2018 The Effects of Climate Change on the World's Ocean
Program at a Glance (June 2-3: Workshops)

Workshops will run 0900-1800, with 1.0-1.5 h for lunch and morning and afternoon coffee

Saturday, 2 June

Room	*Tenleytown W*	*Gunston E+W*	*Cardozo*	*Van Ness*	*Tenleytown E*
0900-1230	**W1**		**W11 (closed)**	**W9**	**W6**
1330-1800	**W1**	**W2 (1300-1800)**	**W11 (closed)**	**W9**	**W6**

Sunday, 3 June

Room	*Holmead E+W*	*Tenleytown E*	*Jay*	*Fairchild E+W*	*Gunston E+W*	*Kalorama*	*Tenleytown W*
0900-1230	**W3**		**W11**	**W7**	**W5**	**W10**	**W8**
1330-1800	**W3**	**W4 (1300-1800)**	**W11**	**W7**	**W5**	**W10**	**W8**

Saturday, 9 June

Room	**Tenleytown E+W**
0900-1230	**WK-PESTLE**
1330-1800	**WK-PESTLE**

Workshops:

W1	Communicating and responding to climate change
W2	Advances in Earth System Models (ESMs) for marine applications
W3	Exploring potential ocean-based solutions to climate change impacts on marine biodiversity and ecosystem services
W4	Climate change adaptation of fisheries and aquaculture: examples of field projects supporting countries and communities
W5	Climate Change and Fishing Communities: Interactions with Environmental Conservation, Sustainable Livelihoods and Food Security
W6	Utilizing bioenergetics measurements and modeling to evaluate climate change effects on marine species and ecosystems
W7	What do seabirds reveal about the effects of climate change on the World’s Oceans?
W8	Connecting climate, ocean and ecosystem observation – Ocean observation futures
W9	Vulnerability of Low Elevated Coastal Zones (LECZ) to SLR in changing oceans
W10	Intercomparison of fisheries and marine ecosystem models
W11	PICES Working Group 36 (CERP) on Common Ecosystem Reference Points across PICES Member Countries workshop: "Quantifying thresholds in driver-response relationships to identify reference points

2018 The Effects of Climate Change on the World's Ocean

TIME	Monday, 4 June			
08:30	**Opening Welcome [Columbia 5-8]**			
08:45	**RDML Timothy Gallaudet (Keynote)** Assistant Secretary of Commerce for Oceans and Atmosphere and Acting Under Secretary of Commerce for Oceans and Atmosphere, USA			
09:05	**Philippe Cousteau (Keynote)** Filmmaker, Explorer, Advocate, CA, USA			
09:55	**Science Panel** (5 min Intro + 50 min panel discussion)			
10:50	**Musical Performance**			
11:00	**Preview of Days Sessions (S5,S6,S9,S16)**			
11:15	**COFFEE**			
Room ==>	***Columbia 1&2***	***Columbia 3&4***	***Columbia 9&10***	***Columbia 11&12***
11:35	**S5**	**S16**	**S9**	**S6**
12:45	**LUNCH**			
	Oh the Places You'll Go: Lessons for Early Career Professionals (TOWN HALL EVENT sponsored by Women's Aquatic Network)			
14:00	S5 Continues	S16 Continues	S9 Continues	S6 Continues
16:20	**COFFEE**	**COFFEE (16:40)**	**COFFEE**	**COFFEE; S6 Ends**
16:40	S5 Continues	**S12 (Day 1)** (17:00)	S9 Continues	**S8 (Day 1)**
18:20	S5 Ends	S12 (Day 1) Ends	S9 Ends	S8 (Day 1) Ends
18:30 20:30	**WELCOME RECEPTION** *The Washington Hilton (Heights Courtyard – Lobby Level)*			

TIME	Tuesday, 5 June			
08:30	**Announcements/Preview Sessions (S1,S3,S12,S13) [*Columbia 5-8*]**			
08:50	**IOC - Ocean Decade (Vladimir Ryabinin, Executive Secretary, IOC-UNESCO)**			
09:05	**David Allen Hutchins (S13 Plenary)**			
09:35	**Eric Galbraith (S12 Plenary)**			
10:05	**Naomi Harada (3 Plenary)**			
10:35	**COFFEE**			
Room ==>	***Columbia 1&2***	***Columbia 3&4***	***Columbia 9&10***	***Columbia 11&12***
11:00	**S13**	**S12 (Day 2)**	**S3**	**S1 (Day 1)**
13:10	**LUNCH**			
	Communicating Science about the Effects of Climate Change on the World's Oceans (COMPASS TOWN HALL EVENT)			
14:20	S13 Continues	S12 Continues	S3 Continues	S1 Continues
16:20	**COFFEE**	**COFFEE**	**COFFEE**	**COFFEE**
16:40	S13 Continues	S12 Continues	S3 Continues	S1 Continues
18:20	S13 Ends	S12 Ends	S3 Ends	S1 (Day 1) Ends
18:30 21:00	**NORWAY-COMPASS HOSTED EVENING RECEPTION** *The Washington Hilton (Columbia West)*			

Program at a Glance (June 4-8: Sessions and Events)

TIME	Wednesday, 6 June			
08:30	**Announcements/Preview Sessions (S4,S10,S14,S15) [*Columbia 5-8*]**			
08:50	**Merle Sowman (S14 Plenary)**			
09:20	**Prateep Kumar Nayak (S15 Plenary)**			
09:50	**Gretta Pecl (S10 Plenary)**			
10:20	**Dimitri Gutierrez (S4 Plenary)**			
10:50	**COFFEE**			
Room ==>	***Columbia 1&2***	***Columbia 3&4***	***Columbia 9&10***	***Columbia 11&12***
11:10	**S14 (Day 1)**	**S15**	**S10**	**S4**
12:40	**LUNCH**			
	Benchmarks for Ecosystem Assessment: Indicators and Guidelines for Practical Ecosystem-Based Fishery Management (TOWN HALL EVENT sponsored by Lenfest Ocean Program and CSIRO)			
14:00	S14 Continues	S15 Continues	S10 Continues	S4 Continues
16:00	**COFFEE**			
16:20	S14 Continues	S15 Continues	S10 Continues	S4 Continues
18:20	S14 (Day 1) Ends	S15 Ends	S10 Ends	S4 Ends
18:30	**POSTER SESSION / RECEPTION (all posters will be on display)** *The Washington Hilton (Columbia West and International Terrace)*			

TIME	Thursday, 7 June			
08:30	**Announcements/Preview Sessions (S2,S7,S11,S17) [*Columbia 5-8*]**			
08:50	**Andreas Oschlies (S7 Plenary)**			
09:20	**Iddya Karunasagar (S17 Plenary)**			
09:50	**Lisa Goddard (S2 Plenary)**			
10:20	**Steve Widdicombe (S11 Plenary)**			
10:50	**COFFEE**			
Room ==>	***Columbia 1&2***	***Columbia 3&4***	***Columbia 9&10***	***Columbia 11&12***
11:10	**S7**	**S17**	**S2**	**S11 (Day 1)**
12:40	**LUNCH**			
	Ocean assessment in the Sixth Assessment Cycle of the Intergovernmental Panel on Climate Change (IPCC TOWN HALL EVENT)			
14:00	S7 Continues	S17 Continues	S2 Continues	S11 Continues
16:00	**COFFEE**	**COFFEE**	**COFFEE**	**COFFEE**
16:20	S7 Continues	S17 Continues	S2 Continues	S11 Continues
17:40		S17 Ends		
18:20	S7 Ends		S2 Ends	S11 (Day 1) Ends

TIME	Friday, 8 June			
08:30	**Announcements/Publication Plans and Target Dates [*Columbia 5-8*]**			
08:50	**Severino G. Salmo III (S18 Plenary)**			
09:20	**Alistair Hobday (S1 Plenary)**			
09:50	**Fan Wang (S8 Plenary)**			
10:20	**COFFEE**			
Room ==>	***Columbia 1&2***	***Columbia 3&4***	***Columbia 9&10***	***Columbia 11&12***
10:40	**S8 (Day 2)**	**S1 (Day 2)**	**S14 (Day 2)**	**S11 (Day 2)**
12:20	**LUNCH**			
13:40	S8 Continues	S1 Continues	S14 Continues	S11 Continues
15:00	S8 Ends	S1 Ends	S14 Ends	S11 Ends
15:00	**COFFEE**			
15:20	**Plenary Closing Ceremony [*Columbia 5-8*]**			
17:00	**END OF SYMPOSIUM**			

Sessions:

S1 Ocean extremes and their impact on marine ecosystems

S2 From prediction to projection: the role of seasonal to decadal forecasts in a changing climate

S3 Carbon uptake, ocean acidification, and ecosystems and human impacts

S4 Deoxygenation in Global Ocean and Coastal Waters in Relation to Climate Change

S5 Climate change impacts on high latitude systems on multiple scales in space and time

S6 The deep ocean under climate change

S7 Eastern Boundary upwelling systems: diversity, coupled dynamics and sensitivity to climate change

S8 Understanding the impact of Abrupt Ocean Warming and Continental Scale Connections on marine productivity and food security via Western Boundary Currents

S9 Drifting into the Anthropocene: How will pelagic marine ecosystems be affected and what are the biogeochemical and lower trophic consequences

S10 Management and conservation of species on the move

S11 Benthic and pelagic system responses in a changing ocean: From genes to ecosystem level functioning

S12 Scenarios and models to explore the future of marine coupled human-natural systems under climate change

S13 Multiple stressors at multiple scales: ecosystem based management in the face of changing ocean conditions

S14 Vulnerability and adaptation of marine socio-ecological systems to climate change

S15 Fisheries and aquaculture in the face of climate change: Current actions, identified solutions and opportunities in support of sustainable livelihoods and food security

S16 Climate, oceans and security

S17 Effects of climate change on ocean ecosystem health: Projecting occurrences of harmful algal blooms and disease outbreaks and assessment of the risk to ecosystem functioning, aquaculture, fisheries and human health

S18 POSTER Session only: Coastal ecosystem and their blue carbon science, conservation and policy progress

Saturday, June 2

Workshop 1: Communicating and responding to climate change (Room *Tenleytown W*)	
9:00	***Introduction by Convenors***
9:10	**Hazel Oxenford (Invited)** Communicating complex climate change impacts to regional stakeholders: The cases of *Sargassum* influxes to the Caribbean Sea and community-collaboration adaptation
9:50	**Paul Buckley** Communicating marine and coastal climate change impacts: Key findings and lessons learnt from the Pacific and Caribbean Regions
10:10	**Emily Nocito** Analysis of United Nations voluntary commitments concerning marine protected areas and resilience
10:30	***Coffee/Tea Break***
11:00	**Lara Hansen** Developing a Fish Manager's Guide to climate change
11:20	**Mona Behl** A tale of two cities: How Sea Grant helped Tybee Island and St. Marys save money while saving lives
11:40	**John K. Pinnegar** Adapting to climate change: The UK Climate Change Risk Assessment (CCRA), National Adaptation Programme (NAP) and Adaptation Reporting Powers (ARP) – An integrated approach
12:00	**Paul Buckley** 10,000 voices on marine climate change in Europe: What does the public know…and really care about?
12:20	**Discussion**
12:40	***Lunch***

Workshop 9: Vulnerability of Low Elevated Coastal Zones (LECZ) to SLR in changing oceans (Room *Van Ness*)		Workshop 6: Utilizing bioenergetics measurements and modeling to evaluate climate change effects on marine species and ecosystems (Room *Tenleytown E*)	
9:00	***Introduction by Convenors***	9:00	***Introduction by Convenors***
9:15	**Mohamed Abdel-Karim Aly Abdrabo (Invited)** The risk of inundation by sea level rise: The Nile Delta	9:10	**Kenneth Alan Rose (Invited)** Predicting marine ecosystem population and food web responses to environmental variation: Now is the time to merge bioenergetics and movement ecology
		9:45	**Shin-ichi Ito** Issues on elucidation of climate variability impacts on living marine resources and future perspectives
		10:00	**Myron Peck (for Ignacio Catalán)** Parametrizing climate-change responses of fished and cultured European aquatic species using experiments: A gap-analysis and meta-analytical perspective
		10:15	**Chenying Guo** Development of a growth-migration model and its application to evaluate environmental effects on growth and migration of Pacific chub mackerel *Scomber japonicus* in the Northwest Pacific
10:30	***Coffee/Tea Break***	10:30	***Coffee/Tea Break***
11:00	**Furqon Alfahmi** Potential increasing coastal inundation over Semarang city based on twelve years tide observations	11:00	**Morten Skogen** Climate change effects on growth, reproduction and distribution of Norwegian Spring Spawning Herring
		11:15	**Juan Bueno-Pardo** Sensitivity of anchovy population to environmental change in the Bay of Biscay using a bioenergetic model
11:30	**Mbachu Ikechuwku** Assessing attitudinal response and perception of the threat of sea level rise: A case study of the coastal area of the Niger Delta	11:30	**Christine Stawitz** Forecasting the effects of ocean change on Alaskan snow crab (*Chionoecetes opilio*) using an individual-based bioenergetics model
		11:45	**Klaus Huebert** Population models for synthesis of climate effects on fish early life history stages
12:00	**John Marra** A scenario-based approach to assessing changes in coastal flood magnitude and frequency under a changing climate, with an exemplar application to ecosystem vulnerability assessment on the Island of Hawai'I	12:00	**Daniel van Denderen** Growth of teleost fish across marine regions and ecological lifestyles
		12:15	**Philipp Neubauer** Sizing the effects of temperature on fish: A general eco-physiological model to assess impacts from individuals to ecosystems
12:30	***Lunch***	12:30	***Lunch***

Workshop 1: Communicating and responding to climate change (Room *Tenleytown W*)		**Workshop 2: Advances in Earth System Models (ESMs) for marine applications (Room *Gunston E+W*)**	
14:00	**Discussion**	13:30	**Matthew Long (Invited)** Earth System Models and marine ecosystems in the context of climate variability and change
		14:30	**Michio Watanabe** Development of the marine ecosystem model OECO2 to be embedded into the Earth system model MIROC-ES2
		14:50	**Charles Stock** Ocean Ecosystem Dynamics in GFDL's CMIP6 Earth System Model GFDL-ESM4
		15:10	**Takashi Mochizuki** Multiyear climate prediction by using 4D-Var coupled data assimilation system
15:30	**W1 Ends**	15:30	***Coffee/Tea Break***
		16:00	**Alexis Bahl** Impact of eddy mixing on the sensitivity of ocean biogeochemical cycling to doubled CO2 within an earth system model
		16:20	**Nicole Lovenduski** Response of O2 and pH to ENSO in the California Current System in a high resolution global climate model
		16:40	**Discussion**
		17:40	**W2 Ends**

Workshop 9: Vulnerability of Low Elevated Coastal Zones (LECZ) to SLR in changing oceans (Room *Van Ness*)		**Workshop 6: Utilizing bioenergetics measurements and modeling to evaluate climate change effects on marine species and ecosystems (Room *Tenleytown E*)**	
14:00	**Poster Presentation**	14:00	**Poster Presentation** **Discussion of talks / open points**
14:15	**Discussion**		
15:30	***Coffee/Tea Break***	15:30	***Coffee/Tea Break***
16:00	**Conclusions**	16:00	**Discussion/ outlining / Writing**
17:30	**W9 Ends**	17:30	**Wrap up and next steps**
		18:00	**W6 Ends**

Sunday, June 3

Workshop 3: Exploring potential ocean-based solutions to climate change impacts on marine biodiversity and ecosystem services (Room *Holmead E+W*)

9:00 **Overview of workshop objectives**
Discuss potential proposed or implemented actions to moderate climate impacts;
Explore challenges and opportunities for their implementation;
Explore the implications for sustainable ; Discuss research and policy priorities to address these challdevelopment

Workshop Outputs
Peer reviewed manuscript summarizing workshop findings;
Research and policy priorities to inform research agenda/policy brief

9:10 ***Introductions***

9:30 **Ling Cao (Invited)**
Aquaculture in a changing climate: Lessons from China

10:00 **Chris Field**
Set the stage – key risks/opportunities (IPCC)

10:15 **Alexandre Magnan**
Assessment of solution space to address areas of key risk

10:30 **Alistair Hobday**
Expanding current management interventions in the face of increasing climate impacts

10:45 ***Coffee/Tea Break***

15-min speed talks
Assessment, development and implementation of ocean solutions in different sectors & countries

11:00 **Abdulwakil Saba**
Impacts of climate change on mangrove biodiversity and sustainable livelihoods along Lagos Coast of West Africa

11:15 **Ibukun Jacob Adewumi**
Using resilience assessment to understand the dynamics of marine socio-ecological systems in order to inform climate-change-smart marine spatial planning processes

11:30 **Malin Pinsky**
Designing climate-smart ocean plans

11:45 **Katherine Mills**
Eliciting and evaluating climate adaptation strategies for fisheries and fishing communities

12:00 ***Lunch***

13:00 **Small breakout groups to discuss**
Synergies/disconnects between cross-sector potential solutions to reduce climate impacts;
Challenges and opportunities for implementation;
Implications for sustainable development and ethical considerations

15:00 **Small group report back**

15:30 ***Coffee/Tea Break***

15:45 **Break out groups**
To identify key elements of policy/research agenda - for near term (1-3 yrs) and long-term (>10 yrs)

16:30 **Small group report back and group prioritization**

17:00 **Wrap up/next steps - Partnership opportunities with related initiatives**

18:00 **W3 Ends**

Workshop 4: Climate change adaptation of fisheries and aquaculture: examples of field projects supporting countries and communities (Room *Tenleytown E*)

13:30 ***Introduction***
Tarub Bahri, FAO

13:35 **Edward Allison (Invited)**
Building capacity to adapt to climate change in communities engaged in small-scale fishing and aquaculture

14:20 **Florence Poulain, FAO**
Methods and tools for adaptation

14:40 **Catarina Frazão Santos**
The role of ocean planning in adapting to global climate change impacts

15:00 **Elena Gissi**
Addressing climate change-driven uncertainties in maritime spatial planning through Cumulative Effects Assessment

15:20 Michaela Aschan, Arctic University of Norway, Norway
Building knowledge and decision making frameworks for adaptation – example of the ClimeFish Project

15:40 ***Coffee/Tea Break***

16:00 **Thomas Nelson, Division of Fisheries, St Lucia & Iris Monnereau, FAO-CC4FISH Project**
Climate Change Adaptation in the Eastern Caribbean Fisheries Sector

16:20 **Gustavo San Martin, Subsecretaría de pesca y Acuicultura (SUBPESCA), Chile**
Fisheries and aquaculture adaptation in Chile

17:00 **TBC**

17:20 **Discussion on key messages and lessons learned**

18:00 **W4 Ends**

Workshop 5: Climate Change and Fishing Communities: Interactions with Environmental Conservation, Sustainable Livelihoods and Food Security (Room *Gunston E+W*)

9:00 **Workshop Opening and Introductions**

Introductory Presentations

9:15 **Anthony Charles**
A community focus: How local communities are dealing with climate change and environmental threats to build sustainable livelihoods and food security

9:30 **Daniela Kalikoski, Lena Westlund & Jessica Sanders**
An FAO perspective on Climate Change and Small-Scale Fishing Communities from a Poverty and Food Security Lens

Invited Presentations

9:45 **Mohammad Mahmudul Islam (Invited)**
Creating an enabling environment to support disaster risk reduction in the context of the Small-Scale Fisheries Guidelines. Lessons from Bangladesh

10:00 **Jake Rice (Invited)**
Communities, climate change and adaptation strategies - Variability and viability

10:15 **Discussion Session #1**
Topic: "Insights and Priorities for Linking Climate Change with Environmental Conservation, Sustainable Livelihoods and Food Security: A Fishing Communities Perspective". This session will invite workshop participants to contribute their analysis of the broad issues concerning interactions of climate change with livelihood sustainability, food security and environmental conservation, within coastal fishing communities around the world.

10:45 ***Coffee/Tea Break***

Oral Presentations

11:00 **Maria Rebecca Alviar Campos**
Indigenous fishers in the Philippines: Adaptation to climate change

11:15 **Sheku Sei**
Assessment of Yawri Bay marine protected area vulnerability to climate change in Sierra Leone

11:30 **Devendraraj Madhanagopal**
Factors influencing the climate change adaptation efforts: Discussions from the case of coastal Tamil Nadu, India

11:45 **Maria Gasalla**
Social vulnerability to climate change of fishing communities across the South Brazil Bight

12:00 ***Lunch***

13:30 **Discussion Session #2**
Topic: "A Fishing Community Focus on Climate Change and Conservation Responses in Relation to Sustainable Livelihoods and Food Security". This session will build on the experience presented in the morning by inviting workshop participants to contribute their own experiences with coastal fishing communities, focused on the interactions of climate change with livelihood sustainability, food security and environmental conservation.

14:30 **Workshop Phase 2: Interactions of Poverty and Climate Change**
Phase 2 of the workshop will focus on a participatory process to generate ideas, insights and priority directions relating to the interaction of climate change with poverty. This will be discussed in the context of coastal communities, as well as Small Island Developing States (SIDS). The discussion will provide input into a process being carried out by the Food and Agriculture Organization of the United Nations to explore desired pathways to progress on linking poverty reduction and climate change responses, including development, humanitarian, disaster risk reduction and climate adaptation perspectives.

Introductory Presentation

Anthony Charles (Saint Mary's University) and Daniela Kalikoski (Food and Agriculture Organization of the UN)
Nexus of Poverty and Climate Change in the Context of Coastal Communities and Small Island Developing States (SIDS)

14:50 **Discussion Session #3**
Each participant will be invited to share their perspectives. Small group discussions will take place as appropriate. The goal will be to generate recommendations for effective approaches to linking climate responses and poverty reduction.

15:30 ***Coffee/Tea Break***

16:00 **Discussion continues**

17:30 **W5 Ends**

Workshop 7: What do seabirds reveal about the effects of climate change on the World's Oceans? (Room *Fairchild E+W*)

9:00 **Convenors**
Opening remarks, goals of workshop, etc.

9:20 **Richard Sherley (Invited)**
Direct and indirect impacts of climate change on seabirds in the Benguela Ecosystem

10:00 **Kate Searle (Invited)**
North Sea seabirds: Responses to fisheries and changing climate

10:40 ***Coffee/Tea Break***

11:10 **Stephanie Jenouvrier (Invited)**
Demographic models and IPCC climate projections predict the decline of an emperor penguin population

11:50 **Claire Saraux (Invited)**
Functional responses of marine birds to local and global changes in climate and prey availability

12:30 ***Lunch***

14:00 Reconvene for planning review and meta-analytical papers

15:30 ***Coffee/Tea Break***

16:00 Planning review… continues

18:00 **W7 Ends**

Workshop 8: Connecting climate, ocean and ecosystem observation – Ocean observation futures (Room *Tenleytown W*)

8:30 ***Introduction by Convenors***

9:00 **Jörn Schmidt**
Short Introdcution/Tour around the table

9:30 **Douglas Wallace (Invited)**
Multidisciplinary Ocean Time Series: For researcher aggregation and the generation of surprises and knowledge

10:00 **Patricia Miloslavich (Invited)**
Implementation of biological Essential Ocean Variables in the global observing system

10:30 ***Coffee/Tea Break***

11:00 **Matthew B. Sullivan (Cont-1)**
Tara Oceans: Eco-systems biology at the planetary scale

11:15 **Tim Boyer (Cont-3)**
The World Ocean Database – Conjoining research observations and observing systems across disciplines, across time

11:30 **A. Miguel, P. Santos (poster)**
OBSERVA.PT - Observations on board national commercial ships to support the conservation of marine biodiversity in the Portuguese Seas

11:45 **Varis Ransibrahmanakul (poster)**
The Great Lakes: A Visual Description Of The Changes In Weather Patterns From 1979 To 2002, And Water Quality From 2002 To 2015

11:50 **José E. Martinelli Filho (poster)**
Widespread microplastic distribution at a microtidal Amazon sandy beach.

11:55 Short wrap up of talks and drafting the afternoon session

12:30 ***Lunch***

14:00 World Cafe OR breack out groups

15:30 ***Coffee/Tea Break***

16:00 **Rapporteurs**
Reporting on World Cafe OR break out groups result

16:45 **Convenor**
Final Discussion

17:30 **Convenor**
Wrap up and discussion on further actions

18:00 **W8 Ends**

Workshop 10: Intercomparison of fisheries and marine ecosystem models
(Room *Kalorama*)

9:00 ***Introduction by Convenors***

9:10 **Eric Galbraith (Invited)**
FishMIP: A community effort to improve the realism and utility of fishery and marine ecosystem models

9:35 **Andrea Bryndum-Buchholz**
Climate change impacts on fish biomass and associated ecosystem structure across ocean basins

9:55 **Olivier Maury**
Projecting climate change & de-oxygenation impacts on global oceanic communities using NEMO-PISCES-APECOSM

10:15 **Colleen Petrik**
The Princeton Ocean Ecosystem Model (POEM) v2.0: A size- and functional type-based model of global fisheries production and catch

10:30 ***Coffee/Tea Break***

10:45 **Discussion**
What have we learned about global ecosystem modelling and change from FishMIP thus far, and what are the big questions/problems/uncertainties we should consider tackling next?

11:10 **John Pinnegar (Invited)**
Shared Socioeconomic Pathways (SSPs) for fisheries and aquaculture in Europe

11:55 **Discussion**
Which scenarios for FishMIP, in an IPCC/IPBES context?

12:30 ***Lunch***

13:30 **Cheryl Harrison**
A predictive fisheries catch metric for CMIP6-OMIP Earth System models

13:50 **Hubert Du Pontavice, Didier Gascuel**
EcoTroph, a tool for simulating unexploited biomass and productivity at the global scale from1950 to 2100 (15 min + 5 min discussion)

14:10 **Ricardo Oliveros-Ramos**
Projecting climate change impacts on regional marine ecosystems using OSMOSE

14:30 **Tyler Eddy**
Fisheries and marine ecosystem projections under climate change from regional to global scales

14:50 **Beth Fulton (for Catherine Bulman)**
Comparing climate forcing projections from global and local climate models in south-eastern Australia using an EwE model

15:10 **Discussion**
Comparing regional models in FishMip

15:35 ***Coffee/Tea Break***

15:50 **Discussion**
How to make the most of the model inter-comparison: critical uncertainties, new experiments, regional testbeds

17:00 **Thibaut de la Chesnais**
Poster Presentation: Role of cephalopods in ecosystem functioning and evolution

17:05 **W10 Ends**

Workshop 11: Quantifying thresholds in driver-response relationships to identify reference points
PICES Working Group 36 (CERP) workshop
(Room *Jay*)

8:30 **Welcome, Introductions, W11 agenda / goals**

8:45 **Overview PICES WG 36: Common Ecosystem Reference Points (Mary Hunsicker, NOAA, USA)**

9:00 **Scott Large, Invited (NOAA, USA)**
Quantifying critical points in ecological indicator responses to fishing and the environment

9:30 ***Coffee/Tea Break***

9:45 **Related research from workshop participants and discussion**
E.g. How have others approached selecting ecosystem indicators and identifying ecosystem-level thresholds and reference points? How are ecosystem-level reference points being used in management across different systems?

I. Informal presentations (10 min overview + 5 min for questions)
Caihong Fu (DFO, Canada) and Yunne-Jai Shin (UMR Marbec, France; remote participation)
Christian Möllmann and Saskia Otto (Univ. of Hamburg, Germany)
Benjamin Planque and Gro van der Meeren (IMR, Norway)
Kirstin Holsman (NOAA, USA)

II. Group discussion

12:00 ***Group Lunch***
(mull over ideas for collaboration) + GROUP PHOTO

13:30 Continue discussion, including generating ideas and identifying pathways for collaboration.

15:00 PICES WG 36 members wrap up (reports, planning for Japan workshop)

17:00 **W11 Ends**

Monday, June 4

8:30 **Opening Welcome**

8:45 **RDML Timothy Gallaudet (Keynote Speaker)**
Assistant Secretary of Commerce for Oceans and Atmosphere and
Acting Under Secretary of Commerce for Oceans and Atmosphere, USA

9:05 **Philippe Cousteau (Keynote Speaker)**
Filmmaker, Explorer, Advocate, CA, USA

9:55 **Science Panel (5 min Intro + 50 min panel discussion)**

10:50 **Musical Performance**

11:00 **Preview of Days Sessions (S5, S6, S8, S9, S16)**

11:15 ***Coffee/Tea Break***

Session 5 (Columbia 1&2)		Session 16 (Columbia 3&4)
11:35	**Grace Saba (Invited)** Ecosystem response to Antarctic climate variability and change	**Frances Ulmer (Invited)** Geopolitical implications of Arctic warming
12:05	**Elizabeth Siddon** The interaction of climate conditions and spatial overlap structure condition and recruitment success of Walleye pollock in the eastern Bering Sea	**Lawson Brigham** Security at the top of the world: Arctic change and new governance
12:25	**Hugh Venables** Feedbacks between wintertime sea ice and summertime heat content and phytoplankton bloom strength in a 20-year Antarctic time series	**Diana Bull** National security implications from tipping events centered in Arctic waters
12:45	***Lunch***	***Lunch***
14:00	**Erik Mousing** Primary drivers of changes in productivity in a future warmer Barents Sea	**Todd Ringler** Connecting Earth system models to national security decision-making: Examples, opportunities and research needs
14:20	**Ken Drinkwater** Climate change impacts in the Northeast Atlantic transition zone between the Subarctic and Arctic	**Apurva Dave** How does our scientific understanding of the oceans need to evolve in order to effectively support national security policy?
14:40	**Marcos Llope** Continuous and abrupt changes in the resilience of northeast Atlantic marine ecosystems	**Amrtatjuti Sereda** Extension of the ecosystem based management scale in the face of Climate Change: Cosmic perspective and need to respect the basic principle of peacekeeping
15:00	**Raul Primicerio** Climate change impact on Barents Sea ecosystem functioning and vulnerability	**Ayse Sezin Tokar** Building resilience of coastal communities to natural disasters

Session 5: Climate change impacts on high latitude systems on multiple scales in space and time

Session 6: The deep ocean under climate change

Session 8: Understanding the impact of Abrupt Ocean Warming and Continental Scale Connections on marine productivity and food security via Western Boundary Currents

Session 9: Drifting into the Anthropocene: How will pelagic marine ecosystems be affected and what are the biogeochemical and lower trophic consequences

Session 12: Scenarios and models to explore the future of marine coupled human-natural systems under climate change

Session 9 (Columbia 9&10)		Session 6 (Columbia 11&12)
11:35	**Laura Lorenzoni (Invited)** Marine Ecological Time Series: What are they telling us about the ocean?	**Lisa Levin (Invited)** Climate-human-policy connections in deep-ocean ecosystems
12:05	**Catherine Johnson** Zooplankton community changes on the Canadian northwest Atlantic continental shelves during recent warm years	**Carlos Dominguez-Carrió** Utility of habitat suitability modelling tools for evaluating changes in VME distribution under future climate scenarios
12:25	**Karen Wiltshire** Long term changes in the controlling factors of phytoplankton in the Southern North Sea	**Murray Roberts (Invited)** Deep-sea ecosystems in a changing ocean and the importance of basin-scale research for their long-term management and conservation
12:45	***Lunch***	***Lunch (12:55)***
14:00	**Joo-Eun Yoon** Multi-decadal variability in coccolithophore abundance in the North Pacific Subtropical Gyre	**Andrew Yool** Future trends in seafloor community biomass in a global, body size-resolved model
14:20	**Kym Jacobson** Variability in the copepod community structure, diversity, and biomass in the northeast Pacific (Newport, Oregon, USA) over the last 21 years	**William Cheung** Vulnerability of deep-sea fishes to climate change
14:40	**Georg Engelhard** Lower trophic consequences with bottom-up effects: A decline in primary production in the North Sea over 25 years, associated with reductions in zooplankton and fish recruitment	**Marina Carreiro-Silva** Using a trait-based vulnerability assessment to estimate sensitivity and adaptive capacity of vulnerable marine ecosystems to climate change
15:00	**Celeste López Abbate** Decadal changes in carbon budget of a SW Atlantic estuary: Coupling between a drop in phytoplankton biomass and the erosion of salt marshes	**Jianing Wang** Deep water flow in the channel between east and west Mariana basins

Session 5 (Columbia 1&2)		Session 16 (Columbia 3&4)
15:20	**Mette Skern-Mauritzen** Diverse responses to warming in the Barents Sea	**Ifesinachi Marybenedette Okafor-Yarwood** Fisheries, climate change and human insecurity in the Niger Delta area of Nigeria
15:40	**Albert Hermann** Biophysical response of the Bering Sea to projected global climate of the 21st century	**Esther Babson** Strained stability: Climate change and regional security in the Asia Pacific
16:00	**Lisa Anne Libungan** Climate change effects on the linkages between environmental factors, zooplankton and pelagic fish in the Norwegian Sea	***Coffee/Tea Break*** ***End of Sesion 16***
		Session 8, Day 1 (Columbia 3&4)
16:20	***Coffee/Tea Break***	**Lisa Hendrickson** Summary of an FAO workshop regarding the effects of climate variability and change on short-lived species and their forecasting with a focus on squid stocks and Boundary Currents
16:40	**Solfrid Sætre Hjøllo** Distribution of plankton and pelagic fish in a future climate	**Peng Sun** Climate change effects on the early recruitment of largehead hairtail (*Trichiurus japonicus*) in the East China Sea
17:00	**Mary Beth Decker** Biomass fluctuations of Eastern Bering Sea jellyfish: Recent trends and environmental drivers	**Shin-ichi Ito** Effects of climate change on growth and distribution of Japanese anchovy (*Engraulis japonicus*) larvae in the East China Sea
17:20	**Jan Sundet** Geographical distribution of the alien snow crab (*Chionoecetes opilio*) as a response to increased warming in the Barents Sea	**Shigang Liu** Climate-induced variations in the sea surface temperature in subtropical Kuroshio waters and its effect on Pacific saury
17:40	**Duane Stevenson** Fish distributions and climate variation in the northern Bering Sea: A comparison of two bottom trawl surveys	**Yongjun Tian** Regime shifts in the fish assemblages around Japan over the last century and their early warning signals
18:00	**Anne Hollowed** A regional assessment of projected impacts of climate change on Arctic fish and fisheries under scenario, process, and structural uncertainty	**James Bisagni** Inter-annual variability of Gulf Stream warm-core ring/continental shelf encounters and longfin squid (*Doryteuthis pealeii*) abundance fluctuations
18:20	***Session 5 Ends***	***Session 8, Day 1 Ends***

Session 9 (Columbia 9&10)		Session 6 (Columbia 11&12)
15:20	**Patricija Mozetic** Linking long-term changes of pelagic microbial communities to fluctuations in climate and hydrological regime in a coastal ecosystem (Adriatic Sea)	**Nadine Le Bris** New seafloor *in situ* laboratories based on fixed and mobile robotic platforms to monitor indicators of deep-sea ecosystem functioning and address their vulnerability to industrial activities and climate change
15:40	**Richard Rivkin** Anthropogenic effects on biogeochemical processes, carbon export and sequestration: Influence of bacteria-particle interactions on oceanic carbon cycling	**Bleuenn Guilloux** The deep ocean biodiversity under climate change: Integrative research and adaptive governance towards ocean and climate resilience
16:00	**Cynthia Pilskaln** Natural and anthropogenic drivers of organic and inorganic carbon dynamics in the Gulf of Maine, USA	**Loreley Picourt** Measuring progress on ocean and climate initiatives: an action-oriented report
16:20	***Coffee/Tea Break***	***End of Session 6*** ***Coffee/Tea Break***
		Session 12, Day 1 (Columbia 11&12)
16:40	**Tore Johannessen** Evidence of bifurcations (regime shift) in marine plankton communities in relation to increasing temperature, resulting in recruitment failure in fish	**Desiree Tommasi** Fisheries Management in an uncertain future: Using management strategy evaluation to assess robustness of harvest guidelines to changing North Pacific albacore tuna productivity and distribution
17:00	**Frédéric Cyr** Decadal environmental changes in the Newfoundland and Labrador ecosystem	**Melanie Ang** Impacts of climate change on Pacific North America's small-scale fisheries
17:20	**Stéphane Plourde** Using optimal and realized habitat models to assess the underlying mechanisms of Calanus population responses to future climate change in the northwest Atlantic	**Jérôme Guiet** Bioenergetic influence on the historical development and decline of industrial fisheries, and implications for a warming ocean
17:40	**Jessica Luo** Investigating plankton size-spectra dynamics using a global trait-based ecosystem model	**Eileen Hofmann** Factors affecting distribution of the Atlantic surfclam (*Spisula solidissima*), a continental shelf biomass dominant, during a period of climate change
18:00	**Nicole Lovenduski** Coccolithophore growth and calcification in a changing ocean: Insights from Community Earth System Model simulations	**Steven Barbeaux** Climate impacts on ecosystem productivity and fisheries management: The 2014-2016 Gulf of Alaska marine heat wave and the cod crisis that followed
18:20	***Session 9 Ends***	***Session 12, Day 1 Ends***

Tuesday, June 5

8:30 Announcements/Preview Sessions (S1, S3, S12, S13) [Columbia 5-8]

8:50 IOC - Ocean Decade

9:05 **David Allen Hutchins (Plenary S13)**
Interactions of global change with nutrient limitation of marine primary producers: How do we get from experimental bottles to whole ecosystem responses?

9:35 **Eric Galbraith (Plenary S12)**
Getting the big picture in focus: Assessing climate and human factors with global human-ecosystem models

10:05 **Naomi Harada (Plenary S3)**
Sentinel studies of ocean acidification in pelagic (the western North Pacific and Arctic Ocean) and Japanese coasts

10:35 ***Coffee/Tea Break***

	Session 13 (Columbia 1&2)	Session 12, Day 2 (Columbia 3&4)
11:00	**Sarah Cooley (Invited)** How can we use imperfect knowledge to inform management of ecosystems facing multiple drivers?	**Kirstin Holsman (Invited)** Science for an uncertain future: evaluating climate impacts and management approaches using a coupled modeling framework
11:30	**Camilla Sguotti** Linear or non-linear? Understanding the effect of climate change on Atlantic cod recruitment	**Amanda Faig** Modeling the manager: Getting catch right to improve integrated climate-fisheries projections
11:50	**Georg Engelhard** Multiple pressures at multiple time-scales: How climate change, fishing, nutrient inputs, and socio-political events shaped the sizes of plaice from 1902 to now	**Cody Szuwalski** The future of crab in the Bering Sea
12:10	**Tin-Yu Lai** The effects of climate on Baltic salmon: An application of Structural Equation Models	**Lisa Crozier** Salmon responses to climate change: From life-cycle models to a multi-model approach
12:30	**Christian Möllmann** Multiple stressors cause alternative stable states in the Baltic ecosystem	**Cheryl Harrison** A predictive fisheries catch metric for CMIP6-OMIP Earth System models
12:50	**Shuyang Ma** Long-term variabilities in ecosystems structure of China Seas and the possible mechanisms of atmosphere-ocean-ecosystem process	**Momme Butenschön** The future status of trophic regimes of the global ocean
13:10	***Lunch***	
14:20	**Phoebe Woodworth-Jefcoats** How do fishing and climate change interact to impact biomass available to future fisheries?	**Didier Gascuel** EcoTroph, a quasi-physical ecosystem model to analyze the global impact of climate change on marine food-webs

Session 1: Ocean extremes and their impact on marine ecosystems

Session 3: Carbon uptake, ocean acidification, and ecosystems and human impacts

Session 12: Scenarios and models to explore the future of marine coupled human-natural systems under climate change

Session 13: Multiple stressors at multiple scales: ecosystem based management in the face of changing ocean conditions

	Session 3 (Columbia 9&10)	Session 1, Day 1 (Columbia 11&12)
11:00	**Nicole Lovenduski (Invited)** A change in the forecast: Ocean carbon uptake over the next decade	**Rebecca Asch (Invited)** Trophic mismatches between plankton blooms and fish spawning phenology as a function of climate extremes
11:30	**Galen McKinley** Variability and trends in ocean carbon uptake: 1981-2016	**Julie E. Keister** Inland sea and coastal ocean zooplankton communities show contrasting responses to recent Northeast Pacific climate variability
11:50	**Maciej Telszewski** Requirements-driven global ocean observing system for ocean acidification and deoxygenation	**Nathan Mantua** Time to expect the unexpected? Unprecedented warming and a chain of ecosystem impacts link altered forage fish distribution and crab fishery delays to a spike in whale entanglements along California's central coast in 2015-2016
12:10	**Darren Pilcher** Impact of local biogeochemical processes and climate variability on ocean acidification in the Bering Sea	**Richard Brodeur** Effects of a recent marine heat wave on forage taxa in the northern California Current: An unprecedented ecosystem shift in progress?
12:30	**Marion Gehlen** Changing ocean acidity as a modulator of atmospheric biogeochemistry and climate	**Jan Newton** Understanding how extreme conditions and ocean acidification uniquely influence coastal upwelling zones: A case study from the Pacific Northwest U.S.
12:50	**Nianzhi Jiao** Microbial carbon sequestration and ocean acidification and hypoxia	**Qiong Yang** Impact of Anomalous Ocean Conditions on the distributional shifts of groundfish in the Gulf of Alaska
13:10	***Lunch***	
14:20	**Libby Jewett** Making ocean acidification data accessible and useable for resource managers	**William Sydeman** Marine ecosystems and extreme events: A global analysis through the lens of seabirds

Session 13 (Columbia 1&2)		Session 12, Day 2 (Columbia 3&4)
14:40	**Javier Porobic** Under pressure: Fisheries and climate change in a highly vulnerable marine ecosystem	**Vicky Wing Yee Lam** Projecting global fishing effort dynamics in the 21st century under climate change
15:00	**George Leonard** OSIRIS: A new analytical framework for evaluating compounding climate stressors in the ocean	**Oai Li Chen** Modeling the global marine capture fish market under climate change
15:20	**Caihong Fu** Incorporating physical forcing in a marine ecosystem model for developing optimal fisheries management strategies	**William Cheung** Exploring future seafood sustainability under scenarios of climate change and socio-economic development
15:40	**Isaac Kaplan** Projections of ocean acidification impacts on marine species and fisheries, for the California Current Integrated Ecosystem Assessment	**Gavin Fay** Development of robust management strategies for Northeast groundfish fisheries in a changing climate
16:00	**K. Ortega-Cisneros** Using ecosystem models to evaluate how climate change influences ecological indicators' response to fishing effects in the southern Benguela system	**Bradley Franklin** Evaluating adaptation scenarios for fishing communities facing climate-driven species changes
16:20	***Coffee/Tea Break***	
16:40	**Jonathan Reum** Scaling climate impacts from individual-level processes to populations and food webs using multispecies size spectrum models	**Arnault Le Bris** Climate vulnerability and resilience in the most valuable North American fishery
17:00	**Leonie Färber** Detecting catastrophic transitions – The case of North Atlantic herring	**Pablo Brosset** Forecasting herring productivity in the Gulf of St. Lawrence fishery: When the environment matters for management
17:20	**Stefan Koenigstein** Impacts of ocean warming, acidification and fishing on marine food-web dynamics and human user groups in the Barents Sea region	**Lisa Kerr** Implications of environmentally-driven movement and productivity of Atlantic bluefin tuna
17:40	**Erik Olsen** Ocean acidification explored using a suite of end-to-end ecosystem models covering ecosystems from the tropics to the arctic	**Ricardo Oliveros-Ramos** An intermediate complexity food web model to explore fisheries management scenarios under climate change
18:00	**Jordan West** Adaptation design tool for ecosystem-based management: coral reef application	**E. Fulton or A. Hobday** The future of Australia's fisheries – A multi-model analysis
18:20	**Session 13 Ends**	**Session 12 Ends**

Session 3 (Columbia 9&10)		Session 1, Day 1 (Columbia 11&12)
14:40	**Nathalie Hilmi and David Osborn** Bridging the gap between ocean acidification impacts and economic valuation "From Sciences to Solutions: Ocean acidification impacts on ecosystem services - Case studies on coral reefs"	**John Piatt** Extreme response of seabirds to extreme climate events in the NE Pacific
15:00	**Richard Alan Feely** Anthropogenic carbon increases and biological impacts in the California Current Ecosystem	**Catarina Vinagre** Robustness of food web complex networks to heat-waves in tropical and temperate shallow waters
15:20	**Martina Stiasny** Projecting the fate of fish stocks in a changing ocean - The future of Northeast Arctic cod under ocean acidification and warming	**Mahasweta Saha** Warmer doesn't mean weaker: Impact of heatwaves on foundation macrophyte species
15:40	**Tomohiko Tsunoda** Dialogues between scientists and stakeholders on making ocean acidification a policy focus in Japan	**Russell Brainard** Ecological impacts of the extreme 2015-2016 El Niño in the central equatorial Pacific
16:00	**Mary Chris Lagumen** Temporal variability of carbonate parameters in Guiguiwanen Channel, Bolinao, Pangasinan	**Mary Hunsicker** Developing an index for early detection of abrupt change in northeast Pacific Ocean ecosystems
16:20	***Coffee/Tea Break***	
16:40	**Bryony Townhill** Commercial shellfish and changing pH: Will fisheries be affected by projected changes or are species already adapted?	**Thomas Frölicher** Marine heat waves under global warming
17:00	**Shubham Krishna** Model-based analyses of an ocean acidification mesocosm experiment	**Michael Alexander** Projected sea surface temperatures over the 21st century: Changes in the mean, variability and extremes for large marine ecosystem regions of Northern Oceans
17:20	**Tiago Grilo** Transgenerational deleterious effects of ocean acidification on the reproductive success of a gammarid amphipod species	**Youngji Joh** Increasing coupling between NPGO and PDO leads to prolonged marine heatwaves in the Northeast Pacific
17:40	**Alexis Valauri-Orton** The Ocean Foundation's International Ocean Acidification Initiative: A cross-cutting program to build capacity of scientists and legislators to understand and address the complex impacts of ocean acidification	**Charlotte Laufkötter** Attribution of recent marine heat waves to anthropogenic climate change
18:00	**Diane Lavoie** Projections of future oceanic biogeochemical conditions in the Gulf of St. Lawrence and on the Scotian Shelf using a coupled regional climate model	**Lester Kwiatkowski** Daily and seasonal ocean acidification extremes during the twenty-first century
18:20	**Session 3 Ends**	**Session 1, Day 1 Ends**

Wednesday, June 6

8:30 Announcements/Preview Sessions (S4, S10, S14, S15) [Columbia 5-8]

8:50 **Merle Sowman (Plenary S14)**
Community vulnerability assessments to inform coastal adaptation planning: Insights from Southern Africa

9:20 **Prateep Kumar Nayak (Plenary S15)**
Vulnerable yet viable: Fisheries and aquaculture amidst global change processes

9:50 **Gretta Pecl (Plenary S10)**
Addressing key questions for climate-driven species redistribution requires integration of ecology, conservation and social science

10:20 **Dimitri Gutierrez (Plenary S4)**
Climate variability and ocean deoxygenation over continental margins associated to the Peru-Chile and other upwelling systems: Insights from proxy records

10:50 ***Coffee/Tea Break***

Session 14, Day 1 (Columbia 1&2)		Session 15 (Columbia 3&4)
11:10	**Beth Fulton (Invited)** Living in a world of change – Juggling cumulative impacts and path dependency	***Introduction by Convenors*** (11:10-11:30)
11:40	**Emanuele Bigagli** Humans at risk. Global spatial patterns of ocean ecosystems degradation and governance scales	**Abdelmalek Faraj (Invited)** (11:30 12:00) The blue belt initiative (BBI): Towards sustainable fisheries and aquaculture for building resilience to climate change
12:00	**Silvana Birchenough** Translating ocean acidification into practical applications to support aquaculture and food sustainability	**Devendraraj Madhanagopal** Social adaptation strategies of marine fishers to respond to climate change: The case of 'Tsunami' affected fishing hamlets in Tamil Nadu, India
12:20	**Laura Falkenberg** Developing adaptation and management strategies for socio-ecological systems in an acidified ocean	**Samiya Selim** Evidence of ecosystem based adaption to climate change in coastal Bangladesh
12:40	***Lunch***	
14:00	**Michaela Aschan** A pragmatic approach to developing climate adaptation plans for fisheries and aquaculture	**Dhanya Kandarattil** Effect of climate change on socio-economic conditions of fishermen – A tale from Kerala, India
14:20	**Catarina Frazão Santos** An index to assess the vulnerability of ocean planning and the Blue Economy to global climate change	**Johann Bell** Adaptations to maintain the contributions of small-scale fisheries to food security in the Pacific Islands

Session 4: Deoxygenation in Global Ocean and Coastal Waters in Relation to Climate Change

Session 10: Management and conservation of species on the move

Session 14: Vulnerability and adaptation of marine socio-ecological systems to climate change

Session 15: Fisheries and aquaculture in the face of climate change: Current actions, identified solutions and opportunities in support of sustainable livelihoods and food security

Session 10 (Columbia 9&10)		Session 4 (Columbia 11&12)
11:10	**Jorge García Molinos (Invited)** Ocean currents and herbivory drive macroalgae-to-coral community shift under climate warming	**Lothar Stramma (Invited)** Large-scale ocean oxygen changes
11:40	**Adriana Vergés** Climate-mediated tropicalisation of temperate reefs: Should we care?	**Rui Rosa** Ocean deoxygenation overrides ocean warming and acidification impacts in marine biota
12:00	**Thomas Therriault** Characterizing and predicting Aquatic Invasive Species distributions: Reconciling large-scale model predictions with small-scale observations and incorporating climate change scenarios	**Natalya Gallo** Implications of ocean deoxygenation for deep-sea demersal fish communities and fisheries
12:20	**Malin Pinsky (Invited)** Can we adapt to species on the move?	**Francisco Chavez (Invited)** Causes and impacts of ocean deoxygenation
12:40	***Lunch***	
14:00	**Irene Alabia** Projected distribution and diversity patterns of marine taxa in the Pacific Arctic under future climate	**Simone Alin** Synthesis of a decade of moored time-series observations of hypoxia and ocean acidification in the northern California Current Ecosystem
14:20	**Samantha Twiname** Mechanistic understanding of climate driven range shifts: Using thermal tolerances of rock lobster to predict future range shifts	**Jack Barth** Changes in coastal ocean hypoxia off Oregon as influenced by multiple, climate-sensitive drivers

Session 14, Day 1 (Columbia 1&2)		Session 15 (Columbia 3&4)
14:40	**Lauren Wenzel and Maria Brown** Building capacity to address climate impacts at marine protected areas	**Cody Szuwalski** Seafood security strategies in China
15:00	**Paul Buckley** Climate change impacts on marine species, communities and habitats: Implications for managing conservation features, marine protected areas and the wider implementation of marine biodiversity legislation	**Mariola Norte** Adapt or lose: How to manage the socioeconomic impact of climate change in the Spanish aquaculture, the case of blue mussel
15:20	**Adrien Comte** Operationalizing ecological adaptive capacity: Assessing vulnerability, resilience, and action for coral reefs in French Polynesia under global environmental change	**Ethel Wilkerson** Strategies for diversifying Maine's softshell clam fishery in response to climate change
15:40	**Poster Presentations**	**Anne Hollowed** Climate variability and fisheries: Tools and information requirements
16:00	***Coffee/Tea Break***	
16:20	**Elliott Hazen** Comparing climate vulnerability assessment of fish and shellfish resources across large marine ecosystems	**Melissa Karp** Accounting for shifting distributions and changing productivity in the development of scientific advice for fisheries management
16:40	**Robert Blasiak** Fuzzy logic approach for integrated assessment of vulnerability of marine fisheries	**Merrick Murden** Climate-related impacts on fisheries management and governance in the Northeast Atlantic
17:00	**Elena Ojea** Ecological, socioeconomic and institutional resilience to shifting fish stocks	**Colette Wabnitz** Adapting to climate change in the Pacific Islands: Nutritional impacts of a change in pelagic fish consumption
17:20	**John Pinnegar** Assessing vulnerability and adaptive capacity in the fisheries sector of Dominica: Long-term climate change and catastrophic hurricanes	**Myron Peck** Risks and opportunities of climate change to European fisheries and aquaculture sectors: The CERES Program
17:40	**Karen Hunter** Pacific Canadian fish stock climate change vulnerability assessment	**Florence Poulain** Methods and tools for fisheries and aquaculture adaptation
18:00	**Jorge Ramos** Vulnerability of key Peruvian fishery species to Climate Change	**Discussion**
18:20	**S14, Day 1 Ends**	**S15 Ends**

Session 10 (Columbia 9&10)		Session 4 (Columbia 11&12)
14:40	**Mitchell Roffer** Evaluating future fisheries management scenarios using combined downscaled climate, ocean circulation, and habitat suitability models	**Xiujun Wang** A pause in the decline of oxygen in the largest Oxygen Minimum Zone: A response to the recent global warming hiatus?
15:00	**Robert Crawford** Famine in a time of plenty – A recent paradox in the Benguela upwelling system	**Olaf Duteil** Pacific Decadal Oscillation and recent oxygen decline in the eastern tropical Pacific Ocean
15:20	**Richard Sherley** Metapopulation tracking juvenile penguins reveals an ecosystem-wide ecological trap	**Kalyani Devasena** Study of oxygen and nutrients in the Arabian Sea using model simulations and observations
15:40	**Manuel Hidalgo** Reconciling ocean connectivity and hydroclimate with the management of transboundary metapopulations	**Andreas Oschlies** Reconciling systematic differences between observed and simulated ocean deoxygenation
16:00	***Coffee/Tea Break***	
16:20	**Rebecca Selden** Vulnerability and adaptation of fishing communities to climate-driven species range shifts: Consequences for climate-ready management	**Hernan Garcia** High-quality dissolved oxygen baseline for ecosystem and variability studies
16:40	**Juliano Palacios-Abrantes** Current state and future scenarios for trans-boundary fisheries management in changing oceans of Canada and United States	**Eric Galbraith** Large oxygen decline on the northwest Atlantic Shelf from an ocean dynamical response to warming
17:00	**Iratxe Rubio** Institutional settings, climate change and the re-distribution of tropical tuna fisheries	**Rui Rosa** Climate-driven oceanic deoxygenation leads to an epipelagic shark 'habitat trap' more prone to overfishing
17:20	**Dorothy Dick** Scenario planning as a tool in protected species management and conservation in a changing climate: An Atlantic salmon pilot	**Peter Swarzenski** Contribution of nuclear applications to study the effects of reduced oxygen in coastal environments
17:40	**Tessa Francis** Fish on the move: Tools to support EBFM in facing challenges associated with species range shifts	**Ozeas Costa Jr.** Stream discharge and nutrient export from the Ohio River watershed under future climate change scenarios
18:00	**Merrick Burden** Addressing the challenge of climate change and fisheries: A framework for implementing climate-appropriate fishery Management	**Isaac Irby** The competing impacts of climate change and nutrient reductions on dissolved oxygen in Chesapeake Bay
18:20	**S10 Ends**	**S4 Ends**

Thursday, June 7

8:30 Announcements/Preview Sessions (S2, S7, S11, S17) [Columbia 5-8]

8:50 **Andreas Oschlies (S7 Plenary)**
Sensitivity of the Eastern Tropical South Pacific oxygen minimum zone to climate change

9:20 **Iddya Karunasagar (S17 Plenary)**
Climate change, harmful algal blooms and health risks in one health context

9:50 **Lisa Goddard (S2 Plenary)**
Ten-years out: Navigating the information gap between El Niño and climate change

10:20 **Steve Widdicombe (S11 Plenary)**
How do we put all the pieces together to appreciate the bigger picture?

10:50 ***Coffee/Tea Break***

	Session 7 (Columbia 1&2)	Session 17 (Columbia 3&4)
11:10	**Veronique Garçon (Invited)** Land-sea-atmosphere interactions exacerbating ocean deoxygenation	**Xuelei Zhang (Invited)** Recurrent green tides in the southern Yellow Sea: The process, drivers and way forward
11:40	**Lucie Buttay** Effect of environmental fluctuation amplitude on community temporal structure	**Jiansheng Huang** Effects of meteorological factors on the temporal distribution of red tides in Tolo Harbour, Hong Kong
12:00	**Folly Serge Tomety** Intercomparison of sea surface temperature trend in the Angola, Benguela and Agulhas currents around Southern Africa from 1982 to 2016	**Janja France** Can we track climate related changes in the HAB species assemblage in a highly variable coastal sea (Gulf of Trieste, Adriatic Sea)?
12:20	**Enrique Curchitser** Climate, anchovy and sardine in the California Current: A mechanistic understanding	**Eileen Bresnan** Regional changes in harmful algal events in the North Atlantic area over the last two decades documented using the HAEDAT database
12:40	***Lunch***	
14:00	**Rodrigue anicet Imbol Koungue** Role of interannual Kelvin waves propagations in the equatorial Atlantic on the Angola Benguela Current System	**Raphael Kudela** GlobalHAB: International coordination to ascertain the effects of Climate Change on the occurrence of Harmful Algal Blooms
14:20	**Nele Tim** Origin and pathways of the central water masses in the Benguela Upwelling system and the impact of the Agulhas leakage	**Elisa Berdalet** Solving harmful algal blooms problems by organizing bricks: Ostreopsis blooms as an example

Session 2: From prediction to projection: the role of seasonal to decadal forecasts in a changing climate

Session 7: Eastern Boundary upwelling systems: diversity, coupled dynamics and sensitivity to climate change

Session 11: Benthic and pelagic system responses in a changing ocean: From genes to ecosystem level functioning

Session 17: Effects of climate change on ocean ecosystem health: Projecting occurrences of harmful algal blooms and disease outbreaks and assessment of the risk to ecosystem functioning, aquaculture, fisheries and human health

	Session 2 (Columbia 9&10)	Session 11, Day 1 (Columbia 11&12)
11:10	**Katherine Mills (Invited)** Understanding stakeholder decisions to guide forecasting efforts	**Ulrich Sommer (Invited)** The effects of climate change on the ocean's plankton
11:40	**Michael Jacox** Mechanisms driving seasonal forecast skill in the California Current System	**Scott Bennett** Contribution of local adaptation to vulnerability of marine biota to warming
12:00	**Mercedes Pozo Buil** Subsurface dynamics leading to decadal predictability in upwelling systems of the North Pacific	**Amrit Mishra** Short term CO2 enrichment increases carbon metabolism of air-exposed inter tidal seagrass communities
12:20	**Antonietta Capotondi** Forecasting physical drivers of marine ecosystems in the California Current System using a Linear Inverse Modelling approach	**Olav Sigurd Kjesbu** Climate vulnerability of marine fish, response traits and mechanisms
12:40	***Lunch***	
14:00	**Takashi Mochizuki** Subdecadal modulation in the Pacific in 2000s	**Sara Mynott** Camouflage under climate change: will marine species respond well to warming?
14:20	**Fernando Gonzalez Taboada** Subseasonal forecast of surface water conditions in Chesapeake Bay using a hybrid approach	**Gabriel Reygondeau** Effect of climate change on the distribution of global marine biodiversity

Session 7 (Columbia 1&2)		Session 17 (Columbia 3&4)
14:40	**Lynne Shannon** Using available fishery, ecological and environmental time series to examine temporal variability in the Southern Benguela ecosystem over the past four decades	**Alexandra Campbell** Which species traits predict susceptibility to disease in warming oceans? A systematic review of the literature from natural and aquaculture systems
15:00	**Isabel Porto da Silveira** Oceanic resolution controls differences between fast-SST-error-growth in CCSM4 simulations of the subtropical Southeastern Pacific	**Alba Serrat** Applying a dynamic energy budget model to understand nematode parasite influence on the trade-offs between reproduction and energetic condition of fish
15:20	**Elizabeth Drenkard** Modeling climate change impacts on California Current System oceanography and fisheries	**Barbara Muhling** Three species of Vibrio pathogen in the Chesapeake Bay under future climate change scenarios
15:40	**Ivonne Montes** Dynamical relationship between the equatorial circulation and OMZ in the Eastern Tropical South Pacific between 1990 and 2008: a high-resolution modeling approach	**Chamika W.A.S.** Dynamics of the Vibrio abundance related to changes in benthic composition at Polhena reef, Southern Sri Lanka
16:00	***Coffee/Tea Break***	
16:20	**Vincent Saba (for Kristin Kleisner)** Evaluating the use of a high-resolution Earth System Model in the Humboldt Current ecosystem to understand regional large-scale climate variability	**Keliang Chen** Advancing the practice of marine eco-compensation in China: Knowledge synthesis from implementation
16:40	**Manon Gévaudan** Changes in the Peruvian upwelling system under future climate scenarios	**Jonatha Giddens** The Pacific Islands Vulnerability Assessment (PIVA): Initial findings from expert panel workshop
17:00	**Steven Bograd** A water mass history of the Southern California Current System	**Ryan Carnegie** Managing marine aquaculture health in a changing world
17:20	**Raphael Dussin** Biogeochemical drivers of hypoxia in a coupled bio-physical model of the California Current Ecosystem	**Discussion**
17:40	**Angelica Peña** Interannual to decadal variability of biogeochemical conditions along the British Columbia continental shelf and slope	**S17 Ends**
18:00	**João Bettencourt** Physical and biogeochemical controls on dissolved oxygen in coastal upwelling systems	
18:20	**S7 Ends**	

Session 2 (Columbia 9&10)		Session 11, Day 1 (Columbia 11&12)
14:40	**Samantha Siedlecki** Seasonal forecasts of hypoxia and ocean acidification in Washington and Oregon waters	**Alyce Hancock** Effect of ocean acidification on Antarctic marine bacterial, archaeal and eukaryotic communities
15:00	**Jong-Yeon Park** Seasonal to multi-annual marine biogeochemical prediction using GFDL's Earth System Model	**Ravi Maharaj** The sensitivity of climate-induced shifts in the distribution of reef fish to the presence of reef habitat
15:20	**Jonathan Tinker** Exploring the potential for a North West European shelf seas ecosystem seasonal forecast	**Laurene Pecuchet** Structural and functional changes of multi-trophic communities in a large marine ecosystem
15:40	**Jason Hartog** Seasonal and decadal forecast development for a multi-species pelagic longline fishery	**Hubert Du Pontavice** Temperature effects on the transfers of biomass in marine food webs
16:00	***Coffee/Tea Break***	
16:20	**Neda Trifonova** Predicting ecological responses to climate variability with a dynamic Bayesian network model	**Vincent Vallée** The effects of climate change and the collapse of the shrimp fishery on fish communities' diversity and functions in a tropical context: The case of the continental shelf off French Guiana
16:40	**Mark Payne** Envisaging the future distribution of North Atlantic bluefin tuna across seasonal, decadal and centennial scales	**Florian Roth** Local acidification caused by coral-algal phase shifts exacerbates the effects of global ocean acidification on tropical reefs
17:00	**Michael Malick** Seasonal forecasting of Pacific hake distribution in the California Current Ecosystem	**Catarina Santos** Early perspective: A 3D approach to the effects of elevated CO2 in the neuroanatomic development of an oviparous shark
17:20	**Gavin Fay** Incorporating recruitment-environment linkages into stock assessment models for Alaskan groundfish with application to population projections in a changing climate	**José Ricardo Paula** Cognitive and neurobiological disruption of cleaning mutualisms under ocean acidification and warming
17:40	**James Thorson** Forecast skill for predicting distribution shifts: A retrospective experiment for marine fishes in the Eastern Bering Sea	**Will Ryan** Complex life cycles and complicated responses to change
18:00	**Noah Oppenheim** Forecasting fishery trends in a warming ocean: A modeling framework using early life stages of the American lobster	**Anna McLaskey** Krill in a changing environment: Leveraging multiple approaches to understand a complex organism
18:20	**S2 Ends**	**S11, Day 1 Ends**

Friday, June 8

8:30 Announcements/Publication Plans and Target Dates [Columbia 5-8]

8:50 **Severino G. Salmo III (Plenary S18)**
Blue carbon ecosystems: Conservation and policy needs for an effective climate change adaptation and mitigation strategies

9:20 **Alistair Hobday (Plenary S1)**
Ocean extremes: Marine heatwaves and marine ecosystems

9:50 **Fan Wang (Plenary S8)**
Facing the future and sustainability through connecting the coastal and open oceans: Center for Ocean Mega-Science, Chinese Academy of Sciences

10:20 ***Coffee/Tea Break***

Session 8, Day 2 (Columbia 1&2)		Session 1, Day 2 (Columbia 3&4)
10:40	**Glen Gawarkiewicz** Recent changes in shelfbreak exchange processes in the Middle Atlantic Bight	**Andrew Pershing** Increases in surprising ocean temperatures will challenge the limits of ecosystems and people to adapt
11:00	**Janet Nye** The influence of the Gulf Stream on Northwest Atlantic ecosystems	**Bayden Russell** Time matters: Longer heatwaves increase mortality of subtidal organisms at sub-lethal temperatures
11:20	**Vincent Saba** Using NOAA's high-resolution global climate model to assess climate change impacts in the Northwest Atlantic	**Jay Peterson** Effects of the recent anomalous warming on the lipid and fatty acid structure of zooplankton in the northeast Pacific (Newport, Oregon, USA)
11:40	**Michelle Staudinger** Climate-induced shifts in phenology: Case studies of fish, whales, and seabirds in the Gulf of Maine	**Louise Castro** Ocean warming and marine heatwaves: Will these make temperate macroalgae increasingly vulnerable to tropical herbivores?
12:00	**Hassan Moustahfid (Invited)** The changing character of Western Boundary Currents with climate change and the implications for fisheries	**Mark Eakin** Global coral bleaching in the Anthropocene and a call for climate action
12:20	***Lunch (12:30)***	***Lunch***
13:40	**Haikun Xu** Evaluating the utility of the Gulf Stream Index for predicting recruitment of Southern New England-Mid Atlantic yellowtail flounder	**Gang Liu** Increase in global coral bleaching heat stress since 1982
14:00	**John Quinlan** How might climate change impact fisheries management and marine protected areas?	**James Robinson** Productive instability of coral reef fisheries after a climate-driven regime shift

Session 1: Ocean extremes and their impact on marine ecosystems

Session 8: Understanding the impact of Abrupt Ocean Warming and Continental Scale Connections on marine productivity and food security via Western Boundary Currents

Session 11: Benthic and pelagic system responses in a changing ocean: From genes to ecosystem level functioning

Session 12: Scenarios and models to explore the future of marine coupled human-natural systems under climate change

Session 14, Day 2 (Columbia 9&10)		Session 11, Day 2 (Columbia 11&12)
10:40	**Nigel Sainsbury** Unravelling the effect of storms on commercial fish landings in UK waters	**Jay Minuti** Resistance of subtidal reefs to change under future conditions: The role of benthic grazers
11:00	**Eva Papaioannou** Not all those who wander are lost – Fishers communities' responses to shifts in the distribution and abundance of fish resources	**Hailey Conrad** Relative depth constraints on temperature-induced range shifts for continental shelf species
11:20	**Lisa Colburn** Social and climate change vulnerability in fishing communities of the United States: An examination of shifting baselines	**Peng Lian** Variability of the spatiotemporal distribution of yellowfin tuna and its response to environmental change in the eastern Pacific Ocean
11:40	**Blair Greenan** Coastal index of vulnerability to climate change by economic zone (CIVEZ)	**Helen Gurney-Smith** The story so far: An in situ pairing of chemical oceanography and physiology
12:00	**Alan Haynie** Adaptive fisheries management under changing environmental and economic conditions	**Christopher Chambers** Experimental methodologies optimized for examining multiple stressors, variable environments, and the scope of responses in early life-stages of marine fishes due to climate change
12:20	***Lunch***	
13:40	**Stephanie Moore** Planning for future resilience of fishing communities to harmful algal blooms: What have we learned from the 2014-2016 northeast Pacific marine heatwave?	**Cátia Monteiro** Is local adaptation driving the transcriptomics response to multiple stressors in the kelp *Saccharina latissima*?
14:00	**Katherine Maltby** Socio-ecological approaches to exploring climate change impacts: A case study of UK fisheries	**Taewon Kim** Effects of temperature increase and oxygen decrease on behavior and physiology of marine benthic invertebrates

Session 8, Day 2 (Columbia 1&2)		Session 1, Day 2 (Columbia 3&4)
14:20	**Jonathan Hare** Fisheries in a changing world: examples from the Northeast U.S. Shelf	**Celina Scott-Buechler** Regional scale coral bleaching is a new phenomenon in the Caribbean Lesser Antilles
14:40	**Discussion**	**Alistair Hobday (for Eric Oliver)** Historical and future projected changes in global marine heatwaves
15:00	**S8 Ends**	**S1 Ends**
15:00	***Coffee/Tea Break***	
15:20	**Plenary Closing Ceremony** [Columbia 5-8]	
17:00	**End of Symposium**	

Session 14, Day 2 (Columbia 9&10)		Session 11, Day 2 (Columbia 11&12)
14:20	**Sarah Schumann** A stakeholder-led process to design climate resilience strategies for wild-harvest commercial fisheries in Rhode Island, USA	**Marta Silva Pimentel** The impact of ocean warming and acidification on the physiology of the seahorse *Hippocampus reidi*
14:40	**Lisa Pfeiffer** Effects of "The Blob" on profitability in the West Coast Pacific whiting fishery	**Carolina Bastidas** Seasonality of fouling organisms in view of climate change and bioinvasions
15:00	**S14 Ends**	**S11 Ends**
15:00	***Coffee/Tea Break***	
15:20	**Plenary Closing Ceremony** [Columbia 5-8]	
17:00	**End of Symposium**	

POSTER SESSION - June 6

Session 1: Ocean extremes and their impact on marine ecosystems

S1-P1 **Franklin Ormaza-González**
"El Niño Costero" 2017 in Niño 1+2 or the Carnival Coastal Warming event?

S1-P2 **Mary Elizabeth Livingston**
New Zealand fisheries and climate change effects on the ocean: A wake up call

S1-P3 **In-Seong Han**
Extreme and abrupt changes of water temperature and their fisheries impacts in the East Asian Marginal Seas

S1-P4 **Catarina Vinagre**
Ecological traps in shallow coastal waters - Potential effect of heat-waves in tropical and temperate organisms

S1-P5 **Catarina Vinagre**
Integrated index of stress responses to a future marine heat wave in tropical intertidal organisms

S1-P6 **Erick Geiger**
Comparing NOAA Coral Reef Watch regional satellite monitoring and in-water observations to prepare for repeat coral bleaching events in a warming world

S1-P7 **Francesco Rendina**
Effects of elevated temperature as climate change stressor on physiological responses and survival of the coralline alga *Corallina officinalis*

S1-P8 **Wei Cheng**
Peek into the future: Extreme physical oceanographic condition in Alaskan Waters from CMIP5 simulations

S1-P9 **Thomás Banha**
Records of bleaching events in Brazilian reef communities

S1-P10 **Cheryl S. Harrison**
The effect of extreme cooling events on ocean ecosystems and biogeochemistry: fisheries implications

Session 2: From prediction to projection: the role of seasonal to decadal forecasts in a changing climate

S2-P1 **Franklin Ormaza-González**
Do sun spots influence the onset of ENSO and PDO events in the Pacific Ocean?

S2-P2 **Meng Xia**
The effect of climate change to the Chesapeake Bay Plume Dynamics

S2-P3 **Yingying Zhao**
The South Pacific Decadal Variability connections to basin-scale climate

S2-P4 **Alistair Hobday**
A framework for combining seasonal forecasts and climate projections to aid risk management for fisheries and aquaculture

S2-P5 **Mark Payne**
Lessons from the first generation of marine ecological forecast products

S2-P6 **Xinyi Kang**
Exchange dynamics at Maryland Coastal Bays under the effect of climate change

S2-P7 **Susan Kay**
Projections of marine ecosystem change in European seas in the 21st century

S2-P8 **John Selvaraj**
Projected sea surface temperature changes in the fishing areas of the Colombian Pacific under climate change scenarios

S2-P9 **Jinyeong Kim**
A wavelet approach to time series analysis for the anchovy recruitment and climate change in the southeastern waters of Korea

S2-P10 **Desiree Tommasi**
Multi-annual climate predictions for fisheries: An assessment of skill of sea surface temperature forecasts for Large Marine Ecosystems

S2-P11 **Michael Alexander**
More reliable coastal SST forecasts from the North American multimodel ensemble

S2-P12 **Yoshikazu Sasai**
Interannual variability of marine ecosystem in the Kuroshio Extension region

S2-P13 **Albert Hermann**
Downscaling global climate projections to the Bering Sea: a rapid hybrid dynamical-statistical method to generate a large regional ensemble

S2-P14 **Masami Nonaka**
Potential predictability of mesoscale eddy activities in the western boundary current regions in an ensemble eddy-resolving OGCM

Session 3: Carbon uptake, ocean acidification, and ecosystems and human impacts

S3-P1 **Saravanakumar**
Seasonal and Interannual variability of partial pressure of carbon dioxide (pCO2) and air-water CO2 flux pattern along the southwest Bay of Bengal-Northern Indian Ocean region

S3-P2 **Tsuneo Ono**
Temporal variation of the saturation state of carbonate in intermediate waters of western North Pacific

S3-P3 **Ortega-Cisneros**
Potential impacts of ocean acidification on the southern Benguela food web

S3-P4 **K. Gunasekaran**
Elevated CO2 effects on shell dissolution rates of two estuarine benthic foraminifera

S3-P5 **Radwa Hossam Eldin saad**
The effect of ocean acidification on *Ulva lactuca* in relation to the associated bacteria metabolic interactions – A lab study

S3-P6 **Alyce Hancock**
Effect of ocean acidification on Antarctic marine organisms – A meta-analysis

S3-P7 **Miho Ishizu**
A marine carbon model coupled with an operational ocean model product for ocean acidification studies in the North Western Pacific

S3-P8 **Robert J Holmberg**
Ocean acidification alters morphology of all otolith types in 3D, delays settlement in Clark's anemonefish (*Amphiprion clarkii*)

S3-P9 **Qinyu Liu**
Influence of human activities on C:N ratio of riverine organic matter along the Pearl River in South China

S3-P10 **Ferial Louanchi**
Multi-decadal temperature, oxygen and pH trends in the upper layer of the Western Mediterranean Sea

S3-P11 **Christine San Antonio**
Examining the integrated effects of ocean acidification and warming on shell development, structural integrity, and incidence of epizootic shell disease in the juvenile American lobster, *Homarus americanus*

S3-P12 **Silvana Birchenough**
The economic impacts of ocean acidification on shellfish fisheries and aquaculture in the United Kingdom

S3-P13 **Katsunori Kimoto**
Morphology and habitat depth of planktic foraminifer in intermediate waters of western North Pacific: Implications of relationship to carbonate saturation states

S3-P14 **Peter Swarzenski**
Tackling diverse marine climate-change challenges: From nuclear-based techniques to policy

S3-P15 **Merna Safwat**
Ocean acidification impact on the grooved carpet shell clam (*Ruditapes decussatus*)

S3-P16 **Maura Niemisto**
Effects of high CO2 and temperature on the physiology, behavior and development of American lobster larvae: comparing subpopulations across New England's thermal gradient

S3-P17 **Christopher Long**
Effects of ocean acidification on snow crab larvae: Carryover effects from embryogenesis and oogenesis reduce direct effects on larval survival

S3-P18 **Robert Foy**
Ocean acidification does not affect embryo development, hatch success, or adult calcification in Bering Sea snow crab, *Chionoecetes opilio*

S3-P19 **Fiona Tomas**
Ocean acidification can release top down control on early life stages of a marine habitat-forming species

S3-P20 **Carlos Barroso**
Ocean acidification and warming induce mortality and shell loss in *Nassarius reticulatus* (L.) veligers jeopardizing the species survival

S3-P21 **Agneta Fransson**
Effects of sea-ice and biogeochemical processes and storms on under-ice water fCO2 from winter to spring in the high Arctic Ocean: Implications for sea-air CO2 fluxes

Session 4: Deoxygenation in Global Ocean and Coastal Waters in Relation to Climate Change

S4-P1 **Pamela Hidalgo**
Community structure and physiological responses of zooplankton in the upwelling system of the Eastern South Pacific: effect of the oxygen minimum zone

S4-P2 **Fei Lan**
The role of the SPM absorbed phosphorus in oxygen consumption in the Pearl River estuary

S4-P3 **Denise Breitburg**
The IOC-UNESCO Global Ocean Oxygen Network (GO2NE): Collaboration across disciplines and national boundaries to promote research and awareness of ocean oxygen decline

Session 5: Climate change impacts on high latitude systems on multiple scales in space and time

S5-P1 **Elodie Salmon**
Evaluation of iron sources and sea ice variability in the Ross sea and implications for the phytoplankton seasonal cycle

S5-P2 **Brooks Kaiser**
Climate change impacts on Arctic marine resource productivity: Interlinking ecological, economic and institutional scenarios

S5-P3 **Hwa Hyun Lee**
Environmental variability and chum salmon production at the northwestern Pacific Ocean

S5-P4 **Kaixing Dong**
Climate effects on phytoplankton blooms in the Barents Sea

S5-P5 **Emily Klein**
Ecosystem outcomes of climate change and fishing impacts on krill, *Euphausia superba*, in the Scotia Sea, and their implications for management in a changing ocean

S5-P6 **James Ianelli**
Dynamic changes in two eastern Bering Sea groundfish stocks and relative impacts of temperature-dependent growth and their consequences for fisheries management

S5-P7 **Suchana Chavanich**
Potential changes in feeding behaviors and parasites of Antarctic fish on the East Ongul Island and King George Island, Antarctica

Session 6: The deep ocean under climate change

S6-P1 **Liliana Espinosa-Leal**
Diversity and distribution of hyperiid amphipods between Caldera – Isla de Pascua, Chile

S6-P2 **Nadine Le Bris**
Fluid and adaptive networks of fixed and mobile robotic platforms for the monitoring of deep-sea ecosystems

Session 7: Eastern Boundary upwelling systems: diversity, coupled dynamics and sensitivity to climate change

S7-P1 **Jin Ma**
Climate-driven latitudinal shift in fishing ground of jumbo flying squid (*Dosidicus gigas*) in the Southeast Pacific Ocean off Peru

S7-P2 **Virginie Bornarel**
Trophic amplification and attenuation of bottom-up perturbation on marine ecosystem in the Northeast Pacific under climate change

S7-P3 **Ruben Escribano**
The impact of the El Niño 2015-16 on the zooplankton community in Chilean Eastern Boundary Upwelling System

S7-P4 **Joyce JL Ong**
Global hotspots of synchronous marine populations

S7-P5 **Nicole Lovenduski (for Riley Brady)**
What controls the variability of CO2 fluxes in Eastern Boundary Upwelling Systems?

S7-P6 **Carlos Conejero**
Mechanisms associated to the global warming-induced SST pattern in the South Eastern Pacific in the CESM-LE

S7-P7 **Dimitri Gutierrez (for Espinoza-Morriberón Dante)**
Modelling biogeochemical trends in the Peruvian Upwelling System: Remote vs local forcing

S7-P8 **Dimitri Gutierrez (for Adolfo Chamorro)**
Effect of climate change on upwelling-favorable winds in the Peruvian Upwelling System

Session 8: Understanding the impact of Abrupt Ocean Warming and Continental Scale Connections on marine productivity and food security via Western Boundary Currents

S8-P1 **Carina Stefoni Böck**
Potential impacts of climate change on physical processes and primary productivity in the Brazilian ocean warming hotspot

S8-P2 **Caixia Gong**
Effects of environmental variations on the abundance of western winter-spring cohort of *Ommastrephes bartramii* in the Northwest Pacific Ocean

S8-P3 **Alexey Mishonov**
Assessing the Northwest Atlantic 30-year climate change using 3-D visualization

S8-P4 **Arielle Stela Nkwinkwa Njouodo**
Atmospheric signature of the Agulhas Current

Session 9: Drifting into the Anthropocene: How will pelagic marine ecosystems be affected and what are the biogeochemical and lower trophic consequences

S9-P1 **Todd OBrien**
International efforts in plankton and ecosystems time series research

S9-P2 **Dongxing Chen**
Effects of typhoon events on chlorophyll and carbon fixation in different regions of the East China Sea

S9-P3 **Roksana Jahan**
Shifting pattern of phytoplankton species response to climate change and eutrophication in Gyeonggi Bay

S9-P4 **Roksana Jahan**
Temperature influences pennate diatom and flagellates in Gyeonggi Bay

S9-P5 **Jasmin John**
Assessing the legacy effects of climate change on the world's oceans utilizing reversibility scenarios

S9-P6 **Shelby Brunner**
Development of a global ocean biogeochemistry observing system

S9-P7 **Charles A. Stock**
Reconciling ocean productivity and fisheries catch in a changing climate

Session 10: Management and conservation of species on the move

S10-P1 **Kate Searle**
Climate and resource variation differentially affect intrinsic population processes to drive patterns of seabird population dynamics in UK coastal waters

S10-P2 **Wei Yu**
Climate-driven abundance and distribution variability of winter-spring cohort of neon flying squid *Ommastrephes bartramii* in the Northwest Pacific Ocean using habitat suitability modeling approach

S10-P3 **Ismael Núñez-Riboni**
Past and projected changes of the suitable thermal habitat of North Sea cod under climate change

S10-P4 **Lisamarie Carrubba**
Creating a climate science toolkit to inform management decisions for threatened and endangered species

S10-P5 **Barbara Muhling**
Out of tuna: Using metabolic models to estimate future accessibility of bluefin and yellowfin tunas to U.S. fisheries

S10-P6 **Georg Engelhard**
Squid on the move in a marine climate change 'hotspot' and why it matters to fisheries and society

S10-P7 **Elena Ojea (for Xiaozi Liu)**
Management solutions for shifting trans-boundary fish stocks under fixed catch shares

S10-P8 **Andrew Yool**
Climatically-induced change in ocean circulation as a potential stressor of marine ecosystems

S10-P9 **Thomas Miller**
Winter is (not) coming: Changes to overwinter behavior of blue crab, *Callinectes sapidus*, in response to warming temperatures

S10-P10 **Matthew Lettrich**
A climate vulnerability assessment for marine mammals in the Northwest Atlantic, Gulf of Mexico, and Caribbean

S10-P11 **Mark Payne**
Understanding the past and predicting the future of the North-east Atlantic "Mackerel War"

S10-P12 **Emily Moberg**
Capital investment for optimal exploitation of renewable resource stocks in the age of global change biology

S10-P13 **Shin-ichi Ito**
Effects of climate change on growth and migration of Pacific saury (*Cololabis saira*) in the North Pacific

S10-P14 **Inna Senina**
Assessing the impact of climate change on marine top predator populations

S10-P15 **Lingbo Li**
Differences in groundfish distributional changes across NE Pacific shelf: Subregion, species, and life history

S10-P16 **Gretta Pecl**
How regional fishery bodies have responded to climate change

S10-P17 **Jin Gao**
Historical dynamics of the demersal fish community in the East and South China Seas

S10-P18 **Yi Xu (or Caihong Fu)**
Towards understanding changes in Pacific herring (*Clupea pallasii*) spawning distribution off the west coast of Canada over the past three decades

Session 11: Benthic and pelagic system responses in a changing ocean: From genes to ecosystem level functioning

S11-P1 **Jun Shoji**
Changes in fish community structures in seagrass beds along Pacific coast of northern Japan: Increase of species transported from southern waters

S11-P2 **Carolina González**
Effect of oceanographic change on the genetic diversity and phylogeography of a widely distributed copepod in the South Eastern Pacific

S11-P3 **Tatyana Belan**
Long-term changes of marine environment conditions in the north part of Amursky Bay (the Sea of Japan/ East Sea)

S11-P4 **Kuo-Wei Lan**
Effects of climate variability on catch rate of yellowfin tuna (*Thunnus albacares*) cohort in the Indian Ocean

S11-P5 **Yongjun Tian (for Rui Wu)**
Otolith microchemistry of Pacific cod in Yellow Sea reflects the annual and interannual variation of Yellow Sea Cold Water Mass

S11-P6 **Ferial Louanchi**
Multi-decadal evolution of Ichtyofauna in trawlable bottom of the Algerian coast (South Western Mediterranean Sea)

S11-P7 **Kathryn Morrissey**
Diving deeper into the algal holobiont: Exploring effects of environmental changes on bacterial diversity

S11-P8 **Michelle McClure (for Aimee A. Keller)**
Return of the dead zone: severe hypoxia observed off Oregon and Washington during the 2017 West Coast Groundfish Bottom Trawl Survey

S11-P9 **Sheng-Yuan Teng**
The Possible Influence of Climatic Variation on the Catch of Grey Mullet (*Mugil cephalus L.*) in the Taiwan Strait

S11-P10 **Regina Kolzenburg**
Is *Corallina officinalis* (*Corallinales, Rhodophyta*) able to adapt to environmental conditions across its geographic distribution?

S11-P11 **Alba Serrat**
New insights into early oocyte dynamics and their links to environmental cues challenge assumed fecundity pattern and reproductive potential

S11-P12 **Rui Rosa**
Effects of ocean acidification on sharks

S11-P13 **Aaron Honig**
Exposure to elevated temperature reduces effects of acidification on inducible defenses in the blue mussel, *Mytilus edulis*, during predator crab exposure

S11-P14 **Thomás Banha**
Effects of multiple thermal stresses on chlorophyll-a content and size of *Cassiopea andromeda* (*Cnidaria: Scyphozoa*) and the role of heterotrophy and *Symbiodinium* concentration

S11-P15 **Nina Bednarsek**
Interactive effects of temperature and acidification on pteropods in the California Current Ecosystem during 2016 El-Niño

Session 12: Scenarios and models to explore the future of marine coupled human-natural systems under climate change

S12-P1 **Travis Tai**
Biophysical responses to ocean acidification and impacts on global fisheries

S12-P2 **Marcos Llope**
Natural and land-based human factors affect the abundance of anchovy in the Gulf of Cadiz (SW Spain)

S12-P3 **Muhammed Oyinlola**
Changes in fishmeal and fish oil supply under climate change

S12-P4 **Leana Deriš**
Effect of cod (*Gadus morhua*) predation on juvenile herring (*Clupea harengus*) in the Barents Sea

S12-P5 **Tayler Clarke**
Climate-induced shift in living marine resources of shrimp trawl and small-scale fisheries in the Tropical Eastern Pacific

S12-P6 **Yi-Sin Lu**
Potential analysis of climatic change impact on the fishing condition of tuna longline fisheries in the Pacific and Atlantic Oceans

S12-P7 **Nan-Jay Su**
Development of abundance index for sailfish based on data from the Taiwanese tuna longline fishery in the Atlantic Ocean

S12-P8 **Paul Spencer**
Projecting the abundance of eastern Bering Sea walleye pollock from a climate and trophically enhanced stock assessment model

S12-P9 **Philip Underwood**
Results from a fisheries configuration of the Madingley General Ecosystem Model

S12-P10 **Sheng-Yuan Teng**
Potential impacts of climate change on the *Mugil cephalus* habitat in the northwestern Pacific under future RCP emission scenarios

S12-P11 **George Whitehouse**
Modelling the interacting effects of climate change and fisheries management on the eastern Bering Sea food web

S12-P12 **Michael Jacox**
From physics to fisheries: A social-ecological management strategy evaluation for the California Current Large Marine Ecosystem

S12-P13 **Maria Gasalla**
Climate change effects on fisheries-dependent communities of coastal Brazil

Session 13: Multiple stressors at multiple scales: ecosystem based management in the face of changing ocean conditions

S13-P1 **Abigail McQuatters-Gollop**
Developing pelagic biodiversity indicators for ecosystem-based management

S13-P2 **Suinyuy Derick Ngoran (for Anthony Banyouko Ndah)**
Response of phytoplankton functional groups to multiple simultaneous environmental stressors in the South China Sea

S13-P3 **Shallin Busch**
Sensitivity of California Current species to ocean acidification and climate change

S13-P4 **Xochitl Cormon**
How does scientific research support management of marine social-ecological systems prone to tipping points? A systematic review

S13-P5 **Jason Holt**
Competing physical processes mediating climatic impacts on shelf sea ecosystems around the world

S13-P6 **Cátia Figueiredo**
Lanthanum-exposure influences trace element accumulation, elimination, and oxidative stress in glass eels under a warming scenario

S13-P7 **Tiago Grilo**
Evidence of cue perception disruption in the European glass eel (*Anguilla anguilla*) migration under climate change

S13-P8 **Sezgin Tunca**
Game theory applications to Baltic Sea Multispecies and Multi-fleet fisheries under climate variability

S13-P9 **Michael Johnson**
Development of guidance for integrating climate change Information into NOAA Fisheries Habitat Conservation Division consultation processes in the U.S. Greater Atlantic Region

S13-P10 **Seema Balwani**
Approaches to utilizing indicators to improve understanding of climate change in the Pacific Islands

S13-P11 **Caihong Fu**
Ecosystem-level biological reference points under varying climate and ecosystem states

S13-P12 **Elliott L Hazen**
A dynamic ocean management approach to reduce bycatch in the California Drift Gillnet fishery

S13-P13 **Lauren Rogers**
Effects of climate and demographic change on spawn timing

S13-P14 **Chen-Yi Tu**
Fishing and temperature effects on the size structure of exploited fish stocks

S13-P15 **Saskia Otto**
Validating the performance of zooplankton as ecological state indicators - A European comparison

Session 14: Vulnerability and adaptation of marine socio-ecological systems to climate change

S14-P1 **Changhua Weng**
Socio-economic impacts of climate change on coastal fishing communities in the Eastern US: risk assessment and visualization

S14-P2 **Kelly Montenero**
Dry Tortugas National Park: Developing a fishery dependent survey as an indicator of marine protected area success

S14-P3 **Bryony Townhil**
Climate change and marine recreational fishing in Europe: Potential benefits and challenges

S14-P4 **Emily Farr**
Local ecological knowledge in managed fisheries: A Maine case study

S14-P5 **Katherine Mills**
Social-ecological vulnerability of Northeast U. S. fishing communities to climate change

S14-P6 **Jade Sainz**
Spatial planning of marine aquaculture under climate variability and change: A case study for mussel, finfish and kelp farms in California

S14-P7 **Yunlong Chen**
Assessing the vulnerability on fishes in the Yellow Sea and Bohai Sea

S14-P8 **Jonathan Hare**
Development of a vulnerability assessment for climate effects on the habitats of living marine resources

S14-P9 **Ching-Hsien Ho**
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W10-P1 **Thibaut de la Chesnais**
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