

## REPORT OF OPENING SESSION

The Opening Session started at 09:00 hours on October 27, 2008. Dr. Tokio Wada, Chairman of PICES, welcomed delegates, observers and researchers to Dalian and formally declared that the PICES Seventeenth Annual Meeting was open. The session agenda is appended as *OP Endnote 1*.

### **Welcome address on behalf of the host country and the host city**

Mr. Lianzeng Chen (Deputy Administrator, State Oceanic Administration, People's Republic of China) welcomed participants on behalf of the host country (*OP Endnote 2*), and Mr. Deren Xia (Mayor of Dalian) addressed the session on behalf of the host city (*OP Endnote 3*).

### **Remarks by representatives of Contracting Parties and the Chairman of PICES**

Dr. Wada invited Dr. Laura Richards (Regional Director of Science, Pacific Region, Fisheries and Oceans Canada) to make a statement on behalf of the Canadian Government. Dr. Richards addressed the session and her remarks are appended to the report as *OP Endnote 4*.

Dr. Wada called upon Dr. Yukimasa Ishida (Director General, Tohoku National Fisheries Research Institute, Fisheries Research Agency, Japan) to speak on behalf of the Japanese Government. Dr. Ishida addressed the session and his remarks are appended to the report as *OP Endnote 5*.

Dr. Wada then asked Mr. Doan Jeong (Director of Marine Research and Development Division, Marine Policy Bureau, Ministry of Land, Transportation and Maritime Affairs, Republic of Korea) to make a statement on behalf of the Korean Government. Mr. Jeong addressed the session and his remarks are appended to the report as *OP Endnote 6*.

Dr. Wada invited Dr. Lev Bocharov (Director General, Pacific Scientific Research Fisheries Center, Federal Agency on Fisheries, Russian Federation) to speak on behalf of the Russian Government. Dr. Bocharov addressed the session and his remarks are appended to the report as *OP Endnote 7*.

Dr. Wada requested Dr. George Boehlert (Director, Hatfield Marine Science Center, Oregon State University, U.S.A.) to make a statement on behalf of the U.S. Government. Dr. Boehlert addressed the session and his remarks are appended to the report as *OP Endnote 8*.

Dr. Wada called upon Dr. Zhanhai Zhang (Director General, Department of International Cooperation, State Oceanic Administration, People's Republic of China) to speak on behalf of the Chinese Government. Dr. Zhang addressed the session and his remarks are appended to the report as *OP Endnote 9*.

Dr. Wada thanked Mr. Lianzeng Chen and Mr. Deren Xia and all the delegates for their remarks, and addressed the participants on behalf of PICES. His remarks are appended to the report as *OP Endnote 10*.

### **Wooster Award presentation ceremony**

Dr. Wada and Dr. John Stein, PICES Science Board Chairman, conducted the 2008 Wooster Award presentation ceremony. Dr. Stein introduced the Wooster Award and announced that the 2008 Award was given to Dr. Charles B. Miller (Oregon State University, U.S.A.), a nationally and internationally distinguished biological oceanographer specializing in studies of zooplankton. He quoted the Science Board citation for the 2008 Wooster Award that is appended to the report as *OP Endnote 11*. (Reading of the citation was accompanied by a special slide show dedicated to Dr. Miller.)

Unfortunately, Prof. Warren Wooster was unable to join this ceremony, but he kindly sent a message to Dr. Miller. Dr. Wada read the tribute from Prof. Wooster:

*It is a pleasure to acknowledge selection of Charlie Miller to receive the 2008 Wooster Award. His contributions to understanding of zooplankton ecology in the northern North Pacific tie in beautifully with studies of physical changes in the ecosystem. Eventually predictions of these physical changes will lead to predictions of ecosystem changes, with all sorts of applications to fisheries and other problems of PICES concern.*

*Monitoring the ecosystem with the Continuous Plankton Recorder (CPR) and studies in OECOS (Ocean Ecodynamics Comparison in the Subarctic Pacific), both of these involving Charlie Miller, are keys to understanding ecosystems of the region. This work has often made me wish I had chosen zooplankton ecology as the field in which to specialize – too late for me but not too late to appreciate the contributions of Charlie and his colleagues. Congratulations to him for his major contributions to PICES projects in this field.*

Dr. Wada presented a commemorative plaque to Dr. Miller (a permanent plaque identifying Wooster Award recipients resides at the PICES Secretariat), who accepted the award with the thankful remarks. After the Annual Meeting, Dr. Miller sent the following note to the PICES Secretariat:

*I have always been dubious of awards in science, because so many who deserve them are never recognized. I am still dubious, but getting the Wooster Award is very gratifying, and I thank PICES for it.*

*Receiving the Wooster Award at this time comes with some sadness because Warren Wooster died just as I was being honored in Dalian. Warren called many times with PICES tasks for me, and I always said “no”. I always ended up doing whatever he asked. That was one of Warren’s many gifts: he could turn “no” into “yes” with his magical powers. Forty-five years ago, he and Polly were very kind to the graduate students at Scripps, offering me and others the initial social outreach from the faculty to newcomers. It was a warm touch of humanity in a ferociously competitive place and never forgotten. Warren’s shift in interest from marine chemistry and physics to fisheries and ocean policy has been of great benefit to ICES, PICES, the University of Washington and every aspect of our concern for the ocean. We will miss him personally, but his lasting gifts to us will carry his spirit onward.*

*Very few work at science alone. I cannot thank everyone here who has pursued ocean ecology with me; I made a list of my more important associates and it came out around eighty! However, I have been especially fortunate in working down the years with Bruce Frost, John McGowan, Peter Wiebe, William Fager, Abe Fleminger, William Peterson, Martha Clemons, Harold Batchelder, Patricia Wheeler and Tim Cowles (in order of appearance in my life). Thanks to them and everyone studying life in the oceans. Keep going, there is much yet to be learned.*

### **PICES Ocean Monitoring Service Award presentation ceremony**

Drs. Wada and Stein also conducted the presentation ceremony for the PICES Ocean Monitoring Service Award (POMA). Dr. Stein introduced POMA and announced that the very first award was given to the training ship T/S *Oshoro-maru* of Hokkaido University, Japan. After he quoted the Science Board citation appended to the report as *OP Endnote 12* (reading of the citation was accompanied by a special slide show dedicated to T/S *Oshoro-maru*), Dr. Wada presented a commemorative plaque and a certificate to a representative of the recipient, Dr. Akihiko Hara (Dean, Graduate School of Fisheries Sciences, Hokkaido University), who accepted the award with remarks of appreciation.

### **PICES “Year-in-Review” 2008**

Dr. Stein reviewed PICES’ scientific accomplishments since the Sixteenth Annual Meeting in Victoria, Canada. An article on the state of PICES science for 2008 will be published in the next issue of PICES Press in January 2009 (Vol. 17, No. 1).

After the closing remarks by Dr. Wada, Dr. McKinnell made announcements related to the logistics of the Annual Meeting. The session was adjourned at 10:40 a.m.

### Keynote lecture

The 2008 keynote lecture entitled “*Wave-tide-circulation coupled model: To improve the forecasting ability for FUTURE*” was given by Dr. Fangli Qiao (First Institute of Oceanography, State Oceanic Administration, People’s Republic of China) as a part of the Science Board Symposium on “*Beyond observations to achieving, understanding and forecasting in a changing North Pacific: Forward to the FUTURE*”. The abstract of his presentation is appended to the report as *OP Endnote 13*.

### OP Endnote 1

#### Opening Session agenda

1. Opening by the Chairman of PICES, Dr. Tokio Wada
2. Welcome addresses by representatives of the host country and host city
  - Mr. Lianzeng Chen (Deputy Administrator, State Oceanic Administration, People’s Republic of China)
  - Mr. Deren Xia (Mayor of Dalian)
3. Remarks by representatives of Contracting Parties
  - Dr. Laura Richards (Regional Director of Science, Pacific Region, Fisheries and Oceans, Canada)
  - Dr. Yukimasa Ishida (Director General, Tohoku National Fisheries Research Institute, Fisheries Research Agency, Japan)
  - Mr. Doan Jeong (Director of Marine Research and Development Division, Marine Policy Bureau, Ministry of Land, Transportation and Maritime Affairs, Republic of Korea)
  - Dr. Lev Bocharov (Director General, Pacific Scientific Research Fisheries Center, Federal Agency on Fisheries, Russian Federation)
  - Dr. George Boehlert (Director, Hatfield Marine Science Center, Oregon State University, U.S.A.)
  - Dr. Zhanhai Zhang (Director General, Department of International Cooperation, State Oceanic Administration, People’s Republic of China)
4. Remarks by the Chairman of PICES, Dr. Tokio Wada
5. 2008 PICES Wooster Award presentation ceremony
6. 2008 PICES Ocean Monitoring Service Award ceremony
7. *PICES “Year-in-Review” 2008* by the Chairman of Science Board, Dr. John Stein
8. Closing Remarks/Announcements

**OP Endnote 2**

**Welcome address on behalf of the host country by Mr. Lianzeng Chen**

Respected Mr. Chairman, distinguished Mayor Xia Deren, honourable guests, ladies and gentlemen: In this golden autumn, I am very pleased to witness the successful opening of the Seventeenth Annual Meeting of PICES in the beautiful coastal city of Dalian. Taking this opportunity, I would like to, on behalf of the State Oceanic Administration (SOA) and the Local Organizing Committee, extend our warmest welcome to the participants, and express our congratulations and sincere thanks for the great support from the Dalian government!

The ocean is a common asset shared by all humans; the responsibility and obligation to study, develop and protect the ocean is therefore shared by all nations. Only when international cooperation is strengthened and the efficient way to sustainable development is found can we humans be greeted with a prosperous future.

As one of the major developing countries, China is fully aware of its obligation and its role in international marine affairs. By participating actively in international, as well as regional marine cooperation, and performing our obligation seriously, China has been contributing to the development of international marine affairs.

As part of the world economy, the Chinese marine industry has now become a new factor of GDP growth and has been incorporated into the development of the world economy. The Chinese Government has attached a great importance to the activities of sea area use and marine environmental protection, and their management has been based on the related laws and regulation. With the preliminary establishment of a marine monitoring system and a disaster mitigation emergency response system, coastal areas enjoy the advantage of both economic and social development in return. Marine science and technology has already become an important pillar for the Chinese marine development and therefore has been listed into the “National Medium and Long Term Science and Technology Development Plan”, as well as the “National Development Plan for the Period of 2006–2010”.

It is our great pleasure to see that, as the most important intergovernmental scientific organization in the North Pacific area, since its foundation in 1992, PICES has always been devoting itself to promoting and coordinating marine research around the North Pacific, to advancing the knowledge of the areas concerning marine environment, global weather, climate change, living resources, ecosystem, as well as impacts from human activities, and to sharing scientific information. Together with the promotion of both position and influence, PICES has been enjoying an increasingly important role in recent years.

Distinguished guests, ladies and gentlemen, dear friends, the Chinese government attaches great importance to the relations with PICES and will continue to support PICES’ work. China also would like to show its willingness to work together with other Contracting Parties to improve the exchange and cooperation in scientific research in the North Pacific, for example, by conducting cooperative research in key fundamental and advanced scientific fields such as climate change, marine environmental protection and marine disaster prevention and mitigation, to improve the level of understanding of influences and the adaptation to climate change, and at the same time to provide technical evidence to governments and international communities for formulating a sustainable development strategy on climate change, by conducting cooperative research in the sustainable utilization of marine ecological resources, exploitation and utilization of marine renewable resources, technology on energy saving and emission reduction, to promote the conservation of marine ecological environment and sustainable utilization of marine resources, to provide technical support and service to solve the problems of global warming and energy crisis, and to contribute to the establishment of a marine ecological civilization and a harmonized living environment.

Finally, I wish the meeting great success, and all the participants good health. Have a pleasant stay in Dalian! Thank you all.

**OP Endnote 3****Welcome address on behalf of the host city by Mr. Deren Xia**

Respected Mr. Chairman, distinguished Deputy Administrator of the State Oceanic Administration, Mr. Lianzeng Chen, ladies and gentlemen: On the occasion of the opening of the PICES Seventeenth Annual Meeting, I would like to, on behalf of the Dalian Municipal Government and its citizens, extend our warmest welcome to the Contracting Parties of the North Pacific Marine Science Organization and all the experts and friends here, and express our congratulations on the successful opening of the meeting!

On the east coast of Eurasia and the southern tip of the Liaodong Peninsula, Dalian is surrounded by the sea on three sides, and backed up by the vast Northeast Plain of China on the north. With a population of 6 million, it covers a land area of 12,500 square kilometers.

Dalian is an important port, trade, finance, industry and tourism city. The Dalian Port carries on trade and business with more than 300 ports in more than 160 countries and areas. It accounts for the majority of sea cargo and foreign trade container transportation in the whole northern area. The Dalian International Airport, the largest in Northeast China, offers flights to 133 domestic and international destinations, including 92 cities in 15 countries. It ranked the 4<sup>th</sup> in China in terms of international passenger volume in 2007.

Dalian, among the first batch of cities being opened to the outside world, is home to Northeast China's Economy and Technology Development Zone of national-level, the Hi-Tech Industrial Zone and the only Bonded Port Area in Northeast China. Foreign investors have set 12,900 enterprises, including 88 Fortune 500 companies who have invested in nearly 200 projects, with an actual utilized foreign capital of USD 30 billion.

As the conference and exhibition center of Northeast China, Dalian has held the World Chinese Insurance Convention, the APEC Summit, the 5<sup>th</sup> ASEM Economic Ministers' Meeting, and the WTO Small-scale Ministers' Meeting in recent years, and was the host of the annual meeting of Summer Davos 2007.

Dalian has been appraised with the Global 500 Award and Habitat Scroll of Honor Award by the UN, China's Model City of Environmental Protection, and is among the first batch of National Civilized Cities, as well. In 2007, Dalian won the honorary title of the Best Tourist City of China by both the World Tourism Organization of the UN and the National Tourism Administration.

On the theme of "*Beyond observations to achieving understanding and forecasting in a changing North Pacific: Forward to the FUTURE*", the PICES Seventeenth Annual Meeting holds 11 sessions, such as linking biology, chemistry, and physics in observational systems, species succession and long-term data set analysis, coastal upwelling processes and their ecological effects, *etc.*, which will further promote the common development of the North Pacific region.

The coast line of Dalian is 1906 kilometers long, and the sea area under the jurisdiction of Dalian is 23,000 hectares. The output value of aquaculture is 30% higher than that of the fishing industry, and the annual output values of the fishery reaches 17 billion yuan (RMB). The port logistics bring 60 billion RMB to GDP growth. The total revenue of tourism is 12.6 billion RMB, of which the sea-oriented tour program is the mainstay. So, the Dalian Municipal Government attaches great importance to the oceanic development and administration and conducts function zoning in marine areas. By sticking to the principle of "development with protection and protection benefits development", the Dalian Municipal Government makes rational use of oceanic resources. With respect to the waste water entering the sea, the environmental protection policies, such as the control of aggregated pollutants and discharge limits, should be executed strictly. Dalian has been a leader in avoiding global warming, saving energy and reducing carbon dioxide discharge in recent years. The city achieves the goals of energy conservation, coal conservation and emission reduction by implementing the central heating system and demolishing heating boilers that fail to conform to the standard of environmental protection facilities. Therefore, you can feel fresh air in our city as very few chimneys are here.

Dalian is well-known for the sea of which our citizens are proud. The inter-tidal zone and offshore sea areas are not only important resources, but are also places for citizens to enjoy the sea as well as the sea-routes leading to all over the world. We have made great efforts for about 2 years to successfully solve the problems caused by mariculture buoyant rafts, such as destroying the seashore scenery, bearing unfavorable influences on citizens who would like to appreciate the sea, as well as blocking the sea channel. We will strive to build Dalian into an ecological coastal city which is harmonious with the environment by deploying artificial reefs around the offshore zones in order to attract more marine creatures to inhabit here.

In the future, the latest research findings of PICES will be applied increasingly to the project of “blue sky, blue sea and green land”, and in response, the successful experience of Dalian in sea planning and administration will be exchanged and transferred to PICES. I believe the achievements of PICES, the stage combining the science and management of the sea, will further benefit the city and our citizens.

I sincerely hope that experts and friends from all over the world could tour around Dalian and enjoy the charm of this city when you finish the sessions of the meeting. Dalian will listen attentively to your wise and far-sighted ideas, and also contribute willingly to the development of PICES.

Finally, may the meeting succeed! Thank you.

**OP Endnote 4**

**Remarks at the Opening Session by Dr. Laura Richards (Canada)**

Mr. Chairman, distinguished guests and colleagues: On behalf of Canada and the Canadian delegation, I would like to thank the People’s Republic of China and the State Oceanic Administration for inviting us here to the beautiful coastal city of Dalian. We appreciate the hard work of the Local Organizing Committee and the PICES Secretariat in preparing for this meeting.

This has been an auspicious year for China as host to the 2008 Summer Olympic and Para-Olympic Games. Many Canadians were glued to their television sets, enjoying the wonderful games and ceremonies. We would like to congratulate China on your success.

This year has also been auspicious for marine science in Canada. We celebrated 100 years of science at St. Andrews Biological Station on Canada’s East Coast and the Pacific Biological Station at Nanaimo, on Canada’s West Coast. Unlike our host country of China, Canada is a young country with relatively few institutions that are 100 years old. As part of our celebration, we hosted several events, including the PICES Sixteenth Annual Meeting in Victoria last year, the American Fisheries Society meeting in Ottawa, in August 2008, and just last month, the ICES Annual Science Conference in Halifax. Our official 100<sup>th</sup> anniversary reception was held at the Pacific Biological Station earlier this month on October 1, bringing this year-long celebration to a close.

But to return to PICES, I would like to acknowledge another busy and successful year. Canada is particularly pleased to see the progress we have made in moving forward with FUTURE, our next major science program and its implementation plan, although we still have more work to do. FUTURE gives us the opportunity to ensure that PICES stays relevant by developing products that make our scientific knowledge available to decision makers and the broader community. We also have the opportunity to ensure that the science conducted within PICES is aligned with the current priorities and information needs of member countries. I encourage everyone to participate in the discussions about the FUTURE Implementation Plan which will take place this week. Let’s get it right so that PICES can continue to lead marine science in the North Pacific.

Thank you.

**OP Endnote 5****Remarks at the Opening Session by Dr. Yukimasa Ishida (Japan)**

Mr. Chairman, distinguished delegates, ladies and gentlemen: On behalf of Japan and the Japanese delegation, I sincerely thank the Government of the People's Republic of China and the Local Organizing Committee for kindly hosting the PICES Seventeenth Annual Meeting here in Dalian. Also, I thank the PICES Secretariat for preparing for this meeting. I am sure that their excellent work will make this a fruitful meeting.

This year, Japan welcomed many international events. In July, the 34<sup>th</sup> Group of Eight Summit (G8) was held in Toyako, Hokkaido. The "*Environment and climate change*" was one of the major issues discussed by G8 leaders, including those from PICES member countries. In August, the PICES Summer School on "*Ecosystem-based management*" and the 4<sup>th</sup> PICES workshop on "*The Okhotsk Sea and adjacent areas*" were held in Hokkaido. The 5<sup>th</sup> World Fisheries Congress was held in Yokohama in October, just before this PICES Annual Meeting. Also recently, four Japanese scientists received the Nobel Prize, and one of them was a scientist who studied jellyfish in the United States. As such, the environment and ocean and fishery sciences were hot topics in Japan this year. The Government of Japan will continue to promote scientific research on these key issues, and I thank all of you for your cooperation now and in the future.

Japan is very pleased with the ongoing success of PICES activities, including the PICES project entitled "*Development of the prevention systems for harmful organisms' expansion in the Pacific Rim*," which is supported by a special Japanese Trust Fund. The goals of this project are to develop international systems to collect, exchange, and store relevant data on non-indigenous species in the North Pacific Ocean (and beyond), and to foster partnerships with non-PICES member countries and related international organizations. Japan hopes that these activities will contribute to the establishment of an information network throughout the Pacific Rim, and will serve to encourage and promote the abilities of scientists in developing countries to address this growing concern.

Also at this Annual Meeting, an implementation plan for a new PICES integrated science program called FUTURE is scheduled to be discussed. This program is focused on marine environmental issues, especially in the coastal areas of each member country. Japan expects that the activities of FUTURE will provide valuable knowledge not only to scientists but also to ordinary citizens and policy makers in PICES member countries and other nations around the world.

Finally, I hope the coordinated activities of the PICES scientific community will foster the international cooperation needed to carry out our important tasks more effectively. I wish productive days to every participant here in Dalian. Thank you very much.

**OP Endnote 6****Remarks at the Opening Session by Mr. Doan Jeong (Republic of Korea)**

Honorable Dr. Tokio Wada (Chairman of PICES), Dr. Alexander Bychkov (Executive Secretary of PICES), Mr. Lianzeng Chen (Deputy Administrator of the State Oceanic Administration), Mr. Deren Xia (Mayor of Dalian), distinguished guests, ladies and gentlemen: First of all, on behalf of the Republic of Korea and the Korean delegation, I would like to extend my appreciation to the Government of the People's Republic of China for this wonderful arrangement of the Seventeenth Annual Meeting of PICES.

In recent years, we have witnessed too many abnormal events resulting from climate change, such as global warming or sea level rise. Rapid changes in the ocean and ecosystem could pose serious problems, especially in the North Pacific region. Now it is high time to make concerted efforts to respond to such climate change and to prevent another severe disaster. In this regard, I believe the theme of this year's PICES Annual Meeting, "*Beyond observations to achieving, understanding and forecasting in a changing North Pacific: Forward to the FUTURE*" is very timely and appropriate.

Ladies and gentlemen: Korea is always ready to take part in every issue of PICES, and cooperate with other member countries to accomplish the purposes of PICES. In this context, I am delighted to inform you that the Republic of Korea is to host the PICES Eighteenth Annual Meeting in 2009, under the theme of “*Understanding ecosystem dynamics, and pursuing ecosystem approaches to management.*” I hope to see all of you at the next Annual Meeting in Jeju, and also suggest that you to take the opportunity to enjoy the beautiful scenery of this southern island of Korea.

In addition, I would like to introduce to you the World Expo 2012 to be held in Yeosu, Korea, under the theme of “*The Living ocean and coast: Diversity of resources and sustainable activities*”. I am confident that the World Expo 2012 will raise common interests in the sustainable development of the ocean, and serve as valuable opportunities to strengthen cooperation among the North Pacific countries.

Lastly, I would like to extend my special thanks to all the staff of the PICES Secretariat and the Local Organizing Committee for their efforts and hard work to make this meeting a success. Thank you very much.

**OP Endnote 7**

**Remarks at the Opening Session by Dr. Lev N. Bocharov (Russian Federation)**

Dear Mr. Chairman, Dr. Tokio Wada, dear Mr. Lianzeng Chen, dear National Representatives, dear participants, ladies and gentlemen: First of all, I would like to thank our Chinese colleagues for the invitation to the beautiful city of Dalian. It is a perfect place for the Annual Meeting of PICES to be held! On behalf of the Russian delegation I would like to express my gratitude to the Local Organizing Committee and the PICES Secretariat for the great amount of work carried out to prepare for the meeting.

For the past 17 years since the moment the Organization was established, the scope of PICES activities has increased a lot. A large amount of work is being carried out between the Annual Meetings. Our relations with other international organizations and programs have greatly strengthened, and the cooperation with them is successfully developing. In the North Pacific region, one of our closest allies is the North Pacific Anadromous Fish Commission (NPAFC). In October 2007, the TINRO-Centre, on behalf of the Russian Federation Government, hosted the NPAFC Fifteenth Annual Meeting in Vladivostok. As an observer from the largest Organizations studying the Pacific Ocean, it was my honor to represent PICES at that meeting. A constantly increasing number of participants and observers from many organizations and programs, with an interest in the study and use of the world ocean, is a confirmation of growing interest in PICES around the world. Furthermore, the need to increasing the number of countries participating in PICES activities keeps getting stronger.

Once again, I would like to note that the Russian Federation has always paid great attention to the study of the world ocean, and PICES’ growing activities receive our regular support and are highly appreciated in our country. Further still, Russia stands for the development and perfection of PICES activities. We especially value the coordinating role of PICES in the realization of large integrative scientific programs, such as the Climate Change and Carrying Capacity (CCCC) Program and FUTURE.

Undoubtedly, lots of changes will occur in ocean science in general, and in fishery science in particular during the first half of this century. An ecosystem approach to the study of the ocean will be widely used for opening up new sea resources and developing mariculture by all the countries. PICES as a progressive scientific organization is ready to take a worthy place in this process.

To conclude my speech, I wish all the participants of the PICES Seventeenth Annual Meeting successful and fruitful work – a lot of problems have to be considered and a lot of important decisions have to be made. Thank you.



**OP Endnote 8****Remarks at the Opening Session by Dr. George Boehlert (U.S.A.)**

The United States and its PICES delegation are very pleased to participate in the Seventeenth Annual Meeting of PICES here in Dalian. We are fortunate to be able to visit this beautiful port city in northern China, and congratulate the People's Republic of China on a very successful 2008 Olympic Games.

The challenges facing our climate, our oceans, and our marine ecosystems require scientific research that transcends the capability of any one nation to undertake. These challenges, indeed, transcend our national boundaries. Yet the impacts of changes to earth systems affect us all. In the North Pacific, PICES has stimulated the cooperation to help fill this need in ocean science. The reach of PICES goes even further by collaborating with ICES (International Council for the Exploration of the Sea), IOC (Inter-governmental Oceanographic Commission of UNESCO), and other organizations, in preparing and convening such events as the recent Gijón symposium on "*Effects of climate change on the world's oceans.*"

In addition to the valuable contributions by PICES scientific committees, working groups, and other collaboration, the scientific programs are timely and provide cutting-edge science. The new synthesis from the Climate Change and Carrying Capacity (CCCC) Program – "*Climate variability and ecosystem impacts on the North Pacific: A basin-scale synthesis*" has recently been published. At this meeting, we will move forward with studying the implementation plan for FUTURE, a new PICES integrative science program, and address new scientific challenges.

At this Seventeenth Annual Meeting of PICES, we will see the full development plans for FUTURE, as well as other new initiatives. New approaches for exchange of scientific information through marine science libraries will be discussed. The Study Group on *Communications* will deliberate on how PICES may better communicate important scientific matters to managers and citizens alike. It is exciting for all of us to be part of the growth and evolution of PICES.

Finally, new uses of the marine environment continue to emerge. Offshore aquaculture is under development in many parts of the world ocean. Many nations are planning for development of renewable marine energy sources from waves, tides, or currents. Each of these new uses will require scientific study, and PICES will continue to serve as a forum to develop new scientific cooperation.

The U.S. delegation looks forward to this meeting and the advances it will bring. We thank the People's Republic of China, the city of Dalian, and the State Oceanic Administration for hosting this meeting and also look forward to learning more about Dalian.

**OP Endnote 9****Remarks at the Opening Session by Dr. Zhanhai Zhang (People's Republic of China)**

Respected Mr. Chairman, Deputy Administrator Mr. Lianzeng Chen, Mayor Deren Xia, honourable guests, ladies and gentlemen: Autumn is the season of harvesting. The Seventeenth Annual Meeting of PICES is successfully opened in Dalian, which provides us a great opportunity to share new information and products, learn from each other and explore new cooperation fields. Please allow me, on behalf of the Department of International Cooperation of the State Oceanic Administration (SOA), and the Chinese delegation, to extend our warmest welcome to all the participants, and express our sincere thanks to the senior officials for your involvement!

Since its establishment in 1992, with the joint efforts from all the Contracting Parties, PICES has developed as an important inter-governmental marine scientific organization in the North Pacific, playing an vital role in the fields of enhancement of marine scientific research and improvement of coordination among the Contracting Parties. Meanwhile, PICES has also initiated large-scale international scientific programs, and implemented a

series of scientific activities accordingly. Through the implementation of these programs and activities, the research capacity of the Contracting Parties has been enhanced in basic marine science, ocean and climate change, marine ecological environment conservation and sustainable use of marine resources. The relationships among the Contracting Parties have been strengthened, and achievement has been made to help people to understand the ocean, utilize the ocean and save the ocean.

In 2005, PICES initiated a new program named “*Forecasting and Understanding Trends and Responses of North Pacific Marine Ecosystems*” (FUTURE). As an integrative large-scale scientific program, FUTURE aims to help understand how marine ecosystems in the North Pacific respond to climate change and human activities, to forecast ecosystem status based on a contemporary understanding of how nature functions, and to communicate new insights to its members, governments, stakeholders and the public. I believe, with the collective support and efforts from relevant governments, research institutions and scientists, we will make great progress on this program.

Since its involvement in PICES, China has put a lot of emphasis on, and took very active part in PICES activities, and at the same time, shouldered the responsibility and made contributions to the development together with other Contracting Parties. In the future, China will continue to support PICES by encouraging more involvement and cooperation. We also hope that through the implementation of FUTURE, we can achieve a better understanding of the responding mechanism of the marine ecosystem in the North Pacific to climate change and human activities, improve the capacity of forecasting and understanding the trends and development of marine ecosystem in the North Pacific, and help to adapt to climate change and make sustainable utilization of the marine ecosystem.

I am very glad that the Seventeenth Annual Meeting of PICES is held in Dalian, with more than 400 scientists from the U.S., Russia, Canada, Japan, Korea, China, as well as other non-PICES member countries. The theme of the meeting is “*Beyond observation to achieving understanding and forecasting in a changing North Pacific: Forward to the FUTURE*”. In the forthcoming week, all the scientists will share information and new scientific output in the following sub-topics: species succession and long-term data set analysis pertaining to harmful algal blooms, ecosystem-based fisheries management, mariculture technology and husbandry for alternate and developing culture species, coastal upwelling processes and their ecological effects, marine system forecast models, consequences of non-indigenous species introductions, and connecting the human and natural dimension of marine ecosystems and marine management in the PICES context, *etc.*

We hope that the meeting would be a wonderful gathering for people to share new products in marine scientific research, marine technology and ocean management, and a free platform for people to explore new fields, generate new ideas, formulate new proposals and implement new projects. We also hope that all the participants could open a dialogue to contribute to further development of marine scientific research and sustainable development of an economic society in the North Pacific.

Finally, I wish the meeting great success! I wish all of you a pleasant stay in Dalian! Thank you.

#### **OP Endnote 10**

##### **Welcome address by Dr. Tokio Wada (Chairman of PICES)**

Mr. Lianzeng Chen, Mr. Deren Xia, distinguished delegates, guests, ladies and gentlemen: Welcome to the Seventeenth Annual Meeting of PICES. On behalf of the entire PICES community, I would like to express our hearty thanks to the Government of the People’s Republic of China, to the Dalian Municipal Government, and to the Local Organizing Committee for their hospitality and hard work in organizing this Annual Meeting.

Since 2004, PICES has been developing a new integrative scientific program called FUTURE, an acronym for “*Forecasting and Understanding of Trends, Uncertainty and Responses of North Pacific Marine Ecosystems*”. Its Science Plan was adopted by the Governing Council at the last Annual Meeting in Victoria, Canada. We

will discuss the Implementation Plan at this Annual Meeting, with a view toward initiating the program from next year.

As you know, FUTURE is a successor to the PICES-GLOBEC Climate Change and Carrying Capacity (CCCC) Program, our first integrative science program. The understanding of responses of North Pacific marine ecosystems to climate change is still a key issue of FUTURE. Therefore, its success will depend on the scientific legacies of the CCCC Program. On the other hand, FUTURE has some new aspects. It will evaluate the human dimensions of ecosystem dynamics, and it will improve the communication of scientific results to policymakers and stakeholders. These are based on the requests from the Contracting Parties and a necessity of PICES itself. From this point of view, we could say that FUTURE is the first PICES-oriented integrative science program.

At the beginning of October, this year's recipients of the Nobel Prize for physics and chemistry were announced. Their prize-winning results were achieved more than 40 years ago, when they were early career scientists. The successive studies for several decades by many other scientists evaluated the validity of those findings. This clearly shows that scientific breakthroughs can be achieved by the flexible thinking of young scientists. The succession of scientific legacy through passing generations is important for scientific seeds to blossom out into fruitful results. I sincerely hope that many young scientists will join in the implementation of FUTURE and open the frontiers of North Pacific marine science.

At this Annual Meeting, we have many interesting sessions under its overall theme, "*Beyond observations to achieving understanding and forecasting in changing North Pacific: Forward to the FUTURE*". Various environmental issues, including ecosystem-based aquaculture technique, are appropriate topics to be discussed in this meeting held in China, a leading country of studies in ocean environment and aquaculture science in the world.

This Annual Meeting will also be a turning point in the administration of PICES. Since the Fifteenth Annual Meeting, we have been discussing ways to collaborate with non-member countries and other organizations. Now, it is nearing the time to make some decision.

In recognition of the recent severe financial and economic situation, we must find a way to adjust our activities to fit within what can be allowed by the financial condition of all our Contracting Parties and the Organization. The Annual Meeting is also not an exception. At this Annual Meeting, I am hoping to discuss the restructuring of PICES Annual Meetings to lessen the financial burden on Contracting Parties and PICES.

Finally, I expect that this meeting will achieve many fruitful results not only in science, but also in administration, and will be a memorable one in the history of PICES. Thank you very much.

## **OP Endnote 11**

### **Science Board citation for 2008 Wooster Award**

In 2000, PICES established an award in honor of Dr. Warren S. Wooster, the principal founder and first Chairman of PICES, and world renowned researcher and statesman in the area of climate variability and fisheries production. The award is to be given annually to an individual who has made significant scientific contributions to North Pacific marine science; has achieved sustained excellence in research, teaching, administration or a combination of these in the area of the North Pacific; has worked to integrate the various disciplines of the marine sciences; and preferably someone who is, or has been, active in PICES.

Prior recipients of the Wooster Award were Michael Mullin (2001), Yutaka Nagata (2002), William Percy (2003), Paul LeBlond (2004), Daniel Ware (2005), Makoto Kashiwai (2006) and Kenneth Denman (2007). Today, it gives me great pleasure to announce that the Wooster Award for 2008 is given to Dr. Charles Miller, a nationally and internationally distinguished biological oceanographer specializing in studies of zooplankton.

Dr. Charles Miller, Charlie to most of his colleagues, grew up far from the ocean, in Minnesota, and did his undergraduate studies at Carleton College in Northfield, Minnesota, where he graduated with a stellar academic record. Charlie did not follow his father into medicine; instead, his interests tended to marine biology and biological oceanography, stimulated perhaps by a summer course taught by Joel Hedgepeth at a marine station. Charlie enrolled in a Ph.D. program at Scripps Institution of Oceanography, where he was a student of John McGowan. At Scripps, Charlie was exposed to the multidisciplinary ecosystem work of the CalCOFI program. Other influential mentors while at Scripps were Abe Fleminger, Ed Fager, and Reuben Lasker.

After receiving his Ph.D., Charlie spent a year in New Zealand as a National Science Foundation (NSF) fellow. In 1970, Charlie obtained an Assistant Professor position at Oregon State University (OSU) and landed in an office that he continues to occupy daily as an emeritus professor of Oceanography. His early career at OSU was marked by research on the early life history of plankton and fish in the Oregon coastal upwelling region; this work was collaborative with OSU faculty members Bill Percy (the 2003 Wooster Award recipient) and Jeff Gonor, and provided research opportunities and training for postdocs and technicians like Sally Richardson and Bill Peterson and training for several students. Key papers that came out of this work included descriptions of zooplankton community structure off Oregon and recognition of the strong seasonality in zooplankton species composition caused by north–south reversals of currents.

To understand the ecology of marine zooplankton, Charlie believes there is no substitute for observing their morphology, behavior and ecology. His observations of zooplankton led to descriptions of how copepod teeth were formed using silica, and how these patterns could inform development stage and the molting cycle of copepods. He also used more traditional incubation-based methods to quantify development rates and describe growth rules in copepods (work done collaboratively with his Ph.D. student, Ken Johnson). Also important are Charlie's studies of the phenology and life history of several dominant subarctic oceanic copepods and chaetognaths, done with several collaborators and students, and his investigations describing copepod sex determination and mating behavior.

Charlie and Bruce Frost of the University of Washington realized in the late 1970s that the Canadian Ocean Weathership program that had been ongoing at Station PAPA in the eastern subarctic Pacific was nearing an end, as the primary functions of weather data observations from the weathership were being replaced by satellite observations. With funding from the National Science Foundation and the cooperation of the Canadian Coast Guard and Institute of Ocean Sciences, Charlie initiated frequent (*ca.* weekly) net-plankton sampling at PAPA, that provided a one and one-half year time series of depth-stratified samples to 2000 meters. At the time, and perhaps to this day, that sample set is still the best long-term, vertically resolved time series for describing the population dynamics and phenology of oceanic Pacific zooplankton.

The results from the weathership sampling sowed the seeds for future big-program interdisciplinary ocean research to understand the spring–summertime dynamics of the planktonic ecosystem of the eastern subarctic Pacific. Project SUPER was a large, multidisciplinary group of scientists (including Pat Wheeler, Mike Dagg, Mike Landry, Suzanne Strom, Bruce Frost, Nick Welshmeyer, Hal Batchelder, Dave Mackas and the 2007 Wooster Award recipient, Ken Denman). The SUPER synthesis, which attributes the lack of spring blooms to both grazers and iron limitation, remains the right way to see the functioning of iron-limited HNLC systems. It was at this time that Charlie described and named *Neocalanus flemingeri*, and wrote the early papers about the life history of this important North Pacific copepod.

Charlie's research on zooplankton and pelagic ecology in the oceanic subarctic Pacific spans more than 40 years—beginning with graduate student cruises at Scripps in the summer of 1964, his sampling at Station PAPA in the early 1970s and later from the weatherships and during SUPER, and continuing with his intellectual leadership in the OECOS program. Charlie's research extends to the North Atlantic also, especially for *Calanus finmarchicus*, but that is a tale for another time. Charlie has published more than 60 scientific papers, half of these as senior author, and 9 of these as sole author. He also authored a widely used text book on biological oceanography.

Charlie has provided extensive service at national and international levels. Within the U.S., he has served on NSF review panels, the Exxon Valdez Oil Spill Scientific and Technical Advisory Committee, and for six years—two years as Chair—on the UNOLS Advisory Council. UNOLS is the organization that provides short- and long-term planning of the U.S. oceanographic research fleet.

Internationally, Charlie has contributed to ICES Working Groups and PICES activities. Since 2000, Charlie has chaired the PICES CPR Advisory Panel. Through his leadership, along with that of Sonia Batten, Dave Welch and others, PICES has established a North Pacific CPR survey. Charlie and Tom Ikeda organized the first OECOS (Oceanic Ecodynamics Comparison in the Subarctic Pacific) workshop, and Charlie continues as Co-Chair of OECOS.

Charlie has served on the editorial boards of *Limnology and Oceanography*, *Plankton Biology and Ecology* of the Plankton Society of Japan, and *Progress in Oceanography*. He served as Co-Editor-in-Chief of *Progress in Oceanography* from 2003–2006.

Charlie Miller mentored and advised (as major professor) ten Master's degree students and five Ph.D. students at Oregon State University, and served on the committees of countless other oceanography students. Charlie has, without doubt, positively influenced most biological oceanography students who have passed through Oregon State University in the past 30-plus years.

Honors bestowed upon Charlie include being a fellow of the American Association for the Advancement of Science, receiving the best presentation award at the 1997 ICES Annual Science Conference, and receiving the Excellence in Mentoring Award (2001) and Excellence in Teaching Award (2003) from the College of Oceanic and Atmospheric Sciences at Oregon State University. At the PICES co-sponsored Third International Zooplankton Production Symposium in Gijón, Spain in 2003, Charlie provided the closing remarks about exciting new developments and progress being achieved in the field of zooplankton ecology. He was chosen for this honor due to his expertise in the field, but perhaps also, to his longevity in the field.

Even though retired, Charlie is intellectually challenging to those around him and full of creative energy. For the past 5 to 10 years, Charlie has been socially proactive within his local community in Oregon. He has organized community forums to inform the general public about pressing social issues—including, but not limited to, forums on health care issues, global warming and associated social changes, energy alternatives to oil, and war and peace issues.

In summary, Charlie is a teacher, mentor and good citizen of planet Earth. Charlie's ability to identify big scientific issues, formulate plans and assemble scientific teams, and to carry the research through to synthesis and publication has clearly increased understanding of subarctic ecosystems and zooplankton phenology. He has contributed greatly to the goal of national and international cooperation and collaboration on North Pacific ocean research in general, and through PICES, specifically. He is extremely qualified for, and a worthy recipient of, the Warren Wooster Award of PICES, and we are pleased to honor him today with this award.

Please join me in a round of applause for Professor Charlie Miller, the 2008 recipient of the Warren Wooster Award.

OP Endnote 12

Science Board citation for 2008 PICES Ocean Monitoring Service Award

Significant advances in marine science are often based on ocean observations. Long-term observations are particularly important for detecting and understanding ecosystem change because major shifts in ecosystem structure and function occur over long temporal periods. It is widely recognized that these fundamental activities often lack the glamour and respect that typically accompanies other types of scientific achievement even though these other achievements rely on monitoring and observation. It is unfortunate that monitoring activities are often taken for granted and are frequently targeted for budget cuts when countries experience financial constraints or hardships.

With this in mind, PICES recently established a new award to recognize the sustained accomplishments of those engaged in monitoring data management, and communication. The PICES Ocean Monitoring Service Award (POMA) was established to recognize organizations, groups and outstanding individuals that have contributed significantly to the advancement of marine science in the North Pacific through long-term ocean monitoring and data management and communication.

In January of this year, PICES announced the award and solicited nominations for the very first POMA. The nominations were considered in April and the Science Board was unanimous in their decision. It is my pleasure to announce that the training ship T/S *Oshoro-maru* of Hokkaido University is the first recipient of the PICES Ocean Monitoring Service Award.

The first *Oshoro-maru* was built in 1909. The 31-meter wooden topsail schooner equipped with a 63 horsepower engine was modeled after those vessels used in the Gloucester cod fishery. It was named for a bay on Hokkaido, Japan. The bay, then an important fishing ground for Pacific herring, was the ship's first home port. In 1927, *Oshoro-maru I* was replaced by *Oshoro-maru II*, a 42-m steel barkentine with a 500 horsepower diesel engine. In 1955, the faculty of Hokkaido University greatly expanded their mission both geographically and thematically, adding meteorological observation, seawater analysis, plankton and larval fish collections, dredging and sea surface temperature measurement. In 1955, the ship made her first foreign port call during a North Pacific cruise to Seattle. This was the first visit by a Japanese government ship to the U.S. since the end of the World War II. One of the prominent scientific accomplishments of *Oshoro-maru II* was Professor Naoichi Inoue's "marine snow" research in 1952 conducted from the submersible "Kuroshio" for which *Oshoro maru II* served as the mother ship.

In 1962, *Oshoro-maru III*, a 67-m stern trawler with 2000 horsepower engine, was launched. She continued the important contributions made by the faculty of Hokkaido University by increasing monitoring activities in the North Pacific and the Bering Sea. This led to an increase in the degree of international collaboration. Since 1962, more than 100 scientists from outside of Japan have participated on her cruises.

*Oshoro-maru IV*, the current vessel, began her tenure in 1984. She is a 73-m stern trawler equipped with 3,200 horse power engine. She has 13 officers and 27 crew and the capacity for 6 researchers and 60 students. *Oshoro-maru II, III and IV* have made more than 90 port calls to nearly 20 ports on her North Pacific cruises, while primarily conducting research in the Bering Sea and North Pacific Ocean. The sampling includes physical, chemical and biological oceanography as well as fisheries. The data from the North Pacific cruises have been published annually since 1957 in the Faculty of Fisheries "*Data Record of Oceanographic Observations and Exploratory Fishing*" and are now available on a CD published by the Japan Oceanographic Data Center. Data from experimental fishing and other associated biological sampling are being organized in a new database that will soon be publicly available. This will contribute to our ability to understand the response of North Pacific marine ecosystems to climate change.

The observations made aboard *Oshoro-maru* have contributed to the rapid progress of marine scientific research in the region. The annual summer cruises since 1955 have allowed long-term ecosystem observations, and have advanced cooperative research among PICES countries. Through the T/S *Oshoro*

*maru*, members of the Faculty of Fisheries, Hokkaido University have actively promoted cooperative investigations among universities and research institutes of PICES countries, such as the University of Alaska, University of Washington, University of Hawaii, Oregon State University, University of British Columbia, NOAA – Alaska Fisheries Science Center, and Institute of Ocean Sciences of Fisheries and Oceans Canada, as examples. More than 250 scientific papers have been published using the data collected during *Oshoro-maru* cruises.

The almost 50 years of hydrographic, nutrient, zooplankton, and chlorophyll data of Hokkaido University are invaluable for addressing current scientific problems of the North Pacific Ocean. The Faculty of Fisheries showed great foresight in establishing their vessel as one of the principle sampling tools of the North Pacific Ocean. They have generously shared their ship time and observations with the international community and today we recognize and reward their accomplishments.

### OP Endnote 13

***“Wave-tide-circulation coupled model: To improve the forecasting ability for FUTURE”***

Abstract of the keynote lecture by Dr. Fangli Qiao

(First Institute of Oceanography, State Oceanic Administration, People’s Republic of China)

As mixing is essentially an energy balance problem, surface waves should play a controlling role in the upper ocean as they are the most energetic motions. Unfortunately, in most ocean dynamics studies, wave motions have always been treated separately from the ocean circulation. So most ocean circulation models have overlooked the role of the surface waves, or just considered wave breaking effects. Consequently, these models have produced insufficient vertical mixing and this resulted in an under-prediction of the mixed layer depth and an over-prediction of the sea surface temperature, particularly during the summer season. As the ocean surface layer determines the lower boundary conditions of the atmosphere, this deficiency has severely limited the performance of the coupled ocean–atmospheric models and hence climate studies. To overcome this shortcoming, we have established a new theory on the wave-induced vertical mixing that will correct this systematic error due to insufficient mixing. This wave-induced vertical mixing is due to Stokes drift rather than wave breaking. Our studies indicate that the wave-induced mixing penetration depth can reach nearly 100m in high latitudes and about 30m in tropical areas. The new scheme has enabled the mixing layer to deepen, and shows an excellent agreement with observed climatologic data. Different OGCMs such as POM, ROMS and HIM show similar improvements, and this surface wave correction can alleviate the too-cold tongue in the tropical area of CCSM3 which is a common problem for all climate models without flux correction. In shallow coastal waters, tidal current-induced vertical mixing is very important for the formation of temperature fronts. So a wave-tide-circulation coupled model has been set up. This new generation ocean circulation model can improve the forecasting ability of temperature, salinity and currents.

