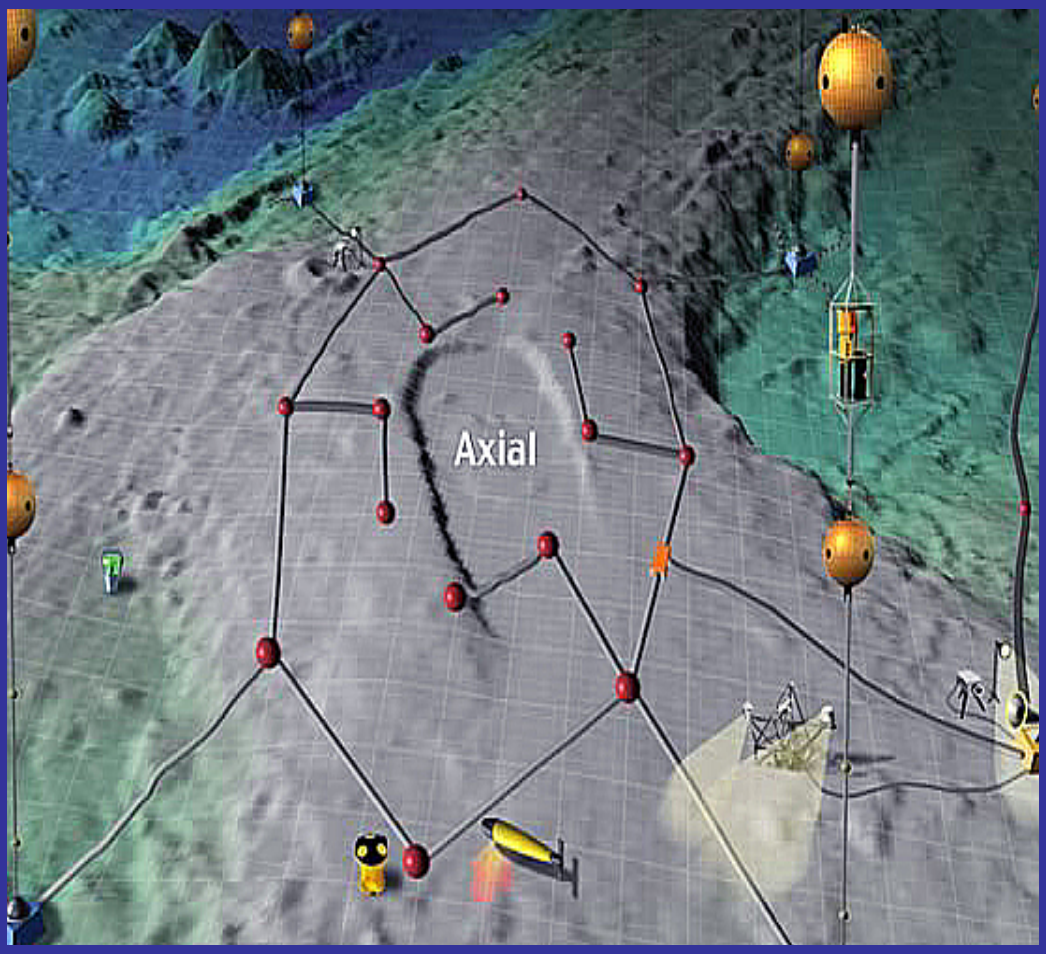
PACON 2007

Ocean Observing Systems and Marine Environment



Ala Moana Hotel
Honolulu, Hawaii, USA
June 24-27, 2007

www.hawaii.edu/pacon

PROGRAM & ABSTRACTS

PACON 2007: DAILY PLANNER

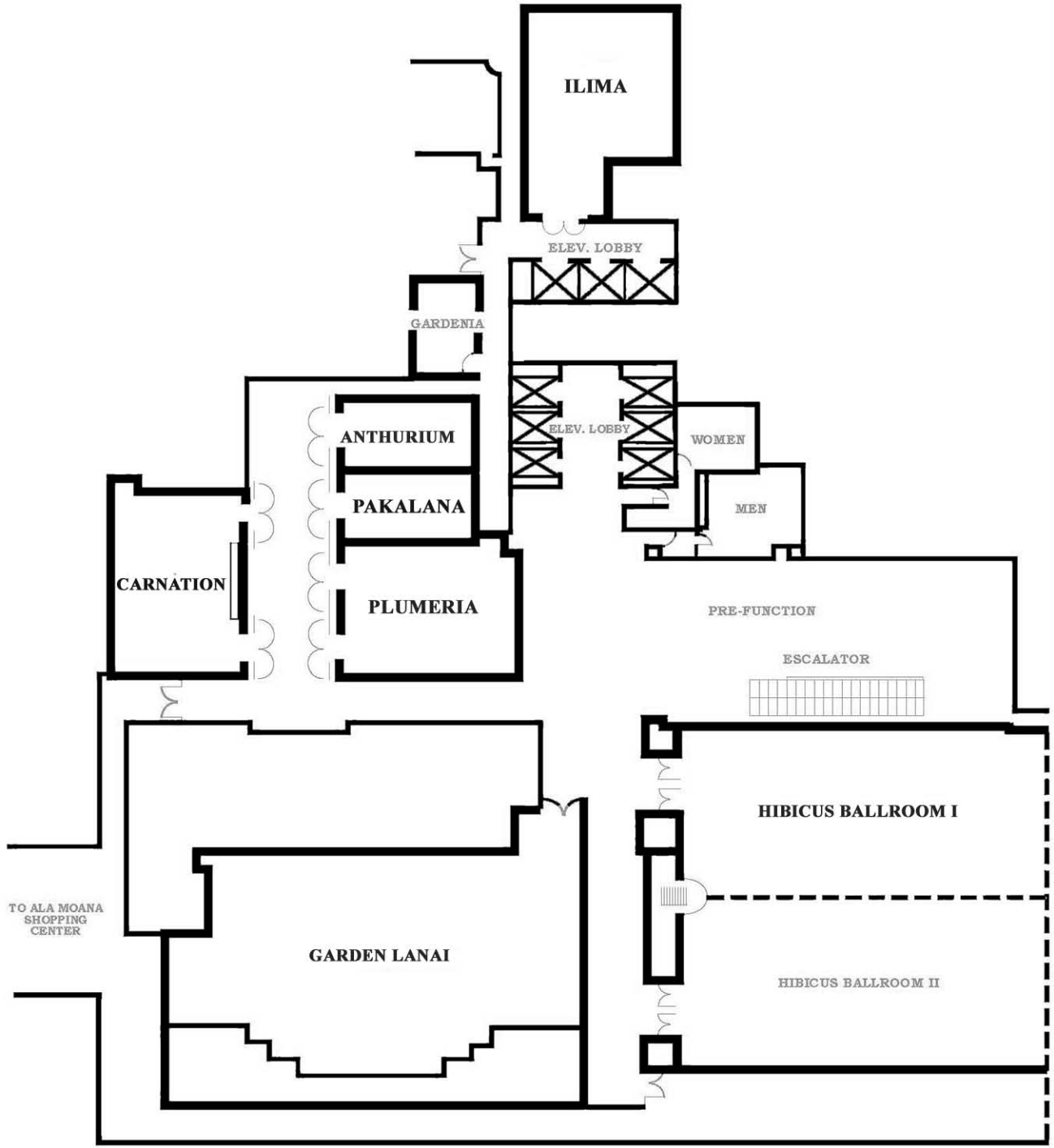
SUN: JUNE 24	MON: JUNE 25	TUES: JUNE 26
	7:00-8:00 EXHIBIT & POSTER SETUP 7:15 **REGISTRATION** *(Garden Lanai Entry)*	7:30 REGISTRATION *(Garden Lanai Entry)* 9:00-4:00 **EXHIBITS** *(Carnation Room) &* **STUDENT POSTERS** *(Anthurium Room)*
	8:00-8:30 **OPENING CEREMONY** *(Garden Lanai Room)* 8:30-9:15 **KEYNOTE ADDRESS 1** on "Integrating Ocean Observing" by Dr. Paul F. Moersdorf *(Garden Lanai Room)*	8:15-9:00 **KEYNOTE ADDRESS 2** on "National Science Board Perspectives on Int'l Science & Engineering Partnerships: Opportunities for PACON Participation" by Dr. Michael P. Crosby *(Garden Lanai Room)*
	9:15-9:45 Coffee Break 9:15-9:45 Poster Judges Meeting *(Garden Lanai Room)*	9:00:-9:30 Coffee Break
	9:15-5:00 **EXHIBITS** *(Carnation Room)* and **STUDENT POSTERS** *(Anthurium Room)*	9:30-11:30 **SESSION 2** WKSP-4A: Climate Change *(Garden Lanai Room)* CST-2: Coastal Water Level Fluctuations *(Plumeria Room)* MRMD-3: Marine Debris *(Pakalana Room)* OST-3: Fisheries Tech. *(Ilima Room)*
	9:45-11:45 **THEME SESSION: Ocean Observing Systems** *(Garden Lanai Room)*	
	11:45-1:00 **LUNCH SPEAKER:** Dr. Patricia Cooper "Opportunities for Women and Minority Students in the Ocean Sciences" *(Hibiscus I Room)*	11:30-12:30 BREAK
	1:00-3:00 **THEME SESSION: Ocean Observing Systems (Continued)** *(Garden Lanai Room)*	12:30-2:30 **SESSION 3** WKSP-4B: Climate Change *(Garden Lanai Room)* CST-3A: Coastal Structures *(Plumeria Room)* MRMD-4: Deep Ocean Water Applications *(Pakalana Room)* OST-4: Remote Sensing and Oceanographic Satellites *(Ilima Room)*
	3:00-3:30 Coffee Break	2:30-3:00 Coffee Break
	3:30-5:00 **SESSION 1** **THEME SESSION: Ocean Observing Systems (Continued)** *(Garden Lanai Room)* OST-2: Marine Biotechnology *(Plumeria Room)* WKSP-2: Women in Marine Science, Technology, and Policy *(Pakalana Room)* CST-1: Hydrodynamics of Coastal Waters *(Ilima Room)* **STUDENT POSTER JUDGING** ***(Anthurium Room)***	3:00-5:00 **SESSION 4** CST-7: Sustainable Coastal Development *(Garden Lanai Room)* CST-3B: Coastal Structures *(Plumeria Room)* OST-7: Aquaculture & Mariculture Technology *(Pakalana Room)* CST-5: Coastal Sediment Processes *(Ilima Room)*
4:00-6:00 **REGISTRATION** *(Plumeria Room Entrance)* **and** **WELCOME RECEPTION** *(Plumeria Room)*		4:00-5:00 **EXHIBIT & POSTER BREAKDOWN**
	6:30-7:30 LIFE MEMBER RECEPTION *(Plumeria Room)*	6:30 NO HOST COCKTAILS 7:00-9:00 **AWARDS BANQUET** *(Hibiscus I Room)*

PACON 2007: DAILY PLANNER

WED: JUNE 27	THURS: JUNE 28
8:00 REGISTRATION *(Garden Lanai Entry)*	8:00-12:00 **BOARD OF DIRECTORS MEETING** *(Carnation Room)*
8:30-9:15 **KEYNOTE ADDRESS 3** on "Marine Environmental Problems in the Pacific and Emerging Solutions" by Dr. Ian Dutton *(Garden Lanai Room)*	
9:15-9:45 Coffee Break	
9:45-11:45 **SESSION 5** OST-10A: Spectroscopic Oceano-graphic Sensors & Instrumentation *(Garden Lanai Room)* CST-6: Coastal Environment *(Carnation Room)* CST-8: Coastal Hazards *(Pakalana Room)* OST-8: Natural Energy *(Anthurium Room)*	
11:45-1:00 BREAK	12:00-1:00 BOARD LUNCH *(Carnation Room)*
1:00-3:00 **SESSION 6** OST-10B: Spectroscopic Oceano-graphic Sensors & Instrumentation *(Garden Lanai Room)* OST-9: Oil Spill Technology *(Carnation Room)* Chapter Forum *(Pakalana Room)* MRMD-2: Marine Recreation & Tourism *(Anthurium Room)*	1:00-5:00 **BOARD OF DIRECTORS MEETING (*CONTINUED*)** *(Carnation Room)*
3:00-3:30 Coffee Break	
3:30-4:00 **CLOSING CEREMONY** *(Garden Lanai Room)*	

PACON 2007
SCHEDULE BY SESSIONS

NUMBER	SESSION TITLE	DATE/TIME	ROOM
THEME SESSION	**OCEAN OBSERVING SYSTEMS**	Mon, Jun 25, 9:45-12:00 Mon, Jun 25, 1:00-3:00 Mon, Jun 25, 3:30-5:00	*Garden Lanai Room*
STUDENT POSTERS	**STUDENT POSTER JUDGING**	Mon, Jun 25, 3:30-5:00	*Anthurium Room*
OST-1	Ocean Mapping and Seafloor Characterization	Cancelled	-----
OST-2	Marine Biotechnology	Mon, Jun 25, 3:30-5:00	*Plumeria Room*
OST-3	Fisheries Technology	Tue, Jun 26, 9:30-11:30	*Ilima Room*
OST-4	Remote Sensing and Oceanographic Satellites	Tue, Jun 26, 12:30-2:30	*Ilima Room*
OST-5	Operational Experiences in Environmental Monitoring	Combined with Theme Session	-----
OST-6	Climate Change	Changed to WKSP-4	-----
OST-7	Aquaculture and Mariculture Technology	Tues, Jun 26, 3:00-5:00	*Pakalana Room*
OST-8	Natural Energy	Wed, Jun 27, 9:45-11:45	*Anthurium Room*
OST-9	Oil Spill Technology	Wed, Jun 27, 1:00-3:00	*Carnation Room*
OST-10A	Spectroscopic Oceanographic Sensors and Instrumentation	Wed, Jun 27, 9:45-11:45	*Garden Lanai Room*
OST-10B	Spectroscopic Oceanographic Sensors and Instrumentation	Wed, Jun 27, 1:00-3:00	*Garden Lanai Room*
CST-1	Hydrodynamics of Coastal Waters	Mon, Jun 25, 3:30-5:00	*Ilima Room*
CST-2	Coastal Water Level Fluctuations	Tue, Jun 26, 9:30-11:30	*Plumeria Room*
CST-3A	Coastal Structures	Tue, Jun 26, 12:30-2:30	*Plumeria Room*
CST-3B	Coastal Structures	Tue, Jun 26, 3:00-5:00	*Plumeria Room*
CST-4	Ports and Harbors	Cancelled	-----
CST-5	Coastal Sediment Processes	Tue, Jun 26, 3:00-5:00	*Ilima Room*
CST-6	Coastal Environment	Wed, Jun 27, 9:45-11:45	*Carnation Room*
CST-7	Sustainable Coastal Development	Tue, Jun 26, 3:00-5:00	*Garden Lanai Room*
CST-8	Coastal Hazards	Wed, Jun 27, 9:45-11:45	*Pakalana Room*
MRMD-1	Marine Policy, Law, and Government	Cancelled	-----
MRMD-2	Marine Recreation and Tourism	Wed, Jun 27, 1:00-3:00	*Anthurium Room*
MRMD-3	Marine Debris	Tue, Jun 26, 9:30-11:30	*Pakalana Room*
MRMD-4	Deep Ocean Water Applications	Tue, Jun 26, 12:30-2:30	*Pakalana Room*
MRMD-5	Methane Hydrates	Combined with OST-8	-----
WKSP-1	Ocean Observing Systems	Combined with Theme Session	-----
WKSP-2	Women in Marine Science, Technology, and Policy	Mon, Jun 25, 3:30-5:00	*Pakalana Room*
WKSP-3	Education in Marine Science and Technology	Cancelled	-----
WKSP-4A	Climate Change	Tue, Jun 26, 9:30-11:30	*Garden Lanai Room*
WKSP-4B	Climate Change	Tue, Jun 26, 12:30-2:30	*Garden Lanai Room*
FORUM	PACON Chapters Forum	Wed, Jun 27, 1:00-3:00	*Pakalana Room*


ILIMA
ELEV. LOBBY
GARDENIA
ANTHURIUM
ELEV. LOBBY
WOMEN
PAKALANA
MEN
CARNATION
PLUMERIA
PRE-FUNCTION
ESCALATOR
HIBICUS BALLROOM I
TO ALA MOANA SHOPPING CENTER
GARDEN LANAI
HIBICUS BALLROOM II

TWENTIETH ANNUAL CONFERENCE

PACON 2007

Ocean Observing Systems and Marine Environment

TABLE OF CONTENTS

MESSAGE FROM THE HONORARY CHAIR (USA)

It is my pleasure to welcome you to The Twentieth Annual Conference, PACON 2007 in Honolulu, Hawaii, U.S.A. The focus for PACON 2007 is *Ocean Observing Systems and Marine Environment.*

For twenty years, PACON International has advanced society's knowledge and understanding of marine science and technology while keeping the needs of the Pacific basin in mind. We are here together and whether you are a scientist, engineer, planner, policy maker, administrator, or educator your view is important and adds extra dimension to our understanding of marine science and technology and its impact on economic development of ocean resources. I hope you will actively participate during and between the many informative sessions at PACON 2007 and take advantage of the excellent opportunity for coordination and collaboration.

I am honored to have the opportunity to participate in this conference and serve as the Honorary Chair. I look forward to a productive and exciting conference and the opportunity to meet as many of you as possible.

Sincerely,

Paul F. Moersdorf, Ph. D.
Director
NOAA National Data Buoy Center
USA

MESSAGE FROM THE GENERAL CHAIR (USA)

Aloha! On behalf of PACON International, it is my pleasure to welcome all of you to the Twentieth Annual Conference, PACON 2007. This year's conference theme "Ocean Observing Systems and Marine Environment" will provide an outstanding opportunity for you to participate in discussions in strengthening our goals in global exchange of information and collaborative research linkages.

Recent activities and disasters within the world have demonstrated the need for our continued international cooperation. This is an important time to increase such awareness of the dynamics of the world's ocean resources and our global community. By your presence here today, and through our collaboration, we will have the opportunity to share our expertise. As we are in a global society connected by oceans, we have a growing need to learn the latest technologies in global and marine science. We look forward to a productive conference and to work proactively to establish partnerships. Likewise, our future success lies in the relationships we build today.

We are grateful for the opportunity to have this year's conference in Hawaii. My best wishes to all of you for an enjoyable and productive symposium.

Lorenz Magaard
Professor of Oceanography
Director, International Center for Climate and Society (ICCS)
Executive Associate Director, International Pacific Research Center (IPRC)
Chair, Manoa Climate Change Commission
School of Ocean and Earth Science and Technology (SOEST)
University of Hawaii at Manoa

PACON INTERNATIONAL MISSION STATEMENT

PACON International is dedicated to sharing scientific and technical information on the world's oceans among, in order to advance marine science and technology and its utilization in ocean policy formation, and the sustainable development of the world's oceans and coastal regions through education and public programs in the Pacific region.

PRINCIPAL GOALS

- To strengthen the global exchange of information and collaborative research linkages with the Pacific nation's programs in marine environment
- To provide information freely to all participating nations
- To promote the environmentally-sound utilization and sustainable development of the ocean's resources
- To emphasize through education and public programs, the need for sound ocean policies
- To advance the various disciplines involved in marine science and technology

PACON INTERNATIONAL BOARD OF DIRECTORS (Current)

Dr. John Benzie, Moana Technologies, USA
Dr. Ju-Chin Chen, National Taiwan University, Taiwan
Ms. Elizabeth Corbin, State of Hawaii DBEDT, Science Technology Branch, USA
Mr. Norman Estabrook, USA
Dr. Kenji Hotta, Nihon University, Dept. of Oceanic Architecture & Engr., Japan
Dr. Ho-Shong Hou, Ministry of Economic Affairs, Taiwan
Mr. David Jourdan, NAUTICOS LLC, USA
Dr. Young C. Kim, California State University, Los Angeles, USA
Dr. H. D. Knauth, GKSS-Research Centre, Germany
Ms. Ann Kobayashi, City & County of Honolulu, USA
Dr. Lorenz Magaard, Int'l Pacific Research Ctr., SOEST, Univ. of Hawaii, USA
Mr. Matthew M. Matsunaga, Schlack Ito Lockwood Piper & Elkind, USA
Dr. Narendra Saxena, Pacific Mapping Program, University of Hawaii, USA
Dr. Yoshifusa Yamada, Nihon University, Japan

PACON INTERNATIONAL BOARD OF DIRECTORS (Elected Term 2007-2011)

Dr. John Benzie, Moana Technologies, USA
Dr. Ju-Chin Chen, National Taiwan University, Taiwan
Ms. Elizabeth Corbin, State of Hawaii DBEDT, Science Technology Branch, USA
Dr. Michael P. Crosby, National Science Board, USA
Mr. Norman Estabrook, USA*
Dr. Kenji Hotta, Nihon University, Dept. of Oceanic Architecture & Engr., Japan
Dr. Ho-Shong Hou, Ministry of Economic Affairs, Taiwan
Dr. Susumu Ishii, Nihon University, Japan
Dr. Young C. Kim, California State University, Los Angeles, USA
Dr. H. D. Knauth, GKSS-Research Centre, Germany
Ms. Ann Kobayashi, City & County of Honolulu, USA
Dr. Lorenz Magaard, Int'l Pacific Research Ctr., SOEST, Univ. of Hawaii, USA
Dr. Koichi Masuda, Nihon University, Japan
Dr. Narendra Saxena, Pacific Mapping Program, University of Hawaii, USA
Dr. DanLing Tang, South China Sea Institute of Oceanology, China
Dr. John Wiltshire, Hawaii Undersea Research Lab, University of Hawaii, USA
Dr. Ki-Dai Yum, Korea Ocean Research & Development Institute, KOREA

*Term: 2007-2009

PACON INTERNATIONAL EXECUTIVE COMMITTEE

Mr. Jerome Comcowich
Ms. Elizabeth Corbin
Dr. Lorenz Magaard
Dr. Narendra Saxena
Dr. Shiv Sharma
Dr. John Wiltshire
Dr. Brandon Yoza

PACON 2007

HONORARY CHAIR

Dr. Paul F. Moersdorf (USA)

GENERAL CHAIR

Dr. Lorenz Magaard (USA)

TECHNICAL PROGRAM COMMITTEE

Dr. Narendra Saxena (USA), Chair
Dr. Young C. Kim (USA)
Mr. Norman Estabrook (USA)
Dr. Kenji Hotta (Japan)
Prof. Ying Wang (China)
Dr. Ju-Chin Chen (Taiwan)
Dr. Sergey Shapovalov (Russia)

INTERNATIONAL SCIENTIFIC ADVISORY COMMITTEE

Dr. Adam Zielinski (Canada)
Prof. DanLing Tang (China)
Dr. Hans-Diethard Knauth (Germany)
Dr. Koichi Masuda (Japan)
Dr. Mohd. Razali Mahmud (Malaysia)
Dr. Vyachesalv B. Lobanov (Russia)
Mr. Tachanat Bhatrasataponkul (Thailand)
Dr. Ian Dutton (USA)

LOCAL ORGANIZING COMMITTEE

Logistics: Ms. Paula Kuriyama
Registration: Ms. Elizabeth Glover
Exhibit Co-Chairs: Dr. Dayananda H. Vithanage
Mr. Ian Y. Kitajima
Ms. Tina Sprague
Social Program & Entertainment: Ms. Carin Brannan

MONDAY, JUNE 25, 2007

OPENING CEREMONY 8:00-8:30 a.m.

Master of Ceremonies
Dr. Jerome Comcowich

Opening of the Congress
Dr. Paul Moersdorf, PACON 2007 Honorary Chair, USA

Welcome of Delegates
Dr. Lorenz Magaard, PACON 2007 General Chair, USA

Remarks from PACON International Founding President, Dr. Narendra Saxena

PACON International Status Report, Dr. Ho-Shong Hou, President

KEYNOTE ADDRESS #1

8:30 – 9:15 a.m. Introduction by Dr. Jerome Comcowich

Keynote Address #1 by **Dr. Paul F. Moersdorf**,
Director, NOAA National Data Buoy Center, USA,
"Integrating Ocean Observing"

9:45 – 11:45 a.m. THEME SESSION: Ocean Observing Systems

LUNCHEON SPEAKER

11:45 a.m. – 1:00 p.m. Introduction by Dr. Lorenz Magaard

Luncheon Speaker by **Dr. Patricia Cooper**, Associate Dean, School of Ocean and Earth Science and Technology (SOEST), University of Hawaii at Manoa, USA, "Opportunities for Women and Minority Students in the Ocean Sciences"

1:00 – 3:00 p.m. THEME SESSION: Ocean Observing Systems (Continued)
3:30 – 5:00 p.m. THEME SESSION: Ocean Observing Systems (Continued)
3:30 – 5:00 p.m. SESSION 1

3:30 – 5:00 p.m. Student Poster Judging

6:30 – 7:30 p.m. Life Member Reception

TUESDAY, JUNE 26, 2007

KEYNOTE ADDRESS #2

8:15 – 9:00 a.m. Introduction by Dr. Jerome Comcowich

Keynote Address #2 by **Dr. Michael P. Crosby**, Executive Officer/Director, National Science Board Office, USA, "National Science Board Perspectives on International Science and Engineering Partnerships: Opportunities for PACON Participation"

9:30 – 11:30 a.m. SESSION 2

12:30 – 2:30 p.m. SESSION 3

3:00 – 5:00 p.m. SESSION 4

6:30 p.m. No-Host Cocktails

7:00-9:00 p.m. Awards Banquet Dinner with Entertainment

WEDNESDAY, JUNE 27, 2007

KEYNOTE ADDRESS #3

8:30-9:15 a.m. Introduction by Dr. Kenji Hotta

Keynote Address #3 by **Dr. Ian Dutton**, Director of Science, The Nature Conservancy, Asia-Pacific Region, USA, "Marine Environmental Problems in the Pacific and Emerging Solutions"

9:45 – 11:45 a.m. SESSION 5

1:00 – 3:00 p.m. SESSION 6

3:30 – 4:00 p.m. **CLOSING CEREMONY**
Coordinator's Report

TECHNICAL PROGRAM

THEME SESSION: Ocean Observing Systems

Co-Chair: Paul Moersdorf Co-Chair: Friedhelm Schroeder
Monday, 25 June 2007
9:45 a.m. - 11:45 a.m.
Garden Lanai Room

Climate Observations From NOAA's Tropical Atmosphere Ocean (TAO) Buoy Array
Chung-Chu Teng

Technical Description and Operational Variables of the Deep-Ocean Assessment and Reporting of Tsunamis Network
Shannon McArthur

Application of Observing Networks: Detection of Wind-Induced Events and Chemical-Biological Processes by Quasi-Continuous Measurements
H.-D. Knauth and F. Schroeder

Autonomous Reef Monitoring Structures as a Measure of Biodiversity and Ecological Monitoring
Russell Brainard, Amy Hall, Elizabeth Keenan, Megan Moews, Julian Caley and Nancy Knowlton

Characteristics of Biofouling by SMP in an Intergraded MBR/RO System for Water Reuse
Lain-Chuen Juang, Dyi-Hwa Tseng and He-Yin Lin

THEME SESSION: Ocean Observing Systems (*Continued*)

Co-Chair: Paul Moersdorf Co-Chair: Friedhelm Schroeder
Monday, 25 June 2007
1:00 p.m. - 3:00 p.m.
Garden Lanai Room

Wave Powered Autonomous Surface Vessels as Components of Ocean Observing Systems
Roger Hine and Phil McGillivary

The Neptune Project: A Cabled Ocean Observatory in the NE Pacific
A. Zielinski, C.R. Barnes, B.D. Bornhold, S.K. Juniper, B. Pirenne and P. Phibbs

Kilo Nalu Cabled Observatory: A Window into yhe Hawaiian Coastal Environment
Geno Pawlak, Tim Stanton, Andy Hebert, Margaret McManus, Eric De Carlo and Frank Sansone

The Data Assembly Center (DAC) at the National Data Buoy Center (NDBC)
Richard L. Crout

Implementing a New Paradigm in Ocean Observing: A View from the Coolroom
Scott Glenn, Oscar Schofield, Robert Chant, Josh Kohut and Janice McDonnell

THEME SESSION: Ocean Observing Systems (*Continued*)

Co-Chair: Paul Moersdorf Co-Chair: Friedhelm Schroeder
Monday, 25 June 2007
3:30 p.m. - 5:00 p.m.
Garden Lanai Room

Real-Time Monitoring in the St. Lawrence: Department of Fisheries and Oceans' Tide Gauge Network
Paul Bellemare and Harry Weiler

Fugro Oceanor Seawatch System : A Historical Review and Perspectives in Operational Oceanographic Service
Svein Erling Hansen

Ocean Observing by Means of Ferrybox Systems
F. Schroeder, W. Petersen, F. Colijn, D. Hydes, H. Ridderinkhoff, S. Kaitala, K. Sorensen, A. Lavin, and I. Lips

OCEAN SCIENCE AND TECHNOLOGY (OST)

Coordinator: Lorenz Magaard (USA)
Co-Coordinator: DanLing Tang (China)

OST-1: Ocean Mapping and Seafloor Characterization

(Cancelled)

OST-2: Marine Biotechnology

Chair: Jo-Ann Leong (USA)
Co-Chairs: Michael Rappe (USA) and Hideki Kohno (Japan)
Monday, 25 June 2007
3:30 p.m. – 5:00 p.m.
Plumeria Room

Cloning of *Clostridium perfringens* Alpha-Toxin Gene and Extracellular Expression in *Escherichia coli*
Masaharu Inoue, Maho Kikuchi, Tomoe Komoriya and Hideki Kohno

Development of Immunoassay Systems for Measuring Small Round-Structured Virus (SRSV): Major Causative Agent of Seafood Borne Infection
Hideki Kohno, Tomoe Komoriya, Takuji Sakai and Susumu Ishii

New Method of Mooring Pontoons using Magnetic Force
H. Gotoh, Y. Yamada, T. Kondo, M. Takezawa and K. Noto

Screening of Photosynthetic Bacteria for High Yield Hydrogen Production
Jyumpei Kobayashi, Toru Honda, Shuhei Tamayama and Hideki Kohno

OST-3: Fisheries Technology

Chair: Kitty Simonds (USA) Co-Chair: Sean Martin (USA)

Tuesday, 26 June 2007

9:30 a.m. – 11:30 a.m.

Ilima Room

Side Setting in the Hawaii-Based Longline Fishery
Scott Barrows

Research on Sea Turtle Bycatch Avoidance Methods: U.S. Research and Regional Review
John Watson, Daniel Foster, Christopher Boggs, Yonat Swimmer and Eric Gilman

Multifunctional Software with Electronic Reporting Applications
Tim Timoney

AIS-Type Technology for Small Vessel Tracking and Enforcement
Fritz M. Amtsberg

Certification of Electronic Reporting Applications for Use in U.S. Fisheries Operating in the Western Pacific Region
Karen Sender and Eric Kingma

EOD Turtlewatch: A Product to Help Minimize Fishery Bycatch of Loggerhead Turtles
Evan A. Howell

OST-4: Remote Sensing and Oceanographic Satellites

Chair: DanLing Tang (China) Co-Chair: Zuojun Yu (USA)

Tuesday, 26 June 2007

12:30 p.m. – 2:30 p.m.

Ilima Room

South China Sea Throughflow as Evidenced by Satellite Images and Numerical Experiments
Z. Yu, S. Shen, J.P. McCreary, M. Yaremchuk and R. Furue

Long Term Observations of Sea Surface Temperature Increase in a Semi-Bay
DanLing Tang, Jing Yu and MingAn Lee

What is the Summertime Bloom in the South of the Jeju Island?
Im Sang Oh, Jisoo Park and Sinjae Yoo

Stationary Alternating Zonal Jets in Hydrographic Data of Eastern North Pacific
Oleg Melnichenko and Nikolai Maximenko

OST-5: Operational Experiences in Environmental Monitoring

(Combined with WKSP-1 into Theme Session)

OST-6: Climate Change

(Changed to WKSP-4)

OST-7: Aquaculture and Mariculture Technology

Chair: Yoshihiro Suenaga (Japan) Co-Chair: Brandon Yoza (USA)

Tuesday, 26 June 2007

3:00 p.m. – 5:00 p.m.

Pakalana Room

Environmental Best Practices Management for Offshore Cage Aqucaulture of Marine Finfish
Philip McGillivary, Paul Troy and Bill Spencer

Research on the Relationship between Prey Abundance and Fish Aggregation
Kaori Yasuoka, Yoshihiro Suenaga, Takashi Hoshino, Hisao Kakegawa and Hee-Do Ahn

Study on the Influence of the River Inflow into the Ocean
Daisuke Yoneura, Masashi Miyagawa, Satoshi Inokuchi, Yoshihiro Suenaga, Hidenori Morita, Hee-Do Ahn and Kenji Hotta

The Influence of the Wind Condition on the Discoloration of *Porphyra ps.*
Takashi Hoshino, Yoshihiro Suenaga, Yasuo Tsunezawa, Kuninao Tada, Kazuhiko Ichimi and Munehiro Fujiwara

OST-8: Natural Energy

Chair: Gerard Nihous (USA) Co-Chair: Jannette Frandsen (USA)

Wednesday, 27 June 2007

9:45 a.m. – 11:45 a.m.

Anthurium Room

Basic Study on Hydrodynamic Behaviors of Darrieus Water Turbines in Uniform Currents
Tomoki Ikoma, Koichi Masuda, Takayuki Sasanuma and Hisaaki Maeda

Improvement in Energy Absorption Efficiency of the PW-OWC Type Wave Power System
Masato Kobayashi, Tomoki Ikoma, Koichi Masuda, Hiroyuki Osawa, Tuyoshi Miyazaki, Hisaaki Maeda and Hideto Yoneno

Methane Hydrate Associated Microbial Communities from the Hikurangi Margin, New Zealand
Brandon Yoza, Renee Harada and Stephen Masutani

OST-9: Oil Spill Technology

Chair: Nobuhiro Sawano (Japan)

Wednesday, 27 June 2007

1:00 p.m. – 3:00 p.m.

Carnation Room

A Case Study on the Regional Oil Spill Contingency Plan in Abashiri City
Kazuko Sao, Kunihisa Sao, Nobuhiro Sawano, Shintaro Goto and Masumi Yazaki

An Experimental Study and Application of Wreck Oil Removal Agent
Kenji Hotta, Kyoichi Okamoto, Tatsutoshi Komatsu, Takao Kuwahara, MikioTakase, Han Duc Viet and Susumu Ishii

Oil Spill Fishery Compensation: Gap between Claimed and Paid
Nobuhiro Sawano, Masumi Yazaki, Shintaro Goto, Kazuko Sao and Kunihisa Sao

Relation between Oil Residues and Angularity of Coastal Gravel
Seiichi Hamada, Nobuhiro Sawano, Kunihiko Endo, Shintaro Goto, Masumi Yazaki, Kunihisa Sao and Kazuko Sao

OST-10A: Spectroscopic Oceanographic Sensors and Instrumentation

Co-Chair: S. Michael Angel (USA) Co-Chair: Shiv Sharma (USA)

Wednesday, 27 June 2007

9:45 a.m. – 11:45 a.m.

Garden Lanai Room

Monte Carlo Optical Modeling of Ocen Lidar Light Fields
David Bates, John Porter, Shiv Sharma and Jeff Bowles

Analysis of Altered Seprentinite using Raman Spectrography, Microprobe, and Petrographic Techniques
Patricia Fryer, Toshio Nozaka and Shiv Sharma

Atmosphere-Ocean 3-Dimensional (AO3D) Monte Carlo Radiative Transfer Model
John Porter, David Bates, Shiv Sharma and Jeff Bowles

Ocean Observatories, Spectrometers And All That
Alan D. Chave

Double Pulse LIBS for Elemental Analysis Underwater: Theory and Experiments
Alessandro De Giacomo

OST-10B: Spectroscopic Oceanographic Sensors and Instrumentation

Co-Chair: S. Michael Angel (USA) Co-Chair: Shiv Sharma (USA)

Wednesday, 27 June 2007

1:00 p.m. – 3:00 p.m.

Garden Lanai Room

Investigating Hydrothermal Vent Chemistry Using a Submersible Raman Instrument
Brian J. Marquardt

Issues Related to Standoff Raman Field Measurements
J. Chance Carter, S. Michael Angel, Joseph Kordas, Darron Nielsen, Will Hunt, Michael Chrisp, Del Eckels, Fred Howland, Jim Hill, Bruce Henderer, Christine Paulson, Marion Lawrence-Snyder, Jon Scaffidi, Jasmine Irvin, Shiv Sharma and Anupam Misra

Optical Measurement of Nitrate by UV Spectrometry
F. Schroeder, M. Gehrung and W. Petersen

Raman Spectroscopic Investigation of Sands and Mud From Shallow Ocean Floor
Shiv K. Sharma, Anupam K. Misra, Patricia Fryer and Roy H. Wilkens

Issues Related to Combined Standoff Raman and Libs Spectroscopy
S. Michael Angel, Marion Lawrence-Snyder, Jon Scaffidi, J. Chance Carter and Shiv Sharma

COASTAL SCIENCE AND TECHNOLOGY (CST)

Coordinator: Young C. Kim (USA)
Co-Coordinator: Fred Chen (USA)

CST-1: Hydrodynamics of Coastal Waters

Chair: Ki-Dai Yum (Korea) Co-Chair: Jae-Youll Jin (Korea)
Monday, 25 June 2007
3:30 p.m. – 5:00 p.m.
Ilima Room

Application of ELMFs Tt Solve Hyperbolic System Problems
Meng-Huang Gu and Der-Liang Young

Local Differential Quadrature Method for Elliptic Equations in Irregular Domains
L.H. Shen and D.L. Young

Propagation of Long-Period Waves into an Estuary through a Narrow Inlet
Takumi Okabe, Shin-ichi Aoki and Shigeru Kato

Stochastic Solutions for Nonlinear Shallow-Water Equations
Liang Ge, Kwok Fai Cheung and Marcelo Kobayashi

CST-2: Coastal Water Level Fluctuations

Chair: Harry Yeh (USA) Co-Chair: Tomoyuki Takahashi (Japan)

Tuesday, 26 June 2007

9:30 a.m. – 11:30 a.m.

Plumeria Room

Pressure Waves Generated in the Water Column by the 2003 Tokachi-Oki Earthquake
Wenwen Li, Harry Yeh and Kenji Hirata

Supposed Disaster Information on the 2004 Tsunami Provided by Virtual Warning System
Tomoyuki Takahashi and Tomohiro Konuma

Remote and Local Wind Effect on Storm Tide Inside the Chesapeake Bay, USA
Jian Shen and Wenping Gong

Development of Operational Fine-Mesh Storm Surge Prediction System in Korea
K. S. Park, J. C. Lee, K.C. Jun, D.Y. Lee and J.I. Kwon

Storm Surge Hindcast using a Three Dimensional Numerical Model
Cha-kyum Kim and Jong Tae Lee

Hindcast of the Storm Surge, Typhoon Maemi.
Jong-Chan Lee, Ki-Cheon Jun, Kwang-Soon Park and Jae-Il Kwon

CST-3A: Coastal Structures

Chair: Kyungmo Ahn (Korea) Co-Chair: Cha-Kyum Kim (Korea)

Tuesday, 26 June 2007

12:30 p.m. – 2:30 p.m.

Plumeria Room

A New Specimen Preparation Method on Calibration Chamber in Silty Sands
Huai-Houh Hsu, An-Bin Huang, Yu-Jie Huang and Chung-Ci Chen

Computation Method of Wave Run-Up on Stepped Seawall
Jea-Tzyy Juang and Chao-Fu Lin

Design Criteria of Coastal Dike around Taiwan Coast
Tai-Wen Hsu and Ho-Shong Hou

Pollutant Transmission by a Long Wave Traveling over A Submerged Cylindrical Structure
Tso-Ren Wu and Philip L.-F. Liu

CST-3B: Coastal Structures

Chair: Kyungmo Ahn (Korea) Co-Chair: Cha-Kyum Kim (Korea)

Tuesday, 26 June 2007

3:00 p.m. – 5:00 p.m.

Plumeria Room

Response Analysis of Aircushion Type Floating Structures Using the MPS Method
Mitsuhiro Masuda, Tomoki Ikoma, Koichi Masuda and Hisaaki Maeda

Response Characteristics of Air Support Floating Structures in Oblique Waves
Yuya Tomisawa, Tomoki Ikoma, Koichi Masuda, Chang-Kyu Rheem and Hisaaki Maeda

The Geogrid Stiffness from Small to Large Strain under Tensile Loading
Huai-Houh Hsu, Meng-Shan Hsieh, Yu-Hsien Ho and Ching-Yi Lin

CST-4: Ports and Harbors

(Cancelled)

CST-5: Coastal Sediment Processes
Chair: Ya-Ping Wang (China)
Co-Chairs: Jian Shen (USA) and Akio Kobayashi (Japan)
Tuesday, 26 June 2007
3:00 p.m. – 5:00 p.m.
Ilima Room

Characteristics of Turbidity Maxima in Yalu River Estuary
Jian-hua Gao

Model for Predicting Beach Changes with Grain Size Composition
Yasuhito Noshi, Akio Kobayashi, Takaaki Uda, Takayuki Kumada and Masumi Serizawa

Performance of Beach Nourishment with Detached Submerged Breakwater
Se-Hyeon Cheon, Jeho Chun and Kyungmo Ahn

Sediment Particles Behavior based on the Lagrangian Concept
Hong-Yeon Cho, Bum-Jun Cho and Kung-Tae Jung

Sediment Transport Processes over Intertidal Mudflats along Jiangsu Coasts, China
Ya Ping Wang, Shu Gao and Jianjun Jia

Velocity Asymmetry and the Controlling Factors in Hainan Island's Tidal Inlets
Wenping Gong, Jian Shen and Daoru Wang

CST-6: Coastal Environment

Chair: Clark Liu (USA) Co-Chair: Kyoichi Okamoto (Japan)

Wednesday, 27 June 2007

9:45 a.m. – 11:45 a.m.

Carnation Room

Marina Elevated Trace Metals:A Case for Sampling with DGT Passive Samplers
Michael S. Tomlinson

Studies on the Ecological Inquisition at the Southern Coast of Taiwan
Ching-Her Hwang, Wen-Chin Lin, S.-M. Lin, L.-H. Tsai and C.-S. Chen

Advective Process of Planktonic Larvae of a Clam in Tokyo Bay
Kaori Miyata, Koichi Masuda, Tomoki Ikoma, Fumikazu Otsuka and Mao Hironaka

Collecting Method and Volume of Mytilus Galloprovincialis as Biomass Resource from Sea
Machi Miyoshi, Yasunori Kozuki, Takuro Kimura, Tatsunori Ishida, Yusuke Mori, Yuki Miyachi and Hitoshi Murakami

Influences of Floods and Seawater Exchange on Water Quality in Lake Furen
Jun Yamamoto, Yoshimi Makita and Hitoshi Tanaka

Purification Effects on Water Quality by Micro Bubble Injecting Ozone
Kyoichi Okamoto and Kenji Hotta

CST-7: Sustainable Coastal Development

Chair: Ian Dutton (USA) Co-Chair: Tetsuo Kitamura (Japan)

Tuesday, 26 June 2007

3:00 p.m. – 5:00 p.m.

Garden Lanai Room

Bolsa Chica Wetland Restoration Restoration of a Coastal Jewel
Russell H. Boudreau

Building Stronger Coastal Management Programs: Lessons from the Micronesian Islanders in Conservation Network
Ian Dutton and Arianne Lowe

GIS-Based Coral Reef Maps in Tourism Areas of Thailand
Thamasak Yeemin, Bancha Lawang, Nisit Ruengsawang, Nipat Somkleeb and Makamas Sutthacheep

Integrated Coastal Zone Management and Its Application in the Yangtze River Delta
Zhi-rong Tan, Xin-pingYan and Ying-lei Zhao

The Characteristics of the Funaya Residences of the Ine Coastal Village
Shinnosuke Agata and Takamasa Miyazaki

The Environmental Characteristics of the Surrounding Areas of Fishery in the Fukuoka
Heisuke Kumagai, Takamasa Miyazaki and Masayuki Suga

The Resource Cultivation of the Setonaikai Coastal Area and the Macro Inquiry
Kiminori Nakazawa, Kazuo Mitsui, Yasukazu Nishi, Takamasa Miyazaki, Susumu Ishii and Takuji Sakai

The Site Tendency of the Intermediary and Final Disposal Facilities in Uchinada
Naoki Kishino, Takamasa Miyazaki and Yasumichi Kawai

CST-8: Coastal Hazards

Chair: DanLing Tang (China) Co-Chair: Im Sang Oh (Korea)

Wednesday, 27 June 2007

9:45 a.m. – 11:45 a.m.

Pakalana Room

Circulation Characteristics Near the Luzon Strait Due to Seasonal Wind Variations
Im Sang Oh and Gillyong Park

Algorithm for Oil Slick Detection by SAR Imagery
Guiwu Wang

Typhoon's Influences on Phytoplankton Ecosystem
DanLing Tang, GangMing Zheng, Hui Zhao, ZhongZheng Yan

The Kurile Tsunami of November 2006: Impact at the Crescent City
Zygmunt Kowalik, Juan Horrillo and William Knight

Fundamental Research on Marine Hazard Map for Ships Struck by Tsunami
Koichi Masuda, Tomoki Ikoma, Shingi Nagasawa and Ryuto Hanada

Effectiveness of Natural Barriers for Mitigating Coastal Inundation Due to Storms and Tsunamis
Hongqiang Zhou, Michelle H. Teng and Andrew J. Kaufman

Changes of the Middle Jiangsu Coast During Past One and Half Century
Dayuan Yang

MARINE RESOURCE MANAGEMENT AND DEVELOPMENT (MRMD)

Coordinator: Ho-Shong Hou (Taiwan)

MRMD-1: Marine Policy, Law, and Government

(Cancelled)

MRMD-2: Marine Recreation and Tourism

Chair: Ching-Piao Tsai (Taiwan) Co-Chair: Ching-Her Hwang (Taiwan)
Wednesday, 27 June 2007
1:00 p.m. – 3:00 p.m.
Anthurium Room

An Economic Benefit of Tourism Increased by Contaminated Marine Sediment Cleanup in Korea
Chang Sun Yum and Hee-Dong Pyo

An Economic Valuation of Ecotourism for Tidal Wetlands in Korea Using the Contingent Valuation Method
Hee-Dong Pyo

Improvement of a Local Guide Center and Ecotourism in Koh Chang, Thailand
Makamas Sutthacheep, Thamasak Yeemin, Nipat Somkleeb, Se Songploy Chaiyaporn Lochaya and Sittiporn Pengsakun

Studies on Creating the Environment of Marine Recreation & Tourism at Taiwan
Ching-Piao Tsai, Hong-Bin Chen and Ching-Her Hwang

MRMD-3: Marine Debris

Chair: Carey Morishige (USA) Co-Chair: Kris McElwee (USA)

Tuesday, 26 June 2007

9:30 a.m. – 11:30 a.m.

Pakalana Room

Marine Debris: U.S. Legislation, NOAA's Marine Debris Program, and Solutions Through Partnerships
Holly Bamford and Kris McElwee

Retrieving Ghostnet at Minimal Cost
Howard C. Wiig

Marine Debris Survey and Removal in the Main and Northwestern Hawaiian Islands
Seema Balwani, Jacob Asher and Oliver Dameron

Factors Affecting Marine Debris Deposition at French Frigate Shoals, Northwestern Hawaiian Islands, 1990-2006
Carey Morishige, Mary J. Donohue, Elizabeth Flint, Christopher Swenson and Christine Woolaway

MRMD-4: Deep Ocean Water Applications

Chair: Ho-Shong Hou (Taiwan)

Tuesday, 26 June 2007

12:30 p.m. – 2:30 p.m.

Pakalana Room

Distributions Characteristics of Deep Ocean Water in the East Sea
D.S. Moon, D.H. Jung, and H.J. Kim

Utilization of Deep Ocean Water Resource and Its Industrial Development in Taiwan
Ho-Shong Hou and Jen-Huan Chang

Comprehensive Study of Deep Ocean Water Cooling and Dow Industry
Ho-Shong Hou, T.F. Chen, Y.M. Hou, S.Z. Huang, H.Z. Chen, C.H. Hsieh, M.C. Chang and Johnny Liu

MRMD-5: Methane Hydrates

(Combined with OST-8)

WORKSHOPS (WKSP)

Coordinator: Elizabeth Corbin (USA)

WKSP-1: Ocean Observing Systems

(Combined with OST-5 into Theme Session)

WKSP-2: Women in Marine Science, Technology, and Policy

Chair: Elizabeth Corbin (USA) Co-Chair: Makena Coffman (USA)
Monday, 25 June 2007
3:30 p.m. – 5:00 p.m.
Pakalana Room

Women In Technology (Wit): Building Systemic Change In Stem Education And Employment
Leslie Wilkins

The Women in Technology Project was launched in 2000 to address the need for a resident trained technology workforce reflecting Hawaii's diversity. The workshop presentation will provide an overview of WIT's successful education and industry initiatives developed to engage and retain girls/women and underrepresented groups in the STEM pipeline. The program models strive to create a continuum, beginning with career awareness programs in elementary school, including training for teachers and outreach for parents. The intermediate school level introduces job shadowing, mentoring, and hands-on math and science relevancy programs, with particular attention to building self-efficacy. High school programs are delivered both formally as project-based learning within the school curriculum and informally in enrichment settings. At the higher education level, WIT facilitates internship and mentoring programs, including recruitment and job placement. The WIT program provides training and technical assistance to educators and industry in gender equity, cultural integration and tools to foster a diverse education and employment environment. The workshop will feature a panel of student protégés, mentors, and educators who will share first hand experiences. Workshop participants will receive packets including replication projects, gender equity resources and curriculum models. The statewide program is administered by Maui Economic Development Board.

WKSP-3: Education in Marine Science and Technology

(Cancelled)

WKSP-4A: Climate Change
Chair: Lorenz Magaard (USA)
Tuesday, 26 June 2007
9:30 a.m. – 11:30 a.m.
Garden Lanai Room

The New Manoa Climate Change Commission of the University Of Hawaii
Lorenz Magaard

The Mexico Declaration on Carbon Management Education
Penelope Canan

Student Action on Campus: The University of Hawaii at Manoa as a Climate Change Policy Microcosm
Jack Kittinger

Economics of Coastal Adaptation to Climate Change
James B. Marsh

Mitigating Climate Change by Reducing Anthropogenic Emissions: Creating a Greenhouse Gas Baseline
Craig S. Coleman

Using Emerging Carbon Markets to Fight the Global Climate Crisis
Alex Handler

WKSP-4B: Climate Change
Chair: Lorenz Magaard (USA)
Tuesday, 26 June 2007
12:30 p.m. – 2:30 p.m.
Garden Lanai Room

The Better Index for ENSO
Jyun-han Jiang, Chung-pan Lee and Ho-shong Hou

Can The "Big Warming" at Spitsbergen from 1918 to 1940 be Explained?
Arnd Bernaerts

Oil Price Shocks and Hawaii's Economy
Makena Coffman

Advanced Evaluation of Ocean Acidification Effects of Economic Policies
Wolf D. Grossmann, Fred Mackenzie and Andreas Andersson

Mitigation Policies Addressing Greenhouse Gases Emissions in a Socio-Economic Dynamic Model Framework
Denise Velhote, Wolf Grossmann and Lorenz Magaard

Review and Critique of Integrated Climate and Society Models
Christian Lapp, Maximilian Mrotzek, Guenther Ossimitz, Christiane Perdacher and Karin Wieser

The Limits of Technological Disaster Prevention Measures and Possible Methods Beyond
Christian Lapp, Maximilian Mrotzek, Guenther Ossimitz, Christiane Perdacher and Karin Wieser

FORUM

PACON CHAPTERS FORUM (ROUNDTABLE DISCUSSION OF CHAPTER ISSUES)

Convenor: Michael P. Crosby (USA)
Wednesday, 27 June 2007
1:00 p.m. – 3:00 p.m.
Pakalana Room

STUDENT POSTER SESSION-*CECILIA HSI SAXENA* AWARD

Coordinator: Jerome Comcowich (USA)

Judging: June 25, 2007, 3:30-5:00 p.m., *Anthurium Room*
Awards Banquet: June 26, 2007, 6:30-9:00 p.m., *Hibiscus Ballroom I*

Dynamics of Near Boundary Flow Over a Coral Reef
Marion Bandet Chavanne and Geno Pawlak

Local Differential Quadrature Method for Flow and Heat Transfer in Irregular Domains
L.H. Shen, D.L. Young and D.C. Lo

Observations of Swash Currents During Long-Wave Forcing
Yu-Hsien Lin, Hwung-Hweng Hwung and Shih-Chun Hsiao

Patch Test Calibration for Multibeam Echosounder System
Kelvin Tang Kang Wee

Potential Artificial Beach Design for Baipai Artificial Island, Sanya Bay, Hainan
Xiaomei Ji, Yongzhan Zhang and Dakui Zhu

Remote Detection of Algae by Laser-Induced Fluorescence Spectroscopy
Chi Hong Chio, Shiv K. Sharma, Anupam K. Misra and Rachel C. F. Lentz

Surface Enhanced Raman Spectroscopy (SERS) for *In-Situ* Measurements of Quorum Sensing Molecules
William F. Pearman, Marion Lawrence-Snyder, S. Michael Angel and Alan W. Decho

Temporal and Spatial Variability in Suspended Solids at The Kilo Nalu Observatory
Melinda Swanson, Geno Pawlak and Eric De Carlo

The Characteristics of Daily Life in the Ine Coastal Village Of Kyoto
Masashi Ogino and Takamasa Miyazaki

SOCIAL ACTIVITIES

PACON 2007 has planned several social events for participants. Awards Banquet Dinner is included in the conference registration *as specified on the registration form* unless otherwise indicated. Additional banquet tickets will be available for purchase at the registration desk.

Sunday, June 24

Welcoming Reception for all delegates (4:00-6:00 p.m.).
The registration desk is also open during this time.

Monday, June 25

Lunch (11:45 a.m.-1:00 p.m.)
Life Member Reception [by invitation only] (6:30-7:30 p.m.)

Tuesday, June 26

PACON Awards Banquet Dinner at Ala Moana Hotel, Hibiscus Ballroom I (6:30-9:00 p.m.)

TOURS

Three (3) main tours to see in Hawaii have been planned as follows:

1) Maui Divers Jewelry Design Center and Showroom/Hilo Hattie
2) Magic of Polynesia (Show located at the Ohana Waikiki Beachcomber)
3) Grand Circle Island Tour

Check availability and transportation information at the PACON 2007 registration desk.

PACON 2007

Ocean Observing Systems and Marine Environment

ABSTRACTS
TABLE OF CONTENTS

Keynote Addresses

Technical Papers and Sessions

THEME SESSION: Ocean Observing Systems

OCEAN SCIENCE AND TECHNOLOGY (OST)

Coordinator: Lorenz Magaard (USA)
Co-Coordinator: DanLing Tang (China)

OST-2
Marine Biotechnology

OST-3
Fisheries Technology

OST-4
Remote Sensing and Oceanographic Satellites

OST-7
Aquaculture and Mariculture Technology

OST-8
Natural Energy

OST-9
Oil Spill Technology

OST-10A & B
Spectroscopic Oceanographic Sensors And Instrumentation

COASTAL SCIENCE AND TECHNOLOGY (CST)
Coordinator: Young C. Kim (USA)
Co-Coordinator: Fred Chen (USA)

CST-1
Hydrodynamics of Coastal Waters

CST-2
Coastal Water Level Fluctuations

CST-3A & B
Coastal Structures

CST-5
Coastal Sediment Processes

CST-6
Coastal Environment

CST-7
Sustainable Coastal Development

CST-8
Coastal Hazards

MARINE RESOURCE MANAGEMENT AND DEVELOPMENT (MRMD)

Coordinator: Ho-Shong Hou (Taiwan)

MRMD-2
Marine Recreation and Tourism

MRMD-3
Marine Debris

MRMD-4
Deep Ocean Water Applications

WORKSHOPS (WKSP)

Coordinator: Elizabeth Corbin (USA)

WKSP-2
Women in Marine Science, Technology, and Policy

WKSP-4A & B
Climate Change

STUDENT POSTER SESSION-CECILIA HSI SAXENA AWARD

Coordinator: Jerome Comcowich (USA)

INTEGRATING OCEAN OBSERVING

Paul F. Moersdorf

NOAA National Data Buoy Center
Stennis Space Center, Mississippi, USA
paul.moersdorf@noaa.gov

With the emergence of the international Group on Earth Observation's System of System's (GEOSS) much attention is focusing on future societal benefits resulting from this global initiative. One GEOSS component is the Global Ocean Observing System (GOOS), of which the United States national Integrated Ocean Observing System (IOOS) is a part. Over the past five years there has been a significant interest growing in both ocean observing and the subsequent data integration. Ocean observing interest is most notable in academia, non-governmental organizations, and state and local governments. For its part the federal government would like to see the many components of ocean observing somehow "integrated" and has put forward a short term action plan and provided a small amount of "seed" funding as top-down encouragement. At the grass roots progress is being made observer to observer. Small groups are collecting and sharing data, technology, and lessons learned. And in many cases they are feeding the data back to the federal government to monitor, quality control, and distribute through its vast infrastructure to users and archivists worldwide. However, these data are being made "interoperable," a necessary step prior to their full integration.

NATIONAL SCIENCE BOARD PERSPECTIVES ON INTERNATIONAL SCIENCE AND ENGINEERING PARTNERSHIPS: OPPORTUNITIES FOR PACON PARTICIPATION

Michael P. Crosby

National Science Board
Arlington, Virginia, USA
mcrosby@nsf.gov

Marine science and engineering (S&E) has demonstrated its clear utility for providing an improved knowledge base on which informed marine and coastal resource management decisions can and should be based. However, marine S&E partnerships and cooperation also have great potential to serve as a vehicle for improving international relations and promoting S&E capacity building in developing countries. The value of international S&E partnerships is of great interest to the U.S. National Science Board (Board). The Board has recently undertaken an effort to examine and make recommendations to the Congress and the President on the role of the U.S. Government in supporting international S&E partnerships in response to the changes that have occurred in recent years to the global dynamics for S&E research, education, politics, and technical workforce. In particular, the Board is examining issues related to how these partnerships may yield more than just excellence in science. Considering PACON's extensive experience and leadership in promoting international marine S&E partnerships and cooperation, it may be uniquely positioned to serve as a key stakeholder group for providing input to the Board on the role of the U.S. Government in supporting international S&E partnerships.

WHY INTEGRATED MANAGEMENT OF THE PACIFIC MARINE ENVIRONMENT IS NEEDED – NOW!

Ian Dutton

The Nature Conservancy
Anchorage Alaska USA
idutton@tnc.org

The Pacific Ocean is now the focus of global economic development. It provides food and other resources directly for more than a third of the world's population. In the past quarter century, as Asian economies have grown rapidly, its role and significance has changed dramatically. From being a divide between developing and developed economies to be explored and overcome, it now empowers global trade and enables interaction between nations on unprecedented scales.

That growth has been powered and sustained by dramatically increased exploitation of non renewable resources such as oil and gas and renewable resources such as fisheries. Such is the scale of global and regional demand for Pacific goods and services that even the most remote corners of this vast ocean are now routinely accessed and exploited.

The impacts of growth are now being felt throughout the Pacific. While many communities are experiencing an improved standard of living, there has also been widespread degradation of coastal ecosystems due to land based sources of pollution and over-development in the coastal zone. The costs of ecosystem rehabilitation typically exceed the benefits derived from short term economic gains and demonstrate once again the limitations of market mechanisms used to value development. Due to under valuation of ecosystem services, we are increasingly observing the local extirpation of species and ecological communities, and continue to see the reduction in numbers and range of once abundant migratory species such as seabirds and turtles. There are very few intact ecosystems, except at relatively small scales, and few sovereign, regional or global programs that effectively conserve living marine resources.

As climate change impacts become more obvious and their scope and severity more profound there is an urgent need to re-examine how nations will adapt to change and to accelerate efforts to anticipate and mitigate those impacts. Ocean and island ecosystems of the Pacific are among the most vulnerable to those changes and most coastal and island communities, particularly traditional communities, are ill-equipped to cope with change in the near term.

A greater emphasis on ecosystem-based approaches to ocean management is needed, with increased efforts to anticipate and mitigate climate and other anthropogenic changes that diminish the productivity and resilience of natural systems and processes. Additionally, there is a need for more tangible and focused local-national and national-regional cooperation to conserve the ecological systems that sustain human well being and economies. Such cooperation will increasingly require a greater emphasis on transboundary and integrated resources management and an unparalleled investment in conserving the array of ecosystem services that the Pacific provides the world.

CLIMATE OBSERVATIONS FROM NOAA'S TROPICAL ATMOSPHERE OCEAN (TAO) BUOY ARRAY

Chung-Chu Teng

NOAA National Data Buoy Center
Stennis Space Center, Mississippi, USA

The Tropical Atmosphere Ocean (TAO) buoy array is maintained and operated by the U.S. National Oceanic and Atmospheric Administration's (NOAA) National Data Buoy Center (NDBC). The mission of the TAO array is to provide real-time atmospheric and ocean data for improved detection, understanding and prediction of weather and climate, especially El Niño and La Niña. The TAO array consists of 55 TAO buoy sites around the equator in the Pacific Ocean. The standard TAO configuration consists of wind speed/direction, air temperature, relative humidity, sea surface temperature, and 12 underwater temperatures (from 20 to 500m below sea surface), and two pressure measurements. Four of the 55 sites at the equator are designated as the flux reference sites which have additional measurements of solar radiation, precipitation, barometric pressure, ocean surface current, and ocean current profile. The TAO array, which was developed by NOAA's Pacific Marine Environmental Laboratory (PMEL) and has now transitioned to NDBC for operations, has a long history of providing high quality, valuable climate data to both the climate and forecast communities**.**

TECHNICAL DESCRIPTION AND OPERATIONAL VARIABLES OF THE DEEP-OCEAN ASSESSMENT & REPORTING OF TSUNAMIS NETWORK

Shannon McArthur

NOAA National Data Buoy Center
Stennis Space Center, Mississippi, USA
Shannon.mcarthur@noaa.gov

The objectives of this paper are to describe the system components of the second-generation Deep-Ocean Assessment and Reporting of Tsunamis (DART II) system as well as describe the variables for establishing and maintaining the operational DART network. The DART II system is an instrument used as part of the National Oceanographic and Atmospheric Administration's (NOAA) tsunami forecast, warning, and mitigation system. Data from the DART system is used to generate accurate tsunami forecasts, warnings and validations. Scientific, technical, operational and political variables are critical considerations in the development and on-going maintenance of at-sea data collection networks. The DART network is no exception and presents unique challenges.

APPLICATION OF OBSERVING NETWORKS: DETECTION OF WIND-INDUCED EVENTS AND CHEMICAL-BIOLOGICAL PROCESSES BY QUASI-CONTINUOUS MEASUREMENTS

H.-D. Knauth and F. Schroeder

GKSS-Research Centre, Institute for Coastal Research
Geesthacht, Schleswig-Holstein, GERMANY
knauth@gkss.de

Nutrients play an important role for the water quality of coastal areas. In the past, monitoring of nutrients was carried out by sampling from ships and analyses in the laboratory. Recent developments in automatic nutrient analyzers provide the possibility of automatic measurements from unattended systems, e.g. buoys. Within the Eureka/Euromar-project "MERMAID" such analyzers had been developed, tested and qualified. In this contribution time series measured on two MERMAID stations show that the transfer of nutrients from the river to the sea is strongly influenced by different short- and long-term events, i.e. freshwater discharge rates and wind actions. During summertime biochemical reactions dominate their fate, additionally. It could be shown that high resolution time series measured at different positions in the estuary lead to improved information about the processes of nutrients on their way from the river to the coastal zone.

AUTONOMOUS REEF MONITORING STRUCTURES AS A MEASURE OF BIODIVERSITY AND ECOLOGICAL MONITORING

Russell Brainard[1], Amy Hall[2], Elizabeth Keenan[2], Megan Moews[2], Julian Caley[3] and Nancy Knowlton[4]

[1]Pacific Islands Fisheries Science Center, National Marine Fisheries Service, NOAA
Honolulu, Hawaii, USA
[2]Joint Institute for Marine and Atmospheric Research, University of Hawaii, Honolulu, Hawaii, USA
[3]Australian Institute of Marine Science, Townsville, Queensland, AUSTRALIA
[4]Center for Marine Biodiversity and Conservation, Scripps Institution of Oceanography
University of California San Diego, La Jolla, California, USA

The Pacific Islands Fisheries Science Center's Coral Reef Ecosystem Division (CRED) leads a Pacific Reef Assessment and Monitoring Program which conducts large-scale biennial monitoring of coral reef ecosystems around 55 Pacific Islands. As part of the Census of Marine Life's Census of Coral Reefs (Creefs) project, CRED also conducts complementary biodiversity studies focusing on small, understudied organisms which are difficult to identify and monitor using traditional means. Creefs is developing and testing Autonomous Reef Monitoring Structures (ARMS) in the main and Northwestern Hawaiian Islands. These are long-term collecting devices designed to mimic the structural complexity of a coral reef and attract colonizing invertebrates. The ARMS will be used for both taxonomic and molecular analysis, to assess indices of invertebrate biodiversity, and to improve our ability to measure and monitor the biodiversity of these understudied organisms. Through development and retrospective analysis of this monitoring tool, ARMS have the potential to greatly enhance the capacity for ecosystem-based management and increase the ability to predict ecosystem change globally.

CHARACTERISTICS OF BIOFOULING BY SMP IN AN INTERGRADED MBR/RO SYSTEM FOR WATER REUSE

Lain-Chuen Juang[1], Dyi-Hwa Tseng[2] and He-Yin Lin[2]

[1]Department of Environmental Engineering, VaNung University, Chung-Li City, TAIWAN
[2]Gradulate Institute of Environmental Engineering, National Central University
Chung-Li City, TAIWAN
lcjuang@vnu.edu.tw

The purpose of this study was to investigate the fouling potential of the SMP (soluble microbial products), which presented in the effluent of a MBR (membrane bioreactor) systems treating textile wastewater, in RO (reverse osmosis) process during different water recycle of intermittent filtration conditions. The results show that over 18.3% and 29.8% of the SMP contained in the effluent of MBR system had a MW (molecular weight) below 1 kDa and between 1kDa and 50 kDa, respectively. Although the quality of permeate filtered with RO process in various water recovery could meet the water reuse standard of tab water, there is a small quantity of SMP in the permeate during 60% water recycle. The wastewater filtered with RO membrane has good pollutant removal efficiency and agrees well with the "solution–diffusion" model. This research also analysis surface properties of membrane characteristics, such as SEM, variation of zeta potential with pH and contact angle to explain the filtration behavior of membrane process.

WAVE POWERED AUTONOMOUS SURFACE VESSELS AS COMPONENTS OF OCEAN OBSERVING SYSTEMS

Roger Hine[1] and Phil McGillivary[2]

[1]Liquid Robotics Inc.
Menlo Park, California, USA
rogerhine@liquidrobotics.net

[2]US Coast Guard PACAREA Science Liaison
Alameda, California, USA
Philip.a.mcgillivary@uscg.mil

We describe a new type of inexpensive autonomous surface vehicle (ASV) under development for long duration deployments, with real-time control and data transmission. These ASVs convert wave motion into thrust, and use solar panels to power on-board electronics. GPS is used to determine location and satellite communications are used for control telemetry. UHF radio and other means provide auxiliary data transmission. These drones can hold position at sea for long periods even in storm conditions, or survey at speeds of about one knot. Having great range, the vehicles can be shore-deployed, transiting to and from observatories without requiring ships for deployment or servicing. The ASVs can function as communication nodes for undersea observatories without installation and maintenance costs of moorings. Such vehicles can extend observatory data collection in near-surface waters. Sensor systems under development include acoustic sensors for marine mammal and fisheries law enforcement monitoring, meteorological sensors and, low-energy optical detection systems for continuous nutrient monitoring. We describe performance and reliability testing of individually and multiply deployed ASVs currently underway in Hawaii.

THE NEPTUNE PROJECT: A CABLED OCEAN OBSERVATORY IN THE NE PACIFIC

A. Zielinski, C.R. Barnes, B.D. Bornhold, S.K. Juniper, B. Pirenne and P. Phibbs

NEPTUNE Canada
Victoria, CANADA
adam@uvic.ca

NEPTUNE will be an innovative network of many sub-sea observatories linked by over 2000 km of powered, electro-optic cable covering most of the Juan de Fuca Plate (200,000 sq km), North-east Pacific, with shore stations at Port Alberni, BC and probably Nedonna Beach, OR. In two years NEPTUNE Canada will install the northern 800km array with 5-6 nodes. Each observatory will host and power many scientific instruments on the surrounding seafloor, in boreholes in the seafloor, and buoyed through the water column. Remotely operated and autonomous vehicles will reside at depth, recharged at observatories and directed from distant labs. Continuous near-real-time multidisciplinary measurement series will extend over 25 years. Major research themes include: structure and seismic behavior of the ocean crust; dynamics of hot and cold fluids and gas hydrates in the upper ocean crust and overlying sediments; ocean/climate change and effects on ocean biota/fisheries at all depths; deep-sea sedimentation, ecosystem dynamics and biodiversity; and engineering and computational systems research. These involve interacting processes, long term changes, and chaotic, episodic events difficult to study and quantify by traditional means. NEPTUNE is a Canada/US partnership with the total facility cost of about $250M.

KILO NALU CABLED OBSERVATORY: A WINDOW INTO THE HAWAIIAN COASTAL ENVIRONMENT

Geno Pawlak[1], Tim Stanton[2], Andy Hebert[3], Margaret McManus[3], Eric De Carlo[3] and Frank Sansone[3]

[1]University of Hawaii at Manoa
Department of Ocean and Resources Engineering
Honolulu, Hawaii, USA
gpawlak@ore.hawaii.edu

[2]Naval Postgraduate School, Department of Oceanography, Monterey, California, USA
stanton@nps.edu

[3]University of Hawaii at Manoa, Department of Oceanography, Honolulu, Hawaii, USA
hebert@hawaii.edu, mamc@hawaii.edu, edecarlo@soest.hawaii.edu, sansone@soest.hawaii.edu

The Kilo Nalu Observatory supplies data and power connections to a suite of instruments over an array of stations extending from 10 to 30m depth, enabling individual user-specific interactive and automated experiment packages. The observatory power backbone includes a shore cabled central distribution node at 10 m depth, which controls DC power for up to four separate nodes distributed across the reef. Each node, then, controls isolated power for up to four experiment modules or 'subnodes'. A monitoring system provides diagnostic data on system performance. Ethernet data and video are transmitted to each node via optical fiber. Observational and diagnostic data are transmitted via wireless link to an online database system at the University of Hawaii campus. The baseline array was deployed in early 2007 with the full system expected to be online by summer of 2007. We describe the observatory infrastructure, discuss some of the challenges in designing, deploying and operating the system, and present preliminary observations on the oceanographic environment including bed morphologies, wave and current forcing, boundary layer physics and shoaling internal tides.

THE DATA ASSEMBLY CENTER (DAC) AT THE NATIONAL DATA BUOY CENTER (NDBC)

Richard L. Crout

NOAA NWS National Data Buoy Center
Stennis Space Center, Mississippi, USA
richard.crout@noaa.gov

The National Data Buoy Center (NDBC) Data Assembly Center (DAC) provides 24/7 quality control and monitoring of marine data from more than 500 platforms. Near-real-time, automated quality control is applied to meteorological, wave, and ocean data as they arrive at the National Weather Service Telecommunications Gateway. NDBC contributes data from 100 buoys, 56 coastal weather stations, 55 TAO moorings, and 28 of 39 planned DART™ buoys. The DAC quality controls data from 161 NOS NWLON stations, 56 oil and gas platforms in the Gulf of Mexico, and 165 IOOS platforms. The DAC also monitors the receipt of data from approximately 600 Volunteer Ocean System ships. Additionally, the NDBC DAC provides daily human quality control for data that are assigned questionable quality flags by the automated process and as data are gathered into monthly data sets and provided to NOAA data centers for long-term archive. The DAC is responsible for monitoring and evaluating the performance of NDBC systems undergoing test and evaluation prior to deployment. The DAC also played a critical role in the transition of DARTTM II system and the TAO array from research to operations.

IMPLEMENTING A NEW PARADIGM IN OCEAN OBSERVING: A VIEW FROM THE COOLROOM

Scott Glenn, Oscar Schofield, Robert Chant, Josh Kohut and Janice McDonnell

Rutgers University
Coastal Ocean Observation Lab
New Brunswick, New Jersey, USA
glenn@marine.rutgers.edu

The Rutgers University (R.U.) Coastal Ocean Observation Lab (COOL) has, over the last 15 years, constructed and operated a shelf-wide ocean observatory to identify and characterize physical, biological, chemical, and geologic processes active on the relatively wide Mid-Atlantic Bight continental shelf. Operation of the observatory is through a centralized computer network dedicated to receiving, processing and visualizing the real-time data, then disseminating results to both field scientists and ocean forecasters over the Web. The system was designed to conduct cutting edge research, requiring the addition of rapidly evolving technologies, and serving society by providing sustained data delivered in real-time. The applied objectives for COOL include: providing critical real-time data over the Web to multiple users, including the Navy, Coast Guard and National Weather Service; use of the observatory as a magnet for engineering/modeling students, both undergraduate and graduate, in partnership with industries to provide a test-bed for developing products that enhance the economic vitality as well as health and human safety along the Northeast United States. This dual purpose ocean observatory has been successfully serving both missions since 1992.

REAL-TIME MONITORING IN THE ST. LAWRENCE: DEPARTMENT OF FISHERIES AND OCEANS' TIDE GAUGE NETWORK

Paul Bellemare[1] and Harry Weiler[2]

[1]Department of Fisheries and Oceans, CANADA
bellemarep@dfo-mpo.gc.ca

[2]AXYS Technologies Inc., CANADA
hweiler@axys.com

The St. Lawrence River is Canada's most commercial waterway. In January 2006, the Canadian Hydrographic Service (Quebec Region) of the Department of Fisheries and Oceans Canada contracted AXYS Technologies Inc. to upgrade the water level gauge stations along the 300 Km stretch of river between Cap-aux-Meules (Magdalen Islands) and Montreal. This network named SINECO provides the real-time environmental data necessary to manage this essential transportation link. The data collected by this network is critical to Canada for: marine traffic control, under-keel clearance, optimization of ship's cargo volume, regulation of the water system, hydrographic surveys, validation of tide predictions and analysis of mean sea level, chart datum management, water level forecasts, hydrodynamic models - currents, storm surge, etc., and shore erosion studies. In this presentation, we will explore both the water level network as well as the St. Lawrence Global Observatory (SLGO), an independent entity created by the Department of Fisheries and Oceans to bring together environmental data from over 28 external partners on the St. Lawrence region. **Keywords**: real-time, water level, telemetry, partnership, hydrologic warning system

FUGRO OCEANOR SEAWATCH SYSTEM A HISTORICAL REVIEW AND PERSPECTIVES IN OPERATIONAL OCEANOGRAPHIC SERVICE

Svein Erling Hansen

Fugro OCEANOR
Pirsenteret
Trondheim, NORWAY
svein.hansen@oceanor.no

Over the last 20 years a revolution has taken place in operational oceanography. Satellite communication links have been offered for the oceanographic community to transfer data from remotely operated moorings at open sea. Great advancements in data management and numerical simulations offer improved capabilities in ocean forecasting. What used to be the privilege of meteorology is today become a reality in oceanography. The Seawatch system was launched in Europe back in 1990 and has since been installed in many countries. The system is an integrated solution for operational oceanography with data buoys combined with suite of numerical models data and information distribution and capacity building. Examples will be given from the Seawatch history to demonstrate a few applications in operational oceanography over the last 15 to 20 years. What is next in operational oceanography? Perspectives in terms of new advanced technological opportunities like deep ocean platforms, will be discussed.

OCEAN OBSERVING BY MEANS OF FERRYBOX SYSTEMS

F. Schroeder[1], W. Petersen[1], F. Colijn[1], D. Hydes[2], H. Ridderinkhoff[3], S. Kaitala[4], K. Sorensen[5], A. Lavin[6] and I. Lips[7]

[1]GKSS-Research Centre, Geesthacht, GERMANY, [2]NOC, Southampton, [3]NIOZ, Netherlands, [4]FIMR, Finland, [5]NIVA, Norway, [6]IEO, Spain, [7]EMI, Estonia
franciscus.colijn@gkss.de

Automated ocean observations, e.g., for monitoring purposes, require frequent measurements at many strategic locations. However, such observations, e.g., by buoy systems are relatively expensive due to the requirement of frequent maintenance by ships. Recently, automated measurements from ships of opportunity (cargo ships or ferries) that are much cheaper reached the operational status. In order to evaluate the technology and to prove its added value to solve different environmental questions the European project “FerryBox” was carried out between 2003 and 2005. Eleven European institutions operated 9 different routes in the Baltic Sea, the North Sea, the English Channel, the Irish Sea, the Bay of Biscay and the Aegean Sea, compared the performance of the systems and the data quality and demonstrated the applicability for questions of water transport, suspended matter transport and eutrophication. In addition, complementing techniques such as satellite remote sensing and modeling were applied to gain as much as possible from the measurements. The main results from the FerryBox-Project will be presented and the applicability of these techniques for observing networks will be discussed.

CLONING OF *Clostridium perfringens* ALPHA-TOXIN GENE AND EXTRACELLULAR EXPRESSION IN *Escherichia coli*

Masaharu Inoue, Maho Kikuchi, Tomoe Komoriya and Hideki Kohno

Advanced Research Center for Life Science and Human
Department of Applied Molecular Chemistry
Graduate School of Industrial Technology
Nihon University
Chiba, JAPAN
c65050@cit.nihon-u.ac.jp

We are studying the environmental and pathological microbiology in the Pacific Ocean. *Clostridium perfringens* is a Gram-positive bacteria which causes various types of infectious diseases. We need a standard diagnosis of *C. perfringens*, terefore, to develop new type immunoassays for clinical purpose we investigated expression and extracellular secretion of recombinant alpha-toxin in the *E. coli* expression system. The cloning was carried out after PCR amplification. Three kinds of fragments were cloned using the pET100/D-TOPO vector. These fragments were coded for ribosome binding site, signal peptide, and alpha-toxin gene respectively. Recombinant pET100 plasmid transformed into TOP10 cells and the obtained plasmids were transformed into BL21 cells. The transformants were induced expression with Isopropyl-β-D-thiogalactopyranoside. We successfully cloned, expressed and exteracellular secreted alpha-toxin. Produced recombinant protein was positive for phospholipase C activity.

DEVELOPMENT OF IMMUNOASSAY SYSTEMS FOR MEASURING SMALL ROUND-STRUCTURED VIRUS (SRSV): MAJOR CAUSATIVE AGENT OF SEAFOOD BORNE INFECTION

Hideki Kohno, Tomoe Komoriya, Takuji Sakai and Susumu Ishii

College of Industrial Technology
Nihon University
Narashino, Chiba, JAPAN
h5kohno@cit.nihon-u.ac.jp

The ocean carries a variety of food-borne diarrhea caused by SRSV in fish and oyster. In research of these causative microbial agents we have been investigating SRSV such as *rotavirus*, *astrovirus* and *norovirus*, which are hazardous agents in seafood industries. In attempts to detect and measure virion, we have developed a simple and sensitive immunoassay to detect these infectious viruses. We cultivated rotavirus in MA-108 cell line and it purified it by ultracentrifugation, and used as antigen to immunize mouse to obtain mouse monoclonal antibody using spleen cell and mouse myeloma P3U1 fusing technology. By use of these monoclonal antibodies we developed the new systems to measure viral virion from varieties of seafood samples. In this paper we will report these immunoassay systems to measure these causative viruses in ocean products.

NEW METHOD OF MOORING PONTOONS USING MAGNETIC FORCE

H. Gotoh[1], Y. Yamada[1], T. Kondo[2], M. Takezawa[1] and K. Noto[3]

[1]Department of Civil Engineering
College of Science and Technology
Nihon University
Tokyo, JAPAN
gotoh@civil.cst.nihon-u.ac.jp

[2]Department of Oceanic Architecture and Engineering, CST, Nihon University, Chiba, JAPAN
[3]Taiyo Road Engineering, Tokyo, JAPAN

In marine space, many floating structures called “pontoons” are utilized, including piers, bridges, wave breakers, and docks. They are also used as a cultivation raft for fish and shellfish in the inshore area. During storm events, pontoons are often destroyed by the energy in currents and waves. Also, the occurrence of red tide may result in great losses for the fishery due to its impacts on fish and shellfish populations. Typically, pontoons are strongly moored to the seafloor by chains, wires and anchors and, thus, can not immediately be moved if the pontoon suddenly faces the risk of being destroyed or affected by red tide. Any method that would allow easy relocation would prevent the loss of pontoons to these hazards. We have developed a new method using magnetic force for mooring pontoons, and have recently obtained a patent for the technique in Japan. Here, proposed applications of the technique for mooring pontoons using magnetic force are presented and empirically evaluated.

SCREENING OF PHOTOSYNTHETIC BACTERIA FOR HIGH YIELD HYDROGEN PRODUCTION

Jyumpei Kobayashi, Toru Honda, Shuhei Tamayama and Hideki Kohno

Department of Applied Molecular Chemistry
College of Industrial Technology
Nihon University
Narashino, Chiba, JAPAN
C65120@cit.nihon-u.ac.jp

Hydrogen attracts great attention as clean energy in stead of fossil fuel. In order to produce hydrogen efficiency, we screened variety of photosynthetic bacteria from water front and ocean side. Photosynthetic bacteria are favorable candidates for biological hydrogen production due to their high conversion efficiency and versatility in the substrates they can utilize. In previous studies, it has been reported to gain hydrogen production (8.5mol H_2/mol glucose) by co-immobilization of photosynthetic bacteria, *Rhodobacter sphaeroides* RV (RV) and *Rhizopus oryzae*. Thereafter, various bacteria have been examined to product hydrogen with RV. But, the theory yield has not been reached. To improve further hydrogen production efficiency, we isolated photosynthetic bacteria with high hydrogen production rate in this study.

SIDE SETTING IN THE HAWAII-BASED LONGLINE FISHERY

Scott Barrows

Hawaii Longline Association
Honolulu, Hawaii, USA
fishrite@alo.com

A comparative study of three methods designed to reduce seabird capture in pelagic longline fisheries was conducted on Hawaii-based longline vessels. Setting longline gear from the side of the vessel instead of from the stern, had the lowest mean seabird capture rate. The two other methods observed were an underwater chute, and blue-dyed bait. Side-setting also provides large operational benefits for longline vessels, including requiring only a single work area and eliminating the need to move large quantities of gear and bait between setting and hauling positions. Since completing this experiment in 2003, federal fishery management regulations were amended to allow side setting as an alternative to meet seabird avoidance requirements. A government-funded program to provide dockside technical assistance to Hawaii vessels to switch to side setting was initiated in 2004. There are now 55 vessels or 28% of the Hawaii fleet using the side setting technique.

RESEARCH ON SEA TURTLE BYCATCH AVOIDANCE METHODS: U.S. RESEARCH AND REGIONAL REVIEW

John Watson[1], Daniel Foster[1*], Christopher Boggs[2], Yonat Swimmer[2] and Eric Gilman[3]

[1]U.S. NOAA Fisheries Southeast Fisheries Science Center
Pascagoula, Mississippi, USA
[*]daniel.g.foster@noaa.gov

[2]U.S. NOAA Fisheries Pacific Islands Fisheries Center, Honolulu, Hawaii, USA
[3]Blue Ocean Institute, Honolulu, Hawaii, USA

The U.S. NOAA Fisheries Service has developed methods to reduce loggerhead and leatherback sea turtle takes in pelagic longline fisheries. Research showed that using circle hooks in place of traditional J hooks and tuna hooks reduces the proportion of hard shelled turtles swallowing hooks and that the use of large circle hooks 4.9 cm or larger in width significantly reduces turtle capture when compared with 4.0 or smaller J and tuna hooks. The use of mackerel bait in the shallow set swordfish fishery also reduced turtle interactions compared to squid bait and the combination of large circle hooks and mackerel bait was the most effective mitigation measure evaluated. U.S. shallow set swordfish fisheries in Hawaii and the Western Atlantic, closed due to sea turtle interaction rates, have been reopened with the requirement to use large circle hooks and mackerel bait. Research results from longline fisheries elsewhere have confirmed that circle hooks reduce the catch rate and increase the survivorship of incidentally caught species. For hardshell sea turtles circle hooks resulted in a reduced proportion of hooks swallowed which may increase post release survival rates.

MULTIFUNCTIONAL SOFTWARE WITH ELECTRONIC REPORTING APPLICATIONS

Tim Timoney

Honolulu, Hawaii, USA
tim@aloha.com

During transiting from fishing grounds to port, the author, a Northwestern Hawaiian Islands bottomfish fisherman, developed a software program (HiPlot) that functions as a navigational plotter as well as contains applications for electronic reporting. Because the program functions as a navigational tool, the coordinates are automatically entered into the electronic reporting form along with oceanographic conditions such as wind and current speed, water temperature, etc. The author will conduct demonstrations of the HiPlot program and its electronic reporting functions.

AIS-TYPE TECHNOLOGY FOR SMALL VESSEL TRACKING AND ENFORCEMENT

Fritz M. Amtsberg

Oceantronics, Inc.
Honolulu, Hawaii, USA
fritz@oceantronics.net

This ongoing project is testing the concept of tracking small vessels (< 50 ft) with economically viable, market available technologies that utilize VHF frequencies similar to those used in Automatic Identification System (AIS) applications. Closed fishing areas are increasingly being touted as an important management tool, however, enforcement of such areas using traditional surface and air assets is difficult and expensive. As observed through the use of vessel monitoring systems (VMS), the ability to remotely track vessels reduces enforcement costs by reducing the need for costly at-sea or air patrols. AIS-type technologies provide potential greater benefits over satellite based systems such as no transmission costs and enhanced safety-at-sea applications. Project partners include the Pacific Missile Range Facility, Western Pacific Fishery Management Council, U.S. Coast Guard, and Oceantronics, Inc.

CERTIFICATION OF ELECTRONIC REPORTING APPLICATIONS FOR USE IN U.S. FISHERIES OPERATING IN THE WESTERN PACIFIC REGION

Karen Sender[1] and Eric Kingma[2]

[1]National Oceanic and Atmospheric Administration
National Marine Fisheries Service, Pacific Islands Fisheries Science Center
Honolulu, Hawaii, U.S.A.
karen.sender@noaa.gov

[2]Western Pacific Regional Fishery Management Council
Honolulu, Hawaii, U.S.A.
eric.kingma@noaa.gov

A recent regulatory amendment has authorized the optional use of electronic logbook forms in United States Western Pacific fisheries (American Samoa, Guam, Northern Mariana Islands, Hawaii). The benefits of using electronic logbooks can include reduced time and effort for fishermen and the federal government to record and manage the data, improved data accuracy, and more timely catch reporting. The Electronic Logbook Certification Project is currently underway to develop guidelines for certifying electronic logbook applications. These guidelines will establish the necessary technical requirements and operational protocols for electronic reporting. Certification ensures the quality, integrity, consistency, and timeliness of data from electronic logbook applications and ensures compliance with National Marine Fisheries Service data standards and best practices. This project will produce documentation that can serve as examples for certifying other electronic logbook applications.

EOD TURTLEWATCH: A PRODUCT TO HELP MINIMIZE FISHERY BYCATCH OF LOGGERHEAD TURTLES

Evan A. Howell

NOAA Fisheries, Ecosystem and Oceanography Division
Honolulu, Hawaii, USA
Evan.Howell@noaa.gov

The Hawaii-based longline fishery is currently regulated to attempt to minimize the bycatch of loggerhead turtles, with an annual cap of 17 allowable loggerhead interactions by the fishery. Research to date by NOAA Fisheries scientists has provided a preliminary understanding of the thermal characteristics of loggerhead turtle habitat in the central North Pacific, with results from satellite tracking and bycatch interactions indicating that most loggerhead turtles stay in water colder than 65.5°F (about 18.5°C). The Ecosystem and Oceanography Division (EOD) product TurtleWatch is a map providing up-to-date information to swordfish fishers about the thermal habitat of loggerhead sea turtles north of the Hawaiian Islands with the goal of reducing loggerhead bycatch. This purpose of this paper is to illustrate the loggerhead turtle bycatch problem in this fishery, as well as to present the research that went into the creation of the EOD TurtleWatch product. The usefulness of the product to the fishery during the 2006-2007 swordfish season will also be discussed, with future plans for this product also presented.

SOUTH CHINA SEA THROUGHFLOW AS EVIDENCED BY SATELLITE IMAGES AND NUMERICAL EXPERIMENTS

Z. Yu[1], S. Shen[2], J.P. McCreary[1], M. Yaremchuk[1] and R. Furue[1]

[1]International Pacific Research Center
University of Hawaii
Honolulu, Hawaii, USA
zuojun@hawaii.edu

[2]George Mason University and Goddard Earth Sciences Data and Information Services Center,
NASA Goddard Space Flight Center, Greenbelt, Maryland, USA

The South China Sea throughflow begins at the Luzon Strait as an intrusion of the Kuroshio. At the present time, there are insufficient in situ measurements either to estimate accurately the transport loss or to provide a clear picture of the Kuroshio pathway at the Luzon Strait. In this study, we use newly available, multi-year, high-resolution satellite images and a numerical model to track the warm, relatively low-biomass, Pacific water carried by the Kuroshio. A suite of numerical experiments is carried out to identify key factors that influence Kuroshio paths at the Luzon Strait. The model can reproduce the satellite-inferred Kuroshio paths across the Luzon Strait only when a significant amount of the Kuroshio water is allowed to enter the Luzon Strait during December–February, therefore providing strong evidence for the existence of the South China Sea throughflow.

LONG TERM OBSERVATIONS OF SEA SURFACE TEMPERATURE INCREASE IN A SEMI-BAY

DanLing Tang[1*], Jing Yu[1] and MingAn Lee[2]

[1]Remote Sensing, Marine Ecology and Environment Group, LED
South China Sea Institute of Oceanology, Chinese Academy of Sciences, Guangzhou, CHINA
and
Graduate School of the Chinese Academy of Sciences, Beijing, CHINA
*lingzistdl@126.com

[2]Department of Marine Science, Taiwan Ocean University, Keelon, TAIWAN

Increase of sea surface temperature (SST) is one of the global warming issues in the world. In the present study, a total of 7614 scenes of NOARR SST (night-time) data obtained from January 1985 to December 2005 were analyzed. The results show SST increased at a high rate in Daya Bay, a shallow semi-enclosed bay of 400 km^2, in the northern South China Sea (SCS), from 1985 to 2005. An unexpected high rate of SST increase was observed after 1994, coincident with the operation of Daya Bay unclear power stations (DUPS), which may have revealed the influence of thermal discharge from power plants. This observation indicates the need for attention on thermal discharge from nuclear power plants and their consequences on SST.

WHAT IS THE SUMMERTIME BLOOM IN THE SOUTH OF THE JEJU ISLAND?

Im Sang Oh[1], Jisoo Park[1,2] and Sinjae Yoo[2]

[1]School of Earth and Environmental Science
Seoul National University
Seoul, KOREA
ois@storm.snu.ac.kr

[2]Korea Ocean Research and Development Institute
Ansan, Gyungi-do, KOREA
jspark@kordi.re.kr

SeaWiFS and MODIS chlorophyll data from NASA Data Active Archive Center were analysed. The SeaWiFS data is level-2, approximate 1 km spatial resolution and MODIS data is level-3, approximate 4.5 and 9 km spatial resolution and daily, 8-days, and monthly in temporal resolutions. We also conducted *in-situ* measurements in the region, 32 ~ 34°S and 124 ~ 127.5°E which is northeastern from the estuary of Changjiang River. The measured quantities are temperature, salinity, chlorophyll *a*, and bio-optic parameters. A large scale chlorophyll bloom in the south of Jeju Island appeared and continued for about twenty days in 2006. The bloom area is found to be chlorophyll-dominant water type differently from the area near the Changjiang River which is sediment-dominant water type. The primary production due to this bloom will be increased by about 330 kilo-ton Carbon. Such large scale blooms were also observed in summertime in 1998, 1999, 2003, and 2004.

STATIONARY ALTERNATING ZONAL JETS IN HYDROGRAPHIC DATA OF EASTERN NORTH PACIFIC

Oleg Melnichenko and Nikolai Maximenko

International Pacific Research Center, SOEST
University of Hawaii
Honolulu, Hawaii, USA
oleg@hawaii.edu

A comprehensive analysis of historical hydrographic observations collected in the eastern North Pacific between 1970 and 2000 reveals the system of quasi-stationary alternating zonal jets between California and Hawaii and validates recent results of Maximenko and Niiler (2005) who found these jets in satellite and drifter data. The jets have meridional wavelength of about 350-400 km and associated vertical displacements of isotherms reach their maximum value of 4-6 m around 12C (which is well in the thermocline). The corresponding thermal signal across the jets does not exceed 0.3C and is much weaker than the temperature difference of 10-15C along the jets due to the large-scale circulation in the Subtropical Gyre and its extraction requires special methods. At the same time, the jets pattern is robust enough to emerge out of the eddy noise. Subsurface jets are vertically in phase with their surface expressions in the mean dynamic topography and are tilted relative to the east-west direction by 10-15 degree as if they were linear Rossby waves propagating north-northwestward against the oncoming southward geostrophic flow.

ENVIRONMENTAL BEST PRACTICES MANAGEMENT FOR OFFSHORE CAGE AQUACULTURE OF MARINE FINFISH

Philip McGillivary[1], Paul Troy[2] and Bill Spencer[3]

[1]US Coast Guard Science Liaison
Alameda, California, USA
Philip.a.mcgillivary@uscg.mil

[2]Hawaii Oceanic Technology, Kona, Hawaii, USA
Paul.troy@gmail.com

[3]Hawaii Venture Capital Association, Honolulu, Hawaii, USA
bspencer@hawaii.rr.com

There is a need for establishing and standardizing best management practices for offshore cage aquaculture of marine finfish. Recent recommendations for best management practices have been published by the EPA, NOAA and the Marine Aquaculture Task force. Standardized best practices for caged finfish aquaculture are needed to monitor pollution, document prevalence and shedding of fish parasites and microbial pathogens, and contingency planning to address problems when they arise. Best management practices, legal considerations and other concerns are discussed in relation to offshore cage aquaculture of marine finfish.

RESEARCH ON THE RELATIONSHIP BETWEEN PREY ABUNDANCE AND FISH AGGREGATION

Kaori Yasuoka[1], Yoshihiro Suenaga[2], Takashi Hoshino[1], Hisao Kakegawa[2] and Hee-Do Ahn[3]

[1]Graduate School of Engineering
[2]Faculty of Engineering
Kagawa University
Kagawa, JAPAN
s06d405@stmail.eng.kagawa-u.ac.jp

[3]Korea Ocean Research and Development Institute, Seoul, KOREA

Many types of porous materials have been developed and settled to create fishery ground for the production enhancement in marine areas. There are many issues to be clarified about the suitable installation of porous materials, such as the relation between clogging conditions and the biological effect of them. In this research, a set of technologies newly developed to restore the environment for juvenile is introduced. It consists of a carbonated porous material using the industrial by-product to adherent the prey abundance for marine habitat restoration and an artificial reef that embodies multiple functions. We also investigated the contents in juvenile's stomach to verify whether they could feed on prey abundance. The set of technologies was applied to coastal areas and was verified to improve biological environment.

STUDY ON THE INFLUENCE OF THE RIVER INFLOW INTO THE OCEAN

Daisuke Yoneura[1], Masashi Miyagawa[3], Satoshi Inokuchi[3], Yoshihiro Suenaga[4], Hidenori Morita[2], Hee-Do Ahn[5] and Kenji Hotta[6]

[1]Graduate School of Environmental Science and Technology
[2]Faculty of Environmental Science and Technology
Okayama University
Okayama, JAPAN
h-morita@cc.okayama-u.ac.jp

[3]Graduate School of Engineering
[4]Faculty of Engineering
Kagawa University
Kagawa, JAPAN

[5]Korea Ocean Research and Development Institute, Seoul, KOREA
[6]College of Science and Technology, Nihon University, Chiba, JAPAN

Issue of environmental deterioration of hydrosphere has been controversial problem recently and countermeasures are urgent need. Actually organic nutrient load and eutrophication has been resulted frequent occurrence of red tide in the Seto Inland Sea. In this study we examined the current status of the river inflow into the seawater especially on Ayagawa River, one of the large rivers in Kagawa Prefecture facing the Seto Inland Sea by numerical calculation. This research is the first stage of the investigation on the influence of the river discharge on the coastal area.

THE INFLUENCE OF THE WIND CONDITION ON THE DISCOLORATION OF *Porphyra ps*.

Takashi Hoshino[1], Yoshihiro Suenaga[2], Yasuo Tsunezawa[1], Kuninao Tada[3], Kazuhiko Ichimi[3] and Munehiro Fujiwara[4]

[1]Graduate School of Engineering
[2]Faculty of Engineering
[3] Faculty of Agriculture
Kagawa University
Kagawa, JAPAN
hoshi@dream.ocn.ne.jp

[4]Kagawa Prefecture Fisheries Research Institute, Kagawa, JAPAN

The production of Nori (*Porphyra sp.*) severely decreased to 60% of the normal annual Nori yield at Kagawa pref. coast, eastern Bisan-Seto. We discussed about the reason of this discoloration of Nori and calculated the positions of nutrient particles from the mouth of Yoshii River to the Nori culture grounds using the multi-level numerical model. From the results of that, we believed that Nori bad harvest was caused due to the positions of nutrient were affected by seasonal west wind velocity and a little rain in the autumn season. In addition, the movement of water with the higher salinity and lower nutrient has been flowing from western marine area to the Nori culture grounds by wind drift. We suggest the nutrient supply for bad Nori harvest area from the Yoshii River flowed from Okayama Prefecture was so important factor for Nori culture.

BASIC STUDY ON HYDRODYNAMIC BEHAVIORS OF DARRIEUS WATER TURBINES IN UNIFORM CURRENTS

Tomoki Ikoma[1], Koichi Masuda[1], Takayuki Sasanuma[2] and Hisaaki Maeda[1]

[1]Department of Oceanic Architecture and Engineering, CST, Nihon University
Funabashi, Chiba, JAPAN
ikoma@ocean.cst.nihon-u.ac.jp

[2]Mitsui Real Estate Sales Co. Ltd., Tokyo, JAPAN

A Darrieus type turbine is in the spotlight as a water turbine for current power generation because the Darrieus water turbine can rotate regardless of influence of current direction. However performance of the Darrieus turbine, which is to torque and to generation, and characteristics of hydrodynamic force have not been cleared. Numerical calculations of torque and horizontal fluid force on the Darrieus turbine with a commercial CFD program are tried. The calculations are two dimensional. Results of the CFD are compared with past results using the model experiment of the Darrieus turbine in a channel, and validity and usefulness of the CFD program are verified in this study. We also research torque characteristics according to a position of wings of the turbine and influence of the solidity of wings to them from results of numerical simulation using the CFD. From the results, accuracy of the numerical simulation results is good for us. However we find a few cases in which the turbine has reverse rotation and find cases such as disagreement with the experimental results.

IMPROVEMENT IN ENERGY ABSORPTION EFFICIENCY OF THE PW-OWC TYPE WAVE POWER SYSTEM

Masato Kobayashi[1], Tomoki Ikoma[1], Koichi Masuda[1], Hiroyuki Osawa[2], Tuyoshi Miyazaki[2], Hisaaki Maeda[1] and Hideto Yoneno[1]

[1]Department of Oceanic Architecture and Engineering
CST, Nihon University, Funabashi-shi, Chiba, JAPAN
m0406008ct@edu.cst.nihon-u.ac.jp

[2]Japan Agency for Marine-Earth Science and Technology, Kanagawa, JAPAN

This paper describes experiment results about the wave energy absorbency performance of oscillating water column equipment with projecting walls. The purpose of present experiments is to confirm the improvement in first transformation efficiency due to the harbor resonance phenomena, which transforms wave energy into compression energy. The number of cases of an experiment model is three. The natural periods of a harbor are 0.95, and 1.26 or 1.6 seconds. Each peculiar period of the oscillating water column is 1.6 seconds. A measuring range is wave period of 0.7 to 1.6 seconds. Wave height is 0.03m. It is confined that the harbor resonance phenomenon is generated when an incident wave period is near 0.95 seconds. It has been conformed that the energy absorption of the oscillating water column had improved. The first transformation efficiency accordingly improves the wave period in which harbor resonance phenomena generated. Furthermore, characteristics of the wave exciting force have also been investigated.

METHANE HYDRATE ASSOCIATED MICROBIAL COMMUNITIES FROM THE HIKURANGI MARGIN, NEW ZEALAND

Brandon Yoza[1], Renee Harada[2] and Stephen Masutani[1]

[1]Hawaii Natural Energy Institute
[2]Molecular Biosciences and Bioengineering,
University of Hawaii
Honolulu, Hawaii USA
byoza@hawaii.edu

Methane hydrates in seafloor sediments are believed to constitute a significant carbon pool that exceeds the reservoir of carbon in the atmosphere and marine biota. Microorganisms (*Archaea* and bacteria) determine the production, consumption, and distribution of methane in sediments and are therefore critical elements in understanding methane hydrate formation, stability, transfers between carbon pools, and the fate of the methane. Molecular biological surveys of sediment cores from methane hydrate beds have provided some evidence of the resident microbial populations. The Hikurangi Margin offshore New Zealand's East Coast is predicted to contain large quantities of gas hydrates, based on the observation of wide-spread bottom simulating reflections (BSRs). The first methane hydrate containing core samples from New Zealand were collected from this location during the summer of 2006. We have characterized the methanogenic *Archea* and sulfate reducing bacterial communities, using molecular methods for a collected core sample. The resulting profile was found to be similar with other methane hydrate containing sediments.

A CASE STUDY ON THE REGIONAL OIL SPILL CONTINGENCY PLAN IN ABASHIRI CITY

Kazuko Sao[1], Kunihisa Sao[1], Nobuhiro Sawano[2], Shintaro Goto[3] and Masumi Yazaki[3]

[1]Ocean Engineering Research, Inc., Shinjuku-ku, Tokyo, JAPAN
Ksao@aol.com, KFH02354@nifty.com

[2]Seiryo Women's Junior College, Kanazawa, Ishikawa Pref., JAPAN
sawano@verdanet.org
[3]Faculty of Geo-Environmental Science, Risho University, Kumagaya, Saitama Pref., JAPAN
got@ris.acjp, masumi.@cityfujisawa.ne.jp

The Russian tanker NAKHODKA oil spill which occurred in 1997 caused serious damages on the marine ecosystem, fisheries and sightseeing. This paper will examine the current Japanese Oil Spill Contingency Plans and make it clear that they lack concerns for stranded oil and localized environmental impacts. We will suggest principles of better oil spill countermeasures based on lessons learned from the NAKHODKA. Based on a research project promoted by Japan Science and Technology Agency (JST), Regional Oil Spill Contingency Plans of Abashiri City facing the sea of Okhotsk has been actually proposed by collaboration of citizens and governments in this area. This plan includes local matters and concrete procedures against possible spills caused by the petroleum and natural gas development and transportation off the coast of Sakhalin. We will present the background and process of preparing Regional Oil Spill Contingency Plans of Abashiri City, and discuss key features of this plan.

AN EXPERIMENTAL STUDY AND APPLICATION OF WRECK OIL REMOVAL AGENT

Kenji Hotta[1], Kyoichi Okamoto[1], Tatsutoshi Komatsu[2], Takao Kuwahara[2], MikioTakase[2], Han Duc Viet[3] and Susumu Ishii[4]

[1]Nihon University
College of Science and Technology
Department of Oceanic Architecture and Engineering
hotta@ocean.cst.nihon-u.ac.jp

[2]JEC AQUA STAFF Co., Ltd.
[3]VJATECH Co., LtD
[4]Nihon University, College of Industrial Technology, Department of Mechanical Engineering

In August 2006, an oil tanker oil spill accident occurred in the Panay Gulf, west of Negros Island, Philippines. The south coast of Guimaras Island, located between Negros and Panay Island, was contaminated with the wreck oil. Benthos, marine living organisms and mangroves suffered extraordinary damage. After site investigations, the authors tried to make an oil removal agent which modified our existing hardening agent made mainly of paper sludge and other minerals for safety analysis and applied this material to the site. We found that the modified agent works very well in removing oil from surfaces of rocks and sand and is, as well, economically feasible. In this paper, new material and its application will be introduced and discussed for further problems of this application.

OIL SPILL FISHERY COMPENSATION: GAP BETWEEN CLAIMED AND PAID

Nobuhiro Sawano[1], Masumi Yazaki[2], Shintaro Goto[2], Kazuko Sao[3] and Kunihisa Sao[3]

[1]Seiryo Women's Junior College
Kanazawa, Ishikawa Pref., JAPAN
sawano@verdanet.org

[2]Faculty of Geo-Environmental Science, Risho University, Kumagaya, Saitama Pref., JAPAN
[3]Ocean Engineering Research, Inc., Shinjuku-ku, Tokyo, JAPAN

As of the moment, oil spill fishery compensation is provided by "tanker owner" and "cargo owner" indemnity insurances. Tanker owner indemnity is maintained under internal convention of CLC. Meanwhile, framework of cargo owner indemnity is organized by another international convention of FC, and actual damages will be claimed to IOPCF (The International Oil Spill Pollution Compensation Funds). In the case of Nakhodka oil spill happened in 1997, whole claims were completed in August, 2002. Total amount of claims to CLC and IOPCF were about 35.8 billion JPY and amount of received was 26.1 billion. Ratio of claimed and paid was varied greatly between each claim party such as fishery union, local government, etc. The biggest problem was the case of local fishery industry; they claimed 5,013 million JPY but received 1,769 million, it was no more than 35% that was covered. This paper will present the background of gap between claims and paid after oil spill and give some suggestions for "fair" and "transparent" management of damage insurance. This study has been promoted and supported by Science and Technology for Society of Japan Science and Technology Agency (JST).

RELATION BETWEEN OIL RESIDUES AND ANGULARITY OF COASTAL GRAVEL

Seiichi Hamada[1] ,Nobuhiro Sawano[2], Kunihiko Endo[3], Shintaro Goto[4], Masumi Yazaki[4], Kunihisa Sao[5] and Kazuko Sao[5]

[1]Geological Survey of Hokkaido
Hokkaido, JAPAN
hamada@gsh.pref.hokkaido.jp

[2]Seiryo Women's Junior College, Ishikawa, JAPAN
[3]Nihon University, Tokyo, JAPAN
[4]Risho University, Saitama, JAPAN
[5]Ocean Engineering Research Inc., Tokyo, JAPAN

In case of oil spill, gravel beaches are commonly hard places for recovery works. In this study, relations between angularity of gravel and residual time of oil after *Nakhodka* oil spill accident has been examined based on the on-site surveys. Digital camera was used to take projected shapes of the gravel, and then public domain software "ImageJ" and spreadsheet have been used to analyze the shapes. Only andesitic cobble-sized gravel was used as a sample because most of the bedrocks of monitoring sites are consisted of andesitic rocks. Every taken image was transformed to 720-angled polygon in accordance with the coordinates of circumference to measure its angularity indices. The indices have been analyzed by (1) ratio between projected area and circumference, (2) difference of the radius between actually measured length of circumference and smoothly translated circumference, and (3) bending angles of the circumference. As a result, strong correlation coefficient (R^2=0.858) has been occurred between angularity index obtained from bending angles and period of oil residue.

MONTE CARLO OPTICAL MODELING OF OCEN LIDAR LIGHT FIELDS

David Bates[1], John Porter[1], Shiv Sharma[1] and Jeff Bowles[2]

[1]University of Hawaii
Hawaii Institute of Geophysics and Planetology
Honolulu, Hawaii, USA
johnport@hawaii.edu

[2]Naval Research Laboratory
Remove Sensing Division, Code 7231

Modeling studies are carried out to investigate light fields and detector signals for laser beams projected from the atmosphere into the ocean. A custom Monte Carlo code is employed to estimate beam patterns in water with various values of absorption and scattering coefficients and phase functions. Time-resolved signals are simulated for elastic and fluorescence detectors in pulsed systems. The effects of typical marine boundary layer aerosols are also explored.

ANALYSIS OF ALTERED SEPRENTINITE USING RAMAN SPECTROGRAPHY, MICROPROBE, AND PETROGRAPHIC TECHNIQUES

Patricia Fryer[1], Toshio Nozaka[2] and Shiv Sharma[1]

[1]Hawaii Institute of Geophysics and Planetology
University of Hawaii
Honolulu, Hawaii, USA
Pfryer@hawaii.edu

[2]Okayama University, Okayama, JAPAN

Serpentine is the predominant alteration product of olivine in hydrothermal conditions at mid-ocean ridges and of metamorphism of the suprasubduction-zone mantle at convergent plate margins. Complexities in composition and mineralogy of serpentinites in these environments provide important clues to the pressure and temperatures and the fluid compositions under which the serpentinization occurred. Furthermore, secondary alteration of serpentinite reflects the dynamics of these environments. Variations in serpentine phases, chlorite, various clay minerals and other phyllosilicate minerals often occur in association with serpentine in these settings. The complexity of interrelationships between serpentine and associated, interlayered phyllosilicates can be determined by a combination of Raman spectroscopy, microprobe analysis and TEM imaging. We have recently performed analysis of serpentinized ultramafic rocks by Raman spectroscopy using glass-mounted thin sections. This technique permits a detailed petrographic, microprobe, and Raman spectrographic analysis of the complexities of interrelationships among serpentine phases and other secondary authigenic mineralizations.

ATMOSPHERE-OCEAN 3-DIMENSIONAL (AO3D) MONTE CARLO RADIATIVE TRANSFER MODEL

John Porter[1], David Bates[1], Shiv Sharma[1] and Jeff Bowles[2]

[1]University of Hawaii
Hawaii Institute of Geophysics and Planetology
Honolulu, Hawaii, USA
johnport@hawaii.edu

[2]Naval Research Laboratory, Remote Sensing Division, Code 7231

Understanding the distribution of lidar scattered light is important for optimizing the design and performance of ocean lidar systems. In order to investigate ocean lidar performance an Atmosphere-Ocean 3-Dimensional (AO3D) Monte Carlo code was developed which can track photons across the ocean surface, off the ocean bottom and back to the atmosphere. Tests are carried out using AO3D and the results are compared with various radiative transfer calculations and independent radiative transfer codes. The AO3D design alows one to specify a Cox and Munk ocean surface with white caps, an inhomogeneous surface (with different surface albedos), and a layered atmosphere with different aerosol properties. Studies were carried out to investigate the distribution of light as a laser beam enters the ocean. Various water absorption and scattering coefficient conditions are considered and the bean size as a function of depth was determined. These parameters will be used in the optimal design of an ocean lidar.

OCEAN OBSERVATORIES, SPECTROMETERS AND ALL THAT

Alan D. Chave

Deep Submergence Laboratory
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts, USA
achave@whoi.edu

Oceanographers around the world are augmenting the ship-based science of the last two centuries with a distributed, observatory-based approach in which scientists continuously interact with instruments, facilities, and other scientists to remotely explore the earth-ocean-atmosphere system. Innovative ocean observatories that provide unprecedented levels of power and bi-directional access to real-time sensor networks will drive scientific innovation and provide education and outreach capabilities that will dramatically impact the general understanding of the environmental sciences. This paper will define the ocean observatory paradigm, describe the infrastructure elements, especially the overarching cyberinfrastructure. It will then outline a vision for the ocean observatory of the future, in which high cost, high capability sensors (such as LIBS, Raman and mass spectrometers) will be housed in autonomous underwater vehicles and controlled remotely. This will be augmented with low cost, low capability sensors fused into coherent arrays.

DOUBLE PULSE LIBS FOR ELEMENTAL ANALYSIS UNDERWATER: THEORY AND EXPERIMENTS

Alessandro De Giacomo

Università degli Studi di Bari
Dipartimento di Chimica
Bari, ITALY
alessandro.degiacomo@ba.imip.cnr.it

Laser Induced Plasma Breakdown Spectroscopy (LIBS) underwater have been investigated to elucidate the basic aspects involved in this technique as well as the main peculiarities of the analytical approach. The strong limitation of Single-Pulse (SP) LIBS are discussed on the basis of plasma emission spectroscopy observations, while the fundamental improvement obtained by Double-Pulse (DP) technique is reported both by the experimental and theoretical point of view in order to give a complete description of DP-LIBS in bulk water and on submerged solid target. Finally a detailed description of laser-water interaction and laser induced bubble evolution is reported to point out the effect of the internal conditions (radius, pressure and temperature) of the first pulse induced bubble on the second pulse producing plasma. The optimization of the DP-LIBS emission signal and the determination of the lower detection limit in a set of experiments reported in the current scientific literature clearly demonstrate the feasibility and the advantages of this technique for underwater applications.

INVESTIGATING HYDROTHERMAL VENT CHEMISTRY USING A SUBMERSIBLE RAMAN INSTRUMENT

Brian J. Marquardt

Center for Process Analytical Chemistry
University of Washington
Seattle, Washington, USA
brian@cpac.washington.edu

This presentation highlights the design, development and deployment of a submersible Raman instrument to depths greater than 2200m. The Raman instrument was designed for deep ocean deployment by the Deep Submersible Alvin for in-situ analysis of hydrothermal systems. It consists of a high resolution, high sensitivity Raman instrument coupled to a specially engineered ballprobe immersion optic for analysis at high pressures and temperature. Hydrothermal vents exist in a wildly turbulent state at high pressures (250 bar) and extreme temperatures (250-400º C). Vent fluid is also quite acidic compared to the surrounding seawater; this combined with the depth, high temperature and pressure makes the study of this corrosive environment extremely difficult. Our current research involves the exploration of this environment to identify and quantitate chemical species within hydrothermal vent fluid. Raman spectroscopy was chosen due to minimal spectral interference from seawater and the ease of identifying species by their characteristic vibrational frequencies. This presentation will describe the submersible Raman instrument, the vent optical sampling requirements and present the Raman data from our September 2007 deployment.

ISSUES RELATED TO STANDOFF RAMAN FIELD MEASUREMENTS

J. Chance Carter[1], S. Michael Angel[2], Joseph Kordas[1], Darron Nielsen[1], Will Hunt[1], Michael Chrisp[1], Del Eckels[1], Fred Howland[1], Jim Hill[1], Bruce Henderer[1], Christine Paulson[1], Marion Lawrence-Snyder[2], Jon Scaffidi[3], Jasmine Irvin[2], Shiv Sharma[4] and Anupam Misra[4]

[1]Lawrence Livermore National Laboratory, Livermore, California, USA
[2]Dept. of Chemistry and Biochemistry, University of South Carolina, Columbia, South Carolina, USA
[3]Department of Chemistry, University of Pittsburgh, Pittsburgh, Pennsylvania, USA
[4]Hawaii Institute of Geophysics and Planetology (HIGP) School of Ocean and Earth Science Technology (SOEST) Honolulu, Hawaii, USA

Fieldable standoff Raman systems are being developed for a variety of applications including planetary measurements and forensic analyses. We have designed and field tested such a system for detecting a variety of forensic-related materials at intermediate distances (10s of meters) in ambient light conditions. In the system to be described light is collected using a telescope which is fiber-coupled to an f/1.8 spectrograph with a gated ICCD detector and a pulsed laser source is used for excitation. The instrument development will be discussed along with specific issues related to standoff detection.

OPTICAL MEASUREMENT OF NITRATE BY UV SPECTROMETRY

F. Schroeder, M. Gehrung and W. Petersen

GKSS-Research Centre
Geesthacht, GERMANY
friedhelm.schroeder@gkss.de

The measurement of nutrients is an important task in advanced ocean observing systems. The disadvantages of systems with “wet chemistry”are i) high maintenance costs and high failure rates due to several moving parts, ii) large time constants of up to 20 minutes and iii) toxic wastes. A relatively new moptical method without any chemicals uses the optical absorption of nitrate in the UV spectrum at about 210 nm. The application in marine waters proved to be difficult due to the interferences of bromide which has a similar absorption range. In order to overcome this the whole spectrum is measured by a miniaturised diode array and a multi-componend analysis compares the spectra of pure sea water and the sample. By this procedure reliable measurements of nitrate with a dtection limit of about 0.5 µmol/l can be achieved. A comparison with lab chemical analyses and nutrient analysers (wet chemistry) are presented together with results from FerryBox measurements in the North Sea.

RAMAN SPECTROSCOPIC INVESTIGATION OF SANDS AND MUD FROM SHALLOW OCEAN FLOOR

Shiv K. Sharma, Anupam K. Misra, Patricia Fryer and Roy H. Wilkens

University of Hawaii
Hawaii Institute of Geophysics and Planetology, SOEST
Honolulu, Hawaii, USA
sksharma@soest.hawaii.edu

In shallow seawater, knowledge of the makeup of the seafloor is of paramount importance in areas such as acoustics and naval operations as well as having significant environmental applications. Fitting an AUV with a miniature telescopic Raman system could provide mineralogical data that would aid in discrimination of different bottom types, and could also provide information about water turbidity and phytoplankton in the water column from laser-induced native fluorescence (LINF) of chlorophyll-*a*. In this work, we have characterized with Raman spectroscopy fine-grain quartz sand naturally occurring garnet and olivine sands as an example of silicate containing bottom. In addition, we have also examined Raman spectra of water saturated sands, which were collected on Oahu (carbonate and organic-rich sands). Our preliminary investigations on shallow water seafloor samples have demonstrated that combine Raman and LINF are capable of providing mineralogical information in these materials as well as in detecting potential biological pigments in mud samples. LINF of chlorophyll-*a* measured in phytoplankton, with the same Raman system, could provide information about phytoplankton distribution in the water column.

ISSUES RELATED TO COMBINED STANDOFF RAMAN AND LIBS SPECTROSCOPY

S. Michael Angel[1], Marion Lawrence-Snyder[1], Jon Scaffidi[2], J. Chance Carter[3] and Shiv Sharma[4]

[1]Department of Chemistry & Biochemistry
The University of South Carolina
Columbia, South Carolina, USA
Angel@mail.chem.sc.edu

[2]Department of Chemistry, University of Pittsburgh, Pennsylvania, USA
[3]M-Division/Forensics Sciences Ctr, Lawrence Livermore National Laboratory, California, USA
[4]Hawaii Institue of Geophysics and Planetology, SOEST, Honolulu, Hawaii, USA

Laser-Induced Breakdown Spectroscopy (LIBS) and Raman spectroscopy are complementary techniques, the former technique providing elemental information and the latter technique providing molecular and structural information. Combining LIBS and Raman in a single instrument has been reported, and it has been recognized that the instrumentation used for these techniques is quite similar. In both techniques a laser is used for exciting the sample, light is collected from the sample region, the light is dispersed using a visible or UV grating monochromator, and an array detector (CCD or ICCD) is used to measure the dispersed spectrum. In the case of LIBS a pulsed laser is always used whereas for Raman spectroscopy a continuous wave laser is typically used. Not surprisingly, a standoff instrument capable of measuring both Raman and LIBS has been described. Although the two techniques are very similar there are many instrumental and measurement parameters which are quite different, and these differences lead to trade-off issues that must be considered in the proper design of a system.

APPLICATION OF ELMFS TO SOLVE HYPERBOLIC SYSTEM PROBLEMS

Meng-Huang Gu and Der-Liang Young*

Department of Civil Engineering and Hydrotech Research Institute
National Taiwan University
Taipei, TAIWAN
*dlyoung@ntu.edu.tw

The objective of this paper is to develop a novel numerical model to solve the one-dimensional system of hyperbolic equations. The proposed Eulerian-Lagrangian method of fundamental solutions (ELMFS), based on the diffusion fundamental solution and method of characteristics, can be easily used for handling the system of hyperbolic equations. The system of hyperbolic equations will be transferred to the system of pure advection equations and then the solutions are approximated by the proposed meshless method. The proposed numerical scheme, free from mesh and numerical quadrature, can transport the physical variables in Eulerian and Lagrangian coordinates effortlessly. There are two numerical tests for validating the proposed numerical scheme and the results are compared with the analytical solutions. Shallow water problem equations were analyzed by the present meshless method and results are compared with solutions obtained by other numerical methods. Therefore, we are convinced that the proposed Eulerian-Lagrangian method of fundamental solutions is a promising numerical tool as the solving system of hyperbolic equations.

LOCAL DIFFERENTIAL QUADRATURE METHOD FOR ELLIPTIC EQUATIONS IN IRREGULAR DOMAINS

L.H. Shen and D.L. Young*

Department of Civil Engineering and Hydrotech Research Institute
National Taiwan University
Taipei, TAIWAN
*dlyoung@ntu.edu.tw

The differential quadrature (DQ) method is a numerical technique with high accuracy, but its application is sensitive to grid distribution and contracted by the problem limited to ill-conditioning matrix throughout. The restriction of this method to deal with the boundary has also limited to the problems with regular domain. In this article, the concept of localization and the technique in dealing with the irregular boundaries has been employed and proposed. The derivatives at a grid point are approximated by a weighted sum of the points in its neighborhood rather than at all grid points. With this concept, the computational cost can be reduced efficiently such that the global matrix will be improved to become a sparse and band matrix. The proposed method is applied to the potential flow problems and extended to the harbor resonance problem which governed by the Helmholtz equations in the two-dimensional irregular domains. Numerical examples show that the present method produces very accurate results while maintaining good stability. The local DQ method enables us to solve more complicated problems and enhance the flexibility of DQ method significantly.

PROPAGATION OF LONG-PERIOD WAVES INTO AN ESTUARY THROUGH A NARROW INLET

Takumi Okabe, Shin-ichi Aoki and Shigeru Kato

Department of Civil Engineering
Toyohashi University of Technology
Toyohashi-shi, Aichi, JAPAN
okabe@jughead.tutrp.tut.ac.jp

In order to estimate sediment exchange between an estuary and the open sea through a narrow inlet, it may be important to investigate the behavior of the long-period waves with periods of several minutes generated by wave groups in the sea. In this study, characteristics of the long-period waves and associated flows outside and inside the inlet of Hamana Lake is discussed based on the field data. The results show that large amount of energy of long-period waves propagate into the estuary through the inlet.

STOCHASTIC SOLUTIONS FOR NONLINEAR SHALLOW-WATER EQUATIONS

Liang Ge[1], Kwok Fai Cheung[1] and Marcelo Kobayashi[2]

[1]Department of Ocean and Resources Engineering
[2]Department of Mechanical Engineering
University of Hawaii
Honolulu, Hawaii USA
cheung@hawaii.edu

This paper examines the use of the polynomial chaos to describe the uncertainty in the input boundary conditions and its propagation through the nonlinear shallow-water equations in long-wave simulations. The formulation is based on the conservative form of the nonlinear shallow-water equations with a Godunov-type scheme. Expansions of the conserved variables by the Hermite polynomials give rise to the stochastic form of the shallow-water equation in terms of a finite number of random modes. The orthogonal property of the polynomials allows the use of a Galerkin projection to derive a deterministic equation for each random mode. The stochastic solutions for wave transformation over a submerged hump and runup on a plane slope are almost identical to the results from the Monte Carlo method, but at a small fraction of it computing cost.

PRESSURE WAVES GENERATED IN THE WATER COLUMN BY THE 2003 TOKACHI-OKI EARTHQUAKE

Wenwen Li[1], Harry Yeh[1] and Kenji Hirata[2]

[1]Department of Civil, Construction and Environmental Engineering
Oregon State University
Corvallis, Oregon, USA
liw@engr.orst.edu
harry@engr.orst.edu

[2]Institute for Research on Earth Evolution
Japan Agency for Marine Science and Technology
Yokosuka, JAPAN
hiratak@jamstec.go.jp

During the 2003 Tokachi-Oki earthquake, acoustic-wave oscillations in the water column were registered by the ocean-bottom observatory located near the epicenter. The numerical simulations demonstrate that the soft sediment layers must play a role in the formation of acoustic waves. The analysis shows that the co-seismic seafloor uplift took place in the duration of 7 ~ 8 seconds. The amplitude modulation of acoustic waves is found to be regular, which indicates that the neighboring geologic factors control its characteristics. Pressure-wave attenuations for the main shock and the following aftershocks are consistent, except for one of the aftershocks. This suggests that the particular aftershock must have taken place away from the location of the pressure gage. Considering the current developments of ocean-bottom observatory systems in the United States, the present analyses demonstrate how the data from a future observatory can be used when and if an earthquake occurs right at the location of the observatory.

SUPPOSED DISASTER INFORMATION ON THE 2004 TSUNAMI PROVIDED BY VIRTUAL WARNING SYSTEM

Tomoyuki Takahashi and Tomohiro Konuma

Department of Civil and Environmental Engineering
Akita University
Akita, JAPAN
tomoc@ce.akita-u.ac.jp

Many people who don't know tsunamis were killed by the 2004 Indian Ocean tsunami. The tsunami disaster showed that disaster information is important to mitigate damage caused by tsunamis. To provide appropriate disaster information for the administrations and residents, a tsunami warning system is necessary. The present tsunami warning system, however, has risk of underestimating tsunamis due to the great earthquakes of magnitude 9 class right after the main shocks. Then, in this study, we show what tsunami disaster information would be provided, if the present tsunami warning system had been established in the Indian Ocean before 2004.

REMOTE AND LOCAL WIND EFFECT ON STORM TIDE INSIDE THE CHESAPEAKE BAY, USA

Jian Shen and Wenping Gong

Virginia Institute of Marine Science
College of William and Mary
Gloucester Point, Virginia, USA
shen@vims.edu

The Chesapeake Bay is vulnerable to hurricanes and strong Nor’easters and has experienced significant flooding caused by storms in recent years. The variations of the surface elevation inside the Bay are strongly influenced by both local wind forcing and remote wind effects off the coast. However, the importance of Ekman transport and remote wind-induced set-up are difficult to evaluate with existing observation data. This study is pursued through a series of three-dimensional numerical model experiments with different wind forcing over a large modeling domain that encompasses both the Chesapeake Bay and the adjacent East Coast of the U.S. The model is used to diagnose the relative importance of the Ekman transport, the forerunner generated by a hurricane on the coastal sea, and the surge that propagates into the Bay resulting from set-up near the coast.

DEVELOPMENT OF OPERATIONAL FINE-MESH STORM SURGE PREDICTION SYSTEM IN KOREA

K. S. Park, J. C. Lee, K.C. Jun, D.Y. Lee and J.I. Kwon

Coastal Disaster Prevention Research Group, KORDI
Seoul, KOREA
kspark@kordi.re.kr

Coastal disasters due to typhoons have emerged as one of the biggest threats to life and property in the costal area of Korea. Therefore, operational prediction system of storm surges is needed to prevent and to mitigate the natural hazards in the Korean seas and coastal area. The primary purpose of this paper is to develop an operational fine-mesh storm surge prediction system in the Korean coast. We focus on a description of the status of operational storm surge prediction system which is connected real-time surge monitoring, typhoon wind model, wave model, and different storm surge models. We also introduce and present the analysis of historic major typhoons, production of typhoon parameters for prediction of sea-surface wind and pressure fields during typhoon passage. Additionally, verification and sensitivity analysis of the wind prediction model and establishment of regional, detailed grid system for storm surge prediction are carried out.

STORM SURGE HINDCAST USING A THREE DIMENSIONAL NUMERICAL MODEL

Cha-kyum Kim[1] and Jong Tae Lee[2]

[1]Department of Civil and Environmental Engineering
Namhae College
Kyungnam, KOREA
kick@namhae.ac.kr

[2]Head of Urban Flood Disaster Management Research Center, MOCT, KOREA

The typhoon landed on the southern coast of Korean Peninsula at 21 hr, 12 September 2003 with a central pressure and a progression speed of approximately 950 hPa and 45 km/h, respectively. It caused the terrific life damage with more than 130 people of missing and dead and the property damage of about 5 billion US dollars. The tide gauge in Masan Harbor located in the southern sea of Korea recorded the storm surge of a maximum of approximately 2.4 m. While typhoon Maemi was passing by Masan Bay, the level of the astronomical tide reached near the high water of a spring tide. The residential and commercial area facing to the Masan Bay was heavily flooded and the almost underground facilities suffered from the inundation by the storm surge. A three dimensional numerical model was established in order to simulate the storm surge which was observed in the south sea of Korea during Typhoon Maemi. The model was also applied to the three dimensional computation of the typhoon induced currents. The simulated surge for the typhoon shows good agreement with the recorded one at the southern coast.

HINDCAST OF THE STORM SURGE, TYPHOON MAEMI

Jong-Chan Lee, Ki-Cheon Jun, Kwang-Soon Park and Jae-Il Kwon

Korea Ocean Research and Development Institute
Ansan, KOREA
jclee@kordi.re.kr

The precise prediction to the storm surges is one of urgent issues for humankind. However, the most important information such as spatial-temporal variations of air pressure and wind field for the warning the storm surges is still limited. In this study, typhoon MAEMI landed on the southeast coast of the Korea on 12 September, 2003 was simulated. MAEMI recorded not only tremendous economic loss but also historic weather survey in Korea. The comparison of model prediction and observed sea level elevation was presented to explore the importance of the meteorological input data and the multi-nesting grid to the storm surge prediction.

A NEW SPECIMEN PREPARATION METHOD ON CALIBRATION CHAMBER IN SILTY SANDS

Huai-Houh Hsu[1], An-Bin Huang[2], Yu-Jie Huang[2] and Chung-Ci Chen[3]

[1]Department of Civil Engineering, Chienkuo Technology University
Chang-Hua, TAIWAN
hhhsu@ctu.edu.tw

[2]Department of Civil Engineering, National Chiao Tung University, Hsin-Chu, TAIWAN
[3]Institute of Mechatronoptic Systems, Chienkuo Technology University, Chang-Hua, TAIWAN

The sand on the West Coast of Taiwan contains significant amount of silt. Due to lack of cohesion, it is difficult to obtain undisturbed samples for sand. In situ tests are often used to determine the engineering properties of sand. The cone penetration test (CPT) is a widely used in situ test. The interpretation rules of CPT data are mostly developed based on chamber calibration tests, and limited theoretical considerations. Most of the available empirical rules came from Europe or Northern America, based on tests in uniformly graded, clean sand. The difference between uniformly graded clean sands and silty sands can be significant. It is not desirable to directly adopt the empirical CPT interpretation rules developed in the West to the silty sand on Taiwan. The preparation of a uniform chamber specimen is important. When the sand contains fines, the particle segregation during deposition process should be minimized. A new deposition method has been developed to prepare a uniform chamber specimen of silty sands. This paper introduces this method and presents test results.

COMPUTATION METHOD OF WAVE RUN-UP ON STEPPED SEAWALL

Jea-Tzyy Juang[1] and Chao-Fu Lin[2]

[1]Department of Civil Engineering
Chienkuo Technology University
Changhua, TAIWAN
jtjuang@ctu.edu.tw

[2]Department of Hydraulic Engineering
Feng Chia University
Taichung, TAIWAN

Both the computation methods of wave run-up by use the potential energy method (Cross et al., 1972) and the wave momentum flux method (Hughes, 2004) were use in this study. The surface of sloping seawall use stepped type. Several water depths in experiment to measure the wave run-up in several incident wave steepness conditions are completed. Using those experiment data of wave run-up to compare with the values that computed by the above mentioned theoretical models also completed. The correlation between surf parameter and slope angle of stepped seawall was computed and compare with the results which presented by Ahrens et.al (1981) and Neelamani et al (2005) respectively. It is found the tendency between those correlations is similar. As to the accuracy of computation on wave run-up, by compare the predicted value with the experiment data, we can see the wave momentum flux prediction method still better than the wave potential energy method in stepped sloping seawall as well as in smoothed sloping seawall.

DESIGN CRITERIA OF COASTAL DIKE AROUND TAIWAN COAST

Tai-Wen Hsu[1] and Ho-Shong Hou[2]

[1]Department of Hydraulic and Ocean Engineering
National Cheng Kung University
Tainan, TAIWAN

[2]Ministry of Economic Affairs
Taipei, TAIWAN

A nearshore hydrodynamic model together with a Reynolds averaged Navier-Stokes (RANS) approach is used to simulate the water level rise and wave setup and run-up mechanics in front of coastal dikes. The sea level changes consist of the maximum astronomic tidal level, storm surge, wind and wave induced-setup and wave run-up and overtopping. The estimated sea water rise is applied to determine the height of coastal dikes. The predicted water level response due to astronomical and meteorological tides and waves is then used as designed criteria of coastal dikes. The advantage of the present designed criteria is its ease, efficiency and accuracy in practical applications when compared with previous empirical methods. Two typical typhoon events with different attacking tracks were demonstrated to validate the predictability of the nearshore numerical models.

POLLUTANT TRANSMISSION BY A LONG WAVE TRAVELING OVER A SUBMERGED CYLINDRICAL STRUCTURE

Tso-Ren Wu[1] and Philip L.-F. Liu[2]

[1]Institute of Hydrological Sciences
National Central University
Jhongli, Taoyuan, TAIWAN
tsoren@ncu.edu.tw

[2]School of Civil and Environmental Engineering
Cornell University
Ithaca, New York, USA

The hydrodynamics around an offshore submerged structure is investigated numerically. A three-dimensional Large Eddy Simulation (LES) with a Smagorinsky subgrid-scale (SGS) model is adopted. The fluid interface is tracked by the volume-of-fluid (VOF) method. Finite volume method (FVM) with an unstructured mesh is used to discretize the domain. The flow simulation is carried out for a solitary wave traveling over the offshore submerged cylindrical structure. A thin-layer numerical dye is placed on top of the structure to mimic the movement of the pollutant. The result is validated with the laboratory experiment. The result shows that the pollutant will first be transferred to the lee side of the structure and then travel towards the free-surface. The pollutant is finally dissipated in the region close to the free-surface.

RESPONSE ANALYSIS OF AIRCUSHION TYPE FLOATING STRUCTURES USING THE MPS METHOD

Mitsuhiro Masuda, Tomoki Ikoma, Koichi Masuda and Hisaaki Maeda

Department of Oceanic Architecture and Engineering
CST Nihon University, Funabashi-shi, Chiba, JAPAN
fearfactory3@jcom.home.ne.jp

An aircushion type floating structures can reduce the wave drifting force and elastic response by installing aircushions in floating structures. A lot of theoretical calculations have been done based on a linear potential theory so far. As a result, the utility of aircushion type floating structures has been proved. However fully nonlinear phenomena such as deck wetness, slamming and air leakage cannot be analyzed by using potential theory based calculation methods. In this study, a two dimensional MPS method program code that is able to consider fully nonlinear influence is developed. The air layer inside an aircushion is expressed by particles of the MPS. Moreover, the numerical technique for introducing directly the mooring force into equation of motion of the particle is conducted. Response analysis of aircushion type floating structures in large waves is carried out. As a result, the usefulness of this numerical technique is confirmed.

RESPONSE CHARACTERISTICS OF AIR SUPPORT FLOATING STRUCTURES IN OBLIQUE WAVES

Yuya Tomisawa[1], Tomoki Ikoma[1], Koichi Masuda[1], Chang-Kyu Rheem[2] and Hisaaki Maeda[1]

[1]Department of Oceanic Architecture and Engineering
CST, Nihon University, Funabashi, Chiba, JAPAN
home-team@hotmail.co.jp

[2]Institute of Industrial Science, The University of Tokyo, Tokyo, JAPAN

This paper describes to adopt an aircushion supported floating type is effective for response reduction of floating structures in oblique water waves, and thereby model experiments are carried out in a wave tank in order to prove validity of the effectiveness. Corresponding floating structures have aircushions which support weight of the structure on water. An experimental model is length of 3.0m, wide of 0.75m, and depth of 0.2m. The aircushion model has three aircushions. Length of a division of the aircushion is 1.0m. The range of measurement wavelength is L/λ =1.0 to 6.0 in which L/λ is ratio of body length and wavelength, and wave height is set to 0.4m. The angle of incident waves is 30 and 60 degrees. A pontoon type floating model is used for comparison of responses. From results of the experiment, it is confirmed that vertical motion is reduced and then the wave drifting force, which is the second-order wave force of a steady component, is simultaneously reduced. Therefore aircushion effect for the reduction is proven.

THE GEOGRID STIFFNESS FROM SMALL TO LARGE STRAIN UNDER TENSILE LOADING

Huai-Houh Hsu[1], Meng-Shan Hsieh[2], Yu-Hsien Ho[3] and Ching-Yi Lin[3]

[1]Department of Civil Engineering, Chienkuo Technology University
Chang-Hua, TAIWAN
hhhsu@ctu.edu.tw

[2]Institute of Mechatronoptic Systems, Chienkuo Technology University, Chang-Hua, TAIWAN
[3]Technical Support Dept., ACE Geosynthetic Enterprise Co., Ltd., Ta-Chia, TAIWAN

To sustain wave forces and traffic loads, some of the coastal structures are constructed with geosynthetics. Limited equilibrium analysis is widely used to analyze the stabilities of these structures. It can provide safety factor at probable failure surface but can not predict the deformation of retaining structure. The working stress analysis (WSA) has been developed and attempt to solve this problem. According to the results measured from in-situ tests and laboratory tests, WSA uses finite element method or finite difference method to estimate external deformation, distribution of internal stress and strain. The stress-strain curve for a geosynthetic material is nonlinear. In small strain level, the stiffness of geosynthetics could be varied rapidly. In order to apply WSA reasonably, the stiffness of geosynthetics at different strain level should be established. Equipped with servo motor and highly resolution measurement system, a series of tensile loading tests is performed using PET, PP, and HDPE geogrids to discuss their behaviors under different strain rates. This paper introduces this equipment, presents the results, and discusses the performance of geogrids.

CHARACTERISTICS OF TURBIDITY MAXIMA IN YALU RIVER ESTUARY

Jian-hua Gao

Ministry of Education Key Laboratory for Coast and Island Development
Nanjing University
Nanjing, CHINA
jhgao@nju.edu.cn

Tidal cycle measurements of tidal currents, salinity and water temperature, and suspended sediment concentrations were measured at four stations. The data indicate that stratification occurred in the flood season, from upstream to downstream, and a salt wedge was formed. The water column was well mixed, but the longitudinal gradient of the salinity was larger on spring tide. The results also showed that the dominating mechanism of suspended sediment transport in Yalu river estuaries is T1, T2, T3 and T5. The non-tidal steady advection transport is restricted by the net transport of suspended sediment induced by mass Stoked drift directed to landwards, then the net sediment transport rate were decreased and the turbidity maxima was also favored to forming and extending.

MODEL FOR PREDICTING BEACH CHANGES WITH GRAIN SIZE COMPOSITION

Yasuhito Noshi[1], Akio Kobayashi[1], Takaaki Uda[2], Takayuki Kumada[3] and Masumi Serizawa[4]

[1]Department of Oceanic Architecture & Engineering, CST, Nihon University, Chiba, JAPAN
[2]Public Works Research Center, Tokyo, Japan
[3]Laboratory of Aquatic Science Consultant Co., Ltd., Tokyo, Japan
[4]Coastal Engineering Laboratory Co., Ltd., Tokyo, Japan

Kumada et al. (2005) assumed that it is easy to move in the mix sand with fine sand. This is well known fact on river and beach. When the beach change is modeled, this means Kumada's et al. (2005) basic idea is effective to show the beach change with the longshore sand transport. In contrast, Noshi et al. (2005) showed Eq. (1) that calculated local seabed slope $\tan\beta_c$ from equilibrium slope $\tan\beta_c^{(K)}$ of the particle grain size and grain size composition $\mu^{(K)}$. Range of application of formula is from h_c to h_R according to grain size composition $\mu^{(K)}$. In this study, a new model for predicting beach changes with relationship between local seabed slope and grain size composition from the idea of Noshi et al. (2005) (Eq. (2)). In fact, it is the model that the stable seabed slope of beaches composed of coarse materials is steep and that the slope of the beaches composed of silt and clay is gentle.

$$\ln(\tan\beta_c) = \sum \mu^{(K)} \cdot \ln(\tan\beta_c^{(K)}) \qquad (1)$$

$$\tan\beta' = \tan\beta + (\tan\beta_c - \tan\beta) \cdot \alpha \cdot \triangle t \qquad (2)$$

PERFORMANCE OF BEACH NOURISHMENT WITH DETACHED SUBMERGED BREAKWATER

Se-Hyeon Cheon[1], Jeho Chun[1] and Kyungmo Ahn[2]

[1]Institute of Construction and Environmental Research, Handong Global University
Pohang City, Kyungbuk, KOREA

[2]School of Spatial Environment System Engineering, Handong Global University
Pohang City, Kyungbuk, KOREA
kmahn@handong.edu

This paper presents beach restoration project proposed for Songdo beach which is located in Pohang city, Korea. Songdo beach has been severely eroded for last 30 years. Aerial photos and water depth changes from series of nautical charts were utilized for the investigation of the main cause of beach erosion. For the optimum design of beach nourishment with protective structures, numerical simulations of cross-shore beach profile as well as shoreline changes with detached submerged breakwater has been conducted. The newly developed cross-shore sediment transport model and shoreline change model have been successfully implemented to account for partially transported waves over detached submerged breakwater. Qualitative comparison between the numerical model result and physical model test result is discussed.

SEDIMENT PARTICLES BEHAVIOR BASED ON THE LAGRANGIAN CONCEPT

Hong-Yeon Cho, Bum-Jun Cho and Kung-Tae Jung

Coastal Development Research Development
Korea Ocean R&D Institute
Seoul, KOREA
hycho@kordi.re.kr

A sediment transport model, based on the Lagrangian concept considering the grain size distribution (GSD), was set up and the sediment diffusion range change was analyzed in both considering and not considering of GSD. The GSD curve is assumed to be the lognormal distribution function with respect to the Lagrangian concept, and the random numbers, i.e., sediment particles, are generated based on the probability distribution function. The sediment particles are assumed to be spherical forms and the random numbers based on the sediment weight are converted to equivalent sediment diameters. Sediment transport patterns are analyzed by the settling behavior simulation in which the settling velocities for the particles are computed by the van Rijn's formula. The computed diffusion patterns show much more reasonable behavior than that without considering the GSD.

SEDIMENT TRANSPORT PROCESSES OVER INTERTIDAL MUDFLATS ALONG JIANGSU COASTS, CHINA

Ya Ping Wang[1], Shu Gao[1] and Jianjun Jia[2]

[1]Ministry of Education Key Laboratory for Coast and Island Development
Nanjing University
Nanjing, CHINA
ypwang@nju.edu.cn

[2]Key Laboratory of Submarine Geo-Sciences, Second Institute of Oceanography
State Oceanic Administration, Hangzhou, CHINA

An MIDAS-400 Customised Data Acquisition System was deployed to obtain the hydrodynamic parameters over the intertidal flat at Wanggang, on the Jiangsu coast (China). The analytical results show that the apparent bed roughness length has a magnitude close to the height of sand ripples, which is much larger than the grain size diameter. Furthermore, several suspended sediment concentration peaks occurred during a tidal cycle, which can be related to strong turbulence near the bed caused by frontal tidal currents and the enhanced resuspension; advection and extreme weather conditions also played an important role. Finally, large net suspended sediment fluxes were observed to present when the flood or ebb currents prolonged. The bed shear stress and bedload transport rates, in response to wave-current interactions, are calculated, which indicate that wind waves enhance the bottom shear stress and bedload transport rates. Grain-size trend analysis of the sediment samples shows that the bedload transport patterns are complex, mainly controlled by the hydrodynamics and local geomorphology over the intertidal flats.

VELOCITY ASYMMETRY AND THE CONTROLLING FACTORS IN HAINAN ISLAND'S TIDAL INLETS

Wenping Gong[1], Jian Shen[1] and Daoru Wang[2]

[1]Virginia Institute of Marine Science
College of William and Mary
Gloucester Point, Virginia, USA
wpgong@vims.edu

[2]Hainan Marine Development Plan and Design Research Institute
Haikou, CHINA

This study employed calibrated model simulations to elucidate the controlling factors for determining the velocity asymmetry in tidal inlets of the Hainan Island. The results show that: (1) factors that affect the velocity asymmetry in tidal inlets include tidal duration asymmetry of offshore tide ($(t_f / t_e)_0$), the ratio of offshore tidal amplitude versus water depth at a tidal inlet (a / h), tidal prism relative to water volume below the mean sea level in a lagoon (v_s / v_c), river discharge and wind. The ratio plays the most important role among others. In general, with the large $(t_f / t_e)_0$ and v_s / v_c, small a / h, and high river discharge, a tidal inlet has a tendency to develop ebb-dominant asymmetry; (2) the velocity asymmetry of tidal inlets in Hainan Island can better be expressed by the percentage occurrence of four different types rather than being solely defined as flood-dominant or ebb-dominant. The study shows that Xincun Inlet has 68.2% occurrence of ebb-dominated asymmetry, while Yangpu Inlet has a 87.06% occurrence of ebb-dominated asymmetry, indicating Yangpu is more stable than Xincun.

MARINA ELEVATED TRACE METALS: A CASE FOR SAMPLING WITH DGT PASSIVE SAMPLERS

Michael S. Tomlinson

Aquatic Ecosystems Research, LLC
Honolulu, Hawaii, USA
tomlinsn@hawaiiantel.net

Dissolved trace metal concentrations were measured for seven months in a marina on Oahu. Not unexpectedly, both the discrete samples and DGTs revealed dissolved copper and zinc concentrations that were elevated relative to the surrounding waters. Although trace metal concentrations using the two techniques were expected to differ, in part because of the differences in the two sampling techniques and the fact that the Ala Wai Canal is a dynamic tidal estuary, the DGTs were not necessarily expected to measure dissolved trace metal concentrations that were higher than those concentrations obtained from the discrete samples. Discrete grab samples were passed through filters with a pore size that was at least 10 times greater than the effective pore size of the DGTs. The fact that the DGT time-integrated concentrations were higher than the grab sample concentrations suggests that DGTs were possibly capturing some temporal variation in dissolved copper and zinc not captured by the discrete samples.

STUDIES ON THE ECOLOGICAL INQUISITION AT THE SOUTHERN COAST OF TAIWAN

Ching-Her Hwang[1], Wen-Chin Lin[1], S.-M. Lin[2], L.-H. Tsai[3] and C.-S. Chen[4]

[1]Department of Civil Engineering, Chienkuo Technology University
Changhua City, TAIWAN
chhwang@ctu.edu.tw

[2]Department of Nature Science Education, National Taitung University, Taitung City, TAIWAN
[3]Harbor & Marine Technology Center, I.O.T., M.O.T.C., Wuchi Taichung, TAIWAN
[4]Taiwan Fisheries and Marine Technology Consultants, Inc., Taipei, TAIWAN

In recent years, owing to the consciousness on environmental protection and more attention on environmental problems of the Earth, people began to consider the balance between developmental behavior and the natural environment. To prevent disasters from coastal erosion and to protect coastal security are primarily the functions of traditional shore protection methods. Responding to the 21st century, which is the century of international environments, shore protection work must be co-constructed with the coastal nature environment as well as the ecological function. In this study, the authors intend to investigate ecological engineering methods in shore protection engineering. We concentrate our investigations on marine ecology at the outlet of Dai-Peng Bay and Ling-Ping coastal areas in southern Taiwan. The results of both the ecological inquisition and the analysis between its environmental factors and ecological effects will be presented.

ADVECTIVE PROCESS OF PLANKTONIC LARVAE OF A CLAM IN TOKYO BAY

Kaori Miyata[1], Koichi Masuda[1], Tomoki Ikoma[1], Fumikazu Otsuka[1] and Mao Hironaka[2]

[1]Department of Oceanic Architecture and Engineering, CST, Nihon University
Funabashi-shi, Chiba, Japan
M0406021ym@edu.cst.nihon-u.ac.jp

[2]Mitsui Consultants Co., Ltd, Tokyo, Japan

Paths of suspended planktonic larvae of clams of Philippiarum must be understood for the estimation of the network of tidelands in Tokyo Bay. Therefore the numerical simulation which can reproduce the regime of tidal currents in an intermediate and a long range is necessary. In this study, the numerical simulation program code is conducted. The data assimilation of salinity and water temperature is applied to the numerical simulation method of the current regime. Moreover influence of temporal and special variation of winds is taken into consideration, and the freshwater inflow from rivers and sewage plant effluent is introduced to the numerical simulation of the current regime, the inflow which changes with time. From comparisons between the computational results and observed results in Tokyo Bay, the prediction of the regime and of the path is possible by using the present simulation method. The path of the larvae can be explained and the network of tidelands can be estimate, and accordingly it is understood that there is the function of the network in present Tokyo Bay.

COLLECTING METHOD AND VOLUME OF *MYTILUS GALLOPROVINCIALIS* AS BIOMASS RESOURCE FROM SEA

Machi Miyoshi[1], Yasunori Kozuki[1], Takuro Kimura[2], Tatsunori Ishida[1], Yusuke Mori[1], Yuki Miyachi[3] and Hitoshi Murakami[1]

[1]Department of Ecosystem Engineering
University of Tokushima
Tokushima, Tokushima, JAPAN
haseda@fe.bunri-u.ac.jp

[2]Department of Environmental Engineering, University of Tokushima Bunri, Kagawa, JAPAN
[3]Sohgoh Kagaku Inc., Chuo-ku, Osaka, JAPAN

In the inner bay, there are some problems with eutrophication and the decrease of oxygen due to the inflow of polluted water from the land. Almost the entire coastline of the bay is surrounded with seawall and a large volume of mussel, *Mytilus galloprovincialis* is attached to the surface of the seawall. When large volumes of excrement and mussels drop to the bottom they cause a decrease of oxygen. The purpose of this study is to show how collected mussels use biomass resources for biologic and physical cycles from the sea to land for environmental improvement. Data was collected on the change succession and volume of *M. galloprovincialis* attached to the seawall. As a result, it was discovered that *M. galloprovincialis* began to attach to the wall in the spring. Organic carbon from the mussels was at its maximum volume in July at 1.4 kg over 1 meter of seawall. In August, the mussels had fallen off the seawall. Therefore, it is possible to obtain a large volume of biomass if collection occurred before the mussels fell off the seawall.

INFLUENCES OF FLOODS AND SEAWATER EXCHANGE ON WATER QUALITY IN LAKE FUREN

Jun Yamamoto[1], Yoshimi Makita[1] and Hitoshi Tanaka[2]

[1]Fisheries Engineering Team
Civil Engineering Research Institute of Cold Region
Public Works Research Institute
Sapporo, Hokkaido, JAPAN
juny@ceri.go.jp

[2]Civil Engineering Department
Tohoku University
Aoba, Sendai, JAPAN

It is known that agriculture and stock raising will pollute down-stream enclosed seas. Lake Furen is an enclosed estuary facing the Nemuro bay in the North-Western Pacific. The measure which prevents the water pollution of Lake Furen by the pollution load from upstream farm is considered. It is required to evaluate the effects of the measures against water pollution in advance. Field observation of water quality, sediment and currents was performed in 2006. In order to investigate the influences of the floods and seawater exchange in more quantitative manner, numerical simulation is carried out. In this study, the results of the field observation and numerical computation are introduced. It is found that nutrients in the inner part of the lake were high especially after rain and that in the mouth is low. They are strongly dependent on salinity. Although the exchange of seawater is helpful for maintaining the good water quality of the mouth area, the seawater does not reach the inner part of Lake Furen. It was proved by the numerical simulation.

PURIFICATION EFFECTS ON WATER QUALITY BY MICRO BUBBLE INJECTING OZONE

Kyoichi Okamoto and Kenji Hotta

Nihon University
Oceanic Architecture and Engineering
Funabashi, Chiba, JAPAN
okamoto@ocean.cst.nihon-u.ac.jp

Recently, high density COD (Chemical Oxygen Demand) was found in water pollution with noticeable oxygen deficiency at the bottom of enclosed areas such as lakes and marshes. Micro bubble technology has been added to water purification applications but purification effects are unclear because of external influences such as rain and river inflows. Our objective in this paper is to examine the effects on the purification quality by micro bubble injecting ozone. As a result, we obtained a spreading speed of dissolved oxygen at about 1.6 times faster than injecting air. Moreover, the purification experiment by micro bubble injecting ozone enabled water purification at about one week.

BOLSA CHICA WETLAND RESTORATION RESTORATION OF A COASTAL JEWEL

Russell H. Boudreau

Moffatt & Nichol
Long Beach, California USA
rboudreau@moffattnichol.com

Restoration of nearly 1,000 acres of severely degraded wetlands was completed in Spring 2006, more than a century after they were cut off from the Pacific Ocean waters. The site has been used for oil extraction since the early 1950s, and adjacent historic wetland areas to the north of the site have been heavily developed, despite being at or slightly below sea level. The project created a new inlet to the Pacific Ocean to bring full tidal flows back to much of the lowlands. Construction of the restoration project has involved removal of contaminated materials, work on a very low lying and wet site, record rainfall for the area and numerous other coordination, design and construction issues. Prior to opening the inlet, an ebb bar was created by dredging clean sand from the lowlands site and pumping it offshore to minimize any shoreline erosion after the inlet was opened. The new tidal inlet was cut through the existing Pacific Coast Highway posing additional logistical challenges. This paper will present a discussion of the planning, modeling, construction and ongoing monitoring to highlight lessons learned during this large wetlands restoration project.

BUILDING STRONGER COASTAL MANAGEMENT PROGRAMS: LESSONS FROM THE MICRONESIAN ISLANDERS IN CONSERVATION NETWORK

Ian Dutton[1] and Arianne Lowe[2]

[1]The Nature Conservancy
Anchorage, Alaska, USA
idutton@tnc.org

[2]Australian National University
Canberra, AUSTRALIA
arilowe@cres10.anu.edu.au

The Micronesians in Island Conservation (MIC) learning network was established with support from The Nature Conservancy (TNC) to leverage conservation work in Micronesia by increasing the strength and effectiveness and number of conservation leaders in the nonprofit and government sectors. A recent review of the initial experience of the MIC network found that the MIC has had a significant beneficial impact on conservation in Micronesia. In its first three years, MIC has worked with 22 leaders and 20 government and non-government organizations in Micronesia to help them strengthen the effectiveness of their organizations and expand the impact of their conservation work. These groups work on management or monitoring of some 34 important island biodiversity sites. By working collaboratively, MIC network members have begun to achieve more than the sum of the parts of their work in an area of the world where collaboration is a challenging, but critical precondition for conservation success.

GIS-BASED CORAL REEF MAPS IN TOURISM AREAS OF THAILAND

Thamasak Yeemin[1], Bancha Lawang[1], Nisit Ruengsawang[2], Nipat Somkleeb[1] and Makamas Sutthacheep[1]

[1]Marine Biodiversity Research Group, Department of Biology
Faculty of Science, Ramkhamhaeng University
Huamark, Bangkok, THAILAND

[2]Divisions of Biology, Department of Science
Faculty of Science and Technology, Rajamangala University of Technology
Krungthep, Bangkok, THAILAND

The main objective of this research is to improve GIS-based coral reef maps in certain popular diving sites in Thailand. Department of Fisheries published coral reef maps of Thailand in 1999 and UNEP/GEF South China Sea Project has developed GIS-based coral reef maps in line feature in 2004. The present study reports on recent developments in mapping coral reefs in selected diving spots using satellite images, aerial photographs and in situ field measurements for zoning of coral reef utilization. The project has also involved stakeholders and local communities for providing relevant information and updating the GIS-based maps.

INTEGRATED COASTAL ZONE MANAGEMENT AND ITS APPLICATION IN THE YANGTZE RIVER DELTA

Zhi-rong Tan[1], Xin-pingYan[1] and Ying-lei Zhao[2]

[1]Maritime Safety and Environmental Protection Institution
Wuhan University of Technology
Wuhan, CHINA
Tanzhi@whut.edu.cn

[2]Maritime Safety Division, Ningbo Maritime Safety Administration, Ningbo, CHINA

The principle objective of this paper is to set up an integrated coastal zone management (ICZM) framework to harmonize the future challenge of the Yangtze River Delta (YRD) coastal zone in China. It begins with a snapshot of YRD coastal profiles, along with the current situation of coastal resources utilization and various economic activities to illustrate the importance of coastal resources to the local and regional economic development. Secondly, Use conflicts particularly in their spatial, functional and temporal forms in the YRD coastal zone are explored and their imminent threats on economic development and social integrity are analyzed. Furthermore, the institutional framework of the YRD coastal zone, together with the inherent common property nature of coastal resource, as the root causes of use conflicts, is critically analyzed. It concludes the need and viability to develop an ICZM framework as such in the YRD coastal zone. The recommendation is to establish an ICZM framework, including coordination mechanism, legal framework and capacity building to serve as the basis for integration.

THE CHARACTERISTICS OF THE FUNAYA RESIDENCES OF THE INE COASTAL VILLAGE

Shinnosuke Agata and Takamasa Miyazaki

College of Industrial Technology
Nihon University
Chiba, JAPAN
forest_fish_crayon@yahoo.co.jp

This paper examines the factors that make highly dense populations possible, by sampling the Ine coastal village of Kyoto. In Japan, many coastal villages are densely populated spaces that have been formed by the concentration of houses and facilities in a very limited area. The Ine coastal village of Kyoto, which is one such densely populated space, is located in the small area surrounded by the mountains and the ocean in which there is only one road in the village. In this village, there is frequent contact among the neighbors who travel up and down its sole road. By the mountainside of the road, the main buildings are lined up on the opposite, ocean side of the road where there are Funayas that consist of both the work place and the residences concentrated mainly on the second floor) for the fisheries. This study ventures to suggest that the internal spatial composition of the residences relieves the density of the highly populated space.

THE ENVIRONMENTAL CHARACTERISTICS OF THE SURROUNDING AREAS OF FISHERY IN THE FUKUOKA

Heisuke Kumagai, Takamasa Miyazaki and Masayuki Suga

College of Industrial Technology
Nihon University
Chiba, JAPAN
u132054@yahoo.co.jp

This paper analyzes and evaluates the characteristics of the land use arrangement in the Fukuoka and Kita Kyushu areas. This also, analyzes the chronicle change of the land use in the Fukuoka and Kita Kyushu areas of Japan. This thesis especially examines the potential for the possible meanings of the fishery sector of the seaside areas. It asks what position such fishery sectors occupy in the face of future regional reorganization. Recently in Japan, there have emerged large-scale sites of unused land in landfill sites of the seaside areas because of the change of transportation systems and urban industrial structures. Even with such drastic changes, there remain fishery port sectors that continue the traditional residential forms and keep the traditional mode of life and production in the oceanic areas. We believe that such fishing port sectors become significant bases for the spatial and environmental formation of the seaside areas, because such fishery port sectors hold certain spatial land use advantages in terms of the recent demands for residences and amenities in seaside areas.

THE RESOURCE CULTIVATION OF THE SETONAIKAI COASTAL AREA AND THE MACRO INQUIRY

Kiminori Nakazawa, Kazuo Mitsui, Yasukazu Nishi, Takamasa Miyazaki, Susumu Ishii and Takuji Sakai

College of Industrial Technology
Nihon University
Narashino, Chiba, JAPAN
nakazawa@cit.nihon-u.ac.jp

This study aims at arguing the necessity of the management in recomposing the broad coastal areas as a whole, for the cultivation of the resources in the Setonaikai coastal area of Japan. Recently, there has been a lot of attention garnered for the creation and recycling therein of the natural resources (= natural cultivation,) such as deep sea water and wind power. In the fisheries industry, people of this area have been searching for a means to generate fishing sites by creating artificial welling currents. Lately, there have been attempts to create a broad area of resource management in the form of offshore fishing sites such as fishing platforms and fishing mounds offshore. This paper aims at suggesting that an inclusive plan is needed from the perspective of a wide area in terms of use of resources; by analyzing the distribution of such fishery resources and facility sites of fishing ports which serve to relay the points of land for this area in order to utilize the fishery resources.

THE SITE TENDENCY OF THE INTERMEDIARY AND FINAL DISPOSAL FACILITIES IN UCHINADA

Naoki Kishino, Takamasa Miyazaki and Yasumichi Kawai

College of Industrial Technology
Nihon University
Narashino, Chiba, JAPAN
Kishino0923@yahoo.co.jp

This study aims at understanding the site tendency of the intermediary and final disposal facilities of the Uchinada area of Hyogo prefecture that faces the Setonaikai region of Japan. There are two types of intermediary and final disposal facilities that are situated in the Uchinada area of Hyogo prefecture. The first one refers to the facilities that are placed in the landfill seaside areas; the second refers to the facilities placed in the mountain, forest, and agricultural land far from the seaside areas. Both types are located in the areas of low population; especially in the case that they are located in the seaside areas, the land use composition rate of industrial, commercial and business designated land around the areas is high. This study endeavors to achieve zero emissions by constructing industrial complexes in which the intermediary disposal facilities are enlarged, thereby aiming to build a resource-recycling society.

CIRCULATION CHARACTERISTICS NEAR THE LUZON STRAIT DUE TO SEASONAL WIND VARIATIONS

Im Sang Oh and Gillyong Park

School of Earth and Environmental Sciences
Seoul National University
Seoul, KOREA
ois@storm.snu.ac.kr

The surface circulation of northern South China Sea for the period 1987-2005 was studied using the data of more than 500 satellite-tracked drifters. The flow near the Luzon Strait (LS) in the northern South China Sea was generally southwestward during October~March(winter) and northeastward during April~September(summer). The intrusion of the Kuroshio through the LS during winter was rather stronger than during summer. The seasonal total kinetic energy (TKE) variations reveled that TKE in the LS was out of phase with those in the east of Philippine. On the basis of the wind data reveled from QuikSCAT, there was predominant northeasterly wind during winter related to the winter monsoon. The strong Kuroshio intrusion through the LS during winter could have relation with variation of the wind stress curl generated by the northeasterly wind. The northwestward intrusion in the northern part of LS happens with larger negative wind stress curl during November 2003~March 2004.

ALGORITHM FOR OIL SLICK DETECTION BY SAR IMAGERY

Guiwu Wang

Joint Laboratory for GeoInformation Science
The Chinese University of Hong Kong
Shatin, Hong Kong, CHINA
wangguiwu@cuhk.edu.hk

Oil pollution causes marine ecological disasters that result in great damages of the quality and productivity of marine environment and involve great expenses in clear-up operations. In this paper, a new algorithm is proposed for the semiautomatic detection, characterization, and classification of oil slicks detected in Synthetic Aperture Radar (SAR) imagery. The experimental results performed on Envisat SAR images have demonstrated the efficiency of the proposed approach.

TYPHOON'S INFLUENCES ON PHYTOPLANKTON ECOSYSTEM

DanLing Tang, GangMing Zheng, Hui Zhao, ZhongZheng Yan

Remote Sensing, Marine Ecology and Environment Group
LED, South China Sea Institute of Oceanology, Chinese Academy of Sciences
Guangzhou, CHINA
and
Graduate School of the Chinese Academy of Sciences
Beijing, CHINA
*lingzistdl@126.com

With global warming, typhoon activity has been strengthening in both intensity and spatial coverage in the past several decades. The South China Sea (SCS) is a tropical sea frequently subject to typhoons. We studied the response of phytoplankton chlorophyll to Typhoon Damrey (2005) in the SCS, and investigated the contributions of two typhoons (Ling_Ling 2001; Kai_Tak 2005) with different wind speed and translation speed to phytoplankton blooms in the SCS. Results show that both typhoon winds and typhoon-rain can enhance production of marine phytoplankton; typhoons in different translation speed and wind strength presented distinct influences on phytoplankton blooms. Stronger typhoons generally induce more extensive ranges of phytoplankton bloom; translation-slower speed of typhoons can enhance the tendency of increasing phytoplankton biomass.

THE KURILE TSUNAMI OF NOVEMBER 2006: IMPACT AT THE CRESCENT CITY

Zygmunt Kowalik[1], Juan Horrillo[1] and William Knight[2]

[1]Institute of Marine Science
University of Alaska
Fairbanks, Alaska, USA
ffzk@ims.uaf.edu

[2]NOAA/NWS/West Coast and Alaska Tsunami Warning Center

Application of global tsunami propagation models to the Indian Ocean Tsunami of December 2004 and to the Kurile Islands Tsunami of November 2006 shows the importance of tsunami modifications through secondary source generation at ridges, seamounts and passages between islands or continents. Interactions between wave fronts derived from primary and secondary sources lead to difficulties in arrival time prediction for the largest wave. A numerical model for global tsunami propagation with spatial resolution of one minute was applied to the Kuril Islands Tsunami of 15 November 2006. Sea level oscillations were found to be highly sensitive to the spatial resolution applied to the bathymetry. Numerical results were compared to sea level data collected by Pacific DART buoys and tide gauges along the U.S. West Coast. The tide gauge at Crescent City recorded initial tsunami of about 60cm, the second large energy packet arrived two hours later. The first energy input into the Crescent City port was the primary (direct) wave traveling over the deep waters of the North Pacific. Interactions with the ridges and numerous mountains located in the tsunami path were a larger source of tsunami energy than the direct wave.

FUNDAMENTAL RESEARCH ON MARINE HAZARD MAP FOR SHIPS STRUCK BY TSUNAMI

Koichi Masuda[1], Tomoki Ikoma[1], Shingi Nagasawa[2] and Ryuto Hanada[3]

[1]Department of Oceanic Architecture and Engineering
CST, Nihon University
Funabashi, Chiba, JAPAN
masuda@ocean.cst.nihon-u.ac.jp

[2]Penta-Ocean Construction Co. Ltd.
[3]Department of Oceanic Architecture and Engineering, Nihon University, Chiba, JAPAN

The objective of a present research is to develop the marine hazard map to consider grounding, collision of ships and damage of mooring lines. In the numerical simulation of tsunamis, the initial water surface elevation of a tsunami has been calculated by applying the scheme of Mansinha-Smylie, and the propagation of tsunamis has been calculated with the finite difference method. The damage of struck ships induced by tsunamis has been computed by applying the distinct element method, and also the estimation system for indicating damage conditions of the struck ships has been established, which results are illustrated on the marine hazard map. Examples of the marine hazard map have been shown, and accordingly the conditions of the damage on ships, which are moored in the vicinity of wharfs induced by tsunamis, have been discussed. In the future, the present marine hazard map will contribute to the reducing of damage of ships struck by tsunamis in harbors, ports and marinas.

EFFECTIVENESS OF NATURAL BARRIERS FOR MITIGATING COASTAL INUNDATION DUE TO STORMS AND TSUNAMIS

Hongqiang Zhou[1], Michelle H. Teng[1] and Andrew J. Kaufman[2]

[1]Department of Civil and Environmental Engineering
[2]Department of Tropical Plant and Soil Sciences
University of Hawaii
Honolulu, Hawaii, USA
teng@eng.hawaii.edu

It has been reported that during the 2004 Indian Ocean tsunami, damages to areas with coastal trees and vegetation were markedly less severe. Previous studies also indicate that vegetation covering a slope introduces significant resistance to overland flows. In the nearshore waters, coral reefs may also serve as natural barriers against storm surge and tsunamis. In this study, experiments in a wave tank are carried out to examine the effectiveness of coral reef and vegetation on reducing coastal flooding caused by storm surge and tsunamis waves. Models of different vegetation species and densities are made and glued to the artificial beach in the wave tank. Their quantitative effect in reducing the wave energy and run-up is measured. For coral reef, models of different height and length are submerged in water and their effect as a barrier for long wave propagation is examined. The goal of the study is to find the most suitable vegetation species and coral reef dimensions that are effective in reducing coastal flooding due to storms and tsunamis in the Pacific Basin.

CHANGES OF THE MIDDLE JIANGSU COAST DURING PAST ONE AND HALF CENTURY

Dayuan Yang

School of Geographic and Oceanographic Sciences
Nanjing University
Nanjing, CHINA
ydy0728@126.com

A large scale delta, called Abandoned Yellow River delta (AYRD), was built at the middle of Jiangsu coast while the Yellow River, the largest river in the world as for river sediment concentration and discharge, entered into the Yellow Sea there before 1855. The coastline of AYRD began to retreat rapidly suffering from the coastal erosion after the Yellow River turned back to enter into the Bohai Sea at 1855. On the contrary, the long coastline south to AYRD was still keeping on progressing fast with the huge sediment supply from the longshore drift. Convex profile was formed along the erosional coast, and beach was formed back to the dyke along the accreting coast. Recently, following the construction of dikes along the erosional part, beach materials there are getting coarse, and the progression processes are becoming slow at accreting part along the coast.

AN ECONOMIC BENEFIT OF TOURISM INCREASED BY CONTAMINATED MARINE SEDIMENT CLEANUP IN KOREA

Chang Sun Yum[1] and Hee-Dong Pyo[2]

[1]Division of Business Administration
[2]Faculty of Marine Business and Economics
Pukyong National University
Busan, Korea
yumcs@pknu.ac.kr
pyoh@pknu.ac.kr

There are various types of predictable economic benefits for contaminated marine sediment cleanup. These benefits can be derived from reduction in aquatic animals died or infected, increase in their consumption recovery, increase in tourism including recreational fishing, reduction in human health risk, increase in amenity and aesthetics, increase in ecosystem integrity, and so on. The benefit from increase in tourism can be measured by using travel cost method. The survey was conducted for 246 visitors by personal interview method around in Yeosu Coastal District in Korea where the Government spent US$26.3 millions on contaminated marine sediment cleanup for five years (2000-2005), during October 2006. As a result of the study, the annual economic effect is about US$6.7 million of increase in tourism.

AN ECONOMIC VALUATION OF ECOTOURISM FOR TIDAL WETLANDS IN KOREA USING THE CONTINGENT VALUATION METHOD

Hee-Dong Pyo

Faculty of Marine Business and Economics
Pukyong National University
Busan, KOREA
pyoh@pknu.ac.kr

The paper is to estimate the economic value of ecotourism for tidal wetlands using a double-bounded dichotomous choice (DBDC) model of the contingent valuation method (CVM). For the reliability and the validity of CVM a survey was conducted for 511 visitors by personal interview method in Anmyundo during August 2005, and respondents were asked for maximum willingness-to-pay (WTP) to buy a ticket for the tidal flat's ecotourism. Overall, respondents answered that they would be willing to pay US$55 for a ticket under the study. All equations and results estimated are statistically significant at the 1% or 5% level. For the aggregation of WTP estimates, the sample values are extended to the total annual number of visitors in Anmyundo area during 2004. A conservative estimate, which considers the calibration factor (0.5) recommended by NOAA (1994) and a positive response rate (83.17%), is 73 million US dollars.

IMPROVEMENT OF A LOCAL GUIDE CENTER AND ECOTOURISM IN KOH CHANG, THAILAND

Makamas Sutthacheep, Thamasak Yeemin, Nipat Somkleeb, Se Songploy, Chaiyaporn Lochaya and Sittiporn Pengsakun

Marine Biodiversity Research Group
Department of Biology, Faculty of Science
Ramkhamhaeng University
Huamark, Bangkok, THAILAND

Mu Koh Chang, Thailand, was selected as one of the coral reef demonstration sites under the UNEP/GEF Project on Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand. Establishing a local guide center and promoting ecotourism programs managed by a group of small fishing boat owners in Klong Son Village of Koh Chang are important activities under the project. The main ecotourism programs included skin diving on coral reefs, recreation on sandy beach, mangrove ecosystem learning and practices on local fishing gears and methods. These programs could generate income and raise public awareness on conservation of marine and coastal resources. This paper reviews obstacles of the activities and provides a guideline for improvement.

STUDIES ON CREATING THE ENVIRONMENT OF MARINE RECREATION & TOURISM AT TAIWAN

Ching-Piao Tsai[1], Hong-Bin Chen[2] and Ching-Her Hwang[3]

[1]Department of Civil Engineering, National Chung Hsing University
Taichung, TAIWAN
cptasi@dragon.nchu.edu.tw

[2]Department of Tourism, Restaurant and Hotel Management, Kainan University, Taoyuan, TAIWAN
[3]Department of Civil Engineering, Chienkuo Technology University, Changhua City, TAIWAN

As we know, Taiwan is an island nation. Its length of coastline is totally almost 1,500 kilometers. It owns a variety of marine resources and seashore landscapes. Lately due to both the rapid changes of the people living custom and the open polish of the government for the coastal zone, to develop and promote the activities of marine recreation and tourism will become the vital goal of the governmental sectors and private enterprises in the future. First of all, therefore, authors intend to investigate the current situations and the encountering problems of marine recreation & tourism at Taiwan in this study. Meanwhile, to aim directly at the distributions of marine recreational and touring resources in Taiwan, it will be analyzed in this paper. Finally some countermeasures and Japan's case study in this field will be also discussed.

MARINE DEBRIS: U.S. LEGISLATION, NOAA'S MARINE DEBRIS PROGRAM, AND SOLUTIONS THROUGH PARTNERSHIPS

Holly Bamford[1] and Kris McElwee[2]

[1]NOAA Marine Debris Program
Silver Spring, Maryland, USA
Holly.Bamford@noaa.gov

[2]NOAA Marine Debris Program, Honolulu, Hawaii, USA

The Marine Debris Research, Prevention, and Reduction Act of 2006 mandated the National Oceanic and Atmospheric Administration (NOAA), the U.S. Coast Guard, and other federal agencies work together and with non-federal partners to understand, prevent, and reduce the impacts of marine debris. The NOAA Marine Debris Program supports national and international efforts focused on preventing, identifying, and reducing the occurrence of marine debris to protect and conserve our nation's natural resources, oceans, and coastal waterways from its impacts. The Marine Debris Program works in three priority areas: 1) Mapping, identification, impact assessment, prevention, and removal efforts; 2) reducing the amount and impacts of derelict fishing gear (DFG); and 3) outreach. Since 2005, the Program has supported over 90 marine debris projects that address these priority areas. The presentation will provide examples of planned and completed projects from the first three years of the program and mention additional activities that NOAA carries out related to marine debris.

RETRIEVING GHOSTNET AT MINIMAL COST

Howard C. Wiig

Department of Business, Economic Development, and Tourism
Honolulu, Hawaii, USA
hwiig@dbedt.hawaii.gov

Fishing net discarded in the North Pacific drifts to Hawaii's Northwest Islands, "bulldozes" reefs and strangles Hawaiian Monk Seals and other wildlife. Currently NOAA and the Coast Guard cut the net free and bring it to Oahu at a cost of $25,000 per ton. The Hawaii Longliners Association is voluntarily breaking this destructive and expensive cycle by retrieving ghostnet from the high seas. They deposit the net at Honolulu Harbor where it is taken to Oahu's garbage-to-energy plant and converted to electrical energy -- all at no cost to the taxpayer. This paper features in-depth interviews with Longliners to identify both "politically correct" and personal motives for performing this strenuous service. The interviews also ask what would motivate the Longliners to pick up ghostnet some distance from their planned courses. The paper's goal is to point the way to expanding the ghostnet retrieval program at minimal cost and allieviating the very expensive Northwest Islands problem. The mariners' first-hand accounts are especially valuable as funding may become available to replicate Hawaii's program nationwide.

MARINE DEBRIS SURVEY AND REMOVAL IN THE MAIN AND NORTHWESTERN HAWAIIAN ISLANDS

Seema Balwani[1], Jacob Asher[2] and Oliver Dameron[2]

[1]Pacific Islands Fisheries Science Center
National Marine Fisheries Service, NOAA
Honolulu, Hawaii, USA

[2]Joint Institute for Marine and Atmospheric Research
University of Hawaii
1125B Ala Moana Boulevard
Honolulu, Hawaii, USA

Marine debris, specifically derelict fishing gear (DFG), poses a lethal entanglement hazard to various marine species of concern, damages sensitive reef habitat, smothers benthic flora and fauna, presents a hazard to boat navigation, and may propagate the introduction of non-native species. NOAA's Pacific Islands Fisheries Science Center (PIFSC) began removing marine debris from the reefs of the Northwestern Hawaiian Islands in 1996. Since then, over 511 tons have been removed through a collaborative effort with federal, state and local agencies, NGOs, academia, and industry partners. Current reduced-level removal efforts are targeted at high density areas of debris, but are unable to keep up with annual accumulation rates estimated at 52 tons per year. In 2005, PIFSC and its partners initiated a project to survey for and conduct targeted removal efforts of DFG in the main Hawaiian Islands. A series of helicopter surveys revealed over 700 sites of DFG on the shores of six islands. Debris removal operations have been conducted on Oahu and Lanai, resulting in the removal of 16 tons and 19 tons respectively.

FACTORS AFFECTING MARINE DEBRIS DEPOSITION AT FRENCH FRIGATE SHOALS, NORTHWESTERN HAWAIIAN ISLANDS, 1990-2006

Carey Morishige[1,2], Mary J. Donohue[2], Elizabeth Flint[3], Christopher Swenson[3] and Christine Woolaway[2,4]

[1]IM Systems Group, Inc.
NOAA Marine Debris Program
Honolulu, Hawaii, USA
Carey.Morishige@noaa.gov

[2]University of Hawaii Sea Grant College Program, Honolulu, Hawaii, USA
[3]U.S. Fish and Wildlife Service, Honolulu, Hawaii, USA
[4]Chris Woolaway and Associates, LLC, Honolulu, Hawaii, USA

Data on the amount and type of small debris items deposited on the beaches of the Hawaiian Islands National Wildlife Refuge Tern Island station, French Frigate Shoals were collected over 16 years. We calculated deposition rates and investigated the relationship among deposition and year, season, El Niño and La Niña events from 1990-2006. In total 52,442 debris items were collected with plastic comprising 71% of all items collected. Annual debris deposition varied significantly (range 1116-5195 items) but was not influenced by season. Debris deposition was significantly greater during El Niño events as compared to La Niña events. Although often deduced to influence floating marine pollution, this study provides the first quantitative evidence of the influence of El Niño/La Niña cycles on marine debris deposition.

DISTRIBUTIONS CHARACTERISTICS OF DEEP OCEAN WATER IN THE EAST SEA

D.S. Moon, D.H. Jung, and H.J. Kim

Ocean Development System Laboratory
KORDI / MOERI
Yuseong, Daejon, KOREA
dsmoon@moeri.re.kr

Oceanographic observation and qualitative analysis for deep ocean water in the East Sea were done in order to understand deep sea water characteristics in the East Sea. Temporal and spatial variation of water masses were discussed from survey of the study area including the coastal sea in the East Sea. Surface water mass in coastal sea in the East Sea is governed by the Korean cold surface water in winter and affected by the Tsushima warm current in summer. Especially in summer, when the Tsushima warm current becomes strong, warm eddies are frequently formed in the polar front. These warm eddies have effects on the vertical profiles of water temperature but its influence is limited within water depths of 300 meters. The East Sea Proper Water existed below the water depth of 300 m has water stability of low temperature less than 1ºC without influence of the warm eddy.

UTILIZATION OF DEEP OCEAN WATER RESOURCE AND ITS INDUSTRIAL DEVELOPMENT IN TAIWAN

Ho-Shong Hou[1] and Jen-Huan Chang[2]

[1]The Ministry of Economic Affairs, TAIWAN
[2]Council for Economic and Planning Development, TAIWAN

The development and utilization of deep ocean water (DOW) resources has been studied for over 20 years in the United States and Japan while Taiwan has advantages in geographical and topographic conditions and related researches and planning viewed from an industrial policy, technology, systematic service. Implementation of technical research and strategies for industrial development is carried out and there have been many companies setting up the DOW pipe to absorb seawater in the eastern part of Taiwan. The total investment is more than 10 billion NT dollars. Consequently, it is an important task for the government to set up a qualified procedure and amend adequate regulations to promote development of the industries. Furthermore, the academic world should take the role to do the advanced research and transfer new technologies to the industries. The studies focus on characteristics of DOW resources and geographical advantages of Taiwan, and reviewing the history on how the policy was formulated and executed, its difficulties and achievements, and finally, how implementation of the DOW development in Taiwan is reached.

COMPREHENSIVE STUDY OF DEEP OCEAN WATER COOLING AND DOW INDUSTRY

Ho-Shong Hou[1], T.F. Chen[2], Y.M. Hou[2], S.Z. Huang[2], H.Z. Chen[2], C.H. Hsieh[2], M.C. Chang[2] and Johnny Liu[3]

[1]National Koahsiung Marine University, TAIWAN
[2]Institute of Ocean Engineering, NKMU, TAIWAN
[3]Hua-Guang Technology Group, Kaohsiung, TAIWAN

Sea Water Air Conditioning (SWAC) takes advantage of available deep cold seawater to cool the chilled water in one and more building. The design of a basic seawater air conditioning system is presented in this research. These basic components can be optimized for each special location, climate and building. DOW Industry is devoted to temperature control refined organic agriculture, cultivate fishery and cooling system.

WOMEN IN TECHNOLOGY (WIT): BUILDING SYSTEMIC CHANGE IN STEM EDUCATION AND EMPLOYMENT

Leslie Wilkins

Maui Economic Development Board, Inc.
Kihei, Maui, Hawaii, USA
leslie@medb.org

The Women in Technology Project was launched in 2000 to address the need for a resident trained technology workforce reflecting Hawaii's diversity. This paper/panel presentation will provide an overview of WIT's successful education and industry initiatives developed to engage and retain girls/women and underrepresented groups in the STEM pipeline. Program models are adapted to Hawaii's technology assets, integrate host cultural values with gender equity concepts. The statewide program is administered by Maui Economic Development Board.

THE NEW MANOA CLIMATE CHANGE COMMISSION OF THE UNIVERSITY OF HAWAII

Lorenz Magaard

School of Ocean and Earth Science and Technology
University of Hawaii
Honolulu, Hawaii, USA
lorenz@hawaii.edu

On 7 February 2007 University of Hawaii at Manoa Chancellor Denise Eby Konan appointed the Manoa Climate Change Commission in an action to adapt to and mitigate climate change and its consequences for Hawaii. The Commission will serve as a resource to advance public awareness of the consequences of climate change on Hawaii, the nation, and beyond. The Commission will also foster multidisciplinary research and advance education and public outreach on the environmental, economic, legal, engineering, and social implications of climate change. Strong emphasis will be placed on developing and implementing measures to reduce green house gas emissions. This implies consideration of, among other things, methods of environmental finance. Equally important are the development of techniques to adapt to climate change in terms of land-use and city planning.

THE MEXICO DECLARATION ON CARBON MANAGEMENT EDUCATION

Penelope Canan

University of Central Florida
Department of Sociology
Orlando, Florida, USA
pcanan@mail.ucf.edu

This presentation extends the conversation among scholars attending the special session on "Responsibility, Opportunity, and Vision for Higher Education in Urban and Regional Carbon Management" at the First International Conference on Carbon Management at Urban and Regional Levels: Connecting Development Decisions to Global Issues in Mexico City Sept. 4–8, 2006 (Canan and Shienke (2006). It discusses The Declaration for Carbon Management Education, agreed upon by the participants and shares the obstacles to such a vision that were discussed along with exemplar models of transdisciplinary curricula and suggestions for scholarship.

STUDENT ACTION ON CAMPUS: THE UNIVERSITY OF HAWAII AT MANOA AS A CLIMATE CHANGE POLICY MICROCOSM

Jack Kittinger

University of Hawaii at Manoa
Department of Geography
Honolulu, Hawaii, USA
jkitt@hawaii.edu

The University of Hawaii at Manoa (UHM) has taken a leading role in addressing the impacts of climate change in Hawaii and formulating viable response strategies. Reliance on imported energy sources and the limitations associated with island biogeography highlight Hawaii's unique susceptibility to global environmental change and the need to implement concepts in sustainability. To confront this challenge, students with research projects and academic interests that transcend a broad spectrum of disciplines and departments at UHM have formed a student committee on climate change. An interdisciplinary student coalition engaged in research on mitigation and adaptation strategies aids the University's Climate Change Commission in achieving sustainability and carbon-neutrality for the UHM campus and Hawaii. The student committee serves as a model community for action on climate change at a microcosm scale, with potential for substantive results expandable to higher levels of governance.

ECONOMICS OF COASTAL ADAPTATION TO CLIMATE CHANGE

James B. Marsh

University of Hawaii at Manoa
Shidler School of Business
Honolulu, Hawaii, USA
barney@hawaii.edu

The economics of adaptation to the impact of global warming may be visualized as the creation of an "industry" which utilizes inputs such as capital, labor, energy, land, and above all knowledge in the production of units of protection against a series of floods & typhoons which become more severe as time (a proxy for global warming) continues. The industry is composed of firms large or small. The firms will introduce technological improvements, innovations, or break-throughs that reduce the costs of producing at various levels of output. With increased severity of the storms, the firms will be pressed to work harder and produce more protection. Following traditional economic theory, the large firms may face diseconomies of scale, while smaller firms may have the advantage of economies of scale. Innovation slows the impact of these cost limitations. The diseconomies of scale at the larger end might be flattened, making profitable expansion feasible. Radical innovation must be such as to flatten the diseconomies enough that they become economies of scale.

MITIGATING CLIMATE CHANGE BY REDUCING ANTHROPOGENIC EMISSIONS: CREATING A GREENHOUSE GAS BASELINE

Craig S. Coleman

University of Hawaii at Manoa
International Center for Climate and Society
Department of Oceanography
craigc@hawaii.edu

As evidence increases that anthropogenic emissions are influencing climate change, policy and market efforts are being directed at how to reduce greenhouse gas (GHG) emissions. Several avenues are being pursued to achieve this reduction, including combinations of emissions trading, carbon taxes, renewable energy development and use, energy efficiency technology development and use, and carbon sequestration projects. With any of these mechanisms, the accounting methodology of GHGs is critical to the integrity of both real emissions reductions and any financial instruments used to create incentives. This study presents an introduction to GHG accounting in the context of creating a GHG inventory/baseline for the University of Hawaii at Manoa. This inventory is being generated to enable multiple ways of neutralizing the University's emissions.

USING EMERGING CARBON MARKETS TO FIGHT THE GLOBAL CLIMATE CRISIS

Alex Handler

Eco2balance, LLC
Honolulu, Hawaii, USA
info@eco2balance.com

Global carbon markets are growing fast. In the first half of 2006, US$15 billion of carbon was traded worldwide. There are two major markets evolving for the trading of carbon, the *compliance* and *voluntary* markets. Eco2balance is a new Hawaii-based for-profit company attempting to use these markets, starting with the voluntary one first, to help resolve the climate crisis and dependence on fossil fuels. Individuals, organizations and events can purchase carbon dioxide offsets through Eco2balance to reduce their levels of carbon dioxide emitted into the earth's atmosphere. These purchases move those individuals, organizations and events toward energy conservation goals and provide some of the necessary investment to develop more efficient clean energy technologies and projects that sequester carbon. Eco2balance is actively moving to create easy to use software applications for large organizations to inventory, monitor and track their greenhouse gas emissions over time. This presentation will briefly discuss the present state of voluntary carbon markets, how Eco2balance fits into these markets and key issues/concerns surrounding these markets.

THE BETTER INDEX FOR ENSO

Jyun-han Jiang[1], Chung-pan Lee[1] and Ho-shong Hou[2]

[1]Department of Marine Environment and Engineering
National Sun Yat-sen University
Kaohsiung, TAIWAN
d955040004@student.nsysu.edu.tw

[2]Ministry of Economic Affairs, TAIWAN

The El Niño-Southern Oscillation (ENSO) affects the precipitation in the climate change and there are many indexes for the ENSO at present. For example: the index uses sea surface temperature (SST) and anomalies (SSTA) or the Southern Oscillation Index (SOI) or the Multivariate ENSO Index (MEI) in the Pacific Ocean equator area. The purpose of this paper is to find a better index with relationship between the precipitation and the indexes. The precipitation data used in this study contains 1,170 precipitation stations in the region (20°N-20°S 90°-150°E) which is influenced deeply by the ENSO. The analysis's indexes of the ENSO include both the above indexes and the relative-region SST (Niño4-Niño1+2 SST, Niño3.4-Niño1+2 SST, Niño3-Niño1+2 SST) indexes. The results indicate that the relative-region SST has better correlation with the ENSO, especially the Niño3.4-Niño1+2 SST index.

CAN THE "BIG WARMING" AT SPITSBERGEN FROM 1918 TO 1940 BE EXPLAINED?

Arnd Bernaerts

Hamburg, GERMANY
dr.arnd@gmail.com

Earlier in the 20th Century it took 10 years to realize a climatic sensation, namely a jump of 8ºC at Spitsbergen, calculated on the basis of half a dozen years between before and after winter 1918/19. The first to discover this big rise was the Norwegian scientist B.J. Birkeland publishing his findings in 1930 with the remark: "In conclusion I would like to stress that the mean deviation results in very high figures, probably the greatest yet known on earth". The objective of the paper is to analyse the possible causes of the extreme increase of winter temperatures in this remote area surrounded by seas and ice. The subject is an interesting object for climatic research, as during the winter season the sun has not played any significant direct role, and during the immediate time period prior the warming in winter 1918/19 a devastating naval war had been fought for four years in the waters around Great Britain which all moves northwards with the Norwegian and Spitsbergen Current reaching the island Spitsbergen in just a few weeks time.

OIL PRICE SHOCKS AND HAWAII'S ECONOMY

Makena Coffman

University of Hawaii
Department of Economics
Honolulu, Hawaii, USA

This study seeks to clarify the oil price-macroeconomy relationship within a small open economy using a computable general equilibrium model for Hawaii. Hawaii is an illustrative example because it is the most relatively oil dependent state in the United States. A range of oil price increases are analyzed to determine the economy's ability to absorb oil price shocks as well as sector-level effects. The model shows that oil price increases have substantial inflationary and negative productivity effects. Nonetheless, induced shifts in consumer demand expenditures and a reduction in real visitor expenditures serve to offset the negative effects of oil price shocks at low levels of oil price increases.

ADVANCED EVALUATION OF OCEAN ACIDIFICATION EFFECTS OF ECONOMIC POLICIES

Wolf D. Grossmann[1], Fred Mackenzie[2] and Andreas Andersson[3]

[1]International Center for Climate and Society, SOEST
University of Hawaii, Honolulu, Hawaii, USA
wolf.grossmann@googlemail.com

[2]Department of Oceanography, SOEST, University of Hawaii, Honolulu, Hawaii, USA
[3]Bermuda Institute of Ocean Sciences, St. George's, BERMUDA

Oceans are a major sink of anthropogenic CO_2. Uptake of CO_2 decreases ocean pH-values. pH-values affect fish abundance and species distribution, health of corals and of other ocean ecosystems. Projections show that the lowering of pH values could considerably impact fisheries which are already facing severe pressure. Corals would suffer from the combined impacts of ocean warming and acidification. This might negatively affect tourism and other ocean-related economic sectors. Many policies are discussed to decrease CO_2 emissions with climate change as the yardstick for emission-policies. Changes of shallow ocean water pH-values tend to be disregarded. The assessment of planned changes of emission regimes needs tools which show their effects on ocean pH-values. By coupling the RGM - Regionalized Global Model for economic innovation policies - with the SOCM – Shallow-water Ocean Carbonate Model – the authors contribute a tool for advanced policy assessment of CO_2-abatement policies with respect to ocean acidification. The authors outline RGM, SOCM and the research and assessment that becomes possible.

MITIGATION POLICIES ADDRESSING GREENHOUSE GASES EMISSIONS IN A SOCIO-ECONOMIC DYNAMIC MODEL FRAMEWORK

Denise Velhote, Wolf Grossmann and Lorenz Magaard

University of Hawaii
International Center for Climate and Society (ICCS)
Honolulu, Hawaii, USA
dvelhote@hawaii.edu

Emissions of greenhouse gases (GHGs) over the next 100 years depend on many social, economic and political factors. Emissions could be decreased more or less, or they could increase by a higher or a lower rate. This is basically unpredictable. Climate mitigation decreases GHGs emissions, but is often regarded as expensive and a major hurdle to innovation and economic development. Here in this work, we describe an approach for assessment of integrated policies and discussed environmentally acceptable low GHG emissions. This study adds to the body of knowledge on climate change with a mathematical framework for policy evaluation and a dynamic systems model. Regional Global Model (RGM) describes global economic growth in a world differentiated in three regions (developed, rapidly developed and least developed). The model produces time series of GHGs subject to scenarios with their different policy choices and thus enhances possibilities for policy development. The discussions concentrate on the mitigation of global warming through a reduction of the emissions of GHGs in particular though suitable innovation policies.

REVIEW AND CRITIQUE OF INTEGRATED CLIMATE AND SOCIETY MODELS

Christian Lapp[1], Maximilian Mrotzek[2], Guenther Ossimitz[2], Christiane Perdacher[2] and Karin Wieser[2]

[1]International Center for Climate and Society, University of Hawaii
Honolulu, Hawaii, USA
lappc@hawaii.edu

[2]Alpen-Adria-University Klagenfurt, Klagenfurt, AUSTRIA

Various approaches on the integration of models of climate and society have been undertaken over the past years and decades. This has either been done creating models from scratch, thus creating all the relevant submodels specifically for this integrated model, or by combining existing models for the various fields to be integrated into one model, thus usually involving a significant decrease in complexity from the specific model to the submodel within the integrated model. The approach from scratch has the advantage of high intra-model compatibility and clarity in design whereas it may lack proficiency in some parts due to the reduced knowledge-base of only a few modelers. The combination approach on the other hand delivers a platform that brings together high quality models from various fields, thus combining a large knowledge base, but creates technological and methodological problems in combining all submodels to one, highly interconnected model. We give a comprehensive overview of current attempts to integrated climate and society models and point out the advantages and disadvantages of each model.

THE LIMITS OF TECHNOLOGICAL DISASTER PREVENTION MEASURES AND POSSIBLE METHODS BEYOND

Christian Lapp[1], Maximilian Mrotzek[2], Guenther Ossimitz[2], Christiane Perdacher[2] and Karin Wieser[2]

[1]International Center for Climate and Society, University of Hawaii
Honolulu, Hawaii, USA
lappc@hawaii.edu

[2]Alpen-Adria-University Klagenfurt, Klagenfurt, AUSTRIA

Based on the distinction between technological and selforganizing systems we assess the abilities and limits of disaster prevention by means of technological measures on a generic level. It is shown that technological measures do not have a capacity to function beyond the limits they were created for, whereas selforganizing systems actually develop their capabilities beyond that level. The social feedback from the perception of risk via disaster prevention and the induced loss of information about risk, leading to a higher societal vulnerability is also discussed. With a generic model of flooding in a region consisting of a narrow valley merging into a broader landscape we can show different behavior in this upstream-downstream conflict situation that is prone to shifting-the-burden behavior. Two scenarios are shown: one, more technologically oriented, leading to shifting-the-burden from upstream to downstream and prone to disastrous behavior in eventually both areas, and a second, utilizing and enhancing natural capabilities of selforganization to hold back water in upstream areas.

DYNAMICS OF NEAR BOUNDARY FLOW OVER A CORAL REEF

Marion Bandet Chavanne and Geno Pawlak

University of Hawaii
Ocean and Resources Engineering Department
Honolulu, Hawaii, USA
marionb@hawaii.edu

Field observations of the wave-induced flow over coral reef were carried out at the Kilo Nalu Observatory on the south shore of Oahu, Hawaii, beginning in summer 2004. The oscillatory motion of surface waves generates turbulent motions along the seabed that are of great interest in coastal waters because wave boundary layers are the site of sediment entrainment, suspension and transport from the seabed as well as wave energy dissipation. The nature of this turbulent boundary layer over very rough bathymetry such as that characteristic of coral reef is not well-understood, although this type of inhomogeneous roughness is pervasive in natural settings. The observations make use of an acoustic current profiler mounted downward-looking on an automated horizontal profiler cabled to and remotely controlled from shore. The objective of these measurements is to shed light on the physical processes that occur in the near bed region over a rough bottom. These data sets enable parameterization of wave energy decay and are critical for accurate modeling of wave and current dynamics in the nearshore.

LOCAL DIFFERENTIAL QUADRATURE METHOD FOR FLOW AND HEAT TRANSFER IN IRREGULAR DOMAINS

L.H. Shen[1], D.L. Young[1*] and D.C. Lo[2]

[1]Department of Civil Engineering and Hydrotech Research Institute
National Taiwan University
Taipei, TAIWAN
[*]dlyoung@ntu.edu.tw

[2]Institute of Marine Science and Technology
National Kaohsiung Marine University
Kaohsiung, TAIWAN

The differential quadrature (DQ) method is a highly accurate numerical method. However, its application is restrained by the problem with ill-conditioned matrix throughout and sensitive to grid distribution. The local differential quadrature (LDQ) method utilizes the localization concept to help researchers to solve the perplexity of ill-conditioned matrix while using the DQ method, such that the computing amount can be expanded as traditional numerical methods. Meanwhile, the treatment of proposed boundary condition will allow the LDQ simulation in irregular domain. The projection method is adopted for advancing the solution in time while simulating flow and heat transfer problems by LDQ method. Three two-dimensional examples are applied for solving flow and forced convection problems by LDQ method. According to the obtained satisfactory results, it possesses accuracy with precision and good capability to deal with the irregular domain while computing these problems by the proposed method. By the localization and boundary treatment technique, the LDQ method is very suitable for applying to coastal environment problems such as discharge in ocean etc.

OBSERVATIONS OF SWASH CURRENTS DURING LONG-WAVE FORCING

Yu-Hsien Lin, Hwung-Hweng Hwung* and Shih-Chun Hsiao

Department of Hydraulics and Ocean Engineering
National Cheng Kung University
Tainan, Taiwan
*hhhwung@mail.ncku.edu.tw

The main purpose of this paper considers the influence of 2nd order bound long waves induced by bi-chromatic wave groups on the swash motion experimentally. Two types of bi-chromatic wave groups are taken into account: naturally evolved by two primary waves and the presence of long-period waves in the short-long wave groups. The hydrodynamics of nonlinear wave fluctuations are measured on a gentle slope (1/60). The experiments were conducted in a super wave flume ($300m \times 5m \times 5.2m$) with working water depth 2.5m at Tainan Hydraulics Laboratory, National Cheng-Kung University. There are ninety capacitance-type wave gauges distributed along the wave flume with three run-up wires parallel to the bottom face around the shoreline. In addition, the bottom flows are measured by seven acoustic Doppler veloci-meters separately from the inner surf zone ($d = 0.7\ m$) to extreme shallow water depth region ($d = 0.1\ m$) with equal space. In the present study, a total of thirty-five cases of bi-chromatic wave groups with varying frequency differences and modulation rates are analyzed. For the sake of comparison, another set of experiments including thirty-five short-long wave combinations are also conducted. The experimental results will be described in the full paper.

PATCH TEST CALIBRATION FOR MULTIBEAM ECHOSOUNDER SYSTEM

Kelvin Tang Kang Wee

Hydrographic Research and Training Office
Faculty of Geoinformation Science & Engineering
Universiti Teknologi Malaysia

The Multibeam Echosounder System (MBES), latest advancement in hydrographic surveying technology, can offer great potential for accurate total seabed search with high acquisition rates. Data received is affected by the perfectness of the sensors' installation on the vessel and reliable and precise data can only be acquired after proper calibration has been performed. Hence, the patch test calibration was introduced to quantify and determine composite offset angles (roll, pitch and yaw) for transducer and navigation timing error. The test consists of several survey lines with different characteristics to determine offset values with no standard sequence to process the four offsets. Here, the collected patch test data are processed according to the sequences suggested by RESON, International Hydrographic Organization (IHO), Canadian Hydrographic Service (CHS), University of New Brunswick (UNB) and CARIS HIPS using the RESON Patch Test Software. Results are replayed in a selected survey line and a detailed analysis, based on the processed survey line dataset, is prudently analyzed. The patch test calibration is an important procedure to ensure accurate measurement of the seabed and produce high quality bathymetric data.

POTENTIAL ARTIFICIAL BEACH DESIGN FOR BAIPAI ARTIFICIAL ISLAND, SANYA BAY, HAINAN

Xiaomei Ji, Yongzhan Zhang and Dakui Zhu

The Key Laboratory of Coast & Island Development of Ministry of Education of China
Nanjing University
Nanjing, CHINA
jxmlpz@163.com

To design Baipai's artificial beach in Sanya Bay, Hainan Island, China, morphological characteristics of sandy beaches surrounding the bay were investigated, and based on the data an artificial beach was designed fronting a breakwater for an artificial island in the southern part of Baipai reef. The arc-shaped artificial beach is about 400 m long and 4050 m wide, including the backshore, foreshore and submarine component parts. The ideal borrow sand was determined as granules to fine quartz sand, especially coarse sand of Md50 = 0.5 mm. This sand was conveniently obtained from sand bars located in western Sanya Bay. Based on USACE and Japanese empirical formula, the borrow sand and beach slope should lead to a stable artificial beach with relatively low annual loss. Artificial beach construction and renourishment is a desired practice that might reasonably be applied in many places in China, not only to protect the current sandy beaches but also to stimulate the development of the tourist industry.

REMOTE DETECTION OF ALGAE BY LASER-INDUCED FLUORESCENCE SPECTROSCOPY

Chi Hong Chio[1], Shiv K. Sharma[2], Anupam K. Misra[2] and Rachel C. F. Lentz[2]

[1]Department of Chemistry, University of Hawaii
Honolulu, Hawaii, USA
chio@hawaii.edu

[2]Hawaii Institute of Geophysics and Planetology, University of Hawaii
Honolulu, Hawaii, USA

A portable spectroscopic system has been developed for the remote detection of algae by laser-induced fluorescence (LIF) up to 50 meters. Water samples from various freshwater and marine sources were excited using a pulsed Nd:YAG laser operating at 532 nm (20 Hz; 8 ns pulse width; up to 20 mJ/pulse). Fluorescence emission from the light absorbing pigments in algae (e.g., chlorophyll *a*) was collected by an 8-inch telescope and directed to a compact spectrograph equipped with an intensified charged-coupled device (ICCD) detector operating in the gated mode. Florescence spectra with low signal-to noise ratio and low stray light background can be obtained during daytime and nighttime with integration times under 1 minute. This portable system can be used for in-situ monitoring of potential algal blooms in fish farms and along coastal regions.

SURFACE ENHANCED RAMAN SPECTROSCOPY (SERS) FOR *IN-SITU* MEASUREMENTS OF QUORUM SENSING MOLECULES

William F. Pearman[1], Marion Lawrence-Snyder[1], S. Michael Angel[1] and Alan W. Decho[2]

[1]Department of Chemistry and Biochemistry
[2]Department of Environmental Health Sciences, Arnold School of Public Health
University of South Carolina
Columbia, South Carolina, USA

Autoinducer (AI) molecules are used by Quorum Sensing (QS) bacteria to communicate information about their environment and are critical for coordination of certain physiological activities. Studying how these organisms react to environmental stress can provide critical insight into new methods to control these activities We have found that for one class of AI's, *N*-acyl homoserine lactones (AHLs), Surface Enhanced Raman Spectroscopy (SERS) can be used to perform measurements *in-situ*. SER spectra of seven AHLs with acyl chain lengths from 4 to 12 carbons are measured for the first time and some spectra were acquired in as little as 10 seconds for 80μM AI solutions. Initial results indicate a potential detection limit of ~1μM which is within the limits of biologically relevant concentrations of AI molecules. We find that SERS is suitable for monitoring both amount and types of AI molecules and may be useful for *in-situ* biofilm measurements. Thus, SERS might offer the ability to "listen in" on the chemical communications between bacteria in their natural environment as that environment is stressed.

TEMPORAL AND SPATIAL VARIABILITY IN SUSPENDED SOLIDS AT THE KILO NALU OBSERVATORY

Melinda Swanson, Geno Pawlak and Eric De Carlo

School of Ocean Earth Sciences and Technology
University of Hawaii
Honolulu, Hawaii, USA
mwanson@hawaii.edu

The Kilo Nalu observatory is a cabled instrumented sampling platform located on the south shore of Oahu, Hawaii. In this region, the location of Hawaii's largest city has placed considerable anthropogenic pressures on the dynamic, variable and economically important coastal ocean environment. Data on the physics and biogeochemistry at Kilo Nalu have been collected in an effort to understand the relationship between variations in suspended solid concentrations and the types of physical forcing prevalent in the area. Echo intensity from the ADCPs at Kilo Nalu and on REMUS has been used as an analog for relative amounts of organic and inorganic suspended solids. The stationary data allow for changes in suspended solids to be correlated with different physical forcing mechanisms. Observations have identified diurnal variations and wave forcing as the dominant components of variability. The regular time series at the site have been augmented by recent deployments of a REMUS AUV. Integration of the AUV has been useful in establishing spatial variability and in identifying possible advective sources.

THE CHARACTERISTICS OF DAILY LIFE IN THE INE COASTAL VILLAGE OF KYOTO

Masashi Ogino and Takamasa Miyazaki

College of Industrial Technology
Nihon University
Narashino, Chiba, JAPAN
machiruda930@yahoo.co.jp

This study argues that it is significant to observe the actions of the daily life of the inhabitants of the Ine coastal village of Kyoto, in order to find what accounts for the dense population of this village. The Ine coast is one such village that is located in a small area surrounded by the mountains and ocean which forms densely populated spaces that unifies the places of living and production utilizing a road that goes through the middle of the village. The people of the village live in the specific area supporting each other by securing the ties among them regardless of the limitations set by the natural environment. They achieve this lifestyle by maintaining fisheries as their mode of production in which the majority of the people engage in various forms. This paper endeavors to suggest that the repetitions of the actions of daily life contribute to creating a viable community in such a unique coastal village.

INDEX BY TITLE

INDEX BY TITLE

INDEX BY TITLE

INDEX BY TITLE

AUTHOR INDEX

AUTHOR INDEX

AUTHOR INDEX

AUTHOR INDEX

PACON 2007

EXHIBITS

AXYS Technologies Inc., Canada

National Science Board, USA

Oceanit, USA

Science Technology Branch, Department of Business,
Economic Development, & Tourism, State of Hawaii, USA

SATCHEL INSERTS

Sea Technology Magazine, USA

2525 Correa Road, HIG 407A
Honolulu, Hawaii 96822
USA
Phone: (808) 956-6163
Fax: (808) 956-2580
E-mail: pacon@hawaii.edu
Website: www.hawaii.edu/pacon

PACON 2007

Sponsors

Dept. of Business, Economic Development & Tourism (DBEDT), Science Technology Branch, State of Hawaii, USA

PACON Hawaii Chapter, USA

PACON International, USA

U.S. Geological Survey, USA

School of Ocean and Earth Science and Technology (SOEST), University of Hawaii at Manoa, USA

Hawaii Sea Grant College Program, University of Hawaii at Mano, USA