

SCOR and PICES Collaborative Activities

Report from PICES for the 2016 SCOR Annual Meeting September 5-7, 2016, Sopot, Poland

The North Pacific Marine Science Organization (PICES) is an intergovernmental scientific organization established by an international convention in 1992, in order to promote and coordinate marine scientific research in the North Pacific and adjacent seas. Our current member countries are Canada, Japan, People's Republic of China, Republic of Korea, Russian Federation and the United States of America. Our goals are to (1) advance scientific knowledge and capacity available for the member countries, including information on human activities affecting, and affected by marine ecosystems, and (2) provide a mechanism for collaboration among scientists in addressing timely and critical scientific questions. In slightly more than 20 years since its establishment, PICES has become a major forum for the discussion and sharing of marine science in the North Pacific. Information on the Organization and its activities is available on the PICES website at <http://www.pices.int>.

Continuing and expanding collaboration between PICES and SCOR is based on the recognition that PICES can play an important role in bringing a North Pacific perspective to the global activities of SCOR, and that by participating in and implementing these activities in the region, PICES can advance its own scientific agenda.

To discuss on-going and future collaborations, SCOR and PICES continue to regularly exchange observers to the others annual/executive meetings. In recent years, SCOR was represented by Dr. Sinjae Yoo (Korea) at the PICES-2014 annual meeting in Yeosu, Korea and Dr. Sun Song, Vice-president of SCOR at the PICES-2015 annual meeting in Qingdao. Dr. Harold Batchelder (PICES, SCOR Capacity Building Committee) attended the 2013 SCOR Executive Committee Meeting (Wellington, New Zealand), the 2014 SCOR meeting (Bremen, Germany), and the 2015 meeting in Goa, India.

This report provides an update on PICES-SCOR collaborations since the 2015 SCOR Meeting in Goa, India (December 2015). This period does not include any PICES annual meetings, as these usually occur during October or November each year. Dr. Urban of SCOR is registered and will attend PICES-2016 in San Diego (7-13 November 2016).

During this reporting interval, SCOR generously provided financial support for travel/local costs of early career scientists of "countries with economies in transition" for three PICES activities. PICES is greatly appreciative of this support.

- (1) \$5000 USD for the PICES-ICES 6th Zooplankton Production Symposium "*New Challenges in a Changing Ocean*" that was held in May 2016 in Bergen, Norway. Four scientists were recommended and approved for funding using SCOR funds (Appendix I, Table 1). Three of these young scientists attended. Unfortunately, one from Peru was unable to attend. The unused funds (\$1490 USD) from the cancelled traveler were reallocated (with the approval of Dr. Urban) to travel support for the May 2017 Early Career Scientist Conference "*Climate, Oceans and Society: Challenges and Opportunities*", in Busan, Korea.
- (2) \$5000 USD for the PICES-2016 Annual Meeting "*25 Years of PICES: Celebrating the Past, Imagining the Future*", which will occur from 2-13 November 2016 in San Diego, CA, USA. The scientists to be offered SCOR travel support are still being discussed at the time of this report. Details of those selected will be available in Sopot.
- (3) \$5000 USD for an international symposium "*Drivers of Dynamics of Small Pelagic Fish Resources*" that will be held March 6-11, 2017 in Victoria, British Columbia, Canada. Registration, abstracts and financial support requests are being accepted through October 1, 2016.

LARGE-SCALE OCEAN RESEARCH PROJECTS CO-SPONSORED BY SCOR

PICES contributes to SCOR-sponsored international large-scale ocean research projects, particularly IMBER and SOLAS, by: (1) convening joint sessions/workshops with the projects at PICES Annual Meetings, (2) co-

sponsoring symposia/workshops, (3) assisting projects having North Pacific activities with meeting logistics, and (4) contributing to participation of early-career scientists from the North Pacific region in projects' activities.

Integrated Marine Biogeochemistry and Ecosystem Research (IMBER)

▪ Joint sessions/workshops at PICES Annual Meetings

Until 2015, PICES and IMBER often convened joint topic sessions at PICES Annual Meetings.. IMBER at PICES-2014 cosponsored a topic session on *Tipping points: defining reference points for ecological indicators of multiple stressors in coastal and marine ecosystems*". Co-sponsorship by IMBER has been reduced during the past few years, as IMBER focused on redefining their strategic and implementation plan for the transition from IGBP to Future Earth (FE). In May 2016, PICES Science Board Chairman Thomas Therriault and Hal Batchelder of the PICES Secretariat met with Eileen Hofmann (former chair of IMBER SSC), Einar Svendsen (Executive Officer, IMBER), and Lisa Maddison (Deputy Executive Officer, IMBER) in Bergen, Norway to discuss how to enhance collaborations between PICES and IMBER.

- The PICES-2016 Annual Meeting will be held November 2-13, 2016, in San Diego, CA, USA. The overall theme for PICES-2016 will be "*25 Years of PICES: Celebrating the Past, Imagining the Future*". IMBER was invited to submit a theme and cosponsor a topic session or workshop, but chose not to. The 2016 meeting is the 25th anniversary meeting of PICES, and has a different structure with more workshops (10), fewer concurrent sessions and more plenary sessions than are typical of the PICES annual meeting. Because there are many more posters than usual, posters will be displayed for four days rather than the usual three days, and there will be two evening poster receptions rather than one. Lisa Maddison will represent the IMBER International Project Office at PICES-2016.

Co-sponsored symposia/conferences/workshops

- IMBER co-sponsored the 3rd PICES/ICES/IOC Symposium on "*Effects of climate change on the world's oceans*" (March 21-27, 2015, Santos City, Brazil). One of the symposium workshops, "*Upwelling systems under future changing climate*", was proposed by a CLIVAR/IMBER/SOLAS collaboration. No symposia were co-sponsored in 2016. IMBER is cosponsoring (providing \$3,000 USD) the Small Pelagics Symposium that will be held in March 2017 in Victoria, Canada.

Capacity building activities

PICES approved a request received from IMBER to cosponsor the IMBER ClimECO5 summer school that will be held in Natal, Brazil during August 2015. PICES is providing financial support to IMBER to enable participation of a PhD student, Natalia Sukhikh of St. Petersburg State University (Russia; \$1,875 USD) and Dr. Zhongxin Wu of Guangdong Ocean University (China; \$3,500 USD) to attend ClimECO5.

Regional Program level

- IMBER Regional Program on Ecosystem Studies of Sub-Arctic Seas (ESSAS)
 - PICES and ESSAS share the goal of using a comparative approach in developing predictions of how climate variability and change affect, and will affect, the sustainability of goods and services obtained from Sub-Arctic seas.
 - A topic session on "*Resilience, transitions and adaptation in marine ecosystems under a changing climate*" proposed for PICES-2016 by ESSAS was accepted and will be co-convened by ESSAS Co-Chairmen (Franz Mueter, Ken Drinkwater, and Sei-ichi Saitoh). This session and one other received many more abstract submissions than any other sessions at PICES-2016.
 - A PICES/ESSAS special issue of *Progress in Oceanography* on "*Modeling and observational approaches to understanding marine ecosystem dynamics*" (Guest Editors: E. Curchitser, S.I. Ito, M. Kishi, M. Peck and K. Rose) was published electronically in late 2015 and in hard copy in early 2016.
 - ESSAS requested financial support from PICES to cosponsor the ESSAS Open Science Meeting (OSM) in Tromsø, Norway in June 2017. PICES Science Board agreed to support the request, but will discuss the amount of financial support in greater detail at PICES-2016, after receiving additional details from the conveners of the OSM.
- IMBER Regional Program on CLimate Impacts on Oceanic TOP Predators (CLIOTOP)

- PICES was one of many contributing sponsors of the 3rd CLIOTOP symposium, titled “*Future of oceanic animals in a changing ocean*”, held September 14-18, 2015 in San Sebastian, Spain. PICES co-sponsorship was by providing travel support for Keynote speaker, Dr. Emanuele Di Lorenzo, for the theme session on “*Integrated modelling to project and explore future patterns*”
- No specific financial requests from CLIOTOP were received during the reporting interval.

Representation

To maintain close relations, IMBER/ESSAS and PICES regularly exchange observers at each other’s annual/executive meetings.

- IMBER is normally present as an observer at PICES Annual Meetings. Dr. Yi Xu (Shanghai Regional Project Office) represented IMBER at PICES-2015 and provided a presentation about IMBER activities to Science Board; Lisa Maddison from the IMBER International Project Office will represent IMBER at PICES-2016.
- Drs. Franz Mueter and Sei-ichi Saitoh represented ESSAS at PICES-2015. Both will be at PICES-2016, as will the third co-chair of ESSAS, Dr. Ken Drinkwater.
- Drs. Thomas Therriault (Science Board Chairman) and Hiroaki Saito (Science Board Vice-Chairman) represented PICES at the June 2014 IMBER SSC meeting. We are uncertain (e.g., have no report) of IMBER SSC activities (or even if there was a meeting) in either 2015 or 2016.
- Dr. Sinjae Yoo (Korea) represented SCOR at the PICES-2014 annual meeting in Yeosu, Korea; Dr. Sun Song, Vice-president of SCOR, represented SCOR at the PICES-2015 annual meeting in Qingdao. Dr. Ed Urban will represent SCOR at PICES-2016 in San Diego.

Surface Ocean-Lower Atmosphere Study (SOLAS)

Joint sessions/workshops at PICES Annual Meetings

- PICES and SOLAS convened a joint workshop at PICES-2014 (Yeosu, Korea) on “*SOLAS into the Future: Designing the next phase of the Surface Ocean-Lower Atmosphere Study within the context of the Future Earth Program*”. The workshop was convened by Lisa Miller & Yukihiko Nojima.
- We are unaware (and have no report) of significant joint PICES-SOLAS activities in 2016. This may be because of similar reasons as the IMBER hiatus, as SOLAS was also proposing new initiatives to be associated with Future Earth.

Capacity building activities

- None this year.

HARMFUL ALGAL BLOOM ACTIVITIES SUPPORTED BY SCOR

Co-sponsored symposia/conferences/workshops

PICES partnered with GEOHAB (with ICES and NOAA as other sponsors) in organizing and funding the workshop on “*Harmful algal blooms in a changing world*” (March 18–22, 2013, Friday Harbor, WA, U.S.A.) to assess the state of knowledge on HABS and climate change, and to identify the most critical research needs that can realistically be addressed over the next 5–10 years. The workshop findings were integrated in a manuscript that was published in the international peer-reviewed journal *Harmful Algae*. Wells, M.L., V. L. Trainer, T. J. Smayda, B.S.O. Karlson, C.G. Trick, R.M. Kudela, A. Ishikawa, S. Bernard, A. Wulff, D. M. Anderson, W.P. Cochlan. 2015, Harmful algal blooms and climate change: Learning from the past and present to forecast the future. [Harmful Algae, 49 \(2015\), 68–9.](#)

- The topic areas identified by the workshop participants served as the foundation for an Open Science Meeting on “*Harmful algal blooms and climate change*” that was convened May 19-22, 2015, in Göteborg, Sweden, with supporting sponsors PICES, FORMAS (Swedish Research Council), and GEOHAB. Local sponsors and host in Sweden were the Swedish Meteorological and Hydrological Institute (SMHI) and the University of Göteborg. The symposium was endorsed by SCOR, IOC and ICES.

Other Activities

- GlobalHAB, a new initiative of SCOR and IOC UNESCO held a 1st meeting of their newly formed Scientific Steering Committee in Oban, Scotland in March 2016. PICES supported the travel and participation of Dr. Vera Trainer (USA, co-chair of PICES Section on Harmful Algal Blooms) to the Oban meeting. The SSC and guests agreed to produce a GlobalHAB Science and Implementation Plan by early summer 2016, which would be presented and discussed at an International Conference on Harmful Algae in Brazil in October 2016.
- Harmful algal blooms (HABs) are important concerns in all six PICES member countries, especially so in the Asian members that border the Western North Pacific Asian seas, where HABs have been increasing in prevalence and frequency of occurrence. For this reason, the activities of the Intergovernmental Panel on Harmful Algal Blooms (IPHAB) to consolidate and expand databases on harmful algal events (HAEDAT) and on occurrence of harmful algal species (data will be stored in OBIS), with the view to publish a Global Harmful Algal Bloom Status Report, are important to PICES. PICES is contributing expertise to this report for the Northeast Pacific and Northwest Pacific regions. Other organizations involved in this activity are IOC UNESCO, IAEA, and ICES.

OCEAN CARBON ACTIVITIES SUPPORTED BY SCOR

Communication/coordination

- PICES, through its Working Groups on *CO₂ in the North Pacific* (WG 13; 1998–2001) and *Biogeochemical Data Integration and Synthesis* (WG 17; 2002–2005), and now through the Section on Carbon and Climate (S-CC), has provided coordination for synthesis of ocean carbon research and the development of a network of ocean carbon observations in the North Pacific. The importance of ensuring effective two-way communication with other international scientific groups that have a responsibility for the coordination of ocean carbon research, such as the SCOR/IOC International Ocean Carbon Coordinated Project (IOCCP) and to the SOLAS/IMBER Carbon (SIC) Research Working Group, has been explicitly included in the terms of reference for S-CC. There are S-CC members on SIC's subgroups: Dr. Masao Ishii is on the subgroup 2 on *Interior Ocean Carbon*, and Drs. Richard Feely and Minhan Dai are members of the subgroup 3 on *Ocean Acidification*. Two S-CC members, Drs. Masao Ishii and Alex Kozyr, are also members of the IOCCP Scientific Steering Group.
- Dr. Maciej Telszewski, IOCCP Project Director, is attending PICES-2016, where he will present an invited plenary talk titled “*Future Global Ocean Observing System—Built on Requirements, Promoting Alignment, Delivering Relevant Information*” in the Science Board Session on Monday, 7 November. Dr. Telszewski will also meet with two expert groups of PICES: Section on Carbon and Climate, and the MONITOR Committee during PICES-2016. IOCCP thematic groups include Underway *pCO₂* Observations, Surface CO₂ Data, Ocean Interior Observations, Ocean Interior Data, Time Series Networks, Instruments and Sensors, Data Management, Nutrients, Framework for Ocean Observations, and Ocean Acidification. S-CC members are theme leaders on two of these, Ocean Interior Observations (Ishii) and Ocean Acidification (Feely).

S-CC activities

- The main S-CC goals for 2014–2016 include:
 - To complete publication of scientific analyses arising from PACIFICA data synthesis;
 - To develop data syntheses or products related to ocean acidification and de-oxygenation and their biological and ecosystem impacts in support of FUTURE objectives;
 - To develop a strategy for assessment of the carbon cycle in coastal oceans and marginal seas of the North Pacific (data syntheses, data products, documentation of methods).

SCOR WORKING GROUPS

PICES regularly provides comments on SCOR Working Group proposals and often recommends and funds an Associate Member for PICES-relevant groups. The support from PICES extends the expertise available within the group, increases the geographic coverage of the groups, and helps individual scientists from the North Pacific become more involved in SCOR activities, which benefits both organizations.

- PICES currently supports Associated Members for two SCOR Working Groups:

- WG 140 on *Biogeochemical Exchange Processes at the Sea-Ice Interfaces* (Dr. Lisa Miller, Canada).
- WG 149 on *Changing Ocean Biological Systems: how will biota respond to a changing ocean?* (COBS) (Dr. Uta Passow, USA)
- The SCOR Working Group proposals for 2016 were reviewed by PICES’ Standing Committees from the view point of their scientific interests and relevance to the PICES integrative science program, FUTURE. One of the proposed SCOR Working Groups was broadly favored by PICES. If approved by SCOR, we would support an Associate Member to the proposed working group titled, “*Eastern Boundary Upwelling Ecosystems (EBUE): inter-comparisons, variability and forecasting responses to climate and global change*”.

CAPACITY BUILDING

SCOR and PICES have long-standing cooperation in capacity building.

- SCOR provides travel support for scientists from countries with “economies in transition” to participate in SCOR-relevant sessions/workshops at PICES Annual Meetings, international symposia and capacity building events led/co-organized by PICES. For this reporting period, funding from the SCOR/NSF fund was provided/committed for the following events (see Appendix I for details):
 - \$5,000 USD for the PICES-ICES 6th Zooplankton Production Symposium that was held in May 2016 in Bergen, Norway. Four scientists were recommended and approved for funding using SCOR funds (Appendix I, Table 1). Three of these attended. Unfortunately, one scientist from Peru was unable to attend. The unused funds (\$1,490 USD) from the cancelled traveler were reallocated (with the approval of Dr. Urban) to travel support for the May 2017 Early Career Scientist Conference “*Climate, Oceans and Society: Challenges and Opportunities*”, in Busan, Korea.
 - \$5,000 USD for the PICES-2016 Annual Meeting “*25 Years of PICES: Celebrating the Past, Imagining the Future*”, which will occur from 2-13 November 2016 in San Diego, CA, USA. The scientists to be offered SCOR travel support are still being discussed/negotiated at the time of this report. Details of those selected will be available at the SCOR annual meeting in Sopot.
 - \$5,000 USD for an international symposium “*Drivers of Dynamics of Small Pelagic Fish Resources*” that will be held March 6-11, 2017 in Victoria, British Columbia, Canada. Registration, abstracts and financial support requests are being accepted through October 1, 2016.
- PICES continues to provide travel support for students and early career scientists from PICES member countries to summer schools and meetings of SCOR-sponsored large-scale research projects. The following event was co-sponsored by PICES in 2016:
 - IMBER ClimECO5 Summer School on “*Towards a more resilient oceans: predicting and projecting future changes in the ocean and their impacts on human societies*” (August 10-17, 2016, Natal, Brazil) by providing travel funds for two early career scientists from PICES member countries: 1 from Russia, 1 from China (PICES expenses ~ \$5,374 USD; see earlier description);
- SCOR and PICES share ideas on capacity building, and a PICES representative has participated on the SCOR Committee on Capacity Building. Dr. Harold Batchelder has served in this capacity since September 2012.

REQUESTS FOR CONSIDERATION BY SCOR

- Travel support at a level of \$5,000 USD is requested for scientists from countries with “economies in transition” to attend SCOR-relevant sessions/workshops at the [2017 PICES Annual Meeting](#) to be held in October 2017, in Vladivostok, Russia, under the theme “*Environmental changes in the North Pacific and Impacts on Biological Resources and Ecosystem Services*”.

Appendix I. Financial Summary to SCOR of Capacity Building Related expenditures

Table 1. SCOR Funds for 2016 Events/Meetings:

PICES/ICES 6th Zooplankton Production Symposium, Bergen Norway, 9-13 May 2016

PICES-2016 Annual Meeting, San Diego, USA, 2-13 November 2016

Event	Participant (Sex)	Country of origin	Grant
6 th Zooplankton Prod Symp	Tuba Terbiyik Kurt (F)	Turkey	\$720 USD
6 th Zooplankton Prod Symp	Mary Mar Noblezada (F)	Philippines	\$1,300 USD
6 th Zooplankton Prod Symp	Luz Ximena Orosco Montenegro (M)	Peru	\$1,490 USD
6 th Zooplankton Prod Symp	Jorge Luis Barturen Silva (M)	Peru	Orig \$1,490 USD withdrew—funds transferred per Ed Urban to 2017 ECS Conference, Busan, Korea
PICES-2016 Annual Mtg	Not determined yet		\$5,000 USD avail
		Total USD	\$10,000 USD

* SCOR's grants totaling US\$10,000; \$3,510 spent; \$1,490 transferred to 2017 ECS Conference (see Table 2); \$5,000 for PICES-2016 not allocated yet

Table 2. SCOR Funds for 2017 Events/Meetings:

Int. Symp. on “Drivers of Dynamics of Small Pelagic Fish Resources”, Victoria, Canada, 6-11 March 2017

PICES-ICES 3rd Early Career Scientist Conference, Busan, Korea, 30 May-2 June 2017

PICES-2017 Annual Meeting, Vladivostok, Russia, October 2016

Event	Participant (Sex)	Country of origin	Grant
Small Pelagic Fish Symp.			\$5,000 USD
3 rd ECS Conference			\$1,490 USD
PICES-2017 Annual Mtg			???—see request
		Total USD	\$6,490 USD