

# EMECS

## NEWSLETTER



# No. 24

### 7<sup>th</sup> International Conference on the Environmental Management of Enclosed Coastal Seas EMECS7

### Message from Madame Nicole LE QUERLER

The coastal zone consists of a wide variety of ecosystems with distinctive communities of plants and animals that interact with each other and with the non-living coastal environment. In addition, powerful and dynamic physical forces continuously shape the coastal zone and also pose risks to human activities. A poor perception of these powerful and dynamic processes increases man's vulnerability to natural hazards.

The coastal zone is also one of the most endangered areas in the world. Pollution, eutrophication, urbanization, land reclamation, over fishing and exploitation continuously threaten the future of the coastal environment. The major challenge that humans face today is managing the use of this area, so that future generations can also enjoy the fantastic visual, cultural and edible products that it provides. Such an approach presupposes that all users of the environment share their views and are able to communicate wisely.

In 1990, the world's first International Conference on the Environmental Management of Enclosed Coastal Seas (EMECS 1) was held in the city of Kobe, Japan, in order to propose the establishment of an international forum for scientists, managers, politicians and the wider public. Thanks to the success of the initial conference and subsequent activities, the International EMECS Center was established in Kobe in 1993. EMECS is now recognized internationally, and activities in which scholars, government officials, industry representatives and private organizations work together to solve environmental problems in enclosed coastal seas are now referred to as essential international activities.

Sustainable use and protection of the coast, this very vulnerable but crucial part of the system Earth, has come high on the international agenda. Increasing international instrumentation, such as the UN Convention on the Law of the Sea (UNCLOS), Agenda 21, the Biosphere Reserve Programme, and the Ramsar Conven-

tion are important tools to control developments. However, despite our rapidly increasing knowledge of coastal ecosystems, crucial questions on the causes of variability and the effects of human impacts are still poorly understood. And although the perception of politicians and managers of our coasts is shifting from a mainly short-term economical approach towards a long-term economical-ecological perspective, the consequences of this shift are often ignored or difficult to justify.



The Estuarine & Coastal Sciences Association is an international organization dedicated to the scientific study of all aspects of estuarine and coastal marine science, and also the application of science for conservation and environmental management. Although the traditional focus of ECSA lies in Europe, its activities, interests and membership now extend to many other global regions. ECSA is involved in the organization of one or more major conferences each year, 39 to date. The combination of efforts from EMECS and ECSA to convene ECSA / EMECS 2006 has been exceptional and the University of Caen is proud to have facilitated the event to take place in France.

EMECS 7 / ECSA 40 will undoubtedly attract many participants from all around the world because the chosen theme of shared responsibility fits perfectly into the world's contemporary preoccupations. Caen will become, for a week, the planet's capital city for coastal management, demonstrating that education and dissemination of scientific information is essential to our society. I wish to cordially invite you to attend EMECS 7/ ECSA 40 in Caen.

**Madame Nicole LE QUERLER**  
Chairperson, EMECS 7 International Organizing Committee  
President of Caen University

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# EMECS 7 / ECSA 40

7th International Conference on the Environmental Management of Enclosed Coastal Seas (EMECS 7)  
40th Symposium of the Estuarine and Coastal Science Association (ECSA 40)

**Date:** May 9 (Tue.) - 12 (Fri.), 2006

**Venue:** CAEN EXPO-CONGRES

<Add.> 13, avenue Albert Sorel, BP 6260, 14065 CAEN Cedex  
4, France  
Tel. (33) 02 31 85 10 20  
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<http://www.caen-expo-congres.com>



Caen Expo Congress

**Theme:** Sustainable co-development of enclosed coastal seas:  
Our shared responsibility

**Languages:** French and English in plenary sessions /  
English in other sessions

**Organizers:** EMECS, GEMEL (Groupe d'Etude des Milieux  
Estuariens et Littoraux), ECSA (Estuarine and  
Coastal Science Association)

**Supporters:** MEDCOAST, OECD, UNESCO



## Co-organizers:

Asia Pacific Network for global change survey,  
IFREMER, Conseil Regional de Basse Normandie, Conseil  
General du Calvados, Caen la Mer (Communaute d'agglomeration  
Caennaise), Ville de Caen, Agence de l'Eau Normandie Seine,  
Universite of Caen - Basse Normandie, Union des Oceanographes  
de France

## Registration Fees (Euro):

General ----- 340  
Accompanying person ----- 280  
Student ----- 180

\* 20 Euro discount to full ECSA and MEDCOAST members

Refreshments and lunch are included.

Bursaries are available for participants with limited resources.

Further Information, Contact to Secretariat:

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## PROGRAM

Date	Morning	Afternoon	Evening
May 9 (Tue.)	Opening Ceremony (Plenary) Opening Address Keynote Lectures Plenary Session : European Coastal Seas	Technical Session 1 (a) Technical Session 2 (a) Poster Viewing Session	Welcome Reception
May 10 (Wed.)	Special Session : Asia-Pacific Coast Special Session : Students and Schools Partnerships (Part A) Technical Session 1 (b) Technical Session 2 (b) Technical Session 3 (a)	Special Session : Students and Schools Partnerships (Part B) Technical Session 1 (c) Technical Session 2 (c) Technical Session 3 (b)	
May 11 (Thur.)	Special Session : Students and Schools Partnerships (Part C) Technical Session 1 (d) Technical Session 3 (c) Technical Session 4 (a) Technical Session 5 (a)	Special Session : Students and Schools Partnerships (Part D) Technical Session 2 (d) Technical Session 3 (d) Technical Session 4 (b) Technical Session 5 (b)	
May 12 (Fri.)	Technical Session 2 (e) Technical Session 3 (e) Technical Session 4 (c)	Closing Session (Plenary) Round Table EMECS Declaration Awards Presentation Announcement of the Next Venue	Farewell Party

## 蘇 Plenary Session

Several quality assessments of marine and coastal environments have been published in Europe in the last decade. Such reports contributed to disseminate scientific knowledge to managers, policy-makers and the larger public. Nevertheless, recent advances in scientific disciplines have rapidly improved the knowledge base and there is a need to define new research themes in the light of new contributions. The need for sharing knowledge at international

level has never been greater as pressures on estuaries and coasts and their living and non-living resources continue to mount.

This plenary session will give the opportunity to participants to learn from recent work on the natural variability and the complexity of European coastal ecosystems, with three presentations regarding North Sea/Baltic Sea, Mediterranean Sea, and English Channel particularly, in the global context)

## 蘇 Technical Session

Technical Session 1: Recent advances in coastal marine sciences

Technical Session 2: Ecological quality: concepts and case studies

Technical Session 3: New concepts and innovative experiences in coastal management

Technical Session 4: Co-management and community involvement: Sustainability and awareness to environmental issues

Technical Session 5: Networking and 21st century education: the communication challenge



Auditorium

## 蘇 Special Session

Special Session I : Asia-Pacific Coast

"Quality Status of the Asia-Pacific Coast"

The Earthquake off Sumatra caused a Tsunami, resulting in tremendous damage on the Asia-Pacific coastal zones. What is more, concerns have increased for the exacerbated impacts of strong tropical cyclones caused by climate change, associated storm surges and coastal flooding, after the unprecedented damage caused by Hurricane Katrina. These dramatic events indicate coastal vulnerability, both for present day hazards and for future climate change and sea-level rise. The impacts of such hazards are a serious threat to the Asia-Pacific coastal zones, due to high population growth, the number of mega cities, and the economic activities expected in this century.

For these reasons, management of future risks are an essential part of the Integrated Coastal Management (ICM). Integrated Coastal Management is parallel with environmental management, which are the main theme of the two books; State of Environment of the A-P Coastal Zones and Issues and Future Directions of Research and ICM. Co-achievement of risk management and environmental protection is a major issue for the sustainability of the coastal zones.

During the Asia-Pacific Session, we will discuss the state of the environment, the vulnerability and safety of society, and future directions of ICM, focusing on the Asia-Pacific region. These issues will be addressed by presenting overviews of the two books, reporting on tsunami and cyclone damage, including

environmental damages, and discussing the lessons learned by recovery practices from their damage. The future direction of ICM will also be discussed.

Asia-Pacific Session Provisional Programme:

1. Opening Remarks
2. Introduction of APN Book and EMECS Book
3. Report of Coastal Vulnerability and Risk Management in the Asia-Pacific Region
4. Report of the Off-Sumatra Tsunami
5. Report of recovery practices and lessons learned
6. Panel Discussion



Session Room

Special Session : Students and Schools Partnerships

The deterioration of the environment, including the marine environment, has become more and more serious at a global level. Consequently, on a worldwide scale, great importance has been placed upon environmental education for the next generation, who will become responsible for environmental conservation.

EMECS, an organization devoted to the environmental management of enclosed coastal seas all over the world, took an active role in environmental education in the 6th International Conference on the Environmental Management of Enclosed Coastal Seas, "EMECS 2003", which was held in Bangkok, Thailand. We conducted an environmental education session there for high school students for the first time, the outcome of which was included in the Bangkok Declaration.

This special session of students and schools partnerships has been passed on to EMECS 7, which will be held from May 9 to May 12, 2006 in Caen, France. The purpose of the session is to contribute to the fostering of future leaders of environmental conservation in each country, as well as to promote environmental education among high school students by supporting their participation and providing them with opportunities to deepen international exchanges on the environment in corporation with scientists in related countries.



Cean Expo Congress Center

In order to provide opportunities to start a fruitful exchange of students from various backgrounds, such as getting together and acting together, the session will cover a variety of activities from the petting of marine creatures to the application of advanced technology. Moreover, it will provide an opportunity to understand young people better and to provide all students with equal opportunities to learn. Environmental education should be based on scientific techniques, mainly for young people, and rooted in the culture of the region.

Outdoor activities and visits to local schools and related institutes etc. will be covered in the session. The tour will include visits to facilities as well as looking at environmental education at a local school, if possible. A session report is to be scheduled at the closing session of EMECS7.

1. Theme: Involvement of students in the environmental conservation of enclosed coastal seas
2. Organizer: International EMECS Center / Caen la Mer
3. Program (Tentative):
  - Oral Presentations
  - School visit / Exchange program / Field trip
4. Participating countries:
  - France, America, Turkey, Thailand, Japan, etc

Special Session : UOF (Union des Oceanographes de France )  
Young Scientists Forum

This forum is intended to the students in 2nd year of master, the post-graduate students and young doctors having supported their thesis since less than 6 months at the date of the forum. An attestation signed by the supervisor and a copy of the student card will be asked.

Students can present their scientific works either in the form of a talk, follow-up of a short discussion, or under a poster



Session Room

presentation in relation to the same topic than the international conference: Sustainable co-development of enclosed coastal seas: our shared responsibility. All sciences relating to the

marine environment (social sciences, geography, chemistry, physics, biology...) are invited. The language of presentations is French or English.

Communications and posters are exposed in front of a jury composed by European lecturers and research scientists. The two best communications and the best poster will be awarded by a prize (Jacques Poutier prize, Jocelyne Marchand prize, poster prize).

The UOF Forum will be presented in opening session of EMECS/ECSA conference by the president of the UOF and the handing-over of the prizes will be carried out with the closing session in presence of the organizers of the EMECS/ECSA conference.

**Organisation:** C. Caplat (c.caplat@laposte.net)  
C. de la Bigne (uof@oceano.org)

**Information:** UOF secretary: uof@oceano.org

## From Normandy to Oristano (1)

Dr. Nobuo Kumamoto

Former President of Hokkaigakuen University

Chair, Scientific & Policy Committee, International EMECS Center

### 1. The Normandy Coast

I left Sapporo on July 4, 2005 and flew to Kansai International Airport. From there, it was a 13-hour flight to Charles de Gaulle International Airport in Paris. Without any time to rest, Executive Director Kunikatsu Nakajima and Advisor Masahiko Inatsugi and I boarded a train at Saint-Lazare Station in Paris and headed for Caen to the northwest. From the windows of the high-speed train, we could see the wheat fields of the hilly country stretching to Normandy. Although it was near sunset, in the European summer the sun was still high in the sky, and the lush green ears of wheat waved in the breeze. It was a truly idyllic scene, and I was struck by the fact that France, the nation that produced the Concorde, was formerly a prosperous agrarian country.

It was 8:00 p.m. before we arrived in Caen. Without even time to take a shower, we met in the lobby at 10 p.m. to discuss the following day's schedule. In addition to our group, the meeting was attended by Dr. Jean-Paul Ducrotoy of GEMEL, Dr. Bernard Sylvand and other individuals from the French side, and, from Turkey, Dr. Erdal Özhan of MEDCOAST, who is also a member of the EMECS Scientific & Policy Committee.

On the morning of the following day, July 6, we visited the Caen Expo Congress Center, which will be the venue for the 7th International Conference on the Environmental Management of Enclosed Coastal Seas (EMECS 7), as well as the city offices that were originally constructed and used as a monastery and other locations. We also called on the president of Caen University (Universite de Caen) and viewed the major facilities and paid a courtesy call on relevant organizations.

EMECS 7 will be sponsored jointly by the International EMECS Center, the Estuarine and Coastal Sciences Association (ECSA) in this region, and the Groupe d'Etude des Milieux Estuariens et Littoraux (GEMEL), and is scheduled to be held May 9 - 12, 2006 in Caen.

In 1944, at the time of the D-Day invasion during the Second World War, Caen suffered severe bombing from both air and sea, and most of the city was destroyed. Caen is famous as the city of William the Conqueror. The city was constructed between 1059 and 1066 by Queen Matilda, the wife of William the Conqueror, and subsequently it went through a process of continual expansion and restoration to reach its present form. The beauty of the Abbaye-aux-Hommes monastery and the Abbaye-aux-Dames nunnery has attracted many visitors. These buildings were spared in the fierce bombing, and it was said that this was done intentionally by the Allied forces, in the same way that Kyoto and Nara were removed from the list of bombing targets. These two build-

ings are still in use as the City Office and the regional conference center, respectively. Their magnificent ambience impresses visitors with the depth of Caen's history and gives them a sense of being participants in that history.

The D-Day counteroffensive of the Allied forces was conducted by the American and British armies in addition to that of Canada. This is the same location from which, in 1066, approximately one thousand years earlier, the army of William the Conqueror set out on the Norman conquest of England. The ruins of the Chateau Ducal, the castle of William, Duke of Normandy (whose name at the time was still Guillaume, and who was born in Falaise in the duchy as the illegitimate son of Duke Robert I of Normandy), still stand to this day in the center of the city. It was from this castle that, in the middle of the night on September 27, 1066, William the Conqueror set out for the coast of Normandy, supported by an elite army of 8,000 heavily armed knights that had been prepared for the previous six months, to the accompaniment of drums beaten loudly and trumpets ringing into the pitch-black wilderness to keep spirits high.

William and his officers kept a careful watch on the weather



conditions to detect momentary subtle changes in the wind direction, and with their fleet of ships constructed in advance fully loaded with heavily armed knights, armored horses, lightly armed foot soldiers, countless weapons, and abundant provisions, they sailed straight across the English Channel and launched a lightning strike at Pevensey in the south of England. William defeated the army of Harold Godwinson, heir to the throne of England

and established a Norman dynasty.

Centuries later, at 6:30 a.m. on June 6, 1944, General Eisenhower, commander in chief of the combined American, British, and Canadian forces, made a careful judgment of the weather conditions in the channel that had been unstable for several days and, deciding to gamble on a momentary brightness, ordered all of the waiting armies to advance. From the interior of England and various bases on the coast, three thousand airplanes and gliders filled with paratroopers and five thousand ships and small boats began the invasion of the continent. As countless shells from naval guns exploded, the largest ground operation in history began.

The officers and soldiers on board the warships, their spirits kept high by the sounds of Glenn Miller's "American Patrol," swarmed onto the coast of Normandy. After many hours, the sound of bagpipes and the rumble of Sherman tanks arrived in the streets of Caen in the evening of that day. If the silent castle ruins could speak, I would have liked to ask what it thought of this repetition of an invasion, be it only an accident of history.

## 2. 7<sup>th</sup> International Conference on the Environmental Management of Enclosed Coastal Seas (EMECS 7)

The main theme of EMECS 7 is "Sustainable Co-development of Enclosed Coastal Seas: Our Shared Responsibility". And there are five technical sessions with the following titles:

- Session 1: Recent advances in coastal marine sciences
- Session 2: Ecological quality: concepts and case studies
- Session 3: New concepts and innovative experiences in coastal management
- Session 4: Co-management and community involvement: Sustainability and awareness to environmental issues
- Session 5: Networking and 21st century education: The communication challenge

In addition, two Special Sessions entitled (1) Asia-Pacific Coast Session and (2) Students and Schools Partnerships, etc. are scheduled to make the conference more fruitful.

On the afternoon of the last day of our meetings, we decided to view the location planned for use in the site visit. This seaside region was one of the locations of the fiercest fighting of the Normandy invasion. We sailed from the French side toward the English Channel and then sailed back toward the coast. This gave us the opportunity to view the status of pollution from the Seine River flowing in from the eastern part of the Baie de la Seine, the changes in ocean currents in this stretch, the impact on



fishing grounds and so on.

At the same time, this excursion was also like a re-creation of the D-Day landing. We frequently saw flashbacks of famous scenes from the movie "The Longest Day" as we went by along this long coastline. As we returned to the pier, our hearts went out to the harsh fate of the tens of thousands of young Allied and German men who fell in this battle.

During a rest stop, Dr. Sylvand found a thin object resembling a stick of incense measuring two or three centimeters in length on the beach. He told us it was the powder from inside some ammunition. Now it poses no danger at all, but even now there are countless incense-like strips scattered over the beach. According to Dr. Ducrotoy, this coast is shallow to a considerable distance from shore and forms a gentle bay, and so the ocean currents are stagnant. Local people and even people from Paris come here to dig for clams. During lunch, we ordered mussels, a regional specialty, and we were surprised when a small bucket-like container filled with large mussels that had been boiled in brine was brought to the table. We felt that we had eaten a lifetime's worth of mussels at one sitting.

## 3. Lasting Peace in Europe

The hinterlands of the Normandy Coast were devastated by the famous military operation during the Second World War. Thanks to a restoration program conducted in the postwar period, this area is now one of France's finest model residential districts, and there is no trace of their former destruction. The area has been transformed into a residential area with distinctive French chic, with roads that have gentle curves so as to prevent traffic accidents, brilliant green lawns, vivid red hedges of bougainvillea and so on. But in one place, at an intersection, there stood a single Sherman tank, well cared for to the point that it looked brand-new, reminding us that this place was once a battlefield.

In June 2004, the final commemorative ceremonies marking the 60th anniversary of the amphibious landing were held in the city of Caen and other major battlefields in the Normandy region. These were attended by many European leaders including HM Queen Elizabeth, HRH Prince Philip and Prime Minister Tony Blair of Great Britain. It was decided that this would be the last commemoration due to the age of the participants. The central players were President Jacques Chirac of France and the chancellor of Germany, whose country up to that point had not been allowed to participate, thus making this occasion Germany's first and last invitation to attend the commemoration. At the scene of this fierce battle, the two leaders shared a firm handshake and pledged lasting peace in Europe.

This scene, which I had viewed on television, came back to me as I looked at the residential area colored with lawns and flowers, and my heart went out to the young men of the United States, Great Britain, Germany, France and Canada who had fallen in this largest military operation in world history, and to the brief lives of the young men of Japan and the United States who had fallen in various locations in the Pacific.

## 4. Visit to Japanese Embassy in France, etc.

After the end of the preparatory meeting in Caen, we returned to Paris on the evening of July 6. On the following day, July 7, we visited the Japanese Embassy in Paris, where we presented a brief overview of the EMECS Conferences to Second Secretary Akira Iizuka and requested his assistance in the future. Next, we visited the Paris office of Hyogo Prefecture and requested assistance from Director General Norihisa Mizuguchi and Deputy Director General Nao Kuroi. The walls of Mr. Kuroi's office were covered with several oil paintings. We were impressed by the breadth of his interests, and really had a sense that we were in Paris. This was the second time that we had visited the embassy and the Hyogo Prefectural Office, following last year's visits, and in each case they graciously promised their cooperation.

After dinner, we went to see the night view of the restored Paris Opera House. The stately dignity and opulence of the glittering gold made us feel a deep sense of awe at the wealth of French culture. The elliptical shield on the front bears the letter "N" etched in bold relief. It goes without saying that this "N" stands for Napoleon. It had a mixture of humility and pride, and at the same time a touch of boastfulness.

# EMECS International Seminar Report

"Current Environmental Conditions of Coastal Areas in the Indian Ocean and the South Pacific Ocean"  
— Preliminary event: EMECS 7 in 2006 <France> —

EMECS International Seminar was held on December 7, 2005 in Kobe, Japan, as a preliminary event of the 7th International Conference on the Environmental Management of Enclosed Coastal Seas (EMECS 7).

The theme of the seminar was, "Current Environmental Conditions of Coastal Areas in the Indian Ocean and the South Pacific Ocean". The purpose of the seminar was to raise awareness of the current environmental conditions and the problems in those coastal areas on a global level for the further improvement of their environmental conditions.

With Dr. Nobuo Kumamoto (Chairperson, Scientific & Policy Committee, International EMECS Center) acting as chairman of the seminar, two specialists, Dr. Piamsak Menasveta (Professor and Dean, Faculty of Science, Chulalongkorn University) and Dr. Eric Wolanski

(Leading Scientist, The Australian Institute of Marine Science), made very informative presentations, which helped us learn much more about the current environmental conditions and problems and the efforts for overcoming them in the coastal areas in the Indian Ocean and the South Pacific Ocean.

Moreover, on behalf of the organizing committee, Dr. Jean-Paul Ducrotoy (Director of GEMEL, Prof. Emeritus, The University of Hull) made a presentation on EMECS 7 in an effort to call for more participation.

Many concerned researchers, government officials, and members of NGOs interested in the coastal environment issues participated actively.

The summaries of the presentations are as follows:

Presentation 1: **"Indian Ocean Tsunami 26 December 2004"**  
**Dr. Professor Piamsak Menasveta**  
Dean, Faculty of Science, Chulalongkorn University, Bangkok, Thailand

## 2004 Tsunami: Scientific Findings in the Andaman Sea Coast

A day after the Tsunami struck the Andaman sea coast of Thailand, the Faculty of Science, Chulalongkorn University called a press conference. We confirmed that the waves had been a real Tsunami, not just tidal waves as had been reported in the news earlier.



We immediately dispatched a group of scientists to the affected areas to collect preliminary information and data such as run-up height, which areas had been inundated, the degree of erosion on different beaches and damage to coastal vegetation and coral communities. At Similan Marine National Park, at a depth of 30 meters below the mean sea level, we observed that a significant amount of sand, as much as 2 meters in depth, was missing from the sea floor. The tsunami had not only smothered but also scraped away the seafloor habitat.

Later on, several research projects were planned and carried out for several months in 2005. The results revealed that the run-up height

differed from beach to beach, varying from 5 to 20 meters. The run-up height seemed to be related to the bathymetry of the coastal areas. Khoa Lak in Phangna Province, which was hardest hit by the tsunami, had the highest run-up height, around 20 meters. Inundated areas and beach erosion also varied from beach to beach depending on the run-up height and beach slope. The longest water intrusion in the land area was approximately 1,500 meters in the Khoa Lak area.

Interestingly, coral communities were not affected that much. A high percentage of coral damage was found in deeper water, between a depth of 10 to 20 meters. In some locations in the Similan group of islands, damage to the coral was as much as 30 percent. Most of the coral affected was of a large and massive type, such as table coral. Coral damage in shallow water varied from 0 to 5 percent.

Mangrove forests were found to be very effective in protecting people from the tsunami. Villages situated behind the mangrove patch were less damaged.

## Student Activities after the 2004 Indian Ocean Tsunami: Case Report

The tsunami of 26 December, 2004 caused massive damage to villages, towns and nature along the Andaman Sea Coast of Thailand and left huge numbers of casualties in its wake. People living in these villages and towns lost their loved ones, houses and belongings. Almost all of them were affected, both physically and mentally.



Following that disastrous day, a great deal of assistance flew into the area. Our students at the Faculty of Science, Chulalongkorn University were filled with compassion and wanted to take part in relief efforts.

A small group of students including their advisors (lecturers) visited the area from 28-30 January 2005 and later decided to select Thale

Nok, a small Islamic village in Ranong Province, as their project site.

The village presently had 63 inhabitants. The village suffered 47 casualties on the day of the disaster, with 20 houses destroyed. Relief efforts from other sources scantily reached the village.

Right after they came back to the university, a project group under the name "Science Tsunami Camp" was formed with 64 student volunteers. The group went to Thale Nok village on 15 March, 2005 and worked there for 11 days.

The main objective of their relief efforts was to construct a hall for praying, and a tower equipped with



speakers for early warning purposes. They also helped villagers to collect garbage, plant trees and teach pupils in an elementary school.

They accomplished the project with great success and were greatly admired by the villagers.

## Presentation 2: Estuarine and Coastal Zone Ecohydrology (in the Pacific Rim)

**Eric Wolanski, PhD, DSc, FTSE, FIE Australia**

Leading Scientist, The Australian Institute of Marine Science,

PMB No. 3, Townsville MC, Q. 4810, Australia. E-mail: [e.wolanski@aims.gov.au](mailto:e.wolanski@aims.gov.au)

Throughout the world, estuaries and coastal waters have experienced environmental degradation. Present proposed remedial measures based on engineering and technological fix are not likely to restore the ecological processes of a healthy, robust estuary and, as such, will not reinstate the full beneficial functions of the estuary ecosystem. The successful management of estuaries and coastal waters requires an ecohydrology-based, basin-wide approach. This necessitates getting away from present practices by official institutions based on municipalities or counties as an administrative unit, or the narrowly-focused approaches of managers of specific activities (e.g. farming and fisheries, water resources, urbanisation, shipping). Without this change in thinking and management concept, estuaries and coastal waters will continue to degrade, whatever integrated coastal management plans are implemented. This is demonstrated by Wolanski (2006) for twelve mega-cities and harbours in the Asia Pacific region. Ecohydrology is neglected and the best of engineering practices have failed to provide a healthy environment to 100 million people.

To help foster this change, UNESCO-ROSTE, NOAA, and AIMS have supported the development and use of a process-based estuarine ecohydrology model. This model is based on the dominant estuarine ecohydrological processes (Wolanski et al., 2004). It is verified against field data for each application. It is a tool that may enable an interaction between scientists, economists, and the public and decision makers to enable sustainable development of an estuary and its coastal waters based on ecohydrology principles. It has now been applied, and the results communicated to management, to

- the Guadiana Estuary, Portugal
- the Great Barrier Reef of Australia
- Darwin Harbour, Australia
- estuaries in Guam, Palau, and Pohnpei (Micronesia).

For Darwin Harbour the model is used to assess to what degree the estuarine ecosystem health may degrade as a result of possible future human activities in the catchment, particularly land clearing, nutrient enrichment, and destruction of mangroves (Wolanski, 2006).

For Micronesia, the model highlighted the beneficial role of mangroves, resulting in a legislative protection in at least one state (Palau).

For Guam, Palau, and Pohnpei, the study demonstrated the need for integrating land-use and coral reef management; in islands where some form of traditional leadership still exists, this model has measurably helped in local environmental planning because these traditional leaders consider the long-term, multigenerational impacts of activities in the development of environmental policies.

For the Great Barrier Reef of Australia, the model suggests that land-use has contributed to degradation of the health of the Great Barrier Reef and to an increased frequency and intensity of crown-of-thorns starfish infestations (Wolanski and De'ath, 2005). The model also predicts that the health of the Great Barrier Reef will significantly worsen by the year 2050 as a result of global warming. However, the model also

A second Science Tsunami Camp was conducted in October last year. The students plan to make another follow-up visit during their next summer break.

suggests that much-improved land-use practices will enable some regions of the Great Barrier Reef to recover, even with global warming. Finally, the model suggests that, if global warming proceeds unchecked, biological adaptation is necessary to avoid a collapse of the Great Barrier Reef health by the year 2100. The model can be used to quantify the effectiveness of remedial measures.



Ecohydrology demonstrates that the land, the river, the estuary and coastal waters are components of the same ecosystem. Traditionally, the estuarine and coral reef management strategy relies on technology and engineering fixes and it neglects ecohydrology; these strategies invariably fail to maintain ecosystem health and the ecological services that these ecosystems provide. Ecohydrology science offers a number of solutions, including the use of created and restored wetlands, top-down and bottom-up ecological manipulation, the creation of freshets, and smarter land-use, to enhance the robustness of the estuarine and coral reef ecosystem. Worldwide estuaries and coastal waters will continue to degrade until a political solution is found to the quagmire that is the present estuarine and coastal management framework, which ignores ecohydrology.

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### Call for Articles

Contributions from readers (reports on research on enclosed coastal seas, conference information, etc) would be greatly appreciated.

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