

REPORT OF PHYSICAL OCEANOGRAPHY AND CLIMATE COMMITTEE



The meeting of the Physical Oceanography and Climate Committee (hereafter POC) was held from 16:00–18:15 hours on October 18, 2006. The Chairman, Dr. Michael G. Foreman, called the meeting to order and welcomed members and observers (*POC Endnote 1*). Dr. Steven J. Bograd served as the rapporteur. The Chairman introduced Dr. Nathan Mantua (U.S.A.) as a new member of the Committee and thanked Dr. Stephen C. Riser (U.S.A.) for his past service. The draft agenda was adopted (*POC Endnote 2*).

Completion of PICES XIV decisions (Agenda Item 4)

The POC Contributed Paper Session proposed for PICES XV was approved by Science Board and held on October 17. Dr. Foreman gave a brief summary of the session. There were 19 presentations and 23 posters. A full report has been submitted to the PICES Secretariat and is included in the *Session Summaries* chapter of this Annual Report.

The POC/MONITOR/CCCC Topic Session on “*Synchronous and asynchronous responses of the North Pacific boundary current systems to climate variability*” was also approved by Science Board and will be held on October 20. (The summary of this session can be also found in the *Session Summaries* chapter of this Annual Report.)

The symposium titled “*Time series of the Northeast Pacific: A symposium to mark the 50th anniversary of Line-P*” was held in July 2006, in Victoria, Canada. A special issue of *Progress in Oceanography* is being prepared from papers presented at the symposium.

The CREAMS/PICES workshop on “*Model/data inter-comparison for the Japan/East Sea*” and the first PICES summer school on “*Ocean*

circulation and ecosystem modeling” were both approved by Science Board and held successfully in August 2006, in Busan, Korea. More details are provided in the report of the Advisory Panel for a CREAMS/PICES Program in East Asian Marginal Seas (CREAMS-AP) under Agenda Item 5b.

The Early Career Scientists Conference (organized with ICES) entitled “*New frontiers in marine science*” was approved by Science Board and is scheduled for June 26–29, 2007, in Baltimore, U.S.A.

The ICES/PICES/IOC Symposium “*Effects of climate change on the world’s oceans*” was approved by Science Board and will be held May 19–23, 2008, in Gijón, Spain, with Luis Valdés, John Church, and William Peterson as convenors.

Progress report of the Section on Carbon and climate (Agenda Item 5a)

Dr. James Christian, Co-Chairman of the Section, reported that a productive 2-day meeting was held October 14–15, 2006. Several scientific presentations were given, and discussions on issues regarding data sharing and steps to getting a data synthesis process in motion to develop a North Pacific carbon database were carried out. A proposal to convene a Topic Session at PICES XVI in Victoria will be put forward to Science Board. Details can be found in the CC-S chapter of the Annual Report.

Progress report of CREAMS/PICES Advisory Panel (Agenda Item 5b)

This report was presented by Drs. Yasunori Sakurai, Co-Chairman of the Panel, and Kyung-II Chang, organizer of the CREAMS/PICES workshop and summer school. The Panel met

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twice during 2006. The first meeting was convened on April 11–12, in Seoul, Korea, hosted by the Research Institute of Oceanography of the Seoul National University. The second meeting was held on October 15 at PICES XV, in Yokohama, Japan. The details can be found in the CREAMS-AP chapter of this Annual Report.

A very successful workshop and a summer school were held August 21–25, 2006, in Busan, Korea. The workshop on “*Model-data inter-comparison for the Japan/East Sea*” included 24 presentations in separate sessions on *Observations, Model/data comparisons, Nowcast/Forecast systems, and Ecosystem modeling*. The workshop proceedings are available on a CD-ROM, and negotiations are underway to publish papers arising from the workshop in a special issue of *Journal of Marine Systems*. A positive response has been received from the Chief Editor, and a proposal is being prepared. This publication is planned for the summer of 2007, and will include approximately 17 papers.

The theme of the summer school was “*Ocean circulation and ecosystem modeling*”, and there were 7 lecturers. Forty-seven applications were received but space restrictions allowed the selection of only 37 participants. They were from all six PICES member countries plus Chile and Indonesia, and mostly graduate students. Tutorials were also given along with the lectures. Future summer schools are planned, but to avoid conflict with the ICES/PICES Early Career Scientists Conference in 2007, the next school will not be until 2008.

Progress report of North Pacific Data Buoy Advisory Panel (Agenda Item 5c)

A Power Point presentation was prepared by the Panel Technical Coordinator, Mr. Bruce Lohnes, and a summary was presented by Dr. Foreman. As this Advisory Panel usually has their annual meeting at the same time as PICES, their annual report is often a year out of date. For the POC meeting presentation, Dr. Foreman retrieved more up-to-date material online. Given the web availability of this data and problems associated

with receiving an accurate report, Dr. Foreman asked the Committee whether POC needs to keep getting this report each year. Dr. Foreman thinks it is no longer necessary, and no other opinions were offered by the Committee. Consequently a recommendation will be made to Science Board that POC no longer requests this report. The Chairman will also inquire what this means for the status of the Advisory Panel.

Progress report of WG20 on “Evaluations of climate change projections” (Agenda Item 5d)

Dr. Foreman reported that the proposed Terms of Reference for WG 20 were approved by Science Board and Governing Council and the membership was finalized. Drs. Foreman and Yasuhiro Yamanaka were named as Co-Chairmen. The first workshop for the group was held October 14, 2006, in Yokohama. Approximately 40 people (10 WG 20 members and 28 observers representing all PICES member countries and several international organizations) attended, and there were 3 invited and 11 contributed presentations along with discussions of future plans and collaborations for the group. Dr. Foreman also participated in the CFAME workshop and business meeting on October 13 and 15, respectively, and the JSC/CLIVAR Working Group on Coupled Modelling held in September 2006, in Victoria, Canada.

Workshop discussions focused on collaborations with CFAME. Outcomes were:

- Drs. Arthur Miller, Emanuele Di Lorenzo and Enrique Curchitser, all WG 20 members, are to provide outputs from their high-resolution circulation models of the California Current System to Dr. Vera Agostini (CFAME) for her ecosystem model;
- Drs. Hiroyasu Hasumi and Yasuhiro Yamanaka, both WG 20 members, to work similarly on the Kuroshio/Oyashio region;
- Dr. Ig-Chan Pang, WG 20 member, to investigate both the feasibility of using climate forcing for his high-resolution circulation model of the Yellow and East Seas, and collaboration with Dr. Jai-Ho Oh,

another WG 20 member, specializing in high-resolution atmospheric climate models;

- Ensemble global climate model results to be computed for the Sea of Okhotsk and provided to Dr. Victor Lapko for understanding possible changes to that ecosystem;
- A joint WG 20/CFAME workshop to be proposed for PICES XVI, with Drs. Foreman and Jacquelynne R. King (CFAME) as convenors.

Potential collaboration with ESSAS (Ecosystem Studies of Sub-Arctic Seas) was also discussed. Dr. James E. Overland, POC member, is planning an ESSAS working group to compute an ensemble of climate projections for sub-Arctic regions including the Bering and Okhotsk Seas, so there is an obvious overlap with activities of WG 20. In June 2007, ESSAS will have a workshop in Hakodate, and it was recommended that travel support be requested for one WG 20 member (probably Dr. Muyin Wang) to attend. Collaboration with CLIVAR, financial support for WG 20 research, and FUTURE (the new PICES integrative science program) were also briefly discussed. The summary of the workshop can be found in the *Session Summaries* chapter of this Annual Report.

POC Action Plan (Agenda Item 6)

The Chairman reported that the POC Action Plan was approved by Science Board and suggested that it need not be reviewed or updated this year. The Committee agreed.

Next major PICES integrative scientific program (Agenda Item 7)

This item was moved to the end of the meeting as it was expected to consume as much time as was available (which is basically what happened).

The Chairman gave a brief summary of the history leading up to the present 2-page outline for this scientific proposal (FUTURE). He stated that POC will likely play a stronger role in FUTURE than it did in the CCCC Program.

Dr. Christian initiated a lengthy discussion expressing concern about the term “forecasting” in the acronym. He stated that no models are currently available to provide ocean circulation forecasts, and that we have to be careful not to promise something that cannot be delivered. Dr. Foreman stated that in terms of forecasting, what might be possible are seasonal-scale and climate-scale forecasting. Dr. Shin-ichi Ito said that the term “projection” is better than forecast, as that is what is employed in the climate modeling community. However that would destroy the acronym. Dr. Albert J. Hermann suggested that the difference in terminology is semantic. He also suggested that “forecasting” might be replaced with “speculating” to give the new acronym SUTURE. Dr. Bograd also expressed concern with “forecasting”. We still have a long way to go to understand mechanisms, so it is not clear that we are at the stage to be able to forecast or predict. It was concluded that the key to any forecast is the expression of the associated uncertainty, and this is something that must be made clear to users of any forecast.

In response to one of the questions directed toward each PICES Committee on FUTURE, a discussion then ensued on assigning priorities to each of the key research activities. This evolved into a re-writing exercise, the outcome of which is given in *POC Endnote 3*. As expected, issues related to POC capabilities were given higher priority.

In response to another question “What type of forecasts should we develop?”, the consensus seemed to be any type that we believe can be developed with confidence. However, it was stressed that along with each forecast, it is essential to quantify the uncertainty.

With regard to a third question on “How to broaden the communication of PICES science?”, the final conclusion seemed to be that the emphasis by POC should be on communicating our science within the PICES community (BIO, FIS, *etc.*), who are closer to the policy makers and managers than us. The first requirement is to have them understand our science and the caveats that come with our products.

Planning PICES XVI (Agenda Item 8)

POC approved the following scientific sessions for PICES XVI:

- a 1-day joint POC/CCCC/MONITOR Topic Session on “*Operational forecasts of oceans and ecosystems*” proposed by Dr. Ito (*POC Endnote 4*);
- a 1-day joint BIO/POC Topic Session on “*Decadal changes in carbon biogeochemistry in the North Pacific.*” proposed by the Section on *Carbon and climate (CC-S Endnote 3)*;
- a ½- or 1-day BIO/FIS/POC Topic Session on “*Phenology and climate change in the North Pacific: Implications of variability in the timing of zooplankton production to fish, seabirds, marine mammals and fisheries (humans)*”, proposed by MBM-AP (*BIO Endnote 3b*);
- a 1-day POC Contributed Paper Session to be convened by Drs. Foreman and Ichiro Yasuda; it was indicated that this session does not require invited speakers.

The Committee also approved the request for a joint POC/CCCC (WG 20/CFAME) workshop (*CFAME Endnote 4*) tentatively entitled “*Climate scenarios for ecosystem modeling*”, to be held at PICES XVI, with Drs. King and Foreman as convenors. There will be no invited speakers for this workshop.

Possible invited speakers for the Science Board Symposium at PICES XVI were briefly discussed, and only one name was put forward, Dr. Nathan Mantua. However, as he is a POC member and works in nearby Seattle, he may not need travel support.

PICES XVII theme (Agenda Item 9)

The theme suggested by China for PICES XVII, “*Beyond observation of the North Pacific Environment: Rebuilt, Nowcast, Forecast*” was briefly discussed. It was pointed out that it was perhaps too close to the POC/CCCC/MONITOR Topic Session proposed by Dr. Ito. Science Board will decide if changes are needed.

Relations with international programs and organizations (Agenda Item 10)

Dr. Vyacheslav Lobanov was not available to present a report on the status of the GOOS and NEAR-GOOS projects.

As mentioned in Agenda Item 5d, collaboration with ESSAS was encouraged, and a proposal to send a WG 20 member to the June 2007 ESSAS workshop will be made to Science Board.

Proposals with financial implications (Agenda Item 11)

Proposed inter-sessional meetings for 2007 and beyond:

- Logistical support for the April 2007 CREAMS-AP meeting to be held in Qingdao, China (suggested by Dr. Yury I. Zuenko).

Proposed publications for 2007 and beyond:

- “*Guide to best practices for oceanic CO₂ measurements and data reporting*” to be published in 2007 as a PICES Scientific Report (funds for this publication have already been allocated);
- Collection of papers from the August 2006 CREAMS/PICES workshop to be published in 2007 as a special issue of *Journal of Marine Systems*.

Travel support requests:

Travel support is requested for:

- 1 invited speaker for the POC/CCCC/MONITOR Topic Session (*POC Endnote 4*);
- 1 invited speaker for the BIO/POC Topic Session (*CC-S Endnote 3*);
- 1 invited speaker, with costs to be shared with BIO and FIS, for the BIO/FIS/POC Topic Session (*BIO Endnote 3b*);
- 1 WG 20 member to attend the June 2007 ESSAS workshop in Hakodate, Japan.

The first two requests have higher priority.

POC Best Presentation and Best Poster Award (Agenda Item 12)

Drs. Lobanov, Yasuda, and Foreman acted as judges for the POC Best Presentation Award to be given to an early career scientist presenting in the POC Contributed Paper Session or the POC/MONITOR/CCCC Topic Session S10. The winner was Ye Yuan (China) for his paper in the POC Contributed Paper Session on “*Estimating suspended sediment concentration using ADCP, LISST-100, and OBS in Jiaozhou Bay and Laizhou Bay, China*”.

Drs. Ito, Bograd, and Zuenko acted as judges for the POC Best Poster Award (which is no longer restricted to young presenters). The winner was Jong Jin Park (Korea) for his poster in the POC

Contributed Paper Session on “*Kinetic energy flux of inertial frequency motion out of the mixed layer and its balance with wind energy input in the global scale ocean*”.

Other business (Agenda Item 13)

No other business was raised.

Adoption of report and recommendations to Science Board (Agenda Item 14)

The preceding report has been circulated and approved by all committee members. All recommendations to Science Board were brought forward by Dr. Foreman at their meeting on October 21, 2006.

POC Endnote 1

Participation list

Members

Steven J. Bograd (U.S.A.)
 Kyung-Il Chang (Korea)
 James Christian (Canada)
 Michael G. Foreman (Canada, Chairman)
 Shin-ichi Ito (Japan)
 Hee-Dong Jeong (Korea)
 Young-Gyu Park (Korea)
 Elena Ustinova (Russia)
 Muyin Wang (U.S.A., alternate for J. Overland)
 Ichiro Yasuda (Japan, Co-Chairman)
 Yury I. Zuenko (Russia)

Observers

Albert J. Hermann (U.S.A.)
 Mingkui Li (China)
 Victor Kuzin (Russia)
 Vadim Navrotsky (Russia)
 Ig-Chan Pang (Korea)
 Gongke Tan (China)
 Yasuhiro Yamanaka (Japan)
 Fei Yu (China)

POC Endnote 2

POC meeting agenda

1. Welcome, introductions, opening remarks
2. Adoption of agenda
3. Introduction of new members
4. Completion of PICES XIV decisions:
 - a. POC Paper Session at PICES XV
 - b. POC/MONITOR/CCCC Topic Session at PICES XV
 - c. 2006 Line-P Symposium
 - d. 2006 CREAMS/PICES Workshop on “*Model/data inter-comparison for the Japan/East Sea*” and PICES Summer School on “*Ocean circulation and ecosystem modeling*”
- e. 2007 Conference for Early Career Scientists on “*New frontiers in marine science*”
- f. 2008 ICES/PICES/IOC Symposium, on “*Effects of climate change on the world’s oceans*”
5. Progress reports of existing subsidiary bodies:
 - a. Section on *Carbon and climate*

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- b. CREAMS/PICES Advisory Panel
- c. North Pacific Data Buoy Advisory Panel
- d. WG 20 on *Evaluations of climate change projections*
6. POC Action Plan
7. Next major PICES integrative scientific program (FUTURE): Roles for POC and respective member countries
8. Planning PICES XVI (Victoria, Canada)
9. PICES XVII (Dalian, China) theme
10. Relation with other international programs and organizations
11. Items with financial implication:
 - a. Proposed inter-sessional meetings for 2007 and beyond
 - b. Proposed publications for 2007 and beyond
 - c. Travel support requests
 - d. Other items
12. 2006 POC Best Presentation and Best Poster Awards
13. Other business
14. Adoption of POC report and recommendations to Science Board

POC Endnote 3

Suggestions from POC concerning the range of Key Research Activities described in FUTURE

The following are recommendations from POC for re-ordering and rewording of the Key Research Activities that are currently described in the FUTURE prospectus:

- investigate mechanisms underlying ecosystem response to change;
- develop integrated models to forecast ecosystem change scenarios and to provide estimates of the uncertainties associated with those forecasts;
- provide advice on the implementation of ocean observing systems;
- investigate climate change and develop human impact scenarios;
- develop integration and visualization tools to communicate ecosystem knowledge and complexity;
- develop data management protocols to support this research;
- develop indicators of ecosystem status and condition to meet conservation and management objectives;
- assess and communicate uncertainty and its implications to managers, communities dependent on the ocean, and the general public.

POC Endnote 4

Proposal for a 1-day POC/CCCC/MONITOR Topic Session at PICES XVI on “Operational forecasts of oceans and ecosystems”

Numerical models of ocean dynamics are becoming increasingly sophisticated and are now used to forecast future ocean states. The forecasts vary in geographic scale from local embayments to the global ocean, and on temporal scales, from one day to several years. Improvements in ocean forecasting will contribute directly to forecasts of fisheries where the linkages between ocean dynamics, fish migration, and fishery ground formation are understood. Likewise, lower trophic level (LTL) ecosystem models have been coupled to numerical models of ocean circulation and tested at many sites. LTL models can now anticipate

the production of planktonic prey and biomass when the state of the ocean is captured accurately by ocean circulation models. Moreover, fish growth and recruitment models are starting to be coupled to LTL ecosystem models. The growing interest in ecosystem-based management, and the need to develop a management/decision policy will no doubt rely upon forecasts from coupled physical-ecosystem models. To fully realize the potential of model-based products for ecosystem-based management, a relatively high predictability of ocean structures is essential. This session will review the current status of operational ocean

prediction models, discuss the ability of physical models to forecast ecosystem state and clarify the approaches needed for future studies and improvements. Ideally, we seek papers describing operational forecasts of oceans and/or ecosystem-state and, more importantly, evaluations of their performance. Operational

forecasts can be based on numerical or statistical models, and comparisons of these two approaches are welcome.

Recommended convenors: Michael G. Foreman (Canada), Shin-ichi Ito (Japan), Skip McKinnell (PICES) and Francisco E. Werner (U.S.A.).

