



PICES-2018 Annual Meeting

Toward Integrated Understanding of Ecosystem Variability in the North Pacific

Program

**Yokohama, Japan
Oct. 25 — Nov. 4, 2018**

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Photo, Front Cover: Foreign Chambers of Commerce near the Yokohama Harbour, Ukiyo-e print, 1872, Hiroshige Utagawa III. Property of the Yokohama Archives of History.

Notes for Guidance

The North Pacific Marine Science Organization (PICES) announces its 2018 Annual Meeting to be held October 25 - November 4, 2018, at the Workpia Yokohama convention facility. The meeting is hosted by the Japanese government and in coordination with PICES Secretariat. Local arrangements are made by the City of Yokohama and the PICES-2018 local organization committee (LOC) comprised of Fisheries Agency and Japan Fisheries Research and Education Agency.

Presentations

In order to allow the sessions to run smoothly, and in fairness to other speakers, please note that all presentations are expected to adhere strictly to the time allocated. All authors should designate at least 5 minutes for questions. Authors can download their presentations directly to the computers where the session/workshops will be held.

Important: Please rename your files - time-name.ppt (e.g. 0900-Smith.ppt, 1530-Kim.ppt).

Posters

Posters for all sessions and workshops will be on display from the morning of Wednesday 31 October through the evening of Thursday, November 1, until the end of the Evening Poster Session/Reception.

Poster presenters are expected to be available near their posters to answer questions during the Thursday evening poster session, 18:00-21:00.

Location of the Poster Session: Marineria Room.

Internet access

Internet access via wireless LAN will be available in the main venue Workpia Yokohama and in the sub venue Yokohama Sanbo Hall (Marineria), where the poster session will be held

Social activities

Monday, October 29 (18:30-21:00)
Osanbashi Yokohama

Welcome Reception

The Welcome Reception for all participants (and registered guests)

Tuesday, October 30 (18:30-21:00)
TBA at the Meeting

Sport Event

Please sign up for participation at the Registration Desk

Thursday, November 1 (18:00-21:00)
Marineria Room

Wine & Cheese Poster Session Reception

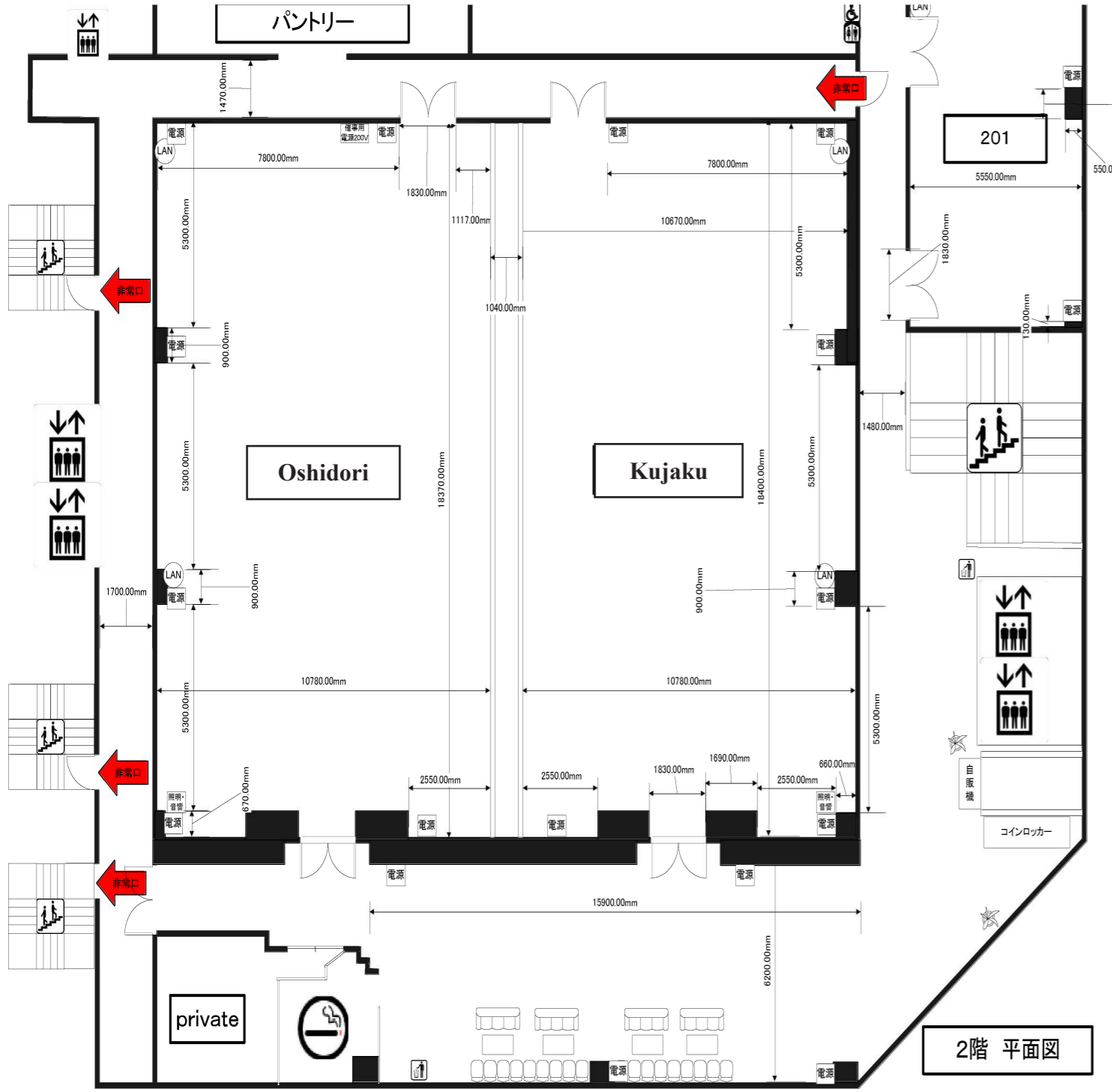
The wine & cheese Poster Sessions at the meeting venue will allow participants to roam around the poster displays and chat with presenters while sipping beer or wine and nibbling on hot and cold hor d'oeuvres.

Posters must be removed at end of evening.

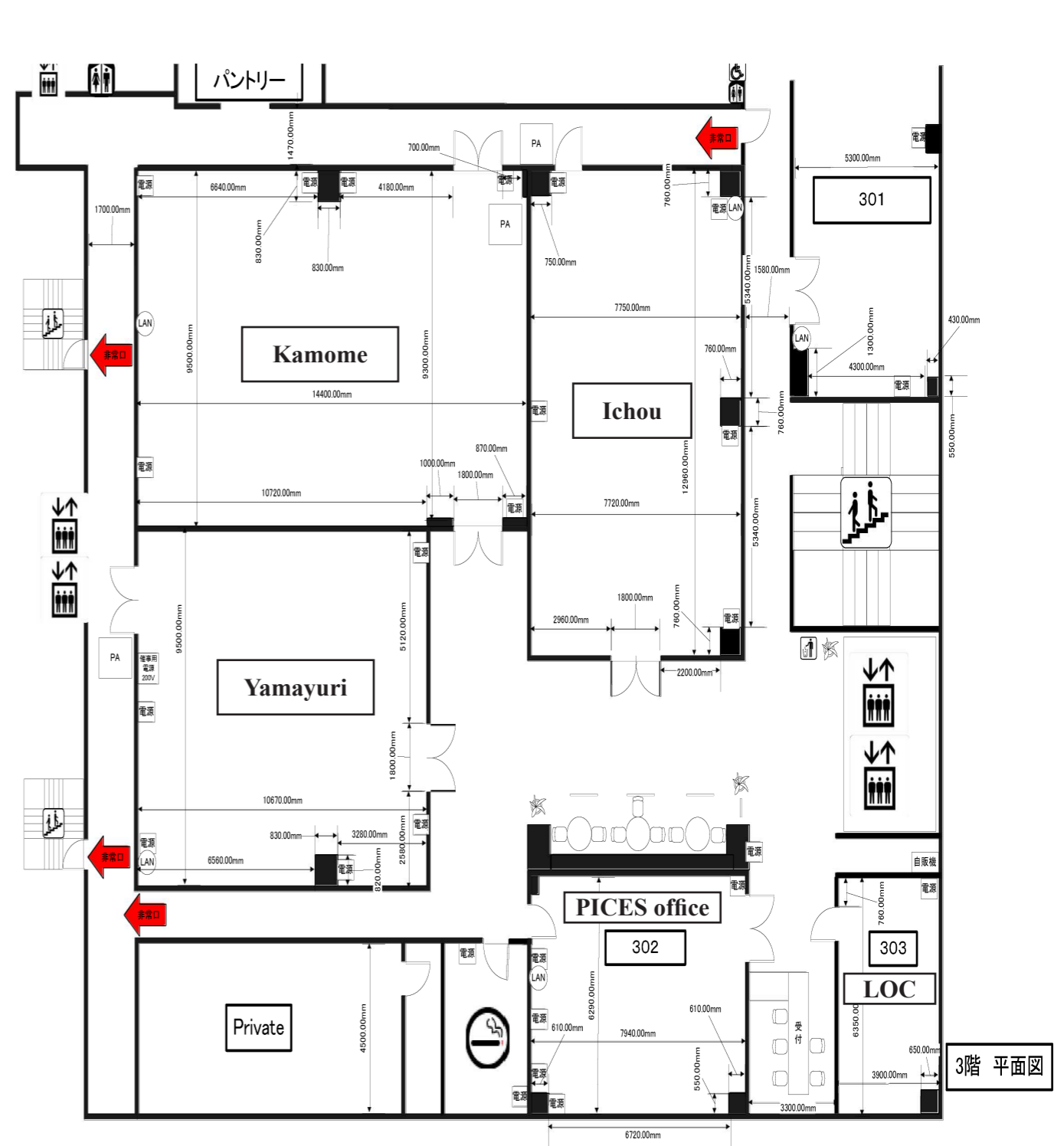
PICES Secretariat and Local Organizing Committee
are located in Room 302 and Room 303

(*) Identifies an Early Career Scientist

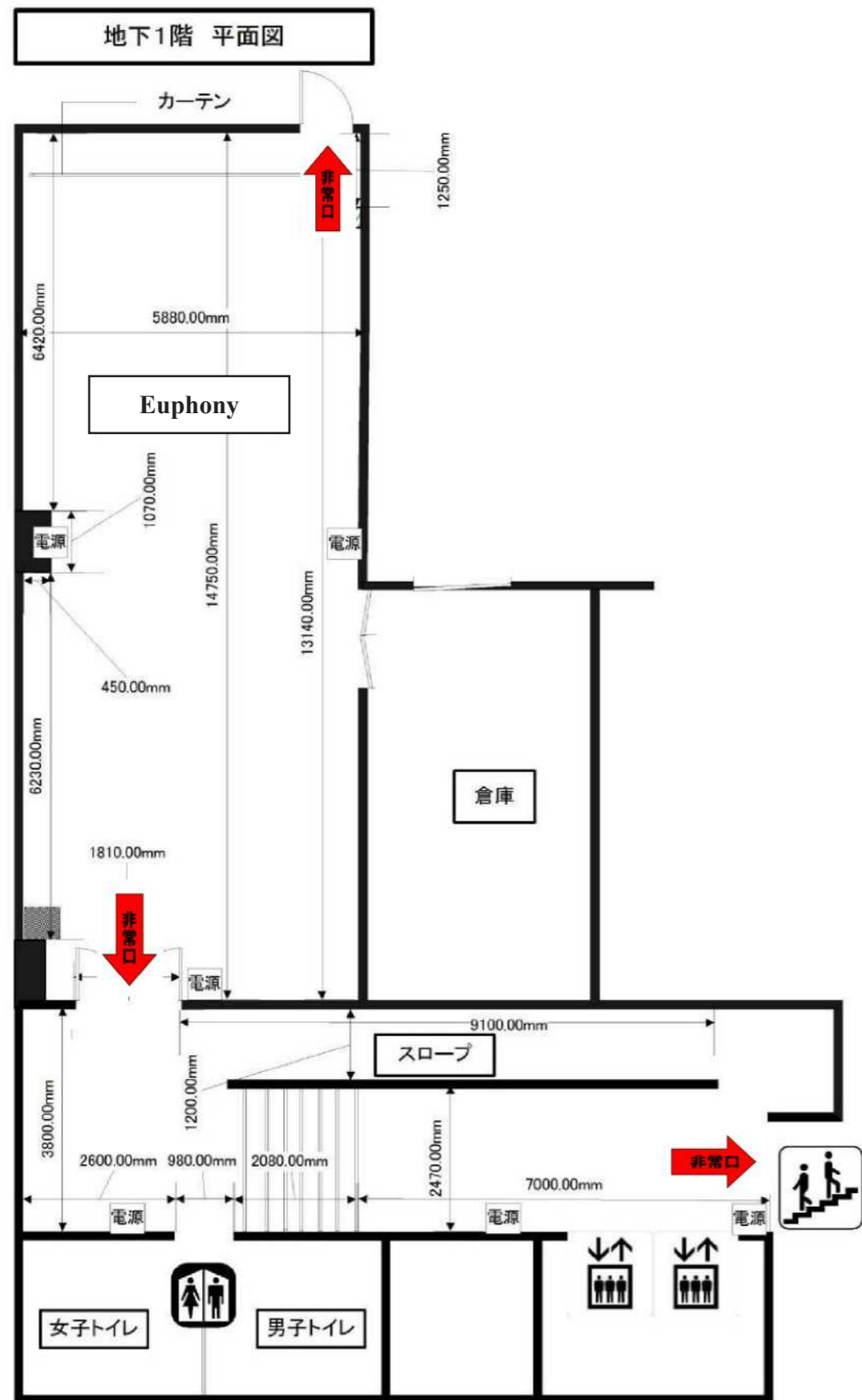
WORKPIA 2nd FLOOR



WORKPIA 3rd FLOOR



WORKPIA B1 FLOOR



List of Sessions and Workshops

S1	Oct. 29-30	Toward integrated understanding of ecosystem variability in the North Pacific
S2	Nov. 1	Fish production through food web dynamics in the boundary current systems
S3	Nov. 1	Science communication for North Pacific marine science
S4	Oct. 30	Indicators for assessing and monitoring biodiversity of biogenic habitats
S5	Oct. 30	Seasonal to interannual variations of meso-/submeso-scale processes in the North Pacific
S6	Oct. 31	The FUTURE of PICES: Next steps in understanding, forecasting and communicating climate impacts on North Pacific marine ecosystems
S7	Oct. 30	Ecological responses to variable climate changes and their applicability to ecosystem predictions
S8	Nov. 1	Internal tides, nonlinear internal waves, and their impacts on biogeochemistry, climate and marine ecosystems via ocean turbulent mixing processes
S9	Oct. 30	Integration of science and policy for sustainable marine ecosystem services
S10	Nov. 1	Ocean acidification and deoxygenation and their impact on ocean ecosystems: Synthesis and next steps
S11	Nov. 1-2	Influence of climate and environmental variability on pelagic and forage species
S12	Oct. 30	Applying ecosystem considerations in science advice for managing highly migratory species
BIO-P	Nov. 2	Biological Oceanography Committee Paper Session
FIS-P	Nov. 2	Fisheries Science Committee Paper Session
HD-P	Nov. 2	Human Dimension Committee Paper Session
MEQ-P	Oct. 30, Nov. 1	Marine Environmental Quality Committee Paper Session
POC-P	Nov. 2	Physical Oceanography and Climate Committee Paper Session
W1	Oct. 25	Ecological roles of gelatinous zooplankton: Evaluation, integration and future prospects in a more gelatinous ocean
W2	Oct. 25	PICES contribution to Central Arctic Ocean (CAO) ecosystem assessment
W3	Oct. 25	Development of a systematic approach to data management in PICES
W4	Oct. 28	Synthesizing projected climate change impacts in the North Pacific
W5	Oct. 25	Identifying common reference points and leading indicators of ecosystem change
W6	Oct. 25	Regional evaluation of secondary production observations and application of methodology in the North Pacific
W7	Oct. 25	Diets, consumption, and abundance of marine birds and mammals in the North Pacific
W8	Oct. 27	Taking Stock of Marine Ecosystem Services in the North Pacific – Exploring examples and examining methods

Meeting Timetable

Room 7F in
Yokohama
Media &
Communications
Center (6-8 min
walk from
Workpia)

Thursday, October 25							
09:00 12:30	Yamayuri Room	Room 7F	Kamome Room	Room 201	Room 301		
	W1 Gelatinous Zooplankton	W3 Data Management	W5 Common Reference Points	W7 Birds and mammal diets	W2 Central Arctic Assessment		
14:00 18:00					W6 Secondary Production		
Friday, October 26							
09:00 12:30	Kamome Room	Yamayuri Room	Room 301	Oshidori Room	Room 201		
	AP-CREAMS Bus. Mtg	WG-39 (Central Arctic) Bus. Mtg	WG-36 (Common Ref Pts) Bus. Mtg	WG-40 (Clim/Ecos Pred) Bus. Mtg	SG-MMP Bus. Mtg		
14:00 18:00							
Saturday, October 27							
09:00 12:30	Kamome Room	Yamayuri Room	Oshidori Room	Room 201	Euphony Room	Room 301	
	WG-35 (NPESR3) Bus. Mtg	WG-32 (Biog. Hab) Bus. Mtg	WG-38 (Meso/submeso Processes)	AP-NIS Bus. Mtg	S-CC Bus. Mtg	WG-41 (MES) Workshop W8	
14:00 18:00						WG-41 (MES) Bus. Mtg	
Sunday, October 28							
09:00 12:30	Room 201	Kamome	Yamayuri	Kujaku	Oshidori	Euphony	Room 301
	SB Bus. Mtg (closed)	SG-PICES/ NPFC Bus. Mtg	W4 S-CCME	AP-NPCOOS Bus. Mtg	WG-41 (MES) Bus. Mtg	WG-41 (MES) Bus. Mtg	S-MBM Bus. Mtg
			S-CCME Bus. Mtg				
14:00 17:00	FUTURE Bus. Mtg		WG-33 (Carbon Flux) Bus. Mtg	WG-37 (Zoopl Prod.) Bus. Mtg	WG-34 (HMS) Bus. Mtg		
18:00 20:00	HD Bus. Mtg Day 1	MEQ Bus. Mtg Day 1	FIS Bus. Mtg Day 1	MONITOR Bus. Mtg Day 1	POC Bus. Mtg Day 1	TCODE Bus. Mtg Day 1	BIO Bus. Mtg Day 1
Monday, October 29 [Oshidori + Kujaku Rooms]							
08:45 10:10	Opening Session						
10:30 18:20	Plenary Science Board Symposium (S1)						
18:30 21:00	[Osanbashi Yokohama] Welcome Reception (for all participants and registered guests)						
Tuesday, October 30							
09:00 10:30	[Oshidori + Kujaku] PLENARY SESSION						
10:50 12:50	Kamome	Oshidori	Kujaku	Yamayuri	Room 201	Room 301	
	S12/FIS (HMS)	S4/BIO (Biogenic Hab)	S7/FUTURE (Ecol. Responses)	S9/HD (Science Policy)	S5/POC (Meso/ submeso)	F&A Meeting (closed)	
14:00 16:00	S1 (Day 2)						
16:20 18:00							
18:00 21:00	Yamayuri Room		Kamome Room		Offsite		
	S-HAB Business Meeting		FUTURE SSC Business Meeting		Sporting Event (18:30-21:00)		

Meeting Timetable (continued)

Wednesday, October 31 [posters can be displayed starting at noon]							
09:00 12:50	Oshidori + Kujaku				Room 301		
	S6 FUTURE Plenary (FUTURE - Next Steps)				F&A Meeting (closed)		
14:00 18:00	Room 201	Kamome	Yamayuri	Kujaku	Oshidori	Ichou	Room 301
	HD Bus. Mtg Day 2	MEQ Bus. Mtg Day 2	FIS Bus. Mtg Day 2	MONITOR Bus. Mtg Day 2	POC Bus. Mtg Day 2	TCODE Bus. Mtg Day 2	BIO Bus. Mtg Day 2
18:00 21:00	[Marineria Room] POSTER SESSION*						
Thursday, November 1 [posters available for viewing all day] Marineria Room							
09:00 10:30	[Oshidori + Kujaku] PLENARY SESSION						
10:50 12:50	Kamome	Oshidori	Room 201	Yamayuri	Kujaku		
	S11/MON (Day 1) (Pelagic/Forage Fish)	S2/FIS (Fish Prod)	S3/FUTURE (Science Committee)	S10/BIO (OA)	S8/POC (Mixing/Tides)		
14:00 18:00			MEQ-P (Day 2)				
18:00 21:00	[Marineria Room] POSTER SESSION / RECEPTION* "Wine and Cheese"						
Friday, November 2							
09:00 12:40	Yamayuri	Oshidori	Kujaku	Kamome	Room 201	Room 301	
	BIO-Paper	FIS-Paper	S11/MON (Day 2) (Pelagic/Forage Fish)	POC-Paper	HD-Paper	MAFF Meeting	
12:50 13:50	[Kujaku] Closing Session**						
14:00 18:00	Science Board Meeting (closed) [Oshidori]					MAFF Meeting	
18:30 21:00	Chairman's Reception [by invitation only]						
Saturday, November 3 [PICES Office: Room 302; Local Organizing Committee: Room 303]							
09:00 18:00	Ichou			Room 201			
	Science Board Meeting (closed)			Governing Council Meeting (closed)			
Sunday, November 4 [PICES Office: Room 302; Local Organizing Committee: Room 303]							
09:00 18:00	Room 201 Governing Council Meeting (closed)						

* Poster presenters are expected to be available to answer questions for at least one hour
(19:00-20:00: Thursday, Nov. 1)

** Award recipients for Best Oral/Poster presentations will be announced during the Closing Session

12:30-14:00 Lunch
10:30-10:50 and 16:00-16:20 Coffee Breaks

PICES Acronyms

Committees

BIO	Biological Oceanography Committee
FIS	Fishery Science Committee
HD	Human Dimensions Committee
MEQ	Marine Environmental Quality Committee
MONITOR	Technical Committee on Monitoring
POC	Physical Oceanography and Climate Committee
TCODE	Technical Committee on Data Exchange

Advisory Panels

AP-CREAMS	Advisory Panel for a CREAMS/PICES Program in East Asian Marginal Seas <i>(reports to MONITOR and POC Committees)</i>
AP-NIS	Advisory Panel on Marine Non-indigenous Species <i>(reports to MEQ Committee)</i>
AP-NPCOOS	Advisory Panel on North Pacific Coastal Ocean Observing Systems <i>(reports to MONITOR and TCODE Committees)</i>

Sections

S-CC	Section on Carbon and Climate <i>(reports to BIO and POC Committees)</i>
S-CCME	Joint PICES/ICES Section on Climate Change Effects on Marine Ecosystems <i>(reports to BIO, FIS and POC Committees)</i>
S-HAB	Section on Ecology of Harmful Algal Blooms in the North Pacific <i>(reports to MEQ Committee)</i>
S-MBM	Section on Marine Birds and Mammals <i>(reports to BIO Committee)</i>

Study Group

SG-MMP	Study Group on Marine Microplastics <i>(reports to Science Board)</i>
SG-PICES-NPFC	Joint PICES-NPFC Study Group for Scientific Cooperation in the North Pacific Ocean <i>(reports to Science Board)</i>

Working Groups

WG-32	Working Group on Biodiversity of Biogenic Habitats <i>(reports to BIO Committee)</i>
WG-33	Joint PICES/ICES Working Group on Climate Change and Biologically-driven Ocean Carbon Sequestration <i>(reports to BIO Committee)</i>
WG-34	Joint PICES/ISC Working Group on Ocean Conditions and the Distribution and Productivity of Highly Migratory Fish <i>(reports to FIS Committee)</i>
WG-35	Working Group on Third North Pacific Ecosystem Status Report (WG-NPESR3) <i>(reports to MONITOR Committee and FUTURE SSC)</i>

WG-36	Working Group on Common Ecosystem Reference Points across PICES Member Countries <i>(reports to FUTURE SSC)</i>
WG-37	Working Group on Zooplankton Production Methodologies, Applications and Measurements in PICES Regions <i>(reports to BIO Committee)</i>
WG-38	Working Group on Mesoscale and Submesoscale Processes <i>(reports to POC Committee)</i>
WG-39	Joint PICES/ICES/PAME Working Group on an Integrated Ecosystem Assessment for the Central Arctic Ocean <i>(reports to Science Board)</i>
WG-40	Working Group on Climate and Ecosystem Predictability <i>(reports to POC Committee and FUTURE SSC)</i>
WG-41	Working Group on Marine Ecosystem Services <i>(reports to HD Committee)</i>

Scientific Program

FUTURE-SSC	Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Marine Ecosystems – Scientific Steering Committee
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Session and Workshop Descriptions

S1: Science Board Symposium

Toward integrated understanding of ecosystem variability in the North Pacific

Convenors:

Hiroaki Saito (SB) *corresponding*, Se-Jong Ju (BIO), Xianshi Jin (FIS), Keith Criddle (HD), Chuanlin Huo (MEQ), Jennifer Boldt (MONITOR), Emanuele Di Lorenzo (POC), Joon-Soo Lee (TCODE), Steven Bograd (FUTURE), Sukyung Kang (FUTURE), Igor Shevchenko (Russia), Motomitsu Takahashi (Japan)

Invited Speakers:

Kirstin Holsman (NOAA Alaska Fisheries Research Center, Seattle, USA)
Michio Kondoh (Tohoku University, Japan)
Xiujuan Shan (Yellow Sea Fisheries Research Institute, CAFS, China)

The North Pacific marine ecosystem is an assemblage of many local marine ecosystems characterized by regional-specific environmental conditions and biological structures. The status of regional ecosystems is subject to the influence of local changes in various factors as well as interactions with adjacent local marine ecosystems and modifications by basin-scale processes. In recent decades, changes attributable to the influence of global warming have become more apparent, including extreme events in the atmosphere and the ocean that threaten marine ecosystems. Climate projections show monotonic increases in ocean warming and increased frequency of extreme events, such as marine heat waves. Measures to mitigate climate change and to achieve sustainable use of marine resources are integral to the Sustainable Development Goals adopted by the United Nations in 2015. Adaptation to present and anticipated marine ecosystem change is essential to enable humans to use ecosystem services in a sustainable manner. Consequently, policy makers need information about the status of regional marine ecosystems and forecasts of how they will change. Meeting that need requires information based on an integrated understanding of ecosystem variability in the North Pacific.

We encourage submission of papers on mechanisms of ecosystem responses to natural and anthropogenic forcing across the spectrum of time and space scales in the North Pacific, as well as monitoring, retrospective analysis, and forecasting ecosystem variability. In particular, papers that characterize variability in each regional ecosystem and link them to basin and global scales are welcome. Anticipated changes in North Pacific marine ecosystems include changing water temperature and upwelling intensity, increased occurrence of hypoxia, harmful algal blooms, and ocean acidification, as well as broader impacts from pollutants and contaminants, coastal development, and fishing. In addition, papers are encouraged on strategic options to forestall, mitigate, or adapt to ecosystem change. Examination of interactions among regional marine ecosystems and relationships between regional and basin-scale ecosystem variability will provide an improved understanding of marine ecosystem structure and function in the North Pacific in the face of climate change.

S2: FIS/BIO Topic Session

Fish production through food web dynamics in the boundary current systems

Convenors:

Motomitsu Takahashi (Japan) *corresponding*, Yuji Okazaki (Japan), Ryan Rykaczewski (USA), Akash Sastri (Canada)

Invited Speaker:

Chih-hao (Zac) Hsieh

Trophic interactions from nutrient to fish are variable spatially and temporally in the North Pacific ecosystems. Fish production has been recognized generally as the grazing food chain: diatom-calanoïd copepod-fish. In addition, microbial food chain and jelly-associated chain also work for maintaining biological production. Comparative studies on trophic interactions between the western boundary current (Kuroshio and Kuroshio Extension) and the eastern boundary current (California Current) would reveal biogeochemical characteristics in the North Pacific marine ecosystems. This session aims to reveal trophic interactions through nutrient supply to fish production and to compare the structures and function between the different boundary systems in the North Pacific. Interaction examples of nutrient supply, community structures of phyto- and zooplankton, food availability for fish larvae and the synergistic model in the ecosystem are highly encouraged. We also seek presentations on trophic interactions revealed using not only traditional approaches based on observations but also contemporary approaches including stable isotopes and DNA bar-coding analyses.

S3: FUTURE Topic Session

Science communication for North Pacific marine science

Convenors:

Toyomitsu Horii (Japan), (MEQ / FUTURE SSC), *corresponding*, Ekaterina Kurilova (Russia), (HD), Mitsutaku Makino (Japan), (HD / FUTURE SSC), Jackie King (Canada), (FIS, FUTURE SSC, S-CCME)

Invited Speaker:

Alan Haynie (Alaska Fisheries Science Center, National Marine Fisheries Service, USA)

Science communication between researchers and society is increasing in importance for PICES' integrated marine science. For example, natural scientific information about sustainable uses of ecosystems cannot be meaningful if the social and economic expectations of the users are not considered. The goal of ecosystem conservation activities, or sustaining "a good ecosystem", cannot be decided without deliberate discussions that include society. In addition, each country or society has a specific view of "a good ecosystem" which could benefit from larger-scale coordination and comparison within the North Pacific basin. Conducting multi-disciplinary integrated marine ecosystem studies, such as those supporting the FUTURE Science Program, requires close and effective interaction of concepts, methodologies, models, and data, from various disciplines. Dissemination of that complex scientific information to society can be difficult. The PICES' scientific community would benefit from hearing examples of successful scientific communication. An example of communication to society includes providing scientific information about the fish stock sustainability and is often used by fish consumers with impacts on market demand which can ultimately decide the fishing pressure on the marine resources. A better understanding by stakeholders of the scenarios of future ecosystem states is an important step towards a society resilient and adaptable to global changes. This Topic Session invites studies about science communications such as those above. Theoretical studies, case studies, experiences, and perspectives for better science communication for the PICES activities are encouraged.

S4: BIO Topic Session

Indicators for assessing and monitoring biodiversity of biogenic habitats

Convenors:

Anya Dunham (Canada) *corresponding*, Hye-Won Moon (Korea)

Invited Speakers:

Yves-Marie Bozec (The University of Queensland, Australia)

Biogenic habitats formed by corals, sponges, and other structure-forming taxa support high species abundance and biodiversity, including socio-economically important fishes and invertebrates. These habitats are also known to be vulnerable to disturbances from human impacts and climate change. Predicting, assessing, and monitoring shifts in habitat-forming species and associated communities in response to natural and anthropogenic forcing require suites of measurable indicators. The goal of this session is to improve our understanding of ecologically relevant, sensitive, observation-based indicators for assessing and monitoring biogenic habitats. We invite presentations on indicators encompassing single or compound metrics of the marine biota in a broad sense (from physiological to species, community and habitat levels) which could be measured to indicate the condition of biogenic habitats and monitor changes to the habitats and communities they support. Empirical studies and literature reviews on indicator development, assessment, and/or application are invited. WG-32 members and collaborators will present a literature review of documented functional associations between commercially important fish and invertebrate species and biogenic habitats and address methods to incorporate these associations into indicator development. This session will help improve our understanding and ability to identify and characterize changes in biogenic habitats, as well as their recovery potential. The results of this session will help inform management and policy decisions and marine spatial planning processes that can maintain ecosystem biodiversity, structure, and function.

S5: POC Topic Session

Seasonal to interannual variations of meso-/submeso-scale processes in the North Pacific

Co-sponsor: OMIX

Convenors:

Annalisa Bracco (USA) *corresponding*, Sachihiko Itoh (Japan), Elena Ustinova (Russia)

Invited Speakers:

Yu-Lin Eda Chang (Japan Agency for Marine-Earth Science and Technology, JAMSTEC)
Bo Qiu (Department of Oceanography, University of Hawaii at Manoa)

Recent observations and model simulations suggest that the ocean currents and biogeochemistry at and near the ocean surface undergo prominent seasonal variability at the submesoscales (scales of 0.1–10 km). The submesoscale seasonal variability is a function of the ratio of lateral to vertical density gradients and, in the open ocean, depends primarily on the mesoscale activity of the flow. Consequently, in the open ocean numerous submesoscale cyclonic eddies can form in winter and the vorticity distributions are skewed towards positive values typical of cyclonic structures. This skewness is highly reduced from spring to fall. In coastal areas, on the other hand, density gradients can be forced not only by mesoscale circulations but also by freshwater fluxes from rivers or melting glaciers, resulting in a seasonal cycle that may differ significantly from region to region, and in interannual variability controlled in part by hydrological and cryospheric processes. Implications of such variability for the ocean biogeochemistry and nutrient distributions are poorly understood. This session aims at characterizing the variability of mesoscale and submesoscale circulations and its linkages with the marine ecosystem in the PICES region at seasonal-to-interannual scales. We welcome as well contributions about future changes in mesoscale variability or in mixed-layer depth and its buoyancy, and therefore in submesoscale variability, in warming climate scenarios.

S6: FUTURE Topic Session

The FUTURE of PICES: Next steps in understanding, forecasting and communicating climate impacts on North Pacific marine ecosystems

Convenors:

Sukyung Kang (Korea) *corresponding*, Steven Bograd (USA)

‘Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Marine Ecosystems’ (FUTURE) is the flagship integrative Scientific Program undertaken by the member nations and affiliates of PICES. Since its inception in 2009, FUTURE has contributed to guiding PICES science to understand how marine ecosystems in the North Pacific respond to climate change and human activities, to forecast ecosystem status based on a contemporary understanding of how nature functions, and to communicate new insights to its members, governments, stakeholders and the public. FUTURE is scheduled to conclude in 2019, so this is a good time to reflect on its accomplishments, to identify remaining gaps in fulfilling its research objectives, and to contemplate new directions for PICES science. In this session, we will conduct a FUTURE ‘Mini-Symposium’ to update the PICES community on FUTURE progress and to coordinate activities amongst the PICES Expert Groups. Each Expert Group will provide a brief review of their past, current and planned activities as they relate to the FUTURE Science Program, which will be followed by a plenary discussion on the future path of PICES science in the coming years.

S7: POC/FUTURE Topic Session

Ecological responses to variable climate changes and their applicability to ecosystem predictions

Endorsed by CLIVAR

Convenors:

Ryan Rykaczewski (USA) *corresponding*, Akinori Takasuka (Japan), Chan Joo Jang (Korea)

Invited Speaker:

Susan Allen (University of British Columbia (UBC), Canada)

In the North Pacific, regional and large-scale climate forcing impacts a range of physical and ecological characteristics including temperature, stratification, ocean circulation, upwelling, biogeochemical properties, and primary and secondary production. These characteristics, in turn, can impact the distribution, composition, and productivity of fisheries resources. However, the accuracy of many climate-ecosystem relationships derived from historical observations deteriorates when faced with new observations. Reducing the uncertainty associated with climate-ecological relationships requires an understanding of the mechanisms that govern empirical correlations. In this session, we seek presentations focused on climate-ecosystem relationships and whether such relationships can be expected to persist under future (e.g., months to decades) climate conditions. Many regional and large-scale properties of the physical ocean state can be skillfully predicted over scales of seasons (and years for some properties), and we hope that such ability, with further clarification of predictable properties in different regions on different timescales, can be used in combination with understanding of robust climate-ecosystem relationships to provide forecasts of marine ecosystems that will be useful to resource management and utilization.

S8: POC/FUTURE/MONITOR Topic Session

Internal tides, nonlinear internal waves, and their impacts on biogeochemistry, climate and marine ecosystems via ocean turbulent mixing processes

Co-sponsor: OMIX

Convenors:

Shin-ichi Ito (Japan) *corresponding*, SungHyun Nam (Korea), John Barth (USA), Annalisa Bracco (USA)

Invited Speakers:

Kristen Davis (University of California, USA)
Yign Noh (Yonsei University, Korea)
Ichiro Yasuda (The University of Tokyo, Japan)

Mixing in the ocean occurs over a broad range of scales and plays a major role in the exchanges of water, nutrients, carbon and heat, thus controlling ocean biogeochemistry and climate. Ocean turbulent mixing is often associated with internal tides and nonlinear internal waves, however the internal wave generation, propagation, and dissipation mechanisms in most of the North Pacific are not well understood due to limited observations and model capabilities. Intense ocean mixing generally occurs in presence of tidal movements around rough bottom topography such as that found on continental shelves, in straits, atop ocean ridges, and around island chains. Strong internal tides and nonlinear internal waves are commonly found in the North Pacific, particularly in shallow seas, outer and inner shelves, and nearshore zones. Recently, a periodic fluctuation of seawater properties, nutrients and oxygen concentrations synchronous with the 18.6-year nodal tide has been observed in the subarctic and subtropical oceans in the North Pacific. Some studies have suggested that the 18.6-year nodal tide might regulate a basin wide climate mode in the North Pacific that has the potential to accelerate or decelerate climate warming depending on the phase. Given the key role played by ocean mixing in controlling biogeochemical interactions and global climate variability, it is our urgent task to elucidate mechanisms of ocean turbulent mixing processes and its impacts.

We propose a topic session that involves participation from multiple PICES committees and focuses on internal tides, nonlinear internal waves, ocean mixing processes, and their impacts on biogeochemistry, climate and marine ecosystems. Specifically, we would welcome presentations on topics such as (a) observational and numerical approaches to understand internal tides, nonlinear internal waves, ocean mixing processes and their distribution, (b) turbulent mixing impacts on biogeochemistry, climate and marine ecosystems, (c) future projections of North Pacific considering 18.6-year nodal tide.

S9: HD Topic Session

Integration of science and policy for sustainable marine ecosystem services

Convenors:

Shang Chen (China) *corresponding*, Daniel K. Lew (USA), Jungho Nam (Korea)

The provisioning, cultural, regulating and supporting services are the major benefits people obtain from the coastal and marine ecosystems. The identification, quantification, valuation and management of ecosystem services are key scientific questions, and have attracted more concerns from both the major intergovernmental organizations (such as PICES, ICES, IMBeR, IPBES) and the environmental organizations (such as WWF, TNC, ESP). The goals of this session are: (1) to provide a venue for marine scientists and social scientists to exchange results from research on identification, quantification, valuation and management of ecosystem services, and (2) to provide a platform to share and discuss the integration of ecosystem service science into policy-making of marine affairs. This session will continue providing strong support to the TORs of HD committee and contribute a greater understanding of social and economic status of the North Pacific ecosystem and fill the gaps to achieve the FUTURE Objectives.

S10: POC/BIO Topic Session

Ocean acidification and deoxygenation and their impact on ocean ecosystems: Synthesis and next steps

Co-sponsor: ICES

Convenors:

Tsuneo Ono (Japan) *corresponding*, Jim Christian (Canada), Silvana Birchenough (ICES)

Invited Speakers:

Christopher Harley (Department of Zoology, University of British Columbia, Canada)
Shoshiro Minobe (Faculty of Science, Hokkaido University, Japan)

Studies of ocean acidification (OA) are showing progress, in particular, monitoring of oceanic acidification status (ca. pH, pCO₂ and Ω aragonite, Ω calcite) in the various PICES countries has significantly progressed in recent years. Progress has also been achieved in the field of biological OA impact. The importance of interactions with other stressors (temperature, deoxygenation, etc.), interspecific interaction (e.g., OA effects on prey species), and biological ability to adapt to OA stress, are increasingly recognized. We welcome presentations from the fields of OA monitoring and impact experiments, to construct new perspective on present OA status in the North Pacific. Presentations on future projections are also welcome. We also welcome presentations about plans for further progress in our understanding, such as continuous carbon system monitoring by new technologies, new experimental studies for OA adaptation, and field observation of biological responses to existing OA and deoxygenation events.

S11: MONITOR Topic Session

Influence of climate and environmental variability on pelagic and forage species

Convenors:

Matthew Baker (USA) *corresponding*, Sei-Ichi Saitoh (Japan), Mary Hunsicker (USA), Elizabeth (Ebett) Siddon (USA)

Invited Speaker:

Haruka Nishikawa (Japan Agency for Marine-Earth Science and Technology, Japan)

Climate and environmental variability have profound effects on pelagic ecosystems from zooplankton to fish and invertebrate stocks. The dynamics of fish species within the pelagic environment may be particularly responsive to environmental drivers, including temperature and salinity, as well as biological drivers, such as prey production and phenology. In addition, differential species responses to environmental and biological drivers may alter fish condition and interactions. Understanding the mechanisms that drive pelagic fish dynamics is important for estimating fish survival and recruitment. This session aims to integrate research that elucidates mechanisms linking climate with recruitment, survival and condition of forage species, larval and juvenile pelagic stages of ground fish, and pelagic fishes more generally. Papers are encouraged in a wide range of topics relevant to environmental and biological conditions and pelagic species or stages, particularly those in the following areas: biophysical interactions; recruitment fluctuations in response to climate and environmental conditions; shifts in species dynamics, distribution and behavior related to environmental forcing; research on critical life history stages in the pelagic environment; and modeling approaches to improve understanding of environmental effects using climate hindcasts and time series analyses and/or forward projections and climate forecasts.

S12: FIS Topic Session

Applying ecosystem considerations in science advice for managing highly migratory species

Co-sponsor: ISC

Convenors:

Steve Teo (ISC USA) *corresponding*, Carolina Minte-Vera (IATTC), Gerard DiNardo (USA)

Invited Speaker:

Yong Chen (School of Marine Sciences, University of Maine, USA)

This topic session will be convened by WG-34: Joint PICES-ISC Working Group on Oceanographic Conditions and the Distribution and Productivity of Highly Migratory Fish. Large-scale oceanographic processes and bioenergetic requirements determine the distribution and productivity of many pelagic fish populations in the North Pacific. For example, highly migratory species (HMS), such as albacore tuna (*Thunnus alalungus*) and Pacific sardine (*Sardinops sagax*), have environmental thresholds and preferences, as well as energetic requirements to sustain growth and survival that drive their distribution and productivity. Managing HMS has traditionally focused on maintaining the sustainability of targeted stocks and, as such, comprehensive data sets on the catches, biology and ecology of many exploited stocks exists. In many cases, there are limited quantitative data describing ecosystem impacts on HMS, social and economic impacts on HMS fisheries due to ecosystem variability, and limited formal consideration of the roles of external drivers (e.g., oceanographic variability) in the context of sustainability and governance. Beyond these limitations there is also the challenge to identify linkages and important relationships both within ecosystems (including exploited stocks), and across social, economic and governance facets of fisheries management. This workshop will provide an overview of contemporary research on the topic, including the identification of statistical modeling approaches that link spatially explicit environmental data (e.g., satellite derived SST) to distributional fish data (e.g., fishery-dependent and fishery-independent), methods to assess impacts of oceanographic variability on fish productivity and socioeconomic decision making, methodologies that explicitly incorporate environmentally driven dynamics into HMS stock assessments, and challenges facing governance when applying ecosystem considerations. Group discussion will help facilitate identification by the Joint Working Group of suitable methodologies for advancing fish stock assessment procedures and methodologies, as well as strategies for applying ecosystem considerations to HMS management.

BIO Contributed Paper Session

Convenors:

Se-Jong Ju (Korea), Debora Iglesias-Rodriguez (USA)

The Biological Oceanography Committee (BIO) has a wide range of interests spanning from molecular to global scales. BIO targets all organisms living in the marine environment including bacteria, phytoplankton, zooplankton, micronekton, benthos and marine birds and mammals. In this session, we welcome all papers on biological aspects of marine science in the PICES region. Contributions from early career scientists are especially encouraged.

FIS Contributed Paper Session

Convenors:

Xianshi Jin (China), Jackie King (Canada)

This session invites papers addressing general topics in fishery science and fisheries oceanography in the North Pacific and its marginal seas, except those covered by Topic Sessions sponsored by the Fishery Science Committee (FIS).

HD Contributed Paper Session

Convenors:

Keith R. Criddle (USA), Mitsutaku Makino (Japan)

This session invites papers addressing the promotion, coordination, integration and synthesis of research activities related to the contribution of the social sciences to marine science, and to facilitate discussion among researchers from both the natural and social sciences. We invite abstract submissions on any of these topics.

MEQ Contributed Paper Session

Convenors:

Chuanlin Huo (China), Thomas Therriault (Canada)

Papers are invited on all aspects of marine environmental quality research in the North Pacific and its marginal seas, except those covered by Topic Sessions sponsored by the Marine Environmental Quality Committee (MEQ).

POC Contributed Paper Session

Convenors:

Emanuele Di Lorenzo (USA), Yury I. Zuenko (Russia)

Papers are invited on all aspects of physical oceanography and climate in the North Pacific and its marginal seas, except those covered by Topic Sessions sponsored by the Physical Oceanography and Climate Committee (POC).

GP: General Poster Session

Papers that do not fit any other topic sessions / workshops.

W1: BIO Workshop

Ecological roles of gelatinous zooplankton: Evaluation, integration and future prospects in a more gelatinous ocean

Convenors:

Shin-ichi Uye (Japan) *corresponding*, Chaolun Li (China), Brian Hunt (Canada), Richard Brodeur (USA)

Invited Speakers:

Russell Hopcroft (University of Alaska Fairbanks, USA)

Dhugal Lindsay (Japan Agency for Marine-Earth Science & Technology (JAMSTEC))

Gelatinous zooplankton, consisting of taxonomically diverse groups such as cnidarians, ctenophores and pelagic tunicates, represent a conspicuous component of the zooplankton communities throughout the pelagic zone. Owing to their characteristic reproductive methods and high somatic growth rates, they can rapidly build a large population biomass, as typically demonstrated by recurrent blooms of cnidarian jellyfish (e.g. *Aurelia*, *Chrysaora* and *Nemopilema*) in the PICES region. Recent studies on their biology and ecology, particularly to elucidate the mechanisms of their problematic blooms, have enhanced our knowledge, yet there is still a large gap in understanding potential ecological roles of gelatinous zooplankton in pelagic ecosystems. Although it is inherently difficult to determine their biomass, spatio-temporal distributions and physiological rates, they may play important roles in transferring materials and energy from picoplankton and zooplankton up to commercially-important fish and other top trophic levels. This workshop seeks contemporary studies on gelatinous zooplankton to evaluate their functional roles. We invite contributions on diverse taxonomic groups and from diverse ecosystems. Studies using new technologies, such as acoustic and optical instruments, remotely-operated and autonomous vehicles, biochemical markers, and molecular approaches, are encouraged. We will discuss future trends of gelatinous zooplankton in the North Pacific region under observed and predicted environmental changes in the context of their ecological roles, and hope to facilitate international research collaborations on gelatinous zooplankton in the North Pacific and elsewhere.

W2: MONITOR/FIS Workshop

PICES contribution to Central Arctic Ocean (CAO) ecosystem assessment (Second)

Convenors:

Sei-Ichi Saitoh (Japan) *corresponding*, Hyoung Chul Shin (Korea), Lisa Eisner (USA), Gordon Kruse (USA)

Invited Speaker:

Hein Rune Skjoldal (Institute of Marine Research, Norway)

The Central Arctic Ocean (CAO) is in rapid transition, largely driven by North Pacific change, has become accessible to a range of activities. Rapid loss of sea ice cover has opened up the Central Arctic Ocean (CAO) for potential fishing opportunities. Debate and policy initiatives have been launched for regulating fisheries that are anticipated to begin in the CAO. Scientific research in the CAO, however, remains scarce in contrast to an abundance of research in the neighboring North Pacific. To inform and support policy decisions in the CAO, an integrated ecosystem assessment is the foremost task. PICES joined with ICES and PAME for such an assessment by forming WG 39 with its mission period ending 2018. WG 39, despite its late start, intends to provide significant Pacific input for the assessment at the third meeting of the Joint Group in May 2018, and also to the final report expected toward the end of 2018. We propose two workshops in 2018. The first one, which is technical in nature and for experts, will be organized February/March in 2018 and this is mostly in preparation for the third meeting of the Joint Group. As a follow-up to this, a half day workshop is proposed to take place at PICES-2018 to consolidate our findings and advice, connect it to those from ICES and to report to the wider PICES community. The major theses of the second workshop at PICES-2018 will be: key locations in the Pacific Arctic and the critical processes to determine biological production; characterization of major changes for recent decades; ramifications for ecosystem monitoring and management in the region. One of the tasks for WG 39 in doing this will be to explore for and make use of a pool of databases, aided by the general findings of previous reports and literature survey.

W3: TCODE Workshop

Development of a systematic approach to data management in PICES

Convenors:

Joon-Soo Lee (Korea) *corresponding*, Peter Chandler (Canada), Igor Shevchenko (Russia)

Invited Speakers:

Yutaka Michida (Atmosphere and Ocean Research Institute, The University of Tokyo, Japan)

Since its establishment in 1992, PICES has produced observation data, experimental data, and model data for scientific purposes through expert group activities and projects, and analyzed the results to produce papers, reports, and data products. Some of the data are also available online. However, PICES data and data products have not been systematically managed and are expected to increase more and more in an unmanaged status in the future. In this regard, there is an urgent need to discuss how to manage the current PICES data and data products as well as how to manage them in the future. Therefore, this workshop aims to identify problems in the sustainable management and use of PICES data and data products, to seek better management structure and system, and to improve the linkage among PICES data producers, scientists and data managers.

W4: POC/FIS/BIO Workshop

Synthesizing projected climate change impacts in the North Pacific

Co-sponsor: ICES

Convenors:

Anne Hollowed (USA) *corresponding*, Shin-ichi Ito (Japan), Jacquelynne King (Canada), Myron Peck (ICES)

Invited Speakers:

William Cheung (The University of British Columbia, Canada)

Taketo Hashioka (Japan Agency for Marine-Earth Science and Technology (JAMSTEC))

Scientists have endeavored to project the implications of climate change on marine ecosystems throughout the North Pacific. We expect that many researchers will complete these projections by June 2018 in anticipation of the 4th Effects of Climate Change on the World's Oceans symposium. A workshop is needed to compare and synthesize results from this international projection modeling effort. The workshop will provide a forum for discussions of: a) Projection outcomes under different modeling approaches; b) Opportunities for comparative studies looking at projected impacts on selected species or fisheries in different LMEs; c) How modeling teams addressed the uncertainty landscape including issues of scenario, parameter and model uncertainty; and d) The range of potential harvest strategies selected and their performance relative to different national value systems. We anticipate that a manuscript will be generated from this session that will be submitted to a peer reviewed journal.

W5: FUTURE Workshop

Identifying common reference points and leading indicators of ecosystem change

Convenors:

Mary Hunsicker (USA) *corresponding*, Xiujuan Shan (China), Vladimir Kulik (Russia)

Invited Speaker:

Caihong Fu (DFO, Canada)

Abrupt nonlinear change in ecosystem structure and function can dramatically alter human-derived benefits from the system and can have negative impacts on people's livelihoods and well-being. A growing number of driver-response relationships in marine ecosystems are being identified as strongly nonlinear, indicating that they are potentially prone to inflection points and threshold dynamics. Better knowledge of where such thresholds occur can advance our ability to anticipate future conditions and critically inform what management actions can maximize ecological, social or economic benefits. Moreover, thresholds common across analogous systems can be used to develop robust sets of reference points to prevent ecosystem components from tipping into undesirable

states. A major goal of WG-36 CERP is to 'determine shapes or functional forms of driver - response relationships from available datasets, and quantify thresholds to identify potential ecosystem reference points' in North Pacific ecosystems (TOR 4). The proposed workshop is an important step for completing this goal and for making comparisons among the focal ecosystems selected for WG-36 activities. The workshop will also allow WG-36 to make progress in 'identifying ecosystem components that respond earliest to changes in biophysical drivers and could potentially serve as leading indicators of loss of resilience and ecosystem change' (TOR 5). In addition, the proposed workshop will give WG-36 members an opportunity to work together to ensure that the methods and R code generated for the WG activities can be easily used by PICES member nations as well as other nations to identify potential target or limit reference points and early warning signs of ecosystem change. The specific objectives of the workshop are to: 1) Conduct analyses for TOR 4 to 'determine shapes or functional forms of driver-response relationships from available datasets, and quantify thresholds to identify potential ecosystem reference points' in North Pacific ecosystems. 2) Identify differences and commonalities among thresholds / ecosystem reference points in the focal ecosystems of WG-36 activities. 3) Select common methods for system-wide comparisons to identify leading indicators of ecosystem 4) Develop, test and share R code via shared GitHub repository that is generalizable for other ecosystems. 5) If time allows, begin applying leading indicator analyses to focal ecosystems of PICES member nations (TOR 5).

W6: BIO Workshop

Regional evaluation of secondary production observations and application of methodology in the North Pacific

Convenors:

Akash Sastri (Canada) *corresponding*, Toru Kobari (Japan)

Invited Speaker:

Koichi Ara (Nihon University, Japan)

Zooplankton production represents a quantitative proxy for the functional response of marine ecosystems to regional and global climate change, because material and energy scattering in the lower food web is integrated by zooplankton communities. Although a variety of methodologies for measuring zooplankton production have been developed and applied over the last half century, our knowledge of which approaches are applicable to a diverse range of organisms and habitats remains limited. Recent advances in biochemical methods for measuring zooplankton production have been reviewed, however, such information is still lacking for the traditional methodologies. This workshop will share the current status on zooplankton production methodologies and measurements, to be reported by the working group members representative of each PICES nation. In addition, we also encourage presentations and discussion on advantages, applications and limitations of traditional methodologies on zooplankton production applicable to natural zooplankton populations and communities.

W7: BIO Workshop

Diets, consumption, and abundance of marine birds and mammals in the North Pacific

Convenors:

Andrew Trites (Canada) *corresponding*, Tsutomu Tamura (Japan), Yutaka Watanuki (Japan), Robert Suryan (USA)

Invited Speaker:

Andrew Trites (The University of British Columbia (UBC), Vancouver, Canada)

The S-MBM of BIO is midway through a 5-year program to update the 2000 PICES Scientific Report on Predation by Marine Birds and Mammals in the Subarctic North Pacific Ocean. To date, we have held a successful workshop (2016) to frame the program and agree on general modelling approaches, spatial boundaries, time scales and other considerations (see PICES W6 Workshop Report: Consumption of North Pacific forage species by marine birds and mammals). Since our 2016 workshop, we initiated the agreed upon databases to estimate prey consumption, and will continue to add and verify data over the coming 12 months in anticipation of our workshop, when invited experts will review the compiled information. Obtaining this expert consensus on model input parameters through the proposed workshop process is a necessary and critical next step to ensure the success of our program to estimate the amounts of prey consumed by seabirds and marine mammals in the North Pacific. The workshop

participants will advance finalizing our databases of diets, abundances, distributions, and energy requirements of 135 species of seabirds, and all 47 species of marine mammals in the 12 PICES eco-regions. During the workshop, the invited holders of data and knowledge on the feeding ecology of seabirds and marine mammals in the North Pacific will 1) review the data summaries compiled by S-MBM members, 2) identify data gaps and sources of missing information, and 3) assist in framing appropriate educated guesses on possible values for missing data. The workshop will be structured with two breakout groups (birds and mammals), where data are presented by individual species and consensus is obtained on their accuracy and completeness. This process will result in near-complete databases of diets, abundances, and energy requirements of marine birds and mammals in the North Pacific.

W8: HD Workshop

Taking stock of Marine Ecosystem Services in the North Pacific - Exploring examples and examining methods

Convenors:

Shang Chen (China) *corresponding*, Daniel K. Lew (USA)

This workshop will advance understanding of the character and value of marine ecosystem services under the aegis of the PICES Working Group on Marine Ecosystem Services (WG-MES/WG 41). Members of WG-MES will be invited to attend this workshop, but attendance will be open to encourage participation by local scientists. The main tasks of this workshop include: (1) reviewing MES studies from the North Pacific region; (2) identifying gaps in understanding the status and trends of MES in North Pacific region; (3) developing a draft typology of marine ecosystem services and various approaches and methods for assessing those services and their value.

Session/Workshop Schedules at a Glance

W1 [Yamayuri Room]: <i>Ecological roles of gelatinous zooplankton: Evaluation, integration and future prospects in a more gelatinous ocean</i>		W3 [Room 7F in Yokohama Media & Communications Center]: <i>Development of a systematic approach to data management in PICES</i>		W5 [Kamome Room]: <i>Identifying common reference points and leading indicators of ecosystem change</i>	
Convenors: Shin-ichi Uye (Japan), Chaolun Li (China), Brian Hunt (Canada), Richard Brodeur (USA)		Convenors: Joon-Soo Lee (Korea), Peter Chandler (Canada), Igor Shevchenko (Russia)		Convenors: Xiujuan Shan (China), Mary Hunsicker (USA), Vladimir Kulik (Russia)	
9:00	Introduction by Convenors	9:00	Introduction by Convenors		
9:10	Russell R. Hopcroft (Invited) Gelatinous zooplankton in Alaskan waters: From nets to ROVs	9:05	Chun-hua Han The marine data resources management strategy under the background of big data era	9:25	Introduction by Convenors
9:50	Dhugal J. Lindsay (Invited) The perils of bad taxonomy for leading edge science: A case study with the genus <i>Aegina</i> , and the consequences for Deep Learning	9:30	Joon-Soo Lee Future of TCODE	9:30	Caihong Fu (Invited) Marine ecosystem responses to anthropogenic and environmental pressures: Linear or nonlinear?
10:30	Coffee/Tea Break	10:00	Round table discussion following “Future of TCODE”, moderated by Robin Brown	10:00	Lisha Guan TBA
10:50	Yasuhide Nakamura Ecological importance and new findings of phaeodarians and radiolarians in the North Pacific region	10:30	Coffee/Tea Break	10:30	Coffee/Tea Break
11:10	Ian Perry Gelatinous zooplankton in Pacific Canadian Waters since 1990: Trends and ecosystem implications	10:50	Yutaka Michida (Invited) Enhancing collaborations between PICES and IOC/IODE in open data access	10:50	Analyzing time series data from different member countries
11:30	Richard D. Brodeur Identification of pelagic and demersal fish predators on gelatinous zooplankton in the Northeast Pacific Ocean	11:20	Igor Shevchenko PICES metadata federation: Past, present, and future		
11:50	Brian P.V. Hunt Using Unmanned Aerial Vehicles (UAV's) to measure jellyfish aggregations: An inter comparison with net sampling	11:45	Toru Suzuki Contribution PICES data activities to global data products		
12:10	Samantha Zeman Trophic ecology of the neustonic cnidarian <i>Velella velella</i> in the northern California Current during an extensive bloom year: Insights from gut contents and stable isotope analysis	12:10	Peter Chandler The Data Management System for Working Group 35: The Third North Pacific Ecosystem Status Report (WG-NPESR3)		
12:30	Lunch	12:35	Lunch	12:30	Lunch

W7 [Room 201]: <i>Diets, consumption, and abundance of marine birds and mammals in the North Pacific</i>		W2 [Room 301]: <i>PICES contribution to Central Arctic Ocean (CAO) ecosystem assessment</i>	
Convenors: Andrew Trites (Canada), Tsutomu Tamura (Japan), Yutaka Watanuki (Japan), Robert Suryan (USA)		Convenors: Sei-Ichi Saitoh (Japan), Hyoung Chul Shin (Korea), Lisa Eisner (USA), Gordon Kruse (USA)	
9:00	Introduction by Convenors	9:00	Introduction by Convenors
Morning Session - Case Studies			
9:10	Yoko Goto Reconstructed and actual weight of stomach contents of the Steller sea lion to estimate their food consumption during wintering in Japan	9:10	Hein Rune Skjoldal (Invited) Integrated Ecosystem Assessment of the Central Arctic Ocean – Work of an ICES/PICES/PAME working group
9:30	Hiroko Sasaki Spatial estimation of prey consumption by Bryde's whales in the western North Pacific during the summers of 2008 – 2009: Density surface model approach	9:40	Shigeto Nishino PICES contribution to WGICA: Climate, physical and chemical oceanographic, and lower trophic level ecosystem aspects in the Pacific gateway of the Arctic Ocean
9:50	Szymon Surma (CANCELLED) Prey consumption by marine mammals and seabirds off northern British Columbia (Canada): Estimates from ecosystem models	10:00	Zhongyong Gao Carbon uptake in bi-polar regions and their responses to climate change
10:10	Yutaka Watanuki Summer prey consumption by three species of seabirds breeding in Japan	10:20	Coffee/Tea Break
10:30	Coffee/Tea Break	10:40	Hyoung Sul La (CANCELLED, NO SHOW) Poorly known and changing ‘mid trophic level’ in the Pacific side of the Central Arctic Ocean; Summary of selected literature
Morning Session – Prey Consumption in PICES Regions			
11:00	Andrew W. Trites Preliminary estimates of prey consumption by seals and sea lions in the North Pacific	11:00	Travis C. Tai Evaluating current and future Arctic marine fisheries in Canada under different scenarios of climate change
11:30	Tsutomu Tamura Estimation of prey consumption by marine mammals in the PICES regions -Update to Hunt <i>et al.</i> (2000)	11:20	Xiaoyang Li Characteristics of environmental risks caused by navigation of the Central Arctic Ocean
11:50	Andrew W. Trites and Tsutomu Tamura Discussion of marine mammal estimates—Data gaps and limitations of data tables	11:40	Hyoung Chul Shin (CANCELLED, NO SHOW) Aligning science in preparation for the Central Arctic Ocean high seas fisheries agreement
12:30	Lunch	12:00	Fujio Ohnishi Improvement or deviation? Assessing the agreement on unregulated fishing in the Central Arctic Ocean from the perspective of international politics
		12:20	Discussion 12:30 W2 Ends, Lunch

Thursday, October 25 (continued)

W1 [Yamayuri Room]: <i>Ecological roles of gelatinous zooplankton: Evaluation, integration and future prospects in a more gelatinous ocean</i>		W3 [Room 7F in Yokohama Media & Communications Center]: <i>Development of a systematic approach to data management in PICES</i>		W5 [Kamome Room]: <i>Identifying common reference points and leading indicators of ecosystem change</i>	
14:00	Satoshi Kitajima (NO SHOW) Temporal variations in abundance and sizes of <i>Nemopilema nomurai</i> in the northern East China Sea between 2006 and 2017	14:00	Sonia Batten Data from the North Pacific Continuous Plankton Recorder Survey	14:00	Analyzing time series data from different member countries (cont.)
14:20	Song Feng Hyposalinity and incremental micro-zooplankton supply in early-developed <i>Nemopilema nomurai</i> polyp survival, growth, and podocyst reproduction	14:25	Hideaki Maki ADRIFT (Assessing Debris Related Impact From Tsunami) Project – Outline and legacy products		
14:40	Fang Zhang (CANCELLED) Index of climate change: Inter-annual change of giant jellyfish <i>Nemopilema nomurai</i> in China coastal waters	14:50	Thomas W. Therriault (CANCELLED) PICES WG-21 – Overview, data products and challenges		
15:00	Yantao Wang Monitoring of two Scyphozoa jellyfish species in the adjacent waters of a power plant, Liaodong Bay, China	15:15	Mitsutaku Makino Data from the PICES Project on Marine Ecosystem Health and Human Well-being (MarWeB)		
15:20	Shin-ichi Uye Blooms and non-blooms of the giant jellyfish <i>Nemopilema nomurai</i> in the East Asian Marginal Seas: 12-year monitoring using ships of opportunity				
15:40	3 min-poster-presentations	15:40	Coffee/Tea Break		
16:00	Coffee/Tea Break	16:00	Discussion about “PICES data and data products inventories”	16:00	Coffee/Tea Break
16:20	General discussion			16:20	Discussion
		17:00	Discussion about “TCODE TOR & PICES Data management policy”, (Joon-Soo Lee and Robin Brown)	17:00	W5 Ends
17:30	W1 Ends				
		18:00	W3 Ends		

W7 [Room 201]: <i>Diets, consumption, and abundance of marine birds and mammals in the North Pacific</i>		W6 [Room 301]: <i>Regional evaluation of secondary production observations and application of methodology in the North Pacific</i>	
		Convenors: Akash Sastri (Canada), Toru Kobari (Japan)	
Afternoon Session – Prey Consumption in PICES Regions (cont.)		14:00	Introduction by Convenors
13:45	Rob Suryan & Yutaka Watanuki Discussion of sea bird estimates — Data gaps and limitations of data tables	14:10	Koichi Ara (Invited) Traditional approaches for estimating zooplankton production rate and food requirement in the neritic area of the North Pacific
Afternoon Session – Breakout Groups to Review Data Tables			
14:30	Breakout Group Discussions — Two groups (birds & mammals) to 1) review data summaries; 2) identify data gaps and sources for missing information, and 3) frame appropriate educated guesses on possible values for missing data	14:50	Kazuaki Tadokoro Spatial and temporal variation of mesozooplankton productivity in the Seto Inland Sea, Japan
		15:10	Chih-hao Hsieh Copepod community growth rates in relation to body size, temperature, and food availability in the East China Sea: A test of metabolic theory of ecology
		15:30	Hui Liu An overview of artificial cohort method for estimating zooplankton production in the ocean
		15:50	Coffee/Tea Break
16:00	Coffee/Tea Break	16:10	Akash Sastri Evaluation of the application of empirical growth rate models toward a long-term zooplankton biomass/production time-series on the southern shelf of Vancouver Island
16:15	Breakout Group Reports	16:30	Karyn Suchy A status report on Canadian marine zooplankton production rate measurements
16:30	Workshop Participant Consensus — How should we proceed with finalizing data tables and preparing final report on estimates of food consumption by marine birds and mammals in the North Pacific?	16:45	Toru Kobari Status report on zooplankton productivity measurements in the western North Pacific Ocean and its neighboring waters
17:00	W7 Ends	17:00	Lian E. Kwong An intercalibration of chitobiase and biomass size spectra zooplankton production estimates
		17:20	Samantha Zeman <i>Calanus marshallae</i> and <i>Calanus pacificus</i> egg production in relation to environmental variables in a productive upwelling zone in the northern California Current
		17:40	Discussion 18:00 W6 Ends

Saturday, October 27 [Room 301]

WG-41 Workshop 8: Taking Stock of Marine Ecosystem Services in the North Pacific — Exploring examples and examining methods

Convenors: Shang Chen (China) *corresponding*, Daniel K. Lew (USA)

- 9:00 **Introductions and Workshop goals**
- 9:20 **Chen Keliang**
Study on Eco-compensation Mechanism based on valuation of ecosystem services in marine protected areas
- 9:40 **Yousuke Fujii**
Labor situation of kelp farmers and the change in farming practice
- 10:00 **Jingmei Li**
Ecological damage assessment of green tide blooms based on double-bounded dichotomous bias correction model
- 10:20 **Coffee/Tea Break**
- 10:40 **Kristy Wallmo**
Challenges and opportunities for using ecosystem service values in NOAA Fisheries
- 11:00 **Dan Lew**
Marine ecosystem service values and valuation in the U.S.: An Assessment of the literature through the lens of recent best practice guidelines
- 11:20 **Discussion**
- 12:00 **W8 Ends**

Benrong Peng (CANCELLED)

Integrating values of ecosystem services into decision making in coastal management in Xiamen

Sunday, October 28 [Yamayuri Room]

S-CCME Workshop 4: Synthesizing projected climate change impacts in the North Pacific

Co-sponsor: ICES

Convenors: Anne Hollowed (USA) *corresponding*, Shin-ichi Ito (Japan), Jacquelynne King (Canada), Myron Peck (ICES)

- 9:00 **Introductions and Workshop goals**
- 9:15 **William W.L. Cheung (Invited)**
Building confidence in projecting future marine biodiversity and fisheries under climate change
- 9:35 **Taketo Hashioka (Invited)**
Diagnostically projected future changes of phytoplankton community structure and their growth limitation based on a multi-model ensemble
- 9:55 **Coffee/Tea Break**
- 10:15 **Wonkeun Choi (talk cancelled, changed to a poster)**
Projected changes in the sea surface wind in the east asian marginal seas from regional climate models
- 10:35 **Myron Peck**
Key Messages from ICES
- 10:55 **Discussion**
Key findings from existing SICCME projects
- 11:15 **Discussion**
What are our greatest challenges?
- 11:35 **Discussion**
Expected products for AR6?
- 11:55 **Discussion**
Looking forward to AR7
- 12:15 **Summary and Next Steps**
- 12:30 **End of Workshop 4/ Start of SICCME BUSINESS MEETING**
- 14:00 **End of SICCME Business Meeting**

Monday, October 29 [Oshidori and Kujaku Rooms]

KeyNote Speaker

Integrated understanding of warming in the western North Pacific

Tomowo Watanabe

Japan Sea National Fisheries Research Institute (JSNFRRI), Japan Fisheries Research and Education Agency (FRA)

Further advancement of climate warming and increase in the occurrences of extreme phenomena are predicted by global warming simulations. Measures against these changes are included as important in the Sustainable Development Goals (SDGs). PICES has promoted marine ecosystem research related to climate change in the North Pacific and has provided a lot of scientific information contributing sustainable development of fisheries. For SDGs, preparation of the accessible scientific information for users of marine ecosystem services is needed in conjunction with further promotion of research on various field of marine science. Because the western North Pacific and its marginal seas are among the hot spots strongly affected by global warming, practical information for adaptation based on scientific knowledge about the marine ecosystems is required for sustainable development of fisheries. Moreover, the prediction with higher resolution is indispensable for adaptation of fisheries in the western North Pacific. It is important for improvement of the prediction of the effects of global warming to understand the current situation based on monitoring and to revisit the knowledge on marine ecosystems. In the western North Pacific, systematic monitoring research on marine environment and marine organisms was started at the beginning of the 20th century, and the data accumulated over 100 years or more are important for understanding the trend and the variability of the marine ecosystems.

Warming is the main climate change observed in the coastal area of the western North Pacific from the late 19th century until date. The climate shifts indicating the rapid change between the climate states contribute to the warming and the shifts in the late 1940s and in the late 1980s were significant in the area. Warming of the sea surface related to these climate shifts is more apparent in the area from the coast of the Asian continent to the western boundary current region in the mid-latitude zone. Many studies have been conducted on the changes in marine environment and marine organisms related to the climate shifts based on the monitoring data, and the understanding of the effects of climate warming has been advanced. Evidently, the effect of climate warming on marine ecosystems in the area is the northward expansion of marine organisms from subtropical waters. The local ecosystems along the warm currents have been affected directly by the increase in water temperature and by the increase in subtropical fish species. It appeared that the adaptations of marine ecosystems to the average physical state after the shift in the late 1980s are still in progress in both coastal and offshore area. Therefore, sustainable monitoring and integrated evaluation of marine ecosystems in wider area from the subtropical waters to the subarctic waters in the western North Pacific is important for providing practical information about the adaptation of coastal fisheries and offshore fisheries.

Session 1 (Day 1): Toward integrated understanding of ecosystem variability in the North Pacific

- | | |
|-------|--|
| 10:30 | Tomowo Watanabe (Keynote)
Integrated understanding of warming in the western North Pacific |
| 11:15 | Kirstin Holsman (Invited)
What is gained (and lost) through an integrated modeling approach: Assessing climate change impacts on Bering Sea fish and fisheries |
| 11:45 | Steven J. Bograd (Invited)
Understanding human and natural changes in North Pacific social-ecological marine systems: The FUTURE framework |
| 12:15 | Robert Suryan
Ecosystem variability and connectivity in the Gulf of Alaska following another major ecosystem perturbation |
| 12:35 | Lunch |
| 14:00 | Michael G. Jacox*
Seasonal- to centennial-scale projections of the California Current System in aid of fisheries management |
| 14:20 | Xiujuan Shan (Invited)
Environmental changes induced population dynamics of marine species in North Pacific waters |
| 14:50 | Shin-ichi Ito
A new integrated method to elucidate climate variability impacts on living marine resources |
| 15:10 | SM Mustafizur Rahman*
Synchronicity of climate driven regime shifts among the East Asian Marginal sea waters and major fish species |
| 15:30 | Michio Kondoh (Invited)
Multi-site, high-frequency monitoring of marine ecosystems using environmental DNA |
| 16:00 | Coffee/Tea Break |
| 16:20 | Christina E. Kong*
Spatial and inter-annual variability in the primary productivity of the East China Sea and Southern Yellow Sea (1998-2012) |
| 16:40 | George L. Hunt, Jr.
Millennial- to decadal-scale variability in the Bering Sea: Changes in the density of seabird species in response to climate fluctuations |
| 17:00 | Julie Keister
Diagnosing the impacts of large-scale climate variability on local ecosystems in the Salish Sea, USA |
| 17:20 | Akinori Takasuka
Density dependence at the time of spawning: Disentangling density-dependent effects in the life histories of fish |
| 17:40 | Fangli Qiao
To initiate seasonal prediction for PICES FUTURE |
| 18:00 | S1, Day 1 Ends |

(*) Identifies an Early Career Scientist

Tuesday, October 30

Plenary Session

(* Identifies an Early Career Scientist)

- 9:00 **Yu-Lin Eda Chang* (S5 Plenary)**
Potential impact of ocean circulation on Japanese eel larvae migration
- 9:30 **Susan Allen (S7 Plenary)**
Twelve years of forecasting the spring bloom in the Strait of Georgia: Lessons learned
- 10:00 **Yong Chen (S12 Plenary)**
Challenge and opportunity for fisheries stock assessment in changing environments
- 10:30 **Coffee/Tea Break**

S12 [Kamome Room]: <i>Applying ecosystem considerations in science advice for managing highly migratory species</i>		S4 [Oshidori Room]: <i>Indicators for assessing and monitoring biodiversity of biogenic habitats</i>		S7 [Kujaku Room]: <i>Ecological responses to variable climate changes and their applicability to ecosystem predictions</i>	
Convenors: Steve Teo (ISC USA), Carolina Minte-Vera (IATTC), Gerard DiNardo (USA)		Convenors: Anya Dunham (Canada), Hye-Won Moon (Korea)		Convenors: Ryan Rykaczewski (USA), Akinori Takasuka (Japan), Chan Joo Jang (Korea)	
10:50	Introduction by Convenors	10:50	Introduction by Convenors	10:50	Introduction by Convenors
11:00	Shingo Kimura Effects of global warming on spawning behavior of the Pacific bluefin tuna based on otolith oxygen stable isotope analysis	11:00	Yves-Marie Bozec (Invited) Identifying mechanistic indicators of coral reef resilience	11:00	Antonietta Capotondi Optimal tropical precursors of US West Coast marine warming
11:20	Ayako Suda* Development of male-specific DNA markers in the Pacific bluefin tuna (<i>Thunnus orientalis</i>): Potential applications for sex ratio control in aquaculture and contribution to tuna resource management	11:30	Go Suzuki Assessment of species diversity and dominance of shallow water corals using environmental DNA	11:20	Yong Sun Kim Interhemispheric teleconnection between Yellow and East China Seas and tropical southeast Pacific sea surface temperatures through a recent change in El Niño-Southern Oscillation in the boreal summer
11:40	Kento Nakatsugawa* Spatio-temporal distribution of albacore <i>Thunnus alalunga</i> and its relationship with environmental changes in the Pacific Ocean	11:50	Mai Miyamoto* Application of association analysis for identifying VME indicator taxa based on sea-floor visual images	11:40	Youngji Joh* Decadal predictability linked to teleconnections between the Kuroshio Extension and North Pacific Meridional Modes
12:00	Barbara Muhling Migration paths and habitat use of albacore in the eastern North Pacific, with implications for surface fisheries	12:10	Anya Dunham Marine biogenic habitats: Assessing benthic cover and species-habitat associations	12:00	Michael G. Jacox* Mechanisms of marine ecosystem predictability along U.S. coasts

S9 [Yamayuri Room] <i>Integration of science and policy for sustainable marine ecosystem services</i>		S5 [Room 201] <i>Seasonal to interannual variations of meso-/submeso-scale processes in the North Pacific</i>	
Convenors: Shang Chen (China), Daniel K. Lew (USA), Jungho Nam (Korea)		Convenors: Annalisa Bracco (USA), Sachihiko Itoh (Japan), Elena Ustinova (Russia)	
10:50	Introduction by Convenors	10:50	Introduction by Convenors
11:00	Elizabeth Logerwell Arctic Council and ecosystem approach to management: Integrating ecosystem service science into guidelines	11:00	Bo Qiu (Invited) Seasonality in transition scale from balanced to unbalanced motions in the World Ocean
11:20	Gakushi Ishimura (swapped with Meng Su) Estimating the potential of Japanese fisheries: Upside Bioeconomic Analysis	11:30	Humio Mitsudera Formation and interannual variations of baroclinic quasi-stationary jets in the transitional domain between the subtropical and subarctic gyres in the western North Pacific
11:40	Jian Zhang* System analysis of Xiangshan bay ecological vulnerability assessment system based on VSD model	11:50	Sung Yong Kim Regional turbulent characteristics of the satellite-sensed submesoscale surface chlorophyll concentrations
12:00	Qi Ding* Vulnerability to impacts of climate change on marine fisheries and food security	12:10	Elena Ustinova Mesoscale and large-scale dynamic features and the spatial distribution of sardine and mackerels east of the Kuril Islands in early and late summer

Tuesday, October 30 (continued)

S12 [Kamome Room]: <i>Applying ecosystem considerations in science advice for managing highly migratory species</i>		S4 [Oshidori Room]: <i>Indicators for assessing and monitoring biodiversity of biogenic habitats</i>		S7 [Kujaku Room]: <i>Ecological responses to variable climate changes and their applicability to ecosystem predictions</i>	
12:20	Gerard DiNardo (for Desiree Tommasi) A management strategy evaluation framework to assess robustness of harvest guidelines for North Pacific Albacore tuna to variable productivity and distribution	12:30	Jackson W.F. Chu* Modelling the environmental niche space and distributions of cold-water corals and sponges in the northeast Pacific Ocean	12:20	Christopher A. Edwards Using a coupled biogeochemical/physical data assimilation system in the California current system to study ecosystem impacts from variable climate
12:40	Ning Chen Evaluating the performance of two methods for estimating fishing mortality rate of Fang's blenny (<i>Pholis fangi</i>) based on size frequency data	12:50 13:10	Hyeong-Gi Kim* Comparison of nematode assemblages associated with <i>Sargassum muticum</i> in its native range in South Korea and as an invasive species in the English Channel 13:10 Discussion 13:20 S4 Ends =====	12:40	Lunch
13:00	Oxana G. Mikhaylova* Commercial stock assessment and forecast of northern shrimp <i>Pandalus eous</i> on the southwestern Kamchatka		Christopher N. Rooper CANCELLED Patterns in fish associations with corals and sponges and diversity in two divergent ecosystems in Alaska		
13:20	Xindong Pan* Life-history connectivity in a highly migratory fish, Japanese Spanish mackerel (<i>Scomberomorus niphonius</i>), implications from otolith chemistry		Fangyuan Qu* (CANCELLED) Building the indicator system to assess the ecosystem health of Laizhou Bay based on Analytic Hierarchy Process (AHP)		
13:40	S12 Ends		Weiwei Yu (CANCELLED) Ecosystem health assessment: Indicators and models		
S1 (Day 2) [Kamome Room]: <i>Toward integrated understanding of ecosystem variability in the North Pacific</i>					
Convenors: Hiroaki Saito (SB)					
14:00	Albert J. Hermann Linking global to regional ocean forecasts: A hybrid dynamical-statistical approach			14:00	Kenneth A. Rose Predicting fish movement and migration in response to changing climate
14:20	Andrew R.S. Ross Depletion of micronutrient trace metals in Line P surface waters during the 2014 warm water anomaly: Implications for marine ecosystems and climate change in the NE Pacific			14:20	Heeseok Jung Development of the ocean mid-range prediction system for the seas around Korea

S9 [Yamayuri Room] <i>Integration of science and policy for sustainable marine ecosystem services</i>		S5 [Room 201] <i>Seasonal to interannual variations of meso-/submeso-scale processes in the North Pacific</i>	
12:20	Aoi Sugimoto* Environment and culture in an island community: Some insights for re-building the framework of cultural ecosystem service	12:30	Guimei Liu Preliminary study of MLD and SCML in the SCS using 3-D physical-biogeochemical model
12:40 14:20	Lunch	12:50	Lunch
14:00	Wenjia Hu* (CANCELLED) Ecological vulnerability based marine spatial planning: An implement in Xiamen Bay, China	14:00	Andrey G. Andreev Mesoscale dynamics and walleye pollock catches in the Navarin Canyon area of the Bering Sea
14:20	Chen Keliang Study on eco-compensation mechanism based on valuation of ecosystem services in marine protected areas	14:20	Olga Trusenkova Short-lived anomalies of hydrophysical characteristics at the continental slope off the Russian coast in the northwestern Japan/East Sea from spring through early fall

Tuesday, October 30 (continued)

S1 (Day 2) [Kamome Room]: <i>Toward integrated understanding of ecosystem variability in the North Pacific</i>		S4 [Oshidori Room]: <i>Indicators for assessing and monitoring biodiversity of biogenic habitats</i>		S7 [Kujaku Room]: <i>Ecological responses to variable climate changes and their applicability to ecosystem predictions</i>	
14:40	Jerome Fiechter Wind, circulation, and topographic effects on alongshore phytoplankton variability in the California Current			14:40	Yury Zuenko Dynamics of walleye pollock recruitment at Primorye (Japan/East Sea) under climate change
15:00	Jennifer Jackson Warming from recent marine heat wave lingers in deep British Columbia fjord			15:00	Kirill Kivva Present and future dynamics of herring stocks in the Northwest Pacific in association with large-scale climate variability
15:20	Richard D. Brodeur Causes and consequences of the great pyrosome bloom in the Northern California Current			15:20	Brian Beckman The PDO, The Blob and juvenile coho salmon growth in the Northern California Current 2000 – 2017
15:40	Jennifer Fisher Variable trends in pteropod abundance between the shelf and slope from two decades of observations off Newport Oregon, USA			15:40	Chih-hao Hsieh Fluctuating interaction network and time-varying stability of a natural fish community
16:00	<i>Coffee/Tea Break</i>	16:00	<i>Coffee/Tea Break</i>	16:00	<i>Coffee/Tea Break</i>
		MEQ-Paper Session (Day 1) [Oshidori Room]			
		Convenors: Chuanlin Huo (China), Thomas Therriault (Canada)			
16:20	Mei Sato* Impacts of hypoxia on diel vertical migration of zooplankton	16:20	Baodong Wang Retrospect and prospect of status of coastal eutrophication in China Seas	16:20	Anne B. Hollowed Multi-model inter-comparison study for elucidating uncertainty and mechanistic understanding of climate change impacts on Bering Sea fishery resources
		16:35	Qingsheng Li Spatial variability of the main contaminations in seawater environment in Xiamen Bay	16:40	Yutaka Watanuki Climate regime cycle affects the productivity of a pursuit-diving seabird and its predation on forage fish
16:40	Hae Kun Jung* (CANCELLED) Effect of vertical structure of water column on depth dependent trends in walleye pollock (<i>Theragra chalcogramma</i>) in the Western coast of the East/Japan Sea Mitsuo Yamamoto (moved) Estimation of the origins of particulate organic matter in coastal waters for understanding the oceanic environmental change around Tsushima Islands	16:50	Olga N. Lukyanova Persistent organic pollutants in bottom and pelagic fish from the Sea of Okhotsk		

S9 [Yamayuri Room] <i>Integration of science and policy for sustainable marine ecosystem services</i>		S5 [Room 201] <i>Seasonal to interannual variations of meso-/submeso-scale processes in the North Pacific</i>	
14:40	Meng Su (swapped with Gakushi Ishimura) Evolution of district marine policies in China: The case of Shandong Province	14:40	Hiromichi Ueno Spatio-temporal variation of anticyclonic eddies in the western subarctic North Pacific
15:00	Shang Chen (CANCELLED) Valuation of marine ecosystem services: Experiences and lessons Franklin B. Schwing (moved from 15:00) Crafting science-based ocean policy for sustained ecosystem services: Balancing place, people, and profits	15:00	KyungJae Lee An extremely long lived Ulleung Warm Eddy from 2014 to 2017 (UWE 2014-II) in the southwestern East Sea (Japan Sea)
15:20	Iana Blinovskaia Maritime spacial planning in Russia: Problems and prospective	15:20	Jun Choi Surface drifter observations in the Korea Strait in spring
15:40	Xuefeng Li* (CANCELLED) Chinese experiences with the implementation of Marine Functional Zoning Kristy Wallmo (moved from 16:40) Using choice models to assess the economic value of large marine protected areas off the U.S. west coast	15:40	Erin V. Satterthwaite* Effects of seasonal variation in oceanography on larval assemblages in the northern Monterey Bay, California upwelling system
16:00	<i>Coffee/Tea Break</i>	16:00	<i>Coffee/Tea Break</i>
16:20	Discussion	16:20	Annalisa Bracco The diurnal cycling of submesoscale circulations: A Lagrangian and Eulerian perspective
16:40	S9 Ends	16:40	Sachihiko Itoh Fine-scale structure and mixing across the front between the Tsugaru Warm and Oyashio Currents in summer along the Sanriku Coast, east of Japan

Tuesday, October 30 (continued)

S1 (Day 2) [Kamome Room]: <i>Toward integrated understanding of ecosystem variability in the North Pacific</i>		MEQ-Paper Session (Day 1) [Oshidori Room]		S7 [Kujaku Room]: <i>Ecological responses to variable climate changes and their applicability to ecosystem predictions</i>	
17:00	Robert Blasiak* (moved) Corporate control and global governance of marine genetic resources			17:00	Hongjun Song* (CANCELLED) Spatial heterogeneity of phytoplankton bloom timing in a marginal sea: Patterns and potential drivers Douding Lu (MOVED from 17:40) Expansion of <i>Cochlodinium Polykrikoides</i> in Chinese coastal waters, what can be linked to?
		17:05	Seongbong Seo* Fate of floating debris released from Major rivers around Korea		
17:20	Discussion	17:20	Cui Liang* (CANCELLED) A preliminary study of the Yangtze River terrigenous inputs change and response of the estuary ecological environment Qutu Jiang (REPLACEMENT) Assessing the Severe Eutrophication Status and Spatial Trend in the Coastal Waters of Zhejiang Province (China)	17:20	Karyn D. Suchy* Spatio-temporal analysis of environmental drivers and patterns of satellite-derived chlorophyll <i>a</i> in the Strait of Georgia, Canada, from 2003-2016
17:40	S1 Ends		Qiulu Wang (CANCELLED) Analysis of water quality change characteristics in Fujian Bay based on time-space matrix method	17:40	S7 Ends
		17:35	MEQ-P, Day1 Ends		

S9 [Yamayuri Room] <i>Integration of science and policy for sustainable marine ecosystem services</i>		S5 [Room 201] <i>Seasonal to interannual variations of meso-/submeso-scale processes in the North Pacific</i>	
		17:00	Hiroto Abe* Aquarius reveals eddy stirring after a heavy precipitation event in the subtropical North Pacific
		17:20	Eko Siswanto Impacts of eddy variability on phytoplankton dynamics in the Kuroshio Extension region
		17:40	Elena A. Shtraikhert Seasonal and interannual variations in the spread of the Razdolnaya and Tumannaya Rivers runoffs (Peter the Great Bay, Japan/East Sea) according to the satellite data on SST and ocean color
		18:00	S5 Ends

Thursday, November 1

Plenary Session

(* Identifies an Early Career Scientist)

- 9:00 **Alan Haynie (S3 Plenary)**
Reaching our audience: how do we better communicate interdisciplinary marine science? Lessons and challenges from the U.S. North Pacific and beyond
- 9:30 **Kristen A. Davis (S8 Plenary)**
Fate of internal waves on a shallow shelf
- 10:00 **Shoshiro Minobe (S10 Plenary)**
O₂ trends in the last six decades
- 10:30 *Coffee/Tea Break*

S11 (Day 1) [Kamome Room]: <i>Influence of climate and environmental variability on pelagic and forage species</i>		S2 [Oshidori Room]: <i>Fish production through food web dynamics in the boundary current systems</i>		S3 [Room 201]: <i>Science communication for North Pacific marine science</i>	
Convenors: Matthew Baker (USA), Sei-Ichi Saitoh (Japan), Elizabeth (Ebett) Siddon (USA)		Convenors: Motomitsu Takahashi (Japan), Yuji Okazaki (Japan), Ryan Rykaczewski (USA), Akash Sastri (Canada)		Convenors: Toyomitsu Horii (Japan), Ekaterina Kurilova (Russia), Mitsutaku Makino (Japan), Jackie King (Canada)	
10:50	<i>Introduction by Convenors</i>	10:50	<i>Introduction by Convenors</i>	10:50	<i>Introduction by Convenors</i>
11:00	Haruka Nishikawa (Invited) Present situation and future prospects of study on sardine and climate change	11:00	Chih-hao Hsieh (Invited) Prey stoichiometry influences growth rate and production of marine zooplankton	11:00	Abigail McQuatters-Gollop From evidence to action: Challenges and solutions for working across the science-policy interface
11:30	Sei-Ichi Saitoh Practical procedure for potential fishing zone prediction of neon flying squid (<i>Ommastrephes bartramii</i>) in the north western North Pacific	11:30	Toru Kobari Trophic pathways of plankton food web to support food availability for vulnerable life stages of migratory fishes in the Kuroshio: As a key for the Kuroshio paradox	11:20	Guangshui Na Fate of antibiotic resistance in estuaries and marine environment
11:50	Yasunori Sakurai Recent decline in winter stock of Japanese flying squid, <i>Todarodes pacificus</i> related to climate change during winter-spring	11:50	Gen Kume The importance of the north Satsunan area, southern Japan as the spawning and nursery ground for small pelagic fish	11:40	Vanessa R. Fladmark* Citizen engagement through shoreline cleanup litter data: British Columbia case study
12:10	Yang Liu* Analysis of monthly variation of fishing zone for Pacific saury using Multi-Sensor satellite and fishery data	12:10	Yuji Okazaki Feeding habits of multiple larval and juvenile fish taxa collected in the Kuroshio off Japan	12:00	Yoshioki Oozeki Outreach program for encouraging sustainable use of fish stock resources by consumers around Japan: Sustainable, Healthy and “Umai” Nippon seafood (SH“U”N) Project
				12:20	Sarah P. Wise (cancelled) Bridging fisheries knowledge and documenting socio-ecological change in Alaska fishing communities

S10 [Yamayuri Room]: <i>Ocean acidification and deoxygenation and their impact on ocean ecosystems: synthesis and next steps</i>		S8 [Kujaku Room]: <i>Internal tides, nonlinear internal waves, and their impacts on biogeochemistry, climate and marine ecosystems via ocean turbulent mixing processes</i>	
Convenors: Jim Christian (Canada), Tsuneo Ono (Japan), Silvana Birchenough (ICES)		Convenors: Shin-ichi Ito (Japan), SungHyun Nam (Korea), John Barth (USA), Annalisa Bracco (USA)	
10:50	<i>Introduction by Convenors</i>	10:50	<i>Introduction by Convenors</i>
11:00	James R. Christian The large-scale distribution of dissolved inorganic carbon, alkalinity and oxygen in the North Pacific: A global ocean modelling perspective	11:00	Ichiro Yasuda (Invited) Progress report. Ocean mixing processes: Impact on biogeochemistry, climate and ecosystems (OMIX)
11:20	Tetjana Ross Long-term variability in the Oxygen Minimum Zone and carbonate chemistry in the North East Pacific and potential impacts on seamount communities	11:30	Yign Noh (Invited) Role of turbulent mixing in plankton dynamics simulated by large eddy simulation (LES)
11:40	Jessica N. Cross* Ocean acidification impacts on biogeochemistry and the decadal variability of Total Alkalinity in the North Pacific		
12:00	Angelica Peña A model simulation of future biogeochemical conditions along the British Columbia Continental Shelf	12:00	Yeonju Choi* The scaling of the mixed layer depth under surface heating by using LES
12:20	Amber M. Holdsworth High resolution biogeochemical modelling of Canadian Northeast Pacific waters	12:20	Takeyoshi Nagai Diapycnal nutrient flux caused by the Kuroshio induced turbulence in the Tokara Strait

Thursday, November 1 (continued)

S11 (Day 1) [Kamome Room]: <i>Influence of climate and environmental variability on pelagic and forage species</i>		S2 [Oshidori Room]: <i>Fish production through food web dynamics in the boundary current systems</i>		S3 [Room 201]: <i>Science communication for North Pacific marine science</i>	
12:30	Tzu-Hsiang Lin* Spatial distributions and catch rates variability of Bigeye tuna (<i>Thunnus obesus</i>) cohorts related to oceanographic and climatic indices in the Pacific Ocean	12:30	Hiroomi Miyamoto Feeding ecology of age-1 Pacific saury during northward migration in June and July with remarks on difference of feeding habits by migration routes	12:20	Siri Hakala (moved to 12:20) An overview of stakeholder directed communication in the Pacific Islands
12:50	Lunch	12:50	Lunch	12:40	S3 Ends
MEQ-Paper Session (Day 2) [Room 201] Convenors: Chuanlin Huo (China), Thomas Therriault (Canada)					
14:00	Matthew R. Baker Climate and potential impacts on distribution and life history: Arctic cod and saffron cod, and Pacific sand lance and Pacific herring	14:00	Khafid Rizki Pratama* Interaction equatorial rossby-kelvin waves to monitoring of fishing area and ocean primary productivity in Northern Indonesia 2012-2017	14:00	Abigail McQuatters-Gollop The Plankton Index: A regional pelagic biodiversity indicator for ecosystem-based management
14:20	Irene D. Alabia Biogeographic patterns of marine communities in the Pacific Arctic under a warming ocean	14:20	Sayaka Sogawa* Spatio-temporal distribution of planktonic copepods and planktonic stages of small pelagic fishes: Copepod community structure and species diversity in egg- and larvae-rich Kuroshio and Kuroshio Extension area	14:15	Lauren M. Howell* Are zooplankton ingesting microplastics in the Arctic?
14:40	Elizabeth Siddon Ecosystem stress test: What an ice-free winter might mean for the eastern Bering Sea	14:40	Mikio Watai* Comparative analysis of the early growth history of Pacific bluefin tuna <i>Thunnus orientalis</i> from different spawning grounds and nursery areas	14:30	Pengbin Wang* Harmful algal blooms (HABs) may trigger and accelerate hypoxia zone formation at the Pearl River Estuary
15:00	Richard D. Brodeur Community and trophic impacts of the unprecedented North Pacific marine heatwave on forage taxa in the northern California Current	15:00	Elena Ustinova Oceanographic conditions and the spatial distribution of saury, sardine and mackerels in the open waters of the Northwest Pacific based on the fishery-independent R/V "Hokko-maru" survey data	14:45	Vera L. Trainer Characterization of oceanic Noctiluca blooms not associated with hypoxia in the Northeastern Arabian Sea
15:20	Yan-Lun Wu* Application of time series analysis to detect the effect of multi-scale climate indices on global yellowfin tuna population	15:20	Bin Wang* Spatial-temporal variations in the distribution and abundance of loligo squids in Shandong offshore of Yellow Sea and Bohai Sea in relation to environmental factors	15:00	Hao Guo (CANCELLED) 2017 Red Tide in China Ya-fang Li* (moved from 17:20) Long-term temporal and spatial variation of macrobenthos in a semi-enclosed bay under human disturbance
				15:15	Haryun Kim Increase in anthropogenic nitrogen and mercury in marginal sea sediments of the Northwest Pacific Ocean

S10 [Yamayuri Room]: <i>Ocean acidification and deoxygenation and their impact on ocean ecosystems: synthesis and next steps</i>		S8 [Kujaku Room]: <i>Internal tides, nonlinear internal waves, and their impacts on biogeochemistry, climate and marine ecosystems via ocean turbulent mixing processes</i>	
12:40	10-min poster presentations	12:40	Lunch
12:50	Lunch		
14:00	Christopher D.G. Harley (Invited) Confronting the complexities of ecological responses to ocean acidification	14:00	Ashley Brereton* The interactions between phytoplankton, nutrients and turbulence simulated by a large-eddy simulation (LES) ecosystem model with Lagrangian phytoplankton
14:30	Kunshan Gao Effects of ocean acidification on phytoplankton physiology and primary productivity	14:20	John A. Barth Internal waves, tides, eddies and wind-driven currents across the inner shelf
14:50	Di Qi* Increase in acidifying water in the western Arctic Ocean	14:40	Eiji Masunaga* Mixing and transports induced by nonlinear internal wave breaking in coastal regions
15:10	Masahiko Fujii Evaluation and prediction of the influences of ocean acidification to the subarctic coast	15:00	Chanhyung Jeon* Near-inertial waves advected by the Kuroshio from observation and simulation
		15:20	Suyun Noh* Observations on internal wave modulations under varying mesoscale variability for 18 years from 2000 to 2017 off the east coast Korea

Thursday, November 1 (continued)

S11 (Day 1) [Kamome Room]: <i>Influence of climate and environmental variability on pelagic and forage species</i>		S2 [Oshidori Room]: <i>Fish production through food web dynamics in the boundary current systems</i>		MEQ-Paper Session (Day 2) [Room 201]	
				15:30	Wu Men Fukushima-derived ¹³⁷ Cs and ¹³⁴ Cs in the Northwest Pacific Ocean in 2017
15:40	Peng Lian* Long-term variations and hotspots in habitat of Japanese-Spanish mackerel (<i>Scomberomorus niphonius</i>) based on spatial analysis	15:40	S. Lan Smith (moved from 17:40) Modeling seasonal and inter-annual variability of trophic transfer and ¹⁵ N stable isotope enrichment within the planktonic food chain	15:45	Bin Zou Marine Environmental monitoring with GF satellite data
16:00	<i>Coffee/Tea Break</i>	16:00	<i>Coffee/Tea Break</i>	16:00	<i>Coffee/Tea Break</i>
16:20	Sheng-Yuan Teng The potential effects of climate change on suitable habitat for the fourfinger threadfin (<i>Eleutheronema rhadinum</i>) in the coastal waters of Taiwan	16:20	Hui Liu A predictive modeling approach for single stocks, fish community and fisheries ecosystems	16:20	Zhengguo Cui Technology of assessing marine fishery losses caused by oil spills in China
16:40	Wei Yu* Climate variability with impacts on habitat suitability of chub mackerel <i>Scomber japonicus</i> in the East China Sea	16:40	Ryan R. Rykaczewski Future of nutrients, fish, and fisheries in the California and Kuroshio Currents: A multi-model approach	16:35	Yujue Wang Impact of Water-Sediment Regulation Scheme on seasonal and spatial variations of biogeochemical factors in the Yellow River Estuary
17:00	Brian P.V. Hunt Application of bulk and compound specific isotopes to resolving regional productivity regimes experienced by Pacific Herring (<i>Clupea pallasii</i>) on the coast of British Columbia, Canada	17:00	Boris Espinasse* Defining isoscapes in the Northeast Pacific as an index of ocean productivity	16:50	Ying Lin An assessment of the marine ecocivilization performance in Oujiang River Estuary Area, Zhejiang, China
17:20	Yanhui Zhu* Seasonal dynamics in pelagic fish abundance around Set-net in Kochi prefecture		Jianguo Du (CANCELLED) Food sources and trophic structure of fishes and benthic macroinvertebrates in a subtropical seagrass meadow revealed by stable isotope analysis	17:05	Jinhui Wang (moved from 17:50) Research on indicator species of bio-blogging on Nuclear Power Cold Source Water
				17:20	MEQ-P Session Ends

S10 [Yamayuri Room]: <i>Ocean acidification and deoxygenation and their impact on ocean ecosystems: synthesis and next steps</i>		S8 [Kujaku Room]: <i>Internal tides, nonlinear internal waves, and their impacts on biogeochemistry, climate and marine ecosystems via ocean turbulent mixing processes</i>	
15:30	Taewon Kim Effects of ocean freshening and acidification on benthic animals of Antarctica		
15:50	William P. Cochlan Effects of ocean warming and acidification on the growth and toxicity of <i>Pseudo-nitzschia australis</i> from the California Current Upwelling system	15:40	James J. Leichter Thermocline dynamics and modulation of a nutrient exposure for Eastern Pacific kelp forests in Southern California
16:10	<i>Coffee/Tea Break</i>	16:00	<i>Coffee/Tea Break</i>
16:30	Haruko. Kurihara Evaluation of carbon chemistry along the near-shore coast of Japan	16:20	Alex S.J. Wyatt Linking internal wave dynamics and the structure and function of coral reef ecosystems
16:50	Shigeki Wada Photosynthetic activity of early successional phytoplankton at a shallow CO ₂ seep off Shikine Island, Japan	16:40	Satoshi Osafune Numerical study on impacts of the 18.6-year modulation of tide-induced mixing on biogeochemical variables based on ESTOC
17:10	Jason Hall-Spencer The ecological effects of ocean acidification in the North Pacific Ocean	17:00	Vadim Navrotsky On energy and matter exchange between near-shore and out-of-shelf waters defining shelf ecosystems state
17:30	Shingo Kurosawa* Effects of ocean acidification on net community production in coastal ecosystems: <i>In situ</i> assessment in natural CO ₂ seeps	17:20	Toru Kobari Turbulent nitrate flux stimulates plankton productivity and trophodynamics even in the oligotrophic Kuroshio

Thursday, November 1 (continued)

S11 (Day 1) [Kamome Room]: <i>Influence of climate and environmental variability on pelagic and forage species</i>		S2 [Oshidori Room]: <i>Fish production through food web dynamics in the boundary current systems</i>		MEQ-Paper Session (Day 2) [Room 201]	
17:40	Jacek Maselko Long-lived marine fish employing broadcast spawning may be resilient to environmental variability: A selective sieve hypothesis		Yongjiu Xu* (CANCELLED) Effects of environmental change and exploitation on marine communities around the Zhoushan archipelago: A functional traits perspective		Virendra Goswami (CANCELLED) Development of physicochemical and spectroscopic methods to characterize the <i>in-situ</i> chemical speciation of the inorganic contaminants and innovative technologies for remediation of water and environmental pollution by catalytic oxidants
					Jianjun Wang (CANCELLED) The potential of alkyl amides as novel biomarkers and their application to paleocultural deposits in China
18:00	S11, Day 1 Ends	17:35	S2 Ends		

S10 [Yamayuri Room]: <i>Ocean acidification and deoxygenation and their impact on ocean ecosystems: synthesis and next steps</i>		S8 [Kujaku Room]: <i>Internal tides, nonlinear internal waves, and their impacts on biogeochemistry, climate and marine ecosystems via ocean turbulent mixing processes</i>	
		17:40	Hidekatsu Yamazaki Phytoplankton distribution at a meter scale and a millimeter scale
17:50	Ben P. Harvey* Dissolution: The Achilles' heel of gastropods in an acidifying ocean		
18:10	S10 Ends	18:00	S8 Ends

BIO-Paper Session [Yamayuri Room]		FIS-Paper Session [Oshidori Room]		S11 (Day 2) [Kujaku Room]: Influence of climate and environmental variability on pelagic and forage species	
Convenors: Se-Jong Ju (Korea), Debora Iglesias-Rodriguez (USA)		Convenors: Xianshi Jin (China), Jackie King (Canada)		Convenors: Matthew Baker (USA), Sei-Ichi Saitoh (Japan), Elizabeth (Ebett) Siddon (USA)	
9:00	Se Hyeon Jang* <i>De novo</i> transcriptome assembly of the mixotrophic dinoflagellate <i>Ansanella granifera</i> : Spotlight on flagellum-associated genes	9:00	Gordon H. Kruse Reproductive biology and fishery management of snow and Tanner crabs in the eastern Bering Sea	9:00	Elizabeth Logerwell The effect of oceanographic variability on pelagic larval fishes of the Northern Bering and Chukchi Seas
9:20	Junya Hirai* Reproductive isolation in oceanic copepods revealed by genome-wide SNP data	9:20	Olga Novikova The dynamics of the biomass of the bottom fish major families in the eastern part of the Sea of Okhotsk in 1960-2017	9:20	Chenyang Guo* Effects of environmental variabilities on the early life stage of Pacific chub mackerel <i>Scomber japonicus</i> in the Northwest Pacific
9:40	Lei Xu* Diversity of marine planktonic ostracods in South China Sea: A DNA taxonomy approach	9:40	Shufang Liu Application of DNA metabarcoding on biodiversity research of nekton community	9:40	Masahide Kaeriyama Influence of climate warming for migration, growth and survival of Japanese chum salmon in the North Pacific Ocean and the Okhotsk Sea
10:00	Yuki Takemuro* Sampling efficiency of ichthyoplankton in the northern Bering Sea: An inter-gear comparison	10:00	Seonggil Go* Estimation of a temperature-dependent Gompertz-Laird growth equation of chub mackerel (<i>Scomber japonicus</i>) larvae	10:00	Bungo Nishizawa* (moved from 12:00) Seabird density relative to their prey and water mass distributions around St. Lawrence Island, northern Bering Sea during summer
10:20	Coffee/Tea Break	10:20	Coffee/Tea Break	10:20	Coffee/Tea Break
10:40	Lianggen Wang* Seasonal variation of micro-copepod assemblages and impact of ichthyoplankton in South China Sea	10:40	Nadezda A. Rastyagaeva Biological monitoring of Pacific salmon at the hatcheries of Kamchatka region	10:40	Lisa Eisner Large zooplankton abundance as an indicator of Walleye Pollock recruitment in the southeastern Bering Sea
11:00	Siyu Jiang* Microzooplankton selective grazing on phytoplankton in the subtropical North Pacific Ocean	11:00	Binduo Xu Effects of sample size and distribution characteristics of survey data on estimation of abundance index of fish population using delta-distribution model	11:00	Hui Liu <i>Calanus sinicus</i> and its relationship with climate variability in the northern Yellow Sea
11:20	Jiajia Ning* Contribution of different organic carbon sources to the food web of a subtropical mangrove ecosystem, China	11:20	Kyunghwan Lee* Stock assessment of Pacific anchovy (<i>Engraulis japonicus</i>) biomass in the Korea Strait based on Simulation-based yield-per-recruit analysis	11:20	Liping Yin (MOVED from 11:40) Physical factors influencing the recapture rate and yield of the edible jellyfish in the Liaodong Bay, China

POC-Paper Session [Kamome Room]		HD-Paper Session [Room 201]	
Convenors: Emanuele Di Lorenzo (USA), Yury I. Zuenko (Russia)		Convenors: Keith R. Criddle (USA), Mitsutaku Makino (Japan)	
9:00	Yury Zuenko Recent changes in producing of the Intermediate water in the Okhotsk Sea	9:00	Natalie Ban Historical and contemporary Indigenous marine conservation strategies in the North Pacific
9:20	Makoto Kashiwai Stirring and up-lifting of deep water at the entrance straits of Sea of Okhotsk (shown by data including flagged 'questionable' or 'bad')	9:20	S. Kim Juniper Observing Canada's Pacific coastal ocean: Networks, programs and pathways to operationalization
9:40	Charles Hannah Sub-surface temperature variability along the west coast of Canada	9:40	Suhendar I Sachoemar Development of Sustainable Integrated Multi Tropic Aquaculture (IMTA) as a Model of Sato Umi Concept in the Coastal Area of Indonesia
10:00	Tao Lian* (CANCELLED) Uncertainty of linear trend in global SST due to multi-scale internal variation Galina Vlasova (REPLACEMENT) The role of regional atmospheric processes in the formation of the structure of currents in region of the straits surrounding Urup island (Kuril island system)	10:00	Wei Liu (CANCELLED) Evaluating the ecosystem services of Rudong coastal wetland using a rapid assessment approach Peng Sun* (MOVED from 11:40) Bioeconomic consequences of stow net selectivity in Haizhou Bay, China
10:20	Coffee/Tea Break	10:20	Coffee/Tea Break
10:40	Daisuke Hasegawa Subduction and mixing processes of the front between the Oyashio and the Tsugaru Warm Current	10:40	Keith R. Criddle Successes and failures of regulatory requirements to rebuild depleted stocks in U.S. fisheries
11:00	Kosei Komatsu (CANCELLED) Structure and impact of the Kuroshio nutrient stream Vyacheslav Lobanov (MOVED from 12:00) Winter season submeso-scale processes at the Peter the Great Bay, northwestern Japan Sea: Direct observations of deep cascading	11:00	Keith R. Criddle Attenuating durable use rights to public resources
11:20	Hajoon Song Data assimilation of physical and chlorophyll-a observations in the California Current System using two biogeochemical models	11:20	HD-Paper Session Ends

Friday, November 2 (continued)

BIO-Paper Session [Yamayuri Room]		FIS-Paper Session [Oshidori Room]		S11 (Day 2) [Kujaku Room]: <i>Influence of climate and environmental variability on pelagic and forage species</i>	
Convenors: Se-Jong Ju (Korea), Debora Iglesias-Rodriguez (USA)		Convenors: Xianshi Jin (China), Jackie King (Canada)		Convenors: Matthew Baker (USA), Sei-Ichi Saitoh (Japan), Elizabeth (Ebett) Siddon (USA)	
11:40	Amatzia Genin Mixing, stratification and spring bloom in an oligotrophic sea	11:40	Wei Yu* Habitat suitability modeling reveals climate-driven abundance variability and geographical distribution shift of winter-spring cohort of neon flying squid in the Northwest Pacific Ocean	11:40	S11 Ends
12:00	Carol Ladd Spatial and temporal variability of coccolithophore blooms in the eastern Bering Sea	12:00	Jia Wo Evaluating the effect of data manipulation on clustering analysis on fish abundance		Hongjun Li* (CANCELLED) Contrasting the relative contribution of species sorting and dispersal limitation to marine macrozooplankton community diversity in coastal Bohai Sea
12:20	BIO-Paper Session Ends	12:20	FIS-Paper Session Ends		Haiqing Yu* (CANCELLED) Potential environmental drivers of Japanese anchovy (<i>Engraulis japonicus</i>) recruitment in the Yellow Sea

POC-Paper Session [Kamome Room]		HD-Paper Session [Room 201]	
Convenors: Emanuele Di Lorenzo (USA), Yury I. Zuenko (Russia)		Convenors: Keith R. Criddle (USA), Mitsutaku Makino (Japan)	
11:40	Qimao Wang Chinese ocean satellites and application		Yang Han* (CANCELLED) Developments, challenges and policy recommendations for marine fishery resources in China
12:00	POC-Paper Session Ends		

POSTER SESSION
October 31– November 1

(*) Identifies an Early Career Scientist

S1: Toward integrated understanding of ecosystem variability in the North Pacific

- S1-P1 **Lev B. Looney***
The decomposition of wind-forced upwelling variability in the California Current through the application of cyclostationary empirical orthogonal functions
- S1-P2 **Joanne Breckenridge***
The importance of peak river flow timing to copepod abundance in the Fraser River Estuary, Canada
- S1-P3 **Sanae Chiba**
(cancelled) Observing ecosystem variability in the UN Decade of Ocean Science: OceanObs'19 perspective
- S1-P4 **Ferdinant A. Mkrtchyan**
(cancelled) Capabilities of remote monitoring systems for assessing the state of marine ecosystems
- S1-P5 **Ferdinant A. Mkrtchyan**
(cancelled) About an adaptive optical technology for monitoring aquatic ecosystem
- S1-P6 **So Jin Kim***
Newly discovered role of heterotrophic nanoflagellate *Katablepharis japonica*, a predator of toxic or harmful dinoflagellates and raphidophytes and its interactions with common heterotrophic protists
- S1-P7 **Hae Jin Jeong**
Ichthyotoxic *Cochlodinium polykrikoides* red tides offshore in the South Sea, Korea in 2014: Temporal variations in three-dimensional distributions of red-tide organisms and environmental factors
- S1-P8 **Qun Lin**
Effects of fishing and environmental changes on the ecosystem of the Bohai Sea
- S1-P9 **Jennifer L. Boldt**
Fish condition and implications for recruitment in the Northeast Pacific

S2: Fish production through food web dynamics in the boundary current systems

- S2-P1 **Kanako Saito and Toru Kobari**
Trophic sources and links of mesozooplankton and fish larvae in the Kuroshio based on stable isotope ratios
- S2-P2 **Ibuki Sato and Toru Kobari**
Trophic sources and linkages of mesozooplankton and fish larvae in the Kuroshio based on metabarcoding analysis
- S2-P3 **Fukutaro Karu***
Mesozooplankton feeding on phytoplankton and protozoans in the Kuroshio
- S2-P4 **Takeru Kanayama***
Impact of microzooplankton grazing on phytoplankton community in the Kuroshio: A major trophic pathway of plankton food web
- S2-P5 **Ying Xue**
(cancelled) Using topological network to identify keystone species in the food web of Haizhou Bay, China

Poster presenters are expected to be available near their poster to answer questions during the Thursday (November 1) evening poster session.

- S2-P6 **Kei Nakaya**
The influence of sporadic oceanic water inflow into Kagoshima Bay, southern Japan on larval fish assemblage
- S2-P7 **Hiroumi Kuroda**
Feeding habits of larval fish in the mouth of Kagoshima Bay, southern Japan
- S2-P8 **Shohei Yoshinaga**
The assemblages and feeding habits of larval fish in the Kuroshio and the adjacent waters, southern Japan
- S2-P9 **Kiyotaka Hidaka**
Dense occurrence of *Fritillaria pellucida* (Appendicularia:Fritillariidae) around the Kuroshio
- S2-P10 **Hiroshi Kuroda**
Numerical experiments using a coupled physical–biochemical ocean model to study the Kuroshio-induced nutrient supply on the shelf and slope region south of Japan: Case study of Tosa Bay facing the Kuroshio
- S2-P11 **Joo Myun Park**
Dietary patterns of walleye pollock, *Gadus chalcogramma* inhabiting the East/Japan Sea: The influences of water depth, fish size and season
- S2-P12 **Xiaoke Hu**
Distribution characteristics of primary feed in typical oceanic ranches and its response to the environmental changes
- S2-P13 **Takafumi Hirata**
Effects of photophysiology and chlorophyll *a* abundance on phytoplankton group-specific primary production in Japanese waters using remote sensing
- S2-P14 **Chiyuki Sassa**
Distribution, reproduction, and feeding of *Symbolophorus californiensis* (Teleostei: Myctophidae) mature adults in the Kuroshio region during late winter: Evidence of a southward spawning migration
- S2-P15 **Kentaro Note***
Relationship between abundance of young-of-the-year black sea bream *Acanthopagrus schlegelii* and eelgrass bed *Zostera marina* vegetation in central Seto Inland Sea, Japan

- S2-P16 **Koji Suzuki**
Spatial variations in community structure of haptophytes across the Kuroshio front in the Tokara Strait

S4: Indicators for assessing and monitoring biodiversity of biogenic habitats

- S4-P1 **Seonock Woo**
Transcriptome study of scleractinian coral *Alveopora japonica*
- S4-P2 **Fiona Davidson***
Predictive modeling methods for deep-sea sponges in the North Pacific Ocean
- S4-P3 **Kentaro Yoshikawa***
Changes in the fish community in seagrass bed on the Pacific coast of northeastern Japan before and after (2009-2017) the tsunami following the 2011 off the Pacific coast of Tohoku Earthquake

S5: Seasonal to interannual variations of meso-/submeso-scale processes in the North Pacific

- S5-P1 **Naohiro Kosugi**
Characteristic of subsurface oxygen maximum in oligotrophic western North Pacific
- S5-P2 **Zhichun Zhang***
Variability of the Pacific North Equatorial Current based on a 1/8° Pacific Model Simulation
- S5-P3 **Hideharu Sasaki**
Submesoscale dynamics in the Northeastern Subtropical Pacific Ocean
- S5-P4 **Yoshikazu Sasai**
Interannual variability of marine ecosystem in the Kuroshio Extension region
- S5-P5 **Yisen Zhong***
(cancelled) Instabilities of an anticyclonic eddy in its growing and decaying phase
- S5-P6 **Elena Ustinova (for Eu. V. Samko)**
(cancelled) Two types of anticyclonic eddies eastward from Japan: An origin, characteristics, influence on fishery
- S5-P7 **Hiromichi Ueno** (talk will be presented instead of a poster)
(P->O) Spatio-temporal variation of anticyclonic eddies in the western subarctic North Pacific

S7: Ecological responses to variable climate changes and their applicability to ecosystem predictions

- S7-P1 **Gloria S. Duran***
Assessing the oceanographic variability impact in the western North Pacific on fishery resources in Japan using FORA-WNP30
- S7-P2 **Lu Guan***
Characterizing time-series of bioacoustics, physical and biogeochemical properties in Saanich inlet (British Columbia, Canada): multi-scale temporal dynamics, causal relationships and forecasting
- S7-P3 **Hui Zhang**
(cancelled) Long term ichthyoplankton assemblage structure and its relationship between with environmental variation in the Yangtze Estuary
- S7-P4 **Hiroto Abe***
Sediment-associated phytoplankton release from the seafloor in response to wind-induced currents in the Bering Strait
- S7-P5 **Kirill Kivva***
(cancelled) Geographic regions in the Bering Sea based on in situ oceanographic data
- S7-P6 **Minkyung Bang***
Responses of Japanese anchovy (*Engraulis japonica*) catch to environmental changes in the South Sea of Korea in recent decades: A generalized additive model approach
- S7-P7 **Boris Espinasse***
Reconstructing foraging conditions experienced by salmon on the high seas
- S7-P8 **Jennifer Jackson**
Simple bio-optical proxies for phytoplankton abundance and compositions in complex coastal waters
- S7-P9 **Jennifer Jackson**
(cancelled) Dynamics governing upwelling and nutrient availability along the BC central coast

S8: Internal tides, nonlinear internal waves, and their impacts on biogeochemistry, climate and marine ecosystems via ocean turbulent mixing processes

- S8-P1 **Taiga Honma***
Response of plankton standing stocks and productivity to turbulent nitrate flux in the Kuroshio across the Tokara Strait
- S8-P2 **Naoki Yoshie**
Effects of strong turbulent mixing on phytoplankton around the Tokara Strait
- S8-P3 **Seung-Woo Lee***
Characteristics of mode-1 and mode-2 nonlinear internal waves observed in the northern East China Sea
- S8-P4 **Konstantin Rogachev**
Amplified diurnal currents over the shallow banks and 18.6-year variability of salinity of the intermediate waters in the Western Subarctic Pacific
- S8-P5 **Marika Takeuchi***
Size distributions of marine aggregates in different aquatic systems
- S8-P6 **Takahiro Tanaka***
Elevated mixing in the Tsugaru Strait through internal hydraulic jump
- S8-P7 **Jianchao Li***
The influence of Yellow Sea cold water mass on the early life history process of young Pacific cod (*Gadus macrocephalus*)

S9: Integration of science and policy for sustainable marine ecosystem services

- S9-P1 **Meng Su**
Preliminary analysis of the Jimo coastal ecosystem with the Ecopath model
- S9-P2 **Artyom Y. Tadzhibaev***
The value of ecosystem services of the West Bering Sea

S10: Ocean acidification and deoxygenation and their impact on ocean ecosystems: Synthesis and next steps

- S10-P1 **Abigail McQuatters-Gollop and Jason Hall-Spencer**
Communicating Ocean Acidification in East Asia: What are the key messages for policy makers and society?
- S10-P2 **Toshiya Nakano**
Recent deoxygenation in the Japan Sea Proper Water in the northeastern Japan Basin
- S10-P3 **Tsunao Ono**
Temporal variation of the saturation state of carbonate in intermediate waters of western North Pacific
- S10-P4 **Miho Ishizu**
A marine carbon model coupled with an operational ocean model product for ocean acidification studies in the North Western Pacific

- S10-P5 (cancelled) **Mi-Ju Ye**
Development and persistence of hypoxia and related environmental parameters at Jinhae Bay, south coast of Korea in 2011-2015
- S10-P6 **Akio Ishida**
Long-term Trends in surface ocean $p\text{CO}_2$ seasonality in the northwestern North Pacific

S11: Influence of climate and environmental variability on pelagic and forage species

- S11-P1 **Wentseng Lo**
Spatiotemporal variations of chaetognaths associated with hydrographic features in the coastal waters off southwestern Taiwan
- S11-P2 **Mitsuhiro Ishino***
Why the body size of walleye pollock larvae in Funka Bay and the adjacent waters, Hokkaido was large in 2016?
- S11-P3 **Ching-Hsien Ho***
Changes in the fish species composition seasonality and in the coastal zones of the Tsushima warm current during periods of climate change: Observations from the set-net fishery of Chiba Prefecture in Japan
- S11-P4 (cancelled) **Chris Rooper**
Linkages between pelagic temperature and zooplankton abundance, and growth and recruitment of Pacific ocean perch in Alaska
- S11-P5 **Takeshi Okunishi**
On the relationship between sea temperature and fishing ground formations of chub mackerel in the region off Sanriku, northwestern Pacific
- S11-P6 **Yuji Terada***
Occurrence of Japanese whiting *Sillago japonica* in the shallow coastal waters of the central Seto Inland Sea
- S11-P7 **Mei Sato***
Assessing the availability and accessibility of prey for the Southern Resident Killer Whales
- S11-P8 **Zhencheng Tao**
Photobehaviors of the marine calanoid copepod *Calanus sinicus* under wavelength-specific light
- S11-P9 **Suam Kim**
Salmon and people in a changing world: Introducing the International Year of the Salmon (IYS)
- S11-P10 **Ringo Nishio***
Distribution of demersal fishes in the southern Chukchi Sea and Northern Bering Sea after low ice conditions
- S11-P11 **William J. Sydeman**
Effects of climate variability on body condition of forage fish sampled by puffins in the Gulf of Alaska

S12: Applying ecosystem considerations in science advice for managing highly migratory species

- S12-P1 **Kirill Kivva (for Alexei Orlov)**
Changes in Pacific cod (*Gadus macrocephalus*) size distribution in the North Pacific Ocean over 6 millennia: Possible impacts of fishing pressure or environmental variability
- S12-P2 **Jia-Huei Lin***
Variation in the catch rate and distribution of swordtip squid (*Uroteuthis edulis*) associated with factors of the oceanic environment in the southern East China Sea
- S12-P3 **Momoko Ichinokawa**
Review of stock status of Japanese domestic fisheries and new harvest control rule in Japanese domestic fisheries management
- S12-P4 **Tsutomu Tokeshi**
Role of shallow channel to space-time variation of coastal fisheries resources -Relationship between coastal fisheries resources and oceanographic condition in Hyuga-Nada, Japan-

Biological Oceanography Committee Paper Session

- BIO-P1 **Emiko Takano**
Biomass and community composition of microzooplankton with reference to their nutritional mode in the North Pacific Ocean
- BIO-P2 **Minju Kim***
Community structure of mesozooplankton during spring and summer in the Ulleung island, Korea
- BIO-P3 **Ken-ichi Nakamura***
The role of ammonium excretion of small planktonic copepods in epipelagic nitrogen cycle in the subtropical North Pacific Ocean
- BIO-P4 **Seung Ho Baek**
Appearance characteristics of harmful algal bloom species related with coastal environments caused by different water mass in southern sea of Korea
- BIO-P5 **Seung Ho Baek**
Succession phenomenon of *Cochlodinium polykrikoides* and *Alexandrium affine* related with changes of coastal environments in the southern sea of Korea in summer
- BIO-P6 **Seung Ho Baek**
The rapid kit and its digital reader for harmful algal detection
- BIO-P7 **Dong-Hoon Im or Seung-Kyu Kim**
Copepod community structure and energy flow around subpolar front in the East Sea (Japan Sea)
- BIO-P8 **Sijun Chen**
Geographical variation of UV protective compounds in zooplankton in the subtropical North Pacific Ocean
- BIO-P9 **Kana Otaka***
Seasonal occurrences and diel color changes of planktonic copepods Sapphirinidae (Copepoda, Cyclopoida) in Sagami Bay, Japan

- BIO-P10 **Gabriel R. Freitas***
Plankton diversity and community structure based on a cabled observatory data
- BIO-P11 **Sachiko Horii**
Nitrogen isotope landscape in primary producers in the Pacific Ocean
- BIO-P12 **Minamo Hirahara***
Can an embayment copepod accumulate in the body?
- BIO-P13 **Susanna Nurdjaman**
(cancelled) Impact of Nature and Anthropogenic Forcing to Chlorophyll-a Variability at Aru Sea, Indonesia
- BIO-P14 **Setsuko Sakamoto**
Distribution and environmental characteristics of harmful dinoflagellate *Karenia digitata* on the coast of Japan
- BIO-P15 **Du Feiyan**
Molecular Phylogenetic of *Oithona* based on mitochondrial COI and 18S gene
- BIO-P16 **Haruka Sato***
Pelagic ostracods in Suruga Bay, Japan: Their species diversity and population dynamics
- BIO-P17 **Jumpei Okado***
Local forage fish availability and the reproductive performance of Rhinoceros Auklets in Hokkaido, Japan
- BIO-P18 **Noriaki Natori***
Food concentration as an explanatory variable for naupliar ingestion rates
- BIO-P19 **Takuya Sato***
Nitrogen fixation and diazotroph community structure in the high latitude region around Hokkaido, northern Japan
- BIO-P20 **Jeong-Min Shim**
(cancelled) The influence of oceanic conditions on the occurrence of *Cochlodinium polykrikoides* blooms in the East Sea, Korea
- BIO-P21 **Miran Kim**
Breeding performance and diet of Black-tailed gulls on Hongdo Island, Republic of Korea
- BIO-P22 **Evgeniy A. Boltnev***
(cancelled) Adrenal gland morphology of the sea otters *Enhydra lutris*
- BIO-P23 **Russell R. Hopcroft**
A new Long-term Ecological Research (LTER) site in the Northern Gulf of Alaska
- BIO-P24 **Liyuan Zhao**
Functional variants of the melanocortin-4 receptor associated with the Odontoceti and Mysticeti suborders of cetaceans
- BIO-P25 **Hye Jung Han**
Analysis of phytoplankton community change according to continuous observation pattern of chlorophyll-a concentration
- BIO-P26 **Seung Won Jung**
Mapping distribution of cysts of recent dinoflagellate and *Cochlodinium polykrikoides* using next-generation sequencing and morphological approaches in South Sea, Korea

- BIO-P27 **Hyun-Jung Kim**
Effects of temperature and nutrients on changes in genetic diversity of bacterioplankton communities in a semi-closed bay, South Korea
- BIO-P28 **JunSu Kang**
Changes in environmental factors and bacteria community caused by harmful algal blooms of *Akashiwo sanguinea* (Dinophyta)
- BIO-P29 **Denis S. Kurnosov**
Variation of microsatellite loci in herring (*Clupea pallasii*) from the Japan and Okhotsk seas
- BIO-P30 **Denis S. Kurnosov**
Mitochondrial DNA polymorphism of the Far Eastern sardine (*Sardinops melanostictus*) in the northwestern Pacific Ocean and Sea of Japan

Fisheries Science Committee Paper Session

- FIS-P1 **Mikhail A. Stepanenko**
The Bering Sea pollock environmentally-dependent spawning diversity, fluctuation of recruitment, migration and spatial distribution
- FIS-P2 **Olga Novikova***
The distribution and the size composition of *Myoxocephalus jaok* Cuvier, 1829 and *M. polyacanthocephalus* Pallas, 1814 on the west coast of Kamchatka
- FIS-P3 **Olga Novikova (for Tatiana N. Naumova)**
The review of the fisheries of pacific capelin (*Mallotus villosus catervarius*) in Russian Far Eastern Seas in 2010–2017
- FIS-P4 **Anastasia M. Khrustaleva**
Population complexes of sockeye salmon (*Oncorhynchus nerka*) on the Asian Pacific Coast
- FIS-P5 **Anastasia M. Khrustaleva**
Adaptive variability at MHC class II gene *Onne-DAB* in two largest sockeye salmon (*Oncorhynchus nerka*) populations in Asia
- FIS-P6 **Zhimeng Zhuang**
Development and application of DNA barcode electronic microarray for species identification of fishes of the family Clupeidae (Osteichthyes: Clupeiformes)
- FIS-P7 **Rachel J. Arnold***
Genomic sequence diversity and population structure of Longfin Smelt (*Spirinchus thaleichthys*) in the Nooksack River using 2b-RAD
- FIS-P8 **Szymon Surma***
(cancelled) Energy-based ecosystem modelling illuminates the ecological role of Northeast Pacific herring
- FIS-P9 **Hirofumi Igarashi**
A statistical approach to estimate optimal habitat suitability of walleye pollock off the north-eastern coast of Japan
- FIS-P10 **Yutaro Nagatomo***
Transpacific distribution of micronektonic fish community in the subtropical open water
- FIS-P11 **Lu Guan***
Characterizing spatial structures of larval fish assemblages at multiple scales in relation to environmental heterogeneity in the Strait of Georgia (British Columbia, Canada)

- FIS-P12 **S. Ovsyannikova**
(cancelled) Seasonal distribution of walleye pollock in the South Kuril Region
- FIS-P13 **Chiyuki Sassa**
Interannual variations in distribution and abundance of yellowtail *Seriola quinqueradiata* larvae in the East China Sea: Southward expansion of spawning ground
- FIS-P14 **Svetlana Yu. Orlova**
Pacific Flatnose (*Antimora microlepis*, *Moridae*, *Gadiformes*) in the North Pacific: An overview of their distribution, genetic diversity, otoliths, and parasites
- FIS-P15 **Naoki Tojo**
Interactions within fisheries eco-/econo-system and impact of participatory research in a coastal community: in the model area of Indonesia
- FIS-P16 **Ayumi Kanaya***
Participatory research in resource production for sustainable fisheries and estimation of option value in Indoramayu Indonesia
- FIS-P17 **Hwa Hyun Lee***
Changes in the specific gravity of Pacific cod *Gadus macrocephalus*, during the early life stages
- FIS-P18 **Ketaro Kubo**
Increase in abundance of mottled spinefoot *Siganus fuscescens* in seagrass bed in central Seto Inland Sea, Japan, for recent years
- FIS-P19 **Ryusei Shigemoto**
Day-night change in fish community in sandy shore in the central Seto Inland Sea, Japan
- FIS-P20 **Chia-Hui Wang**
Species variation of early growth history pattern of grey mullet in Taiwan
- FIS-P21 **Chia-Hui Wang**
Using otolith microchemistry to discriminate wild and released red snapper
- FIS-P21 **Jeonghwa Kim**
Recovery of Pacific oyster, *Crassostrea gigas* raised in an intertidal rack-suspended culture system in terms of growth and reproduction 3 years after the *Hebei Spirit* oil spill accident off the west coast of Korea.

Marine Environmental Quality Committee Paper Session

- MEQ-P1 **Olga Lukyanova (for Tatyana Belan)**
Marine environment quality assessment of the coastal areas around Vladivostok, using biological and chemical data analyses (the Sea of Japan/East Sea)
- MEQ-P2 **Jian Zhang***
(cancelled) Community and distribution of *coccolithophores* in the Yellow Sea and East China Sea
- MEQ-P3 **Hongxia Ming**
Abundance and community structure of ammonium monooxygenase (*amoA*) genes in Liaohu estuary sediments
- MEQ-P4 **Jinqiu Du***
Trends of sediment accretion and carbon sequestration in Liaohu estuarine wetland
- MEQ-P5 **Jung Hoon Kang**
Spatial characteristics of microplastic in the zooplankton samples collected from the Yellow Sea

- MEQ-P6 **Su-Hyun Kim***
Atmospheric long-range transport of microplastics: A preliminary result of atmospheric fall-out samples from a remote island (Daecheong Is.), South Korea
- MEQ-P7 **Tamaha Yamaguchi***
Stimulated phosphorus utilization by possible increase of dust deposition in the western North Pacific
- MEQ-P8 **Renyan Liu**
(cancelled) Toxicity and affecting of toxic dinoflagellates on plankton and bacterial community
- MEQ-P9 **Chunlei Gao**
(cancelled) Multiple toxins determined in shellfish collected from the north Bering Sea and Chukchi Sea and its northern area
- MEQ-P10 **Jinhui Wang**
(P->O) Research on indicator species of bio-blogging on Nuclear Power Cold Source Water
- MEQ-P11 **Kanako Naito**
Distribution of harmful algae, nutrients and iron in Bungo Channel, western Seto Inland Sea, Japan
- MEQ-P12 **Young-Sug Kim**
(cancelled) Statistical analysis of seasonal water pollutants affecting phytoplankton proliferation on the South Korean coasts
- MEQ-P13 **Anna S. Vazhova**
Radiological investigation in the Far Eastern seas of Russia
- MEQ-P14 **Qutu Jiang**
(also talk) Assessing the Severe Eutrophication Status and Spatial Trend in the Coastal Waters of Zhejiang Province (China)
- MEQ-P15 **Collegue (for Mikhail V. Simokon)**
(cancelled) Macro- and microelement composition of marine commercial fishes from the Far Eastern Seas
- MEQ-P16 **Jun Ho Koo**
(cancelled) Hypoxia of Jinhae Bay in the southeastern coast of Korea
- MEQ-P17 **Mi-jin Hong**
Impacts of marine debris on seabirds in South Korea
- MEQ-P18 **Dong-Woon Hwang**
Distributions of organic matter and heavy metal in Korean coastal sediments and their pollution assessment

Physical Oceanography and Climate Committee Paper Session

- POC-P1 **Chuanxi Xing**
(cancelled) Summertime Bottom Cold Water Transports in the Northern Bohai Strait, China
- POC-P2 **Svetlana Marchenko**
Estimation of the hydrodynamic regime of water in the spring transitional season for half a century in the Kamchatsky Strait (the Aleutian island system)
- POC-P3 **Galina Vlasova**
(also talk) The role of regional atmospheric processes in the formation of the structure of currents in region of the straits surrounding Urup island (Kuril island system)

POC-P4 **Valentina V. Moroz**
The South Okhotsk Sea water thermal regime variability under influence of the water dynamic and atmospheric circulation in summer

POC-P5 **Valentina V. Moroz**
Water characteristics peculiarities formed by tides in the South Okhotsk Straits and adjacent areas

POC-P6 **Larissa A. Gayko**
Temperature change along the Russian coast of the Japan Sea from 1991 to 2017

POC-P7 **Daiki Ito***
Kuroshio warm water intrusion observed by high-resolution survey

POC-P8 **Mio Terada***
Mechanisms of future upwelling change in the equatorial Pacific using CMIP5 models

POC-P9 **Kyeong Ok Kim**
A numerical study on the circulation, wave and suspended sediment in the Yellow and East China Seas

POC-P10 **Lijian Shi**
Sea Ice Extent Retrieval with HY-2A Scatterometer data and its Assessment

POC-P11 **Jimin Ko**
The real-time warning system against rip currents occurred at Korean peninsula

POC-P12 **Yugo Shimizu**
Seasonal and longer-term variation of the Kuroshio temperature and salinity based on repeat observation along 138°E

POC-P13 **Kwang-Young Jeong**
Reproducing the sea level in the last 30 years to predict in the Northwest Pacific using a numerical model

POC-P14 **Takashi Setou**
Impact of ARGO observation data on a sub meso-scale forecast based on ROMS

POC-P15 (cancelled) **Kosei Komatsu**
Swell-dominant surface waves inherent in the coastal shape of rias bays facing the western North Pacific

POC-P16 **Yuri Zuenko (for Svetlana Glebova)**
Features of cyclonic activity over the Pacific Ocean and the Far Eastern Seas in spring and summer in 1995-2015

POC-P17 **Sang-Chul Cha***
Climate-related decadal sea level and heat content shifts in the tropical Pacific

POC-P18 **Ji Seok Hong**
Effect of surface gravity waves on upper-ocean mixing in the northern East China Sea in summer using an ocean-wave coupled modeling system

POC-P19 **Hitoshi Kaneko**
Decadal salinity variation in the western North Pacific correlated with the North Pacific Gyre Oscillation and the strength of the Kuroshio Extension

POC-P20 **Natalia I. Rudykh**
Instrumental observations in Peter the Great Bay during more than 100 years: what changed

POC-P21 **Mingjun-He**
Spatio-temporal fusion of multi-resolution satellite sea surface salinity (SSS) products using Bayesian Maximum Entropy method

POC-P22 (cancelled) **Young Baek Son**
Ocean environmental monitoring using a wave glider

POC-P23 (cancelled) **Hee Dong Jeong**
Extended ferry based monitoring lines in the western PICES Area

POC-P24 **Chan Joo Jang***
Evaluation of mixed layer depth in the northern Indian Ocean simulated by CMIP5 climate models

POC-P25 **Jennifer Jackson**
70 year long time series analysis of Bute Inlet water properties in British Columbia

POC-P26 **Hanna Na**
Interannual to decadal variability of the upper-ocean heat content in the western North Pacific and its relationship to oceanic and atmospheric variability

POC-P27 **Anna S. Vazhova**
Evolution of chemical properties in the bottom shelf water during its movement across the shelf of Peter the Great Bay

W1: Ecological roles of gelatinous zooplankton: Evaluation, integration and future prospects in a more gelatinous ocean

W1-P1 **Yusuke Kondo***
Ecological impact of jellyfish fishery on symbionts of jellyfish in Thailand

W1-P2 **Akane Iida***
Morphological and molecular examination of *Aurelia* sp. in Orido Bay, Japan

W1-P3 **Yumiko Obayashi**
Degradation of gelatinous zooplankton carcass by microbial community in seawater

W1-P4 **Nan Wang***
Carbon distribution strategy of *Aurelia coerulea* polyps in the strobilation process in relation to temperature and food supply

W1-P5 **Hiroshi Miyake**
Jellyfish fauna changes before and after 2011 Tohoku earthquake and tsunami in southern part of Sanriku coast, Iwate, Japan

W4: Synthesizing projected climate change impacts in the North Pacific

W4-P1 **Wonkeun Choi (talk cancelled, changed to a poster)**
Projected changes in the sea surface wind in the east asian marginal seas from regional climate models

W6: Regional evaluation of secondary production observations and application of methodology in the North Pacific

- W6-P1 **Lian E. Kwong***
Zooplankton secondary production in high nutrient low chlorophyll (HNLC) and seasonally productive regions in the North Pacific
- W6-P2 **Takashi Fushima***
Estimation of egg production rate of *Calanus sinicus* from preserved samples
- W6-P3 **Yuji Yoshinaga***
Diel rhythm of egg spawning of the planktonic copepod *Calanus sinicus* in Sagami Bay, Japan
- W6-P4 **Julie Keister**
Individual growth rate (IGR) measurements negatively correlate with aminoacyl-tRNA synthetases (AARS) activity in North Pacific krill, *Euphausia pacifica*

W8: Taking stock of marine ecosystem services in the North Pacific — Exploring examples and examining methods

- W8-P1 **Jie Chen***
(cancelled) An index to assess the health and benefits of the global ocean
- W8-P2 **Takaaki Mori**
Economic value of ecosystem services and utility of coastal fisheries in Indramayu, Indonesia

General Poster Session

- GP-P1 **Soonmi Lee***
(cancelled) Temperature mediated effect on productivity-diversity relationship in marine pelagic ecosystems: A modeling study
- GP-P2 **Minuk Lee**
Age determination and growth estimation of the white-spotted conger eel, *Conger myriaster* (Brevoort, 1856) in marine waters of South Korea
- GP-P3 **Akande S.O.***
(cancelled) Modelling environmental impacts and adaptation on sustainable climate and marine ecosystems in the north-atlantic coast
- GP-P4 **Sangyeob Kim***
The environmental analysis for sustainable seaweed aquaculture management in Ariake Sea, Japan
- GP-P5 **Xiuxia Mu***
(cancelled) Fishery biology of whitespotted conger *Conger myriaster* in the Yellow and East China Seas
- GP-P6 **Alexandra I. Chistyakova**
Results of a longterm monitoring of the hatchery marked juvenile pacific salmon identification during autumn migrations in the basin of the Sea of Okhotsk
- GP-P7 **Josep V. Planas**
Assessment of reproductive development in female Pacific halibut (*Hippoglossus stenolepis*)

- GP-P8 **Josep V. Planas**
Identification of molecular growth signatures in skeletal muscle of juvenile Pacific halibut (*Hippoglossus stenolepis*) for monitoring growth patterns in the Pacific halibut population
- GP-P9 **Josep V. Planas**
Electronically monitoring release method as a proxy for Pacific halibut discard mortality rates in the directed Pacific halibut longline fishery
- GP-P10 **Jin-Young Seo**
Effects of biocides of antifouling paints and by-products from vessels on embryos of a sea urchin, *Strongylocentrotus nudus*
- GP-P11 **Wishnu A. Swastiko***
The influence of moisture content on cloud growth when Tropical Cyclones occur in the maritime continent of Indonesia
- GP-P12 **Ma Zhiyuan**
(cancelled) Integrated Assessment of Island Ecosystem in China
- GP-P13 **Yunlong Chen***
Assessing the vulnerability on fishes in the Yellow Sea and Bohai Sea
- GP-P14 **Jiazhen Sun**
Ocean deoxygenation enhances the efficiency of CO₂ concentrating mechanisms in a diatom with stimulated photosynthetic performances
- GP-P15 **Roman Novikov**
Coastal fishing of Pacific halibut (*Hippoglossus stenolepis*) and its prospects of development in the Asian part of the areal
- GP-P16 **Jeong Hyeon Kim***
Community organization of macrobenthic sessile organisms responding to the submerging time of artificial panels in the embayment of the East China Sea, South Korea
- GP-P17 **Masaki Kakita***
Behavior of microplastics in primary, secondary, tertiary, and sludge treatment processes in wastewater treatment plants in Japan
- GP-P18 **Garry Benico**
Morphology and phylogeny of bloom-forming *Takayama* sp. associated with the recent fish kill events in the Philippines
- GP-P19 **Lisha Guan***
Statistical modeling for exploring diel vertical distribution and spatial correlations of marine fish species — A new perspective to look at species interactions
- GP-P20 **Kazuya Takahashi**
Unarmored dinoflagellate *Kapelodinium* sp. with chloroplast derived from haptophyte *Chrysochromulina* sp.
- GP-P21 **Qiufen Li**
Temporal and spatial characteristics of bacterial diversity in the environments of cage and kelp cultural area in Xiangshan Bay, China
- GP-P22 **Li-Xiang Li**
Assessing the outcomes of stocking hatchery-reared juveniles of *Girella punctate* in the north-eastern coast of Taiwan

GP-P23 (cancelled)	Chunjiang Guan The state of red tide of China in 2017	GP-P39	Shohei Takemoto Influence of ammonium derived from hot spring drainage on downriver and estuarine ecosystems
GP-P24	Atsuko Yamaguchi Age and growth of the herbivorous fish, <i>Kyphosus bigibbus</i> , determined by accurate age determination techniques, for elucidating the effects on algal ecosystems in the Northwest coast of Kyushu, Japan	GP-P40 (cancelled)	Taehee Lee Changes of nitrogen and carbon budget by effluent of land-based aquaculture farm in the coastal area of Jeju, Korea
GP-P25	Georgiy S. Moiseenko Use of empirical orthogonal functions for monitoring coccolithophores in the upper layer of sea water	GP-P41	Bo ram Lee Distribution and population structure of <i>Euphausia pacifica</i> in Korean waters
GP-P26	Wai Mun Lum* Ultrastructure and phylogeny of <i>Chattonella subsalsa</i> and <i>C. marina/ovata/antiqua</i> collected from various countries	GP-P42	Jorge García Molinos VoCC: A new R package for calculating the velocity of climate change and related landscape climatic metrics
GP-P27	Misako Matsuba Accumulation of tsunami debris on the seafloor depends on tsunami impact, bathymetry and ocean velocity	GP-P43 (cancelled)	GwangSeob Park* The study of change of marine environment around Jeju Ocean Research Station using wave glider
GP-P28 (cancelled)	Nadezhda Aseeva The Okhotsk Sea de-oxygenizing influence on deep-water fishes	GP-P44	Masakazu Higaki NEAR-GOOS: Developing sustained ocean observations for enhanced services in the north-eastern Asian marginal seas
GP-P29	Hirano Katsushi* Can a deep-sea copepod trophically utilize bacterial bioluminescence and chitinolysis?	GP-P45	Larissa Gayko Influence of variability of thermal conditions on the development of shellfish on marine farms (North-Western part of the Sea of Japan)
GP-P30	Jin-Wook Song* Characteristics of dissolved organic matter in Submarine Groundwater Discharge (SGD) in Jeju Island		
GP-P31	Min-young Lee Monthly distribution of organic matter in precipitation of Jeju Island		
GP-P32	Yoichi Era Microplastic pollution in freshwater ecosystem – A case study of inland lakes in Japan		
GP-P33	Ken-ichi Kitahara Identification of terrestrial sources of microplastics into the aquatic environment		
GP-P34 (cancelled)	Jie Chen Using blue carbon in climate regulation		
GP-P35 (cancelled)	Tatiana Orlova The toxic dinoflagellate <i>Prorocentrum foraminosum</i> and its associated bacteria from the culture collection “Marine Biobank” NSCMB FEB RAS		
GP-P36	Jinik Hwang Taxonomic profiles in metagenomic analyses of marine dinoflagellate communities in Jinhae Bay, Korea		
GP-P37	Jun-Ho Hyung Absolute quantification of <i>Oxyrrhis marina</i> and <i>Oxyrrhis maritima</i> in Korean waters using chip-based digital PCR (dPCR) as a novel detection method		
GP-P38	Koji Fujita* Influence of submarine groundwater discharge on feeding and growth of fish		

Upcoming Event

PICES-2019, October 16–27
Connecting Science and Communities in a Changing North Pacific
Victoria, BC, Canada
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