

International Symposium: Understanding Changes in Transitional Areas of the Pacific

April 24–26, 2018

La Paz, Baja California Sur, Mexico

Closing session

- **Integration from sessions**
- **Plenary discussion**
- **Closure**

S1

1. 36 oral presentations/12 posters/various countries.
2. There are various approaches / researches in various disciplines / various target regions in PTA.
3. Climate modes and the indexes (PDO/Vict. Mode or NPGO/ENSO) greatly help to understand local changes in the coastal areas as well as open ocean PTA.
4. The local processes in the changes were complex and interesting associated with seasonal changes, coastal current, eddies, BGC gradients, various species living and moving.
5. To understand interactions between regional changes along PTA, changes in PTA and out of PTA and marine lives moving across and along PTA regions, it seemed to be important to investigate the mechanisms in the local processes and to understand changes in the other regions in the PTAs (ex. CCS/Mex. coast)

S2

15 contributions

Main topics included:

- Differentiation of pelagic stocks (particularly inhabiting Tas)
- Climate impacts on fish resources, and consequences for fisheries systems
- Potential management strategies for large pelagics, including bioeconomic models, eco certification schemes (*interestingly, several management objectives*)
- Climate-to-fisheries models, such as envelope and niche models (*large potential for interdisciplinary efforts*)

From some of the conveners: this group should be making key questions to the Physical and biological groups.

S3

- ❑ “Transitions” both in space & time
 - ❑ BGC Argo, glider, vertical profiler mooring, wirewalker, Bio-UCTD, microstructure profiler, SMOS
 - ❑ Earth System Model, food-chain dynamics, sub-km model, down-scaling, Lagrangian-analysis, IBM
 - ❑ CCS, KOE, Kuroshio, Tsugaru warm current, Equatorial front, lagoon-marine transition, Pacific saury
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- ❑ North Pacific is a hole of BGC Argo
 - ❑ Multi-parameter observations for marine ecosystem studies
 - ❑ More model-data interaction
 - ❑ Time series champions and innovators welcome!
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Overview of S4: Advances in understanding Pacific shelf-offshore transitional areas

Western boundary current region (Kuroshio)

Oceanic nutrient supply onto the shelf
(biogeochemical modelling, eddies and meander,
Dynamics of a coastal current

Eastern boundary current region (California Current, BC & Humboldt Current)

Interdisciplinary studies from physics to fish
Main focus low oxygen water
Role of mesoscale physical-biochemical coupling
ENSO effect impact on the upwelling ecosystem

General topic

New model technique: a lagrangian NPZD model

Progress in the last 15 years

Improved modelling and observing techniques

(e.g., mesoscale eddy-resolving models, continuous observations glider)

Interdisciplinary studies became common approach

Low-frequency variability like PDO and NPGO is important

in the eastern and western boundary currents

Coastal-offshore transition region play significant role for water properties on the inner-shelf

Future path

Improve understanding of finer scale processes in the coast-offshore transition areas (cross-shore exchanges of water properties, nutrients and oxygen)

Understand modulation of these processes by large scale variability (PDO, NPGO, ENSO)

Improve our prediction capability in a context of future climate change

Keep developing higher resolution models (and coupling) and observing techniques

(submesoscale eddies, internal waves, vertical mixing, nutrients fluxes, biological rates)

“Highlights” from S5

1.5 days of very good talks, including 6 ECS

Presentations covered a range of habitats/ecosystems/trophic levels

Sadly, many studies highlighted the decline or loss in biodiversity, independent of system, in a wide variety of TAs

There is a need to maintain/enhance monitoring efforts and develop indices to better understand biodiversity changes, especially in the face of increased stressors (i.e., climate change and anthropogenic activities)

“Highlights” from S5 Continued

Coastal communities, especially near TAs, can be negatively impacted by biodiversity changes

Consistent with other sessions, predictions of biological changes becoming more difficult and more “abnormal” patterns/cycles emerging over time

Identifying changes in biodiversity across spatial/temporal scales is a challenge – biodiversity (and its changes) is complex so collaborations will be key!

S6 (pending)

Plenary discussion


- The goal of the 2018 symposium was to update and expand our understanding of Pacific TAs
 - Understanding, modelling and observing capacities, and community interest, all have increased during the last 15 years.
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- Continually improving physics to biology linkage
 - Clearly, as scientific community we have interest in gradients (time, space, vertical), but we need a more formal definition of TAs, and recognize gradients on the ocean as a major interest topic. We learned that we can learn from extra NP TAs.

Open questions (for session conveners/general audience)

- 1) Is there clear evidence that climate variability and change impact the TAs. Can we say these are latitudinal shifts (when driven by ocean), and intensity and vertical structure (when related to geography).
 - 2) Do we have evidence indicating they change faster/more dramatically than other regions, or that they less sensitive to climate changes?
 - 3) These changes impact highly migratory species, but implications (management and conservation) are unclear. Can we think on statements, or at least topics of interest?
 - 4) How can we improve observations and models to be more informative and reliable for projecting changes?, clear improvements include ARGOs, different and more powerful climate and physics-biological coupling models, but can we make an statement on major needs, including geographical gaps, data sharing platforms, model nesting, etc.?
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Examples of near future programmatic strategies include:

- 1) Conform an ~informal WG, with clear terms of reference (including objective definition of PTAs and gradient systems of interest for PICES). As conveners, we can start the process by designing such a group based on the symp presentations and the DSRII submissions (August), and deliver a proposal to PICES.
 - 2) Plan a strong piece (book) on gradients in the ocean.
 - 3) Besides the next PTAs meeting in La Paz, We should target having workshops or sessions in every PICES annual meeting.
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- over 140 participants from 12 countries
- 114 oral presentations
- 22 posters

Best Poster
by an early career scientist

Best Poster



Carina Stefoni Böck

Luiz Paulo De Freitas Assad and Luiz Landau

Universidade Federal do Rio de Janeiro

“Spatiotemporal variability of the oceanic fronts at the Kuroshio-Oyashio Confluence region and its relationship with ENSO” (S1)

Best Poster



Adriana Gomez-Leon

Nestor Rey-Villiers and Alberto Sanchez

CICIMAR

“Spatio-temporal variability in the relative abundance of benthic foraminifera in La Paz lagoon, Gulf of California” (S5)

Best Presentation
by an early career scientist

Best Presentation



Ricardo Oliveros-Ramos,

Enrique Ramos-Vasquez, Arnaud Bertrand and Jorge

**“Dynamics of the transition zones between
distribution sub-areas of jack mackerel
(*Trachurus murphyi*) in the South Pacific” (S2)**

Best Presentation



Wencheng Lau-Medrano

“The Peruvian Anchovy and Oceanographic fronts: description of association and using as a proxy of presence” (S4)

Best Presentation



Juan Payan Alcacio,

Rodrigo Moncayo-Estrada, José Dela Cruz-Agüero and
Gustavo Dela Cruz-Agüero

**“Analysis of the community structure of the
mangrove fish in the American Continent” (S6)**

Local Hosting Institutions

CIBNOR

CICIMAR

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La Paz

Ensenada

Directors: Daniel Lluch, Sergio Hernandez Trujillo, and Guido Marinone

and to

The CIBNOR Team

The CICIMAR Team

Silvia Alzaga, Paulina, Alex, technicians, drivers, administration,
and all other participants from the local hosting institutions

Gracias to our Sponsors



Gracias to our Convenors

Session 1

Gerard DiNardo

Evan Howell

Shinya Kouketsu

Edward Weber

Phoebe Woodworth-Jefcoats

Session 2

Nicolas Gutierrez

Salvador Lluch-Cota

Minling Pan

Session 3

Enrique Curchitser

Sachihiko Itoh

Session 4

François Colas

Hiroshi Kuroda

Angelica Peña

Session 5

Xianshi Jin

Rubén Rodríguez Sánchez

Thomas Therriault

Session 6

Francisco Arreguín-Sánchez

Jingmei Li

Gracias to our Symposium Organizer

Alexander Bychkov (PICES)

On behalf of Symposium Convenors

Sachihiko Itoh (PICES/AORI)

Salvador Lluch-Cota (CIBNOR)

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Phoebe Woodworth-Jefcoats (PICES/NOAA)



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