

Schedules
Oral Presentations

May 22 - W1

Workshop 1 (W1)

Biological consequences of a decrease in sea ice in Arctic and Sub-Arctic seas

Co-Convenors:

Anne Hollowed (USA)

Harold Loeng (Norway)

Invited Speakers:

Trond Kristiansen (Norway)

Hyunju Seo (Korea)

This workshop will review life history information and habitat associations to assess the risk of immigration and settlement of new biological populations in the Arctic and surrounding shelf seas in response to the retreat of sea ice. Criteria necessary to establish new species in the Arctic Ocean and surrounding areas will be developed and compared to expected conditions based on climate scenarios. Ways for cooperation in information sharing between groups charged with managing the Arctic will be explored and the results of the workshop will be reported to both PICES and ICES scientists working on these issues.

- 9:00 ***Introduction by Convenors***
- 9:10 **Trond Kristiansen (Invited)**
Analyzing warm and cold climate phases to understand differences in survival of larval fish: Possible implications of climate variability (W1-7552)
- 9:30 **Hyunju Seo, Hideaki Kudo and Masahide Kaeriyama (Invited)**
The effect of global warming and density-dependence on Hokkaido chum salmon from the 1940s to the early-2000s (W1-7502)
- 9:50 **Nicholas A. Bond, Paul D. Spencer and Anne B. Hollowed**
Impacts of climate change on the habitat of Bering Sea arrowtooth flounder (W1-7493)
- 10:05 **Anne B. Hollowed, Steven Barbeaux, Edward Farley, Edward D. Cokelet, Stan Kotwicki, Patrick Ressler, Cliff Spital and Christopher Wilson**
Forecasting climate change impacts on forage fish distributions in the Bering Sea (W1-7500)
- 10:20 ***Coffee/Tea Break***
- 10:40 **Michael Klages, Eduard Bauerfeind, Antje Boetius, Melanie Bergmann, Christiane Hasemann, Eva-Maria Nöthig, Ingo Schewe and Thomas Soltwedel**
Rapid shifts of the marine ecosystem at HAUSGARTEN deep-sea observatory (Fram Strait; 79°N, 04°E) observed over the past decade (W1-7513)
- 10:55 **Daria Martynova and Nikolay Usov**
A life with and without ice in the White Sea: Who will stay tuned? (W1-7401)
- 11:10 **Group Discussion**
Review information on the life history and habitat associations to assess the risk of immigration and settlement of new biological populations in the Arctic and surrounding shelf seas in response to the retreat of sea ice. Establish the habitat requirements necessary for viable range extensions of major fish stocks. Develop criteria necessary to establish residency of new species in the Arctic Ocean and surrounding shelf seas.
- 12:30 ***Lunch***

- 14:00 **Discussion**
Consider climate scenarios for arctic and surrounding shelf seas to evaluate the likelihood of range extensions of selected fish stocks using the criteria.
- 15:00 *Coffee/Tea Break*
- 15:20 **Discussion**
Continue
- 16:40 **Discussion**
Review and report on ongoing relevant activities in the area and suggest ways for cooperation
- 17:00 Summary and recommendations
- 17:30 Workshop ends

May 22 - W2

Workshop 2 (W2)

Arctic-Sub-Arctic interactions

Convenors:

Kenneth F. Drinkwater (Norway)

Thomas Haine (USA)

This workshop will build on the work of the Arctic-Subarctic Ocean Fluxes (ASOF) community that has focused on quantifying the fluxes around the Arctic and the successful IPY session on *Arctic-Subarctic connections: Ecosystems and biodiversity* at the Oslo IPY Conference in June of 2010. It will bring together several disperse groups that are studying these fluxes and their biophysical effects, including: ESSAS that has concentrated on the Subarctic and the effects on the marine biota, especially fish; those working on the benthic-pelagic coupling and the biogeochemistry in the Barents and the Greenland shelves; those looking at the interaction between the Chukchi Sea and the western Bering Sea; scientists who during the IPY studied the effects of the Bering Sea on the Western Arctic; and other interested scientists. The object is to identify the gaps in our knowledge and to highlight what research can be carried out over the next few years to fill some of these gaps in our understanding of the effects of the interactions between the Arctic and Sub-Arctic and to coordinate the research on these issues. Areas of interest include physical, biogeochemical, and food web studies.

- 9:00 **Introduction by Convenors**
- 9:15 **T. Haine**
ASOF Views on Interactions
- 9:35 **E. Carmack**
Views on Arctic-Subarctic Interactions
- 9:55 **Charles H. Greene, Bruce C. Monger, Louise P. McGarry, Matthew D. Connelly, Neesha R. Schnepf, Andrew J. Pershing, Igor M. Belkin, Paula S. Fratantoni, David G. Mountain, Robert S. Pickart, Andrey Proshutinsky, Rubao Ji, James J. Bisagni, Changsheng Chen, Sirpa M.A. Hakkinen, Dale B. Haidvogel, Jia Wang, Charles Hannah, Erica Head, Peter Smith, P. Chris Reid and Alessandra Conversi**
Remote climate forcing of regime shifts in northwest Atlantic shelf ecosystems (W2-7372)
- 10:15 **Coffee/Tea Break**
- 10:35 **K. Drinkwater / J. Grebmeir**
Discussion: What are the important issues?
- 12:30 **Lunch**
- 14:00 **R. Woodgate**
Fluxes through the Bering Strait
- 14:20 **J. Grebmeier**
Biological effects of exchange in Bering Strait
- 14:40 **Peter Rhines, Eleanor Frajka-Williams and Hjálmar Hátun**
Dynamics of upper ocean low-salinity waters in controlling winter convection, water-mass transformation and spring blooms (W2-7481)
- 15:00 **M. Reigstad**
The role of Arctic Outflow on the East Greenland Shelves

- 15:20 **M. St. John**
The BASIN Project
- 15:40 ***Coffee/Tea Break***
- 16:00 **P. Rhines /M. Reigstad**
Discussion: How to address the important questions
- 16:30 **K. Drinkwater /T. Haine**
Summary of workshop and follow-up work
- 17:30 Workshop ends

May 22 - W3

Workshop 3 (W3)**Zooplankton life histories: Developing metrics to compare field observations and model results in order to predict climate effects****Co-Convenors:**

Erica Head (Canada)

Andrew Leising (USA)

William Peterson (USA)

Jaimie Pierson (USA)

This workshop will bring together researchers interested in understanding how climate and life history patterns of zooplankton interact to produce the observed distributions and abundances of key species found throughout the boreal Sub-Arctic and Arctic seas. The Workshop will build on work funded through the GLOBEC Pan-Regional Synthesis project, which is exploring how species pairs of copepods in the genus *Calanus* co-exist in the Atlantic and Pacific basins. That work is a combination of modeling efforts and data analysis, and combines both abundance and distribution data with vital rate data on reproduction, feeding, and development. This workshop will facilitate expansion of that work beyond a single genus. We seek enhanced collaboration within the community to further the understanding of how zooplankton life histories are affected by climate change. Of special interest will be the influence of ice cover and the prediction of the effects of reduced ice cover under global warming. Participation of researchers studying climate effects on zooplankton prey and predators is also encouraged.

- 9:00 **Introduction by Convenors**
- 9:20 **Andrew Leising and James Pierson**
Is *Calanus pacificus* just a warmer-adapted *Calanus finmarchicus*? (W3-7397)
- 9:40 **William T. Peterson, Cheryl Morgan and Jay Peterson**
Calanus marshallae: Life history, seasonal cycle of abundance and egg production rates in the shelf waters off Newport, Oregon (W3-7515)
- 10:00 **C. Tracy Shaw, Leah R. Feinberg and William T. Peterson**
Life histories of the euphausiids *Euphausia pacifica* and *Thysanoessa spinifera* in the upwelling region off Newport, OR, USA (W3-7400)
- 10:20 **Coffee/Tea Break**
- 10:40 **James Pierson, Jeffrey Runge, Erica Head, Stéphane Plourde, Catherine Johnson, Andrew Leising, Frédéric Maps, David Kimmel and Andrew J. Pershing**
Predicting copepod dormancy timing in response to climate change (W3-7398)
- 11:00 **Discussion**
- 12:30 **Lunch**
- 14:00 **Stéphane Plourde, Jeffrey Runge, James Pierson, Erica Head, Pierre Pepin, Catherine Johnson, Astthor Gislason, Xabier Irigoien, David Kimmel, Andrew Leising, Andrew J. Pershing, Frédéric Maps and Webjørn Melle**
Presenter: James Pierson on behalf of Stéphane Plourde
A pan-regional comparison of the seasonal climatology in mortality and population dynamics of *Calanus finmarchicus* across the North Atlantic (W3-7443)

- 14:20 **Erica Head, Wendy Gentleman, Leslie Harris and Marc Ringuette**
Reality and the estimation of mortality for copepod eggs (W3-7399)
- 14:40 **Nicholas R. Record, Andrew J. Pershing and Frédéric Maps**
Modeling copepod biodiversity using evolutionary computing (W3-7492)
- 15:00 **Atsushi Tsuda, Shinji Shimode and Kazutaka Takahashi**
Neocalanus vs. *Calanus* oceans. Comparative study on the life histories of *Neocalanus* and *Calanus* copepods, and their global distribution (W3-7468)
- 15:20 ***Coffee/Tea Break***
- 15:40 **Discussion**
- 16:00 Breakout Groups
- 17:00 Group reports
- 18:00 Workshop ends

May 22 - W4

Workshop 4 (W4)

Comparative analyses of gadid and crustacean dynamics across subarctic ecosystems

Co-Convenors:

Earl Dawe (Canada)

Franz J. Mueter (USA)

This half-day workshop aims to summarize and synthesize the main findings to date of comparative analyses regarding the effects of climate and predator-prey interactions on gadid and crustacean stocks across subarctic ecosystems. The focus will be on studies conducted under the auspices of ESSAS Working Group 4, but the workshop is open to anyone conducting comparative analyses on fish and crustacean stocks in subarctic seas. As a secondary goal, we will discuss future directions for comparative studies of fish and crustacean resources across subarctic systems and the future of Working Group 4.

- | | |
|-------|--|
| 9:00 | <i>Introduction by Convenors</i> |
| 9:10 | Stephanie Boudreau
The role of large benthic decapods in marine ecosystems |
| 9:30 | Franz Mueter / Earl Dawe
Gadid-crustacean interactions in subarctic marine ecosystems: What have we learned? |
| 9:50 | Discussion of main findings from working group to date |
| 10:20 | Brief overview of papers planned for special MEPS volume |
| 10:40 | <i>Coffee/Tea Break</i> |
| 11:00 | Break-out groups to discuss and coordinate collaborative contributions |
| 12:00 | Future directions and future of Working Group 4 |
| 12:30 | Workshop ends |

May 22 - W5

Workshop 5 (W5)

Comparative analyses of Marine bird and mammal responses to climate change

Co-Convenors:

Rolf Ream (USA)

William J. Sydeman (USA)

Yutaka Watanuki (Japan)

This workshop will focus on how to best integrate ongoing and new research on marine birds and mammals into long-term PICES and ESSAS programs and objectives; the overarching goal is to produce a strategic vision and plan for activities of the PICES MBMAP over the next 5 years. Specific workshop objectives include (1) producing an outline of potential new goals reflecting climate change impacts on marine birds and mammals in the northern hemisphere, (2) design and implementation of sub-groups to work on specific areas of interest including (i) models of climate impact (e.g., NEMURO.BIRD), (ii) conservation of threatened and endangered species, and (iii) communication, and (3) initial writing of strategic plan documents. The workshop will include some oral presentations, but the emphasis will be on discussions leading to planning documents.

- 13:30 ***Introduction by Convenors***
- 13:40 **Martin Renner, John F. Piatt, Kathy Kuletz and George L. Hunt, Jr.**
Changes in the distribution of hotspots of pelagic seabird species diversity and abundance in the Bering Sea and North Pacific over four decades (W5-7550)
- 14:10 **William Sydeman**
Presentation on ecological indicators
- 14:40 Discussion on presentations
- 15:10 ***Coffee/Tea Break***
- 15:30 **Discussion**
Future of the PICES Advisory Panel on Marine Birds and Mammals
- 16:30 Workshop ends

May 23 - Opening Plenary

Opening Day Plenary Session

- 8:30 **George L. Hunt, Jr.**
Welcome and opening remarks
- 8:40 **Danielle Merculief, Steven Isaac, Caitlin Bourdukofsky, Anthony Lekanof, Cara Mandregan, Joshua Prokopiou, Ashley Mercurief, Carmen Philemonof, Brandi Mercurief, Michael Dirks, Dallas Roberts, David Mercurief, Chelsea Lekanof, Andronika Emanoff, Barbara Chapman, William Lekanof and Mich Ridgway**
Aleut ecological studies in Pribilof Domain – Maritime heritage and recent work presented by student researchers from the Pribilof Islands, “The Galapagos of the North”
- 9:00 **Eddy C. Carmack (Invited)**
Climate connectivities: Roles of the Arctic and subarctic oceans in global change (S5-7467)
- 9:30 **Anthony Gaston, Jennifer Provencher, Paul Smith, Kyle Elliott, Mark Mallory and Grant Gilchrist (Invited)**
Seabirds and changing ice conditions in the Canadian Arctic (S5-7487)
- 10:00 **Michiyu Yamamoto-Kawai, Fiona A. McLaughlin and Eddy C. Carmack (Invited)**
Effects of ocean acidification, warming and melting of sea ice on aragonite saturation of Canada Basin surface water (S4-7411)
- 10:30 *Coffee/Tea Break*
- 11:00 **Lou A. Codispoti (Invited)**
Nutrient and productivity variations in Arctic and sub-Arctic seas (S4-7352)
- 11:30 **Gennady V. Khen and Eugeny O. Basyuk (Invited)**
Hydrography and biological resources in the western Bering Sea (S2-7346)
- 12:00 **Phyllis Stabeno, Sue E. Moore, Calvin Mordy, Jeffrey M. Napp and Michael Sigler (Invited)**
A comparison of the physics, chemistry, and biology of warm and cold years on the eastern Bering Sea shelf (S2-7546)
- 12:30 Session ends

May 23 - S2 (day 1)

Session 2 (S2)

New observations and understanding of eastern and western Bering Sea ecosystems

Co-Convenors:

Rodger Harvey (USA)

Oleg N. Katugin (Russia)

Sang Heon Lee (Korea)

Mike Sigler (USA)

Invited Speakers:

Gennady Khen (Russia) - presents on May 23, Plenary Session

Franz J. Mueter (USA)

Phyllis Stabeno (USA) - presents on May 23, Plenary Session

This session is meant to showcase the recent major efforts in the Bering Sea Ecosystem Study (BEST) and the Bering Sea Integrated Ecosystem Research Program (BSIERP), as well as the compendium of new information provided in the most recent PICES North Pacific Ecosystem Status Report and studies that have been carried out in the Bering Sea by Russia, Korea, Japan and China. These papers will provide an opportunity to gain an overall perspective of the relative importance of various forcing mechanisms in driving marine ecosystem dynamics.

- 14:00 **Introduction by Convenors**
- 14:05 **Franz J. Mueter, Mikhail A. Stepanenko, Anatoly V. Smirnov and Orio Yamamura (Invited)**
Comparing walleye pollock dynamics across the Bering Sea and adjacent areas (S2-7532)
- 14:35 **Jessica Cross and Jeremy Mathis**
Controls on in carbonate mineral saturation states and ocean acidification on the southeastern Bering Sea shelf (S2-7366)
- 14:55 **Rolf Gradinger, Katrin Iken and Bodil A. Bluhm**
Sedimentation processes under the seasonal sea ice of the Bering Sea (S2-7456)
- 15:15 **Raymond Sambrotto, Jinlun Zhang, Didier Burdloff, Ana Maria Aguilar-Islas and Kali McKee**
Sea-ice dispersal and source influence productivity patterns in the northern Bering Sea (S2-7458)
- 15:35 **David H. Shull, Allan H. Devol and Margaret S. Esch**
Bioturbation and organic carbon mineralization pathways in Bering Shelf sediments (S2-7482)
- 15:55 **Coffee/Tea Break**
- 16:25 **Jeffrey M. Napp, Lisa Eisner, Edward Farley, Kathy Mier, Alexei Pinchuk and Phyllis Stabeno**
North-south variation in eastern Bering Sea shelf spring and late summer zooplankton assemblages (S2-7522)
- 16:45 **Evelyn J. Lessard, Megan Schatz, C. Tracy Shaw and Michael Foy**
Seasonal and interannual patterns in euphausiid diets and feeding rates in the eastern Bering Sea: Three years of BEST observations (S2-7384)

- 17:05 **Sandra Parker-Stetter, John K. Horne, Edward Farley and Lisa Eisner**
Evaluating linkages between forage fish distributions and physical oceanography in the eastern Bering Sea (S2-7459)
- 17:25 **Kanako Toge, Rei Yamashita, Kentaro Kazama, Masaaki Fukuwaka, Orio Yamamura and Yutaka Watanuki**
Biennial change of the pink salmon biomass and its effects on the body condition of two species of seabirds in the central Bering Sea (S2-7386)
- 17:45 **Duane E. Stevenson and Robert R. Lauth**
Latitudinal trends and temporal shifts in the seafloor ecosystem of the eastern Bering Sea shelf and southeastern Chukchi Sea (S2-7450)
- 18:05 Discussion
- 18:15 Session ends

May 23 - S4 & S9

Session 4 and Session 9 merged (S4 & S9)

Nutrients, biogeochemistry and acidification in a changing climate

S4 Co-Convenors:

Knut Yngve Børsheim (Norway)

Al Devol (USA)

Michiyo Yamamoto-Kawai (Japan)

Humio Mitsudera (Japan)

Jean-Eric Tremblay (Canada)

S9 Co-Convenors:

Kenneth Denman (Canada)

Christoph Heinze (Norway)

Yukihira Nojiri (Japan)

Jim Overland (USA)

Hans Pörtner (Germany)

S4 Invited Speakers:

Lou Codispoti (USA) - presents on May 23,
Plenary Session

Eva Falck (Norway)

Shigeto Nishino (Japan) - presents on May 25,
Plenary Session

S9 Invited Speakers:

Jim Christian (Canada) - presents on May 24,
Plenary Session

Mishiyo Yamamoto-Kawai (Japan) - presents on May 23,
Plenary Session

This session will focus on the sources of macro- and micro-nutrients in the sub-Arctic seas. How does the importance of the various pathways to primary production vary with season, and how do they affect the fate of the production? How do these differ between the Atlantic and Pacific oceans? How are these processes influenced by the presence of sea ice? Additionally, this session will include papers that discuss the responses of high latitude regions to either future climate or increasing acidification, or their combined response. Of particular interest are physical, chemical or biological thresholds or tipping points that will lead to large-scale changes in an ecosystem.

- 14:00 **Introduction by Convenors**
- 14:05 **Eva Falck, Frede Thingstad, Paul Wassmann and Knut Yngve Børsheim (Invited)**
Presenter: Knut Yngve Børsheim on behalf of Eva Falk
Tracing Pacific water entering the Polar Ocean through the Bering Strait using N/P ratio signatures (S4-7412)
- 14:35 **Humio Mitsudera, Keisuke Uchimoto and Tomohiro Nakamura**
Cold water belt formation off the Soya Warm Current along the northeastern coast of Hokkaido (S4-7410)
- 14:55 **Tore Johannessen**
The advantage of being eaten: Do zooplankton stimulate growth of their preferred algal prey? (S4-7488)
- 15:15 **Zhongyong Gao, Liqi Chen and Heng Sun**
Developments of Arctic carbon sink from 1999 to 2010 (S4-7416)
- 15:35 **Julie Granger, Maria Prokopenko, Daniel Sigman and Calvin Mordy**
The predominance of benthic processes for N cycling on the eastern Bering Sea shelf as evidenced by the N and O isotope ratios of water-column nitrate (S4-7444)
- 15:55 **Coffee/Tea Break**

- 16:25 **Keisuke Uchimoto, Tomohiro Nakamura, Jun Nishioka, Humio Mitsudera, Kazuhiro Misumi and Daisuke Tsumune**
Toward a simulation of iron circulation from the Okhotsk Sea to the Pacific (S4-7423)
- 16:45 **Kenshi Kuma, Yuta Nakayama, Satoshi Fujita and Koji Shimada**
Iron and humic-type fluorescent dissolved organic matter in the western Arctic Ocean (S4-7462)
- 17:05 **Margaret S. Esch, David H. Shull, Allan H. Devol and Bradley Moran**
Iron and manganese oxide reduction in Bering Sea shelf sediments (S4-7514)
- 17:25 **John Crusius, Rob Campbell and Andrew Schroth**
Abundant, seasonally variable supply of glacier flour-derived iron drives high nitrate consumption in Copper River plume and adjacent Gulf of Alaska continental shelf (S4-7540)
- 17:45 Discussion
- 18:15 Session ends

May 23 - S5

Session 5 (S5)

New insights from the International Polar Year (IPY) studies

Co-Convenors:

Kenneth F. Drinkwater (Norway)

William A. Montevercchi (Canada)

Sei-ichi Saitoh (Japan)

Jinping Zhao (China)

Invited Speakers:

Eddy C. Carmack (Canada) - presents on May 23, Plenary Session

Anthony Gaston (Canada) - presents on May 23, Plenary Session

Naomi Harada (Japan)

This session provides the opportunity to present new and exciting results from the IPY field studies conducted during 2007-2008. This includes physical, chemical and biological investigations in both the north and south polar regions. Contributions are sought from the ESSAS sponsored IPY consortium, Ecosystem Studies of Subarctic and Arctic Regions (ESSAR), as well as from other IPY programs.

- 14:00 **Introduction by Convenors**
- 14:05 **Naomi Harada, Miyako Sato, Kazumasa Oguri, Kyoko Hagino, Yusuke Okazaki, Kota Katsuki, Yoshinori Tsuji, Kyung-Hoon Shin, Osamu Tadai, Sei-ichi Saitoh, Hisashi Narita, Susumu Konno, Richard W. Jordan and Yoshihiro Shiraiwa (Invited)**
Biomarker records of coccolithophorid *Emiliana huxleyi* bloom in the Bering Sea over the past decades (S5-7348)
- 14:35 **Tao Li, Jinping Zhao and David Baber**
Distribution of in-water solar radiation in Marginal Ice Zone in Beaufort Sea (S5-7360)
- 14:55 **Kjell Arne Mork, Kenneth F. Drinkwater, Steingrímur Jónsson and Héðinn Valdimarsson**
Current observations at the Jan Mayen Ridge (S5-7387)
- 15:15 **Héðinn Valdimarsson and Steingrímur Jónsson**
Hydrographic conditions and circulation in the Iceland Sea during the Iceland Sea ecosystem study (S5-7424)
- 15:35 **Toru Hirawake, Amane Fujiwara, Shintaro Takao, Katsuhito Shinmyo and Sei-ichi Saitoh**
Optically derived primary production and size structure of phytoplankton in the polar oceans (S5-7509)
- 15:55 **Coffee/Tea Break**
- 16:25 **Asthor Gislason and Teresa Silva**
Abundance, composition and development of zooplankton in the subarctic Iceland Sea in 2006, 2007 and 2008 (S5-7429)
- 16:45 **Michael L. Carroll, William G. Ambrose Jr., William L. Locke V, Stuart K. Ryan and Gregory A. Henkes**
Reading between the lines: Bivalve growth rate variations across the Barents Sea Polar Front (S5-7426)

- 17:05 **Hiroko Sasaki, Keiko Sekiguchi and Sei-ichi Saitoh**
Cetacean habitat distribution in the eastern Bering Sea and Chukchi Sea (S5-7496)
- 17:25 **Joel P. Heath, Grant Gilchrist and Lucassie Arragutainaq**
Winter ecology of Common Eiders in polynya and floe edge habitats in eastern Hudson Bay, Nunavut (S5-7483)
- 17:45 **William A. Montevecchi, Gail Davoren, April Hedd, Laura McFarlane-Tranquilla, Anthony Gaston, Chantelle Burke, Paul Regular, Grant Gilchrist, Greg Robertson, Paul Smith, Dave Fifield and Richard Phillips**
Seabirds respond to Arctic ecosystem change and identify risk (S5-7389)
- 18:05 Discussion
- 18:15 Session ends

May 24 - Plenary

Plenary Session

- 8:30 **James Christian (Invited)**
The boreal ocean in the enhanced greenhouse (S4-7541)
- 9:00 **J.M. (Lobo) Orensanz, Billy Ernst, Julian Burgos and David A. Armstrong (Invited)**
Fluctuations in recruitment of snow crab in the Eastern Bering Sea and the role of cod predation (S8-7526)
- 9:30 **Patrick Quellet, Louise Savard, César Fuentes-Yaco, Peter Galbraith, Trevor Platt and Alain Fréchet (Invited)**
Oceanography and northern shrimp (*Pandalus borealis*, Krøyer 1838) recruitment variability in the Gulf of St. Lawrence and northwest Atlantic (S8-7344)
- 10:00 **Marit Reigstad, Paul Wassmann, Christian Wexels-Riser and Dag Slagstad (Invited)**
Pelagic-benthic coupling and important regulating mechanisms across the European Arctic and sub-Arctic regions (S1-7470)
- 10:30 *Coffee/Tea Break*
- 11:00 **Jacqueline M. Grebmeier and Lee W. Cooper (Invited)**
The impact of changing sea ice and hydrographic conditions on biological communities in the northern Bering and Chukchi Seas (S1-7476)
- 11:30 **Orio Yamamura, Tetsuichiro Funamoto, Masayuki Chimura, Tomonori Azumaya, Tomonori Hamatsu, Osamu Shida, Yasunori Sakurai, Hiroshi Yoshinari, Koji Kooka and Hiroko Kuroda (Invited)**
Recruitment variability of Japan Pacific walleye pollock: A synthesis from DoCoFis Program (S6-7406)
- 12:00 **Sen Tok Kim (Invited)**
The Sea of Okhotsk: Some conceptions applying to climate-oceanography events and fish resources dynamics (S6-7343)
- 12:30 Session ends

May 24 - S1 (day 1)

Session 1 (S1)

Comparative studies of polar and sub-polar ecosystems

Co-Convenors:

Erica Head (Canada)

Kohei Mizobata (Japan)

Koji Shimada (Japan)

Hyung-Cheol Shin (Korea)

Nils Chr. Stenseth (Norway)

Paul Wassmann (Norway)

Invited Speakers:

Jackie Grebmeier (USA) - presents on May 24, Plenary Session

Suam Kim (Korea)

Marit Reigstad (Norway) - presents on May 24, Plenary Session

Comparative studies have been one of the leading aspects of the ESSAS program. In this session results from comparative studies of entire ecosystems or of significant ecosystem components (zooplankton, fish, seabirds) will be presented. All papers should compare aspects of two or more systems. These can be among different polar or sub-polar seas or between sub-polar seas and other types of ecosystems, e.g. temperate, tropical, etc. Methods papers, as well as results from comparative studies, will be considered. Papers are sought on the similarities and differences in ecosystem structure and function and the processes that lead to these differences.

- 14:00 ***Introduction by Convenors***
- 14:05 **Suam Kim, Chang-Ik Zhang, Sukyung Kang and Hyunju Seo (Invited)**
Comparison of ecological characteristics of fish communities and oceanographic features in coastal areas of the western and eastern North Pacific Ocean (S1-7408)
- 14:35 **Charles H. Greene, Bruce C. Monger, Louise P. McGarry, Matthew D. Connelly, Neesha R. Schnepf, Andrew J. Pershing, Igor M. Belkin, Paula S. Fratantoni, David G. Mountain, Robert S. Pickart, Andrey Proshutinsky, Rubao Ji, James J. Bisagni, Changsheng Chen, Sirpa M.A. Hakkinen, Dale B. Haidvogel, Jia Wang, Charles Hannah, Erica Head, Peter Smith, P. Chris Reid and Alessandra Conversi**
Remote climate forcing of regime shifts in Northwest Atlantic shelf ecosystems (S1-7475)
- 14:55 **Christian Möllmann, Lena Bergström, Thorsten Blenckner, Michele Casini, Juha Flinkman, Rabea Diekmann, Anna Gårdmark, Georgs Kornilovs, Martin Lindegren, Bärbel Müller-Karulis, Saskia Otto and Maris Plikshs**
Climate effects on Baltic Sea sub-ecosystems: A comparison using a meta-analytical approach (S1-7368)
- 15:15 **Makio C. Honda, Kazuhiko Matsumoto, Kosei Sasaoka, Tetsuichi Fujiki, Hajime Kawakami, Masahide Wakita, Minoru Kitamura, Shuichi Watanabe and Toshiro Saino**
Effect of climate change on marine ecosystems and material cycles: Time-series observations in the sub-arctic and sub-tropical gyres (S1-7355)
- 15:35 **Zhongyong Gao, Liqi Chen and Heng Sun**
Comparison of decadal changes in the carbon sink and potential responses to climate change in the western Arctic Ocean and the Southern Ocean (S1-7418)
- 15:55 ***Coffee/Tea Break***

- 16:25 **Andrei S. Krovnin, Boris Kotenev, Marat Bogdanov and Georgy Moury**
Comparison of decadal and interdecadal dynamics of mass pelagic fish stocks in the North Atlantic and North Pacific in relation to climate variations in the Northern Hemisphere (S1-7388)
- 16:45 **Jürgen Alheit, Kenneth F. Drinkwater, Thomas Pohlmann and Carola Wagner**
The impact of climate variability and change on the Barents Sea and the North Sea: A comparison (S1-7517)
- 17:05 **Sarah Gaichas, Jason S. Link, Thomas J. Miller, Tim Essington, Ian Perry, Alida Bundy, Jennifer Boldt, Kenneth F. Drinkwater and Erlend Moksness**
Using production models as tools to examine factors that influence productivity of marine systems: Contrasts across levels of aggregation, ecosystems and drivers (S1-7448)
- 17:25 **Eugene J. Murphy, Eileen E. Hofmann, Rachel D. Cavanagh, Tosca Ballerini, Andrea Pinones, Nadine M. Johnston and Simeon Hill**
Comparisons of Southern Ocean ecosystems (S1-7438)
- 17:45 **Jarrold A. Santora, William J. Sydeman, John C. Field and Christian S. Reiss**
Comparative spatial dynamics of krill and predators at mid and high latitudes: Implications for trophic transfer and conservation (S1-7361)
- 18:05 Discussion
- 18:15 Session ends

May 24 - S6

Session 6 (S6)

National ESSAS programs: Recent advances and contribution

Co-Convenors:

Olafur S. Astthorsson (Iceland)

Yasunori Sakurai (Japan)

Svein Sundby (Norway)

Kai Wieland (Denmark)

Invited Speakers:

Sen Tok Kim (Russia) - presents on May 24, Plenary Session

Orio Yamamura (Japan) - presents on May 24, Plenary Session

Several large national programs under ESSAS have been completed or are underway, including in Japan, the US, Iceland and Norway. In addition, several other countries are involved in ESSAS studies although having no formal nationally-funded project. This session provides the opportunity to present the results from all of the ESSAS programs. In particular, presentations that provide a synthesis of large or several smaller projects within a nation are especially encouraged.

- 14:00 **Introduction by Convenors**
- 14:05 **Olafur K. Palsson, Astthor Gislason, Bjorn Gunnarsson, Hafsteinn Gudfinnsson, Hildur Petursdottir, Solveig Olafsdottir, Sveinn Sveinbjornsson, Konrad Thorisson and Héðinn Valdimarsson**
The ecosystem of the Iceland Sea 2006-2008: Main patterns in structure and function (S6-7436)
- 14:35 **Kenneth F. Drinkwater and the NESSAR Team**
Density-compensating fronts in the Norwegian and Barents Seas and their biological influence (S6-7362)
- 14:55 **Padmini Dalpadado, Randi Ingvaldsen, Leif Christian Stige and Bjarte Bogstad**
Climate effects on the Barents Sea ecosystem dynamics (S6-7351)
- 15:15 **Sünnje L. Basedow, Meng Zhou and Kurt S. Tande**
Comparison of spring bloom dynamics between the subpolar Norwegian Sea and the polar front in the Barents Sea (S6-7474)
- 15:35 **Jinping Zhao and Kenneth F. Drinkwater**
Interannual variability of the surface heat fluxes and potential air-sea coupling in the Nordic Seas and their links with the Arctic Oscillation (S6-7370)
- 15:55 **Coffee/Tea Break**
- 16:25 **Olafur S. Astthorsson, Héðinn Valdimarsson and Asta Gudmundsdottir**
Climate related changes in abundance and distribution of mackerel (*Scomber scombrus*) in Icelandic waters (S6-7427)
- 16:45 **Thomas Juul-Pedersen and Søren Rysgaard**
Greenland Climate Research Centre - Studying climate change up close (S6-7377)

- 17:05 **Erica Head, Kumiko Azetsu-Scott, Glen Harrison, Ross Hendry, Bill Li, John Loder, Igor Yashayaev and Phil Yeats**
Changes in hydrography and ecosystem structure and function in shelf and deep water regions of the Labrador Sea (1990-2009) (S6-7433)
- 17:25 **George L. Hunt, Jr., Lisa Eisner, Kathy Kuletz, Bob Lauth, Elizabeth Logerwell, Martin Renner and Michael Sigler**
Fluxes, fishes and feathers: Relationships among the Bering, Chukchi and Beaufort Seas in a time of climate change (S6-7359)
- 17:45 **Konstantin Rogachev**
Hydrographic control of marine ecosystem in the shelf waters of the northern Sea of Okhotsk (S6-7341)
- 18:05 Discussion
- 18:15 Session ends

May 24 - S8

Session 8 (S8)

Interactions between gadoids and crustaceans: The roles of climate, predation, and fisheries

Co-Convenors:

AnneDorte Burmeister (Greenland)

Earl Dawe (Canada)

Franz J. Mueter (USA)

Olafur Palsson (Iceland)

Invited Speakers:

Patrick Ouellet (Canada) - presents on May 24, Plenary Session

José M. (Lobo) Orensanz (Argentina) - presents on May 24, Plenary Session

In this session we seek papers that document and investigate the processes that lead to shifts between demersal fish, especially gadoids such as cod and pollock, and crustaceans, such as shrimp and crabs. What role does gadoid predation play on the dynamics of shrimp and crabs? How does this compare to the influence of climate regimes or the effects of industrialized fishing? How does the spatial overlap between gadoids and crustaceans change seasonally and annually? Papers that address these questions either within a single ecosystem or compare different sub-Arctic regions are sought.

- 14:00 **Introduction by Convenors**
- 14:05 **Gordon H. Kruse, Jie Zheng and William R. Bechtol**
Effects of climate and gadid predation on red king crab population dynamics in Alaska (S8-7345)
- 14:35 **Stephanie A. Boudreau and Boris Worm**
Exploring relationships between decapods, cod and temperature through time-series analysis: What we have learned in the northwest Atlantic (S8-7379)
- 14:55 **Laurinda Marcello, Franz J. Mueter, Olafur S. Astthorsson, Carsten Hvingel, Dave Orr, Patrick Ouellet and Louise Savard**
A comparison of northern shrimp population dynamics among multiple ecosystems: Influences of gadoid predation and temperature (S8-7403)
- 15:15 **Kai Wieland, Nikoline Ziemer, Kaj Sünksen and Helle Siegstad**
Environmental effects on recruitment of Northern shrimp (*Pandalus borealis*) in West Greenland waters: Impact of temperature and main predators (S8-7358)
- 15:35 **Ingibjörg G. Jónsdóttir and Höskuldur Björnsson**
Interaction between northern shrimp and cod in inshore and offshore areas around Iceland (S8-7432)
- 15:55 **Coffee/Tea Break**
- 16:25 **Earl Dawe, Mariano Koen-Alonso, Don Stansbury, Darrell Mullooney and Denis Chabot**
Effects of predation on Canadian Atlantic crustacean resources: A comparison between the Newfoundland-Labrador Shelf and the Gulf of St. Lawrence (S8-7445)
- 16:45 **Matthew J.S. Windle, George A. Rose, Rodolphe Devillers and Marie-Josée Fortin**
Spatial-temporal variations in shifting ecosystems: A GWR analysis in the Northwest Atlantic (S8-7356)

- 17:05 **Dan Urban (Invited)**
Seasonal predation patterns of Pacific cod and walleye pollock in Marmot Bay, Alaska (S8-7480)
- 17:25 **AnnDorte Burmeister and Bernard Sainte-Marie**
Potential effects of climate change on size at terminal molt and fecundity in snow crab (*Chionoecetes opilio*) in West Greenland waters (S8-7479)
- 17:45 **Earl Dawe, Mikio Moriyasu, Darrell Mallowney, Elmer Wade and Flore Jacques**
Effect of bottom temperature on growth of snow crab: A comparison between the Newfoundland-Labrador Shelf and the southern Gulf of St. Lawrence (S8-7446)
- 18:05 Discussion
- 18:15 Session ends

May 25 - Plenary

Plenary Session

- 8:30 **Diane Lavoie, Joël Chassé and Michel Starr (Invited)**
Modelling the impacts of climate change and variability on productivity and health of high-latitude marine ecosystems: The Beaufort Sea and Gulf of St. Lawrence case studies (S3-7466)
- 9:00 **Dag Slagstad, Morten Alver and Ingrid Ellingsen (Invited)**
Changes in phytoplankton and zooplankton production in the Nordic Seas under a warmer climatic regime (S3-7521)
- 9:30 **Takeshi Okunishi (Invited)**
A modeling study of marine pelagic ecosystems in the western North Pacific (S3-7415)
- 10:00 **Shigeto Nishino, Takashi Kikuchi, Michiyo Yamamoto-Kawai, Yusuke Kawaguchi, Toru Hirawake and Motoyo Itoh (Invited)**
Changes in spreading of nutrient-rich shelf water into the Canada Basin due to sea ice melt (S4-7414)
- 10:30 *Coffee/Tea Break*
- 11:00 **Mitsutaku Makino and Yasunori Sakurai (Invited)**
Climate effects on fisheries in the Shiretoko World Natural Heritage, Japan (S7-7354)
- 11:30 **James McGoodwin (Invited)**
Enhancing the resilience of small high-latitude fishing communities to climatic and marine-ecosystem change (S7-7381)
- 12:00 **Anthony Charles (Invited)**
Policy adaptation and dynamic governance of marine social-ecological systems: Coping with climate change and economic change (S7-7503)
- 12:30 Session ends

May 25 - S1 (day 2)

Session 1 (S1)

Comparative studies of polar and sub-polar ecosystems

Co-Convenors:

Erica Head (Canada)

Kohei Mizobata (Japan)

Koji Shimada (Japan)

Hyung-Cheol Shin (Korea)

Nils Chr. Stenseth (Norway)

Paul Wassmann (Norway)

Invited Speakers:

Jackie Grebmeier (USA) - presents on May 24, Plenary Session

Suam Kim (Korea)

Marit Reigstad (Norway) - presents on May 24, Plenary Session

Comparative studies have been one of the leading aspects of the ESSAS program. In this session results from comparative studies of entire ecosystems or of significant ecosystem components (zooplankton, fish, seabirds) will be presented. All papers should compare aspects of two or more systems. These can be among different polar or sub-polar seas or between sub-polar seas and other types of ecosystems, e.g. temperate, tropical, etc. Methods papers, as well as results from comparative studies, will be considered. Papers are sought on the similarities and differences in ecosystem structure and function and the processes that lead to these differences.

- 14:00 **Introduction by Convenors**
- 14:05 **Igor M. Belkin**
Polar Fronts: Major ecosystem boundaries in the North Atlantic, North Pacific, and Southern Ocean (S1-7518)
- 14:25 **Atsushi Tsuda, Shinji Shimode and Kazutaka Takahashi**
Comparative study of the life histories of *Eucalanidae* copepods in the subtropical and subarctic Pacific (S1-7469)
- 14:45 **Jaume Forcada, Eugene J. Murphy and Phillip N. Trathan**
Multispecies data reveal how sub-Antarctic and Antarctic marine predators respond to variation and change in Southern Ocean ecosystems (S1-7491)
- 15:05 **William J. Sydeman, Sarah Ann Thompson, Jarrod A. Santora and Julie A. Thayer**
A meta-analysis of seabird-climate relationships (S1-7498)
- 15:25 **Kristin L. Laidre and Mads Peter Heide-Jørgensen**
Climate change and baleen whale trophic cascades in Greenland (S1-7516)
- 15:45 Discussion
- 15:55 Session ends

May 25 - S2 (day 2)

Session 2 (S2)

New observations and understanding of eastern and western Bering Sea ecosystems

Co-Convenors:

Rodger Harvey (USA)

Oleg N. Katugin (Russia)

Sang Heon Lee (Korea)

Mike Sigler (USA)

Invited Speakers:

Gennady Khen (Russia) - presents on May 23, Plenary Session

Franz J. Mueter (USA)

Phyllis Stabeno (USA) - presents on May 23, Plenary Session

This session is meant to showcase the recent major efforts in the Bering Sea Ecosystem Study (BEST) and the Bering Sea Integrated Ecosystem Research Program (BSIERP), as well as the compendium of new information provided in the most recent PICES North Pacific Ecosystem Status Report and studies that have been carried out in the Bering Sea by Russia, Korea, Japan and China. These papers will provide an opportunity to gain an overall perspective of the relative importance of various forcing mechanisms in driving marine ecosystem dynamics.

- 16:05 **Introduction by Convenors**
- 16:10 **Tracey I. Smart, Janet T. Duffy-Anderson and John K. Horne**
Alternating climate states influence walleye pollock early life stages in the southeastern Bering Sea (S2-7365)
- 16:30 **Ron A. Heintz, Elizabeth C. Siddon and Edward Farley**
Climate related changes in the nutritional condition of young-of-the-year pollock (*Theragra chalcogramma*) from the eastern Bering Sea (S2-7529)
- 16:50 **George Noongwook and Henry P. Huntington**
Ecosystem influences on hunting success in Savoonga, Alaska (S2-7464)
- 17:10 **Rosana Paredes, Ann M.A. Harding, Daniel D. Roby, David B. Irons, Robert M. Suryan, Rachael A. Orben, Heather Renner, Alexander Kitaysky, Kelly Benoit-Bird and Scott Heppell**
Links between at-sea foraging behavior and breeding performance of black-legged kittiwakes nesting at colonies in different Bering Sea domains (S2-7527)
- 17:30 **Peter Boveng, Josh London and Michael Cameron**
Movements and dive behavior of ribbon and spotted seals: Evidence for resource partitioning in the Bering Sea (S2-7531)
- 17:50 Discussion
- 18:00 Session ends

May 25 - S3

Session 3 (S3)

Modeling marine ecosystem dynamics in high latitude regions

Co-Convenors:

Enrique Curchitser (USA)

Geir Huse (Norway)

Shin-ichi Ito (Japan)

Invited Speakers:

Diane Lavoie (Canada) - presents on May 25, Plenary Session

Takeshi Okunishi (Japan) - presents on May 25, Plenary Session

Dag Slagstad (Norway) - presents on May 25, Plenary Session

This session will highlight different approaches to modeling the impacts of climate variability on high latitude marine ecosystems and their ability to support sustainable ecosystem services. Papers on different types of models will be accepted including mass-balance (ECOPATH) models, size-based models, rule-of-thumb approaches, minimalist models, individual based models (IBMs) and end-to-end models. Special emphasis will be placed on models that examine trophic interactions as well as models that link biogeochemical processes with higher trophic level production. Papers on methods for estimating uncertainties in model predictions are also encouraged.

- 14:00 **Introduction by Convenors**
- 14:05 **Seth Danielson, Enrique N. Curchitser, Kate Hedstrom and Tom Weingartner**
Evaluation of a numerical model and application of results to understanding modes of variability in the Bering Sea ice/ocean/ecosystem (S3-7497)
- 14:25 **Geir Huse, Webjørn Melle, Morten Skogen, Solfrid Hjøllo and Einar Svendsen**
A 3D super-individual model with emergent life history and behaviour for *Calanus finmarchicus* in the Norwegian Sea (S3-7363)
- 14:45 **Mary Beth Decker, Lorenzo Ciannelli, Robert R. Lauth, Richard D. Brodeur, Nicholas A. Bond, Carol Ladd, Jeffrey M. Napp, Atsushi Yamaguchi, Patrick H. Ressler, Kristin Cieciel and George L. Hunt, Jr.**
Insights into the eastern Bering Sea through a jellyfish lens: Recent trends and tests of predictive models (S3-7501)
- 15:05 **Trond Kristiansen, Charles Stock, Kenneth F. Drinkwater and Enrique N. Curchitser**
Effects of climate change on the survival of larval cod (S3-7422)
- 15:25 **Kate Hedstrom, Jerome Fiechter, Kenneth A. Rose, Enrique N. Curchitser, Miguel Bernal, Shin-ichi Ito, Salvador Lluch-Cota and Alan Haynie**
Development of a climate-to-fish-to-fishers model: Data structures and domain decomposition (S3-7547)
- 15:45 **Coffee/Tea Break**
- 16:10 **Wolfgang Fennel and H. Radtke**
An Eulerian nutrient to fish model (S3-7396)
- 16:30 **Daniel Howell, Anatoly Filin, Bjarte Bogstad, Jan Erik Stiansen and Elena Eriksen**
Unquantifiable uncertainty in projecting stock response to climate change: Example from NEA cod (S3-7342)

- 16:50 **Frode B. Vikebø, Åse Husebø, Aril Slotte and Erling Kåre Stenevik**
Ocean variability and recruitment in Norwegian spring-spawning herring (S3-7507)
- 17:10 **Neil S. Banas**
Limits on predictability in a size-spectral plankton model: A strategy for ensemble forecasting of diverse ecosystems (S3-7523)
- 17:30 **Benjamin Planque and U. Lindstrøm**
A minimal Barents Sea ecosystem model from first principles (S3-7471)
- 17:50 Discussion
- 18:00 Session ends

May 25 - S7

Session 7 (S7)

Anticipating socio-economic and policy consequences of global changes in sub-polar and polar marine ecosystems

Co-Convenors:

Keith Criddle (USA)

David Fluharty (USA)

Mitsutaku Makino (Japan)

Ian Perry (Canada)

Invited Speakers:

Anthony Charles (Canada) - presents on May 25, Plenary Session

Mitsutaku Makino (Japan) - presents on May 25, Plenary Session

James McGoodwin (USA) - presents on May 25, Plenary Session

Polar and sub-polar marine systems are expected to be strongly impacted by anticipated climate change, and by anticipated economic development relating to fishing, tourism and, hydrocarbon exploration. Human socio-economic systems in these regions year-round or seasonally are finely tuned to their present environments, with few alternative livelihood opportunities, and are also expected to be severely affected by these changes. This session will explore the potential for anticipating socio-economic conditions in coupled polar and sub-polar marine social-ecological systems. It seeks to identify the key policy issues and what policies are needed as these regions experience climate-driven environmental changes and economic development, with the focus on marine-related issues. Policy needs will include requirements for monitoring and observing of the full coupled social-ecological systems. A comparative approach among the different communities and countries of these regions will enable separation of general from regional and local understanding and policy issues. Such an approach could include the roles of seasonal migrants into these regions for marine-related activities. The session specifically seeks papers that address anticipating marine socio-economic aspects of climate change and economic development, anticipated policy needs related to these issues, and the understanding and information needs (e.g. monitoring) required to forecast responses and to formulate policies. Comparative studies at a variety of spatial scales, as well as studies that examine interactions and feedback mechanisms between humans and the environment, are particularly welcome. Publication of a collection of these presentations in a relevant primary journal will be discussed.

- 14:00 **Introduction by Convenors**
- 14:05 **Dave Fluharty**
Social and economic assessments of the future Arctic: Special cases local and distant (S7-7533)
- 14:25 **Alf Håkon Hoel**
Fisheries management in the face of climate change: The case of the Arctic (S7-7534)
- 14:45 **Alan Haynie and Lisa Pfeiffer**
Climate change and location choice in the Pacific cod longline fishery (S7-7485)
- 15:05 **Alan Haynie and Lisa Pfeiffer**
Modeling the impacts of climate change on fleet behavior in the Bering Sea pollock fishery (S7-7461)
- 15:25 **Henry P. Huntington**
Fisheries management in newly accessible seas (S7-7465)
- 15:45 **Coffee/Tea Break**

- 16:10 **James Strong and Keith R. Criddle**
Institutional structure and profit maximization in the Eastern Bering Sea fishery for Alaska pollock (S7-7535)
- 16:30 **Keith R. Criddle**
Cooperative and noncooperative strategies for management of Bering Sea pollock (S7-7380)
- 16:50 **Dave Fraser**
Rationalization, randomness and romance: A fisher's response to change in dynamic bio-physical, socio-political, and economic systems (S7-7504)
- 17:10 **Emilie Springer**
Exploring features of social-environmental history in eastern Prince William as a mode of anticipating human responses to future transitions within the Copper River and proximate marine ecosystem (S7-7511)
- 17:30 **Alida Bundy and Ian Perry**
Understanding the human dimensions of marine global change: The IMBER Working Group (S7-7449)
- 17:50 Discussion
- 18:00 Session ends

May 26 - Closing Plenary

Closing day Plenary Session

- 8:30 **Overview by Session / Workshop Leaders**
- 10:30 *Coffee/Tea Break*
- 11:00 **Music**
Oded Ben-Horin (Norway)
- 11:30 Awards for best student papers and posters
- 12:00 **Lunch**
- 13:30 **Kevin R. Arrigo (Invited)**
Impact of climate change on lower trophic levels in polar and sub-polar seas
- 14:00 **Steven A. Murawski (Invited)**
Understanding ecosystem processes: A key to predicting climate effects
- 14:30 **Keith R. Criddle (Invited)**
Adaptation and maladaptation to environmental change - Factors that influence the fragility or resilience of sub-Arctic fisheries and fishing dependent communities
- 15:00 Concluding Remarks

List of Poster Presentations

Poster Session: May 25, 18:00-21:00

Session 1 (S1) Posters

Comparative studies of polar and sub-polar ecosystems

- S1-P1 **Maksim Ivanov and A.S. Astakhov**
Mercury distribution in air and bottom sediments of the Chukchi Sea
- S1-P2 **Vladimir B. Darnitskiy and Maxim A. Ishchenko**
Topographical generated eddies in Antarctic and Subantarctic waters near Southern Ocean submarine ridges
- S1-P6 **Eileen E. Hofmann, Michael S. Dinniman and John M. Klinck**
The influence of surface winds on Circumpolar Deep Water transport and ice shelf basal melt along the western Antarctic Peninsula
- S1-P7 **Eugene J. Murphy, Rachel D. Cavanagh, Eileen E. Hofmann, Simeon Hill, Nadine M. Johnston, Phillip N. Trathan, Andrew Constable, Daniel P. Costa, Mathew Pinkerton, John M. Klinck, Dieter Wolf-Gladrow and Kendra L. Daly**
Developing integrated models of Southern Ocean food webs
- S1-P8 **Eileen E. Hofmann, Sophie Beauvais and Lisa Maddison**
The IMBER Project
- S1-P9 **Sarah Ann Thompson, William J. Sydeman, Elvira S. Poloczanska, Anthony J. Richardson and Christopher J. Brown**
Marine climate change ecology: A meta-database for assessing impacts

Session 2 (S2) Posters

New observations and understanding of eastern and western Bering Sea ecosystems

- S2-P1 **Michael Sigler, Kathy Kuletz, Patrick Ressler, Nancy A. Friday, Christopher Wilson and Alex Zerbini**
Apex predators and hot spot persistence in the southeast Bering Sea
- S2-P2 **Xuehua Cui, Jacqueline M. Grebmeier, Lee W. Cooper, James R. Lovvorn, Christopher A. North, William L. Seaver and Jason M. Kolts**
Spatial distribution of groundfish in the northern Bering Sea in relation to environmental variation and feeding habitat
- S2-P3 **Jinlun Zhang, Rebecca Woodgate and Sarah Mangiameli**
Seasonal predictability of the properties of cold bottom waters on the Bering Sea shelf
- S2-P4 **Chiko Tsukazaki, Ken-Ichiro Ishii, Rui Saito, Kohei Matsuno, Atsushi Yamaguchi and Ichiro Imai**
Distribution of diatom resting stages in bottom sediments of the eastern Bering Sea in the summer of 2009
- S2-P5 **Rie Ohashi, Kohei Matsuno, Rui Saito, Atsushi Yamaguchi and Ichiro Imai**
Inter-annual changes in the zooplankton biomass during summers of 1994-2009 and zooplankton community structure in 2006 in the Bering Sea shelf
- S2-P6 **Vladimir V. Kulik**
Correlation between mesopelagic fish abundance and PDO in the upper pelagic northwestern Pacific Ocean
- S2-P7 **Jonaotaro Onodera, Takuya Yoshida and Kozo Takahashi**
Long-term monitoring of sinking diatom fluxes at Stations AB and SA in the Bering Sea and the central Subarctic Pacific, 1990-2006
- S2-P8 **Takahiro Iida, Kohei Mizobata and Sei-ichi Saitoh**
Distribution and recent changes of coccolithophore (*Emiliana huxleyi*) blooms in the eastern Bering Sea shelf
- S2-P9 **Stan Kotwicki and Robert R. Lauth**
Temperature and population density effects on the spatial distribution of groundfishes and crabs in the eastern Bering Sea shelf
- S2-P10 **Beverly A. Agler and Greg Ruggerone**
Growth of Norton Sound and Kuskokwim River, Alaska chum salmon in relation to climatic factors and inter- and intra-specific competition
- S2-P11 **Henry P. Huntington**
Local and traditional knowledge of the eastern Bering Sea ecosystem
- S2-P12 **Elizabeth C. Siddon and Ron A. Heintz**
Conceptual model of energy allocation in walleye pollock (*Theragra chalcogramma*) from larvae to age-1
- S2-P13 **Igor M. Belkin and S. Kalei Shotwell**
North Pacific Polar Front: Trans-ocean link/barrier/blender and its impact on the Gulf of Alaska, Aleutians, and Bering Sea ecosystems

- S2-P14 **Kathy Kuletz, Martin Renner, Sandra Parker-Stetter, Patrick Ressler, Edward Farley, Robert M. Suryan and Elizabeth Labunski**
Seabirds and their prey during late summer and fall in the Bering Sea: Energetic bottleneck or cornucopia?
- S2-P15 **Nancy A. Friday, Alexandre N. Zerbini, Janice M. Waite, Sue E. Moore and Phillip J. Clapham**
Cetacean distribution on the Eastern Bering Sea shelf in June and July of 2002, 2008, and 2010
- S2-P16 **Lisa Eisner, Jeanette Gann and Kristin Ciciel**
Phytoplankton biomass and size structure during late summer/early fall in the eastern Bering Sea
- S2-P17 **Maria Prokopenko, Julie Granger, Matthew Long, Calvin Mordy, Peter DiFiore, Edward D. Cokelet, Nancy Kachel, Daniel Sigman and Bradley Moran**
Rates of net community and gross photosynthetic production on the Eastern Bering Sea shelf as estimated from O₂/Ar ratios and triple O isotopes under non-steady state conditions
- S2-P18 **Olav A. Ormseth**
A nearshore survey of fishes and invertebrates in northern Bristol Bay, eastern Bering Sea, Alaska
- S2-P19 **Robert G. Campbell, Carin Ashjian, Barry Sherr, Evelyn Sherr, Celia Gelfman, Philip Alatalo, Celia Ross and Donna VanKeuren**
Physiological ecology of *Calanus* in the Bering Sea during spring sea-ice conditions: Feeding, reproduction, and population genetics
- S2-P20 **Orio Yamamura, Osamu Sakai, Masaaki Fukuwaka and Tomonori Azumaya**
Interactions among Pacific salmon *Oncorhynchus* spp. in the Bering Sea Basin: Evidence from diets and stable isotopes
- S2-P21 **L. Michelle Ridgway, Nora R. Foster, David W. Scholland Peter Hickman**
Going off the deep end – Faunal diversity in Bering Sea marginal ice zone submarine canyons
- S2-P22 **Thomas Wilderbuer and William Stockhausen**
Updated analysis of flatfish recruitment response to climate variability and ocean conditions in the Eastern Bering Sea

Session 3 (S3) Posters

Modeling marine ecosystem dynamics in high latitude regions

- S3-P1 **Kjersti Eline Tønnessen Busch and Svein Sundby**
Why fish eggs are bigger towards high latitudes - Evolution within boundaries
- S3-P2 **Shin-ichi Ito, Takeshi Okunishi, Michio J. Kishi and Muyin Wang**
Evaluation of uncertainty of Pacific saury (*Cololabis saira*) responses to future climate change
- S3-P3 **Kerim Aydin, Ivonne Ortiz and Albert J. Hermann**
Forage-euphausiid abundance in space and time: Seasonal patterns
- S3-P4 **Paul D. Spencer, Nicholas A. Bond and Anne B. Hollowed**
A simple model for estimating the rate of predation of arrowtooth flounder on walleye pollock on the Bering Sea shelf over the first half of the 21st Century
- S3-P5 **Igor M. Belkin, Ayan Chaudhuri and Avijit Gangopadhyay**
Model realism and model validation: An oceanographer's view of the North Atlantic circulation through the eyes of the ROMS
- S3-P6 **Albert J. Hermann, Georgina A. Gibson, Kerim Aydin, Nicholas A. Bond, Wei Cheng, Enrique N. Curchitser, Kate Hedstrom, Ivonne Ortiz, Muyin Wang, Phyllis Stabeno, Lisa Eisner and Markus Janout**
Modeled and observed modes of biophysical variability on the Bering Sea shelf

Session 4 and Session 9 merged (S4 & S9) Posters

Nutrients, biogeochemistry and acidification in a changing climate

- S4-P1 **Colleen E. Harpold**
Interannual variability of *Neocalanus flemingeri* and *N. plumchrus* in Shelikof Strait, Alaska
- S4-P2 **Towe Holmborn, Andreas Brutemark, Jonna Engström-Öst, Elena Gorokhova, Hedvig Hogfors and Anu Vehmaa**
Influence of elevated CO₂ concentrations on reproductive success and early nauplii development of the copepod *Acartia bifilosa* in the Baltic Sea
- S4-P3 **Paul Loubere and Mathieu Richaud**
Organic carbon flux and seabed nutrient regeneration in fjord to abyssal settings of the sub-polar North Atlantic
- S4-P4 **Bodil A. Bluhm, Katrin Iken, Boris I. Sirenko, Sarah M. Hardy, Brenda A. Holladay, Jared Weems and Kenneth Dunton**
Food web structure and epibenthic megafauna in the Chukchi Sea: A temporal comparison
- S4-P5 **Allan H. Devol, David H. Shull, Heather Whitney and Calvin Mordy**
Denitrification in Bering Sea shelf sediments

Session 5 (S5) Posters

New insights from the International Polar Year (IPY) studies

- S5-P1 **Kohei Matsuno, Atsushi Yamaguchi and Ichiro Imai**
Year-to-year changes of mesozooplankton biomass, community and size spectra in the Chukchi Sea during summers of 1991/92 and 2007/08
- S5-P2 **Yinxin Zeng, Yang Zou, Jacqueline M. Grebmeier and Tianling Zheng**
Culture-independent and -dependent methods to investigate the diversity of planktonic bacteria in the northern Bering Sea
- S5-P3 **Ling Lin, Jianfeng He, Fang Zhang, Minghong Cai, Jianfang Chen and Yunlong Zhao**
Environmental influences on the distribution of heterotrophic bacteria in the Bering Sea and Arctic Ocean during summer 2008
- S5-P4 **Konrad Thorisson and Bjorn Gunnarsson**
Drift, age and origin of capelin larvae in Icelandic waters
- S5-P6 **Steingrímur Jónsson and Héðinn Valdimarsson**
Circulation and hydrography over the Kolbeinsey Ridge
- S5-P7 **Hildur Petursdottir and Astthor Gislason**
Trophic interactions of the pelagic ecosystem in the Iceland Sea as evaluated by fatty acid and stable isotopes analyses
- S5-P8 **Astthor Gislason, Hildur Petursdottir and Teresa Silva**
Effect of the frontal area north of Iceland on small-scale plankton distribution
- S5-P9 **Olafur K. Palsson, Sveinn Sveinbjornsson, Thorsteinn Sigurdsson and Héðinn Valdimarsson**
Capelin in the Iceland Sea: Long-term patterns in life history and physical processes
- S5-P10 **Rachel D. Cavanagh, Eugene J. Murphy, Eileen E. Hofmann and Nadine M. Johnston**
Coordinating international research on Southern Ocean ecosystems: Implementation of the ICED programme
- S5-P11 **Gail K. Davoren, Paulette Penton, Joseph Allen, Chantelle Burke and William A. Montevecchi**
Influence of the biology and behaviour of forage fish on top predators in northeastern Newfoundland
- S5-P12 **Gennady V. Khen on behalf of Nikolay S. Vanin**
Opposite regimes of atmospheric circulation over the East Arctic and hydrological conditions of the west Chukchi Sea shelf in summer 2007 and 2003

Session 6 (S6) Posters

National ESSAS programs: Recent advances and contribution

- S6-P1 **Kenneth F. Drinkwater**
Influence of climate variability and change on the ecosystems of the Barents Sea and adjacent waters: Review and synthesis of recent studies from the NESSAS project
- S6-P2 **Benjamin Planque, E. Johannesen, K. Michalsen, R. Primicerio, M. Fossheim, Randi Ingvaldsen and M. Aschan**
Barents Sea Ecosystem Resilience under global environmental change
- S6-P3 **HaeKyun Yoo, Jun Yamamoto and Yasunori Sakurai**
Laboratory studies on response to temperature change of Walleye Pollock larvae

Session 7 (S7) Poster

Anticipating socio-economic and policy consequences of global changes in sub-polar and polar marine ecosystems

S7-P2 **Danielle Mercurief, Caitlin Bourdukofsky, Anthony Lekanof, Cara Mandregan, Joshua Prokopiof, Ashley Mercurief, Carmen Philemonof, Brandi Mercurief, Michael Dirks, Dallas Roberts, David Mercurief, Chelsea Lekanof, Barbara Chapman, William Lekanof and L. Michelle Ridgway**
Pribilof Islands, Alaska community based King Crab Ecological and Economic Research Program

Session 8 (S8) Posters

Interactions between gadoids and crustaceans: The roles of climate, predation, and fisheries

- S8-P1 **Laurinda Marcello, Franz J. Mueter, Earl Dawe and Mikio Moriyasu**
Effects of temperature and gadoid predation on snow crab recruitment: Comparisons between the Bering Sea and Atlantic Canada
- S8-P2 **Orio Yamamura, Tetsuichiro Funamoto, Masayuki Chimura, Satoshi Honda and Tatsuki Oshima**
Decadal shift in the diets of walleye pollock in the Oyashio area
- S8-P3 **Jonathan Richar and Gordon H. Kruse**
Recruitment mechanisms of eastern Bering Sea Tanner crab, *Chionoecetes bairdi*

Workshop 1 (W1) Poster

Biological consequences of a decrease in sea ice in Arctic and Sub-Arctic seas

- W1-P1 **H.K. Ha, Y.N. Kim, E.J. Yang and K.H. Chung**
Spatial variability of warm eddies in western boundary of Canada Basin: Biochemical implication

Workshop 2 (W2) Posters

Arctic-Sub-Arctic interactions

- W2-P1 **Konstantin Rogachev**
Oceanography and large zooplankton within a bowhead whale feeding area in the Northwest Sea of Okhotsk
- W2-P2 **Natalia Shlyk, Konstantin Rogachev and Pavel Saluk**
Magnitude and spatial variability of the phytoplankton bloom in the changing Sea of Okhotsk

Workshop 3 (W3) Poster

Zooplankton life histories: Developing metrics to compare field observations and model results in order to predict climate effects

- W3-P1 Cameron **Thompson** and Jeffrey Runge
Mortality estimation of the copepod *Calanus finmarchicus* in the Gulf of Maine using the VLT method and molting incubations to estimate development rates