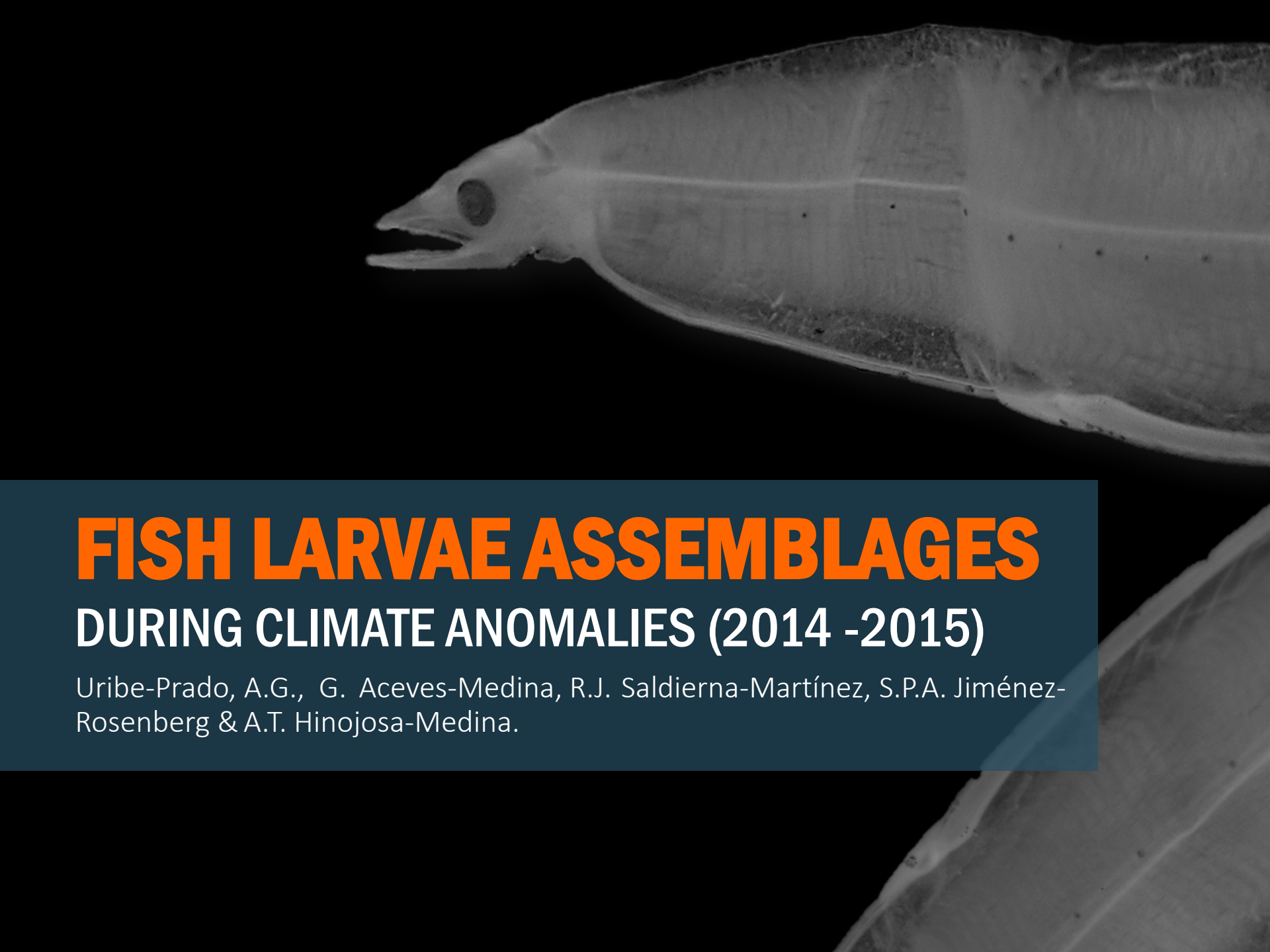
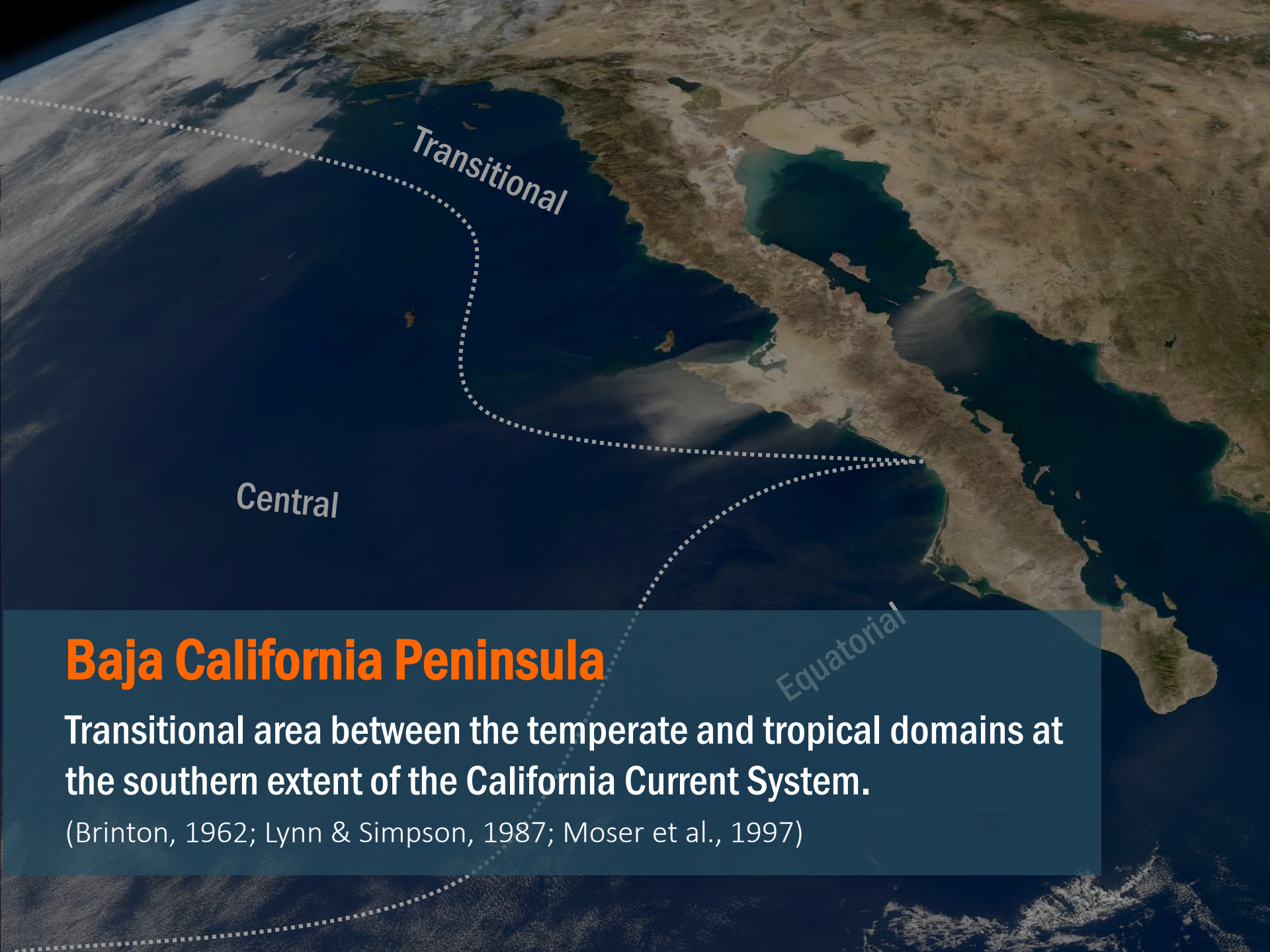


FISH LARVAE ASSEMBLAGES

DURING CLIMATE ANOMALIES (2014 -2015)

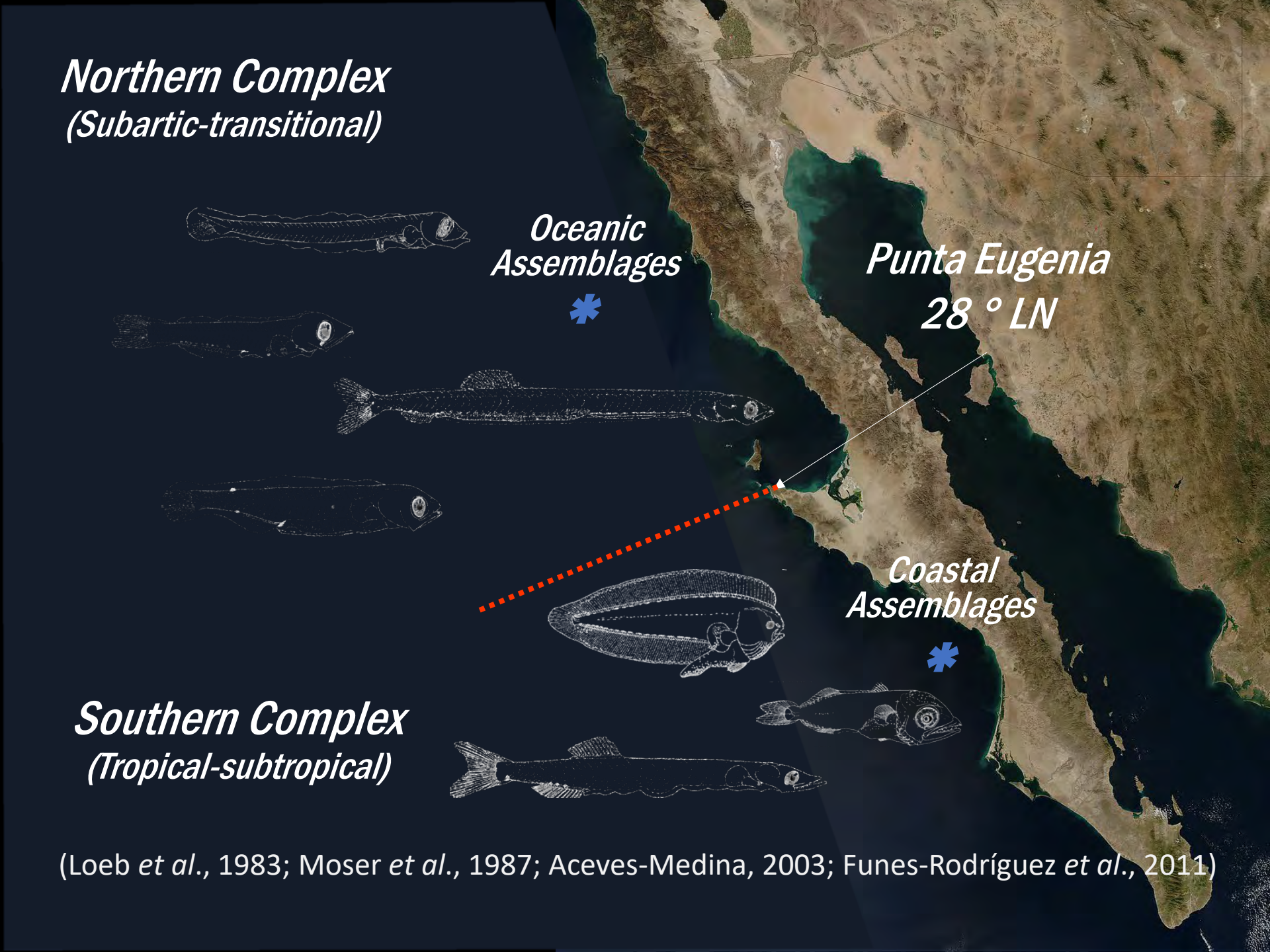
Uribe-Prado, A.G., G. Aceves-Medina, R.J. Saldierna-Martínez, S.P.A. Jiménez-Rosenberg & A.T. Hinojosa-Medina.



Baja California Peninsula

Transitional area between the temperate and tropical domains at the southern extent of the California Current System.

(Brinton, 1962; Lynn & Simpson, 1987; Moser et al., 1997)



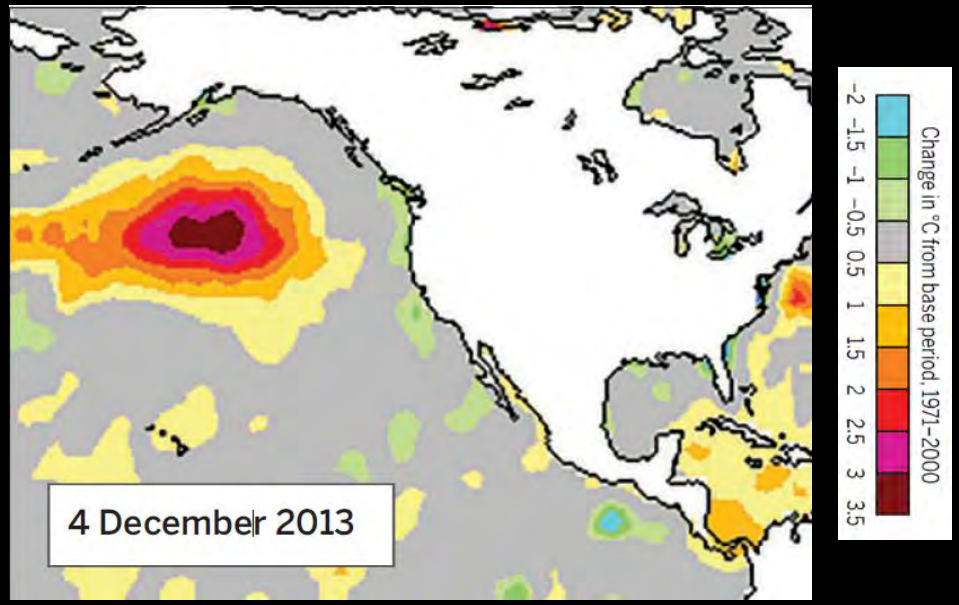
(Loeb *et al*., 1983; Moser *et al*., 1987; Aceves-Medina, 2003; Funes-Rodríguez *et al*., 2011)

Environmental Conditions 2013-16

2013 2014 2015

The Blob

Warm anomalies

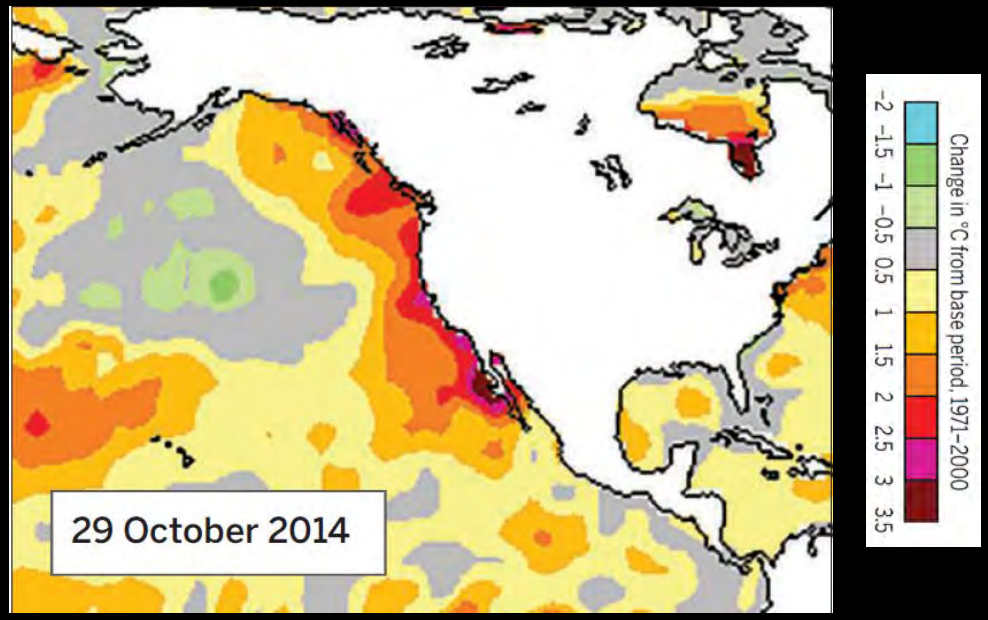


(Bond *et al*. 2015; Di Lorenzo & Mantua, 2016)

2013 2014 2015

The Blob

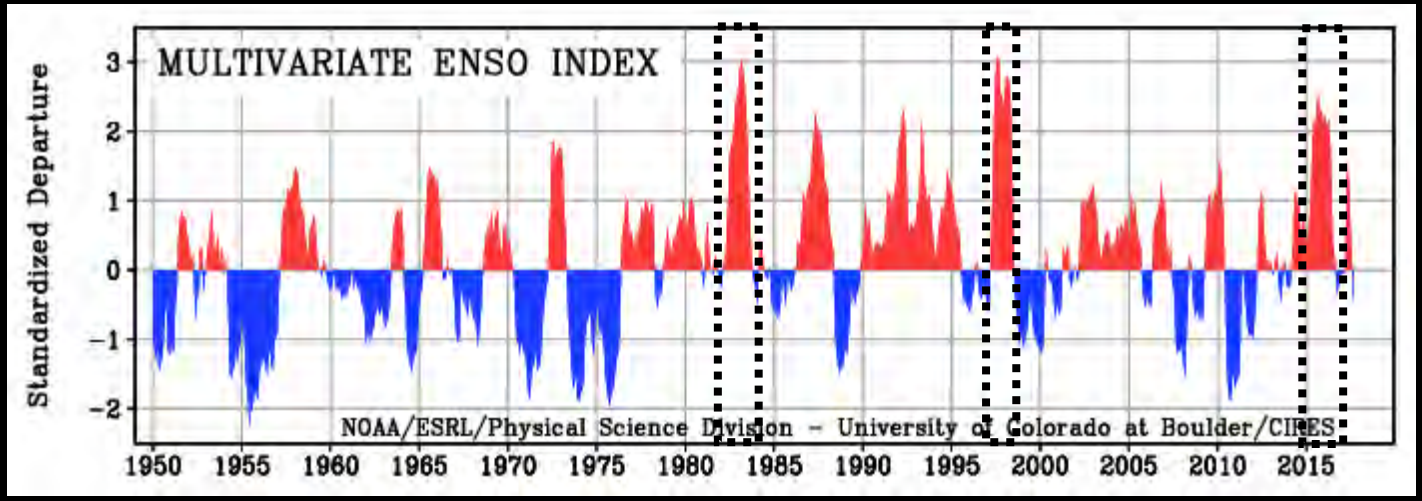
Warm anomalies stretched from Alaska to Baja California



(Leising *et al.*, 2015; Mcclatchie *et al.*, 2016)

2013 2014 2015

The Blob → El Niño 2015-16



(Schiermeir, 2015; Varotsos *et al*., 2016)






Cavole *et al*., 2016; Jacox *et al*., 2016; McClatchie *et al*., 2016

http://www.nationalgeographic.com/magazine/2016/09/

Baja California

2014 — 2015

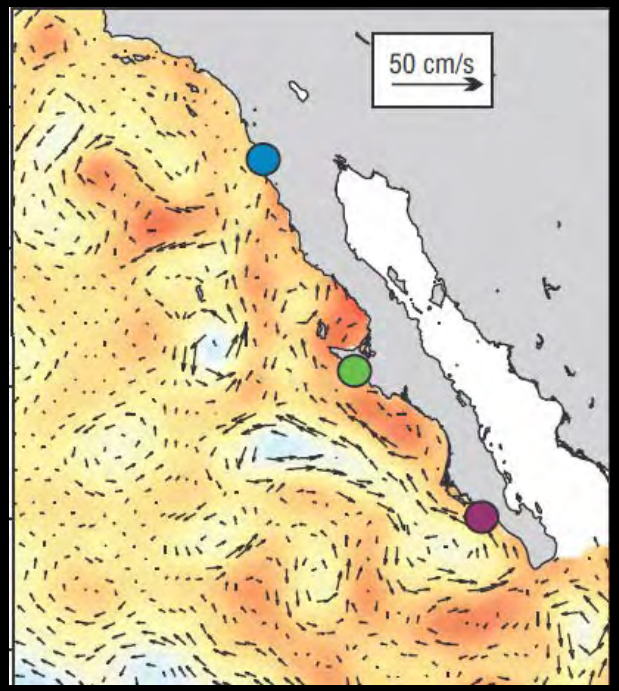
Warm Anomalies

Poleward coastal countercurrent

Advection of tropical and subtropical waters

Declining phytoplankton production

Low zooplankton volume



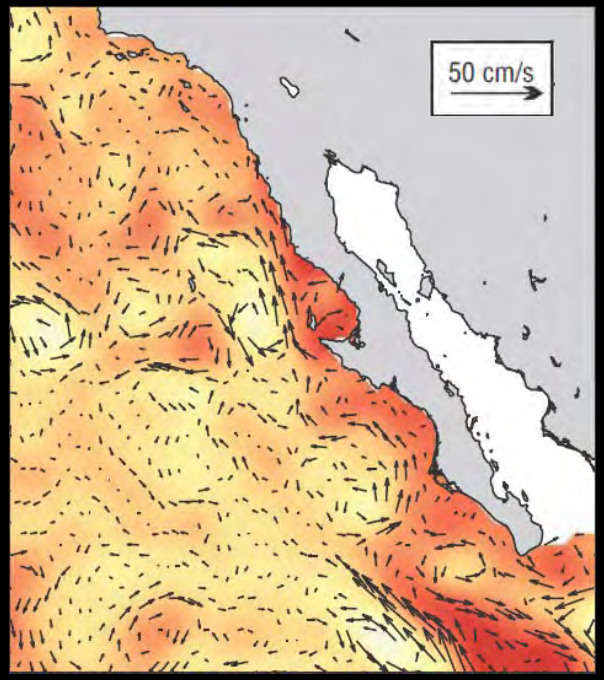
(Leising *et al*. 2015; McClatchie *et al*. 2016; Durazo *et al*. 2017; Gómez-Ocampo *et al*. 2017)

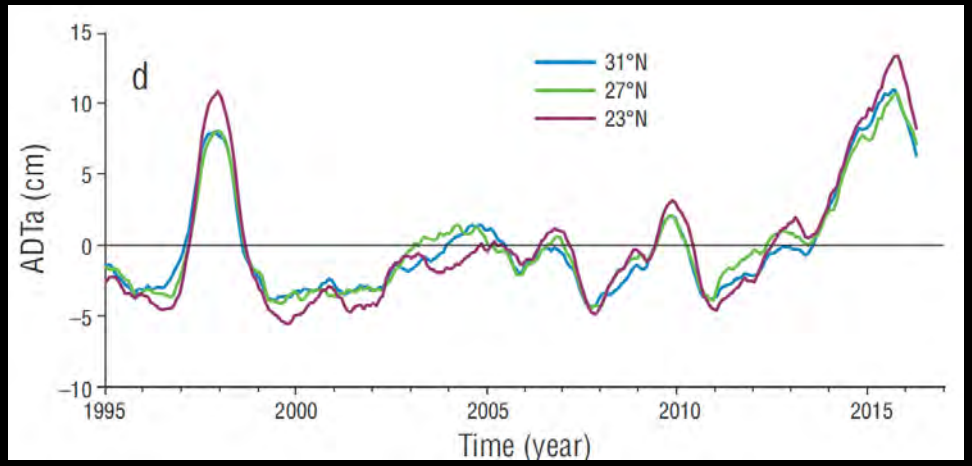
Baja California

2014 — **2015**

Warm Anomalies → El Niño 2015-16

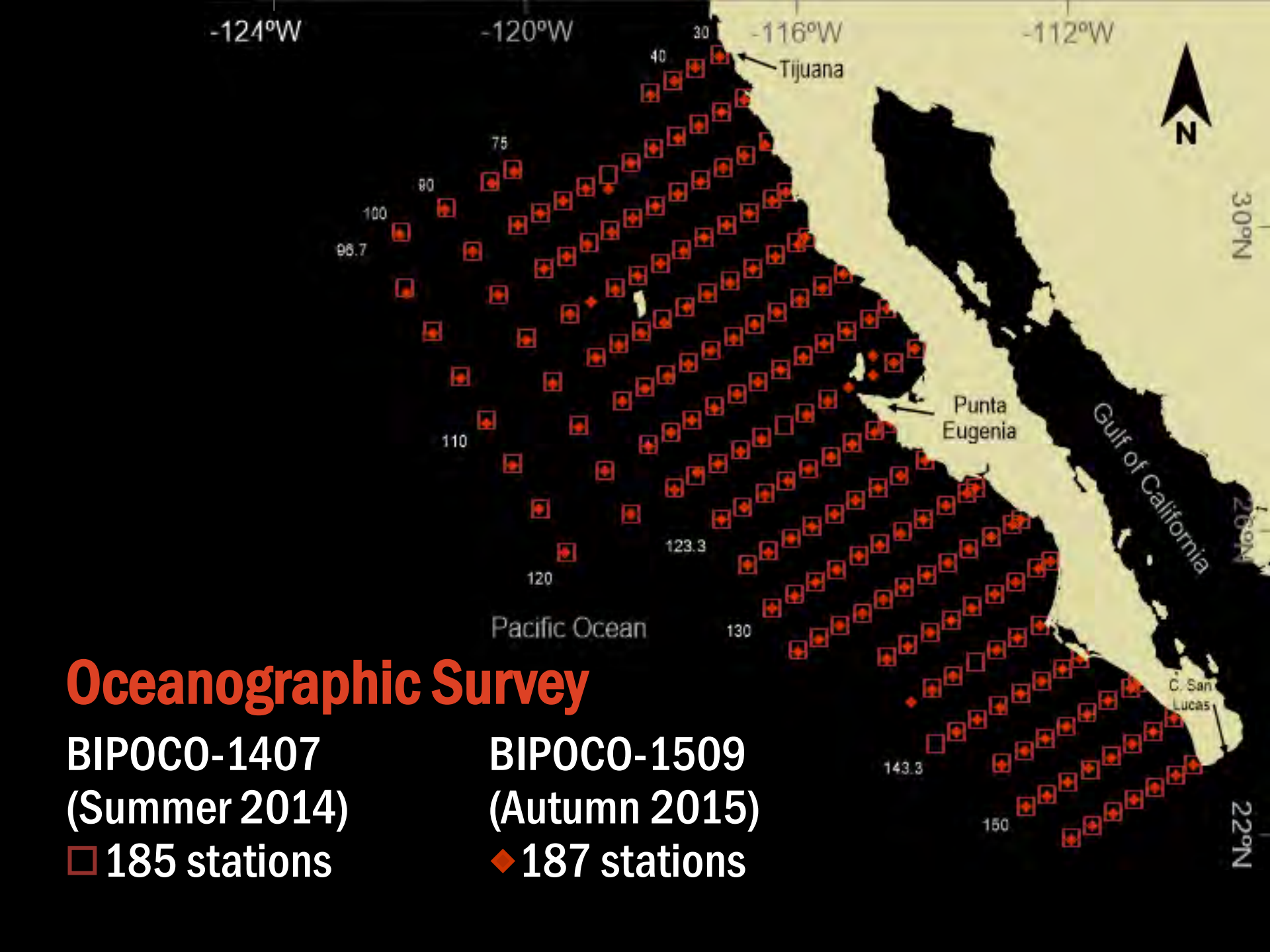
INTENSIFICATION!





(Durazo *et al*., 2017; Gómez-Ocampo *et al*., 2017)

Data and Methods



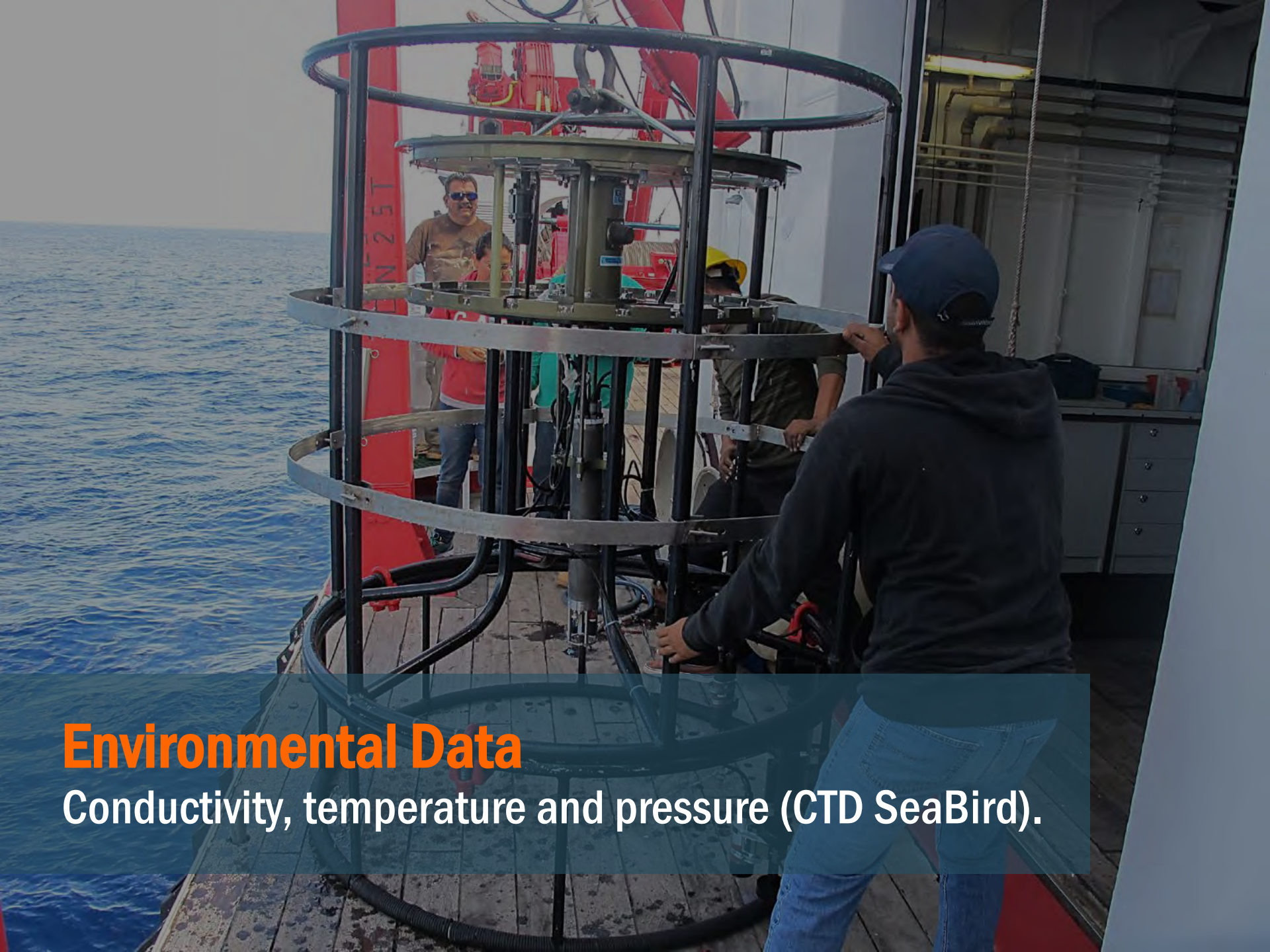
Oceanographic Survey

BIPOCO-1407
(Summer 2014)
□ 185 stations

BIPOCO-1509
(Autumn 2015)
◆ 187 stations

Zooplankton Samples

Collection standard method (Smith & Richardson, 1977).

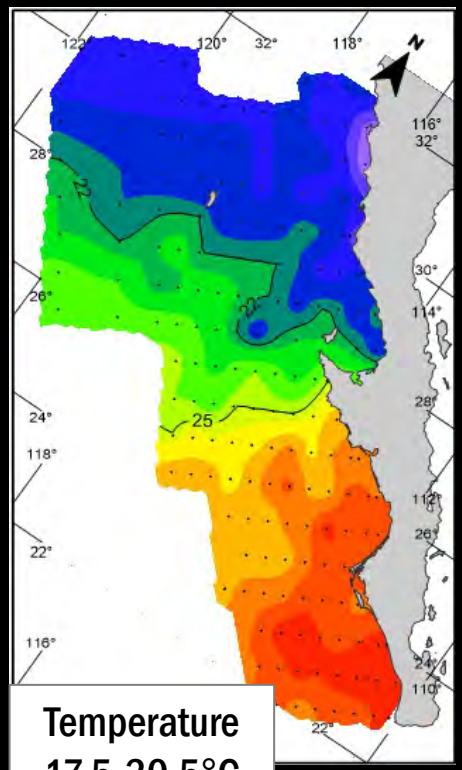


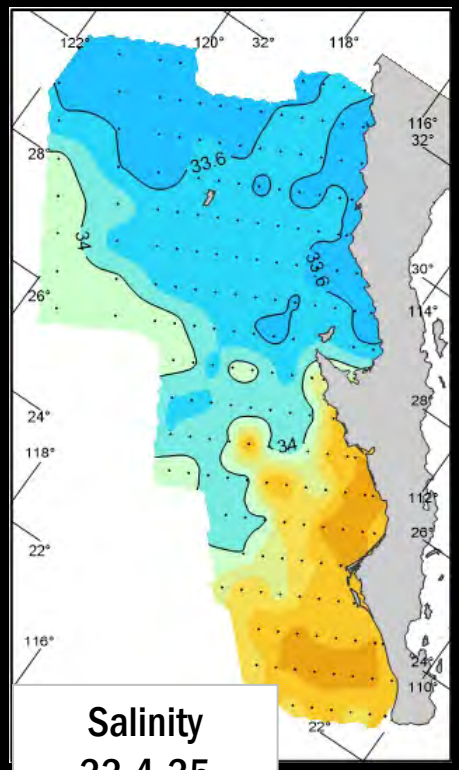
Environmental Data

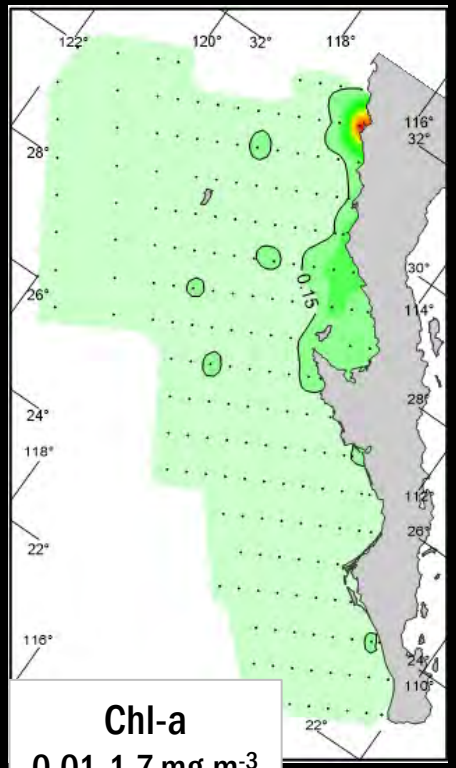
Conductivity, temperature and pressure (CTD SeaBird).

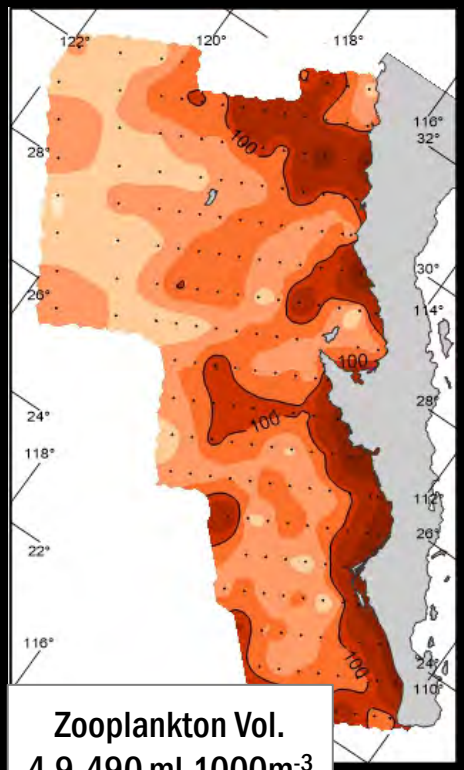
Environmental Characterization

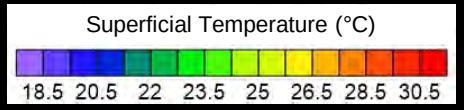
Summer 2014

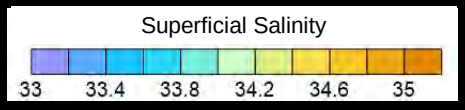

22
25
Temperature
17.5-30.5°C

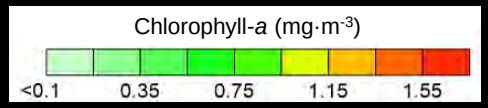

33.6
34
33.6
34
Salinity
33.4-35

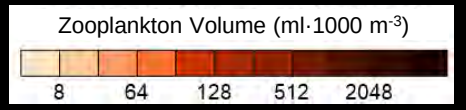

0.15
Chl-a
0.01-1.7 mg·m-3


100
100
100
100
Zooplankton Vol.
4.9-490 ml·1000m-3

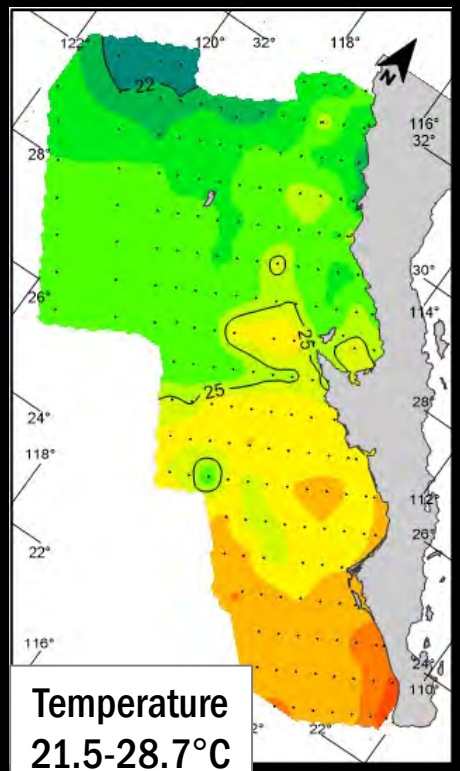

Superficial Temperature (°C)
18.5 20.5 22 23.5 25 26.5 28.5 30.5


Superficial Salinity
33 33.4 33.8 34.2 34.6 35

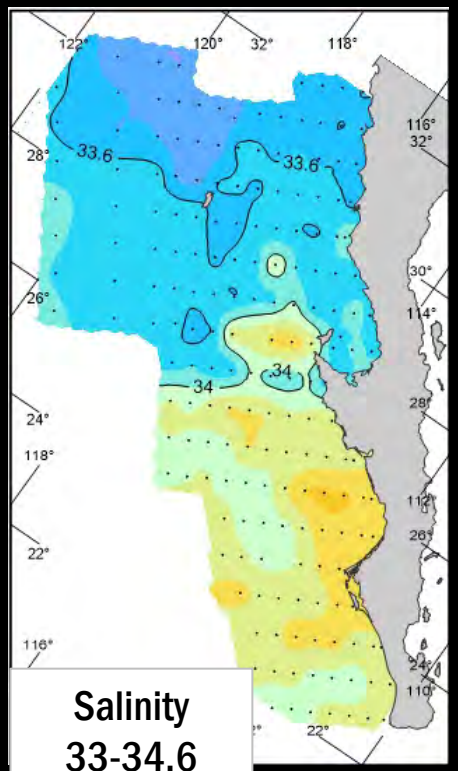

Chlorophyll-a (mg·m-3)
<0.1 0.35 0.75 1.15 1.55


Zooplankton Volume (ml·1000 m-3)
8 64 128 512 2048

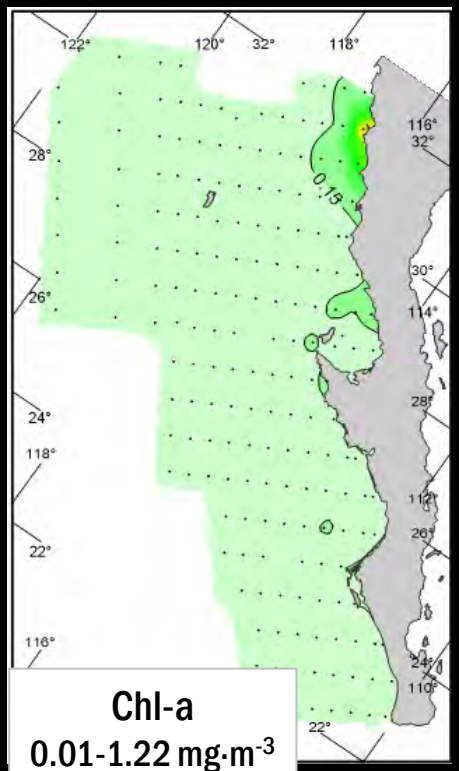
Autumn 2015



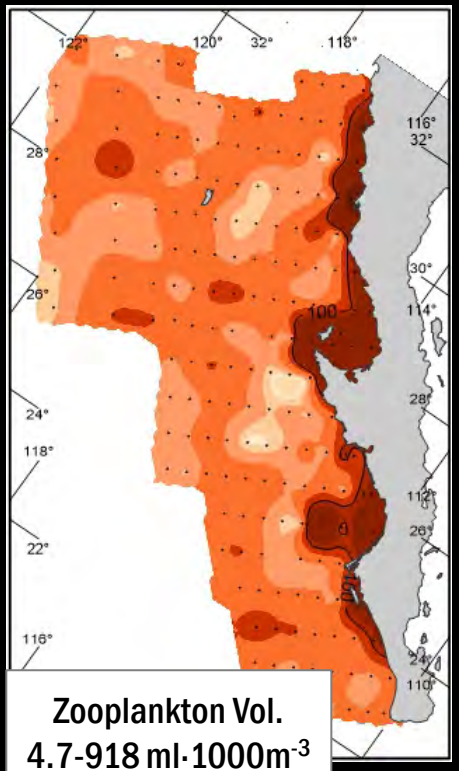
Temperature
21.5-28.7°C



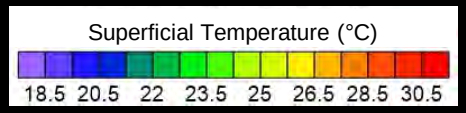
Salinity
33-34.6

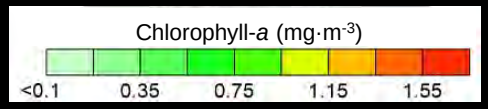


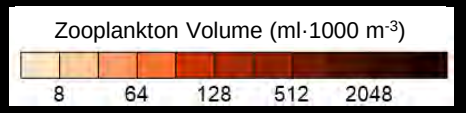
Chl-a
0.01-1.22 mg·m^{-3}



Zooplankton Vol.
4.7-918 ml·1000m^{-3}

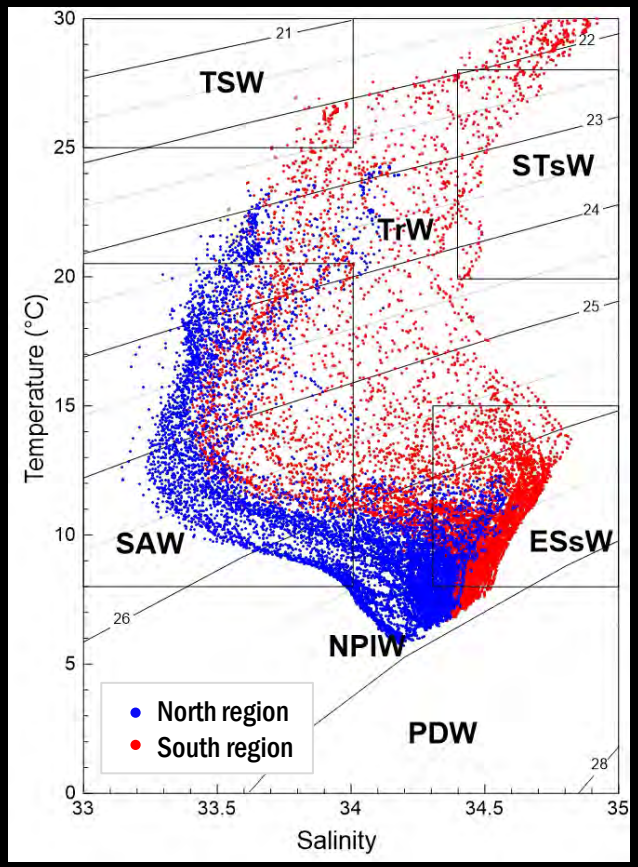




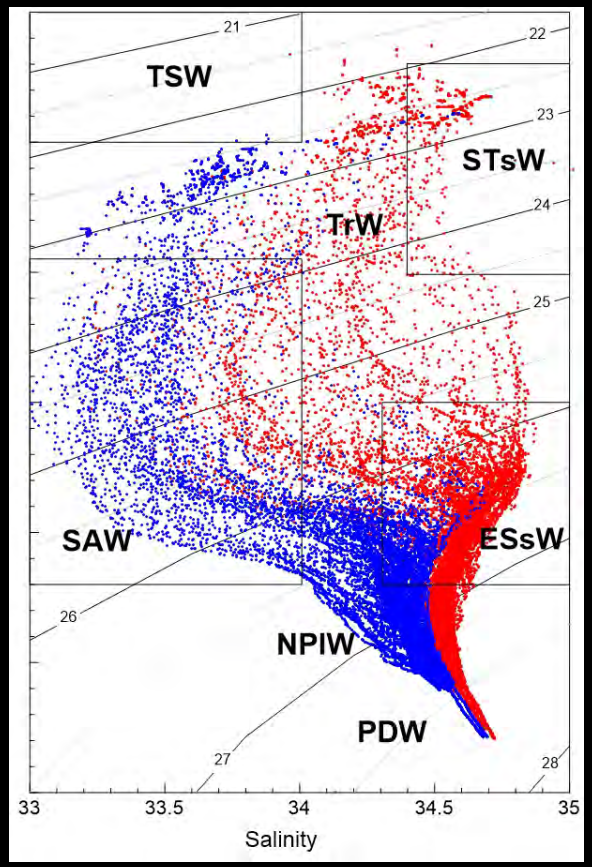


Temperature-Salinity Diagrams

Summer 2014



Autumn 2015



Subarctic Water (SAW), Transitional Water (TrW), Subtropical Surface Water (StSW), Tropical Surface Water (TSW), Equatorial Subsurface Water (ESsW), North Pacific Intermediate Water (NPIW) and Pacific Deep Water (PDW).

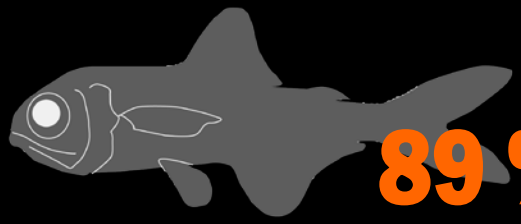
Biological Characterization

Fish Larvae Composition

403 *taxa*

68.7 % species from CCS

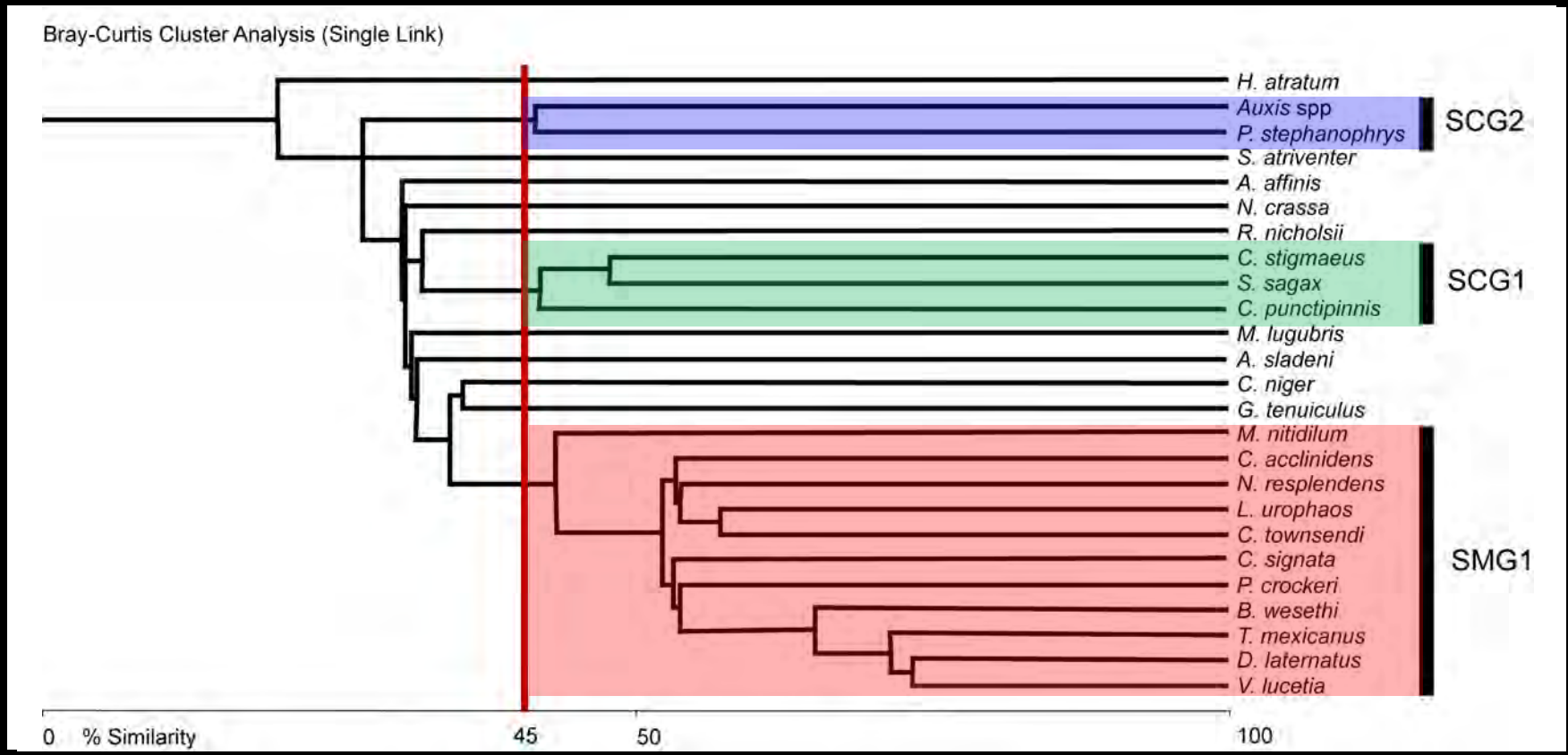
83 % Tropical-Subtropical species



89 % Mesopelagic species

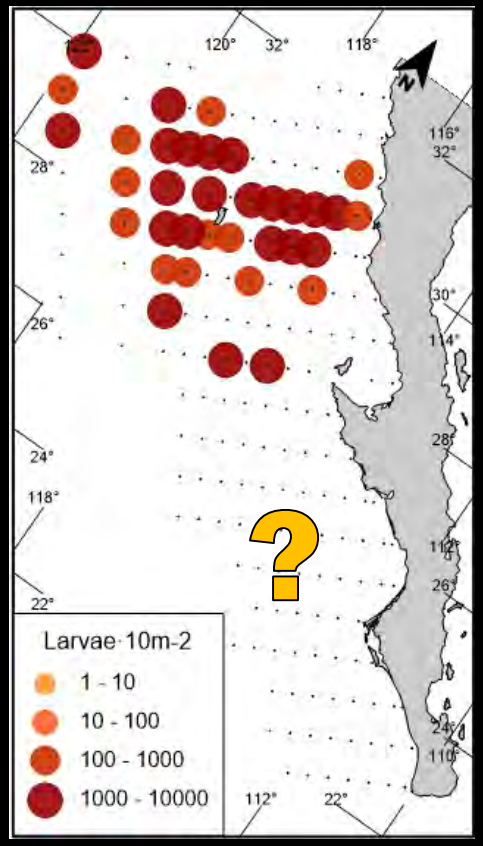
Fish Larvae Assemblages

Composition Assemblages Summer 2014



Summer Mesopelagic Group 1 (SMG1), Summer Coastal Group 1 (SCG1) and Summer Coastal Group 2 (SCG2)

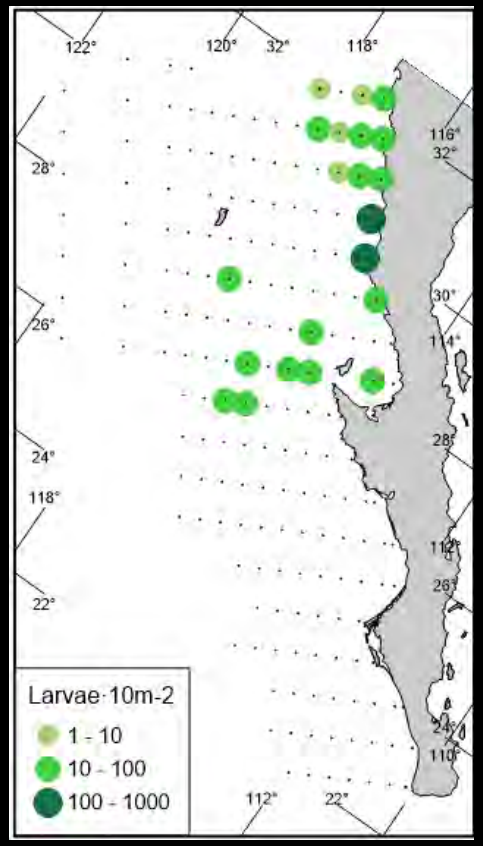
SMG1



Mesopelagic

Mix of Tropical and Temperate Affinity

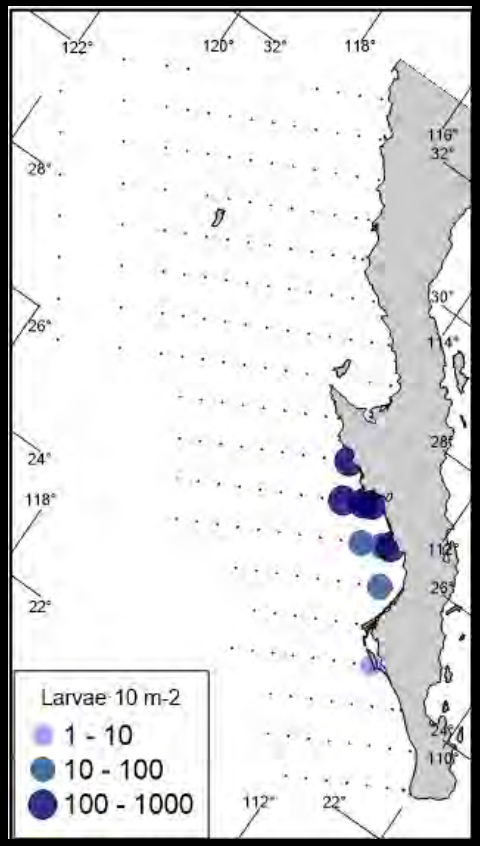
SCG1



Coastal

Subtropical and Temperate Affinity

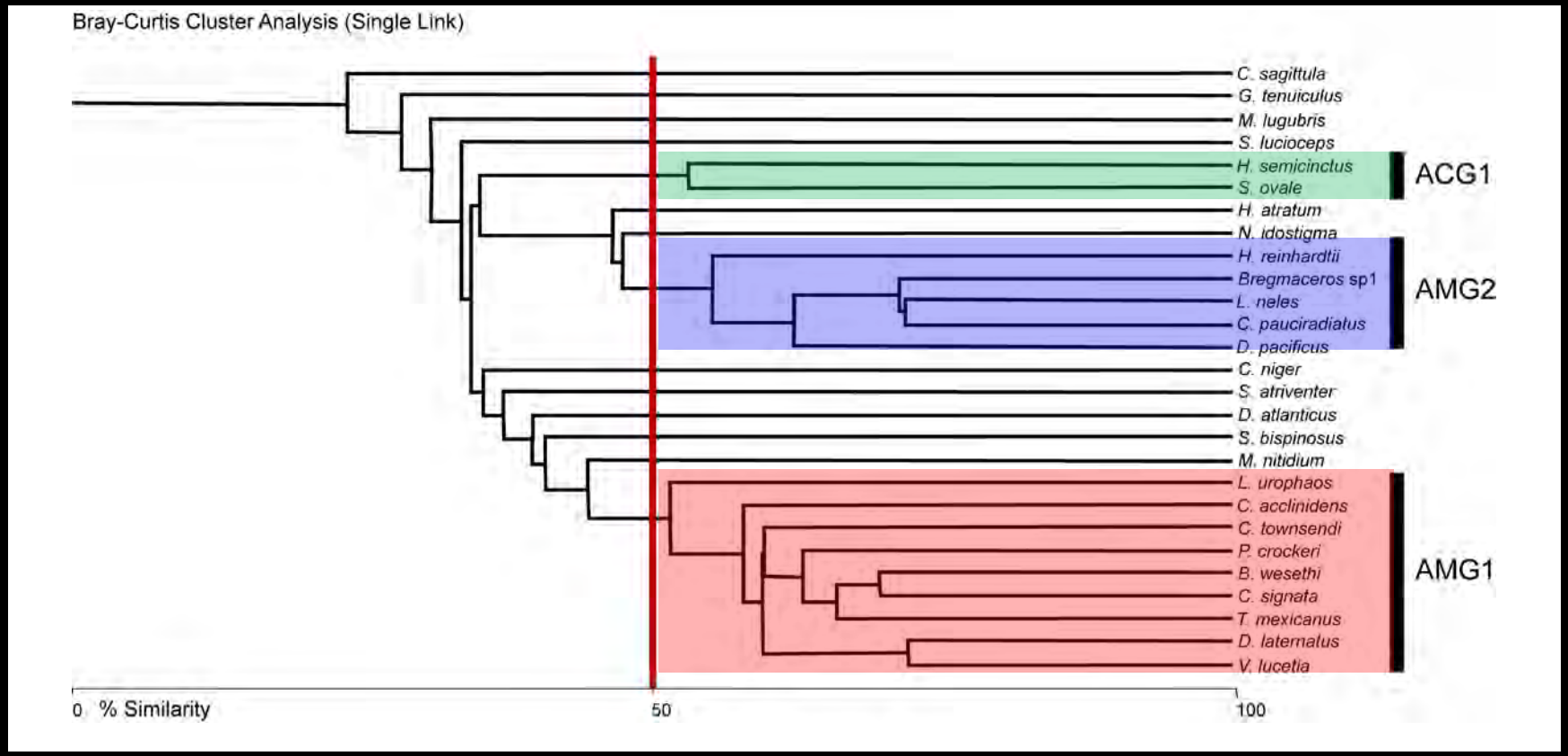
SCG2



Coastal

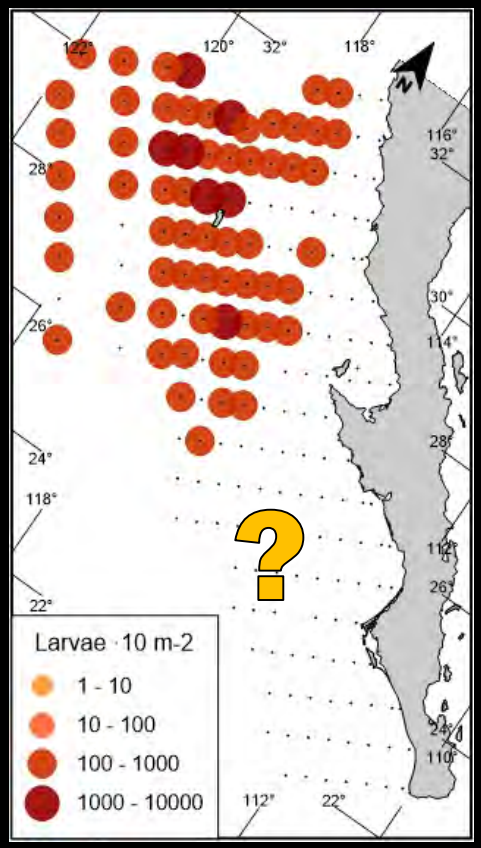
Tropical-Subtropical Affinity

Composition Assemblages Fall 2015



Autumn Mesopelagic Group 1 (AMG1), Autumn Mesopelagic Group 2 (ACG1) and Autumn Coastal Group 1 (ACG1)

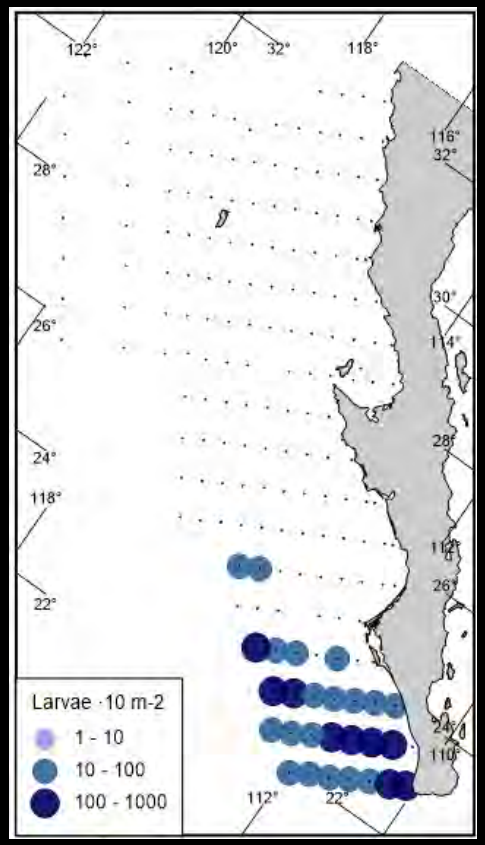
AMG1



Mesopelagic

Mix of Tropical and Temperate Affinity ·

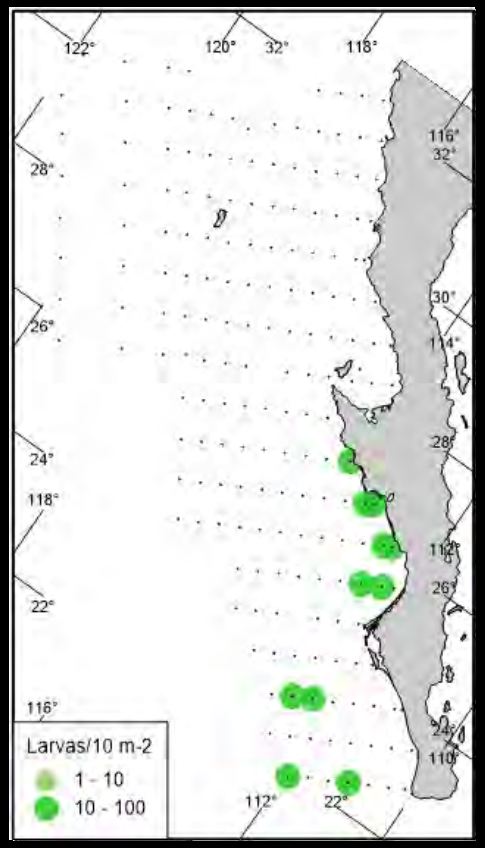
AMG2



Mesopelagic

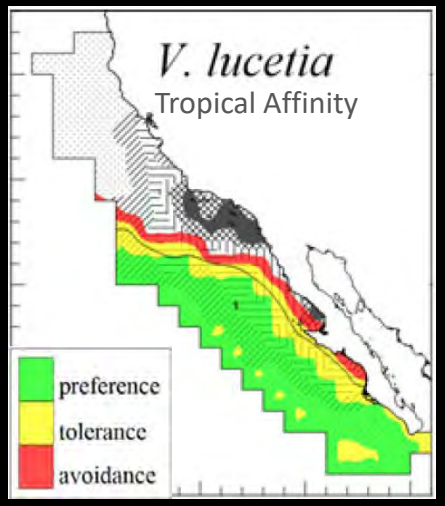
Tropical-Subtropical Affinity

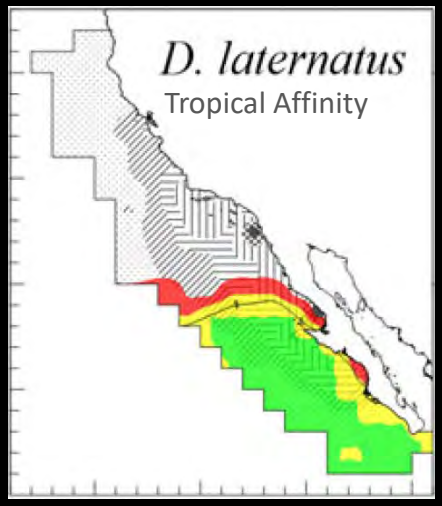
ACG1

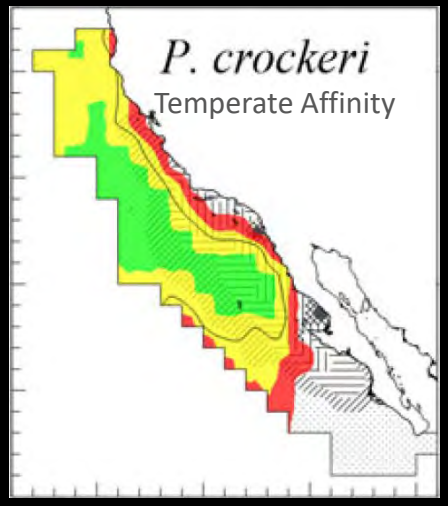


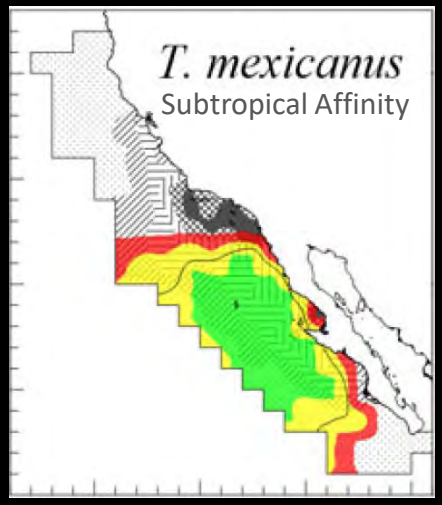
Coastal

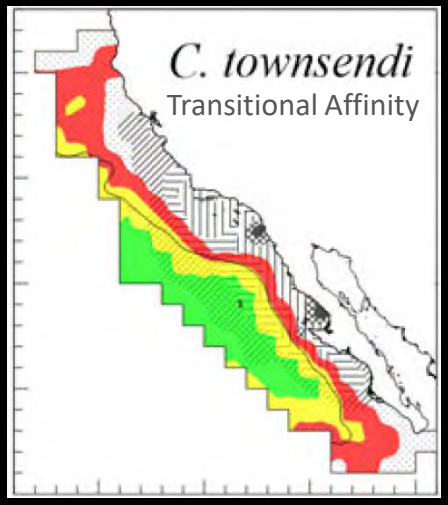
Tropical-Subtropical Affinity

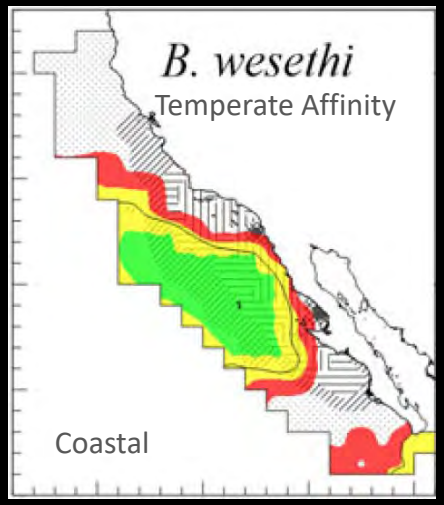






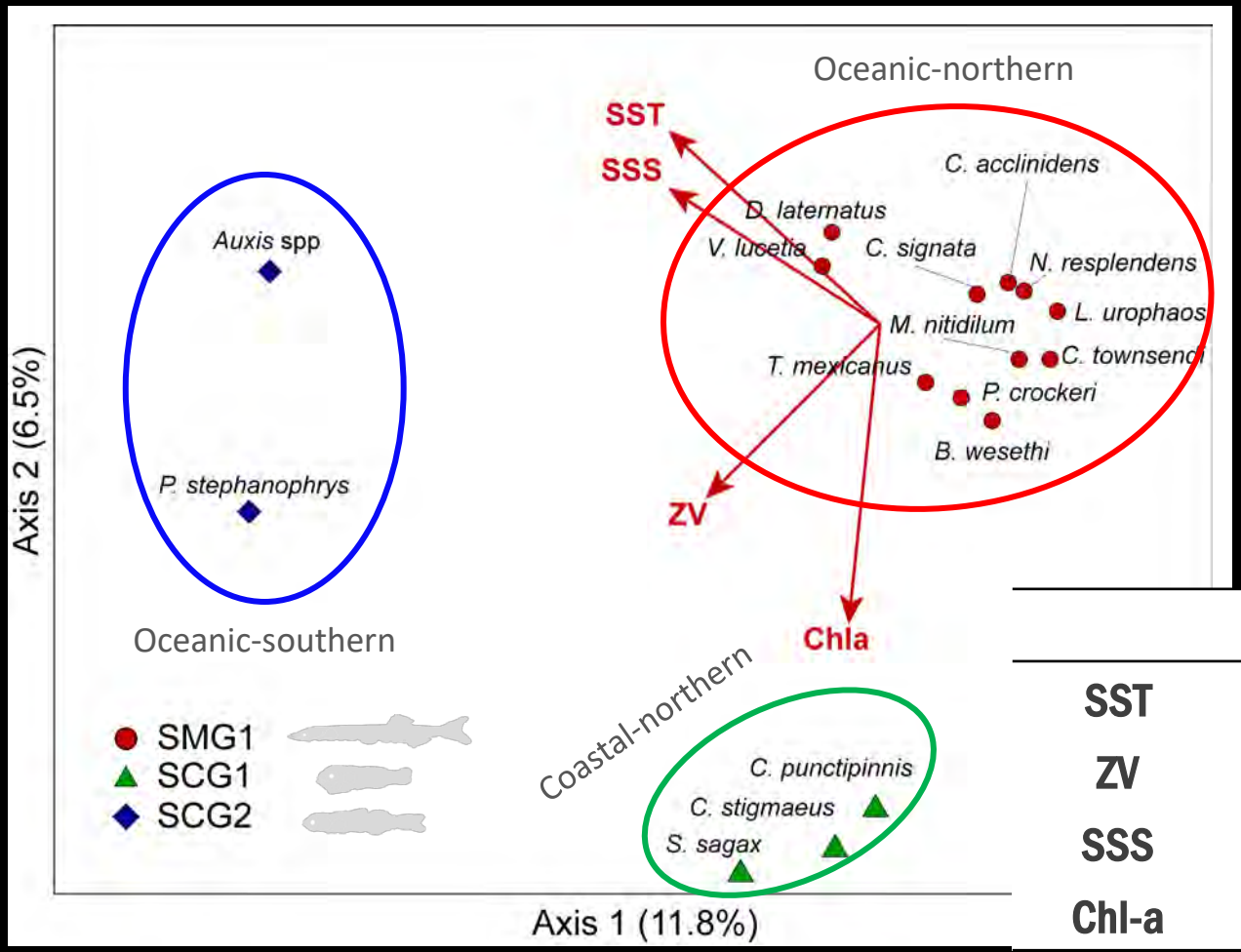






(Bautista *et al*. 2018, DOI: 10.1111/fog.12250)

Associations and Environmental Gradient 2014

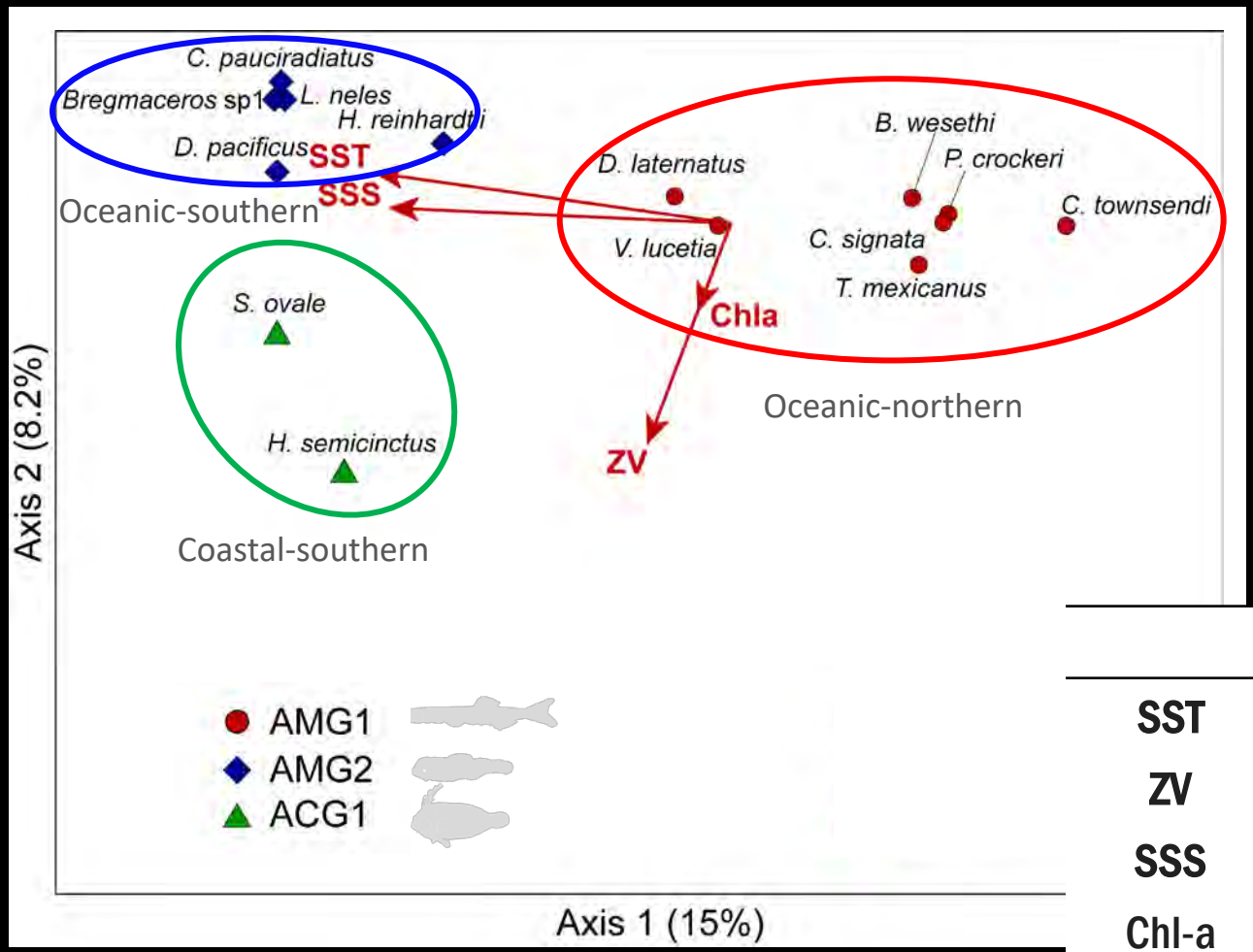


17.2 % variance

***r*= 0.63**

	Axis 1	Axis 2
SST	**0.805**	-0.546
ZV	**0. 559**	0.486
SSS	**0.819**	-0.388
Chl-a	0.118	**0.795**

Associations and Environmental Gradient 2015



23.2% variance

***r*= 0.71**

	Axis 1	Axis 2
SST	**0.972**	0.221
ZV	0. 229	**-0.942**
SSS	**0.929**	0.073
Chl-a	0.081	-0.347

Summary

During the study period, the **transitional boundary** off **Punta Eugenia** was **maintained** even when **atypical warming conditions** were detected in the oceanic region of **Baja California Peninsula.**

The assemblage of **tropical**, **temperate** and **transitional mesopelagic** species **was different** to the ones documented for **previous warming events.**

Acknowledgements

This research was supported by projects of the CICIMAR-IPN (SIP-20160625, SIP-20170916 y SIP-1700376) and INAPESCA.