

Report of WG40

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Outline:

Research Topic on Frontiers in Marine Science (working group final report)
Looking Back: How was the PICES-CLIVAR joint WG created.

Working Group 40: Climate and Ecosystem Predictability

Acronym: WG 40

Parent Committee: [POC](#)

Parent Program: [FUTURE SSC](#)

Term: Jul. 2017- PICES-2020

Extended

at PICES-2020 until PICES-2021

Final Product TBA

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CLIVAR Co-Chair: Dr. Ryan Rykaczewski (CLIVAR; USA) ryan.rykaczewski@noaa.gov

Research Topic

North Pacific Climate and Ecosystem Predictability on Seasonal to Decadal Timescales

Topic Editors



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Ryan Rykaczewski
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13 articles

One paper is under review.

After that paper accepted, we will submit our editorial paper, which conclude the research topic.

<https://www.frontiersin.org/research-topics/12240/north-pacific-climate-and-ecosystem-predictability-on-seasonal-to-decadal-timescales>

ORIGINAL RESEARCH

Published on 29 Jul 2020

Predictability of Species Distributions Deteriorates Under Novel Environmental Conditions in the California Current System

Barbara A. Muhling · Stephanie Brodie · James A. Smith · Desiree Tommasi · Carlos F. Gaitan · Elliott L. Hazen · Michael G. Jacox · Toby D. Auth · Richard D. Brodeur

doi 10.3389/fmars.2020.00589

5,390 views **16** citations

ORIGINAL RESEARCH

Published on 14 Jan 2021

Marine Heatwave of Sea Surface Temperature of the Oyashio Region in Summer in 2010–2016

Toru Miyama · Shoshiro Minobe · Hanako Goto

doi 10.3389/fmars.2020.576240

4,752 views **10** citations



ORIGINAL RESEARCH

Published on 30 Sep 2020

Atmospheric-Driven and Intrinsic Interannual-to-Decadal Variability in the Kuroshio Extension Jet and Eddy Activities

Masami Nonaka · Hideharu Sasaki · Bunmei Taguchi · Niklas Schneider

doi 10.3389/fmars.2020.547442

2,349 views **7** citations

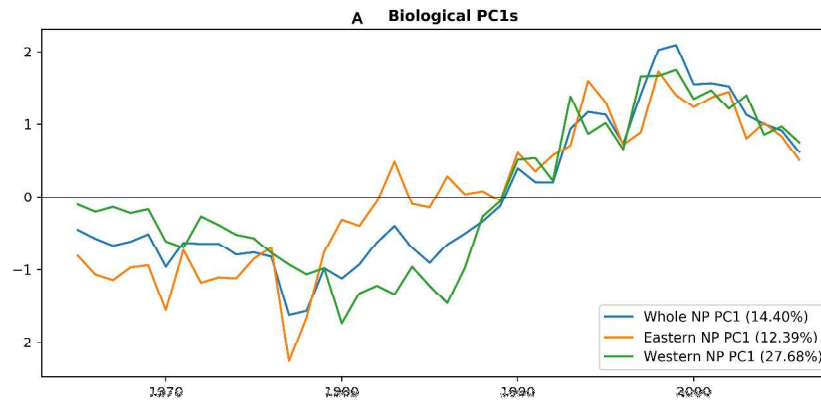
Mentioned in WG49 background.

Marine Ecosystem Variations Over the North Pacific and Their Linkage to Large-Scale Climate Variability and Change

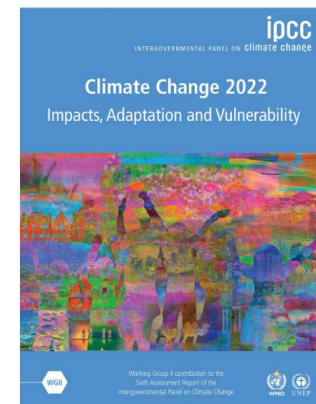
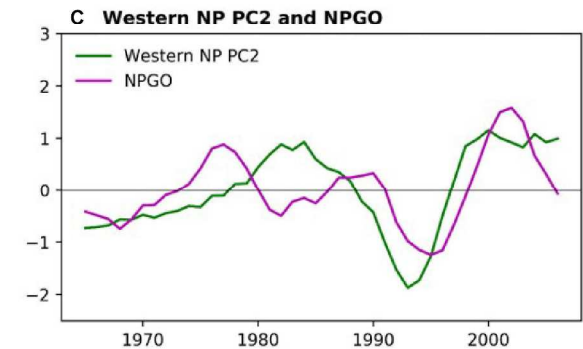
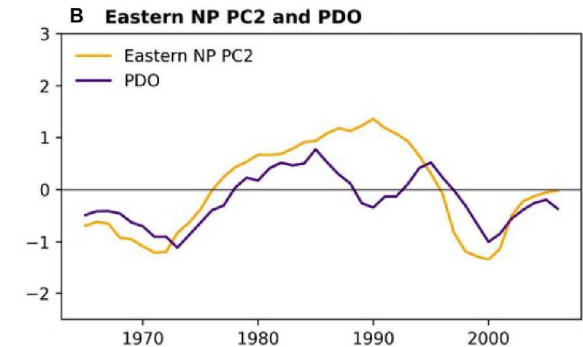
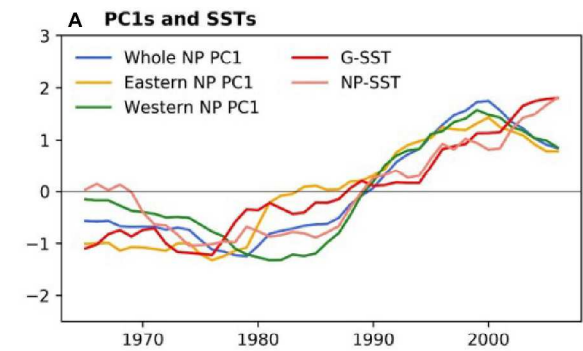
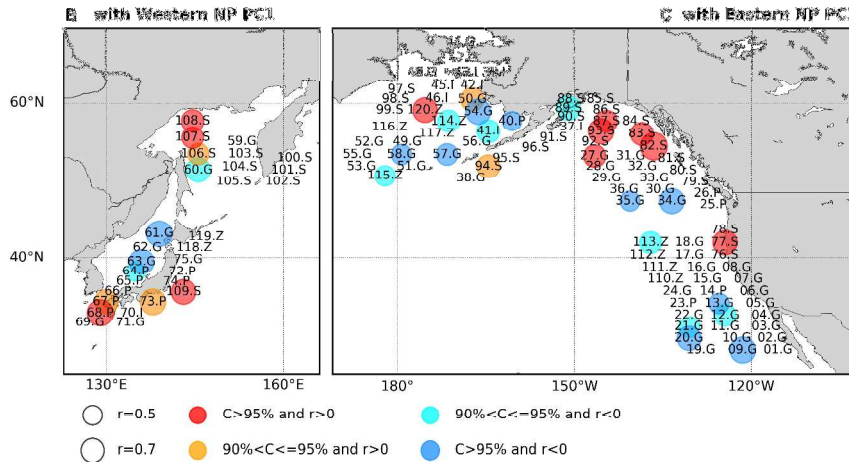
Emi Yati · Shoshiro Minobe ·
Nathan Mantua · Shin-ichi Ito ·
Emanuele Di Lorenzo

<https://doi.org/10.3389/fmars.2020.578165>

- We have analyzed biological indicators from both eastern and western basins
 - Previous studies used only eastern or western basin indicators.
- We have found the first mode is closely related to the global warming, rather than PDO.



Correlation of Biological Time Series with 5-Year Running Averages



Cited by IPCC-AR6 WG2.

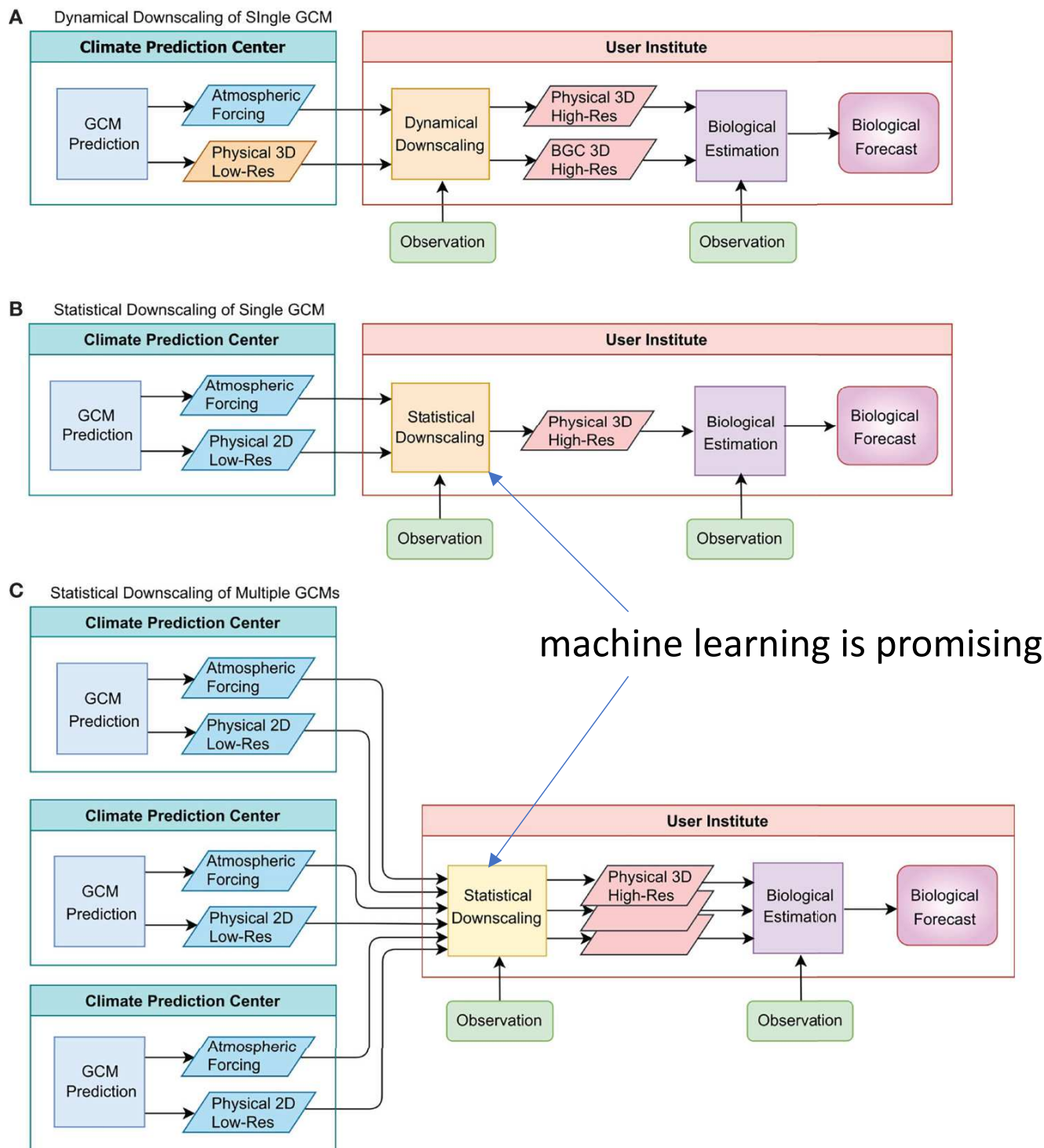
WG's Perspective paper 1/2

Toward Regional Marine Ecological Forecasting Using Global Climate Model Predictions From Subseasonal to Decadal Timescales: Bottlenecks and Recommendations

Shoshiro Minobe · Antonietta Capotondi · Michael G. Jacox · Masami Nonaka · Ryan R. Rykaczewski

<https://doi.org/10.3389/fmars.2022.855965>

We discussed how to use already-existing activity of subseasonal, seasonal and decadal climate predictions for marine ecological forecasting.



WG's Perspective paper 2/2

Project Name	SubX ¹³	S2S ¹⁴	C3S seasonal forecasting ¹⁵	NMME ¹⁶	CMIP6/DCPP ¹⁷
Maximal prediction lead-time	45 days	60 days	5 months	11 months	10 years for most models
Number of models that have near real-time forecasts and have the ocean model	7 models	8 models	9 models	6 models	5 models for dcppB-forecast ¹⁸
Number of Ensembles	1-21	4-50	24-60	4-30	10-40
Ocean model resolutions	0.08 ⁽¹⁾ -1 degree	0.25-1 degree	0.25-1 degree	0.25-1 degree	50-100 km as nominal resolutions
2D ocean data availability for forecast data	SST only	sea-surface height; temperature, salinity, and current speeds at the sea surface; 0-300 m averaged temperature and salinity; 20°C isotherm depth; mixed-layer thickness; sea-ice thickness	SST only	SST only	Surface values; vertically integrated values; depth of specific features
3D ocean data availability	No	No	No	No	Yes
Downloading selected region data	Yes	No	Yes	Yes	No

¹³ <http://cola.gmu.edu/subx/> (access May 17, 2022).

¹⁴ <http://s2sprediction.net/> (access May 17, 2022).

¹⁵ <https://climate.copernicus.eu/seasonal-forecasts> (access May 17, 2022).

¹⁶ <https://www.cpc.ncep.noaa.gov/products/NMME> (access May 17, 2022).

¹⁷ <https://www.wcrp-climate.org/modelling-wgcm-mip-catalogue/cmip6-endorsed-mips-article/1065-modelling-cmip6-dcpp> (access January 15, 2022).

¹⁸ <https://esgf-node.llnl.gov/search/cmip6/> (access May 17, 2022).

(1) Only the US Navy Earth System Model has an eddy-resolving high resolution (0.08 degrees).

A problem is that only SST are available for some projects, but as S2S did it is not difficult to ocean spatial 2-dimension data available.

How was the PICES CLIVAR
joint WG created?

First encounter

- When Manu, Dr. Mike Foreman and I served as co-chairs of WG27, Dr. **Toshio Suga** asked us to come to CLIVAR Pacific Regional Panel Meeting in New Caledonia for discussion of collaboration between the PICES and CLIVAR.
- Dr. **Hiroaki Saito** and I went New Caledonia and explained about what is PICES and possibility of collaboration in the Panel meeting in 2012. One of panel co-chair, Dr. Wenju Cai, is now CLIVAR SSG co-chair.
- But specific plan does not take a form until 2016.



Working group creation

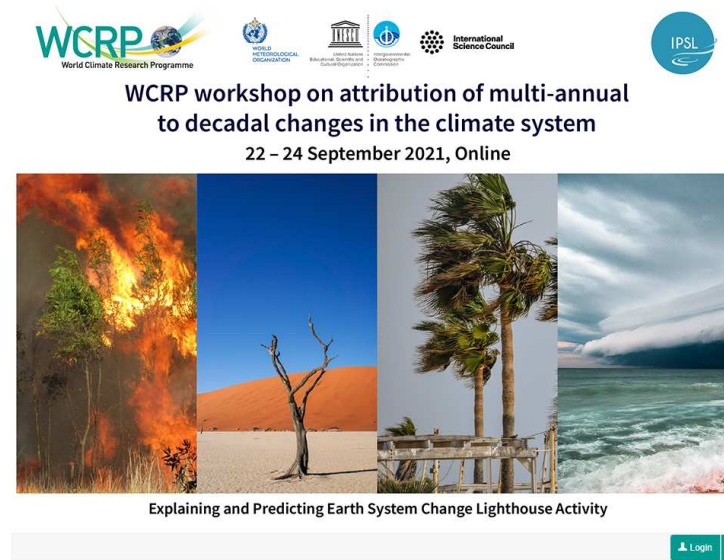
- CLIVAR has built Climate Dynamics Panel, and Prof. Mat Collins and I served as funding co-chairs since 2015.
- **Manu** envisioned a joint working group between CLIVAR and PICES.
- At the 2016 CLIVAR Open Science Conference in Qingdao, **Antonietta** (Pacific Panel co-chair), **Ryan** (Eastern Boundary Research Focus co-chair), and I (Climate Dynamics Panel co-chair) proposed the joint WG, as **essentially a PICES WG, in which some CLIVAR scientists participate**. CLIVAR SSG approved our proposal.
 - CLIVAR cannot have a working group just for the North Pacific.
- Next year in 2017, **after five years of the first encounter**, joint WG40 started. We three CLIVAR scientists are listed as CLIVAR co-chairs.

For Future collaborations

- We hope that PICES and CLIVAR will keep collaborations.
 - CLIVAR scientists who joined PICES WG could be more visible. One person attending two organizations is not collaboration, but her/his separate jobs.
- WCRP Light House Activity, Explaining and Predicting Earth System Change, to which I am a member, can also collaborate with PICES. I am happy to attend an appropriate expert group as a liaison. In our workshop, many researchers said that ocean is promising for decadal prediction.

Thank you!

- We are pleased that this first PICES-CLIVAR joint working group has successfully finished.



The banner features logos for WCRP (World Climate Research Programme), World Meteorological Organization, International Science Council, and IPSL. Below the logos, the text reads: 'WCRP workshop on attribution of multi-annual to decadal changes in the climate system' and '22 - 24 September 2021, Online'. The main visual is a horizontal strip of four images: a wildfire, a dead tree in a desert, a palm tree, and a stormy ocean. At the bottom, it says 'Explaining and Predicting Earth System Change Lighthouse Activity' and includes a 'Login' button.