

REPORT OF BIOLOGICAL OCEANOGRAPHY COMMITTEE



The Biological Oceanography Committee (hereafter BIO) met from 16:00–18:30 hours on October 18, 2006. The Chairman, Dr. Michael J. Dagg, called the meeting to order and welcomed the participants (*BIO Endnote 1*). Dr. Sinjae Yoo served as rapporteur. The proposed agenda was reviewed and approved without additions (*BIO Endnote 2*).

Progress reports of existing subsidiary bodies (Agenda Item 3)

The full progress reports of all subsidiary bodies are included elsewhere in this Annual Report. Brief summaries are as follows:

Advisory Panel on Micronekton sampling inter-calibration experiment (MIE-AP)

A presentation was given by Dr. Evgeny A. Pakhomov, Co-Chairman of MIE-AP. He reviewed the results and data processing from the two inter-calibration cruises (MIE-1 and MIE-2) organized by the Panel in 2004 and 2005, and plans for the MIE-3 experiment. The report on the PICES XV MIE-AP workshop (W9) can be found in the *Session Summaries* chapter of this Annual Report. MIE-AP proposed a workshop on “*Lessons learned during MIE-1 and MIE-2: Reconciling acoustics and trawl data*”, to be held next year at PICES XVI (*MIE-AP Endnote 3*). Convenors will be Drs. Pakhomov and Orio Yamamura. The Committee supported this proposal, but it was undecided if the workshop will be a ½- or ¾-day event.

Advisory Panel on Marine birds and mammals (MBM-AP)

A presentation was given by Dr. Hidehiro Kato, Co-Chairman of MBM-AP. He focused on the results of the PICES XV MBM-AP workshop (W8) on “*Responses of marine mammals and seabirds to large-scale and long-term climate*

change: Mechanisms of environmental forcing” (co-sponsored by BIO, POC and Center of Excellence of Hokkaido University). The brief report of this workshop can be found in the *Session Summaries* chapter of this Annual Report. Another main activity of the group is a joint CPR-AP/MBM-AP monitoring project using ships of opportunity.

MBM-AP proposed a ½-day Topic Session at PICES XVI (to be co-sponsored by BIO, FIS and POC) 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)*” (*BIO Endnote 3b*). This was discussed in more detail under Agenda Item 5.

MBM-AP has continuing concern about lack of membership from all PICES member countries and requested PICES to communicate this concern to Canada, China and Korea.

The Committee was informed that MBM-AP was proposing to modify its Terms of Reference slightly, but these changes were provided after PICES XV (*MBM-AP Endnote 2*), and will be reviewed by BIO later.

The Committee recommended that PICES nominate Dr. Kato to serve as PICES’ representative to the International Whaling Commission.

Advisory Panel on Iron fertilization experiment in the subarctic Pacific Ocean (IFEP-AP)

A presentation was given by Dr. Shigenobu Takeda, Co-Chairman of IFEP-AP. He put the main emphasis on the recent and future publications from iron-enrichment experiments in the subarctic North Pacific initiated by the Panel, and on the results of the IFEP/MODEL workshop (W1) on “*Modeling iron biogeochemistry and ocean ecosystems*” and the BIO

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Topic Session (S4) on “*Synthesis of in situ iron enrichment experiments in the eastern and western subarctic Pacific*” held at PICES XV (for details see the *Session Summaries* chapter of this Annual Report).

BIO supported the publication of a synthesis manuscript in *Eos* based on the three completed iron enrichment experiments in the subarctic North Pacific.

BIO also supported the proposal by IFEP-AP to close activity of the Panel at PICES XVI in October 2007, and to propose a new working group consisting of experimentalists and modelers to examine the causes for the different responses in the completed iron enrichment experiments in the subarctic North Pacific and to develop new hypotheses on the mechanisms controlling phytoplankton production in this region. Terms of Reference for a new working group under BIO have to be presented at the inter-sessional Science Board meeting in April 2007.

Section on Carbon and Climate (CC-S)

A brief summary of the CC-S activities is available in the POC report. Details can be found in the CC-S chapter of the Annual Report.

Summaries of scientific sessions/workshops at PICES XV (Agenda Item 4)

Summaries written by the convenors of each session and workshop can be found in the *Session Summaries* chapter of the Annual Report. The list of BIO-sponsored events at PICES XV includes:

- IFEP/MODEL workshop (W1): *Modeling iron biogeochemistry and ocean ecosystems*;
- BIO/POC workshop (W8): *Responses of marine mammals and seabirds to large-scale and long-term climate change: Mechanisms of environmental forcing*;
- MIE-AP workshop (W9): *Micronekton sampling gear inter-calibration experiment*;
- BIO/FIS Topic Session (S2): *The human dimension of jellyfish blooms*;

- BIO Topic Session (S3): *Interactions between biogeochemical cycles and marine food webs in the North Pacific*;
- BIO Topic Session (S4): *Synthesis of in situ iron enrichment experiments in the eastern and western subarctic Pacific*;
- BIO Topic Session (S5): *Advances in epi- and meso-pelagic ecosystem research*;
- BIO Poster session.

Projects, symposia and workshops (Agenda Item 5)

(a) Completed meetings

Summaries of three completed meetings originally recommended by BIO were presented:

OECOS East and West

Dr. Charles B. Miller summarized the status of the Oceanic Ecodynamics Comparison in the Subarctic Pacific (OECOS) project that was originally discussed as a comparison of various aspects of lower trophic level processes in the eastern and western gyres of the subarctic Pacific Ocean. Proceedings of the PICES-sponsored OECOS workshop, held in May 2005, in Corvallis (U.S.A.), were published in 2006 as PICES Scientific Report No. 32.

OECOS-East: The first proposal, involving U.S. and Canadian researchers, was declined by the U.S. National Science Foundation (NSF). It is now planned to propose to NSF a short-term, project development grant. If successful, the results will facilitate a new proposal to undertake shipboard investigations in 2009.

OECOS-West: The Japanese component has been funded, and two cruises are scheduled for 2007: March 6–16 on the R/V *Oshoru Maru*, and mid-April to mid-May on the R/V *Hakuho Maru*.

The Committee strongly supports OECOS, a collaborative program among PICES member countries, and encourages Dr. Miller to continue in his pursuit of funds for OECOS-East.

2006 Line-P Symposium

Dr. Angelica Peña noted that 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 summary of the meeting is available in the most recent issue of *PICES Press* (Vol. 14, No. 2). All presentations are viewable at <http://www.pices.int/publications/presentations/default.aspx>. Selected papers from the symposium will be published as a special issue of *Progress in Oceanography* in late 2007 or early 2008. Drs. Peña, Steven Bograd and Alexander Bychkov are the Guest Editors for this volume.

2006 ESSAS workshop

Dr. George L. Hunt reported on the PICES-hosted ESSAS (Ecosystem Studies of the Sub-Arctic Seas) workshop to develop comparative studies of the sub-Arctic seas, held in June 2006, in St. Petersburg (Russia). A summary of the meeting is available in the most recent issue of *PICES Press* (Vol. 14, No. 2).

(b) Upcoming events

PICES XVI

The next PICES Annual Meeting (PICES XVI) will be held October 26–November 4, 2007, in Victoria (Canada). The theme for this meeting is “*The changing North Pacific: Previous patterns, future projections and ecosystem impacts*”. The Committee recommends that the following scientific sessions be convened at PICES XVI:

- A 1-day BIO Contributed Paper Session with papers focused on biological aspects of the meeting theme, and with specific encouragement for young scientists to give oral presentations (*BIO Endnote 3a*);
- A joint 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)*” (*BIO Endnote 3b*); it remained

unclear whether the requested time would be ½-, ¾- or a full day;

- A 1-day joint BIO/POC Topic Session on “*Decadal changes in carbon biogeochemistry in the North Pacific*” (*CC-S Endnote 3*);
- A 1-day joint FIS/CCCC/BIO Topic Session on “*Fisheries interactions and local ecology*” (*FIS Endnote 4*).

Committee members were requested to consider potential invited speakers for the Science Board Symposium, and to send their nominations to the BIO Chairman by e-mail.

PICES XVII

BIO discussed the 2008 PICES Annual Meeting to be held in Dalian, China. Discussion was limited by the absence of all BIO Committee members from China. BIO endorsed the meeting theme, “*Beyond observation of the North Pacific environment: Rebuild, nowcast and forecast*” proposed by China, but suggested adjusting the wording of the title to make the meaning clearer. It was also noted that the text of the description is too narrow, focused mainly on modeling, and it should be modified to be more consistent with the title. BIO endorsed the theme.

4th International Zooplankton Production Symposium

This symposium will be held May 28–June 1, 2007, in Hiroshima (Japan). Dr. Michio J. Kishi is a member of the Local Organizing Committee, and Drs. Dagg and David L. Mackas represent PICES on the Scientific Steering Committee.

Year of the Euphausiid

Dr. William T. Peterson summarized activities and plans for development of the *Year of the Euphausiid*. A document titled “*Protocols for measuring molting rate and egg production of live euphausiids*” has been prepared with the objective of providing uniformity of methods throughout PICES countries, and is posted on the PICES website. Activities in the coming

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year will include a workshop on “*Krill biology and ecology*”, to be convened by Drs. So Kawaguchi and Peterson as part of the 4th Zooplankton Production Symposium. Dr. Peterson indicated that he may request PICES to form a Euphausiid Working Group at the next Annual Meeting.

(c) New proposals

4th PICES workshop on “*The Okhotsk Sea and adjacent areas*”

Dr. Kishi proposed that a 4th PICES workshop on “*Okhotsk Sea and adjacent areas*” be convened in the summer of 2007 (*BIO Endnote 4*). The previous workshops were held in 1995 (Vladivostok, Russia), 1999 (Nemuro, Japan) and 2003 (Vladivostok). BIO supported the proposal, but suggested postponing the workshop for one year (probably until August 2008), so further discussion and a financial request will occur at PICES XVI.

SOLOPCs float array

Dr. David Checkley (U.S.A.) was unable to attend the BIO meeting to present information about SOLOPCs. They are novel, profiling floats that combine a SOLO (~Argo) Lagrangian profiling float with a Laser-Optical Plankton Counter and fluorometer. Several parameters (T, S, P, Chl *a* fluorescence, particles, and zooplankton) are assessed autonomously, and data are sent ashore *via* Iridium. The array of SOLOPCs will be embedded within the much larger array of Argo floats and will provide useful information on constituents of the biological pump in the North Pacific. For wide coverage across the North Pacific, deployment of instruments will need the help of PICES members. The opportunity exists to collaborate in gathering comparative data from research vessels in the vicinity of SOLOPCs and interpreting the resultant data. Members were encouraged to talk with Dr. Checkley after his presentation at Topic Session S3.

2007-2009 ESSAS workshops

Dr. Hunt described a request from ESSAS for PICES to co-sponsor ESSAS workshops to be held in the next three years in: Hakodate, Japan (2007), Gijón, Spain (2008), and probably Seattle, U.S.A. (2009). BIO was generally supportive but had reservations about the funding.

Financial requests (Agenda Item 6)

Financial requests associated with proposed BIO activities for the next year include:

- travel support for 1 invited speaker for the BIO Contributed Paper Session and 1 invited speaker for each of three BIO-sponsored Topic Sessions at PICES XVI;
- travel support for 1 invited speakers for the MIE-AP workshop at PICES XVI;
- funds to publish the proceedings of the 2006 BIO/FIS Topic Session on “*The human dimensions of jellyfish blooms*” as a special issue of *Plankton and Benthos Research*.

BIO supported the requests from ESSAS for PICES to co-sponsor the ESSAS workshops in 2007–2009. Nevertheless, the Committee was concerned about committing PICES to all three workshops at once and suggested that each request should be evaluated separately.

BIO confirmed its support for PICES to co-sponsor a scientific session titled “*Comparative marine ecosystem structure and function: Descriptors and characteristics*” at the 2007 ICES Annual Science Conference in Helsinki, Finland. The Committee was later reminded that participation in this session had been approved previously at the April 2006 inter-session Science Board meeting.

BIO was informed by Dr. Atsushi Yamaguchi that Japan will host a workshop in May 2008, to discuss findings from the 2007 OECOS-West cruises, and that at next year’s PICES Annual Meeting, the organizers will request travel funds for several OECOS-East colleagues to attend this workshop.

BIO Action Plan (Agenda Item 7)

A sub-Committee consisting of Drs. Dagg, Kishi, Yoo and Vladimir Radchenko was formed to revise and update the BIO Action Plan. Revisions will be completed and circulated to all committee members for comments, then returned to the sub-Committee for finalization prior to the April 2007 inter-sessional Science Board meeting.

North Pacific Ecosystem Status Report (Agenda Item 8)

It was agreed that BIO should provide MONITOR with some ideas about what should be included in the next North Pacific Ecosystem Status Report, which is expected to be finalized in 2009. A sub-Committee consisting of Drs. Peña, Alexei Orlov and Patricia Wheeler was formed to address this issue, and to make recommendations to BIO at PICES XVI. Dr. Hunt indicated that this issue was also discussed at the June 2006 ESSAS workshop in St. Petersburg and agreed to forward their recommendations to the sub-Committee.

Future PICES integrative scientific program (Agenda Item 9)

There was discussion about the draft outline of FUTURE, the proposed new integrative science program for PICES. BIO supported the general goals of the program and made some specific suggestions, including:

- Outreach to society, managers and governments is not a one-way avenue, and mechanisms for two-way dialog need to be pursued.
- Each PICES member country has unique procedures for communication of important science findings to society, managers and government, so there can be no single PICES approach for all countries. It was agreed, however, that the broad goal of

better communication should be a part of the new Science Plan.

- The idea of conveying the degree of uncertainty (certainty) in communications was strongly endorsed.
- Smaller, point-by-point, comments on the draft outline will be sent to Science Board.

BIO web page (Agenda Item 10)

Each member of the Committee was asked to provide the BIO Chairman with a 1–2 sentence description of his/her area of scientific expertise for addition to the BIO web page. No additional recommendations were made.

Other business (Agenda Item 11)

This year, the Committee was responsible for selecting winners for BIO Best Presentation and Best Poster Awards from BIO-sponsored Topic Sessions S3, S4 and S5 (FIS handled the joint BIO/FIS Topic Session S2). Only young scientists were eligible for the Best Presentation Award.

The panel consisting of Drs. Dagg, Peña and Wheeler selected the paper by Andrew L. King (co-authored by Kathy Barbeau) entitled “*Macro- and micronutrient limitation of phytoplankton standing stock in the southern California Current System*” and given at the S3 BIO Topic Session as the best BIO presentation.

The panel consisting of Drs. Richard Brodeur, Dagg, Peña and Wheeler selected the paper by Satoshi Kitajima (co-authored by Fuminori Hashihama, Shigenobu Takeda and Ken Furuya) entitled “*Nitrogen fixation in the subtropical and tropical western North Pacific*” and presented at the S3 BIO Topic Session as the best BIO poster.

At next year’s Annual Meeting in Victoria, awards for the best oral presenter and best poster will be determined by Drs. Peña and Wheeler. Additional committee members may be added.

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BIO Endnote 1

Participation list

Members

Richard D. Brodeur (U.S.A.)
Michael J. Dagg (U.S.A., Chairman)
Michio J. Kishi (Japan)
David L. Mackas (Canada)
Hideki Nakano (Japan)
Alexei Orlov (Russia)

Angelica Peña (Canada)
Vladimir Radchenko (Russia)
Patricia A. Wheeler (U.S.A.)
Atsushi Yamaguchi (Japan)
Sinjae Yoo (Korea)

(Observers' names were not taken.)

BIO Endnote 2

BIO meeting agenda

1. Welcome and introductions, appointment of rapporteur
 2. Approval of agenda
 3. Progress reports of existing subsidiary bodies:
 - MIE-AP
 - MBM-AP
 - IFEP-AP
 - CC-S
 4. Summaries of scientific sessions/workshops at PICES XV
 5. Projects, symposia and workshops:
 - (a) Completed
 - OECOS East and West
 - 2006 Line-P Symposium
 - 2006 ESSAS workshop
 - (b) Upcoming events
 - PICES XVI in Victoria (Canada)
 6. Financial requests
 7. BIO Action Plan
 8. North Pacific Ecosystem Status Report
 9. Future PICES integrative science program
 10. BIO web page
 11. Other business
 12. Adjournment
- PICES XVII in Dalian (China)
 - 4th International Zooplankton Production Symposium
 - Year of the Euphausiid
 - (c) New proposals
 - 4th PICES workshop on “*The Okhotsk Sea and adjacent areas*”
 - SOLOPCs float array
 - 2007-2009 ESSAS workshops
 - Line-P letter of support

BIO Endnote 3

BIO-sponsored Topic Sessions proposed for PICES XVI

a) 1-day BIO Contributed Paper Session

The theme of PICES XVI is “*The changing North Pacific: Previous patterns, future projections, and ecosystem impacts*”. In this session, we welcome papers on biological aspects of the PICES XVI theme as well as papers on other aspects of biological oceanography in the North Pacific and its

marginal seas (except S2 and S11 topics). Young scientists are especially encouraged to submit papers to this session.

Recommended convenors: Michael J. Dagg (U.S.A.), Michio J. Kishi (Japan) and Angelica Peña (Canada).

b) 1/2- or 1-day BIO/POC/FIS 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)”

Ecosystems of the North Pacific Ocean are characterized by strong seasonal variability in productivity. The Inter-governmental Panel for Climate Change projections indicate that substantial changes in phenology (timing events) and the biological interactions that depend on the seasonal cycle are likely. Several mechanistic hypotheses have been set forth to explain changes in fish production in relation to phenology, including “match-mismatch” and “optimal environmental window”, yet there have been few tests of these ideas. In light of climate change predictions and recent changes in phenology in some North Pacific ecosystems (e.g., late upwelling in the California Current in 2005/2006), the session will focus on the implications of changes in the timing of seasonal zooplankton production to upper trophic level organisms through changes in their trophic

ecology, physiology and behavior. Physical environmental changes that influence phenology also are within the scope of this session. Papers which test hypotheses, present new theoretical treatments, and/or provide models of life history variation are encouraged. In particular, integrated, multi-trophic level, multi-disciplinary analyses are sought. We anticipate publication of the papers from this topic session in primary literature.

Recommended convenors: Elizabeth A. Logerwell (FIS, U.S.A.), David L. Mackas (BIO, Canada), Shoshiro Minobe (POC, Japan) and William J. Sydeman (MBM-AP, U.S.A.).

Potential invited speakers: Gregory Beaugrand (UK) and Nils Stenseth (Norway).

c) 1-day BIO/POC Topic Session on “Decadal changes in carbon biogeochemistry in the North Pacific” (CC-S Endnote 3)

d) 1-day joint FIS/CCCC/BIO Topic Session on “Fisheries interactions and local ecology” (see FIS Endnote 5).

BIO Endnote 4

Proposal for a 4th PICES workshop on “The Okhotsk Sea and adjacent areas”

The Okhotsk Sea and its adjacent area play an important role in the circulation and formation of water masses in the North Pacific Ocean. It is unique because of the formation of seasonal sea ice. The disappearance of ice will cause drastic changes and affect the oceanographic conditions and ecosystems of the North Pacific. In spite of its important role, no significant cooperative research activities on ecosystem dynamics in this area were conducted during the CCCC Program time period. Thus, PICES needs to take the lead in promoting and coordinating cooperative research in this region by convening the proposed workshop. The main objective of the workshop will be to identify the key scientific questions concerning the response of Okhotsk Sea and adjacent area ecosystems to

climate change. These can potentially be addressed as a component of the next PICES integrative scientific program, FUTURE.

Time: Summer of 2007 (or 2008)

Place: Abashiri (or Nemuro), Japan

Potential convenors: Makoto Kashiwai, Michio J. Kishi and Tokio Wada (Japan), Vyacheslav Lobanov and Vladimir I. Radchenko (Russia), and TBD (U.S.A.).

Plan: A 3-day workshop will consist of plenary sessions to review physical forcing, LTL and HTL chemistry and biology, and the fisheries of the area, group discussions and a summary session.

