

## Report of the Physical Oceanography and Climate Committee

The Physical Oceanography and Climate Committee (POC) held two meetings by Zoom during PICES-2020, one on Sunday, September 28, 2020, and one on Tuesday, September 29, 2020. The meetings were chaired by Dr. Emanuele Di Lorenzo. Participants for both meetings are given in *POC Endnote 1*. Dr. Di Lorenzo welcomed members and self introductions were made. The draft agenda for both meetings was reviewed and approved and is included as *POC Endnote 2*.



Day 1 (pictured only) participants at PICES-2020.

### AGENDA ITEM 4

#### POC Topic Sessions at PICES-2020

POC-sponsored Topic Sessions:

- BIO/POC Topic Session VS5 (S5) on “*Atmospheric nutrient deposition and microbial community responses, and predictions for the future in the North Pacific Ocean*”; Convenors: Jun Nishioka (Japan), Guiling Zhang (China), Huiwang Gao (China), Kitack Lee (Korea), Santiago Gassó (USA), Maurice Levasseur (Canada)

Other sessions approved at PICES-2019 and scheduled for PICES-2020 were deferred until PICES-2021 due to COVID-19

### AGENDA ITEM 5

#### POC Best Presentation and Poster Awards

No early career scientist judging was done this year due to COVID-19.

**Relationships with other international organizations/programs**

**Argo** (Susan Wijffels)

- Nearly 4000 operational floats, starting to operate in polar areas (Arctic and seasonally ice-covered Southern Oceans);
- 23–24 countries contributing to Argo;
- Generally healthy array;
- Deployments have started to drop off around 2018 (dropped funding some places) but yearly lifetime of floats has increased so coverage is still OK for now;
- Some gaps during COVID time due to difficulty accessing ships, including research ships;
- Still spatial gaps in South Atlantic and waters off Africa; may soon have gaps in western, equatorial Pacific – may look to PICES to help;
- Ambitious future plan – 4700 float array, mixed floats (2500 normal floats, 1200 deep floats, 1000 BIO-Argo):
  - Doubling background core density in equatorial regions, western boundary currents,
  - Currently trying to put funding together for future plan,
  - Will need to prepare for COVID impact,
  - Invest and improve in technology (communication, sensors, satellite technology, restructured governance),
  - Roadmap for specialized missions while not impacting full array.
- Issues and concerns:
  - COVID-19 impacts,
  - Opportunity and threat to new BIO-Argo and deep Argo missions,
  - Excessive costs and low availability of BGC and deep sensors
    - Less reliability on one supplier
  - Deployment strategies to avoid floats clumping and achieve desired densities
  - Promote Argo beyond 2020

*Discussion/Questions*

- Dr. Trusenkova – How about possible drifts in BGC sensors?
  - A: - This is a big challenge. Work being done on oxygen optode – those must be air calibrated every cycle,
    - pH and optical sensors this is a big work in process,
    - Shipboard CTD cast with every deployment,
    - Find ways to use ocean as a calibration bath (*e.g.*, well-mixed nutrient rich areas).
- Dr. Mueter – Have the Arctic deployments been successful?
  - A: - This remains a big challenge because the Arctic is buoyant and still ice cover.
    - Status is that they are testing the ice avoidance, need to provide for multi-year storage on the float.
- Dr. Ito – What are Argo discussions for the UN Decade of the Ocean? Are resources available to Argo from UN Decade of Ocean?
  - A: - Yes, new Argo design will feed into many area of UN Decade of the Ocean.
- Dr. Rykaczewski – If we know a group is interested in supporting a BGC float, would that group have any input in the frequency and depth of sampling?
  - A: - Current target is a broadscale observing system. Intent is that BGC floats will stay on a 10-day cycle. Changes take away from broadscale mission,
    - People interested in different missions can partner with national Argo groups to find solutions.
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- Dr. Santos – What about capacity building for developing nations through Argo?  
A: - Many developing nations have helped with Argo deployments and this is an essential contribution.
- Dr. Hasegawa – Can glider communities collaborate with Argo?  
A: - These are highly complementary initiatives so there is a lot we can do together to understand dynamic regions, sensor testing, *etc.*  
- There are members of the glider community on Argo sensor task team.
- Dr. Li – What is the specific plan to assess the needs and issues of each nation for Argo deployment due to COVID-19, and the plan to enhance the cooperation with regional observing systems on this?  
A: - No clear plans in place yet. But discussions are happening.  
- For the Atlantic, much more active deployment planning crew. Reaching out to ship operators.

#### **SOLAS** (Jun Nishioka)

- Topic Session S5 will be at PICES-2020, with 29 oral/poster presentations;
- SOLAS summer school coming 2021, but is COVID-dependent;
- SOLAS Open Science Conference, Cape Town, South Africa, planned for September 25–30, 2022;
- Other multiple upcoming events still planned despite COVID-19

#### *Discussion/Questions*

- Dr. Lobanov – How many students and what are the dates for the Summer School?  
A: - June 7–18, 2021; number of students around 50–80;  
- If cannot do face-to-face Summer School, will likely have an online version.

#### **CLIVAR** (Sonya Legg, Chair of SSG)

- Overview of CLIVAR’s mission;
- Two main research foci:
  - Eastern Boundary Upwelling Systems,
  - Tropical Basin Interaction,
  - Regional sea-level change (with World Climate Research Programme).
- WCRP is undergoing a change, new mission and vision with focus on climate change system;
- Focus is now on how do we implement these changes
  - There’s a possibility that the 4 core WCRP projects will be extended to 6 (with 2 new projects) that are brought together by lighthouse activities.
- Draft lighthouse projects:
  - Safe climate landings,
  - My Climate Risk,
  - Explaining and predicting earth system change,
  - WCRP Academy,
  - Digital Earths
- Opportunities to get involved in lighthouse projects:
  - Regional town halls to get input from research community,
  - Lighthouse Activity Task Team,
  - Timeline – consultation process until 2022

#### *Discussion/Questions*

- Dr. Di Lorenzo – Lighthouse set of groups were not very clear. In particular, what does Digital Earths mean?  
A: - not much info yet; so far there is a 2-pager. Still not known who will do this because WCRP’s role is coordination. If questions or concerns, then you can sign up to provide your feedback to WCRP.

## POC – 2020

- Dr. Jang – What is WCRP Academy? Is these only online activities or also in-person activities?  
A: - It's to include summer schools, tutorials, training sessions but also gather all of the material out there and give it a WCRP stamp of approval, *e.g.*, What climate information should you use?
- Joint activities between CLIVAR and PICES
  - WG 40 is preparing a special issue in *Frontiers of Marine Science*,
  - CLIVAR has had past collaboration with PICES WGs,
  - Potential for a marine heatwaves working group,
  - Workshop,
  - ITCP Summer School on “Theory, Mechanisms and Hierarchical Modelling of Climate Dynamics” in 2019,
  - Virtual tropical basin interaction meetings scheduled for February 2021,
  - Summer school 2021 – tropical oceans,
  - Multi-regional panel workshop – virtual meeting in 2021, in person in 2022,
  - Summer school 2021 – macroturbulence,
  - October 2021 – ocean heat, freshwater storage and transport in models.

### *Discussion/Comments*

- Dr. Di Lorenzo comment – collaboration with CLIVAR scientists has been great and beneficial to PICES
  - Large gap in downscaling at regional scales that make sense; this will be part of My Climate Risk.

## ESSAS (Franz Mueter)

- One of the goals for us is to possibly identify a Physical Oceanographer with knowledge of the Arctic (ideally from Russia) to join the ESSAS SSC. We may also issue a broader invitation to the scientific community;
- ESSAS is a comparative study and IMBeR regional study;
- Current working groups:
  - Paleo-ecology,
  - Bioenergetics of fishes,
  - Natural analogues of Arctic Rapid Transition,
  - Human Dimensions
- Generally have an annual meeting at IMBeR;
- Fisheries focused;
- Many products (*e.g.*, special issues) are relevant to PICES committees (POC, HD, FIS, FUTURE);
- Is contributing to PICES WG 39 and WG 44

### *Discussion/Questions*

- Dr. Yury Zuenko – Did you ask for candidate from St. Petersburg research institute?  
A: - Drs. Mueter and Zuenko will discuss later.

## Asia Pacific Network (APN) (Gen'ichiro Tsukada)

- APN just finished its 4<sup>th</sup> strategic period (2015 to 2020);
- Contributes to IPCC, UNFCCC, IPBES

### *Comments/Discussion/Questions*

- Linda Stevenson – APN engages with PICES directly. However there has never been a direct research proposal submitted from PICES.
  - Need to strengthen APN and PICES activities; perceived weakness between APN and PICES,

- Possibly link through early career scientists?
  - Links with UN Decade of the Ocean,
  - Marine biodiversity and ecosystems,
  - APN is currently drafting 5<sup>th</sup> strategic plan stage (2020 to 2024),
  - APN funded-remote sensing conference, upcoming post-COVID; November launch of call for proposals for 2021.
- Dr. Batchelder – Can APN fund people to attend PICES Early Career Scientist Conference in eastern Canada?  
A: - Yes, PICES can apply for funding for early career scientists from APN countries to attend this conference.
  - Dr. Santos – I did not see any members from Latin America in APN, many of the research interests of APN are very relevant to this region. Why is the reason for this?  
A: - Inter American Institute (IAI) global change focuses on similar thematic areas and covers Latin America.
  - Dr. Di Lorenzo – Include a PICES person in APN upcoming plans. Focus on early career scientists and capacity building. PICES weakness in carrying on synthesis work across working groups. Is this a place for early career scientists or PhD/ postdoc positions?
  - Dr. Bograd – PICES is beginning to strategize about our engagement in the UN Ocean Decade, via the FUTURE science program. We are preparing a Study Group to coordinate this and hope to reach out to our network of collaborators. Would love to collaborate with APN on this!

#### **OceanSites** (SungHyun Nam)

- [www.oceansites.org](http://www.oceansites.org)
- Eulerian version of Argo – collect and share data from fixed locations in oceans;
- Includes sites in shallow seas;
- Long continuous time series of biological, chemical and physical data;
- Meeting every 18 months (most recently September 2020), all presentations online at [https://jcomm.info/index.php?option=com\\_oe&task=viewEventAgenda&eventID=2562](https://jcomm.info/index.php?option=com_oe&task=viewEventAgenda&eventID=2562).

#### *Discussion/Questions/Comments*

- Dr. Jackson – What kind of levels of quality control are there on the Ocean Site data?  
A: - Different levels of data but QA/QC data available through website, data freely available.
- Dr. Capotondi – It seems that in the tropical Pacific what you have is the TAO/TRITON array. Or are there other data in that region?  
A: - There are more sites than just TAO/TRITON in the North Pacific.
- Dr. Ito – OceanSITES was supported by JCOMM, but JCOMM was ended. So, my guess is now it is FOO (Framework for ocean observing process) under IOC.  
A: - Yes, JCOMM ended and changed to ocean obs but will continue to provide service to community under IOC.

#### AGENDA ITEM 7

#### **POC Action Plan**

The POC Committee had two 1-hour sessions and completed a new 3-year action plan (see *POC Endnote 3*). During the first session, breakout groups were asked to compile a set of action and tasks for each of the PICES 6 strategic goals. In the second session, breakout groups synthesized the results from each of the goals. Below are some executive summaries.



**POC action plan revealed by words**

*Action Items, Breakout Groups Discussion, Day 1*

**Group 1: Jennifer Jackson**

Future action plan: Possibly form collaboration with WESTPAC (one of regional groups of the IOC), PICES and APN

- Discussion:
  - In eastern Pacific collaboration between WESTPAC with USA and Canada is strong for carbon
  - In western Pacific, collaboration in that is biologically focused but physics and chemistry collaboration could use some work
- There was a joint workshop organized between WESTPAC and PICES in Tokyo, 2019
  - Need for data and science circulation (open data?)
  - Project between PICES and WESTPAC, submit to APN for funding (not just with POC, other committees too)
  - Research questions – BGC, carbon science, ecosystem reaction to future climate change, marine heatwaves
  - NOWPAP (Northwest Pacific Action Plan of UNEP) collaboration as well? – China, Japan, Korea, Russia
  - GOOS regions – Northeast Asian regional observing system
  - UN Decade of the Ocean – good moment to force the collaboration; PICES and APN could try to use potential of this program
  - There are many organizations – who is doing what. How do we use these different organizations efficiently?
  - Possible Action item: joint WESTPAC, NOWPAP, APN, PICES session at PICES-2021 on Western Pacific marine heatwaves.
  - Potential joint topic is coastal – open ocean interactions throughout the North Pacific and how they link with climate change (circulation, freshwater, nutrients, links to ecosystems). Link with CLIVAR’s MyOcean?

Paragraph summary of discussion:

There seems to be many different organizations that are studying and operating regionally and globally throughout the North Pacific Ocean. It is often difficult to know who is doing what! We suggest that we encourage collaboration between PICES and the known organizations (WESTPAC, NOWPAP, APN, CLIVAR, PACON, IOC, UN Decade for the Ocean). One mechanism to do this is through a joint session or working group. Possible topics for this are i) marine heatwaves in the western Pacific or ii) coastal-open ocean interactions throughout the North Pacific and how they link with climate change (e.g. circulation, freshwater, nutrients and ecosystem changes).

Facilitate partnerships with organizations and programs, within and outside of PICES, with interests in understanding North Pacific climate processes and impacts.

Participate in and contribute to organization of scientific fora to promote North Pacific climate research.

- Does Sonya Legg's new WCRP include all of POC's goals? Impacts of MHWs in coastal zone
- APN interested in providing funds

### **Group 2: Jim Christian**

Ocean heat waves was widely considered to be a topic around which new topic sessions, workshops, or EGs might be organized. These could provide opportunities to expand interdisciplinary activities by being explicitly 'end-to-end', including physical climate, biogeochemistry, higher trophic levels, and human dimensions.

It was suggested that we need a compelling justification in terms of societal relevance for some programs, such as BGC-Argo. PICES should partner with other international organizations to make sure this information is available to decision-makers (APN, GOA-ON, UN Ocean Decade were suggested as potentially relevant partners here).

It was suggested that some aspects of the Plan (e.g., goals 2 and 3), could be strengthened by being more specifically oriented to the POC contributions to these goals, rather than making it sound like we are responsible for the broader overarching goal.

Goal 6 in the Action Plan could be facilitated by making sure that physical oceanographers and other young scientists within the POC purview have opportunities to participate in fora such as the ECS forum and the SOLAS Summer Schools.

### **Group 3: Daisuke Haesegawa**

The summary of Group 3 (please modify the following paragraphs as needed):

- (1) We discussed POC mission statement particularly in addition to previous edits via email correspondences. It is so broad statement and questionable whether we need to specify the temporal and spatial scales of processes. If necessary, it can be more inclusive by modifying "submesoscale" to "microscale" to consider spatial scales of turbulent processes, and probably "sub-seasonal" to "high-frequency (diurnal/semidiurnal and even higher frequency)" as turbulent mixing due to breaking of internal waves and other high-frequency processes are relevant to spatio-temporally varying eddy viscosity and ultimately ocean circulation and climate variability. One alternative is not to specify the scales of process but just state "basin-to-local/regional scales".
- (2) We agreed to include "other PICES partners" for Goal 1.
- (3) "Dynamic and statistic regional downscaling techniques" would be important to be included in the Goal 2 statement.
- (4) Second item of Goal 3 needs to be separated into two different statements; A) understanding the drivers, impacts, and predictability of extreme events, and B) diagnosing the link between coastal ecosystem and large-scale/regional-scale climate with a focus on multi-scale processes. We believe the point B) is important to consider the gap in coastal and open ocean interaction processes. The point A) needs to be emphasized independently from the point B).
- (5) Goal 4 is very good and we think it can be improved if few more words are incorporated; "data assimilation and downscaling techniques" into first item, and "collaboration with international observers" into third item.
- (6) Goal 5 is also very good and may be better if "public outreach" beyond the broader scientific community can be considered.
- (7) We appreciate the Chair's great leadership for POC!

#### **Group 4: Hiromichi Ueno**

Goal 2 (underlined: the same as the draft)

It is important for POC to focus on (*i.e.*, organize new WG/SG) understanding the drivers, impacts and predictability of extreme events including not only warm events but also cold events, and diagnosing the links between coastal ecosystems and large-scale climate with a focus on multi-scale processes. Collaborations with OceanSITES (long-term data) and Argo (worldwide subsurface data over 20 years) are very important to understand the extreme events.

Goal 6

It is important for POC to contribute to capacity building for early career scientists (ECS). One suggestion for this purpose is appointing ECS to WG members preferentially. POC/PICES also should consider capacity building for ECS from developing countries. One possibility is funding those who attend PICES ECS events from developing countries. Another possibility is creating a framework for ECS from developing countries to work with PICES members; for example, appointing ECS from developing countries to WG associate members.

#### **Group 5: Fangli Qiao**

The summary of Group 5 (please modify the following paragraph as needed):

- (1) Our observation technique and scientific understanding on turbulence, mesoscale and sub-mesoscale are still quite limited, which is the key to improve ocean and climate models. So, it should be the time to set up a working group on turbulence, mesoscale and sub-mesoscale.
- (2) Although lots of scientific progresses on climate change research, the high-resolution climate model results or downscaling products, not only physical but also chemical and biological, are still urgently needed for serving the people all over the world. Capacity building needs enhanced.
- (3) For better serving the people, spatial planning and integrated coastal management are two main areas we should provide scientific information for.

*Action Items, Plenary Group Discussion, Day 2*

Climate extremes – 2 synergistic working groups (include those from WG 36, 40, 41). Target: November 2020 deadline from APN to provide funding for postdocs that work between the 2 working groups.

- Arrange short telecom between members of POC and WG 36 and 40 (?) to get the ball rolling to start working on proposals;
- General support from POC members to write proposal for 2 different WGs though there was been a lack of interdisciplinary research in WG 40;
- Social-ecological working group (what parameters matter);
- Predictability and modeling group;
- Or? Is one large WG better with postdoctoral individuals assigned as link between disciplines;
- Narrow research topic is needed to get things done;
- Study group to write the proposal for working group?
- Retarget draft plan from 2020 climate extreme sessions?

#### AGENDA ITEM 8

#### **ExGs progress reports, future plans and requests**

#### **S-CCME: Joint PICES/ICES Section on *Climate Change Effects on Marine Ecosystems (2012–continuing)* (Shin-ichi Ito)**

- New Co-Chair/PICES is Dr. Kirsten Holsman (USA), succeeding Dr. Jackie King (Canada) who stepped down;
- Working on Phase 4 Implementation Plan – several activities relevant for the UN Ocean Decade;
- IPCC WG II Lead Authors' Third Meeting January 26 to February 1, 2020, Faro, Portugal;
- 4 S-CCME members attended;



- Second Order draft of chapters due November 6, 2020;
- A new PICES/ICES Working Group on *Impacts of Warming on Growth Rate and Fishery Yields* (WG 45) kicked off its first meeting in September 2020 via Zoom.
  - S-CCME member, Dr. Ito (Japan), is the Co-Chair of the WG,
  - Starting a 6-month Implementation Plan based on its 4 main terms of reference,
  - Members have collected metadata on 121 stock sizes and plans to expand database.
- New EU H2020 project – FutureMARES
  - ICES SICCOME member, Dr. Myron Peck (Netherlands) is leading the project.
- IPCC WGII AR6 Lead Authors' Fourth Meeting scheduled for March 1–7, 2021, location TBD;
- MSEAS 2020 – postponed to May 2021, Yokohama, Japan
  - S-CCME member, Dr. Alan Haynie (USA) is a member of the MSEAS SSC.,
- SNAPP (Science for Nature and People Partnership): Climate Resilient Fisheries Working Group
  - Anne Hollowed (PICES); William Cheung (ICES); Myron Peck (ICES), Manuel Barange (ICES) belong to the group.
- ICES 2020 Annual Science Conference is postponed from 2021, Copenhagen, Denmark.

#### *S-CCME requests to POC*

- Addition of a Russian member from FIS, BIO, or POC (Dr. Ustinova reported that Russia has identified someone, and is awaiting for final approval);
- Feedback and approval on Phase 4 Implementation Plan;
- 1-day meeting at PICES-2021.

#### *Discussion*

- Dr. Di Lorenzo – Who in the S-CCME group are good contacts to help with ICES/PICES/UN Ocean Decade collaboration effort?
  - A: There is likely to be a UN Ocean Decade Study Group linked to S-CCME.
- Dr. Di Lorenzo – Can S-CCME use this to expand to include Southern Hemisphere countries?
  - To be discussed further.

#### **S-CC: Section on Carbon and Climate**

- Large change in membership in 2020: Dr. Wiley Evans (Canada) and Dr. Samantha Siedlecki (USA) are new members; Dr. Geun-Ha Park replaced Dong-Jin Kang (Korea) and Dr. Xianghui Guo replaced Dr. Minhai Dai (China);
- 2020 activities:
  - ICES/PICES Theme Session on “*Taking stock of ocean acidification research for provision of future efforts*” at ICES 2020 ASC is postponed to 2021,
  - SOLAS co-sponsored Topic Session (VS5) on “*Atmospheric nutrient deposition and microbial community responses, and predictions for the future in the North Pacific*” was held at PICES-2020
  - PACIFICA database delivery to be corrected/improved,
  - Attempting to get funding for inter-comparison of pH and  $p\text{CO}_2$  sensors for PICES countries,
  - New program to construct data inventories of pH and ocean coastal monitoring,
  - Proposal to submit a 1-day Topic Session on “*Connecting knowledge of ocean deoxygenation in coastal and offshore regions of the North Pacific*” for PICES-2021 (see 2020 S-CC report).

#### *S-CC request to POC*

- Approval of Topic Session proposal for PICES-2021
- Request \$10,000 support for students to attend SOLAS Summer School
  - POC supports funding for one or two students.

#### *Discussion*

- Dr. Di Lorenzo – In future, Science Board is thinking about what can be done next? Can PICES contribute to sphere or ocean solutions (*e.g.*, ocean for carbon sequestration)? Could there be a session at PICES-2021 for this?

## POC – 2020

- A: S-CC would need geoengineering experts to accomplish this; will discuss at its upcoming meeting.
- Dr. Zuenko – Is \$10,000 support for several scientists or for one?
  - A: Support for several students.
- Dr. Christian – What about atmospheric deposition of nutrients as topic session for next year?
  - A: Currently unknown.

## **WG 38: Working Group on Mesoscale and Submesoscale Processes (Nov. 2016 – Oct. 2019)** (Hiromichi Ueno)

- Current status is writing the final report.

### *Discussion*

- Dr. Zhou – Are modeling results included in report?
  - A: Not currently.
- Dr. Lobanov – What are future plans for this group?
  - A: Group had planned to study regional differences for submesoscale processes using MITGCM but this was not possible.
- Dr. Legg – What will happen to final report?
  - A: A paper that is ready for publication though there are still some problems with names.

## **WG 40: Working Group on Climate and Ecosystem Predictability (Jul. 2017 – Oct. 2020)** (Masami Nonaka)

- WG 40 held its September 2020 remote meeting to discuss papers for a special issue in *Frontiers in Marine Science* and to discuss the next steps
  - Special issue has 10 submitted manuscripts; 8 already accepted.
- Topic Session on “*Predictions of extreme events in the North Pacific and their incorporation into management strategies*” scheduled for PICES-2020 has been postponed to 2021.

### **WG 40 request to POC**

- A 1-year extension to write perspective paper, expand discussions on key questions and contributions, help start new working group (POC approved this request and will submit to Science Board).

### *Discussion*

- Dr. Legg – what does it involve to have a 1-year extension?
  - A: No financial request but several remote meetings and discussions, ability to host additional topic session.

## **AP-CREAMS: Advisory Panel for a CREAMS/PICES Program in East Asian Marginal Seas (Oct. 2005 - continuing)** (Vyacheslav Lobanov)

- Ongoing since 2005; Terms of Reference revised in 2019; main job is to enhance collaboration in East Asian Marginal Seas, including data sharing, workshops, capacity building;
- Would like to welcome a person from Canada;
- Debating whether should expand study area further south;
- Normally have 2 meetings per year; this year meetings were online, in July and September;
- Want to increase collaboration with other organizations;
- Three regional cruises in 2019–2022;
- Summer School on Ocean Turbulence was postponed due to COVID-19;
- EAST II report on “Oceanography of the Yellow and East China Sea” is finished;
- Future plans are to:

- Broaden scope in accordance with SEES (to include socio-economics aspects (HD), AP-CREAMS recommends collaborating with NOWPAP and IMBeR, and inviting HD members (e.g., Dr. Jongseong Ryu) to participate in AP-CREAMS,
- Improve communication with other PICES Committees (review by another Committee might help highlight how our science could be relevant to issues for broader disciplines),
- Closer collaboration with other international organizations (joint efforts to implement main AP-CREAMS ToRs with NOWPAP, IMBeR, WESTPAC; provide data requested by other organizations/programs (e.g., more biological data in CREAMS cruises for CREAMS),
- Contribute to UNDOS (UN Decade Ocean Science) (focus CREAMS research on 6 goals of UNDOS),
- Enhance/make better use of the AP-CREAMS webpage (information on upcoming/past cruises, metadata on past cruises, ETSOs),
- Establish a CREAMS database (to be discussed with TCODE),
- Continue promoting joint cruises (develop a program of coordinated cruises),
- Publish a special issue/report on 30 years of CREAMS in 2023–2024,
- Hold workshops (modelling and observations of the Asian Marginal Seas: current challenges and expeditions),
- Hold training courses (Ocean turbulence (2021, China); Satellite remote sensing 2021 (NOWPAP); develop joint courses with IMBeR, GEOTRACERS, etc. in future),
- Next meeting scheduled for February–April 2021, Vladivostok, Russia, face-to-face or online to continue discussions on new ToRs, broadening scope towards UNDOS goals.

#### *AP-CREAMS requests to POC*

- Funding for Summer School on Ocean Turbulence for 2021 (\$9000) for travel and lecturers (postponed from 2019/2020);
- Funding for a Training Course remote sensing for 2021 (\$15,000) for travel and lecturers (postponed from 2019/2020)
  - POC was supportive of the Summer School on Ocean Turbulence.

#### *Discussion*

- Dr. Di Lorenzo – What is the amount of funds that the Summer School has already secured?
  - A: \$10,000
- Dr. Jang – Can PICES support a lecture fee?
  - A: It is not the goal of PICES to support travel or honorariums of faculty.
- Dr. Batchelder – It is likely that PICES can only support 1 Summer School in a year so recommends POC rank the Summer School proposals.

#### AGENDA ITEM 9

#### **New proposals for ExGs, meetings, workshops, symposia, conferences**

See <https://www.dropbox.com/sh/63ypfunnlqf3g3z/AACuB79IQoCKBDfiUO6IAxK6a?dl=0> for proposals on:

- An AP-CREAMS Summer School on Ocean Turbulence;
- AP-CREAMS/NOWPAP Training Course on Remote Sensing Data Analysis;
- Topic Session on “*Connecting knowledge of ocean deoxygenation in coastal and offshore regions of the North Pacific*” for PICES-2021;
- SOLAS Summer School 2021 in Cabo Verde;
- WG proposal on “*Submesoscale Processes and the Marine Ecosystem*” (presented by Dr. Yisen Zhong) (*POC Endnote 3*).

POC was generally in favor of supporting this group.

## POC – 2020

### AGENDA ITEM 10

#### POC Action Plan –Action Items for 2020/21

See *POC Endnote 4*.

### AGENDA ITEM 11

#### Other business

None.

#### *POC Endnote 1*

#### POC participation list

##### Members

Emanuele Di Lorenzo (USA, Chair)  
Yury Zuenko (Russia, Vice-Chair)  
James Christian (Canada)  
Charles Hannah (Canada)  
Jennifer Jackson (Canada)  
Fangli Qiao (China)  
Lei Zhou (China)  
Daisuke Hasegawa (Japan)  
Hiromichi Ueno (Japan)  
Shin-ichi Ito (Japan)  
Chan Joo Jang (Korea)  
Joon-Soo Lee (Korea)  
SungHyun Nam (Korea)  
Vyacheslav Lobanov (Russia)  
Elena Ustinova (Russia)  
Steven Bograd (USA)  
Jerome Fiechter (USA)

##### Members unable to attend

China: Fan Wang

##### Observers

Antonietta Capotondi (USA, WG 40 CLIVAR Co-Chair)  
Charles Hannah (Canada)  
Alex Kozyr (USA, S-CC Co-Chair)  
Sonya Legg (CLIVAR)  
Jing Li (China)  
Franz Mueter (ESSAS)  
Jun Nishioka (SOLAS)  
Masami Nonaka (Japan, WG 40 PICES Co-Chair)  
Tsueno Ono (Japan, S-CC Co-Chair)  
Ryan Rykaczewski (USA, WG 40 CLIVAR Co-Chair)  
José Luis Santos (CLIVAR)  
Linda Stevenson (APN)  
Onot Suneo (Japan)  
Olga Trusenkova (Russia)  
Gen'ichiro Tsukada (APN)  
Susan Wiffjels (Argo)  
Liping Yin (China)  
Yisen Zhong (China)

##### PICES

Harold (Hal) Batchelder (Deputy Executive Secretary)

#### *POC Endnote 2*

#### POC meeting agenda

*Sunday, September 28, 4:00pm–7:00pm Pacific Time*

1. Welcome and introductions
2. Membership updates
3. Changes to, adoption of, agenda and appointment of rapporteur
4. POC Sessions at PICES-2020
5. POC Best Presentation and Poster Awards, Early career judgment for POC

6. International observers – presentation and updates
  - Argo
  - CLIVAR (Sonya Legg, Chair SSG)
  - SOLAS
  - ESSAS
  - APN
  - OceanSITES
7. Review of POC Action Plan
  - Overview of Plan by POC Chair
  - Updates from POC members
  - Draft of Action items for 2020-21

*Tuesday, September 29, 4:00pm–7:00pm Pacific Time*

8. ExGs Progress Reports and future plans of POC active groups
    - S-CCME: Joint PICES/ICES Section on Climate Change Effects on Marine Ecosystems (Jan 2012–2017, still continuing)
    - S-CC: Section on Carbon and Climate (Oct 2003–2016, still continuing)
    - WG 38: Working Group on Mesoscale and Submesoscale Processes (Nov 2016–Oct 2019, final report discussion)
    - WG 40: Working Group on Climate and Ecosystem Predictability (Jul 2017– Oct 2024)
    - AP-CREAMS: Advisory Panel for a CREAMS/PICES Program in East Asian Marginal Seas (Oct 2015–Oct 2024, renewed)
    - WG 46: Joint PICES/ICES Working Group on Ocean Negative Carbon Emissions (ONCE) (Oct. 2019–Oct. 2022)
  9. New proposals for ExGs, meetings, workshops, symposia, conferences
    - Proposal for new PICES ExGs (e.g. WG, SG, Sections)
    - Ranking of PICES-2020 proposals
  10. POC Action Plan –Action Items for 2020/21
  11. Other business
- Adjourn

### ***POC Endnote 3***

#### **Proposal for a Working Group on “Submesoscale Processes and the Marine Ecosystem”**

#### **Motivation**

To improve the understanding on ocean physical processes that relate to living marine resources is one of the main goals of POC. To this end, much effort has been made towards ocean mesoscale dynamics and its impact on marine ecosystem, while the submesoscale processes, of one or two orders smaller in spatial scale, have received comparatively little attention. Submesoscale processes are relevant to ocean primary productivity because they support large vertical velocity with timescales similar to the phytoplankton growth, which will ultimately influence the upper trophic levels and food chain.

This new group will aim to improve our essential knowledge on the submesoscale processes by integrating the submesoscale-permitting observation dataset, and by developing and evaluating a high-resolution coupled model in the North Pacific, particularly in the coastal areas and other areas with important living resources. The establishment of this group helps address the FUTURE goal on the variability of marine ecosystem under natural and anthropogenic forcings across scales. The study group will also develop tight collaboration with national and international work groups and promote more studies on this topic.

## Terms of Reference

1. Review the recent progress on the submesoscale observation techniques and model skills in the North Pacific;
2. Review the current studies on ocean submesoscales and their role in the marine ecosystem in the North Pacific;
3. Identify how and which submesoscale processes interact with local marine ecosystems in the regional areas;
4. Evaluate the integrated effect of submesoscale physics on ocean primary production in the North Pacific;
5. Promote the national research on ocean submesoscales and international collaboration with worldwide experts.

## POC Endnote 4

### POC Action Plan 2019–2022

#### POC Mission Statement

*To promote and coordinate research and facilitates exchange of information and data on the impacts of ocean climate variability and change on living marine resources and human societies, on scales ranging from sub-seasonal to millennial and sub-mesoscale to basin-scale.*

#### **Goal 1: Foster collaboration among scientists within PICES and with other multinational organizations**

- Coordinate research and communication among international organizations and programs focusing on climate-ecosystem interactions, including CLIVAR, PACON, WESTPAC, and IOC through implementation of the UN Decade of Ocean Science.
- Facilitate partnerships with organizations and programs, within and outside of PICES, with interests in understanding North Pacific climate processes and impacts.
- Participate in and contribute to organization of scientific fora to promote North Pacific climate research.

#### **Goal 2: Understand the status and trends, vulnerability and resilience, of marine ecosystems**

- Promote coordinated activities dedicated to understanding physical and chemical processes in the North Pacific, their impacts on ecosystems, and their current status and trends.
- Facilitate the development of modeling frameworks to improve climate and ecosystem predictability, and guide research and communication about the drivers and impacts of extreme events.
- Communicate the status and trends of North Pacific climate conditions to the PICES and broader scientific communities.

**Goal 3: Understand and quantify how marine ecosystems respond to natural forcing and human activities**

- Lead PICES efforts for improving understanding and advancing predictability of North Pacific climate variability and change, through guidance of collaborative research projects, parenting of Expert Groups, and organizing sessions and workshops.
- In the near term, a research focus is on understanding the drivers, impacts and predictability of extreme events, and diagnosing the links between coastal ecosystems and large-scale climate with a focus on multi-scale processes.

**Goal 4: Advance methods and tools**

- Advance the development of regional to basin-scale models of North Pacific physics and biogeochemistry, including seasonal forecasts and multi-decadal projections.
- Develop modeling toolkit to facilitate research and operational forecasts throughout the North Pacific.
- Contribute to the training of early career scientists on the development and use of models.
- Promote advanced observational technologies and the rapid dissemination of data to the PICES community and other stakeholders.

**Goal 5: Provide relevant scientific information pertinent to North Pacific ecosystems that is timely and broadly accessible**

- Provides data, products and information on North Pacific oceanographic conditions and climate variability and change to the PICES and broader scientific community through peer-reviewed publications and other PICES communication outlets.
- Contribute to a publication of a special journal issue on North Pacific climate and ecosystem predictability, the North Pacific Ecosystem Status Reports, and contribute to other special issues on emerging issues of interest to PICES.

**Goal 6: Engage with early career scientists to sustain a vibrant and cutting edge PICES scientific community**

- Promote the engagement of early career scientists in the work and leadership of POC and PICES, including the organization of Summer Schools on ocean processes, climate variability and change, methods of ocean modeling and observing, data analysis and management, and impacts of extreme events.
- Work through NEAR-GOOS, SOLAS and other PICES partners to support the participation and involvement of young scientists in PICES meetings and projects.
- Support and participate in the creation of a professional development program for early career scientists within PICES.