given an opportunity to present about the content they have and are generating as part of their mandates. These presentations will have to be map based.

b. Policy and legal frameworks: This is the non-map-based content that sets the framework for action. These will be in the form of documents. Participants will be given an opportunity to present the different declarations, agreements, etc. that exist.

- Marine and Coastal Atlas Development: the IODE Capacity Building Experience; **Dr. Greg Reed**, Executive Officer, Australian Ocean Data Centre Joint Facility, Australia
- Sharing the European Research Vessels Information; **Dr. Telmo Carvalho,** Executive Director, European Centre for Information on Marine Science & Technology (EurOcean), Portugal
- Global Hazards Information Network (GHIN); **Mr. Todd Bosse**, Senior Geospatial Information Analyst, PDC, U.S.A.

Each presenter will be provided 20 to 25 minutes; followed by a 20 to 30 minute Q&A and discussions

Theme 4: SCIENCE ON TSUNAMI FOR TODAY'S SOCIETY AND ITS INPUT TO SOCIETY SECURITY AND SUSTAINABILITY

16:00 – 18:35 hrs	**Co-Chair: Rear Admiral Thavorn Charoendee, Thailand's National Disaster Warning Center (NDWC), Thailand** **Co-Chair: Dr. Harkunti Rahayu, Chair, ICG/IOTWS Working Group 3: Mitigation, Preparedness and Response, Indonesia** **Co-Chair: Dr. Iouri Oliounine, IOC/UNESCO Consultant, France**
16:00-16:40 hrs	**Official Opening and Plenary Session of the Leadership Seminar**
16:00-16:15 hrs	General Introduction of the Seminar Objectives, expected results and organization of work
16:15-16:35 hrs	Why establishment of a marine multi-hazards warning system is still a dream to come true? by **Dr. G. Pararas-Carayannis**, President of the Tsunami Society International, USA
16:35-16:40 hrs	Questions/Answers
16:40-18:35 hrs	**Lessons learned and knowledge sharing – Regional experience**
16:40 – 17:00 hrs	Development of Tsunami Warning System in Thailand by **Assistant Prof. Dr. Anat Ruangrassamee**, Chulalongkorn University, Thailand
17:00 – 17:200 hrs	Development on Thailand's National Disaster Warning Center from 2005-2013 by **Captain Song Ekmahachai,** Director of Operation, National Disaster Warning Center, Thailand
17:20 – 17:25 hrs	Questions/Answers
17:25 – 17:45 hrs	Challenges in National Tsunami Warning System by **Dr. Harkunti Rahayu**, Chair of WG 3 – Tsunami Awareness and Response of ICG Indian Ocean Tsunami Early Warning and Mitigation System and Research Center for Disaster Mitigation, Institute Technology of Bandung, Indonesia
17:45 – 17:50 hrs	Questions/Answers

17:50 – 18:10 hrs Tsunami in North East Atlantic and Mediterranean: History, Generation Mechanisms and the NEAM/IOC/UNESCO Early Warning System by **Dr. Gerassimos A. Papadopoulos,** National Observatory of Athens, Greece

18:10 – 18:15 hrs Questions/Answers

18:15 – 18:30 hrs Place and Role of IOI and Other Non-Governmental Organizations in Shaping the Global Tsunami Warning System by **Dr. Cherdsak Virapat**, IOI Executive Director, Malta

18:30 – 18:35 hrs Questions/Answers

19:00 – 21:00 hrs ***WELCOME RECEPTION***

Thursday 5th September, 2013

PARALLEL SESSION **(continued)**

Theme 1: **IMPACTS OF CLIMATE CHANGE & OCEAN RELATED HAZARDS: WATER & FLOOD MANAGEMENT POLICY IMPLICATIONS, PROTECTION, MITIGATION AND ADAPTATION**

Theme 2: **FOLLOW UP OF THE OUTCOME OF RIO +20: IMPLEMENTATION OF UNCLOS & RELATED INSTRUMENTS IN THE SOUTHEAST ASIAN REGION**

Theme 3: **INTEGRATED OCEAN WEB-BASED GEOGRAPHICAL INFORMATION SYSTEM**

Theme 4: **SCIENCE ON TSUNAMI FOR TODAY'S SOCIETY AND ITS INPUT TO SOCIETY SECURITY AND SUSTAINABILITY**

08:30 – 10:30 hrs ***PARALLEL SESSION*** **(continued)**

Theme 1: Cluster/Component 2: Climate change impacts and adaptation: experience, policy and lessons dealing with water/flood management and/or coastal erosion

- The use of Shoreline Management Plans to mitigate against coastal erosion and flooding by **Dr. Anton Micallef, Director**, Euro-Mediterranean Center on Insular Coastal Dynamics, Institute of Earth Systems, University of Malta
- How can and should the coastal regions of Germany adapt to climate change impacts? By **Prof. Dr. Horst Sterr**, the CAU Kiel, Germany
- Thailand's Climate Change Impacts and Adaptation: experience and policy by **Dr. Jirapa I. Trochim**, Office of Agricultural Economics, Ministry of Agriculture and Cooperatives, Thailand

Theme 2: Cluster/Component 2: Oil Spill Responses and Experiences

- Classifying risk zones by the impacts of oil spills in the coastal waters of Thailand by **Dr. Nuanchan Singkran,** Faculty of Environment and Resource Studies, Mahidol University; Nakhon Pathom, Thailand
- Upstream Oil Spills in South East Asia – Risks and Mitigation by **Ms. Geeva Varghese,** Senior Consultant, Oil Spill Response Limited, Singapore

- Preliminary Study on Coastal Ecosystems after the Oil Spill in Rayong Province, Thailand; by **Dr. Thon Thamrongnawasawat,** Head of The Department of Marine Science, Faculty of Fisheries, Kasetsart University, Bangkok, Thailand
- Lessons Learned from Florida's Toxicological Response to the Deep Water Horizon (Macondo MC252) Oil Spill by **Dr. David Krause,** Geosyntec Consultants, Florida, U.S.A.

Theme 3: Cluster 2: Technology

Prototypes and examples: In this part of the programme, technology partners would be given a chance to present portals and other web-GIS impl**e**mentations that serve similar goals to ours in other settings. This would stimulate a discussion on how we may be able to organize the content and present it through our portal.

- PDC DisasterAWARE by **Mr. Chris Chiesa,** Deputy Executive Director, Pacific Disaster Center (PDC), Hawaii, U.S.A.
- Adding value to 'vintage' geophysical data, through web based collaborative tools; **Dr. Mihai Burca**, National Institute of Oceanography and Experimental Geophysics, Italy
- Ocean & Coastal Data, Data Management, and Digital Atlases by **Dr. Dawn Wright,** Chief Scientist, ESRI, U.S.A.

Each presenter will be provided 20 to 25 minutes; followed by a 20 to 30 minute Q&A and discussions session.

Theme 4: Tsunami Leadership Seminar

08:30 – 13:00 hrs Work in Plenary

(i) Research

08:30 – 08:50 hrs Tsunami Alert Systems: From Tsunami Warning to Forecasting by **Dr. V. Titov**, Director, NOAA Center for Tsunami Research, Pacific Marine Environmental Laboratory, National Oceanic and Atmospheric Administration (NOAA), USA

08:50 – 08:55 hrs Questions/Answers

08:55 – 09:15 hrs Mega-Tsunamis: Adverse Effects, Warning Systems and Future Prospects for Hazard Mitigation by **Dr. Walter D. Mooney**, USGS, U.S.A.

09:15 – 09:20 hrs Questions/Answers

09:20 – 09:40 hrs Near Field Tsunami Early Warning and Preparedness: EU NEARTOWARN Project in the Mediterranean Sea by **Dr. Gerassimos A. Papadopoulos,** National Observatory of Athens, Greece

09:40 – 09:45 hrs Questions/Answers

09:45 – 10:05 hrs Investigation of Chabahar Bay Inundation Associated with Makran Subduction Zone by **Dr. Vahid Chegini**, Director, IOI-IR Iran, Islamic Republic of Iran

10:05 – 10:10 hrs Questions/Answers

10:10 – 10:30 hrs Round Table Discussion of above issues, formulation of recommendations

10:30 – 11:00 hrs ***COFFEE BREAK***

11:00 – 13:00 hrs ***PARALLEL SESSION*** **(continued)**

Theme 1: Cluster/Component 3: Thailand's Shoreline Change and Erosion Management

- **Assistant Prof. Payom Rattanamanee,** Department of Civil Engineering, Prince of Songkla University, Thailand
- **Dr. Sutat Weesakul,** Water Engineering and Management Programme, School of Engineering and Technology, Asian Institute of Technology, Thailand

Theme 2: Cluster/Component 3: Regional Cooperation, Including Regional Seas Organizations, Regional Fishing Management Organizations

- Partnerships in Environmental Management for the Seas of East Asia (PEMSEA): Regional Cooperation for Sustainable Development by **Ambassador Mary Seet-Cheng**, Chair, East Asian Seas Partnership Council, PEMSEA
- Climate Change Impact on the World Oceans and Implications to the South China Sea by **Prof. Julie Xue,** China Ocean University, Tsingtao, PR China
- The Need for a RFMO or Fishery-related Arrangement in the South China Sea: What Role Can Thailand Possibly Play? By **Dr. Yann-Huei Song**, Research Fellow, Institute of European & American Studies, Academia Sinica, Taiwan
- Cooperative Seapower in Asia-Pacific: Proposals for Regional Cooperation in Maritime Academic Research by **Dr. Seokwoo Lee**, Vice Dean for External Affairs, Inha University Law School, Republic of Korea
- The Bay of Bengal Large Marine Ecosystem Project – a regional collaborative approach for the management of fisheries and the marine environment in South and Southeast Asia by **Dr. Rudolf Hermes**, Chief Technical Advisor, Bay of Bengal Large Marine Ecosystem Project (BOBLME), Thailand

Theme 3: Cluster 3: Target groups and their needs

This part would be an open discussion on what our user-base (citizens, government organizations and public institutions, and NGOs) would like to access and how. This session will help understand what functionality needs to be incorporated into the portal for easy access, search and query of the content in the portal

- Knowledge sharing though IOI, OceanLearn and IOI-Kids web based activities and beyond by **Mr. Martin Galea De Giovanni,** Chair, Friends of the Earth Malta and Staff Member, Physical Oceanography Unit, University of Malta
- Online metocean data products and interfaces by the IOI – Malta Operational Centre by **Mr. Adam Gauci**, Academic Member, Physical Oceanography Unit, University of Malta
- The setting up of an IOI WebGIS as a promotional, educational and networking tool for the IOI network by **Dr. Charles Galdies**, Institute of Earth Systems, University of Malta

Each presenter will be provided 20 to 25 minutes; followed by a 20 to 30 minute Q&A and discussions session.

Theme 4: Tsunami Leadership Seminar (continued)

(ii) Preparedness and Vulnerability

11:00 – 11:20 hrs Risk Assessment Best Practices

11:20 – 11:25 hrs Questions/Answers

11:25 – 11:45 hrs Tsunami and Tropical Cyclone Forecast in the Global Disasters Alerts and Coordination System by **Dr. Alessandro Annunziato,** T. de Groeve, EC CECML, Italy

11:45 – 11:50 hrs Questions/Answers

11:50 – 12:10 hrs Development of Tsunami Resilient Communities: A Review of Initiatives by **Dr. Elisabeth Conrad,** Institute of Earth Systems, University of Malta, Malta

12:10 – 12:15 hrs Questions/Answers

12:15– 12:35 hrs Assessing Tsunami Vulnerability and Resilience in Southern Thailand: Steps Towards a more Efficient Risk Management by **Prof. Dr. Horst Sterr**, Kiel University, Germany

12:35 – 12:40 hrs Questions/Answers

12:40 – 13:00 hrs Round Table Discussion of the above issues, formulation of recommendations

13:00 – 14:30 hrs ***LUNCH***

14:30 – 16:30 hrs ***PARALLEL SESSION*** **(continued)**

Theme 1: Cluster/Component 4: Thailand's Floods: Policy and Protection

- The 2011 Thailand Great Flood: How about Future Vulnerability from CC by **Dr. Seree Supratid**, Rangsit University
- Analyzing social vulnerability to flooding in Bangkok: a valuable contribution to an efficient risk management by **Mr. Frederick Massmann**, Research Associate, Department of Geography, Kiel University, Germany
- Presentation by **Dr. Anond Snidvongs**, Director, Geoinformatics and Space Technology Development Agency (Public Organization), Thailand

Theme 2: Cluster/Component 4: Sustainable Coastal Management

- Experiences on Coastal Zone management and Fishery Co-Management in Thailand by **Mr. Sanchai Tandavanitj,** Director, EnLife Foundation, Krabi, Thailand
- Potential For Renewable Energy In Indonesia by **Dr. Harsono A. Soepardjo,** Centre for Marine Studies, University of Indonesia, Director of IOI Indonesia
- Sustainable fisheries management: a legal approach focusing on scientific criteria and integrating the human rights through food access to the resources of the sea by **Prof. Alain Piquemal,** Dean of the Faculty of International Law "Institute of the Law of Peace and Development", University of Nice-Sophia Antipolis (UNS), FRANCE), Director of the Maritime and Law of the Sea Center, Honorary Vice-President of UNS in charge of Environment and Sustainable Development, France

- Towards the sustainable development of the coasts and oceans – ICM with national initiatives and regional cooperation by **Prof. Mao Bin**, State Oceanic Administration, People 's Republic of China
- Blue Technology towards Sustainable Coastal Development by **Prof. Nicholas Kathijotes,** Academician, Cyprus University of Technology, Cyprus

Theme 3: Cluster 3: Target groups and their needs (continued)

Theme 4: Tsunami Leadership Seminar (continued)

(iii) Awareness and Response

14:30 – 14:50 hrs Impact of Tsunamis on Structures – Lessons Learned from 3 Tsunami Forensic Investigations and State-of-the Art Tsunami Design Guidelines by **Professor Ioan Nistor**, University of Ottawa, Canada

14:50 – 14:55 hrs Questions/Answers

14:55 – 15:15 hrs Engineering, Political and Economic Challenges in East Japan Tsunami Reconstruction by **Dr. Kit Miyamoto**, Miyamoto International, U.S.A.

15:15 – 15:20 hrs Questions/Answer

15:20 – 15:40 hrs Multilateral Collaboration for Disaster and Emergency Management: From 2004 Indian Ocean Tsunami to the Present Day by **Dr. Tavida Kamolvej,** Thammasat University, Thailand

15:40 – 15:45 hrs Questions/Answers

15:45 – 16:00 hrs Round Table Discussion of the above issues, formulation of recommendations

16:00 – 16:30 hrs ***COFFEE BREAK***

16:30 – 18:30 hrs ***PARALLEL SESSION*** **(Continued) & Discussion**

Theme 1: Panel discussion

Overview:
Cluster 1 sets the background for this session. Arising from presentations in clusters 2, 3 and 4 there is sufficient base for discussion to look at some strategic or framework to deal with climate change and ocean-related hazards. In particular, the presentation from cluster 3 and 4 would be most pertinent in looking at interagency coordination. Discussion and conclusion can be carried out.

Theme 2: Cluster/Component 5: Management Tools to achieve and ensures sustainable use of the oceans and their resources, including marine protected areas and PSSAs, integrated coastal and ocean management, environmental impact assessment, marine spatial planning, etc.

- If the Only Tool You Have is a Hammer, You Tend to See Every Problem as a Nail by **Dr. Lawrence Hildebrand**, Professor and Canadian Chair in Marine Environment Protection, World Maritime University, Malmö, Sweden and Member of the IOI Governing Board

- Management Tools to achieve and ensure sustainable use of the oceans and their resources by **Mr. Stephen Adrian Ross**, Acting Executive Director, PEMSEA Resource Facility
- Governance processes and the sense of local ownership throughout the dynamics of integrated coastal management: South Pacific cases by **Dr. Yves Henocque,** Senior Advisor in Maritime Strategy, Ifremer, France
- Management tools to ensure disaster risk reduction in coastal communities in Ukraine by **Dr. Victoria Radchenko,** Director of IOI-Ukraine
- Disaster preparedness for vulnerable coastal community groups focused on handicap people. Case study: training for regional rehabilitation centre in Ukraine by **Mr. Yaroslav Aleyev,** Coordinator of project, IOI-Ukraine
- The Marine Strategy and the Water Framework Directive(MSFD, WFD) as tools to achieve Good Environmental Status in Europe's seas by **Prof. Dr. Alenka Malej,** Director, Marine Biological Station, Piran, National Institute of Biology , Director, IOI Slovenia
- Ocean Environmental Protection Through Effective Implementation of IMO MARPOL VI; by **Mr. Jai Acharya,** Technical Director of STET Maritime Pte Ltd., Singapore

Theme 3: Conclusion

At the end of the discussion in these three sessions, list of content and functionality will be obtained to have in the designed portal. Our technology partners will be able to get an idea of what needs to be done for the implantation and how all of this could come together.

Theme 4: Tsunami Leadership Seminar (continued)

16:30 -16:40hrs Demonstration of a Video Film: Tsunami Training and capacity Building – from Monitoring to Public Awareness

16:40 – 17:00 hrs Role of Mass Media in Promoting Education, Creating Awareness and Achieving Sustainable Preparation for Tsunami and Other Marine Hazards by **Dr. G. Pararas-Carayannis,** President of the Tsunami Society International, U.S.A.

17:00 – 17:05 hrs Questions/Answers

17:05 – 17:25 hrs Tsunami Disaster Prevention and the Role of Media in Thailand by **Assistant Prof. Supanee Nitsmer**, Ramkhamhaeng University, Thailand

17:25 -17:30hrs Questions/Answers

17:30 – 17:50 hrs Education Technology and Innovative Teaching Strategies for Tsunami Learning for Teachers and Children by **Associate Prof. Rossukhon Makaramani**, Dean of the Faculty of Education, Suan Sunandha Rajaphat University, Bangkok, Thailand

17:50-17:55 hrs Questions/Answers

17:55–18:30 hrs Round Table Discussion of the above issues, formulation of recommendations

Discussion and Approval of a Final Document of a Final Document of the Seminar for the submission to the closing session of the Forum Plenary

19:00 – 21:00 hrs ***DINNER***

Friday 6th September, 2013

PLENARY SESSION

09:00 – 09:10 hrs	**Co-Chair: Dr. Werner Ekau, Chair of Directors, International Ocean Institute (IOI)** **Co-Chair: Dr. Louis F. Cassar, Director of Institute of Earth Systems, University of Malta**
09:10 – 11.30 hrs	**REPORTS OF THE PARALLEL SESSIONS & YOUTH ONLINE DIALOGUE**
11.30 – 12.00 hrs	***COFFEE BREAK***

CLOSING SESSION

12.00 – 12.30 hrs	**Acceptance of the Forum Declaration**
12.30 – 13.00 hrs	**Closing addresses** **--Dr. Awni Behnam, President, IOI** **Closing of the Conference**
13:00 – 14:00 hrs	***LUNCH***
14:00 – 18:30 hrs	**Expert Consultation on Thailand's Implementation of UNCLOS & Its Related Instruments** **Chairman: H.E. Prof. Dr. Kriangsak Kittichaisaree** **Rapporteur: Ms. Salynn Phudtapitug, Department of Treaties and Legal Affairs, Ministry of Foreign Affairs**
14:00 – 14:20 hrs	**Preparation for ratification of UNCLOS and future plans on implementation process & mechanism by Mr. Thanachai Wachiraworakam, Department of Treaties and Legal Affairs, Ministry of Foreign Affairs**
14:20 – 14:25 hrs	**Questions & Answers**

Emerging issues relevant to implementation of UNCLOS & Its Related Instruments

14:25 – 14:45 hrs	**Internal laws enactment process by Prof. Chumporn Patjusanon, Faculty of Laws, Chulalongkorn University, Chairman of the Sub-Committee on Law and Institutional structure for Thailand's Marine Benefits & Security and Mr. Thanachai Wachiraworakam, Department of Treaties and Legal Affairs, Ministry of Foreign Affairs**
14:45 – 14:50 hrs	**Questions & Answers**
14:50 – 15:10 hrs	**UNCLOS and Marine pollution (under Marine Department's Laws and Regulations) by Mr. Chanachai Lertsuchatavanich, Legal Officer, International Law and Agreement Division, Legal Affairs Bureau, Marine Department**
15:10 – 15:15 hrs	**Questions & Answers**

15:15 – 15.35 hrs	**An Overview of the Enhancement of Conservation of National Environmental Quality Act related to Marine Pollution by Dr. Pornsri Mingkwan, Pollution Control Department**
15:35 – 15:40 hrs	**Questions & Answers**
15:40 – 16:00 hrs	***COFFEE BREAK***
16:00 – 16:20 hrs	**Impact of ocean acidification on the marine environment and the related restrictions of ocean activities by coastal States – how would Thailand cope with this? By H.E. Prof. Dr. Kriangsak Kittichaisaree**
16:20 – 16:25 hrs	**Questions & Answers**
16:25 – 16:45 hrs	**IUU fishing & port state control and how Thailand can maintain its position as one of the world's top fishing nations in light of relevant international instruments on high sea fisheries, etc. by Dr. Waraporn Prompoj, Senior Expert on International Fisheries Affairs, Department of Fisheries, Ministry of Agriculture and Cooperatives**
16:45 – 16:50 hrs	**Questions & Answers**
16:50 – 17:10 hrs	**Thailand's declaration at the time of ratification of UNCLOS regarding naval passage by Representative from the Royal Thai Navy**
17:10 – 17:15 hrs	**Questions & Answers**
17:15 – 17:35 hrs	**Issue on maritime piracy by Representative from the Royal Thai Navy**
17:35 – 17:40 hrs	**Questions & Answers**
17:40 – 18:00 hrs	**Conclusion & Recommendations & Way Forwards**
19:00 – 21:00 hrs	***DINNER***

Saturday 7th September, 2013

09.00 – 12.00 hrs	**12th IOI Executive Committee Meeting**
12.00 – 13.30 hrs	***LUNCH***
13.30 – 16.00 hrs	**12th IOI Executive Committee Meeting (continued)**
19.00 – 21.00 hrs	***DINNER***
	Note: Coffee Break will be served in the meeting room

Sunday 8th September, 2013

Departure

Conceptual Notes:

Pacem in Maribus XXXIV: The International Forum on Sustainable Governance of the Ocean will discuss four thematic issues which involve knowledge & practices in Thailand and in the Southeast Asian region; namely, impacts of climate change & ocean related hazards: water & flood management policy implications, protection, mitigation and adaptation; follow up of the outcome of the Rio+20: implementation of UNCLOS and its related instruments in the Southeast Asian Region; integrated web-based geographical information system; and Tsunami Leadership Seminar: Science on Tsunamis for Today's Society and Its Input to Society Security and Sustainability. The Youth On-line Dialogue "Ocean We Want", Right of Youth in Sustainable Development has been communicated through facebook.

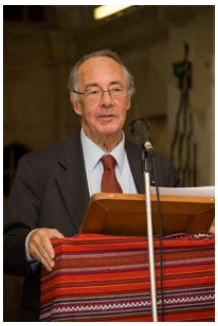
OPENING ADDRESS

H.E. Dr. Plodprasop SURASWADI
Deputy Prime Minister of Thailand

H.E. Dr. Phiraphan PHALUSUK
Minister of Science & Technology
Of Thailand

Dr. Awni BEHNAM
IOI President/Former Assistant
Secretary General of the United Nations
Commissioner General for
The World Expo 2010

Dr. Wendy WATSON-WRIGHT
Executive Secretary
Intergovernmental Oceanographic Commission
and Assistant Director-General of UNESCO



Prof. Salvino BUSUTTIL
Representative of Malta to
The IOI Governing Board and
President, Fondation de Malte

Mr. Chamnong KAEOCHADA
Deputy Permanent Secretary
Ministry of Information and
Communication Technology

Mr. Suphot TOVICHAKCHAIKUL
Secretary-General
Office of the National Water and
Flood Management Policy
Office of the Prime Minister's Secretariat

Dr. Wimol JANTRAROTAI
Director-General
Department of Fisheries
Ministry of Agriculture and Cooperatives

Dr. Chumnarn PONGSRI
Secretary-General
Southeast Asian Fisheries and Development Center

Mr. Pran SIAMWALLA
President
Association of Natural Disaster
Prevention Industry

ELISABETH MANN BORGESE MEDAL

BIOGRAPHY OF
H.R.H. PRINCESS MAHA CHAKRI SIRINDHORN

Her Royal Highness Princess Maha Chakri Sirindhorn was born *Her Royal Highness Princess Sirindhorn Debaratanasuda* on 2 April 1955 to His Majesty King Bhumibol Adulyadej, King Rama IX, and Her Majesty Queen Sirikit of Thailand.

Her Royal Highness Princess Maha Chakri Sirindhorn has rendered public service continously since her early youth. Due to her work dedication, on the occasion of the 50th Birthday of His Majesty the King, 5 December 1977, His Majesty the King conferred the Royal title of *Somdech Phra Debaratanarajasuda Chao Fa Maha Chakri Sirindhorn Rathasimagunakornpiyajat Sayamboromrajakumari* upon her.

Upon being acknowledged of her distinguished service to the nation and to humanity worldwide, His Majesty the King has graciously conferred the **Orders of the Kingdom of Thailand** upon Her Royal Highness Princess Maha Chakri Sirindhorn, who has also received the **Orders of Other Nations** which were conferred upon her in recognition of her significant contribution to relations between nations.

- **ORDERS OF THE KINGDOM OF THAILAND**
- **ORDERS OF OTHER NATIONS**

EDUCATION

Her Royal Highness Princess Maha Chakri Sirindhorn began her schooling when she was three years old, she joined kindergarten with other classmates at Chitralada School in Dusit Palace, the private school founded by His Majesty the King where all royal children were not treated differently from any other students. From the very beginning of her education, Her Royal Highness developed her scholarly ability, showing aptitude for learning which substantiated her consistent academic progress. Adopting the habit of reading from Their Majesties the King and Queen and being guided by her own nature to explore and seek knowledge, she becomes passionately interested in reading and studying Thai and foreign literature. Around the age of twelve, Her Royal Highness started writing proses and poetry. Not only was she keen on academic subjects, she also enjoyed school activities such as sports, music, school fairs and social events.

After completing high school education in 1972, being ranked number one in National School Examination, Her Royal Highness Princess Maha Chakri Sirindhorn enrolled in Faculty of Arts, Chulalongkorn University, with focus on history, Thai and oriental languages. Although Her Royal Highness often had to accompany Their Majesties the King and Queen on royal up-country visits, she has put more effort into her study and class assignments. In addition, she regarded the university experiences as invaluable for it gave her knowledge while at the same time provided her great opportunity to get to know people from all walks of life. Her Royal Highness also enjoyed extra-curricular activities on campus just the same as other college students, i.e. "Welcome Freshmen" Party, faculty sports day and cleaning day. She graduated with a Bachelor of Arts Degree, first class honour, gold medal in History in 1976.

Her Royal Highness Princess Maha Chakri Sirindhorn continued her studies in two Master's programmes concurrently, obtaining Master of Arts in Oriental Epigraphy (Sanskrit and Cambodian) from Silpakorn University in 1978, and Master of Arts in Pali and Sanskrit from Chulalongkorn University in 1980. Her Royal Highness continued her studies for a doctorate with a slightly shifted focus of interest from arts and humanities

to social sciences and education, she enrolled in a Doctor of Education programme in Development Education, an inter-disciplinary degree for her professional development at Srinakarinwirot University (former College of Education) in 1981 and graduated in 1987.

The principle of using education as a means of community and social development which Her Royal Highness has acquired during her doctoral studies, together with her former experiences in the field, has served as a solid base for her subsequent involvement in community development activities ever since.

In addition to her formal education, Her Royal Highness Princess Maha Chakri Sirindhorn continued to pursue life-long learning by attending several training courses and workshops to enhance her knowledge and skills in effective integrated development. These subjects include computer, cartography, meteorology, survey and photogrammetry, remote sensing and geographic information system and nutrition. In her own wide-ranging academic pursuits, Her Royal Highness has ensured what she has learned can benefit the people with whom she works.

- **EDUCATIONAL BACKGROUND**
- **STUDY VISITS AND SEMINAR 1977 - 1997**
- **STUDY VISITS AND SEMINAR 1998 - PRESENT**

WORK EXPERIENCES

Her Royal Highness Princess Maha Chakri Sirindhorn started her academic career teaching history at Chulachomklao Royal Military Academy (CRMA) in 1980. From the starting point as a lecturer in the Department of Law and Social Sciences in the Academic Division of CRMA, Her Royal Highness had duties and responsibilities just the same as other CRMA' s personnels. The Department of History was formally established in 1987 and Her Royal Highness has become the Director of the Department until now. In 1996,

Her Royal Highness was promoted to the highest military rank "General", and following in 2000, was granted the professional title as "Professor" due to her insights and knowledge. Some listings of her taught courses are Thai Studies, Thai History, South East Asian History, Eastern Asia History and Contemporary World History. She occasionally gives special lectures at several other institutions such as Chulalongkorn University, Thammasat University, Chiangmai University and Silpakorn University. She also regularly attends academic conferences and seminars both in and outside the country.



- **OFFICIAL WORK TITLES**

ROYAL DUTIES

In addition to the teaching career in CRMA, Her Royal Highness Princess Maha Chakri Sirindhorn has many different duties to perform every day. Some are familiar public duties, such as ceremonies, receptions or visits within Thailand or abroad. Besides, Her Royal Highness carries out official duties and public engagements as her **Royal Duties**for the benefit of the Thai people. She also represents Their Majesties in various royal functions and performs **The Royal Duties Assigned by Their Majesties the King and Queen** especially the duties in overseeing the management of philanthropic organizations and foundations. Since 1977, she has been the Executive Vice President of the Thai Red Cross Society ; and the Executive Chairman of several foundations including the Chaipattana Foundation (in charge of His Majesty the King's development and environmental conservation projects), the Anandha Mahidol Foundation (to promote higher education), and the King Rama II Foundation (to conserve and promote Thai culture). She is also the President of the Prince Mahidol Award Foundation (to provide international recognition to individuals who have made outstanding contributions in the fields of medicine and public health).

Imbued with a sense of responsibity and caring, Her Royal Highness Princess Maha Chakri Sirindhorn went on to foster several significant initiatives : providing basic education for school children in remote border areas, promoting plant genetic preservation and gene bank projects, instituting IT efforts to assist the handicapped to achieve independent living, and developing nutritional campaigns to improve the well-being of Thai people. Some of these projects, begun more than three decades ago when she was in her twenties, continue to this day.

Since 1990, Her Royal Highness has led cooperation programmes in the Lao People's Democratic Republic, following by the development for post-primary education in the Kingdom of Cambodia, and presently, her initiatives extend to more cooperation in many countries such as educational and academic cooperation with the People's Republic of China, royal scholarships for students in the People's Republic of China and Tibet, to name a few. Among all her initiatives implemented, most of them are well funded and managed. Moreover, she is not a distant benefactor, her consistent visits to the project sites to monitor their progress help her gather the latest information and assess programme developments.

Her Royal Highness Princess Maha Chakri Sirindhorn has inspired those who have followed her life and work to be a part of this charitable deed. Many people, companies, associations and organizations, including those from foreign countries, continuously present her with money or essential resources for implementing her initiatives. Hence, Her Royal Highness founded the **H.R.H. Princess Maha Chakri Sirindhorn Charity Fund** with aims to support projects that improve people's life condition including programmes

that relieve those suffering from catastrophe.

Modern living and hi-technology gadgets have drawn the young generation away from Thai traditional culture progressively. Fortunately, Her Royal Highness Princess Maha Chakri Sirindhorn has expressed her concern in saving and reviving valued Thai traditions. With an intensive effort to preserve Thai art and cultural heritage, Her Royal Highness has conducted many activities including reconstructing monuments and preserving antiques, supervising the restoration of national treasures and promoting Thai classical music. Her accomplishments have been acclaimed by many universities, both local and international, through their bestowal of **Honorary Doctorates**in several disciplines upon her. In addition, Her Royal Highness' dedication is also acknowledged worldwide, she therefore was granted **Honorary Awards**and **Honorary Titles**from many institutions and organizations.

Thai people have acknowledged Her Royal Highness Princess Maha Chakri Sirindhorn's longstanding efforts to help people in distress and her unselfish service to humanity, regardless of socio-economic status, creed, race or nationality. Her achievements have not only been known among the Thai people, but also people from around the world. In honour of their beloved Princess, many individuals, associations, foundations and organizations have proposed their requests for Her Royal Highness' royal title and her naming for the new species of plants and animals including places and many others. One of her active role is patronage of many humanitarian charities, philanthropic foundations and organizations which were founded by her initiatives or for public service.

- **HONORARY AWARDS**
- **HONORARY TITLES**
- **HONORARY DOCTORATES OF THAILAND 1977 - 1997**
- **HONORARY DOCTORATES OF THAILAND 1998 - PRESENT**
- **HONORARY DOCTORATES OF OTHER NATIONS**
- **NAMING PLANTS AND ANIMALS**
- **NAMING PLACES AND OTHERS**
- **ORGANIZATIONS UNDER PATRONAGE**

RECREATIONS

In her spare time, Her Royal Highness Princess Maha Chakri Sirindhorn enjoys various leisure activities. One of her favourite pastimes is reading which includes her interests in going shopping for books and collecting books in her personal libraries. Her love of reading leads to her talent in writing articles, poetry, short stories and travel books. Proceeds from her written accounts of her oversea travels are the main source of income of the Princess Maha Chakri Sirindhorn Foundation which was set up in 1979 to support needy students in schools, vocational colleges and universities.

Her Royal Highness Princess Maha Chakri Sirindhorn enjoys playing Thai classical instruments and practising Thai classical dancing. She sometimes paints. She is also keen on sports : jogging, swimming, biking and trekking, which give her an opportunity to learn about plants, trees and geographical features of the areas.


In addition to her knowledge of Pali, Sanskrit and Cambodian, Her Royal Highness is communicative in both English and French and has been learning Chinese, German and Latin.

PLENARY SESSION

CO-CHAIRS

Prof. Alfred J. Vella
Pro-Rector (Academic Affairs)
University of Malta, Malta

Prof. Jin Yongxing,
Vice President (International Affairs)
Shanghai Maritime University, People's Republic of China

KEYNOTE SPEAKERS

Dr. Awni Behnam
IOI President
Former Assistant Secretary General to the United Nations
Commissioner to the World Expo 2010

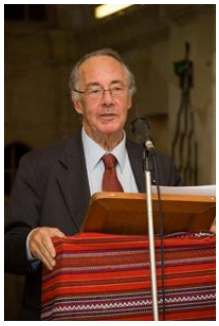
Dr. Wendy Watson-Wright
Executive Secretary
Intergovernmental Oceanographic Commission
Assistant Director-General of UNESCO

Mr. K. Harald Drager
President
The International Emergency
Management Society

Dr. Kit Miyamoto
President & CEO
Miyamoto International, Inc.

Mr. Voradet Viravakin
Director-General
Department of Treaties and Legal Affairs

EXPERT THEME 1



Prof. Salvino Busuttil

Prof. Wong Poh Poh

Dr. Elisabeth Conrad

Mr. Frederick Massmann

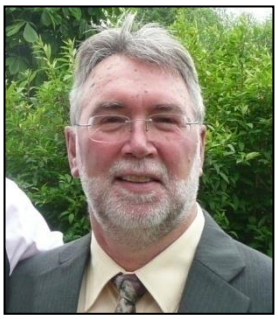
Dr. Werner Ekau

Dr. Louis F. Cassar

Prof. Alenka Malej

Mr. Pran Siamwalla

Dr. Anton Micallef



Prof. Horst Sterr

Dr. Seree Supratid

Assist. Prof. Payom Rattanamanee

Dr. Sutat Weesakul

Dr. Jirapa I. Trochim

EXPERT THEME 2

Dr. Chua Thia-Eng

Prof. Robert C. Beckman

Ms. Youna Lyons

Ms. Antonella Vassallo

Dr. Victoria Radchenko

Mr. Jai Acharya

Prof. Hasjim Djalal

Prof. Nicholas Kathijotes

Mr. Stephen Adrian Ross

Prof. Kriangsak Kittichaisaree

Dr. Albert Caruana

Dr. Yves Henocque

Prof. Seokwoo Lee

Amb. Mary Seet-Cheng

Prof. David VanderZwaag

Prof. Yann-huei Song

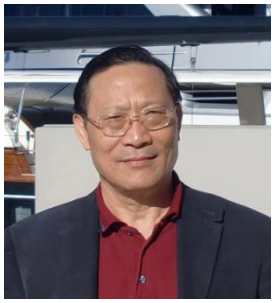
Prof. Alain Piquemal

Mr. Mohd Nizam Basiron

Mr. Jay L. Batongbacal

Dr. Rudolf Hermes

Prof. Julia Xue



Prof. Mao Bin

Dr. Harsono A. Soepardjo

Prof. Alenka Malej

Dr. Nuanchan Singkran

Dr. Thon Thamrongnawasawat

Mr. Sanchai Tandavanitj

Dr. Lawrence Hildebrand

Dr. David Krause

EXPERT THEME 3

Mr. Chris Chesa

Ms. Lata Iyer

Dr. Gabriel Ion

Mr. Todd Bosse

Dr. Dawn Wright

Prof. Aldo Drago

Dr. Charles Galdies

Mr. Adam Gauci

Mr. Martin Galea De Giovanni

Dr. Telmo Carvalho

Dr. Greg Reed

Dr. Mihai Burca

EXPERT THEME 4

Dr. Iouri Oliounine

Rear Admiral Thavorn Charoendee

Dr. Harkunti Rahayu

Dr. Ioan Nistor

Dr. Vahid Chegini

Dr. Tavida Kamolvej

Prof. Rossukhon Makaramani

Dr. Cherdsak Virapat

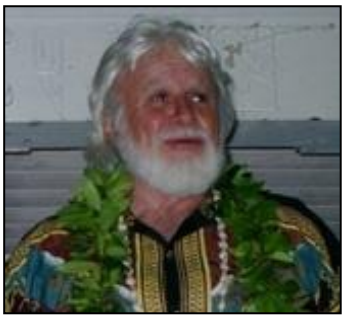
Dr. Walter D. Mooney

Captain Song Ekmahachai

Prof. Supanee Nitsmer

Dr. Elisabeth Conrad

Dr. Gerassimos A. Papadopoulos



Dr. George Pararas-Carayannis

Dr. Vasily Titov

Dr. Anat Ruangrassamee

Dr. Kit Miyamoto

Prof. Horst Sterr

Dr. Alessandro Annunziato

PLENARY SESSION

ABSTRACTS

The Intergovernmental Oceanographic Commission of UNESCO's Role in the Global Tsunami Warning System

Dr. Wendy Watson-Wright

As a follow-up to the disastrous earthquake and tsunami in Chile in 1960, the Pacific Tsunami Warning System was established in 1965, and international co-operation in this area started, led by the Intergovernmental Oceanographic Commission of UNESCO.

In spite of warnings from the scientific community and the IOC Member States, for the next 40 years the warning system was operational only in the northern Pacific, and there was no political will or priority to set up additional global warning systems.

The Indian Ocean Tsunami of the 26th of December was a wake-up call for governments all around the world. It took the lives of around 250,000 people and devastated huge coastal areas in many countries of the Indian Ocean.

Because of the Pacific experience, the IOC was asked to lead intergovernmental cooperation within the UN organizations with the goal to develop warning systems in other ocean areas, leading eventually to a truly global system.

The participants of the Forum will be informed of the progress achieved in the development of warning systems in the Indian Ocean, Caribbean region and North-Eastern Atlantic, Mediterranean and connected seas.

Multi-Cooperation in Natural Hazards Warning and Mitigation

K. Harald Drager

Based on type of disaster, frequency, magnitude and cost, and the expected trend of same, for Thailand as a country, for Asia as a continent and worldwide, key parameters can be identified, which should be decisive for future cooperation of all stakeholders involved in early warning and mitigation of natural hazards.

The overall map of identified vulnerable areas, however, need to be followed up locally with detailed risk assessments, which conclude disaster risk reduction means, with early warning and mitigation solutions, with priorities and funding opportunities. But not at least, responsible and contributing stakeholders to make the proposed early warning and mitigation solutions happen, need to be identified.

Margareta Wahlström, United Nations Special Representative of the Secretary-General for Disaster Risk Reduction (DRR) says it right: "Access to information is critical to successful disaster risk management. You cannot manage what you cannot measure". However, it is necessary, when the problem is identified, and the solution proposed, to point out who is responsible for implementing the solutions, and how it can be financed. This requires an international multi-cooperation of responsible and involved stakeholders. It is therefore pertinent to add the following sentences to Margareta Wahlström's saying: "Successful disaster risk reduction implementation can only be

achieved by identifying responsible stakeholders and relevant and feasible financial solutions. You cannot implement without a liable party with access to money"

An international multi cooperation model needs to put focus on the challenges often met in international disaster risk reduction work, like competition, fragmentation and excessive administrative costs, which reduce the efficiency of international efforts in minimizing the consequences of disasters. The multitude of actors worldwide, like NGO's, industries, private foundations and others, should cooperate with the large actors UN, EU, World Bank, IMF and the international insurance industry and others, in a beneficial way leading to better effectiveness and use of funds available for early warning and mitigation means.

Since research and development activities and education in this field are very important and decisive for better warning and mitigation means in the future, it is also necessary to address how international research and development projects and its funding could be more success oriented, and how to really close the gap between theory and practice through a faster way of feed-back of the research findings and successes into to the education system on all levels, from primary school education to policy briefs to politicians.

Observations and ideas and experiences of TIEMS, and how this organization operates internationally, meeting various challenges, describe how TIEMS try to improve international multi cooperation in natural hazard warning and mitigation, to achieve safer and more resilient societies.

Tsunami Disaster Risk Reduction and Reconstruction of East Japan Earthquake

Kit Miyamoto

The magnitude 9.0 March 2011, East Japan Earthquake had a strong motion that lasted over 90 seconds. This large earthquake was followed by a massive tsunami. Waves of up to 30 m and average 10 meter traveled 10 km inland. Although the coastal area was fortified by seawalls, most of these were overwhelmed by the tsunami and suffered damage.

As high as the casualties were, many lives were saved by the advanced tsunami warning system. Assessment of damage immediately after the tsunami showed that many newer industrial buildings and other structures constructed of reinforced concrete and built according to the modern seismic codes survived the event with no or minor damage. The experience obtained by this tragedy can provide guideline for future construction with emphasis on preserving life safety and the communities.

THEME 1

IMPACTS OF CLIMATE CHANGE & OCEAN RELATED HAZARDS: WATER & FLOOD MANAGEMENT POLICY IMPLICATIONS, PROTECTION, MITIGATION AND ADAPTATION

As natural disasters are on the rise, because of the increased frequency and severity of natural hazards and the large movement of population into urban areas particularly developing countries[1], these populations often live in substandard buildings in hazard prone areas. Consequently, vulnerability is growing because of unsustainable development. Humankind is facing an increasing burden of risk, largely because of lack of preventive action and because of decisions about development that are sometimes inappropriately taken at the local, national and international levels[2]. Over the last four decades, scientific knowledge about natural hazards and the technological lessen their impacts has expanded greatly.

We must and can through science promote a better understanding of natural disasters: where, when and how they might occur, and what their intensity may be. We must and can continue to improve early warning systems and utilize communication technologies more effectively for the dissemination of alerts about impending disasters. We must and can promote and enforce sound engineering and construction principles. There is no time for gentle reminders about the necessity to pay attention to the risks of disasters; it is time for a wake-up call that will summon an adequate response, a response empowered by a firm political will. There is an urgent need to address the communities, households and investors. Mainstreaming disaster risk reduction at the national level and prioritizing risk management in national policies and strategies is a starting point to accelerate progress. To mitigate the risks stemming from natural hazards such as shoreline change and erosion, hurricanes, floods, windstorms, landslides, volcanic eruptions, droughts and wildfires, those at risk must be informed of dangers and the protective measures available, and well versed in the skills of prevention and resilience. We need to educate people - in particular young people - about disasters and their far-reaching implications for the way we live. In this way, a culture of prevention will gradually be put in place and there would be fewer deaths, injuries and less destruction when such disasters strike.

Coastal erosion can be the result of both natural processes and human activities. Natural forces such as wind, waves, near-shore currents, storm surge, tsunamis and delta subsidence can trigger erosion. Human activities that result in the destruction of coastal habitats such as mangrove forest, beach forest, sand dunes or coral reefs can also produce erosion, and serious land subsidence around Bangkok emerged as a result of groundwater pumping from deep wells. Coastal areas may recover naturally from erosion related to natural factors or human activities over time without additional disturbance, but the construction of engineered hard structures that permanently modify coastal morphology and processes can produce permanent change. We must also realize that coastal erosion is highly influenced by the rate of sea-level rise that has doubled in the last century. Given the increasing severity of coastal erosion problems in Thailand, it is appropriate to call on international cooperation and assistance to better understand shoreline change in Thailand and to improve local awareness of the problems and management practices at local level.

Floods occurred in the Central Plains in 2011 in Thailand and were described as the worst flooding that has impacted Thailand because of the amount and extent of flooding and the numbers of people affected. Causes of the floods were due to a series of tropical storms and typhoons from June to October 2011. To mitigate the impacts of the floods, the Thai Government drained the water into the ocean as quickly as possible. The Government utilized various techniques such as the use of

[1] MunichRe. 2012. http://www.preventionweb.net/files/24476_20120104munichrenaturalcatastrophes.pdf.
[2] Rouhban, Badaoui. 2008. In Risk Wise.

motorboats to push the Chao Phraya River water into the ocean, build water dikes using sand bags and earthen dikes, and pump water from flooded areas into the ocean. However due to the massive amount of water, these techniques could not prevent Bangkok from flooding. There were 65 provinces affected by the floods. There were 815 casualties with 3 missing. The World Bank has estimated its economic loss of the amount of $ US 45.7 billion[3]. The total number of 621,355 families in 30 regions of Bangkok were affected by the floods. About 2 million hectares of agricultural land was damaged. About 9,895 factories inside and outside industrial zones were directly affected in 8 provinces with the total investment costs of more than $ US 27,000 million.

However, in the aftermath of the great floods in 2011, the Thai Government set up two committees, namely; the Strategic Committee for Water Resources Management Planning chaired by the Prime Minister and the Strategic Committee for Reconstruction and Future Development. On 7th February 2012, the Cabinet approved the establishment of the Integrated Water Resource Management platform to serve as a single command authority. The Cabinet had approved 246 proposed emergency projects with the total budget of $ US 800 million, which will focus on maximizing the draining capacity of water from upstream to downstream, protecting the important economic and household areas, and preventing long-term floods[4].

With human lives and livelihoods at stake, every means possible for reducing risk and mitigating the impact of natural and human-induced disasters must be undertaken. This includes incorporating what is known about disasters into the planning and development infrastructure, and steps taking to lessen the impacts of future disasters on population and infrastructure.[5].

The Workshop will address impacts of climate change, weather and climate extreme events and ocean related hazards such as floods & landslides, shoreline change and erosion management, water and flood management from policy to implementation. The workshop will also present and discuss end-to-end disaster early warning and mitigation systems of these impacts in Thailand. The outcome of the Workshop will be a strategic plan, which will include a framework to promote interagency coordination in dealing with the climate and ocean-related hazards that is applicable to other countries in the Asian region.

Cluster/Component 1: Overview on climate change impacts and ocean related hazards including perspectives on ocean acidification, weather and climate extreme events, effects of ice-melting, and changing ocean currents pattern

Output 1: Experts will present the background on impacts of climate change, global ocean related hazards, and recent trends in climate change knowledge/research.

Cluster/Component 2: Climate change impacts and adaptation: experience, policy and lessons dealing with water/flood management, ocean acidification and coastal erosion.

Output 2: Experts will discuss impacts, lessons learned & adaptation plans, policy frameworks arising from water and flood management, ocean acidification, and coastal erosion/sea level rise.

Cluster/Component 3: Thailand's Shoreline Change and Erosion Management

[3] Tang, A. 2011. Thailand cleans up areas remain flooded. Time World.

[4] Tatong, T., P. Kunthasap, and C. Virapat. 2012. The Government of Thailand's Flood Impacts, Response and Recovery. 8 pp.

[5] Shirkhodai, Ray and Joseph Bean. 2008. Rapid Increasing Disaster Risks Demand Innovative, Evolutionary Disaster Management Technologies. In Risk Wise. p. 33-36.

Output 3: Experts will comment and discuss national coastal erosion management plans of three regions of Thailand.

Output 4: Experts will discuss national water & flood management policy, strategy.

Cluster/Component 4: Thailand's Floods: Policy and Protection

Output 5: Experts will discuss national water & flood management policy, strategic plans on early warning, mitigation, preparedness and response as well as interagency coordination & integration using Thailand's case studies.

Panel discussion

Output of Panel Discussion:

Cluster 1 sets the background for this session. Presentations in clusters 2, 3 and 4 would provide a sufficient base for discussion to look at some strategic or framework to deal with climate change and ocean-related hazards. In particular, the presentation from cluster 3 and 4 would be most pertinent in looking at the interagency coordination. The discussion and conclusion can be carried out on a strategic plan, which will include a framework to promote interagency coordination in dealing with climate and ocean related hazards that is applicable to other countries in the Asian region.

ABSTRACTS

Cause and Effects of Climate Change

Pran Siamwalla

President, Association of Natural Disaster Prevention Industry, Thailand

Over 50,000 years that human beings have roamed the Earth, Civilization as well as the ending of the Ice Age surprisingly appeared only in the last 10,000 years. Based on the long-range 400,000 years climate change study done by Dr. Hubert Lamp, the Earth experienced the alternate periods between the Ice Age and the cycles of 7-meter high of sea level when the accumulated CO^2 in the Earth atmosphere was around 300 ppm. The alternate period of the Ice Age is the Earth's auto-mechanism to lowering the CO^2 level but it should also affect the world population as well as civilization. Nowadays, the level of CO^2 has reached 399 ppm., the Earth is witnessing worldwide ever increasing of severe natural disasters including high magnitude of earthquakes which caused 30-meter Tsunami; the category 5 hurricanes and tornados, climate anomalies which caused pandemic of new strains of deadly deceases, droughts, floods, coastal erosion, etc. Due to inadequate preventive actions for natural disasters around the world, Association of Natural Disasters Prevention Industry (ANDPI) was formed to play a pivotal role in orchestrating industries to move toward natural disaster proofed economy which includes lowering CO2 release as well as creating prevention from all calamities for society. ANDPI is dedicated in spreading knowledge on natural disaster prevention knowledge & technologies as the directive to form regulations and way of life in order to effectively prevent disasters**.**

Hypoxia as a growing threat to coastal waters

Werner Ekau

Director, IOI-Germany

Hypoxia has become a world-wide phenomenon in the global coastal ocean and causes a deterioration of the structure and function of ecosystems. Systematic reviews of hypoxia and anoxia events have shown two phenomena: 1) is a steady increase in dimension and strength of hypoxic areas that we observe in some regions over the last decades, 2) is an increasing number of areas where we observe hypoxia because the problem has been more recognised by science leading to better distribution of research activities. Obvious external forcings for increasing hypoxia include freshwater runoff and other factors contributing to stratification, organic matter and nutrient loadings, as well as exchange between coastal and open ocean water masses. Their different interactions set up mechanisms that drive the system towards hypoxia. Consequences of these are changes in species composition and productivity of the coastal ecosystems. Examples from temperate and tropical coasts show remarkable decreases in some populations and drastic regime shifts that do not show potential for back-shifts and recovery. The presentation will elucidate processes and drivers behind this phenomenon and examples for the significant impacts increasing temperature and extension of hypoxia has or may develop over the next decades.

Jellyfish and their impacts as related to climate change and anthropogenic activities

Alenka MALEJ

Director, Marine Biological Station, Piran, National Institute of Biology, Director, IOI Slovenia

The perceived increase of jellyfish blooms in coastal areas worldwide draws attention to possible human causes and potential mitigation measures. We compiled available scyphomedusae records to test if multiple human impacts and climate variability affected medusa populations in the northernmost part of the Mediterranean Sea (northern Adriatic) and the Inland Sea of Japan. In both areas, which are productive ecosystems and important fishing grounds, the long-term increase of jellyfish outbreaks, particularly of the moon jellyfish, became more prominent after the 1980s-90s.

Various anthropogenic impacts e.g. the addition of artificial substrates and overfishing as well as warming, eutrophication, hypoxia and loss of biodiversity also became more conspicuous. Our experimental work on jellyfish polyps demonstrated that marine construction works (e.g. docks, ports, marinas, aquaculture facilities), which provide overhanging surface areas for polyps to selectively settle, have been added in both systems and seem to be important anthropogenic drivers of more frequent and longer lasting outbreaks. Moreover, in both systems the recent annual fish catch of forage fish has been greatly reduced and is less than half of its peak in the 1980s. Analysis of long-term jellyfish fluctuations and environmental parameters also indicated that a more frequent medusae presence followed temperature increases. While some jellyfish species are noxious to humans, some represent a valuable resource as human food and a source of new materials that may become even more valuable in the future.

How can and should the coastal regions of Germany adapt to climate change impacts*?*

Horst Sterr

University of Kiel, Department of Geography, Germany

Germany has a marshland coast with barrier islands and estuaries at the North Sea in the west and a hilly coast with sandy beaches and intermediate cliff sections at the Baltic Sea in the east, a total of 3700 km of coastline. Low-lying topography and soft-rock geologic conditions are responsible for long-lasting risks both from flooding and erosion in these regions. In response to historic and recent storm floods coastal engineers have designed flood defense measures, primarily dikes, and have armored major portions of the North Sea coast but also some sections along the Baltic Sea. While dikes are essential to protect vast low-lying areas from getting temporarily flooded or permanently inundated, they are not suitable to prevent beach erosion and cliff retreat, nor to protect the hinterland from salt water intrusion or from hampered marshland drainage.

Global warming will severely affect both the North Sea and the Baltic coastal zone in various ways. Acceleration of sea level rise as well as increases in tidal range and wave energy have been observed in the North Sea. Assuming the continuation of these trends in the 21st century and in combination with local subsidence of marshland (due to compaction) the present dikes might no longer be sufficient within a few decades. Moreover, the tidal flats of the Wadden Sea, wetlands of great ecological importance, are threatened by erosion and drowning in front of an armored shoreline that fosters the so-called “coastal squeeze”. Thus, careful wetland monitoring is needed seaward of

the dikes, whereas risk assessment and water management have to be improved on the landward side.

Along the Baltic coast the population density is significantly higher, as several cities and numerous tourism resorts are lined up here. Tourism as the main economic sector might even gain from climate change in this region, as EU-wide studies have indicated. However, sandy beaches, on which coastal tourism mainly relies, are increasingly threatened by continuous erosion. Counteracting the general trend of shoreline retreat is difficult, though, in urban environments. In general, sediment deficits in the nearshore zone are not easily compensated. As a result coastal communities and authorities are faced with a long list of challenges related to climate change impacts. So far a few possible solutions have been identified but their implementation is still pending:

Vulnerability assessments relating to all impacts of climate change (economic, social, ecologic, structural) are required;

Integrated risk management has to be stepped up and must rely on both structural and non-structural measures;

With respect to structural measures the dimensions and safety of the major sea dikes have to be monitored continuously; new techniques have been identified to improve dike stability with reasonable costs;

Soft measures such as beach nourishment should be applied preferably to hard measures (groins, sea walls, dikes) wherever possible;

Defending the (present) coastline should not be considered the only feasible option; instead multifunctional and wider defense zones ought to be taken into consideration;

Information and participation processes with the population in risk zones might be a way to increase people's willingness to also consider retreat or soft adaptation options;

Policy-makers and authorities should encourage coastal communities towards adopting long-term climate change adaptation strategies and support them (e.g. financially, administratively) in the implementation process.

Presently, the coastal region of Kiel Bay is undertaking an effort of developing towards a model region for climate change adaptation. The project is funded by the German Federal Ministry of Environment.

Thailand's Climate change impacts and adaptation: experience and policy

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Office of Agricultural Economics,
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In the past 50 years, Thailand had experienced rising temperatures of about 0.5 – 1 Celsius, and a decreasing trend, but highly variable, rainfalls. Climate change studies suggested that in the 21th century the temperature in Thailand will continue to rise 1-2 Celsius, number of hot days will increase while the number of cold days will decrease by 2-3 weeks per year. In the first half of the 21th century, the annual rainfall will be highly variable, and tends to increase in the second half of

the century. It is expected that water resources might increase due to increasing rainfalls. However, sea level rise in the future - about 11 centimeters by 2020 and 21 centimeters by 2050 in comparison to 1995 levels - will worsen the intrusion of salt water situation and will affect coastal areas.

Thailand has an area of 513,166 km^2 and a population of approximately 64.4 million people. In 2011, GDP at market price is 11.12 trillion Baht (about $US 365 billion). Thailand is a lower middle country with GDP per capita is about $US 5,395. Its economy relies on services (56%), industry (33%), and agriculture and fisheries (11.4%). While the agriculture sector contributes only 11.4% to the economy, 40% of employment is in the agriculture sector, and 41% of the land is being used for agriculture. Since the agriculture sector heavily relies on the weather and environmental condition, climate change impact assessment and adaption policy for the agriculture sector is one of the top priority issues in Thailand.

Research and knowledge on climate change impact on agriculture and fisheries in Thailand is in the initial stages and quite limited. In general, studies find that major economic crops such as rice, sugar cane, maize, and cassava will be slightly affected by climate change, and in some cases might attend higher yields due to an expected increase in rainfalls and CO_2 fertilization. However, fruit trees and economic trees such as para rubber, palm oil, longan, durian, and lichees will be adversely affected by climate change. Little is known about the climate change impact on fisheries, especially marine fisheries.

The climate change impact on the agriculture sector seems to be moderate. However, Thailand's agricultural sector has experienced climate hazards every year. Most common disasters in the agriculture sector are floods, droughts and dry spells, and insect infestations, respectively. The 2011 flood event which is the most severe flood event in the Thai history, for example, cost the government as much as US$4,000 million, to recover the irrigation infrastructure, transportation infrastructure, and aid disaster victims. Loss and damages to the agriculture sector was estimated to be US$ 1,324 million. Since Thailand has 2,614 km coastline along Gulf of Thailand and Pacific Sea, the country is also affected by natural disaster from ocean such as Tsunami in 2004. Coastal erosion and saline intrusion is one the major problems in the coastal province. Climate change impact studies generally do not include extreme events in their assessments. In this sense, expected loss and damage tend to underestimated.

Disaster management policies and climate change policies for agriculture in Thailand is separated, but complementary. Agricultural disaster policies and management is an integral part of national disaster management which includes various ministries. The policies focus on actions related to prevention, preparation, response, and recovery. Climate change polices are regulated under the National Committee on Climate Change Policies, chaired by the Prime Minister or appointed Vice Prime Minister. Thailand had its first National Strategic Plan for Climate Change in 2008. Currently, it has been preparing a long term master plan for climate change, which will integrate all related sectors. Ministry of Agricultural and Cooperatives also prepared a sectoral plan for agriculture. The first plan, initiated in 2008, focused on improving knowledge base for climate change. The second plan so called "Agriculture Strategic Plan for Climate Change 2013 -2016, consists of three pillars: adaptation, mitigation, and supporting mechanism for implementation. Adaptation policies emphasize on preparing readiness for climate change and building climate resilience agriculture such as establishing information infrastructure and early warning system, restoring irrigation infrastructure, restoring and conserving agricultural resource and environment, as well as promoting the climate resilience agricultural practices and technologies. Mitigation policies focus on developing greenhouse gas information collection system and knowledge base as well as promoting environmentally friendly agriculture. Supporting mechanisms for implementation include developing

and strengthening climate change knowledge, building awareness, understanding, and the participation of stakeholders to bring plan to action.

Climate change is a complicate process. The change has occurred over long time span by several factors, both natural factors and human factors. Forecasting climate change and its impact involve many uncertainties. Thailand adaptation policies mainly include so called “no regret policies” which is known to reduce risk and increase adaptive capacity to climate change. As other developing countries, Thailand still needs reliable scientific information and knowledge to formulate more focus scientific-based climate change adaptation policies. Adaptation technology development and transfer is also essential to reduce climate risk and increase adaptive capacity on the ground.

Analyzing social vulnerability to flooding in Bangkok: a valuable contribution to an efficient risk management

Frederick Massmann

Research Fellow at the Department of Geography, University of Kiel, Germany

The severe flooding in Thailand during October/November 2011 impacted many northern provinces including the capital Bangkok and highlighted their vulnerabilities to external shocks. With more than 700 casualties, seriously disturbed livelihoods of millions of people and an estimated damage of US$ 45 billion, this flood was the worst in terms of economic losses, the amount of water and people affected. In Bangkok, where the economic and population density is highest, the flood revealed political and social conditions which contributed significantly to the vulnerability of the megacity and thus to the extent of the impacts.

An understanding of the causal factors of vulnerability is crucial not only for the implementation of recovery plans, but also for building future resilience. The often cited disregard of the social dimension in hazard and risk research is taken up in order to contribute to a theoretical enhancement and a holistic risk management. This study analyzes the contextual and complex character of social vulnerability through an adapted framework and examines two selected case-study areas in Bangkok. One area is an inner-city slum bordering the Chao Phraya River and the other area is a stream island in the northern suburbs. The underlying factors contributing to the vulnerability of the inhabitants of those areas are investigated. Based on qualitative methods the socio-economic and political conditions in the communities as well as the coping mechanisms and adaptation strategies are analyzed.

Preliminary results show that the vulnerabilities are shaped by various interlinked factors. In addition to the identification of demographic characteristics such as age and gender, an examination of the complex structures and relations within the communities is crucial. The seasonal floods and especially the severity of the 2011 event highlighted the importance of strong local organizations that represent community interests and that are active in flood risk management, i.e. the uplifting of walkways, the implementation of an early warning speaker system, or the establishment of disaster savings groups that play a crucial role in reducing negative impacts. It could be shown that there are various constraints regarding external efforts that have the potential to increase vulnerability. The construction of flood walls, for instance, is criticized heavily by parts of the local people because the top-down planning and implementation led to many problems like disturbed livelihoods, people forced to live outside the dike and many more. The distribution of external help is a reason to

complain, too. Often aid packages and financial compensation are given to those in favour of the distributor. Another factor revealed during the data collection relates to serious conflicts regarding land tenure within the study areas. Many people exposed to flooding are living on governmental land without a legal status. This unsafe condition makes the occupants hesitate in applying adaptation measures to their houses or to the community respectively and hence increases their vulnerability. In order to build up an efficient risk management the responsible stakeholders shouldn't focus on structural measures alone but take into account the needs and also the knowledge of the people affected.

THE 2011 THAILAND GREAT FLOOD: How about future vulnerability from CC

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The 2011 great flood causes tremendous damages to all business sectors including livelihood of Thai people. Official report from the World Bank reveals a figure of 1,440 billion Baht (US$ 45 billion) which ranks forth as the world's costliest disaster. Looking back of the disaster history (EM-DAT International Disaster Database), flood is the dominant natural disaster in the last fifty years for Thailand. Between 1995-2006, 54 flooding events were reported accounting for 55% of all natural disasters, resulting in US$ 4.5 billion damage, 2,682 people killed and 30 millions affected. Thailand (in the Chao Phraya river basin) was regularly flooded every 2 years during the last 10-year records. They are in 2002, 2004, 2006, 2010, and 2011, respectively. Warming of the global climate system will have a multitude of impacts on the monsoon-driven climate of Bangkok. Based on analysis of a subset of models used for the Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC), researchers at the Integrated Research System for Sustainability Science (IRS3) of the University of Tokyo estimate that by 2050 the local mean temperature will rise by 1.9^{o}C and 1.2^{o}C, and the basin mean precipitation will rise by 3 and 2% corresponding to IPCC A1FI and B1 climate scenarios (SRES - Special Reports on Emissions Scenarios) respectively. Furthermore, the sea level in the Gulf of Thailand will rise by 0.29 and 0.19 meters corresponding to IPCC A1FI and B1 climate scenarios.

In this study, we apply a flood simulation model (Mike 11, Mike 21) to investigate the future flood vulnerability from Climate Change. The main climate drivers in term of precipitation increases, sea level rise, temperature increases were obtained from the above mentioned references. The local driver of land subsidence was also included in the model. It was found that several critical characteristics of Climate Change will be happened. Flood-prone area for 2050 will expand 30% (180 km2) more as compared to the present flood situation. This cause more serious impact on the population living in the flooded area, especially, in the condensed housing areas where most live below the poverty level. One-third of the total affected people may be subjected to more than a half-meter inundation for at least one week. This marks a two-fold increase of that vulnerable population. The economic damage of flooding will rise four-fold in 2050. More than a million buildings and housing (residential, commercial and industrial) units in Bangkok and Samut Prakarn might be impacted by flooding in 2050.

THEME 2

FOLLOW UP OF THE OUTCOME OF RIO +20: IMPLEMENTATION OF UNCLOS & RELATED INSTRUMENTS IN THE SOUTHEAST ASIAN REGION

In 2012, we celebrated the 30th anniversary of the United Nations Convention of the Law of the Sea (UNCLOS). In the thirty years since the adoption of UNCLOS, a plethora of complex governance architecture has developed, in support of UNCLOS ranging from protocols, conventions, binding and non-binding multilateral agreements, guidelines model rules, etc. However, UNCLOS and all related instruments did not guarantee implementation and compliance. Despite all good intentions and expressed good will by all stakeholders our oceans are in deep trouble[6].

The deteriorating health of the oceans, the over exploitation of its living resources and the irreparable damage to its biodiversity and the new and emerging challenges of climate change were on the minds of many concerned stakeholders as we approached this year's Rio+20: "the summit on Sustainable Development". The outcome of Rio+20, *The Future We Want*, included many recommendations relating to the oceans and seas.[7] Within two months it was followed by a major initiative of Mr. Ban Ki–moon, United Nations Secretary General, who launched his comprehensive Ocean Compact on 23 August 2012.[8] The stated aim of the Ocean Compact initiative of the UNSG was to set out a strategic vision for the UN system to deliver on its ocean related mandates, consistent with the Rio+20 outcome in a more coherent manner and to aim to provide a platform for all stakeholders to collaborate and accelerate progress in the achievement of the common goal of Healthy Oceans for Prosperity. It is expected to build upon the range of existing and ongoing activities of the UN organizations to assist member States to implement UNCLOS and other relevant global and regional conventions.

The first observation on this Compact milestone is its emphasis on the implementation of UNCLOS and the fact that it up-scales commitments of member states and recommits the United Nations System with a new mechanism for follow up and cooperation. The second is that it comes ever so close to the Blue Economy concept of living from the ocean and with the ocean in a sustainable relationship as it addresses the nexus of ocean and coasts and the protection of life and property. The very first of the Compact's three goals and objectives is the protection of people and the improvement of the health of the ocean, while Rio+20 focused to a larger part on the living resources of the ocean.

Ratify and Implement UNCLOS and related global instruments

The full depth of the meaning of governance, though nowadays a widely used term, eludes many. It is not simply an extension of management techniques, but a system involving all stakeholders. The holistic nature of the seas leads to the greater involvement of stakeholders in ocean governance. Ocean governance is a complex interaction of different processes, requiring inter-linkages and communication with several actors.

The 1982 UNCLOS infers three critical components for ocean governance, albeit with blurred relationships: the Legal Framework, the Institutional Framework and the Implementation Framework. The legal framework sets the tone for the other components. There remains room for better empowerment in imposing legal jurisdictions within territorial and extra-territorial waters.

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[6] Behnam, Awni. The Blue Economy, Thirty Years Beyond UNCLOS. World Ocean Week in Xiamen 2012, 2-8 November 2012.

[7] UN General Assembly Resolution 66/288 The Future We Want, adopted at the Plenary Meeting on 27 July 2012, available at http://sustainabledevelopment.un.org/futurewewant.html

[8] UN Secretary-General to Launch Oceans Compact at Yeosu International Conference, UN Press Release, 10 August 2012, New York, available at http://www.un.org/Depts/los/ocean_compact/launch_oceans_compact_press_%20release_10%20Aug_final.pdf

Encouraging regional co-operation, through a consensus on common jurisdiction and responsibilities, can lead to effective and proper governance[9].

Implementation of UNCLOS and related global instruments

This workshop will examine the status of UNCLOS and related global and regional instruments in the region concerning the following issues:

Component 1: Progress in the Implementation of UNCLOS and Related International Instruments "with special reference" to the Southeast Asian Region

Output (1): Experts will discuss case studies and approaches related to the issues and challenges of implementing aspects of UN Convention on the Law of the Sea and Related International Instruments. Presentations of experiences and best practice as well as current and anticipated challenges; continental shelf issues and maritime boundaries; regional cooperation and implementation agreements. Experts will also assess collaboration, capacity building, and funding needs.

Component 2: Oil Spill Responses and Experiences

Output (2): Experts will discuss the experiences of current and recent incidents and provide outline of lessons learnt in the areas of prevention, mitigation/containment and spill response; the effects on coastal and marine ecosystems as well as management measures such as zonation, risk assessments and classifications will also be presented for discussion.

Component 3: Regional Cooperation, Including Regional Seas Organizations, Regional Fishing Management Organizations

Output (3): Experts will outline and discuss regional cooperative framework and experiences in addressing a comprehensive range of environmental challenges in two regional seas. Experts will discuss integrated management efforts in the region including strengthening institutional and legal capacities to implement international agreements, multi-level and multi-disciplinary expertise coordination approaches and potential funding to enhance effective regional institutions and programmes. The current development of bilateral agreements related to fishing and the conservation of marine living resources to address problems of over-fishing and over-capitalization of the fishing industry, coastal habitat protection in LMEs, EEZs and on the high seas will also be discussed.

Component 4: Sustainable Coastal Management

Output (4): Experts will discuss various sustainable coastal and ocean management efforts and experiences in the coastal and marine areas with special reference to sustainable fisheries management, renewable energy resources, and use of legal and technological tool to achieve sustainable development.

Component 5: Management Tools to achieve and ensure sustainable use of the oceans and their resources, including marine protected areas and PSSAs, integrated coastal and ocean management, environmental impact assessment, marine spatial planning, etc.

[9] Behnam, Awni. 2010. Water: Preserving Our Oceans, Panel Discussion, 30th March 2010. Inter-Parliamentary Union, 122nd Assembly and Related Meetings, Bangkok, Thailand. 18 pp.

Output 5: Experts will present and discuss management tools and their applications to achieve and ensure the sustainable use of the oceans and their resources in various countries, handbooks and practical guidelines, and capacity building requirements in the Southeast Asian Region; case studies and experiences in other regions will also be presented for discussion on lessons learnt and best practice comparisons; Pollution of the marine environment from shipping, dumping and sea-bed activities within national jurisdiction. This includes the ratification and implementation status of the IMO conventions on ship-source pollution, the London Convention and its 1996 Protocol, and global regulations and guidelines on pollution from offshore installations and structures.

Special Session: Expert Consultation on Thailand's Implementation of UNCLOS & Its Related Instruments

Experts will discuss with Thailand's Governmental decision makers and authorities from the Department of Marine and Coastal Resources (DMCR) and interagency departments on general and specific issues and requirements in the implementation of UNCLOS and its related instruments. This includes the analysis of strengths and weaknesses of scientific, technical, administrative and legal frameworks concerned with ocean governance for Thailand, effective implementation mechanisms, and regional cooperation, etc.

ABSTRACTS

The Precautionary Approach in International Fisheries Law: Beacon of Hope, Sea of Confusion and Challenges

David VanderZwaag

Dalhousie University, Canada

This presentation provides an overview of how the precautionary approach has been faring in international fisheries law and policy with three nautical images helping to capture the realities. First, the *beacon of hope* dimension is described. Powerful beams of the precautionary approach, such as placing the burden of proof on fishing proponents to establish some standard of acceptability, have been adopted on occasion and in rather narrow circumstances. The banning of large scale driftnets on the high seas and UN General Assembly resolution calls for closing vulnerable marine ecosystems (VMEs) to bottom trawling until appropriate conservation and management measures have been imposed represent strong versions of precaution.

Secondly, the *sea of confusion* surrounding the precautionary approach is highlighted. Five confusing aspects include: definitional generalities; debates over terminology; the wide spectrum of precautionary management measures available; differing academic views over the legal status and implications of precaution; and limited interpretations by international tribunals.

Lastly, the *sea of challenges* of putting precaution into practice is reviewed with a case study of the International Commission for the Conservation of Atlantic Tunas (ICCAT). Key challenges include: failing to incorporate the precautionary approach into regional fisheries management conventions; lacking scientific capacity and data necessary to establish precautionary reference points; over-riding precautionary scientific advice because of socio-economic and political pressures; focusing management on just commercially important fish stocks; and lagging in the establishment of marine protected areas. Limited surveillance and enforcement capabilities remain an over-arching difficulty.

Maritime Boundaries: Addressing the Challenges in the Central Mediterranean

Albert Caruana

Director-General, Continental Shelf, Ministry for Transport and Infrastructure, Malta

The presentation provides an overview of the different maritime zones as defined by the United Nations Convention on the Law of the Sea (UNCLOS) and discusses the difficulties encountered in the establishment of exclusive economic zones and continental shelf limits when coasts from opposing States are less than 200 nautical miles, particularly the difficulty in the applicability of the relevant circumstances to obtain an equitable solution. Following this overview, the presentation highlights the overlapping maritime zones in the central Mediterranean and refers to the bilateral agreements reached between States as well as the boundaries that were delimited after being referred by various States to the International Court of Justice. The presentation provides a discussion on various factors that affect maritime zone delimitation and presents a set of discussion points for consideration in boundary delimitation issues.

Revised Continental Shelf Claims in the South China Sea and the Future of Regional Cooperation Amidst A Scramble for Seabed Resources

Jay L. Batongbacal

Director, UP Institute for Maritime Affairs and Law of the Sea, the Philippines

Since 2009, there has been a visible decline in the state of relations between the States involved in contesting claims to sovereignty and jurisdiction over various parts of the South China Sea. The submission of claims for the continental shelf beyond 200 nautical miles in the contested area that year appears to be a major milestone in the change in status quo, heralding a somewhat pessimistic outlook for the future of the region. This paper reviews the events and apparently key policy turns surrounding these developments, and considers them in the light of coincident trends in marine living and non-living resource exploration and exploitation in the area. It then poses some key questions on the feasibility and options for practical regional cooperation needed to reverse the pessimistic trend in relations, and consider possibilities for acceptable solutions.

Implementation of UNCLOS and the Practices of States in the Southeast Asian Region

Hasjim Djalal

Retired Diplomat, Indonesia

The UNCLOS 1982 has contributed very substantially to the development of peace, stability, environment and economic needs of the world community, despite some of the unsettled issues. There are, of course, some issues which have not been clearly regulated and therefore would have to be developed through general practices of states and the specific region. In Southeast Asia, the states in the region have been actively engaged in seeking and developing cooperative programs, despite the many unsettled territorial, jurisdictional, and maritime delimitations between states. Thus, maritime boundary problems remain one of the main issues in managing maritime affairs in Southeast Asian region.

Marine Environment Protection in Malaysia: from the Earth Summit to Rio+20

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As a country that values its environment and natural resources and a responsible member of the international community Malaysia has been actively involved in international activities aimed at reaching the global goal of sustainable development. These include the ratification of international legal and non-legal international instruments as well as participating in international negotiations on sustainable development such including the United Nations Conference on Environment and Development also known as the Earth Summit in Rio de Janeiro in 1992, the World Summit on Sustainable Development (WSSD) in Johannesburg in 2002 and most recently the Rio + 20 Summit in 2012. Like other countries Malaysia also agreed to a set of targets and timetables at the Earth Summit and WSSD. Where marine environment and resources are concerned Malaysia has made progress in putting place policies and laws to implement concepts such as ecosystems conservation

and natural resource management but has been less than successful in meeting provisions related to sustainable fisheries in areas outside of national jurisdiction, establishing new programmes to reduce land-based pollution and implementing integrated coastal zone management

Notwithstanding this national level actions not related to the summit process have contributed to the overall maintenance of marine environment quality and resources. However based on available data there is still much room for improvement in all areas of marine environment protection as there has been some decline in the quality of the marine environment in the period following the Earth Summit.

Classifying risk zones as to the impacts of oil spills in coastal waters of Thailand

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Risk zones that could be subject to the impacts of oil spills were identified at a national scale across the 23 coastal provinces of Thailand based on the average percentage risk of critical variables, including frequency of oil spill incidents, number of ports, number of local boats, number of foreign boats, and presence of important resources (i.e., protection area, conservation area, marine park, mangrove, aquaculture, coral reef, seagrass, seagull, seabird, sea turtle, dugong, dolphin, whale, guitar fish, and shark). Risks at the local scale were determined based on the frequency of simulated oil slicks hitting the coast and/or important resources. Four zones with varied risk magnitudes (low, moderate, high, and very high) were mapped to guide the preparation of effective plans to minimize oil spill incidents and impacts in coastal waters. Risk maps with sufficient information could be used to improve regulations related to shipping and vessel navigation in local and regional seas.

Keywords: Modeling; aquatic; environment; assessment; contingency; chemical

Upstream Oil Spills in South East Asia – Risks and Mitigation

Geeva Varghese

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A rapidly growing economy has pushed the energy demands and has significantly increased the exploration and production activities over recent years in the South East Asian Region. Since the introduction of offshore exploration and production in the 1960's, South East Asia has gone through a remarkable transition from an onshore to an offshore focused region with more than 80% of oil production coming from offshore fields in 2011. Also the region has recently moved into deepwater exploration and production activities which now makes up more than 10% of the offshore production. With the rising production volumes, the transport of oil products has continuously increased both in volume and in number of ships used. This trend is expected to grow further with the investment in new refinery capacity of several South East Asian countries. All these factors have significantly contributed to the increased risk of marine oil spill incidents in the region.

1An increased risk of oil spills necessitates an increase in the capability to respond and manage major oil spill incidents. The South East Asian region has made some notable progress over the past few decades in terms of oil spill preparedness and response. Most of the countries in the region

have been successful in establishing the elements of preparedness advocated by the OPRC (International Convention on Oil Pollution Preparedness Response and Cooperation) convention. But with more E&P players conducting exploration activities in the riskier environments of deeper waters there is an increased need for enhanced preparedness and response capabilities. The occasion calls for greater collaboration between the government and industry stakeholders from oil, shipping and port industries.

This presentation will examine the increasing risks of oil spills from the growing exploration and production activities in South East Asian region. In doing so, the author will share the experience gained from working on various oil spill response planning and preparedness projects with the Governments and industry in the region with lessons learned, current developments and recommendation for improvements.

Preliminary Study on Coastal Ecosystems after the Oil Spill in Rayong Province, Thailand

Thon Thamrongnawasawat

Head of The Department of Marine Science, Faculty of Fisheries, Kasetsart University, Bangkok

This preliminary study was conducted by the team of marine scientists from Kasetsart University after the Oil Spill in Rayong Province, Thailand which was happened on 27th July, 2013. Four marine ecosystems included Sandy Beach, Rocky Shore, Coral Reef, and Seagrass Beds around Koh Samet and Baan Pe Beach were surveyed using various techniques such as Life Form Transect, Data Sampling, Fish Census etc. The total surveyed area is more than 50 square kilometers. The results show that there were a few bleaching corals, some benthic organisms on Sandy Beach and Rocky Shore were dead. However, most of the impact area was limited only at Ao Prow, Koh Samet, which is 500 meters in length. Only a few tarballs were observed along other Rayong Beaches. The Seagrass Beds at Baan Pe and reef fish community in surrounding areas showed no sign of impacts at this time. The research will continue for at least 1 year in order to monitor any change in those marine and coastal ecosystems.

Marine Environment Protection in Malaysia: from the Earth Summit to Rio+20

Lessons Learned from Florida's Toxicological Response to the Deep Water Horizon (Macondo MC252) Oil Spill

David Krause

Geosyntec Consultants, Former State Toxicologist for the Florida Department of Health, Florida, U.S.A.

Dr. David Krause will describe the various missions assigned to the Florida Department of Health (FDOH) Toxicology Consulting Program and how they aided the Gulf States in protecting public health during and after the response. The reliance upon local and regional seafood highlights the importance of understanding the impact that an oil spill has on marine life, the resulting economic damages and ultimately upon the health and livelihood of coastal communities. The approach developed by representatives from Gulf States and the Federal Agency responsible for the safety of seafood includes the sampling, analysis, and interpretative criteria for a robust seafood monitoring program. The consensus approach was written so that each state could develop a plan unique to its own situation, while utilizing a common foundation of toxicology and risk assessment. The Gulf

States Plan for seafood monitoring included both cancer and non-cancer risks for people who consume seafood, using estimates of consumption for local populations. Applying such a plan to other situations would require revising some underlying values such as consumption amounts and frequency. Additionally, he will describe the multiple variables related to the oil constituents, and how they can impact the oil's degradation, its fate in the environment, and the risks to marine life and public health. How the various chemical contaminant screening levels were derived, and some of the challenges we experienced will be highlighted. Finally, he will discuss which approaches used in the Gulf of Mexico response can be applied to estimate damages and protect public health in the Koh Samet oil spill response.

Partnerships in Environmental Management for the Seas of East Asia (PEMSEA): Regional Cooperation for Sustainable Development.

Mary Seet-Cheng

Chair, East Asian Seas Partnership Council, PEMSEA, The Philippines

Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) is an international organization addressing improved coastal and ocean governance and sustainable use of ecosystem products and services provided by the Seas of East Asia. PEMSEA's unique partnership mechanism groups together 11 countries of East Asia and 20 organizations as Partners implementing a regional strategy, namely the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA).

Over the 20-year period covering 1993 to 2013, PEMSEA's efforts have been directed at promoting coastal and ocean governance and management at local, national and regional levels. At the local level, PEMSEA concentrated on the development and implementation of integrated coastal management (ICM) as a tool for sustainable development. This was achieved by developing ICM national demonstration and parallel sites to build understanding and confidence in ICM effectiveness for improving governance of coastal and marine areas at the local level and for planning and initiating on-the-ground management interventions. PEMSEA has now standardized the ICM processes into an ICM system, for application in scaling up ICM both geographically and functionally across the region.

At the national level, PEMSEA promotes the development and adoption of national coastal and ocean policy in collaboration with Country Partners. The emphasis is on the integration of the management of coastal and marine areas, and connecting localized issues to the ecosystem/subregional/regional contexts. PEMSEA provides a common non-political platform for cooperation within the context of sustainable development of coasts and oceans.

At the regional level, the SDS-SEA provides a framework to comprehensively work towards sustainable development, and in the process addresses Rio+20 and other global and regional targets. For example, in 2009, the PEMSEA Country Partners emphasized the importance of addressing the effects of climate change through the *Manila Declaration on Strengthening the Implementation of Integrated Coastal Management for Sustainable Development and Climate Change Adaptation in the Seas of East Asia Region*. In 2012, the Country Partners followed this up with the *Changwon Declaration toward an Ocean-Based Blue Economy: Moving Ahead with the Sustainable Development Strategy for the Seas of East Asia*.

PEMSEA has been evolving as a regional organization for 20 years. This presentation aims to provide examples of how PEMSEA operationalizes global commitments to sustainable development of coasts and oceans at the national and regional levels, while making on-the-ground changes at the local level.

Climate Change Impact on the World Oceans and Implications to the South China Sea

Julie Xue

China Ocean University, Tsingtao, PR China

As one of the most pressing issues confronting human society, climate change has brought immense challenges to almost all aspects of our lives. This is also the case with the world's oceans including the South China Sea. In responding to its adverse impacts, the international community has faced legal, political, and scientific challenges. This also applies to the States bordering the South China Sea where maritime disputes have been more on the focus than the adverse climate change impact.

Against this background, this paper explores climate change impacts on the marine ecosystem and biodiversity in general and the challenges of accelerating rise in sea levels, in particular to the low lying islands and rocks of the South China Sea. It illustrates the implications to the bordering States which have engaged deeply in maritime disputes. The paper investigates possible responses against the projected worst case scenario to protect the affected states, and the challenges to such a course of action.

The Need for a RFMO or Fishery-related Arrangement in the South China Sea: What Role Can Thailand Possibly Play?

Yann-Huei Song

Research Fellow, Institute of European & American Studies, Academia Sinica, Taiwan

The South China Sea, a semi-enclosed sea and large marine ecosystem, is one of the world's richest marine biodiversity areas, with abundant and diverse marine resources. Its flat and shallow sea-beds are important fishing grounds of the bordering countries. The livelihood of millions of people relies on this body of water for a sustainable source of marine production. In recent years, however, the South China Sea has faced a serious problem of illegal, unregulated and unreported (IUU) fishing. Fisheries in the South China Sea have been over-exploited and catches in the region have declined. The adverse trend of fishery development points to a need for strengthening regional efforts to help conserve and manage fisheries resources in the South China Sea.

Although a number of existing fisheries-related institutions or arrangements, such as SEAFDEC, APFIC and RPOA, are addressing the problems concerning conservation and management of fisheries resources and IUU fishing, they do not cover the entire South China Sea. Actually there are no regional fisheries management organizations (RFMO) or arrangements in the South China Sea that are established for the purpose of conserving and managing fisheries resources in this important body of water in South East Asia. Accordingly, a number of proposals have been made over the years, calling for the establishment of a RFMO or making a special regional arrangement to deal with the problems in the South China Sea. For example, Mary George, a Malaysian law professor, proposes to establish the Southeast Asian Fishery Management Organization (SEAFMO). Julia

Guifang Xue, a Chinese scholar, proposes to set up a South China Sea Fisheries Commission (SCSFC). And more recently, it is proposed to apply the lessons of the Arctic and form a South China Sea Council (SCSC) to address common environmental concerns and to improve regional fishery cooperation.

Thailand, as a participating country of IOTC, WCPFC, APFIC, Mekong River Commission, SEAFDEC, NACA, APEC, COBSEA, PEMSEA, and RPOA, is one of the key players in the regional efforts to conserve and manage fisheries resources and to combat IUU fishing in the Southeast Asian seas, including the Gulf of Thailand and the South China Sea. In 1967, Thailand initiated, with the support from Singapore and Japan, the establishment of SEAFDEC, which covers the South China Sea and the Gulf of Thailand, and operates through the Secretariat located in Bangkok, Thailand. In the past, Thailand also played a very important role in the Indonesian-led South China Sea Workshop Process, where it was responsible for discussions on conservation and management of fishery resources in the South China Sea. In addition, Thailand, as the country coordinator of China-ASEAN relations (July 2012 – July 2015), can also play a constructive role in facilitating fisheries cooperation between the two sides.

In early May 2013, Yang Yi, the Chinese foreign minister, visited the four ASEAN member countries, namely, Thailand, Indonesia, Singapore and Brunei. During the visit, he said that "China is willing to consolidate and deepen the strategic partnership with ASEAN, vigorously promote key projects of connectivity, maritime and regional cooperation, and jointly contribute to regional peace, stability and prosperity." He also pointed out that China is willing "to discuss and steadily carry on the Code of Conduct (COC) for South China Sea procedure on the basis of consensus and in a step-by-step manner while implementing effectively and comprehensively the Declaration on the Conduct of Parties in the South China Sea (DOC) ." On June 30, 2013, the Chinese foreign minister met with the ASEAN foreign ministers at Bandar Seri Begawan, Brunei Darussalam, where the two sides agreed, among other things, "to make good use of the ASEAN-China Maritime Cooperation Fund, promote practical cooperation in fishery, maritime connectivity, marine science and technology, disaster prevention and reduction, and navigation safety and search and rescue, and make maritime cooperation a new highlight in ASEAN-China Cooperation."

It is clear that Thailand can play a very important role both in helping enhance and strengthen regional efforts to conserve and manage fisheries resources can combat IUU fishing in the South China Sea and promoting fisheries cooperation between China and the ASEAN member countries. If desirable, Thailand can also play a key role in establishing a new RFMO or making a special regional arrangement for the purpose of conserving and managing fisheries resources in the South China Sea.

The purpose of this paper is twofold. First, it studies the need and proposals for the establishment of a new RFMO or making a special fisheries-related arrangement in the South China Sea for the purpose of improving conservation and management of fisheries resources. Second, it explores the possibility for Thailand to play a leading role in helping conserve and manage fisheries resources in the South China Sea by helping realize the idea of creating a new RFMO or making a special arrangement for the region.

Keywords: Thailand, South China Sea, RFMO, Fisheries, Conservation, Management

Cooperative Seapower in Asia-Pacific:
Proposals for Regional Cooperation in Maritime Academic Research

Seokwoo Lee

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In the last few years a major change occurred in the conception of maritime security and safety in Asia-Pacific. Several new educational programs and institutions were formed alongside with existing programs reshaping, rearranging and developing. The complex nature of maritime security and safety is traditionally studied through different disciplines, which sometimes imply their results from one to another. However, the network of inter-reacting components of the maritime security and safety brought independent researchers worldwide to understand that there is a need to develop a holistic approach and a methodology. The timing of the co-development of the maritime security and safety concept worldwide is not a coincidence. It reflects similar local reactions to global changes. It also reflects an understanding that uni- or bi- disciplinary studies are not sufficient for practically deciphering maritime security and safety questions.

Today, even after several successful cross-disciplinary studies in the field, there is no leading methodology for the study of maritime security and safety. We know that many aspects may change from one region in the world to another. However, the globalization of environmental stresses, similar needs of the human dimension, and parallel way of thinking allows (and even asks) for a generalization of a research methodology. The winds are blowing towards transforming the new inter disciplinary approach into a maritime security and safety discipline.

We all agree about the importance of joint work and meetings amongst the academic researches of Asia-Pacific members. We need to aim high. If I read the map correctly we are in a critical point where we can in few years start to arrange conferences and publish journals about maritime security and safety. Such moves may well be supported by governmental and non-governmental bodies as well as the community. But if we move too quickly these efforts will lack any tying concepts. To reach the long term goal we need to move in simple and achievable steps. We need to develop the leading methodologies through joint research and only then percolate them down to our students – to educate.

The Bay of Bengal Large Marine Ecosystem Project – a regional collaborative approach for the management of fisheries and the marine environment in South and Southeast Asia.

Rudolf Hermes

Chief Technical Advisor, Bay of Bengal Large Marine Ecosystem Project (BOBLME), Thailand

Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand are working together through the Bay of Bengal Large Marine Ecosystem (BOBLME) Project and lay the foundations for a coordinated programme of action designed to better the lives of the coastal populations through improved regional management of the Bay of Bengal environment and its fisheries.

Sixty -five large marine ecosystems have been identified around the world and 17 of these are receiving funds from the Global Environment Facility (GEF) in the form of projects that implement a

5-modular approach for assessment and management, addressing major transboundary issues in fish and fisheries, productivity, pollution and ecosystem health, socio-economic and governance.

The BOBLME offers a platform for enhancing regional and sub-regional cooperation, strengthening bodies and organisations working in the area, and improving processes for the management of shared marine resources. BOBLME is also instrumental in developing capacity in integrated coastal management and for the management of shared fisheries resources using an Ecosystem Approach to Fisheries Management. With a number of collaboration partners, BOBLME has designed a training course to develop knowledge and skills in applying the ecosystem approach. Furthermore, the BOBLME Project also assists the participating countries in meeting international obligations in environment conservation and fisheries under conventions and agreements.

Experiences on Coastal Zone management and Fishery Co-Management in Thailand

Sanchai Tandavanitj

Director, EnLife Foundation, Krabi, Thailand

The Administrative Decentralization of Thailand that started under The National Administrative Act of 1991 was lead to the power and right of the Local Government for the Natural Resources and Environment concerned in their area. The Coastal Resources, especially Fisheries Resources was promoted and introduced to the coastal areas under the Community Base Management and Responsible Fishery. The successful of some coastal communities was inducing to the other coastal area. Reforestation of Mangrove and installation of Artificial Riff were introduced throughout the area. Never the less, the success of Coastal Zone Management and Fishery Co-Management need the people participation and support from the Local Government in the area.

Potential For Renewable Energy In Indonesia

Harsono A. Soepardjo

Centre for Marine Studies, University of Indonesia, Director of IOI Indonesia

There are many potential sources of renewable marine energy in Indonesia: solar energy, wind energy, microhydro energy, ocean thermal energy (OTEC), tidal energy, and wave energy. The average solar radiation in Indonesia of 4.5 kwh/m2 is suitable for use as photovoltaic energy, and wind speeds of 2.5 – 7ms-7 could be used for small and mediumscale wind energy generation. Many places along the coastline have sloping topography which could be tapped for microhydro energy. The other potential energy sources (OTEC, tidal energy, and wave energy) are explained in this paper.

Sustainable fisheries management: a legal approach focusing on scientific criteria and integrating the human rights through food access to the resources of the sea.

Alain Piquemal

Dean of the Faculty of International Law "Institute of the Law of Peace and Development", University of Nice-Sophia Antipolis (UNS), FRANCE), Director of the Maritime and Law of the Sea Center, Honorary Vice-President of UNS in charge of Environment and Sustainable Development, France

A legal approach could associate the rights and duties of the States in the management of fisheries and the human rights related to the food access to the resources of the sea.

International law, taking into account the freedom of fishing, faced with the sustainable management of fisheries, especially beyond national jurisdiction, has to promote cooperation in a context of conflicts.

Two categories of links have to be developed in that perspective. One is the link between the sustainable management of fisheries within and beyond national jurisdiction, which found its legal sources, partly in UNCLOS and widely in the 1995 UN Fish Stocks Agreement. Other multilateral agreements, i.e. CMB or negotiations have established another important link between the legal principles and the scientific approach for the sustainable management of fisheries within and beyond national jurisdiction. For example, on 21 April 2012, 94 States established the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services as an independent intergovernmental body to strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development. The United Nations Conference on Sustainable Development called for effective application of an ecosystem approach and the precautionary approach, in accordance with international law, in the management of activities having an impact on the marine environment. The concept of "*Ecologically or biologically significant marine areas in need of protection*" is also evolving in several Regions. These scientific approaches for the sustainable management of fisheries can offer a support to the international law and its evolution for a better management of sustainable fisheries.

A new challenge, complementary to the previous, has to be integrated by the international community through the right of food access to the resources of the sea, which impacts the methods of management for sustainable fisheries.

In a Report of August 8th 2012 to the UN General Assembly, "the Right to Food", the Special Rapporteur has pointed out that *"Global marine and inland fisheries provide food security to millions of people, supplying a vital source of high-quality dietary protein and supporting livelihoods and incomes. It is widely acknowledged, however, that the productivity of global fisheries as a source of food is declining, caused primarily by unsustainable and destructive fishing practices and distorting subsidies".* In the present report, the Special Rapporteur identifies the challenges facing global fisheries… noting that pursuing a human rights approach is critical to achieving sustainable development in the fisheries sector.

Conclusion: This management will involve a new legal approach (national and international), using precise scientific criteria, equally preserving the rights and duties of States that human rights access to the resources of the sea: ***the Law of the Sea can also become a Right to the Sea.***

Towards the sustainable development of the coasts and oceans -
ICM with national initiatives and regional cooperation

Mao Bin

State Oceanic Administration, People 's Republic of China

The sustainable development of the oceans and their resources is of critical importance to China's socio-economic development. In the last two decades or so, China has taken a number of actions to strengthen its ocean and coastal zone management, including institutional arrangements and legislation to harmonize national marine laws and regulations with the United Nations Convention on the Law of the sea, and the conventions, agreements generated by the Rio Earth Summit, providing a legal framework for conducting integrated ocean and coastal management (ICM) in China.

China implemented the GEF/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS) known as the first phase of PEMSEA in 1994 with Xiamen as the demonstration site. China continued the implementation of PEMSEA programme phase 2 in 2002. In addition to Xiamen, other 10 coastal cities and counties were selected as the ICM scaling up sites and the Bohai Sea was chosen as a pollution hotspot in the Region Project on Building Partnerships for the Environmental Protection and Management of the East Asian Seas in 2000 to address land-based environmental problems. Based on the achievements of the implementation of the1st phase and the 2nd phase of PEMSEA projects in China, China started the implementation of the GEF/UNDP/UNOPS Regional Project on Implementation of SDS-SEA (3rd phase of PEMSEA) in China in 2008 and completed the implementation in 2012.

With the close regional cooperation, China achieved a significant achievement in the implementation of ICM, based on which an ecosystem-based coastal and marine development policy and legal framework has been established in support of the ocean-based blue economy development in China. In addition, China has promulgated Outline of National Marine Development Program which serves as the national coastal management and development strategy from 2008 to 2020 and has mainstreamed ecosystem-based management and integrated ocean management as the first and foremost principles of ocean development in China. Integration of land and sea as well as integration of river and ocean is also highlighted in the Program which requires that the level of total pollution loading from rivers be determined by the carrying capacity of marine environment.

While learning the experiences of ICM from the region during the implementation of PEMSEA projects, China has developed its own ICM scaling up approaches in both Xiamen City and Dongying City. As one of the earlier leadership for leading the implementation of PEMSEA projects for the first time in China, the author of this presentation will share with the participants the lessons and experiences obtained from the implementation of ICM and from the cooperation with other countries in the region through partnership. The author suggests that oceans are playing increasing importance both socially and economically in this region and the proper management of the oceans are essential to achieve the goal of sustainable development of the ocean. PEMSEA takes the lead in conducting ICM in the East Asian Sea Region and the implementation of SDS-SEA is also in conformity with the benefits of the Southeast Region as a whole. The author also makes a suggestion for further regional cooperation in implementation of PRESEA phase 4 project through partnership

Blue Technology towards Sustainable Coastal Development

Nicholas Kathijotes

Academician, Cyprus University of Technology, Cyprus

The aim of Blue Economy models are to shift society from scarcity to abundance –based on what we have, and to start tackling issues that cause environmental and related problems through new and novel ways.

Some major factors that cause ecological alterations to coastal and surface waters and contribute to nutrient inputs include, in no special order, municipal wastewater and storm water discharges; combined sewer overflows; other urban runoff; agricultural runoff; and aquaculture. Tourism and maritime activities are activities that play an important role in the management of coastal areas too. The sea has also an important role to play in the production of renewable energy, mineral resources as well as in blue biotechnology development. All the above are presented in a comprehensive way within the scope of blue economy principle and thus suggesting novel actual management techniques for sustainable coastal management, together with an introduction to spatial planning.

If the Only Tool You Have is a Hammer, You Tend to See Every Problem as a Nail

Lawrence Hildebrand

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If the Only Tool You Have is a Hammer, You Tend to See Every Problem as a Nail

This famous quote by American psychologist Abraham Maslow, cautions us against single-solution thinking and at the same time reminds us of our good fortune, in the toolbox full of innovative, evolving and sometimes tried-and-true management instruments at our disposal for addressing coastal and ocean challenges. From legislative, regulatory and enforcement-oriented 'hammers', to more adhesive policies and consensus-based conventions and agreements, to softer skills training and capacity-building approaches, we have most of the instruments we need to achieve sustainable governance of our oceans.

But perhaps too often, despite our calls for integrated thinking and approaches, we cling to our favourite choices of instrument and see them as the preferred solution to all of our problems. If all we take in hand, for example, are MPAs, then the problems in the coastal and marine environment can only be solved through increased conservation. If we only have and apply regulations and enforcement, the problem must be tackled by controlling non-compliant behaviour. If education and training are the only tools at our disposal, then the problem is lack of awareness and capacity. And increasingly, we may look to the development of new technologies as our saviour. We must also be cautious, as new tools come along, all shiny and full of promise – marine spatial planning is our current darling – that we don't ignore or abandon the old and grasp the new tool uncritically, as the ultimate solution.

But our coastal and ocean challenges are not just 'flat at one end and pointy at the other'; they are complex, multi-faceted and vary over space and time. We must carefully select and apply the right

tool(s) for the job at hand and have them work together in tandem. This requires big-picture planning (engage the client, process architects and engineers), strong leadership (foreman/woman), a clear plan of how to go about the task (blueprint), careful preparation (measure twice, cut once), skilled craftspersons (who have apprenticed in real-life situations), local knowledge and support (required engagement and permits), anticipation of unforeseen circumstances (adapt and adjust), and a dedicated team that is willing to work together, each bringing their own set of tools and expertise to a common project. Challenges persist and hope remains.

Management Tools to achieve and ensure sustainable use of the oceans and their resources.

Stephen Adrian Ross

Acting Executive Director, PEMSEA Resource Facility, The Philippines

Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) has been working with national and local governments and other stakeholders in the East Asian region for 20 years, developing and implementing ICM as a practical, systematic and locally-driven management approach to strengthen capacities in coastal and marine management. ICM experiences across the region demonstrate its effectiveness as a step-wise management system that empowers implementers and stakeholders through a learning-by-doing approach, balancing environmental protection with sustainable economic benefits. This experience has provided the foundation for advancing geographic and functional scaling up of ICM to cover wider geographic and administrative boundaries and ecosystems, respectively.

ICM's holistic management approach addresses issues relating to economic development, environmental governance and management of human behaviour. These issues are critical to sustainable development as they relate to the socio-economic well-being of coastal communities, protection and rehabilitation of ecosystem services, and the effectiveness of policy and management interventions. Various techniques and tools are used at different stages of ICM development and implementation to assist local governments, resource and environmental managers, ICM program implementers and stakeholders to develop and adopt a common strategy, management framework and program of work for achieving a shared vision and objectives for sustainable development.

For example, at the start of the ICM implementation, the State of the Coasts (SOC) Reporting System, the Integrated Information Management System (IIMS) and the Stakeholder Analysis Process provide a comprehensive assessment of the social, economic, environmental and governance status of coastal areas, while at the same time promoting interaction and sharing of points of view among various stakeholder groups. As a consequence, concerned stakeholders become more aware of the local situation, and are able to better appreciate the implications of conflicting uses of coastal and marine resources within the geo-political boundary of the local government. Tools such as environmental risk and vulnerability assessment and economic valuation/natural resources damage appraisal facilitate scientific input to the planning, assessment and decision-making processes of local government, and provide local policymakers and managers with an analysis of root causes, impacts and options. Coastal strategies, coastal strategy implementation plans, coastal use zoning/marine spatial planning, communication plans, and integrated environmental monitoring are among the ICM tools that facilitate interventions and desired changes, including improved governance, management and evaluation processes.

There are more than 31 ICM sites in the East Asian region at present, and PEMSEA member countries have targeted ICM coverage of 20 percent of the region's coastline by 2015. This presentation will provide a brief overview of how ICM and ICM tools are being applied in the East Asian Seas region to address sustainable use of coastal and marine resources under various political, social, economic and ecological conditions, and form the basis for the development of a standardized ICM operating system.

Governance processes and the sense of local ownership throughout the dynamics of integrated coastal management: South Pacific cases

Yves Henocque

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Fundamentally, governance is about power, relationships and accountability: who has influence, who decides, and how decision-makers are held accountable. It therefore addresses the values, policies, laws and institutions by which a set of issues are addressed involving the marketplace, the government, and the institutions and arrangements of civil society. Governance sets the stage within which management occurs.

Applied to the integrated ecosystem-based coastal management approach, the above definition and principles imply a process of learning and adaptation through initiatives/projects that should be, (i) sustainable well beyond their actual implementation, over long periods of time, i.e. many decades, (ii) capable of being adapted to changing conditions, (iii) and provide the mechanisms to encourage or require specified forms or resource use and collaborative behaviours among institutions and user groups. Therefore, much of the challenge lies in achieving changes in the behaviour of the user groups and institutions in regard to specific goals as they are defined through the successive initiative or project generations. Five governance criteria and their set of indicators are proposed to describe the processes at stake throughout local management initiatives in different areas of the South Pacific.

Management tools to ensure disaster risk reduction in coastal communities in Ukraine.

Victoria Radchenko

Director of IOI-Ukraine

Global climate change, industrial development, human factors and other influences could lead to different types of disasters that affect safety of human life, economic development and environment. Only in 2012, there were 212 disasters in Ukraine that led to death toll 301 people, 861 were injured.

International experience recognizes risk-based approach to the natural and man-made disasters consequences management, based on achieving of the certain safety level, the balance of benefits and costs within a single object, territory and the state in general, to be the most effective. However, there is still not sufficient level of implementation of modern management tools aimed at reduction of man-made and natural risks in Ukraine.

There are three sets of management tools that have to be implemented in order to ensure risk reduction. Among them are set of management tools dealing with infrastructure, aimed at policy,

strategy and planning development, staff training, and ensuring community preparedness, public awareness.

Set of management tools dealing with infrastructure includes implementation of integrated coastal zone management, landscape and marine spatial planning, forest management, waste management, etc. All of abovementioned elements are implemented only partly.

Integrated coastal zone management started to be developed since 2001. However, the Law on ICZM is still not adopted, Coastal Zone Administration is absent and the level of public awareness on this subject is very low. Landscape planning (especially for coastal zones) is implemented. Coastal landscape development plans became available for all community members. However, marine spatial planning is presented only partly. The big problem is waste management. There are 4,6 thousands poorly managed waste landfills in Ukraine.

Set of management tools aimed at policy, strategy and planning development is dealing with the legislation development, strategic plans, trainings, etc. With the aim of disaster risk reduction, the conceptual framework of risk management of emergency situations of technogenic and natural origin in Ukraine was proposed. However, it is still not adopted as well as the model Law on protection of population and territories from natural and man-made emergency situations that was proposed in 1997. The unified State system of prevention and response to technogenic and natural disasters (USSPRD) was established in Ukraine to ensure community and environment safety and decrease potential economical and social damage from disasters in accordance with the Cabinet of Ministers Regulation (1998). The main task of USSPRD was development of policy and strategic plans, monitoring and forecasting of the natural disasters, undertaking of precautionary and preparedness measures, response and mitigation. There are national, regional and local levels of USSPRD functioning. The elements of USSPRD are governmental and regional authorities, municipalities, state enterprises and organizations. Functional sub-systems are established also in ministries. All system is under supervision of the Ministry of Emergency. However, it is necessary to introduce modern approach to work of USSPRD that was proposed in conceptual framework of risk management of emergency situations of technogenic and natural character. The education and training of staff is conducted at good level following the law.

Set of management tools ensuring community preparedness, public awareness is also presented in Ukraine. The level of education of public on disaster preparedness, response and mitigation has been drastically increased since the year 2000 when new subject on basic disaster preparedness was introduced at schools and universities. However, there is still lack of specialized training programs for handicap people.

It is also necessary to take into account the existence of strong linkage between environment and disaster management in terms of disaster risk reduction. Low level of environmental management efforts integration increases the vulnerabilities that human population faces in the case of disaster happening. However, environment and disaster issues at the local and national levels are often still dealt separately. There is a need for real connection of policy, plans, local actions and resource distributions that are the essential factors in the environment-disaster consequences mitigation linkage.

Disaster preparedness for vulnerable coastal community groups focused on disabled people. Case study: training for regional rehabilitation centre in Ukraine

Yaroslav Aleyev

Coordinator of project, IOI-Ukraine

The negative effects of climate change and urbanization are becoming more and more evident in present time. Coastal communities around the world are becoming increasingly vulnerable to a wide range of coastal hazards including severe storm events, tsunamis, shoreline erosion, floods and coastal resource degradation.

For the millions of coastal community members who have physical, medical, sensory or cognitive disabilities, disasters such as floods, tsunami, and earthquake are a real challenge. The same challenge also applies to the children and other special needs populations.

According to the Ministry of Labor and Social Policy of Ukraine, there are 2,71 millions people with disabilities (approx. 6% of population). There are more than 165 thousands children among them. People with disabilities have difficulty in moving, hearing, seeing, communicating and/or learning. They have the same needs and perform the same activities as other members of the community (eating, dressing, working, etc.). However, they need specific support related to their disability and their living environment (assistive devices, caregiver, a modified physical environment or equipment) to enable them to participate fully in these daily activities. In an emergency situation, when all members of the community are placed in a vulnerable situation, a people with disabilities may face extra challenges if these special needs are not met. Moreover, in the case of a serious disaster, they have to be able to be self-sufficient.

Lack of awareness and lifesaving skills are among the major factors for people with disabilities not to comprehend disaster and handle its consequences, especially in Ukraine where this gap has been never fully dealt ever before. They are often excluded from disaster response efforts and particularly affected by changes in terrain resulting from disaster, as well as often found themselves mistreated by existing Ukrainian programs of disaster preparedness.

In respond to such problem IOI-Ukraine have developed special educational and awareness raising program for people with disabilities. Curricula of disaster preparedness and lifesaving training for disabled people were developed in correspondence with ILS standards. Such training was organized at the Crimean Inter-Regional Rehabilitation Centre for people with disabilities.

The Marine Strategy and The Water Framework Directives (Msfd, Wfd) As Tools to achieve Good Environmental Status In Europe's Seas

Alenka Malej

Director, Marine Biological Station, Piran, National Institute of Biology, Director, IOI Slovenia

Numerous anthropogenic activities at the coast and sea threaten marine biodiversity and may reduce their potential to provide benefits to humans. In past, activities to protect marine ecosystems focused on distinct human pressures and on sectoral control measures. By the end of 20th century it was clear that a more integrated and holistic philosophy was needed to manage marine ecosystems sustainably, and an ecosystem approach emerged. The sustainable management of marine ecosystems also moved up the political agenda and was reflected in the progress of global,

regional and national policy initiatives. In Europe these initiatives were mirrored in the European Regional Sea Conventions (Barcelona, Bucharest, HELCOM, OSPAR) as well as in the European Union's Integrated Maritime Policy (IMP). The EU IMP views sustainable development as simultaneously achieving a sustainable society, economy and environment. The EU's legislative acts such as the Water Framework Directive (WFD) and in particular the Marine Strategy Framework Directive (MSFD) represent the environment pillars of the EU IMP. The combined implementation of the two directives ensures environmental protection of inland waters, with the WFD covering rivers, lakes, ground waters, estuaries and coastal waters to one nautical mile out to sea, and the open seas, whereas the MSFD establishes European marine eco-regions on the basis of geographical and environmental criteria. The MSFD requires that countries bordering such eco-regions jointly develop implementation plans that include: an assessment of the current environmental status and an assessment of the impact of human activities, a coherent set of specific environmental objectives, a programme of measures required to meet these objectives, and a programme for monitoring and assessment. The MSFD is building upon existing regional seas conventions and its aim is to achieve or maintain good environmental status (GES) of the EU's marine waters by 2020. The MSFD lists eleven qualitative descriptors that refer to the state of the marine environment grouped in ecosystem characteristics (biodiversity, food webs, sea-floor integrity) and the most relevant anthropogenic pressures (non-indigenous species, fisheries, eutrophication, hydrographical conditions, contaminants in water, sediments and seafood, marine litter and energy including underwater noise). Evaluation of the environmental status is based on criteria and indicators set for each descriptor.

Ocean Environmental Protection Through Effective Implementation of IMO MARPOL VI

Jai Acharya
Technical Director of STET Maritime Pte Ltd., Singapore

Over 80 per cent of world trade by volume being carried by sea, ships fulfill a critical function as links of global supply chains and constitute engines of economic growth. At the same time, deterioration of the ocean environment caused by ships' emission is one of greatest challenges facing our maritime industry, society and environmental systems in general. Identified as a significant factor on climate change due to emission of GHG, SOx, NOx, Particulate Matters (PM10; PM2.5) and Ozone depletion substances, the assessment of the maritime emission and its inventory management is a vital task and greater challenge for the sustainable development and prevention of the maritime environmental degradation. Within the transport sector, the special case of shipping calls for particular attention.

Research data reveals that the emissions from maritime transport in European waters constitute a significant share of worldwide ship emissions of air pollutants and greenhouse gases. Emissions of Nitrogen Oxides from International Maritime Transport in European waters are projected to increase and could be equal to land-based sources by 2020 onwards. Shipping emissions can contribute significantly to local air quality problems in globally, however, a research based precise knowledge and scientific observation needs to be developed to provide a more complete picture on emission assessment and its inventory management.

SPECIAL SESSION: EXPERT CONSULTATION ON THAILAND'S IMPLEMENTATION OF UNCLOS & ITS RELATED INSTRUMENTS

Experts will discuss with Thailand's Governmental decision makers and authorities from the Department of Marine and Coastal Resources (DMCR) and interagency departments the general and specific issues and requirements in implementation of UNCLOS and its related instruments. This includes the analysis of strengths and weaknesses of scientific, technical, administrative and legal frameworks concerned with ocean governance in Thailand, effective implementation mechanisms, and regional cooperation, etc.

Background:

The Sub-Committee on Knowledge Management for Thailand's Marine Benefits (KM) was established on 27th November 2007 under the order of the Committee on Administration and Coordination of National Marine Security (NMS) of the Office of National Security Council (ONSC), in accordance with the research findings of the Thailand Research Fund (TRC). The KM is chaired by Rear Admiral Siriwat Thanapate. One of the issues is the result which stated that there is no central policy body responsible for the holistic policy on national marine benefits which has a value of approximately 7.5 trillion THB or about $ US 250 billion. The KM can be considered as a think tank to provide holistic policy guidance and strategies in this matter. Two other Sub-Committees have been established as supporting bodies for KM, namely; Sub-Committee on Law and Institutional structure for Thailand's Marine Benefits & Security (LI) chaired by Prof. Chumporn Patjusanon of the Faculty of Laws, Chulalongkorn University, and the Sub-Committee on Knowledge Dissemination on Thailand's Marine Benefits & Security (KD) chaired by Rear Admiral Chumpon Lumpikanon, RTN. To date, there is no implementing body and an Executing Agency has yet to be established in the future to be an independent organisation in implementing the respective mission.

On the 26th April 2011, the 6th Joint Session of the Parliament approved Thailand becoming the State party to the United Nations Convention on the Law of the Sea (UNCLOS) 1982 and the Agreement relating to the implementation of part XI of the Convention by making a declaration under Article 310. Article 310 is the mechanism provided for by the Convention allowing Thailand to gradually review its laws and regulations and harmonize with the provisions of the Convention as well as to state Thailand's position in order to protect and preserve national interests. In addition, Thailand also made a declaration according to Article 298, declaring that Thailand does not accept compulsory dispute settlement procedures entailing binding decisions with respect to certain categories of disputes, especially those concerning maritime boundary disputes. In this regard, the Ministry of Foreign Affairs has deposited the instruments of ratification and accession of the said Convention and Agreement on the 15th May 2011. The Convention entered into force for Thailand on 14th June 2011 in accordance with its article 308 (2)[10].

Since Thailand signed the United Nations Convention on the Law of the Sea (UNCLOS) 1982 on 10th December1982, becoming a State party to the Convention and Agreement relating to the implementation of part XI of the Convention is a very important milestone for Thailand. It is a significant step allowing Thailand to participate in this important instrument, which is recognized as the "Constitution for the Seas" laying down all basic principles of international law of the sea and regulating various maritime activities. The Convention provides for the power, duties and rights of all States (coastal States, maritime States) in each maritime zone – internal waters, territorial sea, contiguous zone, exclusive economic zone, continental shelf and high seas, including different

[10] Ministry of Foreign Affairs, Thailand. http://www.thaiembassy.sg/press_media/news-highlights/thailand-becomes-state-party-to-the-united-nations-convention-on-the-law

regimes of passage of ships therein. Moreover, the Convention also confers rights and duties to States with regard to the exploitation of natural resources, and protection of the marine environment. Henceforth, by adhering to this important instrument, Thailand will be able to effectively preserve and protect its rights and interests in the maritime sphere as well as strengthen Thailand's role and image in the regional and multilateral arena.

In addition, in line with Thailand's declaration made according to article 310 of the Convention, the Committee on the Law of the Sea and maritime boundaries of Thailand, functioning under the purview of the Ministry of Foreign Affairs, is tasked by a Cabinet Resolution dated 21st December 2010 to monitor, coordinate and provide assistance, if needed, to relevant public agencies in their efforts to amend and develop laws and regulations in order to comply with UNCLOS, in a comprehensive manner.

With regard to the promotion of capacity-building, hosted by the Department of Treaty and Legal Affairs, Ministry of Foreign Affairs, a seminar entitled "Declarations, Settlement of Disputes and Enforcement of decisions under the United Nations Convention on the Law of the Sea 1982" held during 11th – 12th May 2011, aimed to disseminate knowledge concerning UNCLOS to practitioners from relevant public agencies. Experts on the law of the sea from the Division for Ocean Affairs and the Law of the Sea (DOALOS), United Nations attended the event.

The 1982 United Nations Convention on the Law of the Sea (UNCLOS) is the defining document of international oceans law. It has been in force since the 16th November 16 1994. To date, it has been ratified by 165 countries. The Convention is the "constitution" of the oceans and governs many aspects of oceans affairs, ranging from fisheries and navigation to marine pollution and scientific research. It also has provisions on binding, compulsory dispute settlement procedures, and sets out the means by which a State is to delimit the outer edge of its continental shelf.

UNCLOS has been supplemented by two implementing agreements. The 1994 Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea which contains provisions on deep seabed mining. The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10th December 1982, relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, more commonly known as the 1995 United Nations Fish Stocks Agreement (UNFA), elaborates on the subject matter suggested by its title.

The ratification of UNCLOS will allow Thailand to enjoy the benefits provided under the Convention. Thailand will now speak on an equal footing with its peers regarding oceans issues. It will also be able to play a role in UNCLOS institutions making decisions of relevance to Thailand. In addition, Thailand candidates will be eligible for positions with other UNCLOS bodies, such as the Commission on the Limits of the Continental Shelf and the International Tribunal for the Law of the Sea.

Expert Consultation on Thailand's Implementation of UNCLOS & Its Related Instruments

The proposed session for Expert Consultation on Thailand's Implementation of UNCLOS & Its Related Instruments will be a suitable forum for further planning and discussion in connection with the initiatives made by Thailand on knowledge management for Thailand's marine benefits under the National Security Council.

Consultations with KM, LI and KD will bring the issues to the workshop theme 2 during 4th – 6th September 2013 and stakeholder consultation workshop for Thailand on 6th September 2013. There will be about 4-5 months for planning and developing of a concept note for Thailand. It may be

appropriate to set up an ad-hoc working team to work on the concept note as a strategic document. The ad-hoc working team shall consist of DMCR, DTLA, MOFA, DOF, KM, LI, and KD and relevant organisations to consider the assessment of legal aspects, current joint development agreements, maritime zones for resource exploitation, pollution prevention, areas beyond national jurisdiction (ABNJ), marine scientific research, technology transfer, capacity building needs, etc., gap analysis and strategic road maps.

Milestone in the preparation of a strategic document may be proposed as follows:

(1) Set up an ad-hoc Working Team;

(2) Organise a series of meetings to develop a strategic document on the assessment of Thailand's implementation of UNCLOS and its related instruments, gap analysis and strategic road maps from March-June 2013;

(3) Organise a workshop for interagency departments to discuss the outcome from (2) in July/August 2013;

(4) Presentation of the outcome and suggestions at the Workshop Theme 2 for Southeast Asia and the stakeholder consultation workshop for Thailand during 4^{th} – 6^{th} September 2013.

THEME 3: SPECIAL WORKSHOP

INTEGRATED OCEAN WEB-BASED GEOGRAPHICAL INFORMATION SYSTEM

Founded in 1972, the International Ocean Institute (IOI) is a scientific, educational and, non-profit international organisation devoted to the sustainable development of the oceans. It operates through the activities of its Headquarters in Malta and 22 Operational Centres and 14 Focal Points, located in 33 countries around the world. These serve as platforms for the implementation of project activities worldwide. As a non-governmental body with consultative status at the United Nations and some of its specialized agencies, IOI works to uphold and expand the principles enshrined in the United Nations Convention on the Law of the Sea (UNCLOS) for the benefit of humankind as a whole, with particular consideration of the poor. The mission of the IOI is to promote education, training and research to enhance the peaceful uses of ocean space and its resources, their management and regulation as well as the protection and conservation of the marine environment, guided by the principle of the Common Heritage of Mankind. IOI is committed to promoting sustainable development, eradicating poverty, disaster reduction, and improving the livelihoods of people by implementing strategies which build awareness, resilience and capacity to address their unique and particular vulnerabilities. More information can be found on the website www.ioinst.org.

Challenges in Ocean Governance and Sustainable Development

IOI faces the challenge of overcoming the present hurdles in ocean governance at all levels and tiers with optimism, through the implementation of its Operational Centre's and network activities and under the direction of the IOI President, the IOI Governing Board and Steering Committee, all of whom are committed to the realization of the IOI's core philosophy and mission. Although much has already been achieved over the 40 years since the International Ocean Institute and its network of operational centres were established, much remains to be done to bring to the fore the challenges currently being faced by the oceans and the ocean governance community and to provide the latter with the important tools required to implement mechanisms at the national and local levels for ocean governance in the light of current environmental, financial and risk reduction challenges.

Geographical Information System Technologies as Solutions

The advent of internet technology facilitates the user with easy and faster access to the availability of information with a mouse-click and the Geographical Information System (GIS) provides the capability for storing and managing large amounts of spatial data. A Web-GIS system combines the potential of both internet and GIS technologies enabling the users to access the geospatial information and data via web-browsers without purchasing expensive, proprietary GIS software. Data and map services are being implemented using Web-GIS. The growing number of research publications and implementation of many common GIS software have proven the potential and increased utility of Web-GIS[11].

IOI would like to develop its state-of-the-art internet web-based Geographical Information System (GIS) of the world oceans and IOI network activities project to display world ocean perspectives and useful information and contributions of the IOI network around the globe on ocean governance and sustainable development on screen at the Elisabeth Mann Borgese and Arvid Pardo Learning and Exhibition Centre. The system will be used by relevant users such as students of the University of

[11] Rama Rao, E. Pattabhi, B.V. Satyanarayana, Shailesh Nayak. 2008. Ocean Data and Information System (ODIS) and Web-based Services. The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences. Vol. XXXVII. Part B4, Beijing. p. 687-702.

Malta, international students, academicians, interns, trainees and for distant public access such as the IOI network, alumni, academic institutions, governments, relevant private sectors and partners as well as the general public world-wide through the internet for planning and operation at the national and local levels.

Building upon the existing data and information available from various sources, they will be shared and integrated into the IOI internet web-GIS system on the World Oceans using the most modern web-based technologies and architecture. The end results will be multipurpose, multi-users, multi-dimensional, multiple scales (spatial and temporal) of ocean mapping, linking small-scale patterns to the large scale, multi-disciplinary, multi-integrated data layers, multi-variable modeling and multi-mission and related issues[12].

Since the development of a geospatial framework under the internet web-GIS system on the World Oceans will require broad collaboration of key players, the IOI and its partners will investigate collaborative opportunities with the International Oceanographic Data and Information Exchange (IODE) of the Intergovernmental Oceanographic Commission (IOC), Cluster of Excellence, Future Ocean Kiel Marine Sciences[13]; European Centre for Information on Marine Science and Technology (EurOcean)[14],[15]; and Pacific Disaster Center (PDC)[16].

In addition, IOI will collaborate with the National Geographical Data Center of the National Oceanic and Atmospheric Administration (NOAA)[17]; United Nations and its specialized agencies such as the Food and Agriculture Organization of the United Nations (FAO), the International Oceanographic Commission of the United Nations Scientific, Educational and Cultural Organization (IOC/UNESCO)[18], International Maritime Organization (IMO), International Seabed Authority (ISB), United Nations Convention on Trade and Development (UNCTAD), United Nations Development Programme (UNDP), United Nations Office of Legal Affairs/Division for Ocean Affairs and the Law of the Sea (UNDOALOS), United Nations Environment Programme (UNEP), United Nations Human Settlements Programme (UN-HABITAT)[19], World Meteorological Organization (WMO) and private sector organizations, namely ESRI[20] and Open Geospatial Consortium (OGC)[21], etc. for the integration of required data and information into the system.

At a later stage, the assessment and analysis of the IOI systems will provide an outlook for planning and implementation of the IOI project activities by the IOI Operational Centres, Focal Points, their host institutions as well as relevant local stakeholders. This will promote local ocean governance through the collaborative network.

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[12] Noji, T., J. Pederson, and C. Adams, 2006. Geographical Information Systems and Ocean Mapping in Support of Fisheries Management. Sea Grant College Program, Massachusetts Institute of Technology, Cambridge, Massachusetts.

[13] World Ocean Review (WOR): Living with the Oceans, http://www.worldoceanreview.com/en/.

[14] European Centre for Information on marine Science and Technology (EurOcean). Bridging European Marine Information. http://www.eurocean.org. 19 pp.

[15] EurOcean. 2009. Uncovering the Ocean Secrets: A Cruise through the Blue, Target Audience: Upper and Lower Secondary. 15 pp.

[16] Pacific Disaster Center (PDC). Global Hazards Atlas, http://www.pdc.org/atlas/.

[17] http://www.ngdc.noaa.gov/mgg/aboutmgg/oceanmapping.html

[18] Travin, Dmitri. 2006. Ocean Mapping Program of IOC/UNESCO. Observations and Knowledge of the Oceans. International Symposium on Geophysical Data Management, 25th October 2006, Seoul, Republic of Korea.

[19] UNHABITAT. 2011. Cities and Climate Change: Global Report on Human Settlements 2011. 279 pp.

[20] ESRI Team at the GIS for the United Nations and International Community Conference organized by UNITAR's Operational Satellite Application Programme (UNOSAT) and ESRI, April 3-5, 2012, World Meteorological Organization, Geneva, Switzerland. (Paul Doherty, Public Safety Technology Specialist, Technical Marketing, pdoherty@esri.com; Ryan Lanclos, Emergency Management Industry Manager, rlanclos@esri.com; Christophe Lapierre, Enterprise Consulting, c.lapierre@esri.ch; Salim Sawaya, Federal/Global Affairs Account Manager, ssawaya@esri.com; Simon Thompson, Director, Commercial Solutions, sthompson@esri.com; Emanuele Gennai, Global Affairs Account Executive, egennai@esri.com.

[21] Athina Trakas, Director, European Services, Open Geospatial Consortium, Heestr. 162, 53111 Bonn, Germany, atrakas@opengeospatial.org.

Scope of Work

The goal of the project is to develop its state-of-the-art internet web-based Geographical Information System (GIS) of the world oceans and IOI network activities to display world ocean perspectives and useful information and contributions of the IOI network around the globe on ocean governance and sustainable development on screen at the Elisabeth Mann Borgese and Arvid Pardo Learning and Exhibition Centre. The IOI will cooperate with the IODE/IOC, the Cluster of Excellence, Future Ocean Kiel Marine Sciences; European Centre for Information on Marine Science and Technology (EurOcean); and Pacific Disaster Center (PDC); private partners; relevant United Nations agencies and international organizations to develop its internet web-based GIS system of the World Oceans and IOI network activities on ocean governance and sustainable development.

Technical Tasks

Task 1 – Development of Conceptual Plan/Framework

The objective of this task is to discuss and to develop a Conceptual Project Plan/Framework with IOI policy and its network, relevant key partners, ESRI, Open Geospatial Consortium (OGC) to determine the scope of works and timeframe, architectural design, resources and input required to achieve the project objectives.

Output (Task 1): A Conceptual Project Plan/Framework.

Task 2 – Ocean Base Map Data Layer

The objective of this task is to overlay existing ocean base map data from the IODE/IOC. The IOI will collaborate with IODE (www.iode.org)[22] to obtain the ocean base map data as the basic layer of the system.

Output (Task 2): Ocean Atlas with key scientific information.

Task 3 – Training of IOI Operational Centers and Focal Points in internet web-based Geographical Information System (GIS) and preliminary development of the IOI Internet Web-Based GIS of the world oceans and IOI network activities around the world.

The objective of this task is to train IOI Operational Centres and Focal Points on internet web-based Geographical Information System and applications of the technology such as ArcGIS Online[23] to develop its own internet web-based GIS of the world oceans and IOI network activities. The world ocean perspectives and useful information and contributions of the IOI network around the globe on ocean governance and sustainable development will be displayed on screen at the Elisabeth Mann Borgese and Arvid Pardo Learning and Exhibition Centre.

Output (Task 3): The IOI network activity layers.

This may include:

(1) IOI Operational Centres, IOI Focal Points and their host institutions office locations;

[22] Peter Pissierssens, Head of IOC Project Office for IODE, Intergovernmental Oceanographic Commission, Email: p.pissierssens@unesco.org, Wandelaarkaai 7, 8400 Oostende, Belgium, Tel: +32 59 34 01 58.

[23] ESRI. 2012. Quick Start Guide to ArcGIS Online. 8 pp.

(2) IOI educational and Training Programmes in Ocean Governance and their network of Alumni in different countries as well as activities carried out by the IOI Alumni in their respective countries;
(3) IOI coastal community development projects under the Women, Youth and the Sea Programme as well as other projects, showing communities' locations, outreach expansion and achievements in the Millennium Development Goals (MDGs);
(4) Results of relevant research activities carried out by the IOI network and their host institutions;
(5) IOI *Pacem in Maribus* Conferences;
(6) IOI Scholarships, i.e., Danielle de Saint Jorre Scholarships, EMB Bursary Programme, etc.
(7) IOI partnerships and international cooperation programmes;
(8) World Ocean Day activities and target groups;
(9) Other spatial data activities.

Task 4 – Collaboration with EurOcean to create and to implement a data layer on the European Research Vessels Information

The objective of this task is to collaborate with EurOcean in Portugal to create and to implement a data layer on the European Research Vessels Information which can be used to monitor ocean information in the European waters.

Output (Task 4): The European Research Vessels information Layer.

Task 5 – Collaboration with the Pacific Disaster Center (PDC) to access and share information (ArcGIS Online) on Global Hazards Information

The objective of this task is to collaborate with the Pacific Disaster Center (PDC) in Hawaii to access and display information on Global Hazards Information. The Global Hazards Information Network (GHIN) equips disaster managers, planners, governments, and nongovernmental organizations with instant access to a wide range of high-quality geospatial information resources to support risk assessment, early warning, response and other disaster management activities. Partners share data by registering metadata in a PDC-hosted information portal powered by PDC's geospatial data management environment. Capabilities include a data search engine, dynamic-content map services, data download, and interactive hazard mapping applications, via a robust, always-on environment requiring only a standard browser for access[24]. The IOI will also collaborate with PDC on Thailand's Flood Early Warning and Mitigation Project implemented in 2012.

Output (Task 5): The Global Hazard Information Layer.

Task 6 – Collaboration with the Cluster of Excellence, Future Ocean Kiel Marine Sciences to develop layers of ocean information outlined in the World Ocean Review 2010

The objective of this task is to collaborate with the Cluster of Excellence, Future Ocean Kiel Marine Sciences to develop layers of the state of the ocean information outlined in the World Ocean Review 2010. This includes ocean as climate drivers, ocean chemistry, sea level rise, marine pollution, climate change impacts on marine ecosystems, fisheries, marine minerals and energy, maritime transport, medical knowledge from the sea, and the Law of the Sea issues.

Output (Task 6): The World Ocean Review Chapter Layers.

[24] Pacific Disaster Center (PDC), www.pdc.org, Ray Shirkkhodai, Executive Director, rays@pdc.org, Stanley Goosby, Chief Scientist, sgoosby@pdc.org.

Task 7 – Collaboration with the relevant organizations for integration of required data and information into the system

The objective of this task is to collaborate with various relevant organizations such as the National Geographical Data Center of the National Oceanic and Atmospheric Administration (NOAA); United Nations and its specialized agencies such as the Food and Agriculture Organization of the United Nations (FAO), the Intergovernmental Oceanographic Commission of the United Nations Scientific, Educational and Cultural Organization (IOC/UNESCO), International Maritime Organization (IMO), International Seabed Authority (ISB), United Nations Convention on Trade and Development (UNCTAD), United Nations Development Programme (UNDP), United Nations Office of Legal Affairs/Division for Ocean Affairs and the Law of the Sea (UNDOALOS), United Nations Environment Programme (UNEP), United Nations Human Settlements Programme (UN-HABITAT) and World Meteorological Organization (WMO), etc. for the integration of required data and information into the system.

Output (Task 7): Multi-integrated dynamic data layers of the world oceans.

Roles and Responsibilities

For the successful implementation of the project, the following roles and responsibilities are assumed:

(1) IOI Headquarters (IOI HQ)
IOI HQ will be the Project Executive Agency (PEA) who will administer, coordinate with relevant partner organizations and implement the project.

(2) IOI Operational Centres and Focal Points
IOI Operational Centres (IOI OCs) and IOI Focal Points (IOI FPs) will be involved in training and development of the IOI web-based GIS system as well as maintaining and updating the data and information.

(3) ESRI and Open Geospatial Consortium (OGC)
ESRI and OGC will provide training and strategic advisory support to the web-based GIS system development to the IOI and its partners.

(4) European Centre for Information on Marine Science and Technology (EurOcean)
EurOcean will collaborate with IOI in the development of the research vessel layer.

(5) Pacific Disaster Center (PDC)
PDC will collaborate with IOI to access and to display information on Global Hazards Information.

(6) Cluster of Excellence, Future Ocean Kiel Marine Sciences
Cluster of Excellence, Future Ocean Kiel Marine Sciences will collaborate with IOI to develop layers of the state of the ocean information outlined in the World Ocean Review 2010.

(7) Relevant organizations and UN organizations and their Specialized Agencies
Collaboration between IOI and these organizations to develop multi-integrated dynamic data layers on the world oceans.

The Workshop will discuss ways to plan and to implement the project in an integrated manner.

ABSTRACTS

Marine and Coastal Atlas Development: the IODE Capacity Building Experience

Greg Reed

Executive Officer, Australian Ocean Data Centre Joint Facility, Australia

The Intergovernmental Oceanographic Commission (IOC) of UNESCO is the United Nations body for ocean science, ocean observatories, ocean data and information exchange, and ocean services such as Tsunami warning systems. The International Oceanographic Data and Information Exchange (IODE) is the IOC programme that aims to enhance marine research and management programmes by facilitating the exploitation, development, and exchange of oceanographic data and information between participating Member States and by meeting the needs of users for data and information products. One of the major objectives of the IODE programme is to assist IOC Member States to acquire the necessary capacity to manage marine data and information and to develop national and regional data and information products.

As part of these capacity development activities, IODE has developed the OceanTeacher training capability, a knowledge-based system that supports all IODE training activities. In 2010 the IODE initiated the OceanTeacher Academy to further advance the OceanTeacher model. The OceanTeacher Academy provides an annual teaching programme of courses related to oceanographic data and information management and the development of related products and services that contribute to the management of oceans and coastal regions. Training courses offered included in Marine and Coastal Atlas Development and Marine GIS Applications. The proposed OceanTeacher Global Academy will promote the establishment of regional training facilities to contribute to the long-term sustainability of capacity development activities of IODE and other IOC programmes.

IODE is committed to increasing capacity in developing countries and to support regional projects that assist with the development of ocean data and information networks in developing regions. One of the regional products sponsored by IODE is the African Coastal and Marine Atlas (ACMA), an online resource that provides maps, data and information to support coastal and marine research and management in Africa. ACMA has been developed by a team of scientists and data experts with GIS skills, from 25 countries and 5 LME regions across Africa. The objectives of ACMA are to increase access to public-domain data for African scientists, resource managers and decision-makers, to develop capacity for marine data management in Africa, and to increase collaboration between data centres and projects collecting or disseminating African marine and coastal data. ACMA currently incorporates over 3,000 national and regional scale datasets covering the marine and coastal environment.

This paper describes the IODE approach to providing capacity for the support of marine and coastal atlases. The process to develop the African Coastal and Marine Atlas will be described in detail.

Sharing the European Research Vessels Information;

Telmo Carvalho

Executive Director, European Centre for Information on Marine Science & Technology (EurOcean), Portugal

EurOcean is a focal point for information on marine science and technology in Europe and its Internet portal is aiming to provide information on topics related to marine science and technology in Europe having as one of its priorities, since 2002, to promote the exchange of information on European marine research infrastructures. In this context EurOcean assessed some of the major gaps of information on this field and tried to overcome them by developing interactive tools of support to marine policy and decision makers and the scientific community.

EurOcean has 3 on-line searchable and updatable InfoBase's on European marine research infrastructures with information on the infrastructure specifications and contact details: Research Vessels; Large Exchangeable Equipment and Aquaculture Facilities. The user-friendly interfaces of the InfoBase's and its search criteria provide the end-user with a simple and efficient mode of search. This tools are updated every six months.

Specifically for the Research Vessels, the EurOcean_RV InfoBase has information on 265 European research vessels operating in Europe and abroad, from the coastal to high seas (≥ 10 meters). It also includes information on planned and under construction vessels (7) and out of service vessels (46).

This tool has been used to feed several other Research Vessels databases like the EUROFLEETS (Towards an Alliance of European Research Fleets) EU Project or the POGO (Ocean Going Research Vessels) Initiative, where RVs around the world can be identified.

This tool is also ready and available to plug-in into the Internet web-based geographical information system led by IOI.

Global Hazards Information Network (GHIN);

Todd Bosse

Senior Geospatial Information Analyst, Pacific Disaster Center (PDC), U.S.A.

The Global Hazards Information Network (GHIN) is a partnership of national and international organizations providing decision makers access to high-quality geospatial information for risk assessment, early warning, response, and other disaster management-related activities. Hosted by Pacific Disaster Center (PDC), GHIN maintains a web-accessible catalog of data available from GHIN partners.

Static data and live map services on various topics are available directly from GHIN and include real-time and historical hazard incidents, hazard model outputs, real-time meteorological observations and forecasts, base map data such as infrastructure, hydrography and emergency services, demographic and socio-economic data and high-resolution satellite imagery and other raster data.

GHIN builds upon new and existing partnerships between local, regional, and global organizations. Data that otherwise may be difficult to locate and obtain are documented, catalogued, and made

available so that the time consuming investment in these data can be leveraged by those with a need for them.

Best practices for implementing and operating a data sharing network will be presented and discussed, as well as strategies for helping to overcome challenges along the way. A demonstration of GHIN is also planned.

Knowledge sharing though IOI, OceanLearn and IOI-Kids web based activities and beyond;

Martin Galea De Giovanni
Aldo Drago, Adam Gauci, Joel Azzopardi, Alan Deidun, Raisa Tarasova
University of Malta

The International Ocean Institute offers a wealth of online information and services ranging from information targeting professionals in the field to those aimed at raising marine awareness with the general public and children. The aim of this presentation is to explore some of these services offered by IOI-HQ, namely those found on the IOIHQ and Oceanlearn websites. This will be followed by presenting a selection of initiatives being undertaken by other IOI centres around the world. Amongst others is the ongoing IOI-KIDS project; an initiative funded by the IOI-HQ through the IOI network-wide Women, Youth and the Sea Programme and initiated through its operational centre at the University of Malta. Apart from serving as a treasure trove of information for children, it also hosts the Spot the Jellyfish initiative which showcases the IOI-KIDS citizen science program. As a conclusion, this presentation will acknowledge the constant relevance of indigenous knowledge.

Online metocean data products and interfaces by the IOI - Malta Operational Centre

Adam Gauci
Aldo Drago, Joel Azzopardi, Martin Galea De Giovanni
University of Malta

The Physical Oceanography Unit (PO-Unit) of the IOI-Malta Operational Centre (IOI-MOC) at the University of Malta undertakes fundamental research in coastal meteorology, hydrography and physical oceanography with a main emphasis on the experimental study of the hydrodynamics of the sea in the vicinity of the Maltese Islands. It offers facilities for the gathering, processing, analysis and management of high quality physical oceanographic observations both for long term and baseline studies as well as for general applications in marine environmental research and assessments. Operational activity is enhanced through the installation and maintenance of permanent monitoring systems which provide data for ocean forecasting, and by applying numerical modelling techniques in the study of physical marine systems. The aim of this presentation is to demonstrate some of the data products made freely available and accessible through the institute's website (www.capemalta.net). These include real-time sea current measurements recorded by an HF Radar network between Malta and Sicily as well as meteo-marine observations from operational stations around the Maltese Islands. The operational forecasting activities that are carried out by the Institute and which provide predictions of atmospheric and sea state conditions, will also be described.

PDC DisasterAWARE

Chris Chiesa

Deputy Executive Director, Pacific Disaster Center (PDC), U.S.A.

Disaster managers face significant challenges in managing essential information for preparedness, response, and recovery efforts. PDC's DisasterAWARE (All-hazard Warnings, Analysis, and Risk Evaluation) platform has been designed specifically to help overcome these challenges. This web-based application integrates real-time information, impact modeling, and mapping technologies to provide situational awareness and decision support in a highly visual and easy-to-use web application.

DisasterAWARE continually monitors reliable scientific data sources for events deemed potentially hazardous to people, property, or assets, and posts these incidents as "Active Hazards." These postings are accessible to decision makers and to the public through several early warning and decision support tools provided by Pacific Disaster Center, including:

- Disaster Alert: PDC's free and easy-to-use application for iPhone, iPad, and Android™ users delivers a mobile, up-to-the-minute multi-hazard monitoring platform.
- Global Hazards Atlas: Available to all users, this interactive global map viewer provides a continuously updated information stream on current hazards worldwide, along with other geospatial data.
- EMOPS: Designed to meet the information needs of disaster managers and state and local government users, this free, subscription-based Emergency Operations (EMOPS) system provides a secure environment for accessing, updating, and sharing information before, during, and after a disaster.

PDC has also customized and delivered versions of DisasterAWARE for national disaster managers at EOC's in Thailand, Vietnam, and Indonesia, as well as for regional coordination at the AHA Centre in Jakarta. This presentation will highlight key considerations for deploying regional and national GIS-based decision support applications for disaster management and resource management.

Adding value to 'vintage' geophysical data, through web based collaborative tools

Mihai Burca

International Centre for Theoretical Physics-TRIL fellow, National Institute of Oceanography and Experimental Geophysics, Trieste, Italy

Data transparency could be used as a metaphor to describe how data owners can give controlled access to their data to end users. In a scientific environment and focusing on seismic data, this is a very delicate activity that needs to consider the desire for data owners to position themselves in the research community, possible legal issues and the commercial incomes that data could provide. In this perspective, this work focuses on the possibility of having various levels of access to data so that its opacity can be progressively removed according to the contractual

status with the end user. Within the EU FP7 GeoHSeas project, an interactive web based seismic data viewer tool has been developed that can provide these features. End users work within secured shells contained in the viewer without downloading any data. This relieves the concerns of data providers of losing control of their data, fosters their collaborative attitude and ultimately increases the availability of data within the community.

Key words: seismic data viewer, data protection, data dissemination.

Ocean & Coastal Data, Data Management, and Digital Atlases

Dawn Wright

Chief Scientist, ESRI, USA

This talk will provide a short overview of principles of oceanographic data, data management, and web-based GIS, including the special category of digital atlases, many of which use the new medium of "intelligent Web maps" with text, multimedia content, and intuitive user experiences. These atlases have a great potential to inform, educate, entertain, and inspire decision-makers about a wide variety of ocean and coastal issues, including fisheries management, habitat preservation and restoration, coastal and marine spatial planning, vulnerability to hazards, community adaptation to climate change and resilience, and more. The talk will also highlight agencies, organizations and related resources to consult for further information and involvement.

The setting up of an IOI WebGIS as a promotional, educational and networking tool for the IOI network

Charles Galdies

Institute of Earth Systems, University of Malta

The WebGIS platform offers a cheap and easy way of disseminating geospatial data and tools to process this data. Many organisations are now becoming ever more interested to distribute geographic information and related processing tools without any restriction to their members and to the general public. Internet technology has made its way to many government and non-governmental organizations as well as numerous educations and commercial establishments.

IOI's ambition to offer a WebGIS portal is wise, strategic and timely in order to sustain its advocacy for the sustainability and governance of the oceans. This new IOI information "pillar" could form a central activity, featuring the provision of smart, dynamic, web-based geospatial information based on established user preferences. This could become an increasingly important activity of IOI also as a marketing, networking and fund-raising tool, as more and more geospatial data and applications become available resulting from its activities.

THEME 4: LEADERSHIP SEMINAR

SCIENCE on TSUNAMI for TODAY'S SOCIETY and its INPUT to SOCIETY SECURITY and SUSTAINABILITY

Great disastrous tsunamis always live in infamy in the annals of tsunami history.

As a follow-up to the tsunamis of the 1950-ies and 1960-ies the Pacific Tsunami Warning System was established and international co-operation started in 1065 led by the International Oceanographic Commission of UNESCO.

In the 20th century the losses, in human lives and property, were relatively small in comparison with those caused by hurricanes, floods and others of hydro meteorological types. And then the 21st century had arrived with the Indian Ocean (26 December 2004), Chile (2010) and Japan (11 March 2011) tsunamis which totally took almost half a million people who were killed and had large social and economic consequences estimated in hundreds of billions of dollars.

The Indian Ocean Tsunami was a wake-up call for governments and marine natural hazards and have become a high priority issue on the political agendas.

Taking into account experience of the IOC in operating the Pacific Tsunami Warning System for almost 40 years the Commission was given a responsibility to lead and co-ordinate the efforts in marine natural hazards mitigation with the aim to establish a multi-purpose system to be used for the prevention or diminution of effects not only of tsunamis but also of storm surges and coastal flooding. This system was planned to be composed of prevention, monitoring and mitigation elements to meet the needs to respond effectively to both local and distant tsunamis. There was a general opinion that there is a need for a global warning and mitigation system as there is a global threat from marine natural disasters.

As a result tsunami warning systems have been designed and implemented in addition to the Pacific Tsunami Warning System in the Caribbean region and North-East Atlantic and Mediterranean with the support of the governments' concerned, international organizations, industries, private sector and civil society organizations.

Almost ten years after the Indian Ocean Tsunami it will be timely to have a meeting to sum up the progress achieved. The Leadership Seminar under the title "Science on Tsunamis for Today's Society and its Input to Society Security and Sustainability" will be implemented with the objectives:

- discuss the progress achieved in the development of all components of the global tsunami/marine multi hazards warning system;
- demonstrate the role of science on marine hazards and its contribution to society security and sustainability;
- identify gaps in the development of the global system and problems common to all geographical regions which slow down the progress;
- study lessons learned from the last decade from disastrous tsunamis and formulate recommendations on the ways to close the gaps and overcome problems in the warning system(s) development and operations.

Speakers and experts will be invited to present reports on tsunami preparedness projects considering far and near-field tsunami sources which threaten coastal communities. They discuss present trends in tsunami science and their impact on the warning system developments, as well as the policy of tsunami disaster prevention and mitigation.

There will be discussed co-operation between governmental and non-governmental organizations in implementing the warning system and the role of mass media and educational institutions in making society aware of marine hazards danger and of the actions to be taken to diminish hazards' effects.

The presentations made by speakers and round table discussions will help provide a base for the formulation of recommendations and facilitate co-operation in dealing with the marine natural hazards.

On the 4th of September after the official opening of the Forum till the afternoon coffee break there will be a number of Forum Plenary presentations and among them three directly related to the objectives of the Leadership Seminar on Tsunamis: the IOC Executive Secretary and Assistant Director-General of UNESCO Dr. Wendy Watson-Wright will give a presentation on the progress achieved by the IOC in the development of the global tsunami warning system. Her presentation will be followed by the one delivered by Mr. K. Harald Drager, President of The International Emergency Management Society (TIEMS) who will speak on multi-cooperation in natural hazards warning and mitigation, and by another delivered by Dr. Kit Miyamoto, President & CEO of Miyamoto International, on tsunami risk reduction and reconstruction after the East Japan earthquake.

The Seminar itself will take place from 4th to the 6th September 2013 in Centara Grand at Central Plaza Ladprao Hotel, Bangkok, Thailand and will be implemented through plenary meetings.

The official opening of the Seminar will be at 16.00 hrs on the 4th of September co-chaired by Rear Admiral Thavorn Charoendee from Thailand, Dr. Harkunti Rahayu from Indonesia and Dr. Iouri Oliounine from IOC. After a short introduction where seminar objectives will be presented and the organization of work introduced, the presentations will be made by world-known scientists in which they will elaborate ideas presented by the speakers on tsunamis at the Forum Plenary. After each presentation, time will be given for questions and answers.

The day of the 5th of September will be entirely dedicated to the presentations on tsunamis grouped in three areas: research and modeling; preparedness and vulnerability; and awareness and public safety. After each presentation there will be time given for questions and answers. After presentations within each area are completed there will be time for a detailed discussion of the progress achieved, and of existing problems and ways to overcome them. The output of discussions will be in the formulation of conclusions and recommendations to be presented to the Forum Plenary for approval on the 6th of September.

It is expected that discussions and conclusions will lead to the promotion of interagency co-operation; imposing importance of tsunami science for effective tsunami preparedness; using a balanced approach to the implementation of all tsunami system components and proposing actions required for the development of a marine multi-hazards warning system.

ABSTRACTS

Marine multi-hazards warning systems – Challenges and future opportunities

George Pararas-Carayannis
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Close to 50 years ago, and in close cooperation with member states, UNESCO-IOC helped establish a very successful Tsunami Warning System in the Pacific Ocean. This early warning system involved elements which needed to be supported by governance, coordination and collaboration mechanisms from national to local levels, and additionally supported by appropriate and continuously improving instrumental infrastructure. The system was successful because it dealt with one marine hazard only a potentially destructive Pacific-wide tsunami generated by a measurable large earthquake along a tectonic subduction zone. Such a system required observation and detection of an earthquake of large magnitude, assessment of potential risks to Pacific member countries, integration of risk information in warning messages, and distributing, rapidly and reliably, understandable warnings to authorities, risk managers and the population at risk in the potentially vulnerable areas. Educational efforts under the same program required emergency preparedness and response to warnings at all relevant levels to minimize potential impacts. Similar successful programs of Tsunami Warning Systems were supported by UNESCO-IOC for other regions of the world, with the ultimate objective of providing adequate protection at local, regional and global scales. Following the great earthquake of 26 December 2004, UNESCO-IOC took again a lead role in coordinating activities in establishing a Tsunami Warning System (TWS) in the Indian Ocean. However, given the infrequency of tsunamis in this region and in order to improve on cost-effectiveness, it was believed that the evaluation and warning capabilities of such a system could be integrated into a system that could include other potential marine hazards. However, such a multi-hazard warning system created a number of challenges and thus was difficult to implement. This presentation reviews and evaluates the problems that made such a marine multi-hazard warning system difficult and proposes strategies for future implementation.

CHALENGES IN NATIONAL TSUNAMI WARNING SYSTEM

Harkunti P. Rahayu[12]

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In the last decade two devastated tsunami have shaken the world and become turning points for the development and evaluation of ocean wide tsunami warning and mitigation system in Indian Ocean region. Due to its extreme death toll, the 2004 Indian Ocean (Sumatera) Tsunami has been as the starting point for the establishment tsunami warning system in the region; while the 2011 Tohoku Tsunami became the critical point to evaluate the effectiveness of the system established in reducing loss of life if another devastated tsunami were occurred in the area. Would a massive loss of life be likely to be reduced, remained or even worse?

Tsunami warning system is a complex and dynamic integration of physical, technological, social and cultural phenomena. The existence of high and accurate technological component of National Warning System in several countries in the Indian Ocean region as well as the existence of several

Regional Tsunami Service Provider in the region have shown the success performance of technological phenomena, i.e. ability to detect, monitor, analyze and disseminate tsunami warning within max 5 minutes. To some extent this has not been followed by the performance of physical, social and cultural phenomena of the tsunami prone area. The responsiveness of local government and the people at risk are still in questioned. Lesson learned taken during several tsunami-genic earthquakes in 2009, 2010, and 2012 in Indonesia, several national show case cities for tsunami disaster risk reduction still showed chaotic condition in evacuation and no proper response to tsunami warning, as if no disaster risk reduction countermeasure for strengthening the down stream of the tsunami warning system, i.e. socio-culture and physical phenomena, have been in placed. In fact, in line with the development of technological component, several extensive and intensive tsunami disaster risk reduction countermeasures national program to increase readiness of these cities and preparedness of their people at risk have been conducted to strengthen the physical, social and cultural component of the tsunami warning system. The tsunami education and simulation become disaster management euphoria, never been imbedded into the culture. The integration between the technological components with the physical, social and cultural component seems to be the weakest point. There is lack of sound linkage between national tsunami warning center and national disaster management office down to local disaster management office. The existence of effective SOP (standard operating procedures) for warning dissemination and warning chain at national tsunami warning system up to become a question among the 28 member states of Indian Ocean Tsunami Warning System.

As an attempt to solve these challenges faced by the national tsunami warning system, this paper presents the use of logic model as a holistic approach for tsunami disaster risk reduction strategic planning to enhance effective tsunami warning system by recognizing and structuring tangible and intangible factors that indelible in people mind toward the existence of the warning system. Result of the model shows a complex relation among factors with some significant correlation numbers among the factors, which assist and/or hinder the people and government official's response to the warning.

Development on Thailand's National Disaster Warning Center from 2005-2013

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Thailand's National Disaster Warning Center (NDWC) was established in the aftermath of the 26th December 2004 Indian Ocean tsunami to protect lives and property of all people in Thailand from natural disasters. It was established within five months after the great tsunami on 30th May 2005 with the synergy among the key inter-agency departments under the Ministry of Defense, Civil Service, academic institutions, United Nations agencies and international organisations. In particular, NDWC in cooperation with the USTDA/PDC provided technical assistance to improve the capability of the integrated decision support system for earthquakes and tsunamis early warning (Disaster All Hazards Warning, Analysis and Risk Evaluation System-DisasterAware) during 2006-2007 with a total amount of US$ 597,000. The system has been upgraded to include floods & landslides in 2012-2013.

In addition, NOAA supported a Deep-Ocean Assessment and Reporting of Tsunamis (DART) Buoy and data analysis and management with a total amount of US$ 400,000 for the installation in the high sea of the Indian Ocean in December 2006. Later, two additional buoys were installed in national waters of the Andaman Sea. To complete the end-to-end tsunami early warning system, NDWC installed 328 warning towers in Thailand. These include 164 warning towers for provincial governments and public relations offices, 270 sets of disaster warning control systems in the disaster prone areas, 654 loud village speakers, and 1,590 sets of two-way radios for village leaders. Various communication modes have been developed through hotline, Fax, SMS, TV pool and Smart Phone servers, etc. NDWC participated in the tsunami exercises under the ICG/IOTWS and ICG/PTWS. NDWC also recognizes that mitigation, preparedness and response are important components in disaster management. NDWC has provided outreach and capacity development programmes for local communities under the Adaptive Learning in Disaster Management for Community Awareness and Resilience Project under the technical assistance of IOC/UNESCO, UN-OCHA, UNDP, UNISDR and ADPC and IOI during 2007-2008 and continued to engage local communities to improve their readiness and resilience for future disasters.

Place and Role of International Ocean Institute (IOI) and Other Non-Governmental Organizations in Shaping the Global Tsunami Warning and Mitigation Systems

Cherdsak Virapat

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After forty years of experience coordinating the Pacific Tsunami Warning System (PTWS), UNESCO-IOC is leading a global effort to establish ocean-based tsunami warning systems as part of an overall multi-hazard disaster reduction strategy. The IOC Tsunami Unit works with Member States, together with other UN agencies and NGOs, to build sustainable tsunami early warning systems. The International Ocean Institute (IOI) is a scientific, educational and, non-profit international organisation devoted to the sustainable development of the oceans. IOI is committed to promoting sustainable development, eradicating poverty, disaster reduction, and improving the livelihoods of people by implementing strategies which build awareness, resilience and capacity to address their unique and particular vulnerabilities. IOI has been awarded the 2006 UN South-South Solidarity Award for a project implemented by the IOI Operational Centre in India, addressing the rehabilitation and reorientation of women's livelihood in a tsunami-affected village, Senthilveedhi, in South India. In Thailand, the National Disaster Warning Centre (NDWC) completed a two year project on Adaptive Learning in Disaster Management for Community Awareness and Resilience Project (ALDC) with the technical cooperation of the IOC/UNESCO during 2007-2008. The project demonstrated that IOI had multi-task role to play in supporting and facilitating NDWC. The project provides strategic integrated approaches for all related stakeholders for implementation at national and community levels. Other NGOs such as the National Red Cross and Red Crescent Societies have a long history of providing public education for disaster risks and the steps that households and communities can take to increase their safety and resilience. NGOs have experience and expertise in mechanisms of engagement, consultation and participation of local partners and communities. Many governments are looking at National Societies to take on a more significant role in disaster risk reduction education, both through community disaster education for schools and through national disaster management plans.

Tsunami Alert Systems: from Tsunami Warning to Forecasting

Vasily Titov

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The last decade has seen an evolution in the capabilities of tsunami warning systems from merely alert networks to full forecast-capable systems. This has been primarily due to the development of Deep Ocean Assessment and Reporting of Tsunamis (a.k.a tsunameters) and the integration of computer simulations in tsunami warning operations. After major expansion of the tsunameter network in the wake of the 2004 Sumatra event, over 30 tsunamis have been analyzed in real time to evaluate model forecast accuracy. The 2011 Honshu tsunami provided the first opportunity to assess the accuracy of current tsunami forecasting technology, in which one or more DART stations were located in, or near the main energy beam of the tsunami. The signal reported by three near-field DART stations, and used to drive the forecast, which resulted in very high correlation between observations and forecast data throughout the Pacific Ocean, in both the linear and non-linear wave regimes. The forecast results obtained during the Honshu event underline the success of current tsunami forecast technology in the intermediate and far fields however, there still is a latency period between earthquake occurrence and forecast generation due to tsunami travel time delay to the closest DART. We present here an overview of the forecast results for tsunami occurred after 2005 throughout the Pacific Ocean and introduce some of the approaches to reducing the latency period for near-field tsunami forecasting.

Mega-Tsunamis: Adverse Effects, Warning Systems, and Future Prospects for Hazard Mitigation

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The Indian Ocean earthquake and tsunami of 26 December, 2004 marked the beginning of a new awareness of tsunami hazards worldwide. At 07:58 local time massive earthquake of magnitude 9.1 struck the coastal area off northern Sumatra in Indonesia. The death toll reached 227,898 (dead or missing) people throughout the Indian Ocean region. Wave height locally exceeded 15m. The tsunami caused more casualties than any other in recorded history and was observed nearly worldwide on tide gauges in the Indian, Pacific and Atlantic Oceans. The total cost of the damage is difficult to estimate, but exceeds $10 billion.

Along with the human suffering and destructive damage, it affected a number of marine ecosystems in the region, through broken coral reefs, sedimentation, and piling of debris, among other impacts. Some 141,000 houses were destroyed (BRR & World Bank, 2005). There was no operational tsunami warning system for the Indian Ocean region in 2004. In addition, the large number of deaths were in part caused by the inadequate building structures. However, the survival of a large number of buildings in Thailand does point out that it is feasible to design buildings to resist tsunamis of moderate heights with reparability performance (Lukkunaprasit and Ruangrassamee, 2007). The 2011 Tohoku, Japanese mega-thrust earthquake occurred on Friday, March 11th 2011 at 14:46 local time. It had a magnitude of 9.0 (USGS) and a hypocentral depth of 32km, but ruptured to the sea floor. Despite the fact that it was the greatest earthquake to be recorded in Japan there was a limited amount of building damage. On the Tohoku coast, the highest wave arrived between 15:15 and 15:20. This means that the highest was reached the nearest coastlines about 30 to 40 minutes after the earthquake occurred (Mimura, 2011). Human casualties include 14,508 dead and 11,452 missing people (Mimura, 2011). The damage cost was between 16 and 25 trillion yen ($US108-308 billion) (Mimura, 2011). One of the largest impacts of the earthquake and tsunami was the accident

at the Fukushima nuclear power plant No.1 (Mimura, 2011). In this presentation, I will summarize my personal field observations of these tsunamis, together with the 2010 M=8.8 Chilean tsunami, and describe the efforts that have been made to provide more effective warnings to the public, and to mitigate risk. Much progress has been made worldwide since the great Indian Ocean tsunami of December 2004.

Near-Field Tsunami Early Warning and Preparedness: The EU NEARTOWARN Project in the Mediterranean Sea

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Near-field tsunamis occur in the global ocean including the Mediterranean Sea and its connected seas. For such tsunamis the first wave has very short travel time arriving to the closest coastal zone in less than 30 min., thus making the early warning a very difficult task. An efficient, end-to-end early tsunami warning system in local conditions should fulfill the condition that the time needed from the earthquake detection to population evacuation is less than the arrival time of the first wave. In the physiographic conditions of the Mediterranean Sea it is extremely hard to satisfy such a condition unless the total time needed to response in early warning is drastically reduced. The project NEARTOWARN (Near-Field Tsunami Warning and Emergency Planning) which is supported by the EU DG-ECHO Prevention Programme aims, among others, to establish a pilot system in Rhodes island, Greece, with the purpose to meet needs for local early tsunami warning but applicable in other coastal zones of the Mediterranean and beyond. To minimize the time for emergency in less than 30 sec, seismic alert devices (SED's) make the core component of alerting. SED's are activated and send alerting signals as soon as a P-phase of seismic wave is detected in the near-field domain but for a predetermined threshold of ground motion corresponding to strong local earthquakes. Then, emergency starts while SED's activate remotely other devices, such as computers with data bases of pre-calculated tsunami simulations, surveillance cameras etc. The system is completed with tide-gauges, simulated tsunami scenarios and emergency planning supported by a Geographical Management System. Rhodes island in Dodecanese, South Aegean Sea, Greece, has been selected as a test-area for the development of the prototype system given that it was hit by large tsunamigenic earthquakes several times in the past and it was, along with Fethiye in SW Turkey, the master test-site of the pan-European FP6 research tsunami project TRANSFER (2006-2009). To promote future development of such local systems in other coastal zones of the Mediterranean the NEARTOWARN partners review current status of early warning systems, produce digital inventories of wave travel times from several tsunami sources to a number of standard forecasting points, standardize data bases for pre-simulated tsunami scenarios and optimize triggering thresholds for the SED alerting networks. A local system such as the one developed by NEARTOWARN is expected to function in synergy with national warning systems and, through them, with the regional system which operates under the coordination of ICG/NEAMTWS/IOC/UNESCO. Except NOA, partnership of NEARTOWARN include the Universities of Bologna (Italy), Cyprus, Santander (Spain), as well as ACRI-ST (France) and the Civil Protection Unit of Rhodes Municipality (Greece).

Tsunami and Tropical Cyclone Forecast in the Global Disasters Alerts and Coordination System

Alessandro Annunziato. T. de Groeve

The presentation describes the details of the forecast system that the Joint Research Centre is currently using in the frame of the Global Disasters Alerts and Coordination System. For every earthquake of magnitude greater than 6.5 under water the system estimates the potential for Tsunami looking into a predefined scenario database; at the same time it launches online calculations in order to have a better estimate. The system is using SWAN and Hyflux computer codes to estimate wave height and inundation; it is operational since 2007 and was able to identify and correctly estimate the major Tsunami events since then. For the tropical cyclones the system uses bulletins for the events and performs an online storm surge calculation up to 72 h forecast. The calculation is performed using the Hyflux computer code developed by JRC and estimates wave height and inundation.

Developing tsunami-resilient communities: a review of initiatives

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Tsunamis have garnered increasing attention worldwide, particularly since the devastating Boxing Day event of 2004. Given the substantial risks to life posed by these hazard events, countries at risk of being affected by tsunamis have been implementing a range of initiatives designed to lessen their eventual impact, with these generally spanning three major components: hazard assessment, warning guidance and mitigation (including preparedness and response). Particular emphasis has been given to building tsunami-resilient communities, i.e. communities prepared to respond to such a tsunami event, in a manner that causes least loss of life and disruption.

This paper presents the results of a semi-systematic review of papers published in the scientific literature from 2004 to date, which focus on the development and/or implementation of such initiatives. The review focuses in particular on initiatives designed to raise awareness and preparedness amongst the general public and coastal communities.

The study was conducted with a view towards: (i) identifying the range, types and characteristics of initiatives implemented worldwide, (ii) evaluating the extent to which the effectiveness of these initiatives has been evaluated, (iii) identifying criteria used for such evaluations, and (iv) reviewing the overall effectiveness of these various initiatives in building tsunami-resilient communities.

Assessing tsunami vulnerability and resilience in Southern Thailand:
steps towards a more efficient risk management

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Next to Indonesia the Andaman Sea coast of Thailand was most heavily impacted by the tsunami in Dec. 2004, with 8500 people dead or missing in this region. Tsunami run ups up to 14m were observed, e.g. in the Khao Lak area; thus, major destructions occurred in the Provinces of Phang Nga, Phuket and Krabi. In addition to the tragic loss of many lives, the damage to life-supporting infrastructure, such as buildings, roads, water & power supply etc. caused high economic losses in the region. With high seismic and tsunami risks prevailing in this region, there is obviously a need to

understand and assess the tsunami hazards. Detailed knowledge of the tsunami vulnerability at this coast will allow the determination of the spatial distribution of risk and thus enable the development of adequate risk management strategies.

A bilateral research project carried out by German and Thai colleagues from 2007 to 2011 (acronym TRAIT) addressed the following objectives:

1) To analyze the mechanisms of tsunami-related hazards and impacts at the Andaman Sea coast;
2) To provide an integrated approach for assessing the vulnerability and resilience of the ecologic, social and economic system(s) against such impacts;
3) To investigate the potentials of remote sensing methodology for vulnerability assessment and resilience monitoring, both in socio-economic and ecologic terms;
4) To combine knowledge gained from the steps above in an integrated tsunami risk analysis tool, thus providing assistance for future risk mitigation and management.

The project was conducted on a local scale focusing on four Andaman coast communities which display different natural assets and socio-economic characteristics: Thai Mueang (National Park, intact ecosystems), Ban Nam Khem (small fisheries community), Khao Lak (mid-size, spread-out tourism community) and Patong Beach (large-size, aggregated urban and tourism community).

Based on a conceptual framework the research in TRAIT addressed both the hazard side (= tsunami flooding) and the vulnerability side (impacts, long-term effects) of this disaster. The project analyzed the key of components of the region's and communities' vulnerability against tsunamis: exposure, sensitivity and resilience. A comprehensive vulnerability assessment must integrate ecological, economic and social vulnerability aspects and can thus provide a basis for (future) tsunami risk management. The essential project findings are the following:

- To analyze past and future tsunami floodings a Digital Terrain Model/ DTM is needed and was built for the study area through an aerial survey;
- Based on this, a tsunami inundation model, including surface roughness (Manning) parameters, serves both for hindcasting and forecasting tsunami wave propagation and flooding; this model is crucial for early warning efforts on a local scale;
- The services and functions of typical coastal ecosystems, e.g. the dampening effect of coastal forests and dunes on tsunami waves, are generally underestimated but need to be taken more into account;
- The resilience of most coastal ecosystems in post-tsunami time is high, but recovery takes (several) years, especially in the coastal forests;
- Economic vulnerability strongly depends on various household or community structures and social factors, but dominance of the tourism sector increases a community's vulnerability;
- The experience with the 2004 tsunami disaster has strongly increased risk awareness on household level; also coping capacity and adaptation efforts at community level are significantly higher now than before but might wear off in the years to come;

- Remote sensing data from satellites (e.g. IKONOS) are a powerful tool for risk zoning and thus for supporting risk management, but always have to be complemented by (biophysical and social) field techniques.

Over all, the TRAIT project results reveal that lessons learned from the 2004 tsunami have served as an impetus to increase the capabilities of disaster management in the region and in the coastal communities that had been hit hard. On the other hand, new vulnerabilities have been created by enhancing tourism infrastructure development in the existing risk zones.

Engineering, political, and economic challenges in East Japan Tsunami Reconstruction

Kit Miyamoto

President & CEO Miyamoto International, Inc., U.S.A.

The March 2011, East Japan Earthquake and the ensuing tsunami caused loss of life and extensive economic hardship. The casualties and economical damage by the tsunami was far greater than expected. This is attributed to the size of the water surge, which was much higher than forecasted and which overcame the sea walls. The Japan Meteorological Agency warning allowed hundreds of thousands of people to escape to higher grounds inland. Assessment of damage following the earthquake showed that properly designed structures performed well, and areas for which taller buildings provided a shelter for people, experienced lower casualty rates. This event affected an area of over over 400 square km. As such, the governmental agencies alone were not able to reconstruct the impacted areas. Robust reconstruction planning requires participation from commercial investment sector as well as government agencies. It involves several key factors including reconstruction policies, availability of commercial and public funding, and political leadership.

Multilateral Collaboration for Disaster and Emergency Management

Tavida Kamolvej

Thammasat University, Thailand

Disaster management can be viewed in three-step-cycle or four processes. The three steps are before-disaster, during-disaster, and after-disaster, while the four processes include prevention-mitigation, preparation, response, and recovery. In before-disaster stage, we take into account the importance of prevention-mitigation and preparation where during-disaster stage focuses on how effective and efficient emergency response functions and agencies perform. After-disaster stage has a lot to do with recovery and rehabilitation functions which seeks for a capacity to return to normalcy. The focus is on multilateral collaboration for disaster management in Thailand, learning the improvement and development from Indian Ocean Tsunami 2004 to Flood 2011. How leading agencies and the network turn the situation back to normal during disaster.

On the one hand, disaster reserves its privilege on collaboration since the effects and destruction to human security become common and mutual among those who affected not only at national but also community levels. Working together among nations regarding public safety is not questionable and seems to be convincingly committed because all actors believe this collaboration results the benefit to everyone.

However, in some respects, there are two sides of a same coin seeking for collaboration when it comes to mandating agency-representatives to both take responsibility of life and death as being main disaster management agencies, and in the meantime receive several forms of domestic and

international assistance through network. The need of thorough selection may lead to a competition among the potential nations in terms of capability, effectiveness, and efficiency. Such collaboration may or may not be agreed upon.

The significant role of Mass Media in promoting education, creating awareness and achieving sustainable preparedness for tsunamis and other marine hazards.

George Pararas-Carayannis
President, Tsunami Society International, U.S.A.

Several mega-tsunamis in the last decade have caused unprecedented deaths and destruction in many countries bordering the Pacific and Indian Oceans. Many other areas in the Atlantic Ocean and in the Caribbean and Mediterranean Seas remain highly vulnerable to future destructive events. To this day the entire world is still feeling the effects of the great tsunamis of 2011, 2010 and 2004. The combined impacts of tsunamis and of collateral hazards have caused hundreds of thousands of deaths and billions of dollars in damages. As a result, much attention has been given to planning for future tsunamis and for the collateral impacts of landslides, fires, hazardous material spills and nuclear plant accidents. In spite of the great attention that has been given, many regions of the world still remain unprepared and are highly vulnerable if similar disasters strike again. However, mass media can play a very important role in creating continuous awareness of potential threats and in achieving effective preparedness for tsunami and other marine hazards and thus minimize future losses of lives and destruction of property. Media contributions could include frequent educational programs, as well as anniversary tributes for the thousands of victims of the recent tsunamis. Such educational and commemorative programs, if repeated with frequency, will have significant long-term benefits for all the areas devastated in the past, would help enhance to a greater extent awareness and preparedness, but would also serve as paradigms in mitigating the future impact of tsunamis and other marine disasters. A multi media approach could be used in providing products for such Tributes – perhaps to be repeated annually and to serve as constant reminders of future potential disasters and of the need for adequate preparedness. Such effort could include photojournalistic exhibitions, picture handbooks and radio documentaries on disaster management. Multi media products – when completed - should receive distribution throughout the potential vulnerable areas, but particularly in the South East Asia region. Countries that would particularly benefit from mass media efforts would include the most vulnerable countries, specifically, Japan, Philippines, Indonesia, Thailand, India, Bangladesh, Malaysia, Myanmar, Sri Lanka, Yemen, Oman, Maldives, Kenya, Tanzania, Seychelles and South Africa. In summary, this presentation provides strategies, guidelines and integrating programs that mass media can employ to help ensure that local actions are taken that would enhance marine disaster education and of factors related to preparedness, overall resiliency and post-disaster recovery.

Tsunami Disaster Prevention and the Roles of Media in Thailand

Supanee Nitsmer
Ramkhamhaeng University, Thailand

A tsunami is capable of destruction in a particular geographic region. The impacts of the 2004 tsunami on Thailand were most severe on the Andaman Coast devastating 6 provinces. The tsunami exposed major flaws in Thailand's hazard management and emergency response systems since there had never been preparedness to this kind of natural hazard. The Thai government and many international donor communities supplied consumable items needed for immediate use (food, clothes, shelter, and medicine), followed by small and medium housing and infrastructure projects. Livelihood recovery was the highest priority, especially programs that helped restart income

generating activities. To prevent and mitigate disaster from the unexpected recurrence of tsunami, policy, legal and institutional changes that provide the basis for risk reduction have been improved, enacted and translated into practice by setting up the National Disaster Warning Center (NDWC), National Disaster Prevention and Mitigation Committee and Tsunami Warning System in Thailand. International cooperation had made Thailand's EWS full-fledge functioning. The roles of media to minimize losses would be great if they had known about tsunami. They could tell people what and how to do before tsunami hit Thailand.

Education Technology and Innovative Teaching Strategies on

Tsunami Learning for Teachers and Children

Rossukhon Makaramani
Suan Sunandha Rajabhat University, Bangkok, Thailand

The content emphasizes an important role of basic education in teaching children from grades K through 12 to understand and be able to survive when natural disasters especially tsunamis occur. By focusing the use of educational technology to facilitate and enhance teaching and learning process, well-selected examples of innovative teaching strategies for tsunami learning from various tsunami-experience countries/states and relevant organizations are described and discussed. Moreover, examples of lesson plans, reliable education resources and compendium of selected practical tsunami teaching and learning aids are organized for easy access of the teacher and children.

Tsunamis in the North East Atlantic and the Mediterranean: History, Generation Mechanisms and the NEAM/IOC/UNESCO Early Warning System

G. A. Papadopoulos
Institute of Geodynamics, National Observatory of Athens (NOA), Greece

The origin of tsunamis in the North East Atlantic, the Mediterranean and connected seas (NEAM region) is documented in a variety of historical sources, evidence from on-shore and off-shore geological signatures, geomorphological imprints, observations from selected coastal archaeological sites, as well as instrumental records, eyewitnesses accounts and pictorical material. Tsunami sources both seismic and non-seismic (e.g. volcanism, landslides) can be found in all the seas of the region with a variable tsunamigenic potential. Local, regional and basin-wide tsunamis have been documented. An improved map of 22 main tsunamigenic zones and their relative potential for tsunami generation is presented. The mean recurrence of large tsunamis (intensity≥8) in the entire region is around 90 yrs and in the Mediterranean basin around 102 yrs. However, for most of the historical seismic tsunamis it is still doubtful which one was the causative seismic fault and if the tsunami was caused by co-seismic fault dislocation or by earthquake-triggered submarine landslides or by a combined source mechanism. Therefore, more research on source discrimination is needed. In June 2005 the NEAM country members of IOC/UNESCO decided for the development of a tsunami warning system in the region called NEAMTWS. After the intensive work of many experts and national delegations working together in several working groups, task teams and general assemblies of the Intergovernmental Coordination Group of NEAMTWS, this system entered an interim operational stage since the summer of 2012. The regional centers of France, Greece and Turkey are acting as tsunami watch providers while Portugal and Italy is expected to start providing such services in the near future. All regional centers are based on respective national centers. The GFZ, the leading geophysical institute in Germany, provides back up services as regards the seismic data. This new very important development is completed by the NEAM Tsunami Information Center which is supported by IOC with the contribution of EU projects.

THEME 5: YOUTH ONLINE DIALOGUE

Right of Youth in Sustainable Development of the Ocean

"THE OCEAN WE WANT"

The Youth Online Dialogue at the **PIM34 International Forum on World Ocean Review** entitled *"Right of Youth in Sustainable Development of the Oceans"*

… The Ocean We Want….

The Youth Online Dialogue will become an interchange and discussion platform where the youth all around the world will discuss the future scenarios of the Ocean.

The Youth Online Dialogue will face the weaknesses and vulnerabilities of our Oceans and will address the challenges for its Sustainable Management and Governance in the coming years.

The Youth Online Dialogue will also bring to the youth the possibility to discuss the importance that they place on the oceans, and the demands they have of its users in order to ensure the future sustainability of their Oceans in order to achieve the "*Rights and Responsibilities of Youth for the Sustainable Development of the Ocean"*.

EXHIBITIONS

(1) Government of Thailand

- Office of National Water and Flood Management Policy, Office of the Prime Minister's Secretariat
- Department of Marine and Coastal Resources, Ministry of Natural Resources and Environment
- Thailand's National Disaster Warning Center, Ministry of Information and Communication Technology
- Department of Fisheries, Ministry of Agriculture and Cooperatives

(2) International Ocean Institute (IOI)

- IOI-Headquarters
- IOI International & Regional Activities: IOI Training Programmes and Coastal Community Development Projects

(3) Others

- IOC/WESTPAC
  Efforts of IOC/WESTPAC in Marine Science, Observations and Capacity Building
  - Introduction to WESTPAC
  - South East Asian Global Ocean Observing System
  - Marine Biodiversity and Ecosystems
  - World Ocean Assessment and Asian Dust and Ocean EcoSystems
  - Capacity Development
  - WESTPAC 9th International Scientific Symposium "A Healthy Ocean for Prosperity in the Western Pacific: Scientific Challenges and Possible Solutions", Nha Trang, Vietnam, 22-25 April 2014
  - Expedition of Widya Nusantara (E-WIN) 2013
- Pacific Disaster Center
- EurOcean
- Etc.

BIOGRAPHIES OF EXPERTS

Jai ACHARYA

Technical Director of STET Maritime Pte Ltd., Singapore

Jai is currently working as Technical Director of STET Maritime Pte Ltd Singapore. Jai has been appointed as Director of IOI-Singapore (Focal Point) in 2012. Jai Acharya obtained MSc (Maritime Studies) from NTU (Singapore) in collaboration with BI (Norway). A Graduate in Electrical Engineering with Honours from BITS Pilani (India), Top Class Institute of Technology & Science in India, Affiliated with M.I.T (USA) and First Class Marine Engineer, Jai has thirty five long years of active experience in the Maritime Industry.

Being a proactive ocean and maritime environmental activist, Jai has keen interest in maritime education and training with an emphasis on environmental awareness and protection of oceans. Jai's interest in the area of research in maritime emission assessment and inventory management shows his commitment for the ocean environmental protection and green shipping. Having sailed onboard a variety of merchant vessels in national and multi-national shipping companies, Jai rose to the rank of Chief Engineer and gathered a wealth of varied hands-on experience in shipboard operations.

Jai has obtained the status of Life Fellowship of Institution of Engineers (FIE) and became Chartered Engineer in the vast field of Marine and Electrical Engineering, which is unique in its own type. Having deep involvement in Maritime Surveys, Inspections, Audits and Consultancy, Jai has been given overall responsibility to oversee all technical matters of STET Maritime Pte Ltd. Jai has conducted Classification and Statutory Surveys including ships' drawings Plan Approval, Damage, Vessel Grounding and Maritime Environmental Pollution (MEPP) related incidents survey on behalf of Isthumus Bureau of Shipping (IBS), Intermaritime Certification Services (ICS), and International Naval Survey Bureau (INSB) for Panama Maritime Authority (AMP).

Being a qualified and approved internal & external auditor, Jai has conducted ISM and ISPS audits on behalf of Panama Maritime Authority and other Flag States for many vessels and shipping companies. He is a qualified internal auditor for ISO 14001:2004. Jai has played a pivotal role for initial and developing phase of the Ship Management Technical / Crew Management Business of STET Maritime and also involved in the sale, purchase and vessel registration in Singapore. Prior to joining STET, Jai was involved in ship repairing, and as ship repair manAGER IN REPUTED companies in Singapore, he supervised and managed numerous ship repair activities for marine and offshore industries. Jai achieved the precise understanding of ship building including preparation of detailed plans and supervision of retrofitting and new installations during his tenure. As an entrepreneur in past years, Jai has a wide experience of business development in international ship management and maritime services.

Yaroslav ALEYEV

Coordinator of project, IOI-Ukraine

Mr. *Yaroslav Aleyev* is a student of the Sevastopol National University of the Nuclear Energy and Industry (SNUNEI). He also works as technical coordinator of the projects for the Operational Center of the International Ocean Institute in Ukraine and for "Ecological initiative" NGO. He actively participates in implementation of environmental education programs in cities of Ilyichevsk and Yalta. Mr. Aleyev is an author of several presentations delivered at national ecological conferences.

Kunjapong ANURATPANICH

Director of IOI-Thailand

Mr. Kunjapong Anuratpanich is a Former Director of Satellite and Radar data Analysis Division, Thailand's Meteorological Department (TMD). He has been appointed as a Director of the International Ocean Institute of Thailand in December 2009.

He obtained his graduate degree from the Faculty of Science (Mathematics), Srinakharinwirot University in Bangkok, Thailand. His experiences include the Advanced in Meteorology Course at the Meteorological Department; training Program on Seismology and Tsunami Warning, Bangkok, Thailand organized By the U.S. Geological Survey (USGS) during May 15-22, 2006; training Program on the Weather Long Range Forecast Intermediate Course at Pune, India during August - November 1989. He was a Senior forecaster of the Central Weather Bureau, TMD during in 1978-2001. He worked at Thailand's National Disaster Warning Center on the Rattanathibet road, Nonthaburi During from year 2005 to 2009.

Mohd Nizam BASIRON

Research Fellow,Centre for the Straits of Malacca,Maritime Institute of Malaysia

Mohd Nizam Basiron is presently Research Fellow and Head of the Centre for the Straits of Malacca at the Maritime Institute of Malaysia (MIMA). Prior to that he was also head of MIMA's Centre for Maritime Security and Environment. His research interests are marine environment protection and safety of navigation in the Straits of Malacca, ecosystems conservation marine environment law and maritime security. Mohd Nizam was a member of the Regional Task Force on Legal Matters for the UNEP-GEF Project on Reversing Environmental Trends in the South China Sea and Gulf of Thailand from 2001 to 2008. He holds a Bachelor of Applied Science Degree in Ecology and Natural Resources from the University of Canberra and a Diploma from the 17th session of the Rhodes Academy of Oceans Law and Policy 2012.

Selected Publications

1. Basiron, M.N. and Lexmond, S.L. Review of the Legal Aspects of Environmental Management in the South China Sea. Ocean and Coastal Management (in press).
2. Basiron, M.N. 2012. The Search for Sustainability and Security: Malaysia's Maritime Challenges and Opportunities in Ho, J and Bateman, W.S.G (eds). Maritime Challenges and Priorities in Asia. Routledge, Oxon.
3. Basiron, M.N. 2009. Issues in Policy and Law on the Conservation of Marine Biodiversity: a Malaysian Case Study in Rumley, D, Chaturvedi, S and Sakhuja, V. (eds). Fisheries Exploitation in the Indian Ocean: Threats and Opportunities. Institute of Southeast Asian Studies, Singapore.
4. Basiron, M.N. 2008. Review of the Institutional Framework for the Management of Marine Parks in Peninsular Malaysia in Phang, S.M, Yang Amri, A, Ooi, J.L.S and Mydin, A.J. (eds). Natural History of the Pulau Tioman Group of Islands. Institute of Oceana and Earth Sciences University of Malaya, Kuala Lumpur.
5. Forbes, V.L and Basiron, M.N. 2008. Malaysia's Maritime Realm Atlas. Maritime Institute of Malaysia, Kuala Lumpur.
6. Basiron, M.N. and Dastan, A. (eds). 2006. Building a Comprehensive Security Environment in the Straits of Malacca. Maritime Institute of Malaysia, Kuala Lumpur

Jay L. BATONGBACAL

Director, UP Institute for Maritime Affairs and Law of the Sea, the Philippines

Jay L. Batongbacal is an Assistant Professor at the University of the Philippines College of Law and currently Director of the newly-created Institute for Maritime Affairs and Law of the Sea. He holds a Master of

Marine Management and a Doctorate in Jurisprudential Science from Dalhousie University of Canada. He was the legal advisor of the technical team that successfully pursued the Philippines' submission for a continental shelf beyond 200 nautical miles in the Benham Rise Region before the Commission on the Limits of the Continental Shelf. Aside from teaching, he is presently involved in applied research in the Coral Triangle Initiative and consulting work with the Philippine seafaring and shipping industries.

Robert C. BECKMAN

Director, The Center for International Law, Singapore

Robert Beckman is the Director of the Centre for International Law (CIL) and the head of its programme in Ocean Law and Policy. He heads the CIL Research Projects on Submarine Cables and Law of the Sea and on International Maritime Crimes.

Prof Beckman is also an associate professor in the NUS Faculty of Law. He currently teaches Public International Law and Ocean Law & Policy in Asia. He also teaches a module on International Law & Singapore Law in the first year compulsory course, Singapore Legal System. In addition to his current subjects, he has taught International Legal Process, International Regulation of Shipping, Maritime Security & International Law, Marine Environmental Law, Space Law & Policy and United Nations Law.
Prof Beckman has a special interest in public international law and in ocean law and policy. He lectures in Rhodes Academy of Oceans Law and Policy, a summer diploma programme held in Rhodes, Greece. He has also taught intensive course on Ocean Law & Policy for UNITAR in Myanmar and at the Graduate School of International Studies, University of Tokyo.
He is an Adjunct Senior Fellow in the Maritime Security Programme at the Institute for Defence and Strategic Studies of the S Rajaratnam School of International Studies, NTU. He serves as a member of the Singapore delegation meetings of the Council on Security and Cooperation in the Asia-Pacific (CSCAP). He also served as a resource person for many of the meetings and Workshops on Managing Potential Conflicts in the South China Sea. He has also worked on ocean law and policy issues with the Ocean Policy Research Foundation (OPRF) of Japan and the Science Council of Asia.

Prof Beckman also has a special interest in mooting and advocacy. He served as the faculty advisor and coach of NUS teams in the Philip C Jessup International Law Moot Court Competition for 30 years, and has also coached NUS teams in the Manfred Lachs Space Law Moot Court Competition and the International Maritime Law Moot Court Competition.
Prof Beckman served as the Vice Dean (Academic Affairs) from 2001 to 2006. He was awarded the Public Administration Medal (Bronze) at the 2007 National Day Awards. He has also received two awards from NUS – the Outstanding Educator Award in 2001, and the Staff Achievement Award in 1997.

Qualifications

LLM (Harvard), JD BBA (Wisconsin)

Appointments

- Director, Centre for International Law, NUS
- Adjunct Senior Fellow, Maritime Security Programme, Institute for Defence & Strategic Studies, S Rajaratnam School of International Studies (RSIS), Nanyang Technological University

Research Interests

- Ocean Law & Policy
- Piracy and Maritime Security
- International Regulation of Shipping
- Marine Environmental Law

Selected Publications

1. “Moving Beyond Disputes Over Island Sovereignty: ICJ Decision Sets Stage for Maritime Boundary Delimitation in the Singapore Strait” (2009) 40 OCEAN DEVELOPMENT & INTERNATIONAL LAW, 1-35 (CO-AUTHORED WITH CLIVE SCHOFIELD)

2. "PSSAs and Transit Passage – Australia's Pilotage System in the Torres Strait Challenges IMO and UNCLOS" (2007) 38 OCEAN DEVELOPMENT & INTERNATIONAL LAW 325-357
3. "The Establishment of a Cooperative Mechanism for the Straits of Malacca and Singapore under Article 43 of UNCLOS", in A. Chircop, T. L. McDorman & S. J. Rolston, (eds), THE FUTURE OF OCEAN REGIME-BUILDING: ESSAYS IN TRIBUTE TO DOUGLAS M. JOHNSTON, (Leiden: Brill Publishers, 2009), pp. 233-260
4. "The Regulation of Ship-Source Pollution in Straits Used for International Navigation, in M. Nordquist, T. B. Koh, and J. N. Moore, (eds), FREEDOM OF SEAS, PASSAGE RIGHTS AND THE 1982 LAW OF THE SEA CONVENTION (The Hague: Martinus Nijhoff, 2009), pp. 311-337
5. "The 1988 SUA Convention and the 2005 SUA Protocol – Tools to Combat Piracy, Armed Robbery and Maritime Terrorism", in R. Herbert-Burns, S. Bateman & P. Lehr, (eds), LLOYD'S MIU HANDBOOK OF MARITIME SECURITY (Australia: Taylor & Francis, 2008), Chp 12, pp. 187-213
6. "Archipelagic Sea Lanes Passage in Southeast Asia – Developments and Uncertainties" in Kwa Chong Guan and J K Skogan, (eds),MARITIME SECURITY IN SOUTHEAST ASIA, (Singapore: Oxon: Routledge, 2007), Chp 9, pp. 117-133

Awni BEHNAM
IOI President/Former Assistant Secretary General of the United Nations
Commissioner General for the World Expo 2010

Dr. Awni Behnam began his early public schooling and cadetship in the United Kingdom (1953-1959). He served as Commanding Officer in the Navy (1962-1969) and held executive post in the Shipping Administration in Iraq (1969-1971). He joined the University of Wales (UK) in 1972 and, as member of the academic staff, lectured in the Department of Maritime Studies (1974 - 1977). He joined the United Nations at UNCTAD, Geneva in 1977 as Economic Affairs Officer and became Assistant to the Director in the Shipping Division of UNCTAD and was instrumental in the adoption of several international maritime conventions (Multimodal Convention, Ship Registration Convention, Mortgages and Liens and Arrest of Vessels Conventions) before assuming responsibility as the Chief of Liaison with Developing Countries (Group of 77) for the Secretary-General of UNCTAD. In 1986 he was responsible for the political and diplomatic relations of the Secretary-General with the Permanent Representatives of developing countries and provided support and advice for negotiations and consensus building in multilateral diplomacy on trade and development. He was promoted to the rank of Principle Officer in 1992 as the Secretary of the Trade and Development Board of UNCTAD. In addition, he assumed the responsibility of Chief of Intergovernmental Support Services of UNCTAD, (Conference Services) and was responsible for the management of intergovernmental processes and the organization of intergovernmental conferences and meetings in UNCTAD.

In 1996, he was appointed Secretary of the Ninth United Nations Conference on Trade and Development (South Africa), Secretary of the Nyon Summit in 1998, Secretary of the Tenth Conference of UNCTAD (Thailand) 2000, Secretary of the Third United Nations Conference on the Least Developed Countries (Brussels) 2001 and designed and supervised the Eleventh Conference in Sao Paulo in 2004 and acted as spokesman with oversight on the conference protocol. He was accredited with renovating the General Debate by hosting live video casting and freeing the plenary for interactive debates; he was also accredited for introducing video conferencing to the UN System and interpretation for distance Conferencing. The UNCTAD video conferencing facility in Geneva which he established was inaugurated by the former UN Secretary General. Mr. Kofi Annan.

In 2000 he assumed the position of Senior Advisor to the Secretary-General of UNCTAD, a post he held until leaving UNCTAD in 2004. As a UN diplomat, Dr. Behnam accumulated some 27 years of experience in the diplomatic service of the United Nations and in organizing international conferences and major events. He was instrumental in the successful negotiations of several international conventions and multilateral agreements under the auspices of UNCTAD. He served on request as Secretary of the Ministerial meetings of the G77 prior to UNCTAD in Tehran, Havana, Morocco, and South Africa and as Secretary of the G77 regional meetings in Bangladesh, Jordan and Lebanon. He assisted and advised the Government of Qatar in the organization of the South Summit in Doha, 2004, and other numerous events including the GATES conference in Shanghai and GPA in Beijing.

A long-time associate and close friend of the founder of IOI Professor Elisabeth Mann Borgese, he devoted a life time to advocacy in favour of the genuine link and in promoting ocean governance. He lectured at the IOI training course in Halifax Canada for 29 consequent annual courses.

On leaving the UN, he was elected President of the International Ocean Institute (IOI) headquartered in Malta, with responsibility for 26 (IOI) Operational Centres worldwide, succeeding his predecessor, Judge Warioba, former President of Tanzania. Dr. Behnam assumed full-time responsibility for leading the Organization (IOI), a position he currently holds (www.ioinst.org), presiding and directing its flag ship conferences *Pacem in Maribus* in Ukraine (2004), Australia (2005) and Malta (2007) and representing the organization in major international events. He promoted and instituted the first Youth Ocean Arts Exhibitions in Ukraine and Malta. As the chairmen of the IOI Board of Governors he has gained major experience in financial and budgetary programming and management of a civil society organization and developed a well-recognized capacity for outreach and advocacy skills and capacity-building. He was also responsible for the signing of several MOUs with international organizations such as the UNEP/GPA and RAMSAR Convention, and executing joint projects such as the Children's Art Publication entitled "Skies and Ocean" with the World Meteorological Organization (WMO).

In 2008 he was invited by the UN Secretary General to assume the responsibility of Commissioner General for the UN Pavilion at the Shanghai Expo 2010 at the level of Assistant Secretary-General.
He is a member of a number of Professional Societies and was awarded the Life Achievement Award from the ILD, recipient of the General Assembly's South – South Cooperation Day award for South -South Solidarity on behalf of IOI's work in India in the Tsunami area. He was presented by the President of Malta, the Honourable E. Fenech Adami, with the Fondation de Malte Gold Cross Medal for outstanding leadership (November 2007).

Dr. Behnam has published widely; his most recent publications are "Twilight of Flag States Control", «Unfulfilled Promises of the Seventies", "The Ocean Trade in the New Economy", "Developing Countries in the Group of 77, a Journey in Multilateral Diplomacy"; "Towards World Constitutionalism", "Whither IOI?", "Achieving the MDGs – a Stake Holder's Contribution", "Biodiversity – an Issue of Governance", "Millennium of Paradox",Telos 2009
Dr. Behnam holds a first degree in Business Administration (BA Mustensiriya University – 1968), a Masters (MSc.) in Development Economics and a Doctorate (PhD) from the University of Wales (1974 and 1976 respectively).

Born in Mousel, Iraq in 1940 and having left his country of birth in 1972, he became a Swiss citizen in 1994. On the occasion of the entry of Switzerland to the UN, the Swiss Authorities honoured him with Swiss Diplomatic Passport for the duration of his service in the UN. He is married with two children and four grand children.

Todd BOSSE

Senior Geospatial Data Analyst, Pacific Disaster Center

Mr. Todd Bosse is a Sr. Geospatial Information Analyst with the Pacific Disaster Center (PDC), Hawaii, USA. One of PDC's goals is to fill the gap between technology and what is needed and used by disaster managers before/during/after disaster events. Supporting this goal, Mr. Bosse has long been part of a team tasked with managing PDC's geospatial data holdings as well as designing and implementing products based on these data. He brings a wealth of experience to this event including GIS data inventory/gathering, GIS analysis, risk and vulnerability assessment, training international audiences and providing on-site support to disaster managers before/during/after disaster events.

Mihai BURCA

International Centre for Teoretical Physics-TRIL fellow,
National Institute of Oceanography and Experimental Geophysics, Trieste, Italy

Education

B.Sc. Faculty of Physics (Physics of the Earth & Atmospheric Physics), University of Bucharest, 1990.
M.Sc. Faculty of Hydrotechnics (GIS), Technical University of Civil Engineering Bucharest, 2000.
Career
IOI – Canada Alumni, 1999

Employment

Regional Meteorological Centre “Dobrogea”, Constanta, Romania, 1990-1992
Maritime Hydrographyic Directorate, Constanta, Romania, 1992-1999
National Institute for Marine Research and Development “Grigore Antipa”, Constanta, Romania, 1999-2003
“The Abdus Salam” International Centre for Teoretical Physics, Trieste, Italy, 2003-

Salvino BUSUTTIL

Representative of Malta to the IOI Governing Board and President, Fondation de Malte

Professor Salvino Busuttil, former Ambassador of Malta to France and Portugal, is currently the President of the Fondation de Malte, Chairman of La Valette Funds Sicav plc and of Wignacourt Funds Sicav plc., AROS Paridigm Fund SICAV plc. AROS Paradigm, Master Fund SICAV, Director of Corinthia Hotels International, of Trafigura Ltd (and of its several subsidiaries based in Malta). He is also President of the consulting company Taktos Limited.

A former Director of the UN Mediterranean Action Plan and of UNESCO's Division of the Socio-cultural Environment, he was President of the International Centre for Higher Studies in Mediterranean Agronomy; Vice-President of the International Commission for the Scientific Exploration of the Mediterranean, Emeritus Professor in Economics at the University of Malta where he served as Dean. He was also Director of the Malta Development Corporation, President of the Economic Council of Malta, and the United Nations’ Adviser to the Prime Ministers of the Bahamas and of St Vincent and the Grenadines. He is also an adviser to Malta’s Minister of Foreign Affairs.

He has written extensively on Mediterranean Affairs and on the problematique of future generations and their environment, having led Malta’s delegation to the 1972 UN Environment Conference in Stockholm.

Albert CARUANA

Director-General, Continental Shelf Department

Dr Albert Caruana is currently the Director General of the Continental Shelf Department in Malta with responsibilities of maritime governance and oil exploration. Dr Caruana is also deputy chair of the inter-ministerial committee on Integrated Maritime Policy in Malta. Prior to this post Dr Caruana was an advisor on EU major projects within the Ministry for Resources and Rural Affairs. He was also a member of the Board of Directors of the Malta Tourism Authority. Previous work experience also included his employment as Chief Executive Officer of Grand Harbour Marina Ltd, freelance consultant specialising in management, project management and environmental risk assessments, Head of Secretariat at the Ministry for Tourism and Culture with one of his responsibilities being to coordinate major Government projects, Reservoir Engineer with Texaco North Sea Oil and engineer with the Oil Exploration Department at the Office of the Prime Minister.

Louis F. CASSAR

Director, Institute of Earth Systems, University of Malta

Dr. Louis F. Cassar Ph.D. is a landscape ecologist and environmental planner by training, with experience in environmental appraisal (ecology and vegetation analysis) and land-use evaluation. Dr. Cassar is currently the Director of the International Environment Institute of the University of Malta, whose role is to provide multidisciplinary training in areas of environmental science, and environmental planning and management. His research interests are in environmental management and conservation, as also in aspects of entomology, with key specialization in:

- coastal management, in particular, the dynamics and conservation of coastal dune systems;
- landscape ecology, primarily corridor ecology, fragmentation and ecological restoration;
- participatory methods for stakeholder involvement in conservation and decision-taking;
- Orthoptera (Insecta) of the circum-Sicilian island complex and the Maghreb.

Over the years, he has lectured and carried out research in the areas across the Mediterranean, in Europe, South America and West Africa, as also conducted conservation management audits and landscape appraisals, in the Maltese Islands, the Maghreb (Morocco, Tunisia and Algeria), as also in Italy (The Maremma) and Sicily. In his capacity as consultant to a United Nations agency (ICS-UNIDO) he was responsible for setting up the coastal management programme for the International Centre for Science & High Technology in 1998/99 as

well as led a number of courses, with a view to building human resource capacity, in Latin America, West Africa and throughout the Mediterranean over a span of almost a decade. Together with colleagues from the University of Reading, he was recently involved in the development of a coastal landscape appraisal methodology for UNEP, using the Cap Bon promontory in Tunisia as key example. Moreover, he has participated in and/or led more than 110 environmental appraisal/impact assessment assignments, both in the Maltese Islands and overseas, with terrestrial ecology being the main focus. Between 2001 and 2007, he served as Independent Member on the Board of the national environment and planning agency (MEPA), as well as on other boards, notable amongst which is that of the Centre for Environment & Development in the Arab Region & Europe (CEDARE), based in Cairo, on which he has served since 1993.

Telmo CARVALHO

Executive Director, European Centre for Information on Marine Science and Technology (EurOcean), Portugal

Telmo Carvalho has a graduation in Social and Cultural Anthropology and specialised (MSc) in Science Policy. Previously, worked at the Portuguese Foundation for Science and Technology in the International Relations Department as a Science Manager in the fields of environmental and Marine Sciences.

Vahid CHEGINI

Director of IOI-Islamic Republic of Iran

Dr. Vahid Chegini is the director of IOI-OC Iran and the director of the Iranian National Institute for Oceanography and director of Iranian National Committee for oceanography.

He holds a Ph.D. in Coastal Engineering from the University of New South Wales, Australia (1995), a M.Sc. in Hydraulic Structures from Tehran University, Iran (1989), and a B.Sc. in Civil Engineering from Amir Kabir University of Technology, Iran (1985). He was appointed as the director of the Iranian National Center for Oceanography in 2007. He has started work at the institute since 2001 as the research deputy and a scientific member of the Marine Engineering & Technology Department. He has also worked as the research deputy of Soil Conservation and Watershed Management Research Center (SCWMRC) for one year, as the director of Jihad Water and Watershed Management Company (JWRC) for five years and as the head of Shore Protection Section of SCWMRC for two years. He has published 9 books in the field of coastal engineering and Physical Oceanography in Persian and approximately 80 papers in Persian and English.

Moreover, Dr. Chegini has cooperated as a professor of Physical Oceanography with Khoramshahr University of Marine Sciences and Technology, University of Tehran, Faculty of Marine Sciences and Technologies of Northern Tehran Branch Islamic Azad University, Faculty of sciences of Tarbiat Moalem University, Hormozgan University, nonprofitable Kish University and Faculty of Marine Sciences and Technologies of Science and Research Branch of Islamic Azad University.
His research interests are as follows:

- Water wave theories
- Wave modeling
- Wave forecasting
- Coastal processes and sediment transportation
- Breakwaters and coastal protective structures
- Integrated Coastal Zone Management
- Coastal oceanography

Chris CHIESA

Deputy Executive Director, Pacific Disaster Center, U.S.A.

Mr. Chiesa serves as the Deputy Executive Director of Pacific Disaster Center. During the past 10 years at PDC he has also held the roles of Director, Data and Information Resources Division, and Chief Information Officer. He has been responsible for establishment of PDC's Enterprise Geospatial Data Environment as well as the development of the Center's GIS-based "Global Hazards and Vulnerabilities Atlas" and the PDC-hosted DM geospatial information sharing service, the "Global Hazards Information Network." He is presently responsible

for Center-wide operations and program development, as well as value-added information development activities at PDC. He has nearly 25 years experience developing and managing enterprise product and service applications of geospatial information technologies, and has been actively involved in disaster management activities in the Asia Pacific region for the past decade. He has extensive experience in the region including project-based activities in Vietnam, Thailand, Philippines, Taiwan, and Korea. He has also supported regional efforts of APEC's Emergency Preparedness Working Group. His work has also taken him to Europe, South America and Africa. Mr. Chiesa is active in regional and international professional associations, having served on the Board of Directors for the Hawaii Geographic Information Coordinating Council and presently as the Vice-Chair of the Navigators Council (aka Board of Director) for the Pacific Risk Management Ohana (PRiMO). He also serves on the International Advisory Board of Experts for The International Emergency Management Society's (TIEMS) Education Program.

His work has been widely recognized, and that recognition includes receiving both the Special Achievement in GIS Award by ESRI and the President's Award by HIGICC. He holds degrees from the University of Michigan (BSME, MSNR) and the University of Arizona (MBA).

Elisabeth CONRAD

Institute of Earth Systems, University of Malta

Dr. Elisabeth Conrad is an academic member of staff with the Institute of Earth Systems of the University of Malta. She has held this position on a full-time basis since January 2009, after having served as a visiting lecturer/research associate since 2002. Her previous job positions include that of environmental management consultant in the private sector and of environment protection inspector with the Malta Environment and Planning Authority. In the former role, she was responsible for the coordination and compilation of Environmental Impact Assessments and environmental management plans. She holds a first class honours undergraduate degree in earth sciences (geography) from the University of Malta and a Master of Science degree (with distinction) in environmental management from Imperial College, University of London. She is currently completing her doctoral research, on aspects of stakeholder involvement and perception, with the Institute of Biological, Rural and Environmental Sciences, University of Aberystwyth. Dr. Conrad is also an associate member of the Institute of Environmental Management and Assessment. Her specific research interests include coastal management, stakeholder involvement, landscape systems and environmental ethics, and she has participated in several international research projects, particularly in the Mediterranean basin. She has also published a range of papers, books and book chapters on related subjects.

Hasjim DJALAL

Retired Diplomat, Indonesia

Prof. Dr. Hasjim Djalal was born on February 25, 1934, in West Sumatra, obtained a BA degree from Indonesian Academy for Foreign Service in Jakarta (1956), M.A (1959) and Ph.D (1961), both from the University of Virginia. He graduated from the Indonesian National Defense Institute (LEMHANNAS) in 1971.

He was Director of Treaty and Legal Affairs of the Indonesian Department of Foreign Affairs (1976-1979) and Director General for Policy Planning (1985-1990). He has served at the Indonesian Embassies in Belgrade, Guinea (Africa), Singapore, Washington DC. and Ambassador/Deputy Permanent Representative of Indonesia to the UN in New York (1981-1983), Ambassador to Canada (1983-1985), Germany (1990-1993) and Ambassador at-large for the Law of the Sea and Maritime Affairs (1994-2000).

He participated fully in the Third UN Law of the Sea Conference (1973-1982) and in its implementation thereafter, as well as in other maritime activities, nationally, regionally and internationally until now.

He was President of the International Seabed Authority (ISBA) in Jamaica (1995, 1996), and currently serves as Chairman of the Finance Committee of the ISBA. Since 1989 he has been the initiator and convener of the

Workshop Process on Managing Potential Conflicts in the South China Sea, and has been involved in development of maritime cooperation in the Indian and Pacific Oceans.
Currently, he is a member of Indonesian Maritime Council, Senior Advisor to the Indonesian Minister for Maritime Affairs and Fisheries, and to Indonesian Naval Chief of Staff, and lectures at universities and other high learning institutions in Indonesia.

He has written extensively on the Law of the Sea and Regional issues. His books include (1.) *Indonesian Struggle for the Law of the Sea* (1979), (2.) *Indonesia and the Law of the Sea* (1995), (3.) *Indonesian Foreign Policy in the 1990s* (1997), (4.) *Preventive Diplomacy in South East Asia: Lessons Learned* (2003), (5) *Seeking Lasting Peace in Aceh (2006),* and numerous articles in Indonesia and abroad.

He has received various awards, commendations and decorations for various services to his country, including Bintang Mahaputera Utama (the Greatest Son of the Country, First Class), the highest honor that can be bestowed by the Republic of Indonesia to its greatest sons and daughters

K. Harald DRAGER

President of The International Emergency Management Society (TIEMS)

K. Harald Drager, Oslo, Norway, is the Managing Director of QUASAR Invest AS in Norway, a consultancy in global safety, emergency and disaster management. He has a Master's degree in control engineering from the Norwegian Technical University in 1966 and a Master's degree from Purdue University in USA in industrial engineering in 1973.

His specialisations are international organizational development, emergency, disaster and risk management, and project management. He has been doing consultancy work for numerous clients internationally amongst others the World Bank/International Finance Corporation, NATO and the European Commission, and he has been project manager of several international research and development projects for methods and software development in risk, emergency and disaster management.

He took the initiative to establish TIEMS (The International Emergency Management Society; www.tiems.org) in 1993, and was the International Vice President of TIEMS since its inauguration until 2002, when he took over as TIEMS President. TIEMS has under his leadership developed to a global well known organization with local chapters in many regions/countries, and TIEMS arranges each year workshops and conferences all over the world with focus on disaster risk reduction. Recently TIEMS has initiated development of a global education, training and certification program and a research coordination service for its members. He has published numerous papers internationally on emergency, risk and disaster management.

He was TIEMS representative in the NARTUS project with the responsibility for consensus building and establishing the PSC Europe Forum, www.psc-europe.eu, an all stakeholder forum for public safety communication. PSC Europe Forum is now a sustainable organization after it was launched at the end of the NARTUS project in 2009, and arranges two assembly conferences each year and is a leading global advocate for standardization and research initiatives in public safety communication.

Aldo DRAGO

Director of IOI- Malta

Prof. Aldo Drago is the Director of the IOI-Malta Operational Centre and Head of the Physical Oceanography Unit at the University of Malta. He obtained his Ph.D. in physical oceanography from the University of Southampton, SOC in 1999. His initial engagement was with the Malta Council for Science and Technology in 1991, where he conducted a number of programmes and initiatives both locally and internationally, and served as the Coordinator of the Marine Sciences Network. He is currently the Maltese delegate to the Intergovernmental Oceanographic Commission (IOC/UNESCO) and to the International Commission for the Scientific Exploration of the Mediterranean (CIESM), the National Representative for the Committee on the International Oceanographic Data and Information Exchange (IODE/IOC), and Malta's lead delegate on the

European Earth Monitoring Programme (GMES) User Forum. Prof. Drago is also the National Delegate for Malta on the Joint WMO/IOC Technical Commission for Oceanography & Marine Technology (JCOMM). Since 1998, he is serving as the Executive Secretary of MedGOOS (the Global Ocean Observing System for the Mediterranean) with Office in Malta.
He set up the Physical Oceanography Unit which undertakes oceanographic research, in a holistic perspective, including operational observations and forecasts, specialised data management analysis and participation in international cooperative ventures. The overarching research themes of the PO-Unit cover coastal meteorology, hydrography and physical oceanography with a main emphasis on the experimental study of the hydrodynamics of the sea in the vicinity of the Maltese Islands. The Unit has mainly endeavoured to promote activities in operational oceanography by the installation and maintenance of permanent sea monitoring systems, and the provision of meteo/marine forecasts. Observations include atmospheric parameters, sea level, currents and waves in both delayed and operational mode; forecasts for the same parameters are issued daily for the Central Mediterranean area and in the vicinity of the Maltese Islands on the services website. The PO-Unit also acts as a national oceanographic data centre and promotes the IOC/IODE (Committee on International Oceanographic Data and Information Exchange) products and activities in Malta. A main achievement in this field is the online national oceanographic database forming part of the Malta Blue Pages.
Under the direction of Prof. Drago, the PO-Unit has strengthened its activities, know-how and capability through the participation in several EU funded regional and pan-European scientific projects (MFSPP and MEDATLAS in FP4; MFSTEP; SEASEARCH, ESEAS-RI and MAMA as project leader in FP5; SESAME, ECOOP, MyOCEAN and SEADATANET in FP6; and JERICO, MyOCEAN2, SEADATNET2 and PERSEUS in FP7). The PO-Unit has participated in several INTERREG projects, (WERMED under MEDOCC; RISKMED and NET.MARI.MED under ARCHIMED. The PO-Unit is also partner in several European and Mediterranean networks like ESEAS (the European Sea Level Service), MedGLOSS (the Mediterranean regional subsystem of the Global Sea Level Observing System with a local station for real-time sea level, sea temperature and atmospheric pressure measurements in Portomaso), and MOON (the Mediterranean Operational Oceanography Network).
Prof. Drago is currently coordinating the project CALYPSO (HF Radar Monitoring System and Response against Marine Oil Spills in the Malta Channel). This is a 2-year project partly financed by the EU under the Operational Programme Italia-Malta 2007-2013. The main target of this project is the setting up of an HF radar observing system, which will routinely furnish updates in the form of 2D maps on the sea currents and sea state conditions in real-time in the stretch of sea between Malta and Sicily. Another recent activity is the BLUE OCEAN ENERGY project funded by the National Research and Innovation Programme of the Malta Council for Science and Technology. The project brings together efforts of academia and industry to adapt and test the feasibility of the DEXAWAVE converter as a means of extracting energy from sea waves in the Maltese coastal sea areas.

Werner EKAU

Director, IOI-Germany

Dr. Werner Ekau is Director of the Operational Centre Germany of IOI, the International Ocean Institute, member and chair of the Committee of Directors.

Dr. Werner Ekau is a fisheries biologist trained at Bochum, Hamburg and Kiel universities. He worked in Antarctica, Argentina, and the Azores. Since 1991 he works on fish biology and ecology in tropical ecosystems. In the 1990ies he was coordinator for the bilateral co-operation in Marine Research between Brazil and Germany. His research interests lie in the wider field of “Adaptations of different life stages of fish to their environment". This includes activities in:

- Growth and population dynamics
- Migration pattern of fish in coastal environments
- Ichthyoplankton
- Fisheries biology
- Ecology

Recent projects are:

- GENUS (Geochemistry and Ecology of the Namibian Upwelling System) aims to clarify relationships between climate change, biogeochemical cycles, and ecosystem structure in the Benguela Large Marine Ecosystem off northern Namibian (SW Africa)

- Developing fisheries science in Papua New Guinea'. A cooperative project of ZMT/IOI-Germany with GTZ on the development and implementation of a Bachelor of Science Degree programme at Vudal University in Papua New Guinea.

- Evaluation of Integrated Coastal Zone Management (ICZM) in Europe. A contribution of IOI-Germany to a joint project of Rupprecht Consult, Köln, and IOI-HQ, Malta

Captain Song EKMAHACHAI, Royal Thai Navy
Acting Director, Warning and Dissemination Section, Natural Disaster Warning Center

Captain Song Ekamahachai is currently an Acting Director of The Warning and Dissemination Section of Thailand's Disaster Warning Center, Ministry of Information and Communication Technology in Thailand. He is a national Focal Point for ICG/IOTWS and ICG/PTWS for Thailand. He has been involved in weather forecasting and natural disaster warning systems. He obtained his Bachelor's Degree in nuclear physics from Chiang Mai University in Thailand and his Masters Degree in marine meteorology from New York University in U.S.A. He has worked for the Hydrographic Department of the Royal Thai Navy for 35 years. He had joined Thailand's National Disaster Warning Center (NDWC) since 2009 on a special task assignment. Apart from his specialization in earth science and marine science surveys in the Gulf of Thailand and the Andaman Sea, he used to work as Chief of the Seismic Station in Chiang Mai for two years to monitor nuclear tests from around the world. He is also a computer specialist in sea waves and sea level forecast since 1999. He has carried out a number of research and development through various funding agencies in Thailand. He attended various training programmes conducted under the Royal Thai Navy.

Charles GALDIES
Lecturer, Institute of Earth Systems, University of Malta

Charles Galdies is a lecturer with the Division of Environmental Management and Planning within the Institute of Earth Systems, having previously taught undergraduate and graduate courses in climate, remote sensing, spatial mapping, data management, and the life sciences. Dr Galdies received his Ph.D. in Remote Sensing and GIS from Durham University (UK) in 2005. He studied ways to improve small scale weather and ocean forecasting in the central Mediterranean region using novel remote sensing observations of the ocean and atmosphere. Dr Galdies previously served as Chief Meteorological Officer of the Malta Meteorological Office and Permanent Representative of the Government of Malta with the World Meteorological Organisation (WMO) from 2007 to 2011, and before that as Deputy Director of the International Ocean Institute Headquarters. Dr Galdies's expertise focuses on weather and climate, the application of remote sensing for coastal, benthic and terrestrial ecological mapping, as well as environmental data processing and analysis. He has provided consultancy to the Food and Agriculture Organisation, the European Commission, the International Union for the Conservation of Nature (IUCN) and to private companies related to ecology and policy formulation.

Martin Galea De GIOVANNI
Chairperson, Friends of the Earth Malta and
Staff Member, Physical Oceanography Unit, University of Malta

Martin Galea De Giovanni holds a B.Sc. (Hons.) in Environmental Studies, after having originally studied and worked in the field of Computer Science. He is currently finalising a full time Masters by Research course at the Institute for Earth Systems of the University of Malta, focusing on Environmental Ethics and is in the process of applying for his Ph.D. Martin is also the chairperson of Friends of the Earth Malta. FoE Malta is a local non-

government organisation, member of an International network of NGOs, which strive to promote sustainable development and to ensure that human activities do not harm other living creatures. He represents FoE Malta at international meetings and until recently held the post of Executive Board Member at Friends of the Earth Europe in Brussels. Since joining FoE in 2000, Mr. Galea De Giovanni has been responsible for issues relating to Agriculture, Biodiversity and Climate change. Mr. Galea De Giovanni also works at the International Ocean Institute at the University of Malta. Thanks to his extensive experience of the IT and NGO sectors he has also formed part of a consulting team at Friends of the Earth Europe when it came to developing a new web portal for the network with the aim to bring the work of the national groups to the European platform. Mr Galea De Giovanni has also been involved in the developed of various online interactive web portals including the IOI HQ web site.

Gonzalo GARCIA DE ARBOLEYA DE LA QUINTANA
Project Manager
Youth Online Dialogue

Mr. Gonzalo García de Arboleya de la Quintana is currently working as a team member at the International Ocean Institute Headquarters in Malta. Despite not having a long career in terms of years, he has carried out numerous tasks at different companies in which he has worked. Having a **Bachelor's degree in Environmental Sciences**, he specifically focused his education in the field of the Coastal Management.

After obtaining his degree in Environmental Sciences, he specialized in the management of Environmental Impact Assessment Projects through a Master degree in Environmental Impact Assessment and worked in various consulting companies. Other studies in his background are; A degree in **Forest Plan Management**, courses on GIS and gvSIG Geographical Systems, Environmental Consultancy and Product Quality Consultancy courses are some of the complementary studies he carried out during the time he worked in the private sector.

After his career and the numerous years he worked in the private sector he obtained two different master degrees successively, one being a **Postgraduate Programme on Abilitation and Management of Coasts**, and the second one on **Coastal Areas Management**. Aware of his interest in directing his career towards the development of coastal management projects, he began working as an intern at the IOI as a young Coordinator in the management of a Tsunami Awareness and Preparedness project in Malta, and he is ready to attend the **Training Program on Ocean Governance** conducted by the IOI Headquarters in Malta in November 2012.

Adam GAUCI
Academic Member, Physical Oceanography Unit
University of Malta

Adam Gauci is an academic member of staff within the Physical Oceanography Unit of the University of Malta and is currently reading for a Ph.D. in Intelligent Computer Systems. Following his B.Sc course of studies in Computer Science and Physics, in 2009 he obtained his M.Sc in Artificial Intelligence. His main research interests include the application of machine learning techniques on mega-dimensional datasets. Such interdisciplinary investigations help to enhance the cooperation between domain-specific researchers, a cooperation which has become increasingly important in all fields of scientific research. Mr. Gauci has participated, presented and published papers in a number of scientific conferences and refereed journals. Apart from his active role in participating and managing projects funded by the European Union, he delivers lectures in undergraduate courses on Optics, Data Management and Remote Sensing with the Faculties of Science and Earth System. Mr Gauci has also been involved in the developed of various online interactive web portals including the IOI HQ web site.

Yves HENOCQUE

Senior Advisor in Maritime Strategy, IFREMER, France

First trained as a scientist (marine ecology) who then acquired management and international cooperation skills (to start with in Japan and South-East Asia) through technical training and professional practice, it was from the very beginning of the 90s that Yves Henocque settled in the Mediterranean to start a new coastal environmental laboratory within the premises of the French Research Institute for the Sustainable Development of the Sea (IFREMER) in Toulon. After a dedicated vocational training in the United States in 1994, he started to practice integrated coastal management (ICM) and strategic planning in the Mediterranean and other marine regions like the Indian Ocean (1995-2000). More recently, he expanded his experience in Thailand (Department of Fisheries) as Team Leader and Co-Director of CHARM (Coastal Habitats and Resources Management), a 5-years and 16M Euros project (2002-2007) co-funded between the Thai Government and the EU. Since 2008 he is IFREMER Maritime Strategy Senior Advisor where, among others, he is contributing to the building up and implementation of national maritime strategies and integrated coastal and ocean management strategy and action plans in Europe and Asia-Pacific countries including more particularly Japan with which he never stopped working during the last 30 years.

Rudolf HERMES

Chief Technical Advisor, Bay of Bengal Large Marine Ecosystem Project (BOBLME), Thailand

Rudolf Hermes holds a Master's Degree in Biology from Bonn University and a Doctorate in Natural Sciences (Marine Fisheries and Zoology) from Hamburg University. During his studies, he participated in numerous research cruises of German research vessels in the Northwest Atlantic. From 1979 until 2004, he worked in fisheries and coastal resources development, research and management in several projects of bilateral cooperation, seconded through the German Technical Cooperation (GTZ), mainly in the Philippines, Indonesia and Papua New Guinea. This work included assignments with Departments of Science and Fisheries, at national and provincial levels, with NGOs, and as Associate Professor at the University of the Philippines. From 2005 onward, he worked as a consultant for FAO in post-tsunami relief and rehabilitation, both in Aceh/Indonesia and FAO-HQ based, in Monitoring and Evaluation, as Chief Technical Officer, and engaged in project concept development and formulation. In 2009, he started his current assignment as Chief Technical Advisor of the Bay of Bengal Large Marine Ecosystem Project, based in Thailand.

Lawrence HILDEBRAND

Professor and Canadian Chair in Marine Environment Protection, World Maritime University, Malmö, Sweden and Member of the IOI Governing Board

Dr. Lawrence Hildebrand is Professor, Canadian Chair in Marine Environment Protection and Head of the Marine Environmental and Ocean Management specialization at the World Maritime University in Malmö, Sweden. He took up this post at WMU after a 35-year career with the Canadian federal Environment Department in Halifax, Nova Scotia, where he represented the department in integrated coastal and ocean policy and governance initiatives and managed and advised regional programs as Senior Coastal and Ocean Specialist. Dr. Hildebrand is also Adjunct Professor with the Marine Affairs Program at Dalhousie University, a Governor of the International Ocean Institute and a Senior Research Fellow with IOI-Canada. He contributes to the executive management of the IOI and several other international NGOs and to the teaching, research and capacity-building activities at several universities. Dr. Hildebrand is also serving as a consulting advisor, policy developer and trainer with UNEP's Coordinating Body on the Seas of East Asia (COBSEA) on issues and approaches of regional significance, including coastal erosion and coastal and marine spatial planning. He has degrees in marine biology and coastal zone management (Dalhousie) and coastal and ocean governance (Cardiff). Dr. Hildebrand also headed up a Coastal Needs Assessment Team in Thailand on behalf of the

Government of Canada and at the request of the Royal Thai government, immediately following the 2004 Asian tsunami.

Gabriel ION

Director of IOI Black Sea, Romania

Dr. Gabriel Ion obtained his Ph.D. in geology (Applied Geophysics) "Summa Cum Laude" from Bucharest University in 2001 with the thesis entitled "Application of multi-frequency controlled seismic to study marine sediments: capabilities and limitations."

He is Head of Seismo-acoustics, GIS and Digital Cartography Department, the National Institute of Marine Geology and Geo-ecology (GEOECOMAR) in Bucharest, Romania. He is responsible for Laboratory of Seismo-Acoustics Digital Mapping, GIS and Database. He involves the research project on evaluation of the Danube River paleo sediment discharge and of the littoral drift fluxes along the delta front. He is also responsible for the international project of the Institute on Black Sea Scientific Network. He directs the IOI Black Sea to work principally on a project for a series of short conferences, training and education events on new research methodologies available in marine environment research. The subject was considered a current topic of interest in the framework of new challenges of climate change, eutrophication and anthropogenic pressure on the marine environment and the Black Sea in particular.

Lata IYER

Director of IOI-India

Ms. Lata Iyer is a Planner, Architect and GIS Analyst living and working in Auroville (www.auroville.org), an international community in southern India aspiring to be a living embodiment of human unity. In Auroville, she's been involved in the Planning and Development of Auroville, and has also worked as one of the coordinators for Auroville's efforts post-tsunami in 2004. Prior to coming to Auroville in 2003, she was a project manager at ESRI (Environmental Systems Research Institute), a private company devoted to building GIS (Geographic Information Systems) software and applications for many industries. She has served as the director of the Regional Conservation Analysis Program at Conservation International that works in many countries around the world for the conservation of biodiversity. She practiced Architecture for several years before going to the US for her Masters in Regional Planning in 1992.

Currently, she's involved in efforts to integrate planning in post-disaster rehabilitation, understanding of water and its management in rural and urban settings and prevention of coastal erosion due to man-made structures.

Tavida KAMOLVEJ

Thammasat University, Thailand

Dr. Tavida Kamolvej is currently the Associate Dean for Academic Affairs and Director of Graduate Study at the School of Political Science, Thammasat University, Thailand. Her academic expertise and research interests emphasize Disaster Management and Public Policy Analysis. In her field of expertise, Previously, she used to serve as Disaster and Emergency Management advisor to the National Disaster Warning Center (NDWC) and is developing an end-to-end disaster warning system and as a Strategic Planning and Evaluation Advisor to the National Security Council (NSC), where she is working to establish a National Crisis Management Center (NCMC).

Dr. Kamolvej also serves as a Chief Technical Advisor to the Department of Disaster Prevention and Mitigation, Thailand. Recently, she joined the sub-committee on Disaster and Risk Communication of the National Committee of Broadcasting, Televising, and Telecommunication, where she has been asked to develop national and local communication regulations and a framework for action. At the international level, Dr. Tavida is the instructor and evaluator for the US State Department Senior Crisis Management Seminar Program in collaboration with American University, Washington DC, USA. In addition, Dr. Kamolvej joined as an Emergency

Management Consultant to the Pacific Disaster Center (PDC), located in Hawaii, USA, since 2005 and also serves as an expert in Community Resilience and Education for Disaster and Risk Management to UNESCO/IOC (Intergovernmental Oceanographic Committee). With the International Ocean Institute (IOI), she is helping educate and train communities on potential risk areas to build their capacity to cope with disaster. Dr. Kamolvej is also commonly called upon by a variety of agencies (UNISDR, UNDP, USAID, NOAA, USFS, and East West Center, University of Hawaii) to assist with the development of materials and training sessions for emergency response and youth programs for schools that support the execution of community action plans for disaster management.

Nicholas KATHIJOTES

Academician, Cyprus University of Technology, Cyprus

Nicholas Kathijotes studied civil engineering at the University of Massachusetts, in U.S.A (1976).

After a Fulbright scholarship, he received his Master's degree in Environmental Engineering at the University of New Haven, Connecticut, U.S.A (1986). He did his doctoral research at the University of Architecture, Civil Engineering and Geodesy - UACEG in Sofia studying the effects of wastewater recycling on various soils. He received his PhD in 2001.

He is a professor in the Department of Civil Engineering at the Cyprus University of Technology since 2008 and also recently elected as 'Adjunct Professor' at the 'Institute of Soil Science- Nikola Poushkarov' in Sofia.

His research interests are in the areas of sustainable use of water resources, wastewater reuse and coastal protection and management with emphasis on the developing countries.

In 2008 he was appointed by the International Ocean Institute Headquarters as the Focal Point of the International Ocean Institute for Cyprus. In this capacity he is coordinating all activities of IOI (Cyprus), hosted by the Cyprus University of Technology. He has considerable research activity towards the evaluation and elimination of nutrients due to human activities in ground and coastal waters.

In 2011 he was honored by the 'N. Poushkarov Institute of Soil Science' for his contribution to the protection of soil resources in Bulgaria and the World. He coordinated and was involved in various projects as follows:

NOVIWAM FR7 EU Project on Water Resources which is currently running , "Treatment Technology and Application of Domestic Solid Wastes", "Industrial and Agricultural Wastes of Fertilizers" , "Reclamation Of Disturbed Terrain" ,"Technological Evaluation of the Effectiveness of Organic Wastes for use in Agriculture" , "Agro ecological evaluation of Wastewater Sludge and Organic Manure for Use in Agriculture". Also, STAR CITY- Marie Curie Actions, COST EU Action 637, COST EU Action 629 and others. He is a Member of the Cyprus Scientific and Technical Chamber (ETEK), and currently Member of the Management Committee of Cost Action ES1003 «Development and implementation of a pan-European Marine Biodiversity Observatory System (EMBOS) » as National Coordinator for Cyprus.

He is also a member of the Editorial Board of the 'Asian Journal of Environment- Behaviour Studies and member of the 'Borneo Science' - International Advisory Board, as well as member of the 'Association of Malaysian Environment-Behaviour Researchers' AMER. He reviews scientific articles for the 'Academy Sains Malaysia (ASM) – Journal', IWA, IASTED and others.

He was invited as expert on environmental issues in various developing countries, by UNEP, IOI-Thailand, 'State Oceanic Association-China', EAS, and others. He is an author of over 70 scientific articles, many of which are related to developing countries, in International Journals, book sections, and conference proceedings. He presented numerous keynote presentations and articles at various scientific events in Europe, Canada, Malaysia, Philippines, Russia, USA, Thailand and others.

Kriangsak KITTICHAISAREE

Kriangsak Kittichaisaree is a well-known international lawyer. He is a Visiting Professor at the University of New South Wales School of Law in Sydney, Australia, and a Distinguished Visitor at the National University of Singapore. He also teaches at Duke University School of Law's Asia-America Institute in Transnational Law from time to time.

His long interest in human rights and humanitarian issues led to his specialization in the International Law of Human Rights at Harvard Law School, where he graduated with a Master of Law (LL. M.) degree in 1983, with the highest grade of A+ for class seminar and another A+ for his research paper on the subject.

For decades, the international community has been trying to prevent and punish genocide, crimes against humanity, and violations of international humanitarian law (or'war crime's). The International Criminal Court has been set up to punish perpetrators of these crimes. In this respect, Kriangsak has made some meaningful contributions. He was commissioned by the Delegates of Faculties of Oxford University to write a standard law textbook entitled International Criminal Law (Oxford University Press, July 2001), a rare accomplishment for an Asian lawyer. In addition, he made outstanding contributions to the conclusion of the Elements of Crimes under the Rome Statute of the International Criminal Court, at the 5th Session of the Preparatory Commission for the International Criminal Court (PCNICC), held at the United Nations Headquarters, New York, in June 2000.

Kriangsak has participated in other negotiations at various United Nations forums. He was the youngest-ever elected Chairman of the Group of 77, comprising over 100 developing countries, for the 9th Session (1991-1992) of the United Nations Preparatory Commission for the International Sea-Bed Authority and for the International Tribunal for the Law of the Sea. Since August 1999, he is a member of the Advisory Body of Experts (Law of the Sea) of the UNESCO Intergovernmental Oceanographic Commission in Paris. He was one of the 5 panelists on the High-Level Panel on 'Terrorism: Threat to a Civilized Society's , moderated by the UN Undersecretary-General for Legal Affairs, at the UN Headquarters, New York, on 9 June 2005. (The other panelists included: Spain's Judge Baltasar Garzon who sought the prosecution of General Augusto Pinochet, former President of Chile, for international crimes, and the Deputy Secretary-General of the Council of Europe. Webcast of this annual Treaty Event is available at: http://untreaty.un.org/English/Panel_2005.asp.)

In his full-time job, Kraingsak holds a rank of ambassador/director-general, with responsibilities over, among other things, human rights; social development; international organizations; peace, security, arms control and disarmament; humanitarian affairs and projects; and counter international terrorism.

David KRAUSE

Geosyntec Consultants. USA Florida.

[Former State Toxicologist for the Florida Department of Health]

Dr. Krause received his Ph.D. in Environmental & Occupational Health, from the University of South Florida, and has 19 years of experience in industrial hygiene, environmental science and public health, with particular emphasis in the areas of occupational health, industrial hygiene, toxicology, indoor air quality, and litigation support. Prior to joining Geosyntec, Dr. Krause was the State Toxicologist for the Florida Department of Health (DOH).

Seokwoo LEE

Vice Dean for External Affairs, Inha University Law School, Republic of Korea

Seokwoo LEE is Professor of International Law and Vice Dean for External Affairs, INHA University Law School, Korea, where he is also working as Director of INHA Int'l Ocean Law Centre. He is also Chairman of Research Committee, SLOC (Sea Lanes of Communication) Study Group-Korea; and Chairman of the Foundation for the Development of International Law in Asia (DILA).

Prior to taking his current post at INHA, he conducted research at a number of universities including the University of Tokyo, Harvard, Georgetown, Oxford, Durham, and George Washington. He holds a D.Phil. (Oxford), LL.M.s (NYU, Minnesota, and Korea University), and LL.B. (Korea University). His research focuses on Territorial and Boundary Disputes, Law of Title to Territory, Law of the Sea, and International Human Rights Law.

He has experience in organizing more than thirty major international conferences, including the Annual LOSI-INHA (now KIOST) International Conference on the Law of the Sea and Ocean Policy with Law of the Sea Institute, UC Berkeley. He has taught at various universities including Xiamen University, China (Marco Polo - ZHENG He Academy in 2009) and William S. Richardson School of Law at the University of Hawai'i at Mānoa, USA (Visiting Wallace S. Fujiyama Professor in 2013).

His representative recent book publications in English are: *Ocean Resources: New Challenges and Emerging Regimes* (edited with Jon M. Van Dyke, Sherry P. Broder, and Jin-Hyun Paik by Brill/Martinus Nijhoff Publishers (2013)); *Northeast Asian Perspectives on International Law: Contemporary Issues and Challenges* (edited with Hee Eun Lee by Brill/Martinus Nijhoff Publishers (2013)); *Asian Approaches to International Law and the Legacy of Colonialism and Imperialism: The Law of the Sea, Territorial Disputes and International Dispute Settlement* (edited with Jin-Hyun Paik and Kevin YL Tan by Routledge (2013)); *Dokdo: Historical Appraisal and International Justice* (edited with Hee Eun Lee by Martinus Nijhoff Publishers (2011)); *Frontier Issues in Ocean Law: Marine Resources, Maritime Boundaries, and the Law of the Sea* (edited with Harry N. Scheiber by The Berkeley Electronic Press (2008)).

His representative recent journal publications in English are: "A Tribunal Navigating Complex Waters: Implications of The *Bay of Bengal Case*", *Ocean Development & International Law* (2013) (with Clive Schofield and Anastasia Telesetsky); "Republic of Korea v. Araye: *Korean Supreme Court Decision on Universal Jurisdiction over Somali Pirates*", *American Journal of International Law* (2012) (with Young Kil Park); "*DOKDO*: The San Francisco Peace Treaty, International Law on Territorial Disputes, and Historical Criticism", *Asian Perspective* (2011); "The 1951 San Francisco Peace Treaty and Its Relevance to the Sovereignty of Dokdo", *Chinese Journal of International Law* (2010) (with Jon M. Van Dyke).

His tripartite research on territorial disputes in East Asia was published in *Boundary and Territory Briefing* by International Boundaries Research Unit, University of Durham, which include *Towards a Framework for the Resolution of the Territorial Dispute over the Kurile Islands* (Vol. 3: No. 6, 2001.9); *Territorial Disputes among Japan, China, and Taiwan concerning the Senkaku Islands* (Vol. 3: No. 7, 2002.9); *The Resolution of the Territorial Dispute between Korea and Japan over the Liancourt Rocks* (Vol. 3: No. 8, 2002.12).

Youna LYONS
Senior Research Fellow
Centre for International Law, the National University of Singapore

Youna is a senior research fellow with the Centre for International Law at the National University of Singapore focusing on regional environmental governance in Southeast Asia. Her primary research areas are offshore oil and gas in Southeast Asia, the use of satellite imagery to inform marine environmental management through habitat mapping and maritime boundary disputes on remote features, the protection of marine sensitive environments in the seas of Southeast Asia and the underlying legal and institutional governance framework.

Prior to this, Youna created and led the private international law practice of the Litigation and Arbitration Group at Clifford Chance (Paris office), one of the world's leading law firms, for more than 12 years. Passionate about the ocean, Youna has been trained in marine ecology and policy at the College of Ocean and Fisheries of the University of Washington (where she obtained a Masters in Marine Affairs).

Youna's dual expertise in law and marine sciences uniquely position her to integrate these fields for marine policy making purposes. In addition she focuses on developing industry relevant research and on involving the industry in marine policy proposals.

Rossukhon MAKARAMANI

Suan Sunandha Rajabhat University, Bangkok, Thailand

Dr. Rossukhon Makaramani is an Associate Professor and Chair of Master Degree Program in Teaching Profession at Suan Sunandha Rajabhat University. She serves as a Member in Educational Profession Development Committee of The Teachers' Council of Thailand. Her experiences include Dean of the Faculty of Education, President of Rajabhat Universities' Education Deans Consortium, Vice-President of Thailand Education Deans Council, Head Department of Educational Technology & Innovation, Director of Academic Promotion Bureau, and a Committee of University Council.

Dr. Makaramani earned her B.Ed. with first-class honor in Social Studies and M.Ed. in Elementary Education from Chulalongkorn University, Thailand. With Thai government scholarship, she completed her M.Ed. in Educational Technology and Ph.D. in Curriculum and Instruction from Texas A&M University, USA. Her academic interests include educational technology, innovative teaching strategies, ICT in education, project-based learning, citizenship education, and education for sustainable development. She has authored several academic books, academic articles, research reports and documentary. Her publications cover more than 500 entries.

Alenka MALEJ

Director, Marine Biological Station, Piran, National Institute of Biology, Director, IOI Slovenia

Director of the IOI Operational Centre Slovenia, is a research program director at the National Institute of Biology and full professor of ecology at the University of Ljubljana, Slovenia. She has authored/co-authored more than 150 peer reviewed scientific papers. Dr. Malej has broad experience in the coordination of national/international research projects and served as head of the Marine Biology Station in Piran for more than two decades. She has been involved in the NCEAS Working group on Global Jellyfish Blooms and several research, monitoring and policy initiatives in the Mediterranean region. She was awarded the National Award for Scientific Achievements (1989, with 2 colleagues, and in 2000), Prometheus of Science for Excellency in Communicating Science (2006) and the M. Zei award for reasearch work in the field of life & environmental sciences (2011).

Alenka Malej is a member of the Bureau Central de la Commission International pour l'Exploration Scientifique de la Mer Mediterranée (CIESM), chairperson of the National Committee for the Intergovernmental Oceanographic Commission (IOC) and national MED POL co-ordinator of UNEP MAP (United Nations Environmental Programme, Mediterranean Action Plan). She acted as a consultant/expert for UNEP/MAP, was visiting scientist/professor at many renown universities/marine institutions and taught Coastal Zone Management at UNIDO and UNESCO international courses, for the International MBA Degree Programme, ICPE Ljubljana, and Joint Study of the two EU universities of Trieste, Italy and Koper, Slovenia.

Bin MAO

State Oceanic Administration, People 's Republic of China

Professor Mao Bin worked for the State Oceanic Administration of China (SOA) from 1969 to 2008 and successively held academic, and governmental and diplomatic posts: Secretary-General, the China Ocean Mineral Resources R&D Association (COMRA), 2001—2008; Deputy Permanent Representative of the People's Republic of China to the International Seabed Authority, Kingston, Jamaica, 1998-2001; Advisor and Deputy Representative of China to the Preparatory Commission for the International Seabed Authority and for the International Tribunal on the Law of the Sea during 1986-1994, and then to the International Seabed

Authority, 1995-2008; Deputy Director-General, the International Cooperation Department, SOA, Beijing, China, 1994-1998. During this period of time, he concurrently served as Chairman of the National Committee for Implementing GEF/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS) known as the first phase of PEMSEA in 1994 with Xiamen as the demonstration site.

He participated in the drafting of China's long-term marine development strategy. He was a member of the Leading Group for working out China Ocean Agenda 21. After retired in 2008, he served as senior consultant for the Department of International Cooperation, SOA, responsible for Implementation of SDS-SEA (3rd phase of PEMSEA) in China, and head of the Chinese Delegation to the Workshop for Managing the Potential Conflicts for the South China Sea in 2008, 2009, 2010. He is now honorable professor, guest professor, and senior research fellow for several universities and research institutions.

Frederick MASSMANN
Department of Geography, Kiel University, Germany

Mr. Frederick Massmann was born on 04 April 1984 in Northern Germany. He graduated at the Department of Geography, Kiel University, Germany with the Diploma of Geography in 2010. Since then he works as a research assistant at the same department. Aside from teaching he conducted research on the Tsunami 2004 with an emphasis on social vulnerability and adaptation at the Andaman Coast of Thailand. Currently he is finishing his Ph.D. on the social implications of flooding in Bangkok. From September 2012 until February 2013 Mr. Massmann worked at the Social Research Institute, Chulalongkorn University Bangkok as a visiting researcher. His main research areas are 'hazard research', 'development research', and 'human-environment research'.

Anton MICALLEF
Institute of Earth Systems, University of Malta

Dr Anton Micallef, lecturer at the University of Malta, holds a B.Sc. (Hons) in Biological Sciences from Plymouth, UK, a Post-Graduate Diploma in Air & Water Pollution Control (London), and a Ph.D. on Beach Management in the Maltese Islands (Swansea, Wales). Since 1989, he has headed a Council of Europe specialized centre (the Euro-Mediterranean Centre on Insular Coastal Dynamics – ICoD) pertaining to the EUR-OPA Major Hazards Agreement. Dr. Micallef currently holds the position of Chairman of the Committee of Directors of Specialised Centres under this Agreement. He is also a faculty member of MedCoast Network (a Euro- Mediterranean network of scientists dedicated to coastal management in the Mediterranean and the Black Sea) since 1994. He is chairman and organizer of the International biennial Conference series on the Management of Coastal Recreational Resources since 2004, and was

also Project Director of the ICSC - World Laboratory (Geneva) Malta Centre on Atmospheric and Ocean Modelling in the Mediterranean (1997 – 2005). Dr Micallef has authored/co-authored several publications and reports on coastal /beach management related issues, and has also coordinated several EU-funded projects addressing the coastal and marine environment.

Research Interests
- Coastal geomorphology
- Integrated Coastal Area Management
- Beach management

Kit MIYAMOTO
Miyamoto International, U.S.A.

Dr. H. Kit Miyamoto S.E., is the CEO for Miyamoto International a California Seismic Safety Commissioner and a governing board member for Global Earthquake Model. Under his leadership, more than 15,000 projects have been successfully completed worldwide. Dr. Miyamoto has won numerous awards including the National Council of Structural Engineers Associations Excellence in Structural Engineering Award. Dr. Miyamoto specializes in high-performance earthquake engineering, and disaster mitigation, response, and reconstruction.

Dr. Miyamoto was an expert consultant to the World Bank on the seismic risk mitigation project for 1,500 schools in Istanbul. He worked with the government of Haiti, the UN, and USAID to conduct seismic assessments of more than 430,000 earthquake-damaged structures in that country. Dr. Miyamoto is implementing the repair and strengthening of more than 120,000 damaged Haitian buildings. He is also involved with post-disaster reconstruction in New Zealand and natural disaster risk reduction in Bangkok and Manila.

A past director for the Structural Engineers Association of California, Dr. Miyamoto is an American Society of Civil Engineers (ASCE) Fellow, who has served on many code-writing organizations, including the ASCE 7 Seismic Task Committee. He was also an adjunct professor at California State University. Dr. Miyamoto holds graduate degrees from the Tokyo Institute of Technology and California State University where he has been recognized as a Distinguished Alumni.

Dr. Miyamoto has published more than 100 technical papers and is a frequent international speaker. He has been featured by several media organizations, including CNN, NBC, the Discovery Channel, the New York Times, and Rolling Stone.

Walter D. MOONEY
U.S. Geological Survey, Earthquake Science Center, U.S.A.

EDUCATION:

University of Wisconsin, Ph.D. in Geophysics, 1979.
Cornell University, B.S. in Physics, 1973.

POSITIONS HELD:

Research Geophysicist, USGS, 1978-present
Chief of the USGS Branch of Seismology, USGS 1994-1997
Consulting Professor of Geophysics, Stanford University, 1984-2006

Professional Associations:

American Geophysical Union (1973; Fellow 1996), President of the AGU Seismology Section (2002), Sigma Xi (1980), European Geophysical Union (1993), European Union of Geosciences(1994), Seismological Society of America and SSA Eastern Section (1973), American Association for the Advancement of Science (1997), Geological Society of America(1973;

Very short Bio:

Dr. Walter D. Mooney is a research seismologist with the US Geological Survey (USGS), Earthquake Science Center in Menlo Park, California, USA. His thirty-four year career at the USGS has focused on reducing earthquake and tsunami hazards, both domestically and internationally. Most recently, he has travelled to

Japan, China, Indonesia, Haiti and Chile to investigate the deadly earthquakes that struck those countries. He was the lead USGS coordinator for the development of an Indian Ocean tsunami warning system. He is a native of New York and graduated of Cornell University (B.S.) and the University of Wisconsin (Ph.D.). He has co-authored two books on geophysics and published 175 research papers.

Supanee NITSMER

Assistant Professor, Faculty of Mass Communication,
Ramkhamhaeng University, Thailand.

Ms. Nitsmer obtained B.A. in Education (1st Class Honors) from Chulalongkorn University in 1978 and M.A. in Mass Communication from Thammasart University in 1991. She was awarded scholarships to conduct the Graphic Reproduction (Colombo Plan) in Singapore; the Television Program Production (NHK-Communication Training Center) in Japan; and again the Television Program Production at Capilano College in Canada.

Her working experiences are in Television Script Writing, Journalism and Photojournalism; a project leader in "Youth Television Program Production", in collaboration with TV Channel 5, Thailand (1995-2005); co-authors in “The Appropriate Post Rating for Television Program: A Case Study of Thai TV Channel 7”, Research Working Paper, 2008. Her current online papers: Quality Rating in TV Programme (in Thai language) can be accessed at www.lib.ru.ac.th., Public Service Broadcasting in Thailand, and Tsunami Disaster Prevention and the Roles of Media in Thailand at www.jamco.or.jp.

Ioan NISTOR
University of Ottawa, Canada

Dr. Ioan NISTOR is an Associate Professor of Hydraulic and Coastal Engineering in the Department of Civil Engineering of the University of Ottawa and Vice-Dean Graduate Studies of Faculty of Engineering. Dr. Nistor is a coastal and hydraulic engineer researching hazards associated with extreme hydrodynamic loading on infrastructure (tsunami impact on infrastructure, extreme wave and flood forces on structures, dam failure phenomena, etc.) and he is currently the Vice-Chair of the Maritime and Coastal Division of International Association for Hydro-Environment Engineering and Research (IAHR) and a member of the Board of Directors of the Canadian Coastal Science and Engineering Association. He is also a voting member of the new ASCE7 Subcommittee for the elaboration of New Design Guidelines for Tsunami-Resistant Buildings.

Dr. Nistor is also an Associate Editor of the Coastal Engineering Journal (JSCE – Japan), of the Canadian Journal of Civil Engineering (CSCE), and of the Maritime Engineering Journal (ICE – UK). He is the winner of several research and teaching awards: 2010 Award of the Tsunami International Society, 2010 Excellence in Education Award of the University of Ottawa, 2009 John V. Marsh Teaching Award of the Faculty of Engineering, 2005 Ontario Ministry for Infrastructure Renewal.

Dr. Nistor started his academic career in the Faculty of Hydrotechnical Engineering of the Technical University of Iasi, Romania. Following his doctoral studies in Coastal Engineering at Yokohama National University, Japan, he was awarded several postdoctoral fellowships (DAAD-Germany, NATO-Greece, AUF-Canada) and participated in several academic research programs (TEMPUS and SOCRATES) at universities in Europe (France, Germany, Greece, Italy, UK), Japan, and Canada in the fields of hydraulic and coastal engineering).

Prior to joining the University of Ottawa, Dr. Nistor spent several years as a design and consulting hydraulic engineer with AECOM-TECSULT Montreal, working on various international and Canadian projects related to dam engineering, coastal engineering, environmental engineering, as well as sanitation and water resources development.

Iouri OLIOUNINE
IOC/UNESCO

Dr. Oliounine was born on 30 May 1939 in the Russian Federation. He graduated from the Institute of Foreign Languages in Gorky (ditto, Nijnii Novgorod) with the Diploma of Teacher of English and German Languages, Master of Arts in Linguistics. He was a Professor of English at the Polytechnic Institute in Gorky, Leningrad State University; Graduated with the Diploma of Master of Science in Marine Geophysics, Arctic and Antarctic Research Institute in Leningrad.

He participated in more than 20 national and international research cruises as engineer, head of scientific group, head of expedition; formulation of the scientific programmes of the expeditions and fully in charge of their implementation. As some of the expeditions were implemented by groups of foreign and national RVs I was in charge of the coordination of their work.

He obtained a PhD in Geophysics for the research in the area of statistical and spectral analysis, forecasting and modelling of sea waves and swell. He was the First Deputy of the Head of the Central Directorate of the State Committee for Hydrometeorology, Soviet Union; Assistant Secretary of the Intergovernmental Oceanographic Commission of UNESCO, Head of Ocean Services Section in charge of data collection and management systems, and of IOC programmes related to natural hazards mitigation (P5); Deputy Executive Secretary of IOC (D1); Coordinator of the International Year of the Ocean in charge of coordinating related activities of UN and other governmental agencies, NGOs, Member States and industries; IOC Consultant; Executive Director of the International Ocean
Institute in Malta. He obtained a Honorary Doctor of the Nijnii Novgorod University in 2008.

At present, he is employed as the IOC Consultant in charge of the coordination of the 50th anniversary of the IOC. He published around 100 papers in Russian and English. He received several awards and diplomas of recognition for the input to the ocean science and international cooperation.

Gerassimos A. PAPADOPOULOS

Research Director, Institute of Geodynamics, National Observatory of Athens

G. A. Papadopoulos since 1995 was Researcher, and since 2002 is Research Director, with the Institute of Geodynamics, National Observatory of Athens, which is responsible for the 7/24 seismic monitoring and the operation of the tsunami warning system of Greece. His main research fields are the tsunami science including early warning and risk mitigation as well as seismology, seismotectonics and earthquake prediction from seismicity patterns.

After his studies in the Univ. of Thessaloniki, Greece, holding BSc in Physical Sciences (1975) and PhD in Solid Earth Geophysics (1982), he was post-doctoral researcher with the Seismological Lab., MIT, Boston, USA, 1984; Visiting Researcher, Seismological Lab., Natl. Research Center for Earth Science & Disaster Prevention, Tsukuba, Japan, 1993, and Visiting Professor, Earth Sciences Dept., Univ. of Tohoku, Sendai, Japan, 2004.

He was with the Earthquake Planning & Protection Organization (EPPO), Athens (1985–1994) serving later as Chairman of the EPPO's National Committee for the Evaluation of Earthquake Hazard and Risk (2006-2008). He served also as Vice-Chairman of the IUGG Tsunami Commission (2003-2009) and of the ICG/NEAMTWS/IOC/UNESCO (2005-2009), Co-Chair of the Task Team on the System's Architecture for NEAMTWS (2009-2011) and Member of the Inter-ICG Task Team on Tsunami Watch Operations of IOC (2011-present); Vice-Chairman of the European Advisory Evaluation Committee for Earthquake Prediction, Council of Europe (1994-2001), President of the International Natural Hazards Society (2000-2006), Chairman of the Subcommission on Earthquake Prediction, European Seismological Commission (ESC, 2004-2006), Vice-Chairman of the ESC (2006-2008) and Member of the International Commission on Earthquake Forecasting (2009-2012) established by the Italian Government in the aftermath of the lethal L' Aquila earthquake of 6

April 2009. He has been awarded special prizes given by several organizations including the Academy of Athens (2002) and the EuroScience foundation (2003).

He has been Coordinator and/or Principal Investigator of many national and international research projects publishing more than 100 reviewed papers and getting more than 1300 citations. Currently he coordinates a project for the development of near-field early tsunami warning systems in the Mediterranean focusing initially in Rhodes island, Greece, supported by EU DG-ECHO.

George PARARAS-CARAYANNIS

President of the Tsunami Society International, U.S.A.

Dr. Pararas-Carayannis has a Ph.D. in Marine Sciences from the University of Delaware, a M.S. in Oceanography from the University of Hawaii, and both a B.S. in Chemistry-Mathematics and an M.S. in Chemistry from Roosevelt University. In addition to mathematical modeling and field studies of natural disasters, Dr. Pararas-Carayannis has considerable experience in Environmental Engineering, Coastal Engineering, Geology, Seismology, Volcanology, Geophysics, Risk Analysis, Disaster Planning/Mitigation, Real Time Data Systems, and Hazard Reduction. He has been Oceanographer/Geophysicist or consultant to a number of government agencies including the State of Hawaii, the United States Army, NOAA, EPA, the Smithsonian Institute the Nuclear Regulatory Commission, and numerous United Nations organizations.

SPECIAL EXPERTISE

* Extensive experience on mathematical modeling of hurricanes, hurricane surges, and tsunamis. * Coastal and Ocean Engineering. * Extensive experience in environmental work (Effects of ocean dumping; coastal processes). * Applied tsunami research, including: Focal mechanisms of earthquakes and tsunamis (with N. S F. support); * Development of methodology for studying tsunami propagation and terminal effects; * Historical documentation of tsunamis in Hawaii, Alaska, the Pacific and Atlantic Oceans; * Quantitative surveys of the most important tsunamis to strike Hawaii for the last fifty years; * Development of tsunami inundation limits for coastal evacuation and zoning; * Development of mathematical modeling for tsunami travel times and paths; * Development of methodology for fast earthquake epicenter determinations; real time assessment of the tsunami hazard for warning purposes. * Earthquake, Tsunami, and Hurricane Surveys * Environmental Impact Statements. * Risk analysis. * Development of a multi phase approach to environmental hazard vulnerability reduction and preparedness. * Planning and preparedness for environmental hazard risk reduction. * Standard Operating Plans for Civil Defense Agencies.

INTERNATIONAL SCIENTIFIC LEADERSHIP Organized and chaired or co-chaired several international conferences, symposia, and workshops, on disasters and mitigation of disasters in United States, Canada, Chile, Peru, Mexico, China, Philippines, Ecuador, former Soviet Union, and elsewhere. The following are a few examples:

* Co-Chairman: International Tsunami Workshop, August 1989, Novosibirsk, Siberia, USSR * Co-Chairman / Keynote Speaker: Fourth International Conference on Natural Disaster Mitigation, August 1991, Perugia, Italy. * Chairman: Third International Conference on Disaster Mitigation, Scripps Institution of Oceanography, University of California La Jolla, California, and at CICESE, Ensenada, Mexico,1988. * Chairman: XI Session of the International Tsunami Warning System in the Pacific, UNESCO-IOC,September 1987, Beizing, China.

International Cooperation / Leadership in Disaster Mitigation. Since 1965, when the International Tsunami Warning System in the Pacific was established at a meeting in Honolulu, instrumental in increasing the membership from the original 6 nations to 25. (presently 28). As Director of ITIC under the auspices of the United Nations Educational Scientific and Cultural Organization (UNESCO) and its Intergovernmental Oceanographic Commission (IOC), handled and processed all Tsunami investigations around the world; monitored tsunami warning system automation; prepared detailed data bases for historical tsunamis; arranged for membership of several nations into the Tsunami Warning System; published and distributed educational newsletters to 75 countries around the world; prepared, participated and distributed master plans for the development of tsunami warning systems in the Pacific; assisted developing countries with disaster preparedness; developed and published numerous educational materials; conducted liaison activities and

international cooperation with agencies in more than 50 different countries; managed and conducted a very successful international visiting scientists training program in Hawaii; monitored and performed important tsunami research; participated, chaired and gave keynote addresses at several international conferences in Europe, China and the Americas; published a glossary with definitions of more than 3,000 technical terms; edited and published voluminous proceedings of conferences; published numerous papers, books and reports; performed noteworthy community services; responded to hundreds of inquiries for assistance from numerous countries around the world.

International Decade for Natural Disaster Reduction (IDNDR): Active in the International Decade for Natural Disaster Reduction (IDNDR), by having contributed to the United Nations master planning for implementation, particularly for developing countries.

International Scientific Societies: Co-founder and officer of the Tsunami Society, President, Vice-President, Treasurer, Secretary) and the International Society for Natural Hazards Mitigation (Vice-President, incorporating it as a non-profit international organization in Hawaii). Served as Chairman or co-organizer of Conferences for these societies in Hawaii, Canada, China, former Soviet Union, Mexico, and in Perugia, Italy.

Awards: Numerous awards and commendations. Among them: In 1988,
Award (2002) of the International Tsunami Society for original and outstanding contributions to the Science of Tsunami Hazards http://www.sthjournal.org/award.htm

Hobbies and other Activities: Sailing, Writing, Poetry, the Arts; Also served as Vice-President, National Society of Arts and Letters, NSAL, Hawaii Chapter); Insignia Chairman - National).

Publications (Partial Listing)131 at http://drgeorgepc.com/Publications.html

Alain PIQUEMAL

Dean of the Faculty of International Law "Institute of the Law of Peace and Development"
University of Nice-Sophia Antipolis (UNS), FRANCE), Director of the Maritime and Law of the Sea Center
Honorary Vice-President of UNS in charge of Environment and Sustainable Development, France

- Dean of the Faculty of International law “Institute of the Law of Peace and Development”, University of Nice Sophia Antipolis (UNS, France), Director of the Maritime and Law of the Sea Center, Honorary Vice-President of the UNS, in charge of Environment and Sustainable Development,
- Member of the Governing Board of I.O.I. and of its Executive Committee ;
- Legal Consultant since 1978 to the United Nations and Specialized Agencies (UNO, WHO, FAO, IMO, UNEP) , the World Bank Group , O.E.C.D in several members States of U.N (drafting of laws and regulations regarding the maritime and environmental sectors), UNITAR (training legal seminars);
- Missions as Legal Adviser for various French and Foreign Departments (Foreign Affairs, Justice, Environment), specialised in questions of maritime delimitations.
- Member of the National Council of the Sea of the Principality of Monaco;
- Senior Lawyer in international Law Firms, in charge of specialized Departments (maritime law, environmental law, banking law, trade and investment law, privatisation law). Experience before International Courts (International Court of Justice, The Hague; Court of Justice of the European Union, Luxembourg);
- Arbitrator and President of Arbitration Tribunals ;
- Senior Lawyer before the UNCC (United Nations Commission for Compensation), first Gulf War), F4 Claims (Maritime Environmental Law), Geneva/Switzerland, (2001 / 2003).
- Administrator of the « Operating Company of the Ports of Monaco » (Société d’Exploitation des Ports de Monaco) and Vice-President of the “Banque Populaire de la Côte d’Azur”.

Wong POH POH

Visiting Associate Professor, School of Social Sciences, University of Adelaide

Poh Poh Wong is currently a Visiting Associate Professor at the School of Social Sciences, University of Adelaide. He is a Former Associate Professor at the Department of Geography, National University of Singapore, and has a Ph.D. from McGill University. He is a coastal geomorphologist with more than 130 publications and wide experience on the coasts of more than 30 countries, particularly in Southeast, South and East Asia and Indian Ocean islands. He is a Lead Author in the IPCC (Intergovernmental Panel on Climate Change) Third Assessment Report (2001) and a Coordinating Lead Author in the Fourth Assessment Report (2007) and the forthcoming Fifth Assessment Report (2014). Since 2005 he expanded his research on the Indian Ocean tsunami and has conducted fieldwork in Southern Thailand, Aceh, Tamil Nadu and Sri Lanka and is currently evaluating ecosystem-based management (EBM) for coastal erosion and sea-level rise. He is part of the IPCC which won the joint-award of the 2007 Nobel Peace Prize and the Millennium Ecosystem Assessment which won the Zayed Prize for the Environment in 2005. He received the Special Commendation Award from the National University of Singapore in 2008. He is a Life Member of the Geological Society of Malaysia and a Member of the International Society for Mangrove Ecosystems.

Victoria N. RADCHENKO

Director of IOI-Ukraine, Regional Representative for Eurasia

Dr. Victoria N. Radchenko is Head of the Marine Biological Resources Chair in Ukrainian Maritime Institute, marine biologist and international programs manager for Oceanological Center of National Academy of Science of Ukraine (OC NASU) in Sevastopol. Prior to this position, she served as marine biologist for Institute of Biology of Southern Seas (IBSS) of NASU where she managed research from the level of Ph.D. work to joint academic project with Lund University (Sweden) later on gradually developed into applied fish farming aquaculture engineering in Ukraine (Crimea). Dr. Radchenko joined OC NASU in 2000 and established International Ocean Institute (IOI) Operational Center in Ukraine (IOI-Ukraine) Now Dr. Radchenko works as a Director of IOI-Ukraine performing a variety of projects aimed at integration of national marine science research into internationally recognized efforts and public awareness in environmental issues increase in Ukraine.

Dr. Radchenko joined OC NASU from IBSS NASU in Sevastopol where she served as Technical Assistant, Ph.D. student, Post-doc and Research Biologist and Program Manager from 1989 till 2005. During her tenure at IBSS NASU, she worked with a variety of projects which included general marine biology, fish physiology, histology, biotechnology, aquaculture and marine environment protection as well as risk management.

Dr. Radchenko received her Ph.D. degrees from University of St. Petersburg, Russia in 1994, and University of Kharkov, Ukraine in 1997. Later on she entered and graduated from World Maritime University in Malmo (Sweden) with Masters in Maritime Affairs. Her awards include Sasakawa Foundation scholarship and the President of Ukraine research fellowship.

Dr. Radchenko published over 55 manuscripts, 1 patent, co-edited Conference Proceedings book, several articles and given over 55 presentations to national and international audience. She also serves as technical advisor for Sevastopol and Ilyichevsk Municipality from 2005 till now. She is ethnic Ukrainian and a citizen of Ukraine, married, with a son and two daughters.

Natasha C. RALSTON

Secretary and Administrative Assistant, IOI Headquarters, Malta

Ms. Natasha Ralston was born in Birmingham, United Kingdom. She attended and completed her studies at Carisbrooke High School, Isle of Wight in the United Kingdom and St. Joseph's High School, Sliema, in Malta and obtained GCSE/`O' Level standard of education in English Language, Literature, Maths and Italian.

Ms. Ralston began her professional career with the International Ocean Institute (IOI) Headquarters in 1989 as a Clerk and worked her way up to the post of Secretary & Administrative Assistant. During the last 23 years with the IOI, she has contributed to supporting the organisation's administration and communication with the IOI Governing Board Members/Steering Committee, Operational Centres & Focal Points, assists in the

organisation of official meetings and events, disseminates/circulates IOI annual reports, various publications and announcements. She also worked as an Editor for various IOI publications, namely; the IOI Ocean Songbook: a selection of our favourites in 2011; the Thai Seas and Global Warming: Narrative School Children's Artworks in 2010-2011; Proceedings of the the Pacem in Maribus XXXIII Conference held in Beijing, China in 2011-2012; and assisting in compiling the publication on the Celebration of the 40th Anniversary of IOI and the 10th Anniversary of Professor Elisabeth Mann Borgese's passing away planned to be published in 2012. Ms. Ralston enjoys sports, music, reading and travelling.

Greg REED

Executive Officer, Australian Ocean Data Centre Joint Facility, Australia

Greg Reed is an internationally recognised oceanographic data management expert with significant experience in the development, implementation and operation of ocean data and information management infrastructures at national and regional scales.

He has a strong interest in international co-operation and has served as Co-chair of the Intergovernmental Oceanographic Commission's International Oceanographic Data and Information Exchange (IODE) Committee for two consecutive terms and is currently Chief Editor for OceanTeacher, the IODE capacity development system for oceanographic data and information management. He has taken a lead role in developing a capacity building framework for oceanographic data management for the IODE programme, including participation as course coordinator and lecturer at more than forty international training courses on aspects of data management and GIS, included training for the IOI programme.

He is also technical lead for the design and application of marine and coastal atlas development for the IODE programme including the African Coastal and Marine Atlas, a collection of national and regional scale maps and datasets that will play an important role for regional decision and policy makers in Africa coastal states.

Stephen Adrian ROSS

Acting Executive Director, PEMSEA Resource Facility

Stephen Adrian Ross is an environmental policy and technical advisor with longstanding record of capacity development in sustainable coastal development over the past 20 years in the East Asian region. Currently he holds the position of Acting Executive Director (AED) and Chief Technical Officer of the PEMSEA Resource Facility and is responsible for managing the GEF/UNDP/UNOPS Regional Project on Implementation of Sustainable Development Strategy for the Seas of East Asia (SDS-SEA) executed by PEMSEA. Rich in experience in partnership building with national and local governments, UN organizations, IFIs, NGOs, the private sector and universities in East Asian region, he was a key contributor to the adoption of the SDS-SEA by 14 countries in East Asia and one of the founding members of PEMSEA as a regional organization with its own international legal personality. He is editor-in-chief of Tropical Coasts, a PEMSEA journal on sustainable coastal development, as well as author, advisor and editor of numerous case studies, policy briefs and technical reports on integrated coastal management (ICM) development and implementation, and the principal coordinator for the EAS Congress, a triennial event organized by PEMSEA for partners, collaborators and stakeholders to share knowledge and monitor the progress of SDS-SEA implementation. He is an engineer by training and a Canadian citizen.

Mary SEET-CHENG

Chair, East Asian Seas Partnership Council, PEMSEA, The Philippines

Ambassador Mary Seet-Cheng is the Council Chair of the East Asian Seas Partnership Council and currently a Senior Specialist Adviser in the Ministry of Foreign Affairs. She is also non-resident Ambassador of Singapore to Panama and Cuba.

She served as a diplomat in the Ministry of Foreign Affairs of Singapore from 1973 to 1997, and has held many senior appointments. From January 1993 to June 1996, she served as Singapore's Ambassador in Brussels from

which she was concurrently accredited to the three Benelux countries (Belgium, the Netherlands and Luxembourg), the European Commission and the Holy See. She had also held several senior appointments in the Ministry, covering a wide range of portfolios, including Europe, North America, Southeast Asia, ASEAN and International Economics. She also headed the Management and Personnel Directorate.

In November 1997, Ambassador Cheng joined the Maritime and Port Authority (MPA) of Singapore as Director, Policy. As Director (Policy) until May 2006, she oversaw policy and strategic planning, port industry development and regulation, economic research and international affairs. During this period, she regularly represented Singapore at the International Maritime Organisation meetings in London. She remains a Special Adviser to MPA.

Ambassador Cheng graduated with a Bachelor of Business Administration (Hons) Degree from the University of Singapore in 1973. In 1986, she was awarded a Fulbright Scholarship to pursue a Master of Arts Degree in International Relations from the Fletcher School of Law and Diplomacy, Tufts University, Massachusetts.

Ambassador Cheng is married to Leonard Cheng Tye Loke.

They have two grown sons, Wayne and Winston.

Pran SIAMWALLA

President, Association of Natural Disaster Prevention Industry, Thailand

Mr. Siamwalla currently holds a title as President of Association of Natural Disaster Prevention Industry, a non-profit entity promoting awareness and preventions to ever-increasing & more violent natural disasters by; i) tapping & sharing top international scientific knowledge through the Association's Conferences with full supports from media, ii) implementing recommendations through local Government's policies changed with Inter-Government assistant, iii) assisting technical transfer fulfilling local demands, iv) promote demand creation both private & public. Earthquake and flood/drought (Water Economy) are the primary focus.

He's a banker by profession, working for Bank of Ayudhya PCL., under the title of Environment & Social Management System (ESMS) Officer, the task of implementing credit policies requiring all lending to be environmental & social friendly. He provided consultation to USAID on Green Banking and Kenan Institute Asia on Micro-Finance, being the Key-Note speaker at IFC's forum on Green Banking.

He has been in financial arena more than twenty years starting from the Wall Street career in New York during 1980's. His early days have already provided him with valuable experiences such as company liquidation of a Commodities Exchange in Chicago, an affiliate of Continental Grains, Inc., and investment firm, McAndrews & Forbes, Inc. which took over companies such as, Revlon, CBS Fox, etc.

He's been working in various posts as Managing Director, Principal, Director, Advisor; both for business, Inter-Government, NGO, & charitable entities, Strategist, Controller, VP title in Private Banking, Investment Banking, Business Development, Representative, Consultant, etc., for numeral financial institutions such as Dow Jones & Co, Inc., MBIA (the world largest Mono-line Insurer), Nomura Securities, etc. He served as the Senate's Sub-Committee's Advisor of International Affairs on Climate Change Negotiation and Senate's Sub-Committee's Member of Science, Technology & Communication of Thailand. He represented Inter-Government Agency attending the Pre-Cop 17, UNFCCC Conference.

Mr. Siamwalla has dedicated his time to share his knowledge and insight through Inter-Government's Conventions, Conferences, Universities, etc. He gave interviews to Forbes Global, Business Weeks, Bloomberg, etc. He regularly chairs several high-profile international professional conferences under the topics such as Bangkok Long-Distant Large Earthquake, Coastal Erosion Prevention, Floating Breakwaters, Private Jets, FPSO, FLNG, Global Pension Fund Management, etc.

He earned a Master of Management from SASIN, a joint program between Kellogg, & Wharton, with a Bachelor in Accounting from St. Francis College in New York.

Nuanchan SINGKRAN

Faculty of Environment and Resource Studies, Mahidol University, Thailand

Dr. Nuanchan Singkran was born in Chantaburi province located in the eastern part of Thailand. Nuanchan entered the Faculty of Science at Chulalongkorn University in 1989 for her undergraduate study in Marine Science with a major in Marine Biology. After graduation, Nuanchan began her career as an environmental reporter for Thai and English newspapers during 1993 – 1996. During her career as a journalist, Nuanchan received a 2nd place award for an environmental article supporting Eco-Tourism of Thailand in 1993, and the award for outstanding environmental news reporter from the Environmental Siam Association in 1994. During 1996 – 1999, Nuanchan obtained scholarships from the Chin Sophonpanich Foundation for Environment and from the Biodiversity Research Grant to further her Master's program in the multidisciplinary Department of Environmental Science, Chulalongkorn University.

In 2001, Nuanchan received a government scholarship to pursue her PhD program in Natural Resources at Cornell University in Ithaca, New York. After graduation, Dr. Singkran worked for Water Quality Management Bureau's Marine Water Division, Pollution Control Department, Ministry of Natural Resources and Environment, for about 5 years. She established the Aquatic Ecology and Mathematical Modeling Center; and she was responsible for all related-aquatic modeling works spanning from rivers through coastal zones to the sea. Since October 2012 upon present, she has become a permanent lecturer at Faculty of Environment and Resource Studies, Mahidol University, Nakhon Pathom, Thailand. Other than her fields of expertise in aquatic systems (from a river through estuary to the sea), Dr. Singkran 's research interest are system dynamic and ecological modeling.

Anond SNIDVONGS

Director, Geoinformatics and Space Technology Development Agency (Public Organization), Thailand

Date of Birth: 7 October 1960
Place of Birth: Bangkok, Thailand
Citizenship of: Thailand
Education: Ph.D. (Oceanography), University of Hawaii, 1993
Professional Awards and Recognitions:
1999 Recipient of International START Young Scientist Award
Positions :

- Director, Geoinformatics and Space Technology Development agency (Public Organization), (since Jan 2012)
- Director, Climate Change Knowledge Management Center, National Science and Technology Development Agency (since 2010)
- Assistant Professor, Department of Marine Science, Chulalongkorn University, Bangkok, Thailand (since 1985)
- Director, Southeast Asia START Global Change Regional Center (since 2001)

Project Leaders/Coordinators (Last 5 years):

- Task Teams Leader, Climate and Agriculture Modeling, Hydro-Agronomic Economic Model (HAE) for the Mekong Basin and Local Adaptation for Thailand and Lao PDR, Department of Water Resource, Thailand and Water and Environment Research Institute, Lao PDR, with support from The World Bank.
- Co-Project Leader, Cities at Risk: Developing Adaptive Capacity for Climate Change in Asia's Coastal Megacities. An International Project of START in collaboration with The World Bank Institute, Asia Pacific Network for Global Change Research, USAID and IDRC.
- Coordinating Lead Author, Thailand Assessment Report on Climate Change, Working Group 2, Risk, Vulnerability and Adaptation. Thailand Research Fund.

 Principle Investigator, Ensemble of Climate Model Outputs for Thailand. Thailand Research Fund.

 Team Leader, Impact, Vulnerability and Adaptation to Climate Change and Climate Variability of Major Sectors—a Contribution to Thailand Second National Communication to UNFCCC, Office of Natural Resources and Environmental Policy and Planning (ONEPP)

International Activities:

 Lead Author, Chapter 5 (Coastal Systems and Low Lying Areas) of IPCC Working Group II Contribution to the Fifth Assessment Report (AR5): Climate Change 2013 Impacts, Adaptation and Vulnerability (since 2010)

 Editorial Board, Current Opinion in Environmental Sustainability, Elsevier (Since 2009)

 Advisory Committee to the Executive Director, Asian Disaster Preparedness Center (since 2009)

National Committees (Last 5 years):

 Commitee, Board of Directors in monitoring the flood victims of the cabinet (since 2010)

 Executive Board, Geoinformatics and Space Technology Development Agency (Public Organization) (since 2009)

 Technical Subcommittee of the National Committee on Climate Change Policy, Office of the Prime Minister (since 2009)

Harsono SOEPARDJO

Director of IOI-Indonesia

Dr. Soepardjo, A. Harsono has several chairman positions in Jakarta, Indonesia.

1. Chairman of Post Graduate Sciences in Marine Sciences in the Faculty of Mathematics and Natural Sciences, University of Indonesia
2. Chairman of Center Marine Sciences in The same Faculty
3. Chairman of Sea Grant Program in province of Jakarta
4. Director of International Ocean Institute Operational Center Indonesia

He has many activities in that institution since 2000, which are Youth and Sea Program for elementary and high school in remote islands (North of Jakarta), Women and Sea Program in coastal area, implementation photovoltaic for electricity in several small islands in Indonesia, training for researcher about coral reef, Basic Safety Training (BST) for ship crews, etc. He is a senior lecturer in Physics Department in The University of Indonesia, Jakarta. He finished his doctoral program from The University of Montpellier II, France in 1993. He also interested in other renewable energies, such as: wind energy, micro hydro energy, and ocean energy (tidal, OTEC, and wave energy).

Yann-huei SONG

Research Fellow at the Institute of European and American Studies
Research fellow at the Centre for Asia-Pacific Area Studies, Academia Sinica, Taipei, Taiwan

Professor Dr. Yann-huei Song is currently a research fellow at the Institute of European and American Studies, and joint research fellow at the Centre for Asia-Pacific Area Studies, Academia Sinica, Taipei, Taiwan, the Republic of China.

Professor Song received his Ph.D. in International Relations from Kent State University, Ohio, and L.L.M. as well as J.S.D. from the School of Law (Boalt Hall), University of California, Berkeley, the United States.

He has broad academic interests covering ocean law and policy studies, international fisheries law, international environmental law, maritime security, and the South China Sea issues. He has been actively participating in the Informal Workshop on Managing Potential Conflicts in the South China Sea (the SCS Workshop) that is organized by the government of the Republic of Indonesia.

Professor Song is the convener of Academia Sinica's South China Sea Interdisciplinary Study Group and the convener of the Sino-American Research Programme at the Institute of European American Studies. He is a member of the editorial boards of *Ocean Development and International Law* and *Chinese (Taiwan) Yearbook*

of International Law and Affairs. He has frequently been asked to provide advisory opinions by a number of government agencies in Taiwan on the policy issues related to the East and South China Seas.

Professor Song's writings in English (2011-2013):

1. Yann-huei Song (2013). "Survey of Declarations or Statements Made by the Parties to the Law of the Sea Convention: 30 Years after Adoption," *28 The International Journal of Marine and Coastal Law 1 (2013):5-59.*
2. Yann-huei Song (2013). "Recent Developments in the South China Sea: Taiwan's Policy, Response, Challenges and Opportunities," paper presented at the "Managing Tensions in the South China Sea" conference held by CSIS on June 5-6, 2013 in Washington, D.C.
3. Yann-huei Song (2013). "Peaceful Proposals and Maritime Cooperation between China, Japan, and Taiwan in the East China Sea," paper presented at the International Symposium on "Peaceful Use of the Sea and Maritime Cooperation, June 22-23, 2013, at Zhejiang University Guanghua Law School, Mainland China.
4. Yann-huei Song (2013). "The Application of Article 121 of the Law of the Sea Convention to the Disputed Offshore Islands in East Asia – A Tribute to Judge Choon-ho Park," in LAW OF THE SEA AND OCEAN POLICY ISSUES RELATED TO THE PACIFIC OCEAN AND THE PACIFIC RIM, edited by Jon Van Dyke/Sherry Broder and Seokwoo Lee and published by Brill/Martinus Nijhoff Publishers, Leiden and Boston (2013): 61-98.
5. Yann-huei Song (2013). "The Role of Taiwan in Global Ocean Governance," in IMPLEMENTING THE LAW OF THE SEA: INSTITUTIONS AND REGIONS IN OCEAN GOVERNANCE, edited by Harry N. Scheiber and Jin Hyun Palk and published by Brill/Martinus Nijhoff Publishers (2013), Ch. 17: 293-309.
6. Yann-huei Song and Stein Tonnesson (2013). "The Impact of the Law of the Sea Convention on Conflict and Conflict Management in the South China Sea," *44 Ocean Development and International Law 3* (2013): 235-269.
7. Yann-huei Song and Keyuan Zou (2013). MAJOR LAW AND POLICY ISSUES IN THE SOUTH CHINA SEA: EUROPEAN AND AMERNCIAN PERSPECTIVES, Ashgate Publishing Ltd. (forthcoming)
8. Yann-huei Song (2013). "The South China Sea Issue in the Development of U.S.-ASEAN Relations: 2009-2011," edited by Ian Storey, *Contemporary Southeast Asia*, special volume, Institute of Southeast Asian Studies (ISEAS) (forthcoming).
9. Yann-huei Song (2012). "Sovereignty and Maritime Disputes in the South China Sea: Potential Conflicts between China and the United States." *16 China Oceans Law Review2 (2012): 112-154*.
10. Yann-huei Song and Elias Blood-Patterson (2012). "Likelihood of U.S. Becoming a Party to the Law of the Sea Convention During the 112th Congress." *43 The Journal of Maritime Law and Commerce 4 (2012):447-466.*
11. Yann-huei Song (2011). The Application of Article 121(3) of the Law of the Sea Convention to Five Selected Disputed Islands in the South China Sea. *Chinese (Taiwan) Yearbook of International Law and Affairs 27 (2011): 43-66*.
12. Yann-huei Song (2011). "Taiwan's Participation in the SCS Regional Dialogue Mechanisms: What Actions Should Be Taken by the Ma Administration?" *Prospects & Perspectives 15 (2011): 1-4*.
13. Yann-huei Song (2011). "A Marine Biodiversity Project in the South China Sea: Joint Made in the SCS Workshop Process," *26 The International Journal of Marine and Coastal Law 1 (2011): 119-149.*
14. Yann-huei Song (May 2011). "The Application of Article 121 of the Law of the Sea Convention to the Selected Geographical Features Situated in the Pacific Ocean", in TECHNICAL AND LEGAL ASPECTS OF THE REGIMES OF THE CONTINENTAL SHELF AND THE AREA, edited by Zhiguo Gao, Haiwen Zhang, Haisheng Zhang and Jiabiao Li, Ocean Law and Policy Research Series No. 216 (Beijing: China Ocean Press): 42-99.

Horst STERR

University of Kiel, Department of Geography, Germany

- Professor Dr. Horst Sterr, born 2nd March 1848
- working fields: natural hazards research, climate change impacts, coastal morphology & ecology; coastal defence strategies; coastal zone management,
- Graduate study program at University of Regensburg (Germany),
- Ph.D. in Earth Sciences from University of Colorado, Boulder/USA (1980): earthquake hazards research;
- Habilitation from Kiel University (1989): coastal morphodynamics, coastal defence strategies;
- project leader and coordinator of a federal research program addressing the impacts of climate change and sea-level rise to the German coastal regions at University of Oldenburg / ICBM (1991-1998)
- member of the Coastal Zone Management Group of the Intergovernmental Panel on Climate Change (1992 – 1996), reviewing author of IPCC Second Assessment Report
- full professor at CAU, chair of coastal geography since 1998;
- leader of 4 research projects on coastal vulnerability assessments (Germany & Brazil);
- organizer and chairman of 4 international scientific coastal conferences in Kiel and Oldenburg (1992; 1996, 2000, 2002);
- editor /co-editor of 4 books on interdisciplinary coastal research.
- member of the scientific steering committee of the EU Project SURVAS (Synthesis and Upscaling of Vulnerability Assessment Studies in Coastal Regions) 1999 – 2001
- member of the scientific steering committee of the EU Project EUROSION 2003-2004
- vice-president of the European coastal organisation EUROCOAST from 1990-1993
- regional chairman and scientific council member of the european coastal organisation EUCC - THE COASTAL UNION (2004 - 2010)
- scientific advisor to the German government in the process of developing a national strategy for Integrated Coastal Zone Management (since 1999)
- Principal Investigator in the CAU Cluster of Excellence “Future Ocean”, responsible for the research area “Coasts at Risk” (= Junior Research Group of Prof. Dr. A. Vafeidis)
- member of the national advisory committee on civil protection (*Schutzkommission beim Bundesministerium des Inneren*; since 2005).
- Project leader of DFG Project TRAIT (Tsunami Risks, Vulnerability and Resilience in the Phang-Nga Province, Thailand = *Tsunami Risk and Information Tool*) since Sept. 2007
- Advisor to DFG in the Belmont Forum process of strengthening (inter)national research on coastal vulnerability since October 2011

Selected Publications:

1. STERR, H., KLEIN R. & S. REESE (2003): Climate Change and Coastal Zones: An Overview on the state-of-the-art of Regional and Local Vulnerability Assessments. In: Giupponi, C. & M. Shechter (eds.) Climate Change in the Mediterranean. S. 245 - 278. Cheltenham, UK

2. SZLAFSZTEIN, C.F: & STERR, H. (2007): A GIS-based vulnerability assessment of coastal natural hazards, state of Pará, Brazil. Journal of Coastal Conservation Vol.11, 53-66

3. STERR, H. (2008): Assessment of Vulnerability and Adaptation to Sea-Level Rise for the Coastal Zone of Germany. In: Nicholls R. (ed.): Global Overview of coastal vulnerability and adaptation to sea-level rise. Journal of Coastal Research Special Issue 24; 380-393

4. ROEMER, H., KAISER, G., STERR, H. LUDWIG, R. (2010): Using remote sensing to assess tsunami-induced impacts on coastal forest ecosystems at the Andaman Sea coast of Thailand. Nat. Hazards Earth Syst. Sci., 10, 729-745

Plodprasop SURASWADI

Deputy Prime Minister of Thailand

Education:

- Bachelor Degree in Fisheries from Kasetsart University, Thailand in 1968
- Master Degree in Fisheries Management from Oregon State University, U.S.A. in 1970
- Post Graduate in Administration, Bangalore Institute of Management, India in 1975
- Ph.D. Degree in Ecology, University of Manitoba, Canada in 1976
- Thailand's National Defense College in 1990
- Honorary Doctoral Degree in Fishery Technology, Mae Jo University in 1991
- Honorary Doctoral Degree in Fisheries, Kasetsart University in 1992

Past Government Services:

- Director-General, Department of Fisheries, Ministry of Agriculture and Cooperatives (1989-1997)
- Deputy Permanent Secretary, Ministry of Agriculture and Cooperatives (1997)
- Secretary-General, Agricultural Land Reform Office, Ministry of Agriculture and Cooperatives (1997-1998)
- Director-General, Royal Forest Department (1998-2002)
- Permanent Secretary, Ministry of Natural Resources and Environment (2002-2004)

Past Political Positions

- Vice Minister to the Office of the Prime Minister in 2005
- Vice Minister to the Ministry of Natural Resources and Environment in 2006
- Vice Minister to the Ministry of Culture in 2006
- Advisor to the Prime Minister and Secretary-General to the Prime Minister (Political Affairs) in 2008
- Deputy Party Leader, Pheu Thai Party in 2009
- Member of the House of Representative in 2011
- Minister of Science and Technology in 2011

Past University Council Member

- Prince of Songkla University (1989-1991)
- Burapha University (1995-1997)
- Mae Jo University (2003-2007)
- Kasetsart University (1992-2006)

Special Lecturer

- Natural Resources and Environment, Fisheries, Forestry, Land Reform, Tourism at Kasetsart University, Mahidol University, Chiang Mai University, and Mae Jo University, etc.

Achievements & Initiatives :

- Receiving Awards for the Department of Fisheries in recognition for the outstanding national government organization in economic development
- Achievement in making Thailand a number one of exporter of fishery products of the world
- Achievement in land reform of the Wang Nam Kaew Forest
- Achievement in forest conservation
- Founder of the Ministry of Natural Resources and Environment and 1st Permanent Secretary of the Ministry
- Founder of Thailand's National Disaster Warning Center and 1st Executive Director
- Founder of the Designated Areas for Sustainable Tourism Authority and 1st Chairman of the Governing Board
- Founder of the Chiang Mai Night Safari in Chiang Mai

Sanchai TANDAVANITJ

Director, EnLife Foundation, Krabi, Thailand

Working with Department of Fisheries,Thailand as a Fishery Biologist. Background in Shrimp and Fin Fish Culture, Fishery Extension, Small Scale Fishery Development.

- Bay of Bengal Programe (BOBP) ,Project Leader for Thailand.
- Director, Coastal Habitats and Resources Management Project (CHARM) ,EU-Thai Project.
- Senior Expert on International Fishery Foreign Affairs.
- Present Position: Director, Enlife Foundation.

Thon THAMRONGNAWASAWAT

Head of The Department of Marine Science, Faculty of Fisheries,

Kasetsart University, Bangkok, Thailand

Head of The Department of Marine Science, Faculty of Fisheries, Kasetsart University

Graduated from Chulalongkorn University, Ph.D. from James Cook University, Australia (marine science)

Publication

- 60 scientific papers (coral reefs, management, remote sensing etc.)
- 15 text books (Reef Fish of Thailand, Reef shrimp of Thailand, etc.)
- 6,000 published documentary (newspaper magazine in Thai etc.)
- 100 published books (travels etc.)
- More than 300 interviews on TV Programs as a marine scientist.

Others

Advisor to many government and private organizations

14 Prizes from various government and private organizations.

Chua THIA-ENG

Former Council Chair of PEMSEA, Malaysia

Education

Chua Thia-Eng, male, born 28 March 1940, Malaysian citizen, married with two children. He completed his primary, secondary and high school education at St. Andrew's School in Muar, Malaysia. He continued his higher education at Nanyang University, Singapore for his bachelor degree in Biology (1964) and later at the University of Singapore (now National University of Singapore) for his postgraduate diploma in fisheries with distinction (1965), Master (1967) and Doctorate (1971) degrees in estuarine ecology and zoology respectively.

Current Positions

He currently serves as the Chair of the East Asian Sea Partnership Council of PEMSEA (Partnerships in Environmental Management for the Seas of East Asia) after retiring from the UN services in 2007 while concurrently serving as the Visiting Fellow of the Ocean Policy Research Foundation of Japan and members of its research council as well as Chair/ Guest Professor of the Coastal and Ocean Management Institute of Xiamen University (PR. China). He was elected as the chair of the International Academic Advisory Committee of the Coastal and Ocean Management Institute of Xiamen University (2009- present). He also serves as the Special Advisor to the Ocean Development Institute of Qingdao Ocean University, China (2011-present).

Past Activities

He has devoted his entire 44 years of professional working life in East and Southeast Asia on the sustainable development of rivers, coasts and oceans by undertaking research and human capacity development,

promoting policy and management reforms and forging regional cooperation and collaboration towards sustainable use of coastal and marine resources and ecosystem services.

Fisheries and Aquaculture

He began his research and teaching career in fisheries, aquaculture and marine biology in 1967 as a lecturer at the National University of Singapore until 1972 when he joined the University of Science Malaysia as an Associate Professor until 1979. He joined the Food and Agricultural Organization of the United Nations in 1980 as Senior Aquaculturist and Training Coordinator based in the Philippines. He developed and conducted postgraduate degree programs for Senior Aquaculturists in Asia and the Pacific region under the Network of Aquaculture Centers of Asia (NACA). During his term with FAO (1980-1985), he produced more than 100 master degree graduates on aquaculture in collaboration with the University of the Philippines in the Visayas and Seafdec Aquaculture Department in Iloilo, Philippines; many of them are now leaders in aquaculture and fisheries in their respective countries.

Coastal Resource Management

In 1986, he was hired by the International Center for Aquatic Resource Management (ICLARM, now the World Fish Center) to coordinate and implement a regional project on Coastal Resource Management supported by USAID in six Asean countries (Brunei, Indonesia, Malaysia, Philippines, Thailand and Singapore) where he successfully implemented the first regional program in coastal resource management and has made contributions to developing, verifying and promoting the concept and practices of integrated coastal management. He was made Director of the Coastal Management Program in ICLARM (1991-2) and later as the Director of National Support Programme until 1993.

Environment and Integrated Coastal Management

In 1994 he was hired by the International Maritime Organization (IMO) to direct a larger regional program in Marine Pollution Prevention and Management through the auspices of the Global Environmental Facilities (GEF) and United Nations Development Programme (UNDP). Through the initial and second phases of this program (1994-2007), he was able to facilitate /develop integrated coastal management demonstration projects in six countries and later on scaling up the number of local governments practicing ICM to more than 33 provinces and municipalities in 11 nations including Cambodia, China, DP R Korea, Indonesia, Japan, Malaysia, Philippines, RO Korea, Singapore, Thailand and Vietnam. Through the training courses of PEMSEA and ICLARM, he helped trained no less than 3000 coastal managers and coastal technicians, academes and local executives in the application of integrated coastal management and related specialized courses.
He improved the concept and practices of integrated coastal and marine management which enable effective integration of policy, management and technological interventions based on interdisciplinary knowledge and participation of all stakeholders, including the civil society, business sector, scientific and academic communities as well as the local coastal communities. Building upon his long experience and extensive work in the region, he has advanced the concept and practice of integrated coastal management (ICM) into an ICM system (ICMS) which provides a holistic governance framework and a stepwise, cyclical process for developing, implementing and managing pertinent action programs that addressed environmental and other sustainable development issues of the coastal and marine areas. The development of ICMS enables the standardization of approaches and methodologies for future planning and management of the coastal and marine areas.

Coastal and Ocean Policy

He has effectively energized policy changes towards coastal and marine policy development in the region. Through the Baguio (1990) and Singapore (1991) Resolutions as well other subsequent subnational and national declarations, he was able to bring political leaders from various countries to commit to sustainable coastal and marine development, thus paving the foundation for various coastal and marine policy developments in the Philippines, Indonesia, China, Japan, Republic of Korea, Thailand and Vietnam. He played a critical role in the formulation of the Arusha Declaration (1993) and the Seychelles Declaration (1996), resulting in the initiation and propagation of coastal and marine area management practices in East Africa. He was also the key force behind the formulation and signing of the Bohai Sea Declaration (2000), which signals the commitment of the different provinces and municipalities bordering the Bohai Sea in China to protect their

marine and coastal environment of the only Chinese Inland Seas. He also served as a member of the International Task Force for the Development of National Policy on Sustainable Development of the Chinese Seas, under the Chinese Council for International Collaboration on Environment and Development (CICCED), People Republic of China (2009-2010). As a result of his continued efforts and support of the governments of the region, the East and Southeast Asia has become one of the most active regions promoting integrated management of its coastal and marine resources.

Regional Cooperation

He has successfully brought the countries in East and Southeast Asia together under a regional collaborative and partnership mechanism through the establishment of the Partnerships in Environmental Management of the Seas of East Asia (PEMSEA) to implement a long term regional marine strategy known as the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA), the implementation of which enable the pooling of regional human and financial resources to address the common threats to coastal and ocean security of the region. The countries of the region adopted the SDS-SEA through the "Putrajaya Declaration (2003)" by ministers of relevant agencies and further recognize PEMSEA as the implementing agency for the SDS-SEA through other policy initiatives, the Haiko Agreement (2006). PEMSEA provides the regional platform for regular regional meetings under its tri-annual East Asian Seas Congress which serves as an international market place for sharing of management and technical knowledge through workshops, seminars and meetings during the international conference and policy dialogue through a tri-annual ministerial forum. The SDS-SEA is the first regional marine strategy being developed in Asia so far parallel that of the regional marine strategy of the European Community. As the chair of the Partnership Council of PEMSEA since 2008 he played a significant role in moving the transformation of PEMSEA from a UN project into an international organization with international legal personality made possible through the official recognition of the legal personality of PEMSEA by 8 countries in 2009 and began the process of Headquater Agreements with the Government of the Philippines.

Networking

Over the years, he had established effective networks of natural and social scientists, legal professionals, resource managers, civil society, private sectors and political leaders in the region to forge regional cooperation and collaboration. He was the founding president of the Malaysian Society of Marine Sciences (1972-1973), Asian Fisheries Society (1986-95) and the chair of the First World Fisheries Congress in Athens. He also led the establishment of a number of professional networks, thus strengthening the use of scientific knowledge for management and bringing scientists closer to the policy makers.

He facilitated the establishment of the PEMSEA's Network of Local Government practising Integrated Coastal Management since 2004 as well as participated in the establishment of the Ocean Policy Institutions Network in East Asian Region (OPINEAR) (2006-). He also facilitated the annual conduct of the "World Ocean Week" which is led and sponsored by Xiamen Municipality and served as a member of the organizing committee since its inception in 2004. He is currently a member of the Steering Committee of a global network " Global Forum for Coasts, islands and Oceans" with head office at the University of Delaware, USA.

Academic Services

In addition to his services to universities in the region (National University of Singapore (1965-1972), University of Science Malaysia (1972-1980), University of the Philippines (1980-1985), Xiamen University (2004 to present) and Nippon University (2009)), he had also served as external examiner for the postgraduate programs of the Faculty of Fisheries and Marine Science, University of Agriculture, Malaysia; Department of Zoology, University of Colombo, Sri Lanka; as well as for a number of master and doctorate theses from various universities in the Asia-Pacific region, Europe and the US.

Consultancies and other services

He has provided consultancy services in Asia and the Pacific, Africa and Latin America. He also served as member of advisory committees/panels of a number of international and donor agencies including Swedish

Agency for Research Cooperation with Developing Countries (SAREC), Commission of the European Communities (CEC), United Nations Development Programme (UNDP) and Food and Agriculture Organization (FAO) of the United Nations. He had also been serving as consultant to World Bank, IDRC, USAID and oil companies such as EXXON.

He was a Board Director of the International Centre for Coastal and Ocean Policy Studies (ICCOPS), a member of the Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP) and served also as a Scientific Advisor of the International Foundation for Science (IFS).
He served until recently as a member of the International Advisory Committee of the Marine Environment Research and Innovative Technology centre (MERIT), City University, Hong Kong and as the Associate editor of the *Journal of Coast and Ocean Management* and as Executive Editor of the *Tropical Coasts.*

Publications

He has published extensively over the years with no less than 225 papers, technical reports, keynote speeches, articles and books. His most recent book (2006) "The Dynamics of Integrated Coastal Management –practical Application in the Sustainable Development in East Asia" has been widely used as text or reference for marine affairs or ICM courses in universities such as Rhode Island, Delaware (USA), World Maritime University, Khamar University in Sweden, Asian Institute of Technology (Thailand), University of the Philippines, Xiamen University (China), Nihon University and others. Another recent publication, "Securing the Oceans" (2008), which he was the senior editor and co-author amongst 25 eminent experts, is also another major contribution he has made to ocean and coastal governance of the world.

Awards and Recognition

He won the First Gold Medal Award (1995) and Honorary Membership Award (1998) by the Asian Fisheries Society and the Honorary Life Membership Award (1994) of the Malaysian Fishery Society.
In recognition of his work, the State Council of the People's Republic of China conferred him the Prestigious "Friendship Award" in October, 1997. The Royal Government of Cambodia conferred him the Sahak Metrey Medal in March 2002 by his majesty King Sihanouk. In 2006, he was recognized as one of the outstanding alumni of the National University of Singapore for the work he has done. In September 2011, he was conferred Honorary Citizen of the City of Xiamen, China in recognition of his contribution to sustainable coastal development of the Xiamen city.

Vasily TITOV
Director, NOAA Center for Tsunami Research (NCTR)
National Oceanic and Atmospheric Administration .Pacific Marine Environmental Laboratory

PhD, Coastal and Ocean Engineering, School of Engineering, University of Southern California, Los Angeles, CA, 1997. **Website:** http://nctr.pmel.noaa.gov/Titov/

Research Interests: Numerical modeling of water waves; long wave modeling; data assimilation techniques, tsunami measurements, tsunami modeling, tsunami forecast.

Vasily V. Titov is Director of the NOAA Center for Tsunami Research, the joint operation of NOAA's Pacific Marine Environmental Laboratory and the Joint Institute for the Study of the Atmosphere and Ocean of the University of Washington. He is also Affiliate Assistant Professor of the Earth and Space Sciences of the University of Washington. He received his Ph.D in Coastal and Ocean Engineering in 1997 at the University of Southern California. His undergraduate degree is in Mathematics from the Novosibirsk State University. He published over 100 papers on the subject of tsunami modeling and forecast. He has developed the MOST model that is now being use for operational NOAA tsunami forecast and for tsunami studies in many countries.

Current Research Projects

- PI, Tsunami Forecast development for NOAA Tsunami Program

- Leader, Tsunami Research for NOAA Tsunami Program
- PI, Tsunami Hazard Assessment Project for U.S. Nuclear Regulatory Commission
- PI, Tsunami Inundation Mapping project for the State of Washington
- PI, Tsunami Hazard Assessment for California ports and harbors

Selected Publications

Kânoğlu, U., Titov, V.V., Aydın, B., Moore, C. , Stefanakis, T.S., Zhou, H., , Spillane, M. and Synolakis, C.E., (2013), Focusing of long waves with finite crest over constant depth, *Proc. R. Soc. A* 2013 469, 20130015.

V.V. Titov (2009). Tsunami Forecasting, in The Sea, v. 15, Ed: Bernard and Robinson, Harvard University *Press*, p. 371-400.

Tang, L., V.V. Titov, E. Bernard, Y. Wei, C. Chamberlin, J.C. Newman, H. Mofjeld, D. Arcas, M. Eble, C. Moore, B. Uslu, C. Pells, M.C. Spillane, L.M. Wright, and E. Gica (2012): Direct energy estimation of the 2011 Japan tsunami using deep-ocean pressure measurements. *J. Geophys. Res.*, 117, C08008, doi: 10.1029/2011JC007635.

Jirapa I. TROCHIM
Economist, Office of Agricultural Economics, Thailand

Education:

2008: PhD.(Economics), **University of Colorado at Boulder, Colorado, USA**
1998: M.A. (Economics), **Thammasat University, Bangkok, Thailand**
1994: B.A. (Economics), **Thammasat University, Bangkok, Thailand**

Working Experience:

August 2008 – present: Bureau of Agricultural Economic Research, Office of Agricultural Economics

Thailand Ministry of Agriculture and Cooperatives

- Current position: Director Division, Agricultural Resource Economic Research

1998-2000: Policy Research Institute, Fiscal Policy Office, Thailand Ministry of Finance

1997–1998: Macroeconomic Policy Program, Thailand Development Research Institution

1994-1995: Economic Information Center, Manager Information Service Co.Ltd., Thailand

Conference participations:
The 5th Roundtable Meeting on ASEAN+3 Food Secruity Cooperation Strategy : 2013 (July)

United Nations Climate Change Conference: 2009 (June, August, October, December); 2010 (June, October, December); 2011 (April, June, October,December); 2012 (December)

Global Research Alliance on Agriculture Greenhouse Gases: 2010 (July); 2011 (March, June); 2013 (June)

The Hague Conference on Agriculture, Food Security, and Climate Change: 2010 (November)

Conference and workshop presentations:

Jirapa Inthisang and Kalaya Boonyanuwat, "Thailand report: Adaptation Strategies with Mitigation Potential for Food and Water Security" organized by Asia-Pacific Economic Cooperation (APEC), Manila, the Philippines, Febuary 2012

Jirapa Inthisang,"Agriculture's Adaptation to Climate Change" organized by United Nations University and Khon Khaen University, Khon Khaen, Thailand, August 2011

Jirapa Inthisang, "Agriculture and Climate Change" organized by Thailand Greenhouse Gases Organization (TGO), Bangkok, Thailand, August 2011 (in Thai)

Jirapa Inthisang, "Building Thai Agriculture Policy for Climate Change" organized by Greenpeace, Bangkok, Thailand, October 2010 (in Thai)

Jirapa Inthisang,"Climate Change: Threats or Opportunity for Agriculture Sector?" organized by Thailand Research Fund (TRF), Khon Kaen, Thailand, July 2010, (in Thai)

Jirapa Inthisang, "How Thai Agriculture Ways of Life related to Climate Change?" organized by Ministry of Agriculture and Cooperatives, Utaradit, Thailand, March 2010 (in Thai)

Jirapa Inthisang, Tapee Vatcharangkool, Orapim Sundaraket,and Areerat Luxmila-awe, "Agriculture Markets Outlook &Modeling" organized by Food and Agriculture Organization (FAO) under the FAO's Bioenergy and Food Security (BEFS) project, Bangkok, Thailand, March 2010

Research and publication:

Jirapa Inthisang (2011), Market vs. Climate Elasticity Supply for Thailand's Major Crops, Research Paper. Office of Agricultural Economics, Bangkok, Thailand (in Thai)

Jirapa Inthisang (2009), Climate Change and Agricultural Economics, *S*ethakitkarnkaket, 55 (June 2009), p 2-7. (in Thai)

Jirapa Inthisang **(2008). Essay on Income Inequality,** Ph.D.Dissertation. Department of Economics, University of Colorado at Boulder, United States of America.

Jirapa Inthisang, Pipat Luengnaruemitchai, and Sira Klongwicha (1999), Tax Revenue Estimation Consistent with Macroeconomic Policies, *Sanpakornsarn*, 46 (8), p 45-82. (in Thai)

Jirapa Inthisang, Pipat Luengnaruemitchai, and Sira Klongwicha (1999), Financial Liberalization: Does it cause economic crisis in Thailand? Tax Revenue Estimation Consistent with Macroeconomic Policies, *Sanpakornsarn*, 43 (3), p 61-67. (in Thai)

Bhanuphong Nidhiprabha, Taweewan Sidthidet, and Jirapa Inthisang (1998), Constructing Short-run Economic Forecasting Model, Thailand Development Research Instittute, Document number M46. (in Thai)

Jirapa Inthisang **(1998). Economic Fluctuation and Its Origin in Thailand,** Mater's Thesis.Department of Economics, Thammasat University, Bangkok, Thailand.

David VANDERZWAAG

Dalhousie University, Nova Scotia, Canada

Prof. Dr. David VanderZwaag holds the Canada Research Chair (Tier 1) in Ocean Law and Governance at Dalhousie University, Halifax, Canada. He teaches in the areas of international environmental law and law of the sea. He is the past Co-director of Dalhousie's interdisciplinary Marine Affairs Program (1986-1991) and the past Director of the Marine & Environmental Law Institute .

Dr. VanderZwaag is currently a member of the IUCN's Commission on Environmental Law (CEL) and Co-chair of the CEL's Specialist Group on Oceans, Coasts & Coral Reefs. He is a Co-founder and Co-chair of the Australian-Canadian Oceans Research Network (ACORN) and has had extensive research and lecturing experience in South and Southeast Asia, the South Pacific, Europe, and the Caribbean. He is an elected member of the International Council of Environmental Law.

Dr. VanderZwaag has authored over 100 papers in the marine and environmental law field. His most recent book publications are: **Recasting Transboundary Fisheries Management Arrangements in Light of Sustainability Principles: Canadian and International Perspectives** (edited with D. Russell) (Leiden: Martinus Nijhoff 2010); **Understanding and Strengthening European Union-Canada Relations in Law of the Sea and Ocean Governance** (co-edited with T. Koivurova, A. Chircop, E. Franckx and E.J. Molenaar) (Rovaniemi, Finland: University of Lapland Printing Centre, 2009); **Towards Principled Oceans Governance: Australian and Canadian Approaches and Challenges** (edited with D.R. Rothwell) (London: Routledge Press, 2006) and

Aquaculture Law and Policy: Towards Principled Access and Operations (edited with Gloria Chao) (London: Routledge Press, 2006).

Teaching subjects:

Tort Law, International Environmental Law, Environmental Law.

Publications:

- The Fish Feud: The U.S. and Canadian Boundary Dispute (1982);
- Environmental Decision-making in a Transboundary Region, 1986 (co-editor);
- Transit Management in the Northwest Passage: Problems and Prospects, 1986 (co-editor);
- The Challenge of Arctic Shipping: Science, Environmental Assessment and Human Values, 1990 (co-editor);
- Canadian Ocean Law and Policy, 1992 (editor); Law and the Environment: Problems of Risk and Uncertainty, 1993 (co-editor);
- Canada and Marine Environmental Protection: Charting a Legal Course Towards Sustainable Development, 1995;
- Oceans Law and Policy in the Post-UNCED Era: Australian and Canadian Perspectives, 1996 (co-editor).

Research interests:

Law of the Sea, International Environmental Law, Sustainable Development Law, Ocean Development and Management, Protection of the Marine Environment, Regional Cooperation, U.S. - Canada Relations, Legal Regimes of Polar Areas, Biodiversity Protection and Global Forests, and Fisheries Law and Policy.

Courses:LAWS 2051 - International Environmental Law

Geeva VARGHESE

Senior Consultant, Oil Spill Response Limited, Singapore

Geeva Varghese is a Senior Consultant with Oil Spill Response Limited. Prior to becoming a Consultant, she worked as a Spill Response Specialist in the company and has attended to a number of oil spill incidents in the Asia Pacific Region. Geeva has also presented technical papers to various international conferences. As a Senior Consultant, Geeva works with the various international Oil & Gas companies and Governments in the region for the delivery of oil spill preparedness projects including Oil Spill Contingency Plans, Risk Assessments, Capability Reviews and Audit, Oil Spill Training and Exercises. Geeva holds a Bachelors Degree in Environmental Engineering from the National University of Singapore.

Antonella VASSALLO

Programme Officer, International Ocean Institute Headquarters, Malta

Ms. Antonella Vassallo has a Master's Degree in Biology and a first degree in Biology and Chemistry. Following her post-graduate education, she has worked in areas of research and application allowing her to obtain specific experience in environmental appraisal (ecology and vegetation analysis, both marine and terrestrial). In other work capacities, she has coordinated project applications and project implementation from various regional and international funding agencies in the course of her duties.

She is currently the Programme Officer with the International Ocean Institute at its Headquarters in Malta. In this capacity, she is responsible for coordinating the Annual IOI Training Programme on Regional Ocean Governance for the Mediterranean, Black, Baltic and Caspian Seas held in Malta; assisting the IOI Executive

Director and the IOI President, in, amongst others, the organization and implementation of PIM Conferences. She is responsible for the overall coordination of the IOI's network-wide Women/Youth and the Sea Programme and the implementation of any Women/Youth and the Sea Projects on behalf of IOI HQ, including the annual Elisabeth Mann Borgese Bursary and the Danielle de St. Jorre Scholarship; and the initiation, development and implementation of projects and partnerships with other universities, centres and organizations as necessary. She is currently a focal point within the IOI HQ for the planned Master Degree in Ocean Governance to be offered through the University of Malta. She is responsible for IOI HQ outreach and dissemination as the editor of the IOI's Annual Reports, the IOInforma e-bulletin and the IOI Webpage as well as of occasional publications and exhibition and poster material.

Ms. Vassallo is currently a member of the Natural Heritage Advisory Committee (NHAC) of the local Malta Environment and Planning Authority (MEPA); the committee advises on the environmental implications of development applications in environmentally sensitive areas or in sites outside the development zone. She has also served as a Board Member of the Malta Resources Authority (MRA); the Board is responsible for regulatory oversight on mineral, water and energy resources and for policy, planning and advisory on these matters. Other work also includes lecturing, research and organization of fieldwork activities with the University of Malta.

Alfred J. VELLA

Pro-Rector, Academic Affairs, University of Malta

Alfred J. Vella graduated BSc in physics and chemistry in 1971 and MSc in chemistry in 1975, both degrees from the University of Malta and PhD in organic geochemistry in 1984 from Colorado School of Mines (USA). He has lectured at the University of Malta since 1987 and is currently professor of chemistry and teaches mainly in the area of environmental chemistry. He has also taught general and organic chemistry and chemistry of natural products. Professor Vella served for many years as Head of Department of Chemistry and between 1997 and 2007 was also Dean of the Faculty of Science. Since July 2006, he serves as Pro-Rector for Academic Affairs and in this capacity heads several Senate Sub-Committees including the PhD Committee and the Programme Validation Committee, the latter body being responsible for ensuring internal quality assurance processes at the University in accordance with the Bologna Process and associated standards and guidelines. Prof Vella is chairman of the Institute of Earth Systems and the Institute for Islands and Small States.

Having taught chemistry since 1968 and at all levels, Professor Vella still participates actively in syllabus design and development in Advanced and Intermediate Matriculation Chemistry.

Although much immersed in university administration, Professor Vella's commitments as academic frequently extend beyond university walls, being regularly requested to act as court forensic expert in judicial inquiries on chemical accidents, fire and explosion. He has consulted on environmental and other scientific matters to the Government of Malta and local firms and industrial concerns. Prof Vella was a member of the Board of the Planning Authority (1992-98), the Malta Council of Science and Technology (1997-98; 2009 to date), Malta Centre for Restoration (2003-5), Heritage Malta (2005 – 2008) and is currently Director of the Malta National Authority for the Organisation for the Prohibition of Chemical Weapons (OPCW).

Professor Vella's research interests are mainly in the area of environmental chemistry and he publishes regularly in this area. He is also a reviewer for a number of international journals including Atmospheric Environment, Environmental Pollution and Applied Organometallic Chemistry.

Cherdsak VIRAPAT

IOI Executive Director, International Ocean Institute Headquarters, Malta

Dr. Cherdsak Virapat has been appointed as Executive Director of the International Ocean Institute since May 2008. He served as an officer of the Royal Thai Government for 28 years since 1981. He worked as Fishery Biologist for the Department of Fisheries, Ministry of Agriculture and Cooperatives during 1981-2002 and 2007-2008. He was responsible as Chief of Small-Holder Rural Aquaculture Development and Royal Initiative Projects Sub-Division from1996 to 2002. He was appointed a Director of International Ocean Institute-Thailand Operational Center by the Office of the Thai Marine Policy and Restoration Committee under the Office of Prime Minister and worked voluntarily on this position during 2000-2008; Chief of Public Sector Development Group, Ministry of Natural Resources and Environment during 2003-2005; Chief of International Coordination and Assistant Executive Director of Thailand's National Disaster Warning Center under the Office of Prime Minister and Ministry of Information and Communication Technology during 2005-2008. He obtained B.Sc. in Fishery Management from Kasetsart University, Bangkok, Thailand, M.Sc. in Fishery Science from University of Helsinki, Finland and Ph.D. in Fisheries Management from Dalhousie University in Halifax, Nova Scotia, Canada. While serving the Royal Thai Government, he obtained the Royal Decoration, namely; the most Exalted Order of the White Elephant and the most Noble Order of the Crown of Thailand.

Wendy WATSON-WRIGHT

Executive Secretary Intergovernmental Oceanographic Commission
Assistant Director General of UNESCO

Wendy Watson-Wright is the Executive Secretary and Assistant Director General of the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (IOC-UNESCO). Headquartered in Paris, IOC-UNESCO has the mandate within the United Nations system for ocean science, observations, data and information exchange and services, including global tsunami warning systems. It is also the competent international organization for marine science under the United Nations Convention on the Law of the Sea.

From 2001 to 2009, she was Assistant Deputy Minister, Science, for Fisheries and Oceans Canada in Ottawa where she was responsible for providing the policy direction and scientific leadership for all science activities in the department's fifteen science institutes throughout Canada.

She is or has been a member of several boards including the Canadian Foundation for Climate and Atmospheric Science, Ocean Networks Canada, ArcticNet and the Strategic Advisory Board for the EU Joint Programming Initiative on Oceans (JPI Oceans).

A Killam scholar, Dr. Watson-Wright holds a Ph.D. in Physiology from Dalhousie University in Halifax, Nova Scotia, Canada.

Dawn WRIGHT

Chief Scientist, Esri, USA

In October of 2011, Dawn Wright was appointed Chief Scientist of Esri. She maintains her appointment as Professor of Geography and Oceanography at Oregon State University. Her current research interests include benthic terrain and habitat characterization, and coastal/ocean informatics and cyber-infrastructure. She

serves on the U.S. National Academy of Sciences Ocean Studies Board, the NOAA Science Advisory Board, and the Science Advisory Council of Conservation International, as well as many journal editorial boards, including the International Journal of Geographical Information Science. Wright is a fellow of Stanford University's Aldo Leopold Leadership Program and a fellow of the American Association for the Advancement of Science (AAAS). She holds an Individual Interdisciplinary Ph.D. in Physical Geography and Marine Geology from UCSB, an M.S. in Oceanography from Texas A&M, and a B.S. cum laude in Geology from Wheaton College (Illinois).

Guifang (Julie) XUE

China Ocean University, Tsingtao, People's Republic of China

Dr. Guifang（Julia）Xue is Executive Director to the Center for Polar Areas and Deep Ocean Development, Chair Professor of KoGuan Law School, Shanghai Jiao Tong University. She also temporarily holds the position as the Director the Institute for the Law of the Sea, the first institution of its kind established in China, and Chairs the Department of International Law in the School of Law and Political Science, Ocean University of China (Qingdao).

She teaches and research in law of the sea and related issues, including the United Nations Convention on the Law of the Sea and state practice, fisheries law, marine environmental law, climate change law, and maritime disputes between China and its maritime neighbors. She has published and consulted widely on these issues.

Besides directing the institute, she takes responsibilities for funding application and project operation. She chairs governmental funded projects for drafting up national marine laws and regulations, provides consultancy on policy-making and practical issues to ocean-related agencies, and conducts training courses for their administrative personnel and enforcement teams.

She involves actively in academic activities home and abroad, and sits in committees as Professional Adviser or working as a resource person for ocean related agencies and serves as executive member of academic associations. She also teaches at the Bremen University, Germany to Erasmus Mundus M.S. in Marine Biodiversity and Conservation (EMBC) on Law of the Sea and Marine Environmental Protection.

Jin YONGXING

Vice President, Shanghai Maritime University, People's Republic of China

Prof. Jin Yongxing, born in 1958, studied in undergraduate program on nautical technology in Shanghai Maritime University from 1978 to 1982, and postgraduate program on shipping management from 1995 to 1997. He has been on board ship for 3 years as an ocean-going vessel's Chief Officer. His main research fields are modern seamanship and ship's safety management. He now works as Vice President, Professor and doctoral supervisor in Shanghai Maritime University. At the same time, he is appointed as a Commissioner to National Guidance Committee for Transportation and Communications Specialty in higher institutions, Vice-Chairman of National Education Committee for Nautical Science Specialty, Honorary Secretary of International Maritime Lecturers Association. He also serves as Deputy Director of Compilation Group for the journal Ship Engineering.

Prof. Jin has been devoted to research and investigation on ship operation safety and supervision, navigational environment safety evaluation, as well as on characteristics of ship structure and operation. He has conducted and accomplished over 20 research projects, such as Supervision and Evaluation System for Container Ship Structural Condition, Safety Research on Railway Ferry System of Bohai Bay, Research on Emergency Pre-proposal for Shanghai Port Waterway Transportation and Discipline Criteria for Nautical Science Specialty.

His publications include over 20 papers and 5 books, such as Marine Signals and Radiotelephony, Ship Structure and Equipment published by China Science and Technology Press and China Communications Press. The English-Chinese Maritime Dictionary compiled by Prof. Jin has been selected as Shanghai 11th Five-Year Plan Key Books.