

Report of the Physical Oceanography and Climate Committee

An overture meeting of the Physical Oceanography and Climate Committee (POC) took place from 18:00-19:30 h on October 16, 2011. Overture meetings were recommended by the Study Group on *Restructuring of the PICES Annual Meeting* at PICES-2010 and became effective from the PICES-2011. The POC Chairman, Dr. Kyung-Il Chang, called the meeting to order and circulated a draft agenda. Committee members discussed key issues and any addition of items to the agenda for the formal POC meeting. Several changes were made to the draft agenda to accommodate a request for a new working group on Regional Climate Modelling in Agenda Item 5, SOFE's request for FUTURE activities and NPESR in Agenda Item 8, requests for inter-sessional meetings and requests for 2012 and beyond in Agenda Item 11, a notification of documenting sessions and workshops in Agenda Item 13, and the discussion of ICES symposia and Annual Science Conference in Agenda Item 14.

The formal meeting of the POC Committee was held from 14:00–18:00 h on October 19, 2011. The Chairman called the meeting to order and welcomed members and observers (*POC Endnote 1*). Dr. Michael Foreman agreed to act as rapporteur. Dr. Enrique Curchitser was introduced as a new POC member from USA, replacing Dr. Nathan Mantua. The revised agenda decided at the overture POC meeting was adopted (*POC Endnote 2*).

AGENDA ITEM 4

Completion of PICES-2010 decisions

1. Travel support request for 2 invited scientists to attend the “*International Workshop on Development and Application of Regional Climate Models*” Seoul, Korea, October 11–12, 2011, was approved.
2. Travel support request for an Asian PICES scientist (Shin-ichi Ito) to give a plenary talk at the annual meeting of the Canadian Meteorological and Oceanographic Society, “*Ocean, Atmosphere and the Changing Pacific*”, Victoria, Canada, June 6–9, 2011, was approved.
3. A travel support request by AP-CREAMS for 4 students or early career scientists to attend the NOWPAP/IOC-WESTPAC/PICES training course on “*Remote Sensing data analysis*” in Vladivostok, Russia, October 8–12, 2011, was approved (3 trainees and 1 lecturer).
4. Travel support request of WG-FCCIFS for Drs. Ichiro Yasuda and Emanuele Di Lorenzo to co-convene the ICES/PICES theme session “*Atmospheric forcing on Northern hemisphere ocean gyres and their subsequent impact on the adjacent marine climate and ecosystems*” at the ICES Annual Science Conference in Gdansk, Poland, September 19–23, 2011, was approved.
5. A travel support request by WG-FCCIFS for 2 Asian scientists to attend their workshop on “*Biological consequences of a decrease in sea ice in Arctic and sub-Arctic Seas*” at the ESSAS Open Science Meeting in Seattle, USA, May 22, 2011, was approved.
6. Travel support request of ESSAS for 4 PICES Asian scientists (2 students/early career scientists) to attend their 2nd Open Science Meeting in Seattle, USA, May 22–26, 2011, was approved (2 early-career scientists).
7. Travel support request of WG-FCCIFS for 2 Asian co-conveners to attend a workshop on the “*Reaction of Northern Hemisphere ecosystems to climate events: A comparison*” in Hamburg, Germany, May 2–6, 2011, was approved.
8. A proposal for an AP-CREAMS/POC/MONITOR/BIO ¾-day Workshop, “*Recent advances in monitoring understanding of Asian marginal seas: 5-year of CREAMS/PICES EAST-I Program*” was approved for PICES-2011 (2 invited speakers).
9. A proposal for a POC/FIS ½-day Topic Session, “*Linking migratory fish behaviour to end-to-end models*” was approved for PICES-2011 (2 invited speakers, co-sponsored by ICES).
10. A proposal for a BIO/POC 1-day Topic Session, “*Mechanisms of physical-biological coupling forcing biological hotspots*” was approved for PICES-2011 (4 invited speakers, co-sponsored by ICES).

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11. A proposal for a FIS/POC 1-day Topic Session “*Recent changes of North Pacific climate and marine ecosystems: Implications for dynamics of the dominant species*” was approved for PICES-2011 (2 invited speakers, co-sponsored by ICES).
12. A proposal for a MONITOR/POC/FUTURE 1-day Topic Session “*How well do our models really work and what data do we need to check and improve them?*” was approved for PICES-2011 (5 invited speakers, co-sponsored by IMBER).
13. A proposal for a POC Contributed Paper Session was approved for PICES-2011.

AGENDA ITEM 5

Reports of existing subsidiary bodies and plans for new ones

Section on *Carbon and Climate* (S-CC)

Dr. James Christian, Co-Chairman of S-CC, reported the Section’s 2011 activities and 2012–2013 plans. Drs. Dong-Jin Kang from Korea and Burke Hales from USA are new members and Drs. Steve Emerson (USA) and Kyung-Ryul Kim (Korea) are no longer members. The Korean and Chinese translations of PICES Special Publication 3 “Guide to best practices for ocean CO₂ measurements” have been completed. A joint SOLAS/IMBER/IOCCP Carbon Synthesis meeting was held September 14–16, 2011 at UNESCO, Paris. The meeting aimed to bring together scientists working on global ocean carbon synthesis projects, such as CARINA, PACIFICA, GLODAP2, SOCAT. Six S-CC members, Drs. Masao Ishii, Akihiko Murata, Toru Suzuki, Richard Feely, Christopher Sabine, and Alexander Kozyr, attended the meeting. The PACIFICA dataset will be opened by February 2012 at the latest. S-CC has proposed a POC/BIO topic session for PICES-2012 on “*Anthropogenic CO₂ trends and their impacts on marine ecosystems in the North Pacific and its marginal seas*” with a consideration of a publication. S-CC requested co-sponsorship by FUTURE for this topic session and funding for one invited speaker. S-CC showed an interest in a proposed POC/BIO/TCODE topic session on “*Trends in hypoxia and ecosystem impacts in the North Pacific*”, and suggested a possible merger of two sessions if one of them was not be approved by Science Board. Dr. Christian suggested the replacement of word “hypoxia” with “low-oxygen content” in the title and description of the topic session. Following the Annual Meeting, it was decided to merge the two, and the combined session description has been rewritten (see *POC Endnote 5*). Other requests were made for a ½-day business meeting at PICES-2012, and for PICES to become a co-sponsor for the SOLAS summer school in Xiamen, China, in 2013. POC approved all requests from S-CC and decided to request Science Board approval. A travel request was also made for one early career PICES scientist to attend pCO₂ inter-comparison experiment in Japan in 2012, but it turned out the experiment will not take place in 2012. The full report of S-CC appears elsewhere in the PICES 2011 Annual Report.

Advisory Panel for a *CREAMS/PICES Program in East Asian Marginal Seas* (AP-CREAMS)

Dr. Kyung-II Chang, a member of AP-CREAMS, gave a brief report of the Panel on its activities in 2011 and plans for 2012 and beyond. AP-CREAMS meetings were held twice in 2011, on April 18–19 in Hangzhou, China, and on October 14, 2011 in Khabarovsk, Russia, at PICES-2011. Research activities both in the EAST-I and EAST-II regions in 2011 included cruises in the southern and southwestern Japan/East Sea, and a China-Japan-Korea joint *Nakasaki-maru* cruise in the East China Sea in July 2011. The second phase of the Korean EAST-I program was launched in 2011 for another 5 years, from 2011 to 2015. A NOWPAP/PICES/IOC-WESTPAC joint training course on remote sensing data analysis was successfully completed. The training course held in Vladivostok, Russia on October 8–12 was well attended with 25 trainees from seven countries and 11 lecturers from five countries. AP-CREAMS decided to approve the Supplementary to the 2010 NPESR – Japan/East Sea prepared by the *ad hoc* committee and to publish it as the PICES special publication within 6 months of its approval at the Science Board meeting at PICES-2011, taking into account comments recommended at the POC/MONITOR/TCODE Workshop (W4) “*Recent advances in monitoring and understanding of Asian marginal seas: 5 years of CREAMS/PICES EAST-I Program*”. The preparation of the Supplementary was charged to AP-CREAMS by Science Board at PICES-2010. Eighty-three scientists from Japan, Korea, and Russia contributed to the Supplementary of 314 pages. An observer, Dr. Olga Trusenkova,

suggested an inclusion of more physical oceanography in a subsection of the Supplementary - Straits. In 2012, two joint cruises are scheduled both in EAST-I and EAST-II regions. A request was made to provide travel support for 2 invited speakers to the PEACE 2012 Symposium in Japan in December 2012. The Panel will have its next meeting in spring 2012 in Yeosu, Korea. The full AP-CREAMS report can be found elsewhere in the PICES 2011 Annual Report.

Working Group on *North Pacific Climate Variability and Change* (WG 27)

Dr. Emanuele Di Lorenzo, Co-Chairman of WG 27, gave a brief report of the Working Group business meeting on October 15. WG 27 was established following the April 2011 Inter-sessional Science Board Meeting. Sixteen of 19 members attended the WG 27 business meeting, and each participant made a presentation outlining their research which was relevant to the terms of reference. The meeting then reviewed the TORs, and a list of members interested in directing some of their research to the TORs together with action items for each of the TORs was made. Dr. Di Lorenzo suggested that the Working Group have its own web page to facilitate communications among the group members and presented a prototype of the web page (<http://wg27.pices.int>). Requests were made for funding 2 invited speakers for each of 2 topic sessions for PICES-2012, POC/COVE/CLIVAR Topic Session, “*Challenges in understanding North Pacific climate variability and change*”, and FIS/POC/SCCME/WG25/WG27 Topic Session, “*Comparison of impact of multi-decadal climate variability in North Pacific and North Atlantic ecosystems and corresponding teleconnection patterns*”. POC decided to support the request with high priority and submit the request at the Science Board Meeting.

PICES/ICES Working Group on *Forecasting Climate Change Impacts on Fish and Shellfish* (WG-FCCIFS)

Dr. Michael Foreman, a member of WG-FCCIFS, gave a brief report summarizing activities of the Working Group in 2011 including those during 2011 ICES Annual Science Conference and 2011 PICES Annual Meeting. The Working Group had business meetings in May and September in 2011, and co-chaired and convened several sessions and workshops. The Group’s term ends in December 2011, and its major TORs culminated in the publication of a special issue of ICES Journal of Marine Science based on 35 scientific papers from the 2010 PICES/ICES/FAO Symposium on “*Climate change effects on fish and fisheries: Forecasting impacts, assessing ecosystem responses and evaluating management strategies*” held April 26–29, 2011 in Sendai, Japan. The volume will serve as a key reference for scientists developing international or national climate change impact assessments. The Working Group proposed establishing a new PICES/ICES Section on *Climate Change Effects on Marine Ecosystems* (S-CCME) as a successor. The draft plan was reviewed by the POC Committee at PICES-2010 before submitting the proposal for approval at PICES-2011. According to its plan for Phase 1 during 2012–2014, S-CCME will work with newly formed WG 27 to foster integration and synthesis of ideas between those two expert groups. It is also anticipated S-CCME will collaborate closely with a new Working Group on *Regional Climate Modeling* that POC proposed at PICES-2011 to address one of S-CCME’s key questions, *How will the physical, chemical and biological components of regional marine ecosystems of the northern hemisphere change under future climate scenarios?* The POC Committee decided to support the S-CCME Science Plan. The Group requested support for a FIS/POC/S-CCME/WG27 Topic Session on “*Comparison of impact of multi-decadal climate variability in North Pacific and North Atlantic ecosystems and corresponding teleconnection patterns*” at PICES-2012. POC decided to support the request with high priority and submit the request at the Science Board Meeting.

Proposal for a new Working Group on *Regional Climate Modeling*

Drs. Enrique Curchitser and Michael Foreman prepared a proposal for a new working group and Dr. Curchitser presented the proposal at the POC meeting (*POC Endnote 3*). Following an international PICES/ICES workshop on “*Development and Application of Regional Climate Models (RCM)*” held October 11–12, 2011 in Seoul, Korea, many issues and ideas were raised concerning the use of RCMs for regional ecosystem studies. This is an emerging capability and a pivotal component for the success of FUTURE. PICES can lead research efforts on this topic with great benefit to its community because of work that was presented at the workshop. Important issues included in the TORs are (i) to assemble a comprehensive review of existing regional climate modeling efforts, (ii) to assess the needs for regional ecosystem modeling studies, and (iii) to publish a report

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on best practices for regional coupled modeling. The POC Committee unanimously approved this proposal and decided to put it forth to Science Board after revising the TORs to accommodate Committee members' suggestions such as the linkage to FUTURE and model development to interface with a new database like PACIFICA.

AGENDA ITEM 6

Relations with other international organizations/programs

The following four brief presentations were given.

1. Dr. Howard Freeland, representing Argo, reviewed the current status of the Argo program, noting the relatively low density of Argo floats in some parts of the North Pacific, and asking PICES members for help in the deployment of floats during their future surveys. Also asked was to provide high-quality CTD data for the purpose of quality control of Argo profile data. Interested parties should contact Mathieu Belbeoch (belbeoch@jcommops.org).
2. Dr. Hee-Dong Jeong, representing NEAR-GOOS as a NEAR-GOOS Coordinating Committee member, gave an overview of NEAR-GOOS activities over the past year focusing on an establishment of Real-Time (RTDB) and Delayed Mode (DMDB) Data Bases in China, Japan, Korea and Russia. The NEAR-GOOS Coordinating Committee showed its interest in developing regional forecasting and reanalysis systems.
3. Dr. Enrique Curchitser, a member of CLIVAR Pacific Implementation Panel, introduced CLIVAR, its Pacific Panel and Working Group on Ocean Model Development. The CLIVAR Pacific Panel is willing to co-sponsor or support sessions, symposia and workshops with PICES. Dr. Curchitser presented an e-mail from Dr. Toshio Suga, a member of the CLIVAR Pacific Implementation Panel, to invite a PICES representative to the next Panel meeting planned for April 2012 in Noumea, New Caledonia. The POC Committee decided to request travel support for 1 POC member to attend this meeting.
4. Dr. George Hunt, member of the ESSAS Scientific Steering Committee, gave a brief report on the 2nd ESSAS Open Science Meeting "*Comparative studies of climate effects on polar and sub-polar ecosystems: Progress in observation and prediction*" in Seattle, USA in May 2011. The OSM with 8 theme sessions, was well attended by 195 participants from 15 countries. Dr. Hunt requested travel supports for 2 invited speakers for a PICES-2012 topic session or workshop (POC/BIO/FIS/FUTURE/MONITOR/MBMAP) on "Subarctic-Arctic Interactions". The theme was also listed in 2012 ICES ASC. The POC Committee decided to support the request.

AGENDA ITEM 7

POC Action Plan

PICES Strategic Plan was updated and approved at the 2011 PICES Annual Meeting on October 22, 2011, in Khabarovsk Russia. The POC Committee will start to review its Action Plan to revise it to align with the updated PICES Strategic Plan and to prepare a final revised draft plan for review at the Inter-sessional Science Board Meeting in 2012.

AGENDA ITEM 8

Update on FUTURE

Dr. Steven Bograd, member of the FUTURE Advisory Panel on *Anthropogenic Influences on Coastal Ecosystems* (AP-AICE), introduced a combined report from the three FUTURE Advisory Panels focusing on results from their Joint Meeting on October 16, 2011. The following issues were discussed by the POC Committee members' opinions and decisions:

1. Regarding the 2 newly proposed expert groups linked to FUTURE, Section on *Climate Change Effects on Marine Ecosystems* (S-CCME) and Section on *Human Dimensions of Marine Systems* (S-HD), the POC Committee fully supports S-CCME, but has no opinion about S-HD.

2. The POC Committee plans to propose a new working group linked to FUTURE on regional downscaling, and to have a “start-up” workshop/meeting for the new working group in Korea, possibly in conjunction with the 2012 Yeosu Symposium, if it is approved at PICES-2011. Even if the new working group is not approved at PICES-2011, the Committee has decided to request a workshop to make any necessary updates and revisions of the proposal in preparation for re-submitting the proposal at PICES-2012. Existing and newly proposed expert groups have already shown their interest in, and acknowledged the necessity of, the new working group.
3. It was suggested that a FUTURE Open Science Meeting (OSM) be held in 2013 at the Joint Meeting of the 3 FUTURE Advisory Panels. Most POC Committee members regarded that it would be premature to have an OSM because FUTURE expert groups have just started to work or have only recently been proposed. The major opinion of the POC Committee is that it is more urgent to establish a detailed and concrete FUTURE roadmap linked to its major goals. To look at the progress of FUTURE, it would be a good idea to invite external reviewers to PICES-2012 where they can observe overall PICES activities.
4. The POC Committee reviewed a draft proposal for producing North Pacific Ecosystem Status Report (NPESR) prepared by Dr. Phillip Mundy, member of Advisory Panel on Status, Forecasts, and Engagement (AP-SOFE). Contents of the proposal include: updating reports annually on a suite of agreed variables, submitting it via the web, reviewing and editing the reports by regional lead author supported by regional peer reviewers, and formatting it into an NPESR by database managers after being passed by senior editors. The senior editors would provide a preface of highlights that would serve as a press release and would organize a synthesis on five- or six-year intervals. The POC Committee’s opinion on this proposal is as follows. There were no opinions and suggestions to revise the current rule of producing the NPESR in terms of frequency and contents. Although Dr. Mundy’s proposal is desirable, the difficulty lies in who is going to do the work and how to support it. It would especially be a lot of work for lead authors initially. However, the situation would be better once a procedure is established like the “State of the Ocean” reports prepared annually in Canada and Japan.

AGENDA ITEM 9

Planning for PICES-2012

1. In addition to a POC Paper Session, nine Topic Sessions were proposed for PICES 2012 (*POC Endnote 4*).
2. Half-day business meetings for CC-S, WG 27, CREAMS-AP, S-CCME, and the new working group, if it is approved, were proposed.
3. Five scientists were recommended as invited speakers for the Science Board Symposium, Dr. Ian Perry (Canada), Dr. Akihiko Yatsu (Japan), Dr. Kitack Lee (Korea), Dr. Benjamin Halpern (USA), and Dr. Daniel Pauly (USA).

AGENDA ITEM 10

Theme for PICES-2013

The 2013 Annual Meeting will be held in Nanaimo, Canada, with the theme “*Communicating forecasts, uncertainty and consequences of ecosystem change to society*” at the time of the 2011 POC meeting.

AGENDA ITEM 11

Items with financial implications

Inter-sessional travel requests in 2012

The Committee agreed to put forward to Science Board the following ranked list of travel support requests:

1. Two invited speakers for the new working group on the regional downscaling during the 2012 Inter-sessional Science Board Meeting or 2012 Inter-sessional FUTURE Workshop.

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2. Dr. Enrique Curchitser to attend the 2012 Yeosu Symposium (May 15–19, 2012) as one of the convenors of the workshop on “*Climate change projections for marine ecosystems: Best practice, limitations and interpretation*”.
3. One POC Committee member as a PICES representative to attend the CLIVAR Pacific Panel Meeting held in Noumea, New Caledonia in April 2012.
4. One S-CC member to attend 3rd International Symposium on “*The ocean in a high-CO₂ world*” held in Monterey, USA from September 24–27, 2012.
5. One invited speaker to attend the PICES/ICES Symposium on “*Forage fish interactions*” held in Nantes, France from November 12–14, 2012.

Funding requests associated with PICES-2012

1. See requests in *POC Endnote 4*.
2. Topic Session on “*Subarctic-Arctic Interactions*” could be turned into a workshop if it is not approved as topic session. In any case, ESSAS requested travel support for 2 invited speakers.

Proposed publications for 2011 and beyond

1. Drs. Shin-ichi Ito and Enrique Curchitser, POC Committee members, are planning to publish a special volume of *Journal of Marine Systems* on “*Modeling of marine ecosystem dynamics and the use of observations for improving models*” in 2013. This special volume will be dedicated to Dr. Bernard Megrey.
2. WG-FCCIFS published a special issue of *ICES Journal of Marine Sciences* based on selected papers from the 2010 PICES/ICES/FAO Symposium on “*Climate Change Effects on Fish and Fisheries: Forecasting Impacts, Assessing Ecosystem Responses and Evaluating Management Strategies*” in June 2011.
3. Final report of WG 20 on “*Evaluation of Climate Change Projections*” and recommendation for FUTURE was submitted to PICES in May 2011.
4. Review paper from the POC Workshop “*Exploring the predictability and mechanisms of Pacific low frequency variability beyond inter-annual time scales*” convened by E. Di Lorenzo and S. Minobe at PICES-2010 has not yet been published.

AGENDA ITEM 12

POC Best Presentation and Poster awards

Drs. Kyung-Il Chang, Enrique Curchitser, Shin-ichi Ito, Hee-Dong Jeong, Michael Foreman, and Yury Zuenko were judges for the best early career scientist presenters and best poster at the POC Paper Session and Topic Sessions S4 and S8. The POC Best Presentation award was given to Hanna Na (Korea) for “*Decadal variability of the upper-ocean heat content in the Northwestern Pacific*” presented at the POC Paper Session. The POC Best Poster award was given to Rong-shuo Cai (China) for “*Possible impacts of tropical El Niño Modoki on SST of China’s offshore and its adjacent waters*” presented at the POC Poster Session (see Session Summaries elsewhere in the 2011 Annual Report).

AGENDA ITEM 13

Documenting Topic Sessions and Workshops

The following POC Committee members were allocated to document Topic Sessions and Workshops at the 2011 PICES Annual Meeting and 2011 Inter-sessional Events:

- POC Paper Session and business meeting by Dr. Kyung-Il Chang,
- Topic Session S4 by Drs. Enrique Curchitser and Shin-ichi Ito,
- Topic Session S8 by one of the convenors,
- Inter-sessional Workshop on Regional Climate Models by Dr. Kyung-Il Chang.

All were asked to include the title, convenors, background, a brief summary of major themes, and discussions and recommendations in preparing the reports.

AGENDA ITEM 14

Other business

POC Committee members reviewed proposals for the 2012 ICES Annual Science Conference (as of October 7, the proposals were not revised) and 5 ICES symposia that will be convened in 2012–2014, and discussed the relevance of them to POC's interests. Dr. Yury Zuenko showed an interest in Items 6 and 22 of the ICES ASC on Subarctic-Arctic Interactions. As ESSAS also proposed a similar theme as a Topic Session at PICES-2012, the POC Committee agreed to support the ESSAS proposal, and no further discussion was made on this issue. POC members expressed little interest in co-sponsoring any ICES ASC proposals or ICES symposia.

Two new working groups were selected by SCOR from a number of SCOR proposals in 2011: Organic Ligands (SCOR 2.3.2) and Biogeochemical Exchange Processes at the Sea-Ice Interface (SCOR 2.3.7). The POC committee reviewed the proposals, as requested by Science Board, to recommend associate members to those 2 working groups, if any members are interested in them. Dr. James Christian suggested nominating Dr. Lisa Miller as a PICES representative, as she is already an associate member. The Committee decided to leave this decision to the Science Board.

AGENDA ITEM 15

Adoption of report and recommendations to Science Board

This POC report was circulated among, and approved by, all Committee members. All recommendations were brought by Dr. Kyung-Il Chang to Science Board meeting on October 21–22, 2011.

POC Endnote 1**POC participation list**Members

Steven Bograd (USA)
 Kyung-Il Chang (Korea, Chairman)
 James Christian (Canada)
 Enrique Curchitser (USA)
 Michael Foreman (Canada, Vice-Chairman)
 Shin-ichi Ito (Japan)
 Chan Joo Jang (Korea)
 Hee-Dong Jeong (Korea)
 Elena Ustinova (Russia)
 Yury Zuenko (Russia)

Observers

Robin Brown (AP-SOFE)
 Emanuele Di Lorenzo (WG 27)
 Howard Freeland (Argo)
 George Hunt (ESSAS)
 Shoshiro Minobe (WG 27)
 Olga Trusenkova (Russia)
 Sinjae Yoo (Science Board)

POC Endnote 2**POC meeting agenda (revised after the overture POC meeting)**

1. Welcome, introductions, opening remarks
2. Membership changes
3. Changes to, adoption of agenda and appointment of rapporteur
4. Completion of PICES-2010 decisions
5. Reports of existing subsidiary bodies and plans for new ones
 - i) Progress report of the renewed Section on *Carbon and Climate* (James Christian)

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- ii) Progress report of the Advisory Panel for a *CREAMS/PICES Program in East Asian Marginal Seas* (Kyung-II Chang)
 - iii) Progress report of its first meeting of WG 27 on *North Pacific Climate Variability and Change* (Emanuele Di Lorenzo)
 - iv) Progress report and future plans of PICES/ICES WG on *Forecasting Climate Change Impacts on Fish and Shellfish* (Michael Foreman)
 - v) Proposal for a new working group on *Regional Climate Modeling* for approval at the PICES-2011 (Enrique Curchitser)
6. Relations with other international organizations/programs
- i) Argo (Howard Freeland)
 - ii) NEAR-GOOS (Hee-Dong Jeong)
 - iii) WCRP/CLIVAR (Enrique Curchitser)
 - iv) ESSAS (George Hunt)
7. POC Action Plan
8. Update on FUTURE
- i) New expert groups linked to FUTURE
 - ii) POC new Working Group on *Regional Climate Modeling* and related workshop in 2012
 - iii) FUTURE Open Science Meeting
 - iv) Draft proposal for producing North Pacific Ecosystem Status Report
9. Planning for PICES-2012
- i) Topic/Paper sessions
 - a. POC Paper Session
 - b. Nine Topic Sessions
 - ii) Business meetings for subsidiary bodies
 - iii) Invited speakers for the Science Board Symposium
10. Theme for PICES-2013 in Nanaimo, Canada
11. Items with financial implications
- i) Proposed inter-sessional meetings for 2012 and beyond
 - a. 2nd PICES/ICES/IOC Symposium on “*Effects of climate change on the world’s oceans*”, Yeosu, Korea, May 13–20, 2012 in conjunction with Ocean Expo-2012
 - b. 3rd International Symposium on “*The ocean in a high-CO₂ world*”, Monterey, USA, September 24–27, 2012
 - c. ICES/PICES Early Career Scientist Conference on “*Oceans of change*”, Palma de Mallorca, Spain, April 24–27, 2012
 - d. ICES/PICES Symposium on “*Forage fish interactions: Creating the new tool for ecosystem-based management of marine resources*”, Nantes, France, November 12–14, 2012
 - e. 2012 ICES Annual Science Conference
 - f. CLIOTOP/IMBER special session on “*Global science for global governance of oceanic ecosystem and fisheries*”. Planet Under Pressure Conference, London, U.K., March 26-29, 2012
 - g. IMBER’s 3rd summer school, ClimECO3, “*A view towards integrated earth system models – Human-nature interactions in the marine world*”, Ankara, Turkey, July 23–28, 2012
 - h. Regional Climate Models workshops in 2013 and 2014
 - i. Summer school in 2014 on “*Ecosystem modeling*” (tentative) (AP-CREAMS)
 - j. Others
 - ii) Publications for 2010 and beyond
 - a. WG-FCCIFS: Special issue of ICES Journal of Marine Sciences published in June 2011
 - b. Review paper from the PICES 19 POC Workshop “*Exploring the predictability and mechanisms of Pacific low frequency variability beyond inter-annual time scales*” (Lorenzo and Minobe)
 - c. Final report of WG 20 on *Evaluation of Climate Change Projections* and recommendation for FUTURE submitted to PICES in May 2011.
 - d. Special volume Dedicated to Dr. Bernard A. Megrey in 2013
 - iii) Travel support requests
 - iv) Other items

12. 2009 POC Best Presentation and Poster awards (Judges were appointed at the POC committee overture meeting and will give their recommendations just before the Closing Session.)
13. Documenting sessions and workshops
14. Other business
15. Adoption of POC report and recommendations to Science Board

POC Endnote 3

Proposal for a new Working Group on *Regional Climate Modeling*

Motivation

- Physically based future climate projections are the starting point for many socio-economic impact and adaptation considerations to future climate change.
- Global climate models capture large scale climate behaviour but due their coarse spatial resolution have limitations for regional assessments.
- A joint PICES/ICES regional climate modeling workshop, with an emphasis on techniques and ecosystem applications, was held in Seoul, October 11–12, 2011.
- Several PICES members are at the leading edge of this emerging field.
- A new WG could be of great benefit to PICES and FUTURE.

Draft Terms of Reference

1. Assemble a comprehensive review of existing regional climate modeling efforts.
2. Assess the requirements for regional ecosystem modeling studies (*e.g.*, how to downscale the biogeochemistry).
3. Continue the development of RCM implementations in the North Pacific and its marginal seas.
4. Convene special sessions and inter-sessional workshops dedicated to the RCM topic.
5. Publish report and/or review paper on best practices for regional coupled modeling.
6. Establish connections between PICES and climate organizations (*e.g.*, CLIVAR), and global climate modeling centers (*e.g.*, NCAR, JAMSTEC, CCCMA).
7. Collaborate with other PICES groups such as WG 27, S-CCME and the FUTURE Advisory Panels possibly by producing “Outlooks”.
8. Publish a final report summarizing results.

Proposed Co-Chairs: Enrique Curchitser (USA), Chan Joo Jang (Korea)

Membership Suggestions

Canada: James Christian, Michael Foreman, Angelica Peña

China: Fangli Qiao, Zhenya Song (suggested by Chinese delegation at the Science Board meeting)

Japan: Yasuhiro Hasumi, Shin-ichi Ito, Hiroyuki Tsujino

Korea: Yang-Ki Cho, Byoung-Ju Choi, Chan Joo Jang

Russia: Nikolay Diansky, Dmitry Stepanov, Olga Trusenkova

USA: Neil Banas, Enrique Curchitser, Jerome Fiechter

POC Endnote 4

Proposal for Paper and Topic Sessions for PICES-2011

1. *Contributed Paper Session*

Co-convenors: Kyung-Il Chang (Korea) and Michael Foreman (Canada)

Sponsoring Committee: POC

Duration: 1 day

Invited speakers: none

Description: Papers are invited on all aspects of physical oceanography and climate in the North Pacific and its marginal seas

2. *POC- ranked Topic Sessions*

2-1. **Title:** Challenges in Understanding North Pacific Climate Variability and Change

Duration: 1 day

Sponsoring Committee (& Advisory Panel): POC, COVE

Description: Physical climate variability and change exert substantial impacts on marine ecosystems, particularly on longer timescales because of the longer ocean memory compared with the atmosphere, and the cumulative effects on marine ecosystems. On a centennial scale, climate changes due to anthropogenic forcings may dominate over natural variability, but variations on decadal or shorter timescales may be mainly due to natural climate variability. Furthermore, natural climate variability can be modified via climate changes. Therefore, a correct understanding of the mechanisms underlying climate variability and change should be the basis for understanding and predicting future conditions of the North Pacific. At present, there is no widely accepted consensus on the mechanisms governing decadal-to-multidecadal climate variability over the North Pacific, and this mainly reflects the uncertainty of how, or even whether, the mid-latitude ocean influences the atmosphere. Some linkages between processes, such as oceanic memory due to Rossby wave propagation, are generally accepted, and predictability associated with these processes may also be important for understanding marine ecosystem impacts. Also, it is important to share ideas about what physical parameters are important for specific marine ecosystems between researchers of marine ecosystems and physical oceanography and climate.

Through collaboration between PICES and CLIVAR, this session invites contributions exploring important developments in the research field of the North Pacific Climate Variability and Change, including physical environmental variations and their predictability, and linkages between physical conditions and marine ecosystems.

Scientists willing to serve as PICES convenor: Shoshiro Minobe (Japan), Emanuele Di Lorenzo (USA), Michael Foreman (Canada) and Hiroaki Saito (Japan)

Co-sponsoring Organization: CLIVAR

Nominations for CLIVAR convenor: Toshio Suga (Japan)

Primary Publication: No

Requests: We propose to invite speakers from both the climate (1–2 speakers from CLIVAR) and ecosystem (1–2 speakers PICES) science community. The climate speakers would be asked to provide a more general and interdisciplinary introduction/review of the status and challenges of climate research. This will allow a more active engagement from the participating ecosystem scientists. We would also invite one or two leading ecosystem scientists to provide an overview of the most important types of long-term ecosystem observations available and the challenges of interpreting these observations in the context of climate variability and change. These invited talks would set an important basis for the developments of WG 27 on *North Pacific Climate Variability and Change* group activities and for accomplishing the FUTURE goal as they foster a direct and explicit connection between the climate and ecosystem scientists in the WS. We request travel support for the 3–4 invited speakers.

2-2. **Title:** Anthropogenic CO₂ trends and their impacts on marine ecosystems in the North Pacific and its marginal seas [later merged with “Trends in hypoxia and ecosystem impacts in the North Pacific” to become “Changing ocean biogeochemistry and its ecosystem impacts” co-sponsored by POC and TCODE] See *POC Endnote 5*.

Duration: 1 day

Sponsoring Committees: POC, BIO

Description: Anthropogenic CO₂ has been accumulating in the upper ocean for the past two centuries, and is beginning impact ecosystems in ways that will likely become more profound and ubiquitous in the coming decades. The North Pacific is a key area of concern because of naturally shallow carbonate saturation horizons and relatively low buffering capacity. Anthropogenic CO₂ alters the oceanic carbonate system, the main chemical equilibrium that gives seawater its buffering capacity. The added carbon drives down the pH and reduces the saturation state of carbonate minerals like calcite and aragonite in a process known as “ocean acidification”. Anthropogenic changes are not only seen in the open ocean, but can be even more significant in coastal regions and marginal seas. Anthropogenic CO₂ affects calcifying organisms, but its biological impacts are not limited to these organisms and are felt across ecosystems. We invite papers on the changing distribution of anthropogenic CO₂ in the upper ocean, its impacts on organisms and ecosystem function, and emergent impacts on biogeochemical cycles related to the interaction of ocean acidification with climate change and other anthropogenic impacts.

Scientists willing to serve as PICES convenor: Masao Ishii (Japan), Lisa Miller (Canada)

Primary Publication: No

Requests: 1 invited speaker

2-3. **Title:** Comparison of impact of multi-decadal climate variability in North Pacific and North Atlantic ecosystems and corresponding teleconnection patterns

Duration: 1 day

Sponsoring Committee(s): FIS, POC, S-CCME/WG 25, WG 27

Description: Regime shifts have been observed in northern hemisphere marine ecosystems in the Atlantic and the Pacific including: the Baltic Sea, the North Sea, the Mediterranean Sea, the Bering Sea, the Gulf of Alaska/Northern California Current, the Oyashio-Kuroshio System and the western Pacific marginal seas which all have important small pelagic resources. Retrospective studies indicate these regime shifts may be linked to climatic teleconnection patterns suggesting that time trends in ecosystems shifts may be temporally synchronous even though the systems are widely separated from each other. This Topic Session seek oral presentations and posters that evaluates the mechanisms underlying decadal shifts in climate forcing and the response of small pelagic species to shifting ecosystem conditions. We seek papers that compare responses of small pelagic species to shifting ecosystem conditions between large marine ecosystems. These studies will yield further insight as to whether temporal periods of climate forcing can be characterized or whether they are best described as a continuous process. In any one geographical ecosystem the expression of changes resulting from climatic forcing may take on different patterns reflecting the detailed mechanisms and local processes that are influential within the constraints of the larger scale forcing. With sufficient interest by the contributors, a special issue will be sought.

Scientists willing to serve as PICES convenor: Shoshiro Minobe (Japan), William Peterson (USA)

Co-sponsoring Organization: ICES

Nominations for ICES convenor: Jürgen Alheit (Germany), Svein Sundby (Norway)

Primary Publication: Special issue (Anticipated)

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2-4. **Title:** Linking migratory fish behavior to End-to-End models II

Duration: ½ day

Sponsoring Committees: POC, FIS

Description: In order to understand ecosystem response to climate impacts, End-to-End modeling (E2E) approaches are essential. One of the most difficult parts for E2E is the modeling of fish behavior migration. Fish behavior can be very complex; It is a consequence of genetics, physical, chemical and biological environments and their interaction. Learned behavior may also be a factor. To model fish behavior, integrated studies are needed including laboratory experiments, tagging and acoustic observations, and modeling skills. The purpose of this session is to understand the current state of development in laboratory experiments, field observations and modeling to understand fish behavior and discuss future potential collaborations to improve fish migration models. Presentations related to laboratory experiments, field observations and modeling works related to fish behavior are welcome.

Scientists willing to serve as PICES convenors: Skip McKinnell (Canada), Enrique Curchitser (USA), Michio Kishi, and Shin-ichi Ito (Japan)

Nomination for ICES convenor: Geir Huse (Norway)

Primary Publication: No

Requests: 3 potential invited speakers, Robert Humston (USA), Hao Wei (China), Michio Yoneda (Japan)

2-5. **Title:** Trends in hypoxia and ecosystem impacts in the North Pacific later merged with “Anthropogenic CO₂ trends and their impacts on marine ecosystems in the North Pacific and its marginal seas” to become “Changing ocean biogeochemistry and its ecosystem impacts” co-sponsored by POC and TCODE] See *POC Endnote 5*.

Duration: ½ day

Sponsoring committees: POC, BIO, TCODE

Description: Declining oxygen levels have been reported from mid-ocean depths in the tropical oceans and across the North Pacific. Global climate models predict that dissolved oxygen concentrations in the deep ocean will decline by 20-40% over the coming century or so as global warming enhances stratification of the upper mixed layer and reduces ventilation of the deep ocean. This session will examine current trends in oxygen concentration in the North Pacific, the factors contributing to observed trends, and their ecosystem impacts. Studies examining time series for oxygen concentration in the deep ocean; the physical, chemical and biological factors underlying observed trends; and the physiological, ecological and biogeochemical impacts of hypoxia on the water column and benthos are invited. Examples of impacts on the distribution and abundance of deepwater fish stocks or the midwater micronekton, their predators and prey, are particularly encouraged. The session is especially interested in papers that examine the impact of hypoxia on ecosystem structure, the biogeochemistry of the carbon cycle, and the vulnerability of ecosystems to climate change.

Scientists willing to serve as PICES convenors: Tony Koslow (USA), Tsuneo Ono (Japan)

Primary Publication: No

Requests: 4 potential invited speakers, Brad Seibel (USA), Frank Whitney (USA), IOS (Canada); Tsuneo Ono or Y.W. Watanabe (Japan)

POC Suggestion: Add 2 more convenors, Arthur Chen (*ex-officio* member of S-CC) and Steven Bograd (USA, POC member)

2-6. **Title:** Subarctic-Arctic interactions

Duration: 1 day

Sponsoring Committee(s): POC, POC, BIO, FISH, FUTURE, MONOTOR, and AP-MBM

Description: Exchanges of water masses and their associated flora and fauna strongly link the marine Arctic and the Subarctic. Both regions have undergone significant warming and there has been reduced sea-ice in recent years in some regions. Climate change scenarios indicate that these regions are likely to experience even greater warming and transformation in the future. To improve understanding of how climate variability and change will affect these marine ecosystems from biogeochemical processes, through the food web to the highest trophic levels, it is essential to improve our knowledge of the role of physical and biological fluxes between the Subarctic and Arctic and the fate of the transported organisms. Therefore, this theme session will examine of the influence of the warm Subarctic inflows on the physical conditions and biology in the Arctic basin and shelves, as well as the role of fluxes of water from the Arctic basin onto the surrounding shallow shelves and into the Subarctic. Papers that cover multiple trophic levels or investigate biophysical coupling are especially sought. Also, we seek presentations on the observed changes that are occurring as well as those on possible scenarios under climate change. Relevant experimental studies, field programmes and modelling of Arctic-Subarctic interactions will be considered. Emphasis will be on the Arctic-Pacific Ocean linkages but those considering the exchanges in the Atlantic are also welcome.

Scientists willing to serve as PICES convenor: James Overland (USA), Sei-Ichi Saitoh (Japan)

Co-sponsoring Organization: ICES

Nomination for ICES convenor: Ken Drinkwater (Norway), Jackie Grebmeier (USA)

Primary Publication: No

Requests: 2 invited speakers

2-7. **Title:** Inter-basin comparisons of ecology and recruitment processes of Pacific cod (*Gadus macrocephalus*) in the North Pacific [FIS did not support this proposal for PICES-2012]

Duration: 1 day

Sponsoring Committees: FIS, POC

Description: Recently commercial catch of Pacific cod (*Gadus macrocephalus*) in the Yellow Sea, the Korea Strait and the southwestern Japan/East Sea has steadily increased from 1998 to 2010, which is contrary to the recent declining trend since 1997 in the Russian coast of the Japan/East Sea and the eastern North Pacific areas (Gulf of Alaska and Bering Sea). Although most cods in the North Pacific show similar biological characteristics, those in the Yellow Sea have often been considered as a distinct stock because of their earlier maturation and relatively small size compared with other cods in the North Pacific. Despite these distinctive biological characteristics, cod recruitment in the Yellow Sea seems to be synchronized with the Korean Strait and the southwestern Japan/East Sea. The changes in cod recruitment in the western Pacific are tentatively related to changes in climate and oceanographic conditions such as the Arctic Oscillation and cold-water penetration from deep ocean. In addition, annual catch of Pacific herring (*Clupea pallasii*), a dietary component of cod, also has dramatically increased from 2002 to 2010 in Korean waters, indicating that biological factors may also play a role, for example, possible match-mismatch or a common prerequisite between herring and cod for successful recruitment. It is uncertain whether the cod stocks in the Yellow Sea are genetically connected or isolated from those in the Korea Strait and the Japan/East Sea. Regional comparisons of biology, ecology and recruitment processes are expected to provide insights into the common roles of hydrographical changes and biological controls in recruitment processes of Pacific cod in the western vs. eastern North Pacific. This session will exchange information and ongoing research results among regional scientists who have interested or involved in the phylogenetics, early-life history, larval cultivation, ecology and recruitment of Pacific cod. The session is especially interested in papers that examine regional climatology,

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oceanography and trophodynamics in relation to cod recruitment fluctuation. With sufficient interest by the contributors, a special issue of a scientific journal will be sought.

Scientists willing to serve as PICES convenor: Sukgeun Jung (Korea), TBD

Primary Publication: Special issue of *Fisheries Research* (Anticipated).

2-8. **Title:** Science needs for offshore oil and gas development in the North Pacific
[Science Board did not support this proposal for PICES-2012.]

Duration: 1 day

Sponsoring committees: FIS, BIO, MEQ, POC

Description: PICES is well-suited to provide a suite of information needed to advise agencies and institutions involved in offshore Oil and Gas (O&G) development, regulation, clean-up, damage assessment and restoration. Many of the information needs are similar to those needed for management of fisheries, aquaculture and pollution. For example: baseline data on population distribution, abundance and habitat use; climate change and shifting baselines; current and wind transport models. The purpose of this session is to introduce the PICES community to the processes of O&G development, response and damage assessment; and to demonstrate how current and future research by PICES scientists could contribute to these processes.

Presentations on the following topics would be of interest:

- Current and wind transport models
- Biological baseline data
 - Distribution, abundance, habitat use, population trends
 - Zooplankton, fish, marine mammals, seabirds, benthos
- O&G development, permitting and regulation
- Response (clean-up)
 - Technologies and techniques (Ken Lee, Bedford DFO, invited speaker)
 - Physical and biological information needed for response
- Damage assessment and restoration
 - Processes of natural resource damage assessment
 - Biological information needed for damage assessment and restoration planning
- Models of oil fate and impacts
- Toxicology of oil to marine organisms
- Climate change and shifting baseline
- Impacts on human communities and use of TEK

Scientists willing to serve as PICES convenor: Libby Logerwell (USA), Ken Lee (Canada), and TBD (Russia)

POC Endnote 5**Merged POC/TCODE Topic Session on “*Changing ocean biogeochemistry and its ecosystem impacts*”****Co-sponsored by ICES and IMBER****Co-Convenors:** Silvana Birchenough (ICES), Steven Bograd (USA), Arthur Chen (IGBP), Tony Koslow (USA), Tsuneo Ono (Japan)

Ocean biogeochemistry is undergoing rapid and growing anthropogenic change. A significant fraction of anthropogenic CO₂ is taken up by the ocean, which drives down pH and reduces the saturation state of carbonate minerals like calcite and aragonite, a process known as “ocean acidification”. Global climate models also predict that dissolved oxygen concentrations in the deep ocean will decline by 20–40% over the coming century or so as global warming enhances stratification of the upper mixed layer and reduces ventilation of the deep ocean. Declining oxygen levels have now been reported from mid-ocean depths in the tropical oceans and across the North Pacific. Both processes are of particular concern in the North Pacific, where the water is naturally ‘old’ and has shallow carbonate saturation horizons, relatively low buffering capacity, and extensive oxygen minimum zones. It is anticipated that these anthropogenic influences on the global ocean will increase in coming decades as atmospheric CO₂ levels and global temperatures continue to rise. We invite papers on the changing biogeochemistry of the global ocean, its impacts on organisms and ecosystem function, and emergent impacts on biogeochemical cycles related to the interaction of ocean acidification and declining oxygen with climate change and other anthropogenic impacts.