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Biomass Zooplankton in the Northern Humboldt Current System and its variability associated with areas of transition

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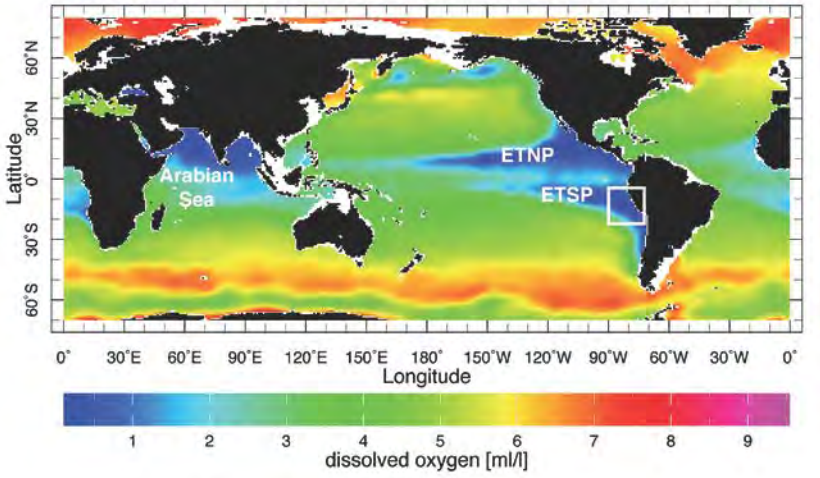
Institut de Recherche pour le Développement
FRANCE

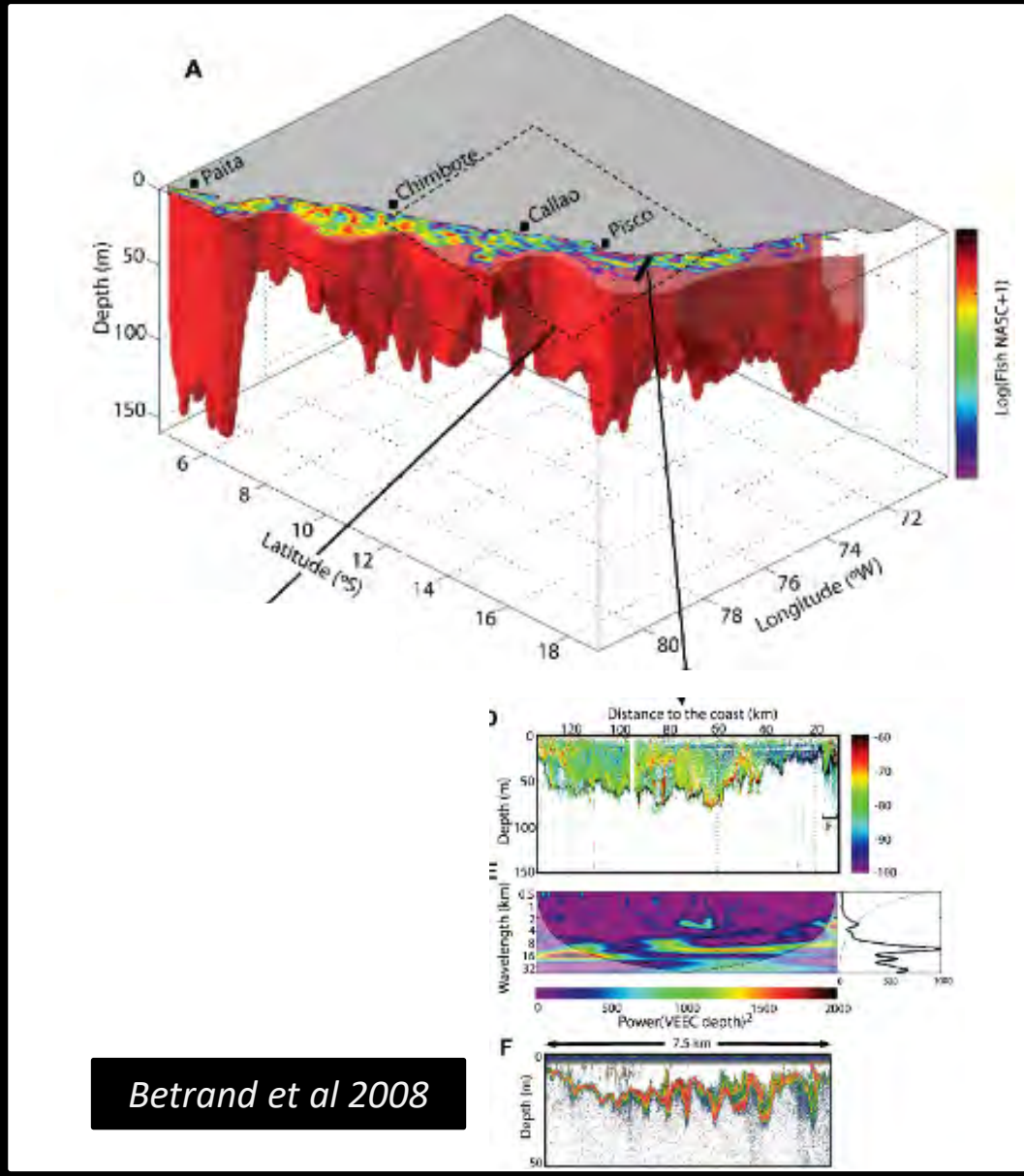
Summary

Introduction
Background
Transitional Area
Objectives
Study area
Methodology
Results and Discussion

Introduction

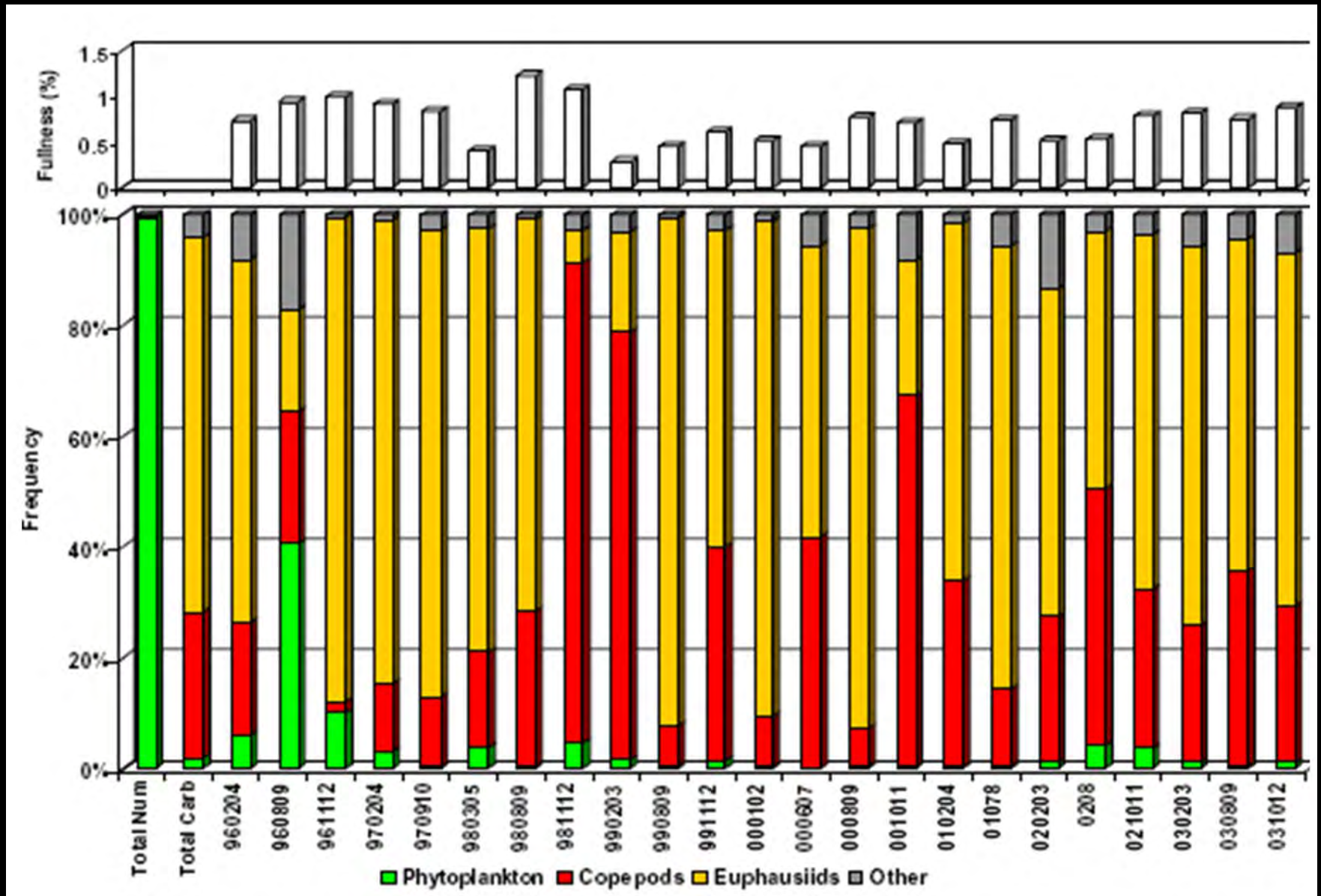


Engraulis ringens



Betrand et al 2008

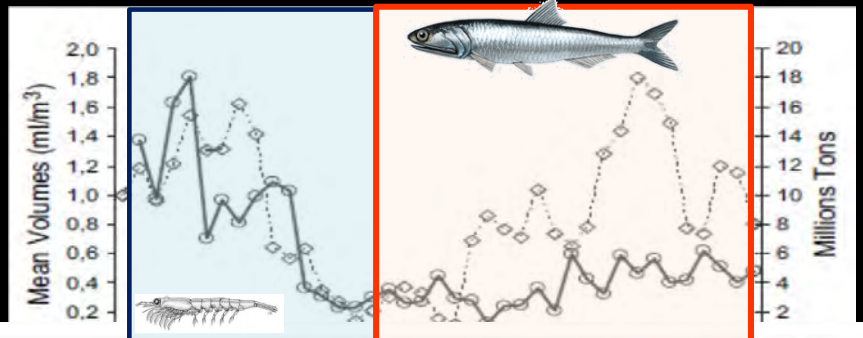
Introduction

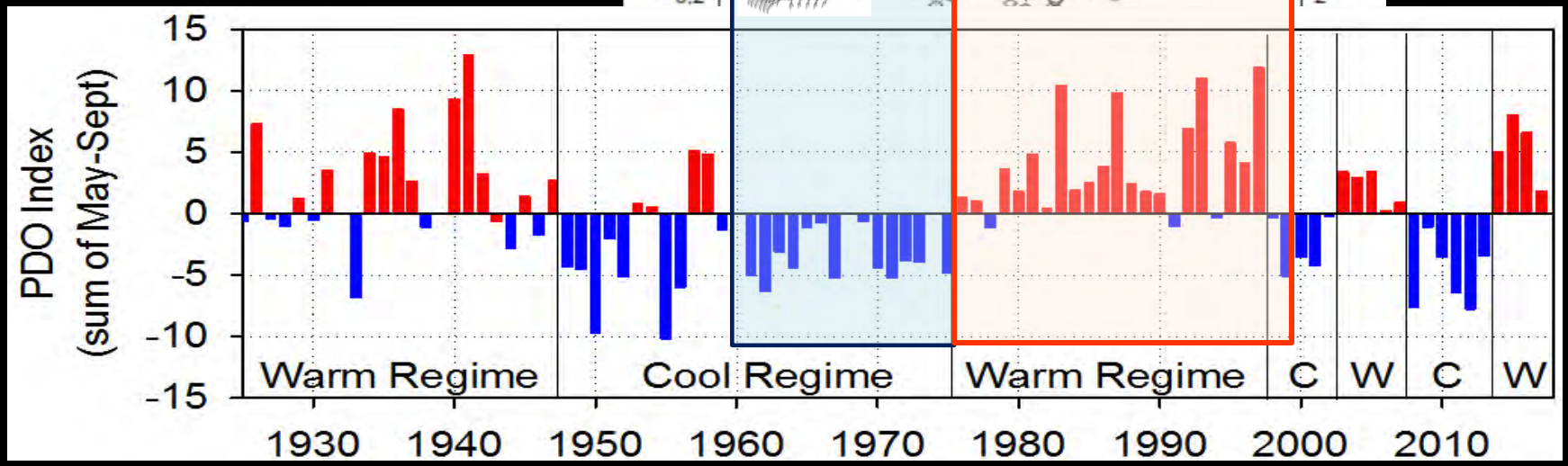


Source: Espinoza and Bertrand 2008, 2014

Background

Carrasco-Lozano 1989
Ayón et al 2004, 2008





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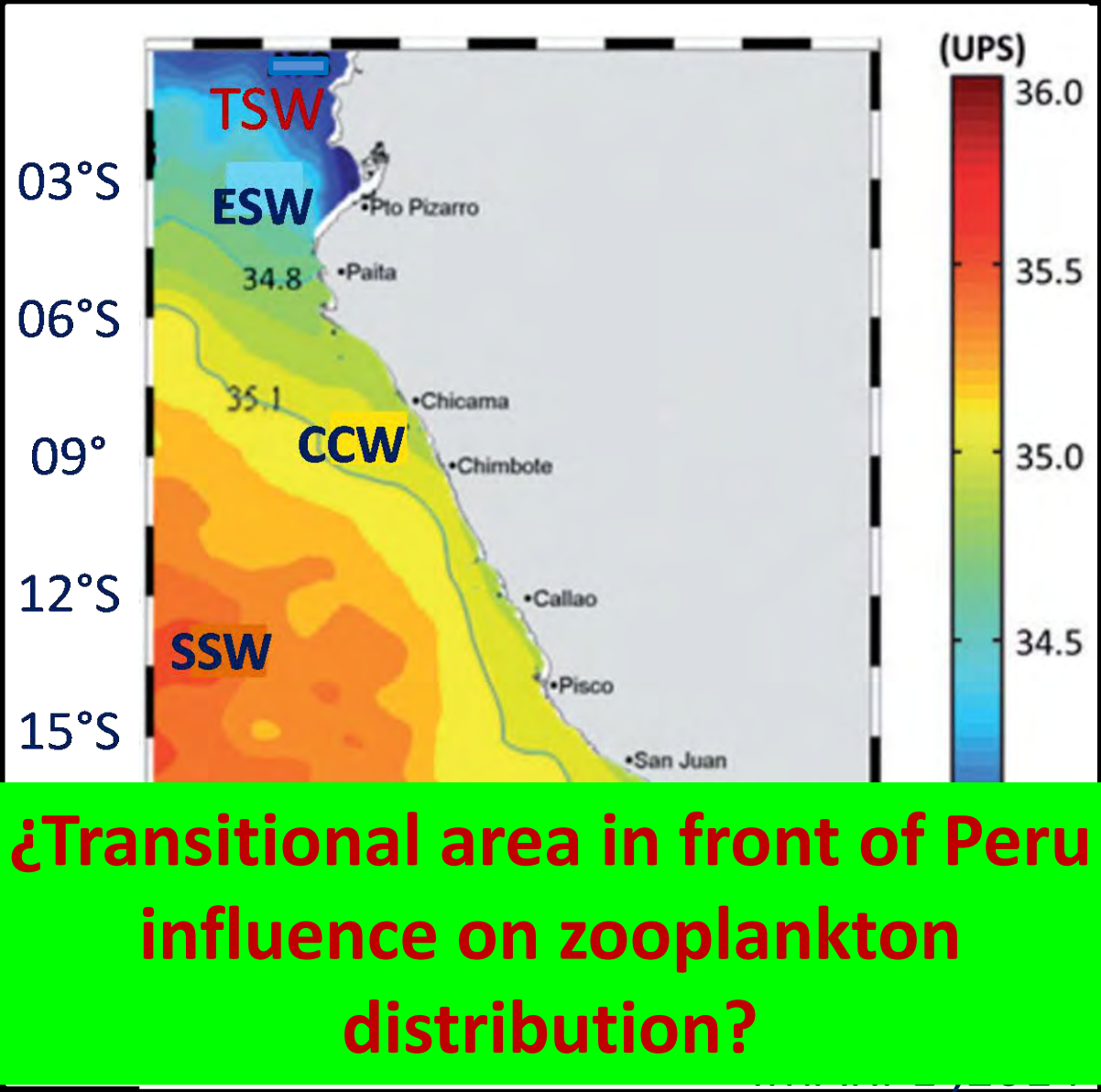
Is there enough zooplankton to feed forage fish populations off Peru? An acoustic (positive) answer

Michael Ballón [a,b,*], Arnaud Bertrand [a,b], Anne Lebourges-Dhaussy [c], Mariano Gutiérrez [d], Patricia Ayón [a], Daniel Grados [a,b], François Gerlotto [b]

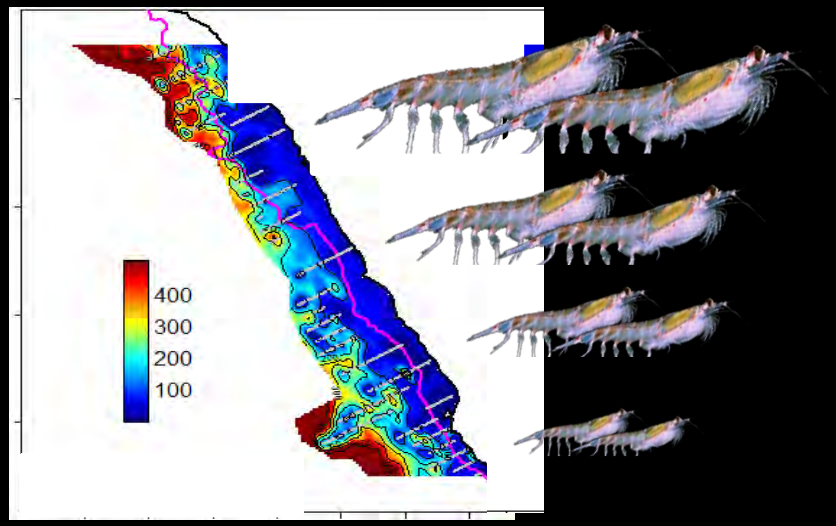
Transitional Area



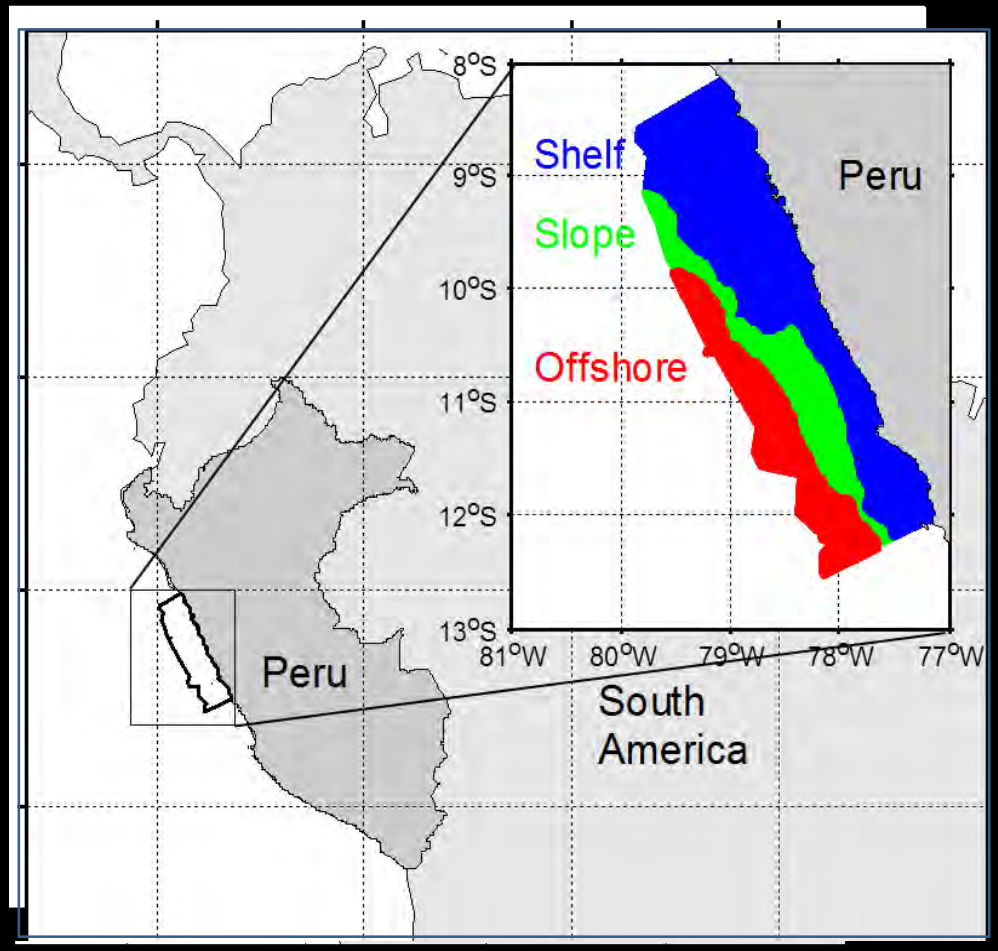
¿Transitional area in front of Peru influence on zooplankton distribution?

Objetives

To know temporal-spatio dynamics of zooplankton biomass distribution associated with transitional areas



Study Area



Pelagic surveys 2002-2012

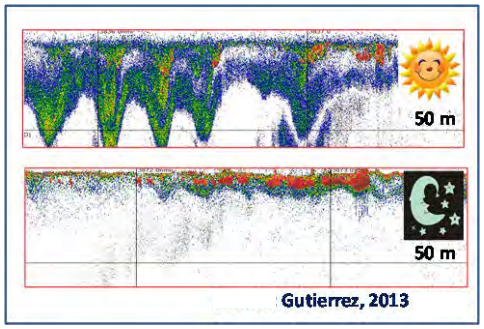
08°30'-14°00'S – 100 nm

Shelf (0 – 200 m),
Slope (200 – 1000 m)
Offshore (> 1000 m).

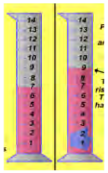
Methodology

Conventional Method

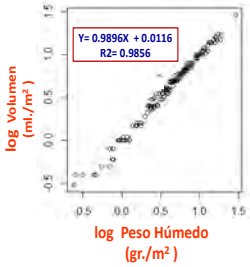
Sampling hour: Night
Hensen Net : 50m



Volumetric Methods
Biovolumes



Gravimetric Method
Wet weight



$$Y = aX^{?}$$

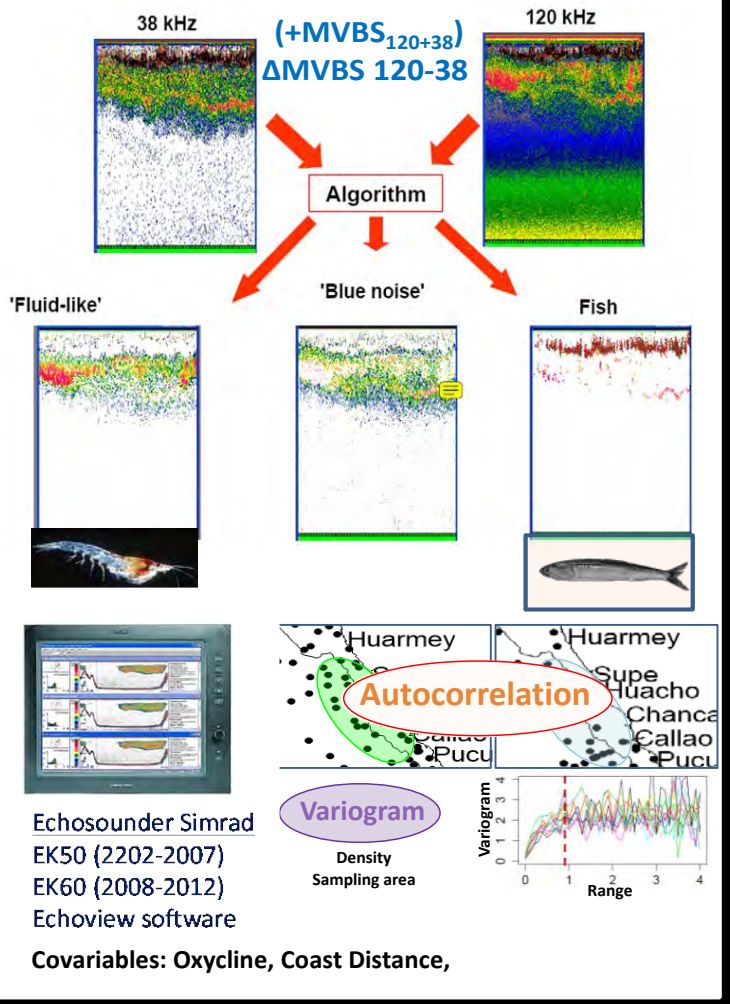
$$log_{10}(Y) = log_{10}(a) + ?\ log_{10}(X)$$

$$Log_{10}(\ Volume\ ) = Log_{10}(a) + ?\ Log_{10}(Wet\ weight)$$

Regression: 145 samples
Cruises- 1996-1998-2000-2003

Mesozooplankton (0,2-20mm)

Acoustic Method



Echosounder Simrad
EK50 (2202-2007)
EK60 (2008-2012)
Echoview software

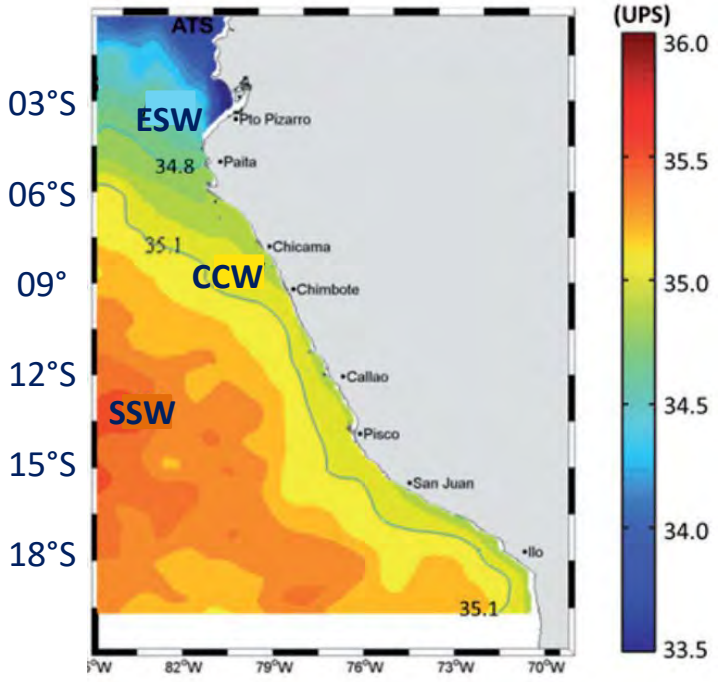
Covariables: Oxycline, Coast Distance,

Macrozooplankton (2-20cm)

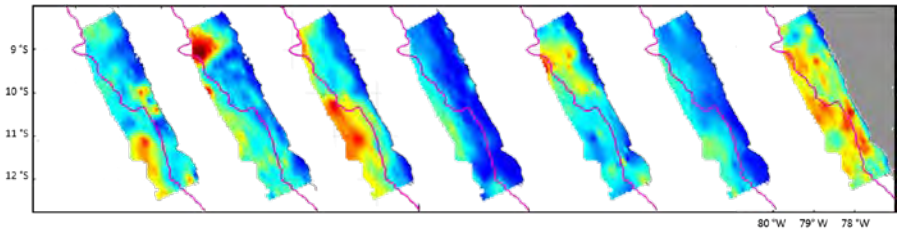
Total biomass

Methodology

Water Masses



Oxycline depth



Statitical Analysis of Variance Anova

Results and Discussion

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Understanding Changes in Transitional Areas of the Pacific
April 24-26, 2018
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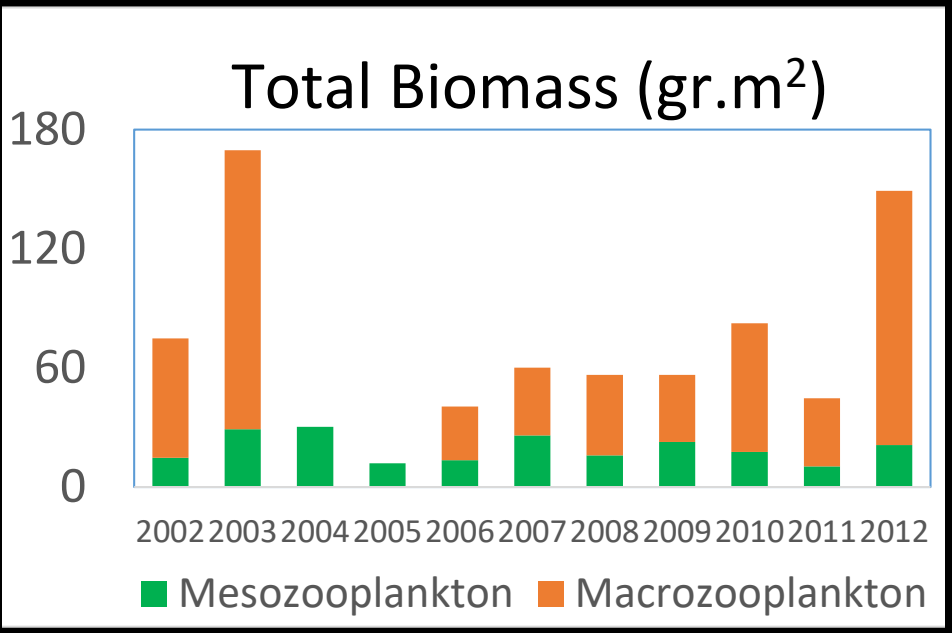

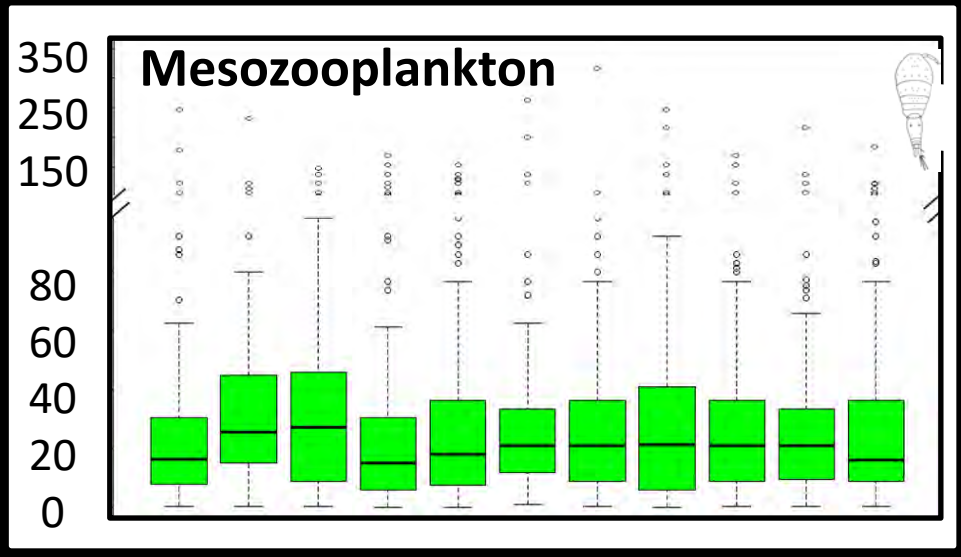

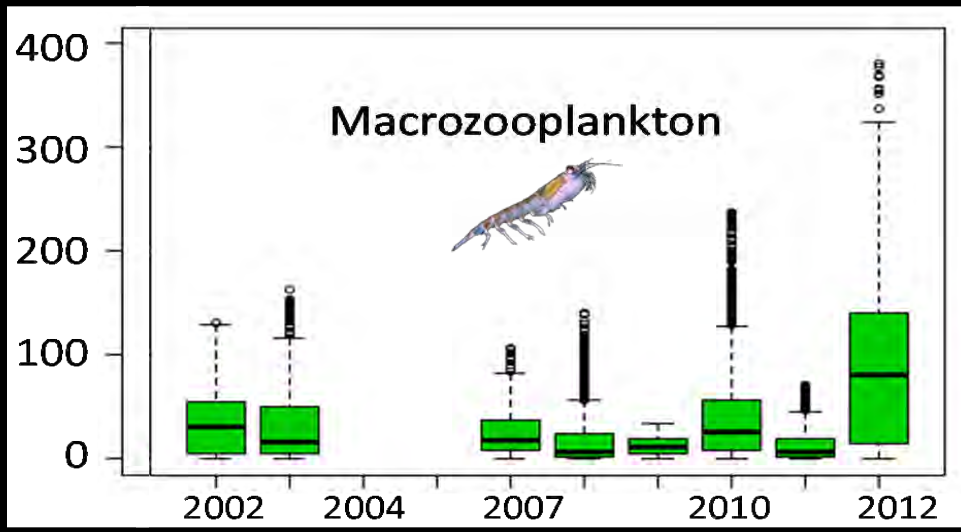

Biomass ($gr.m^{-2}$)

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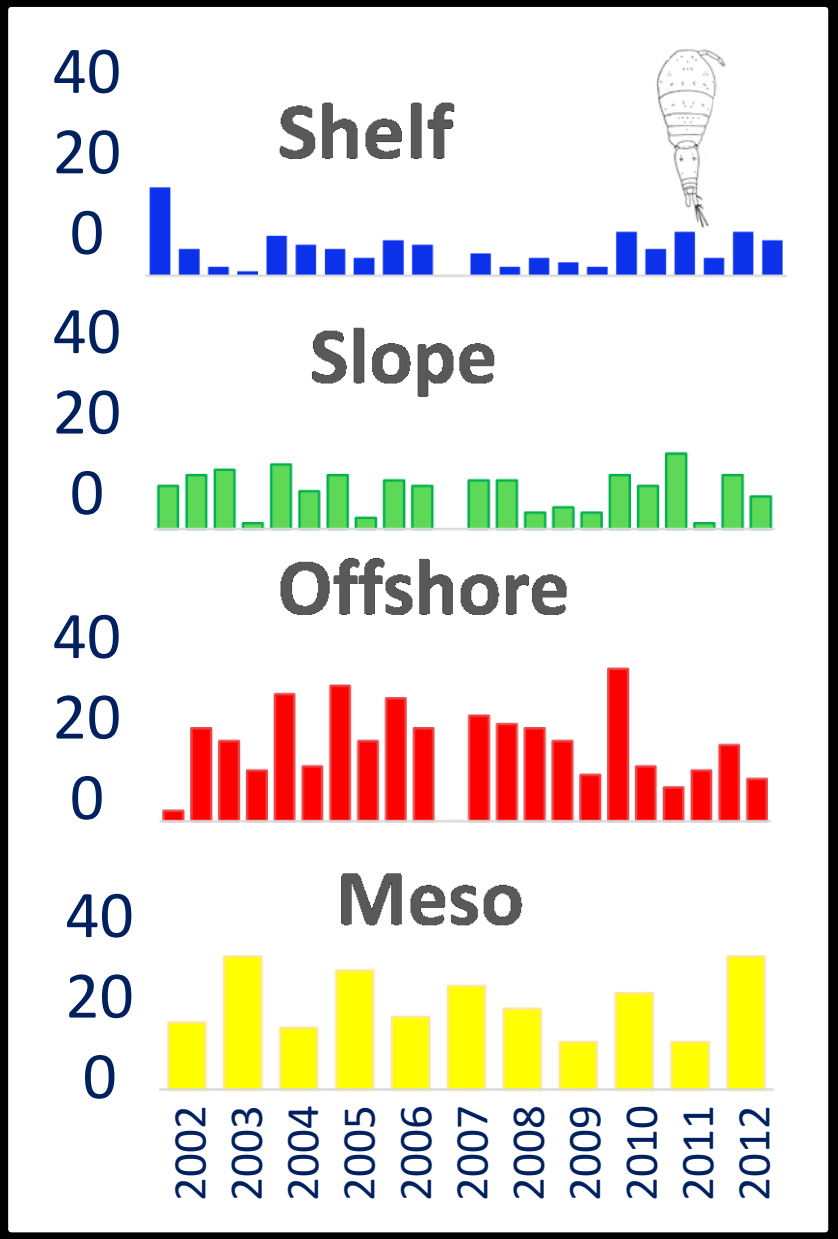
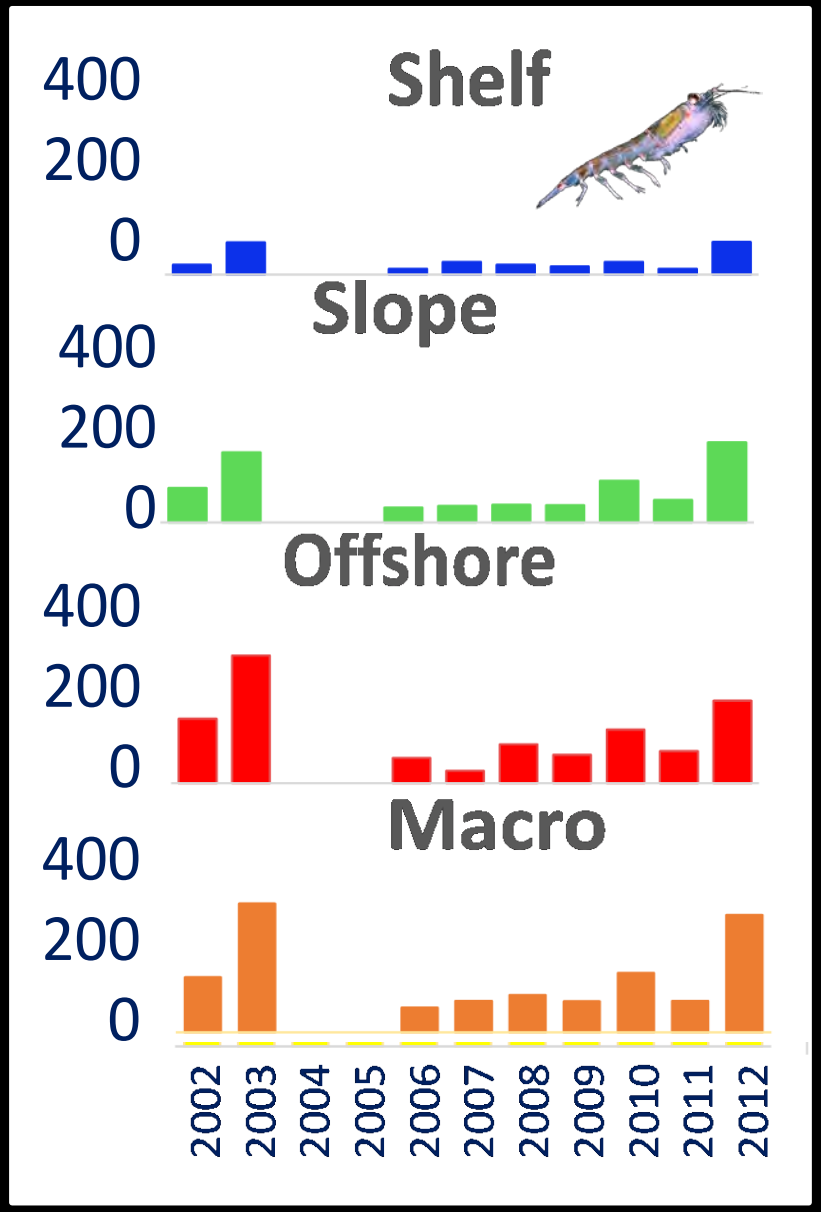
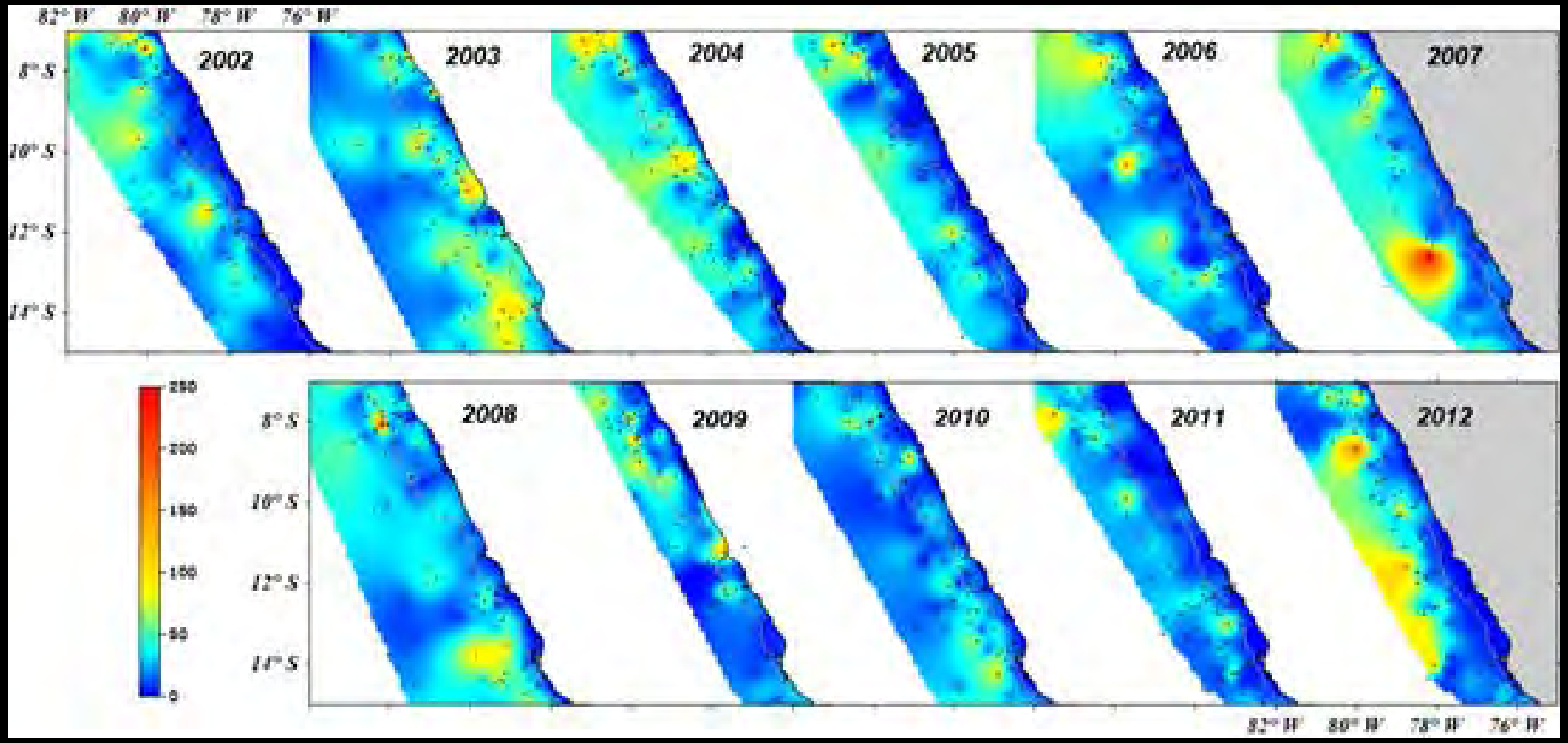




Results and Discussion

Mesozooplankton distribution



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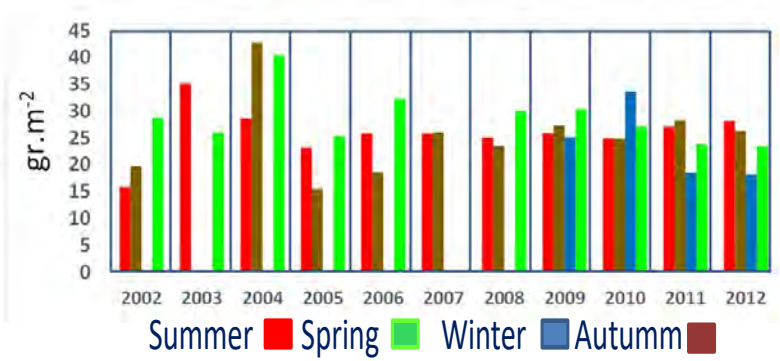
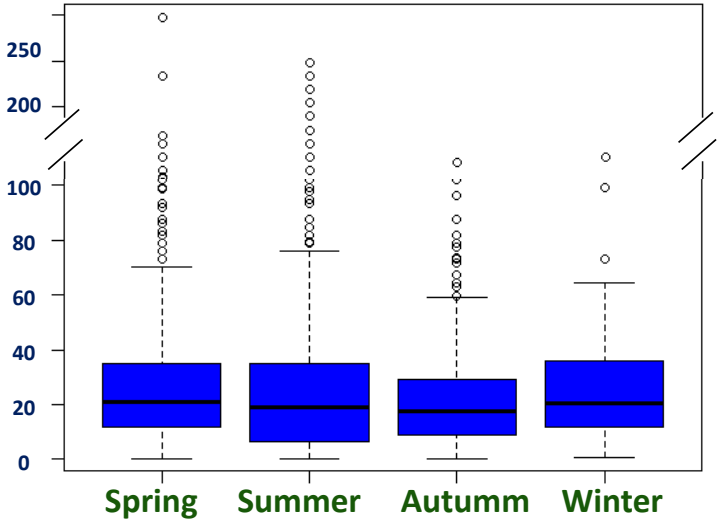
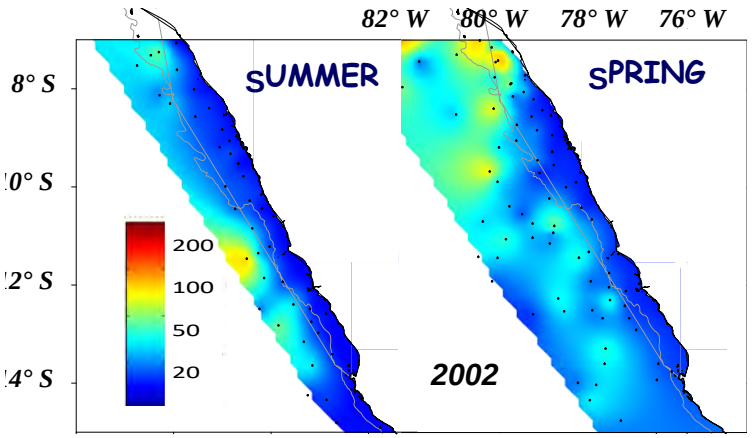
Biomass (gr.m^2)

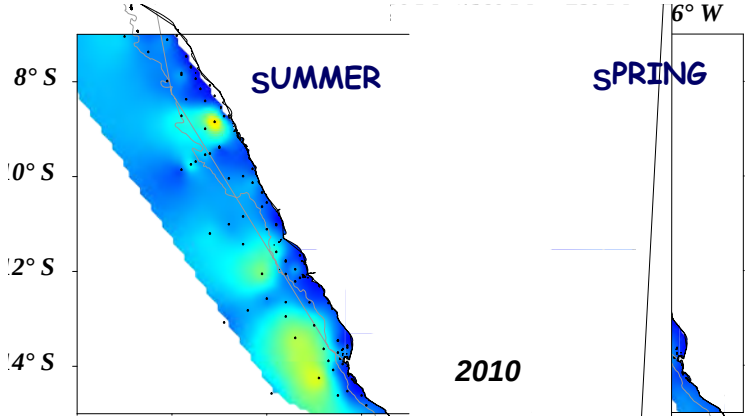




	Df	Sum Sq	Mean Sq	F value	Pr(>F)
as.factor(dato$Stacion)	3	582563	194188	47.79	<2e-16 ***
Residuals	7534	30611772	4063		

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1





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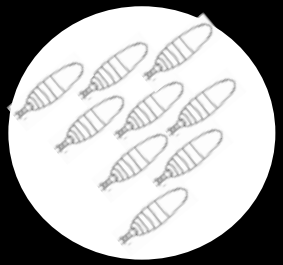
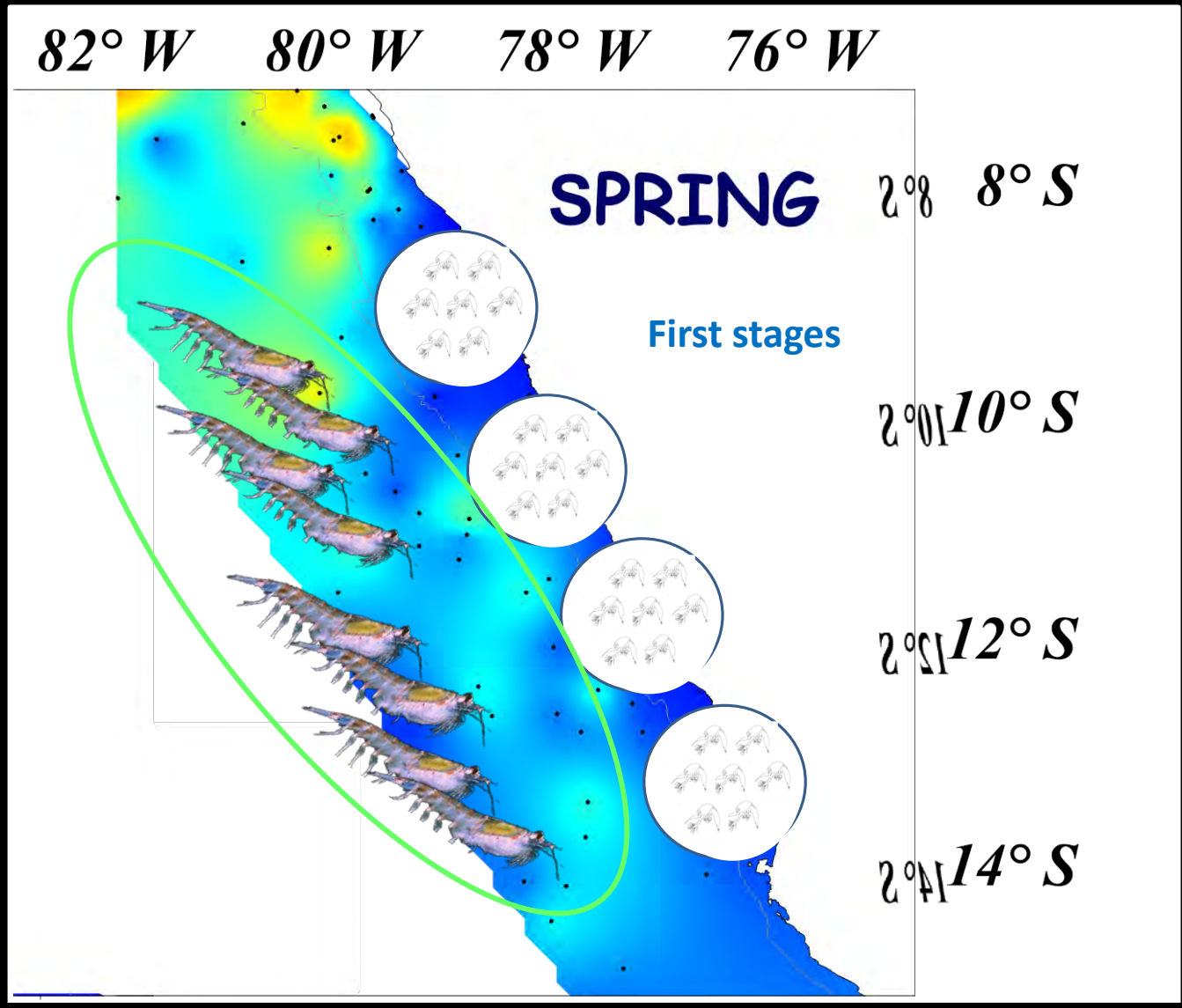
Highest Biomass: Offshore



Calanus chilensis

2010



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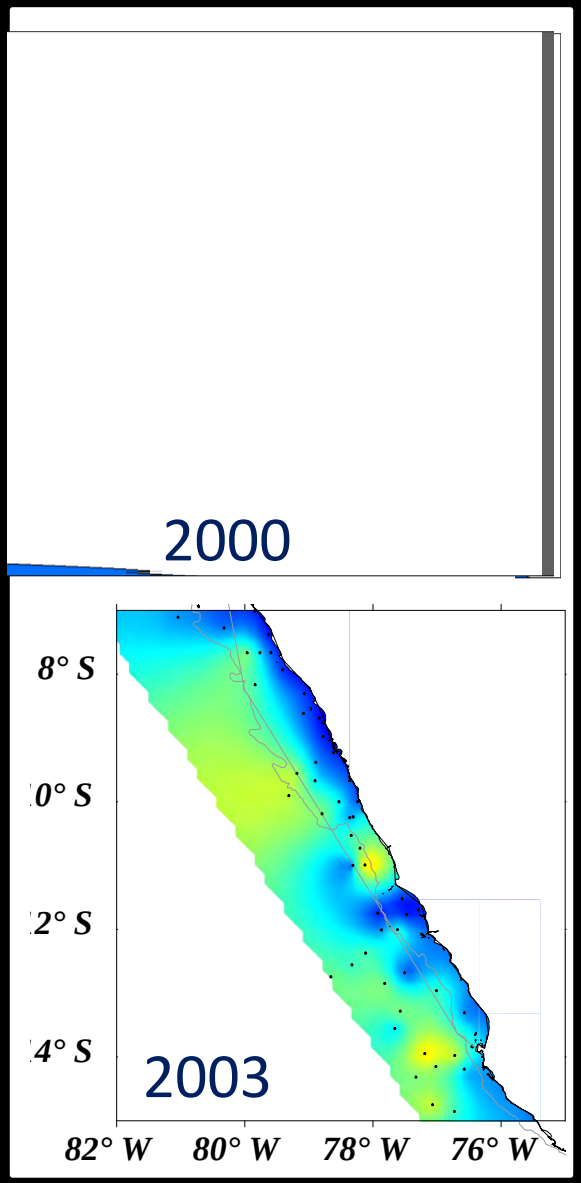
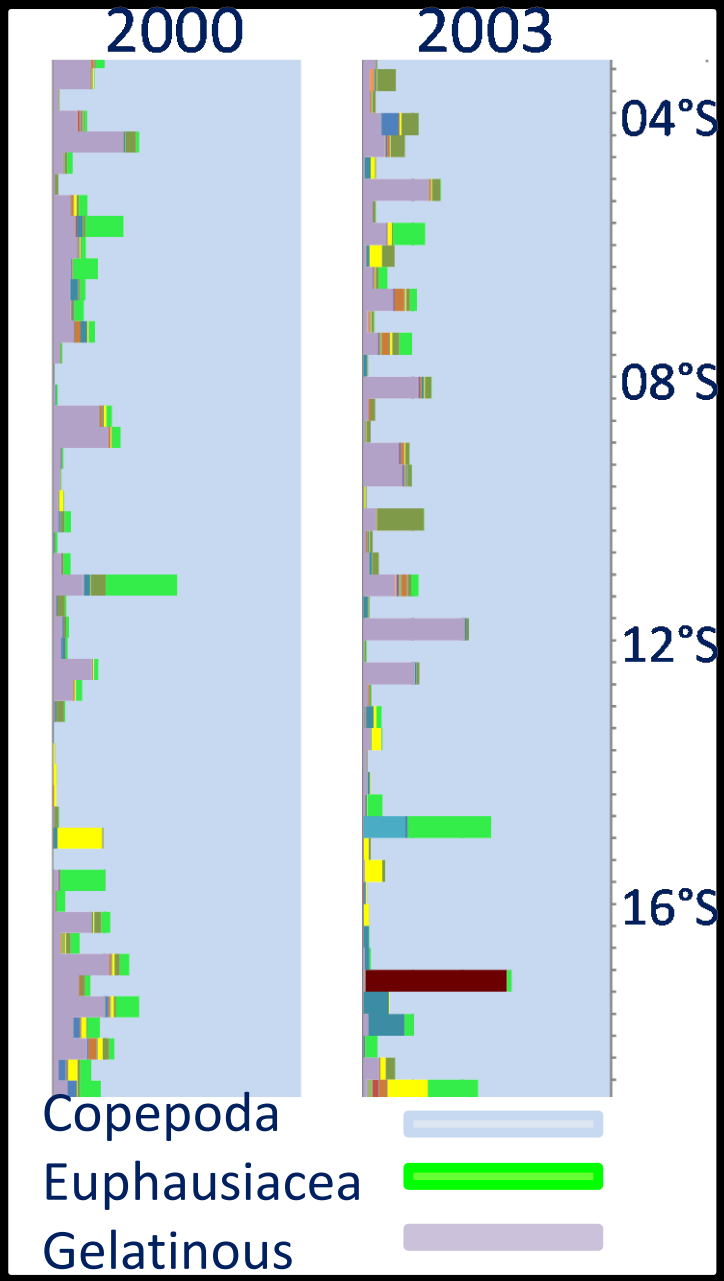
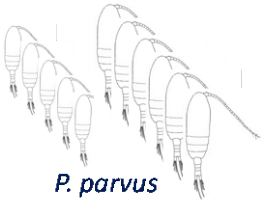




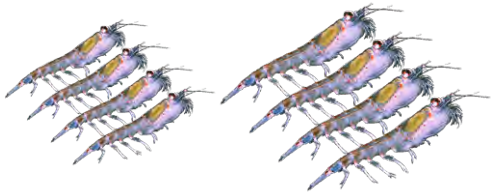
Summer

2000 2003



P. parvus

Sagitta pacifica



Euphausia mucronata

Pinedo et al 2014

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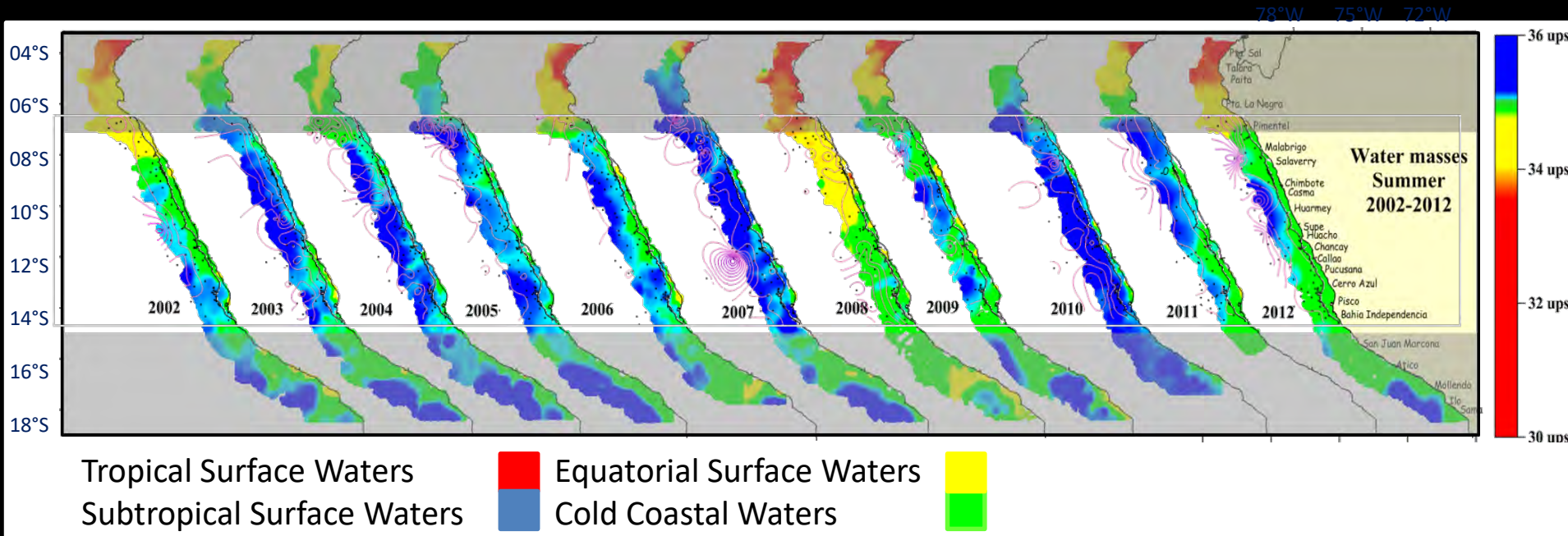
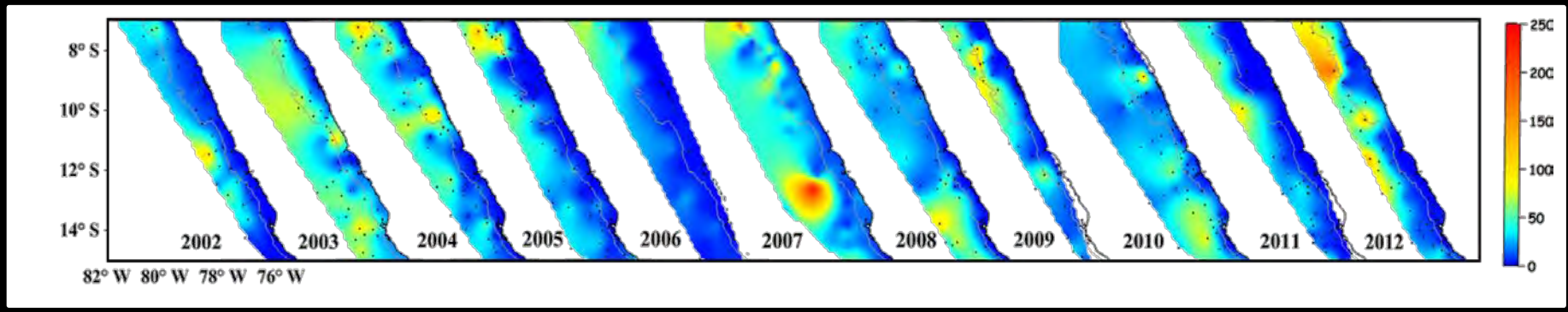
Summer: 2002-2012



Tropical Surface Waters
Subtropical Surface Waters
Equatorial Surface Waters
Cold Coastal Waters



High correlation between water masses and mesozooplankton

Results y Discussion

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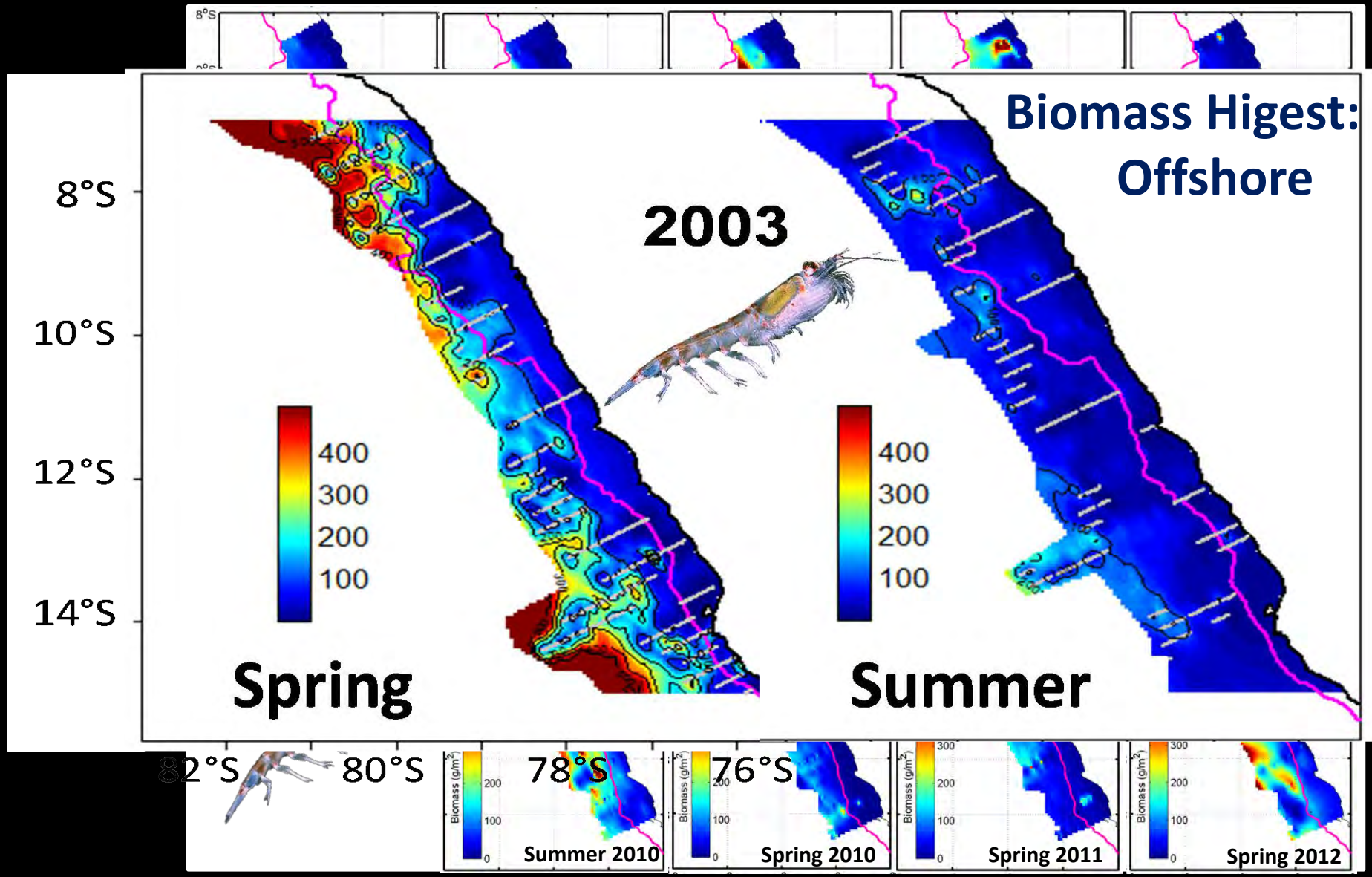
Macrozooplankton biomasses:2002-2012



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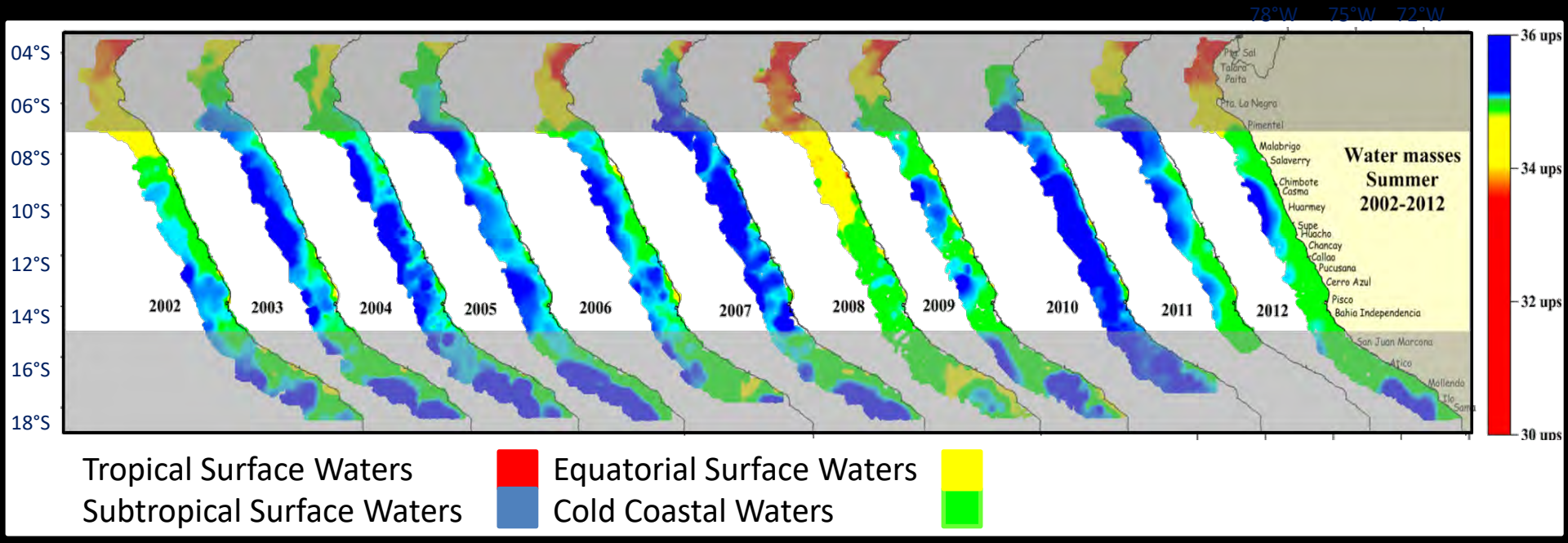
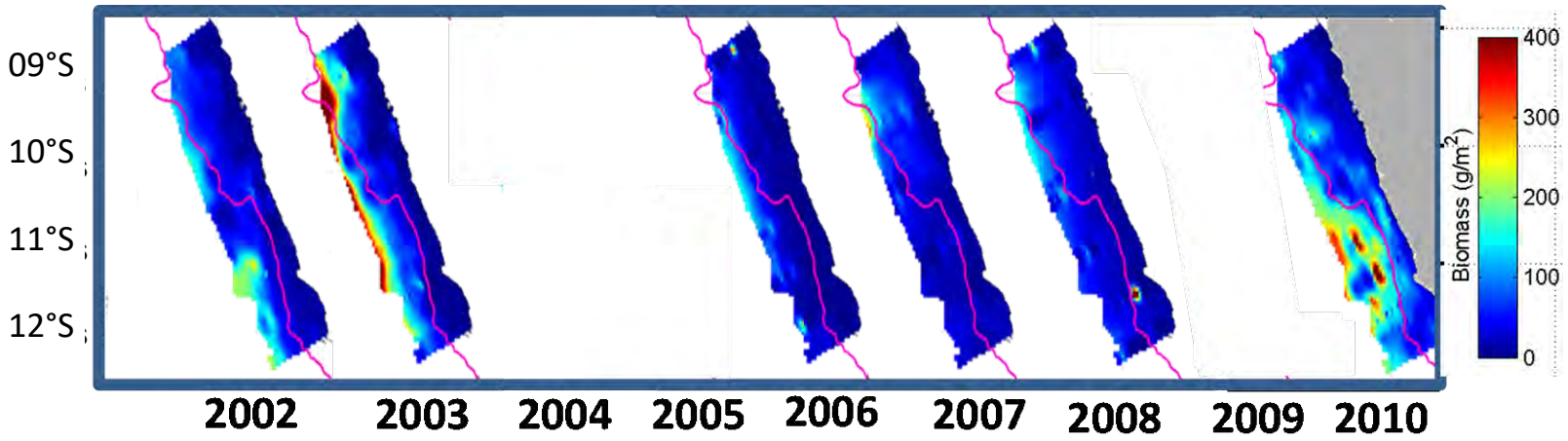
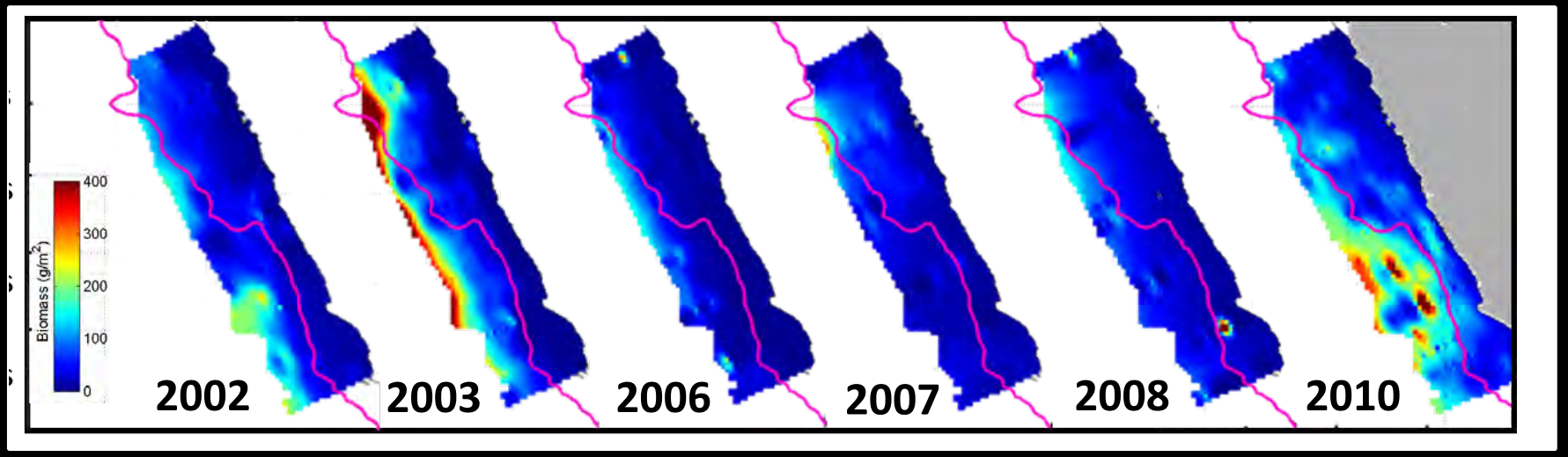


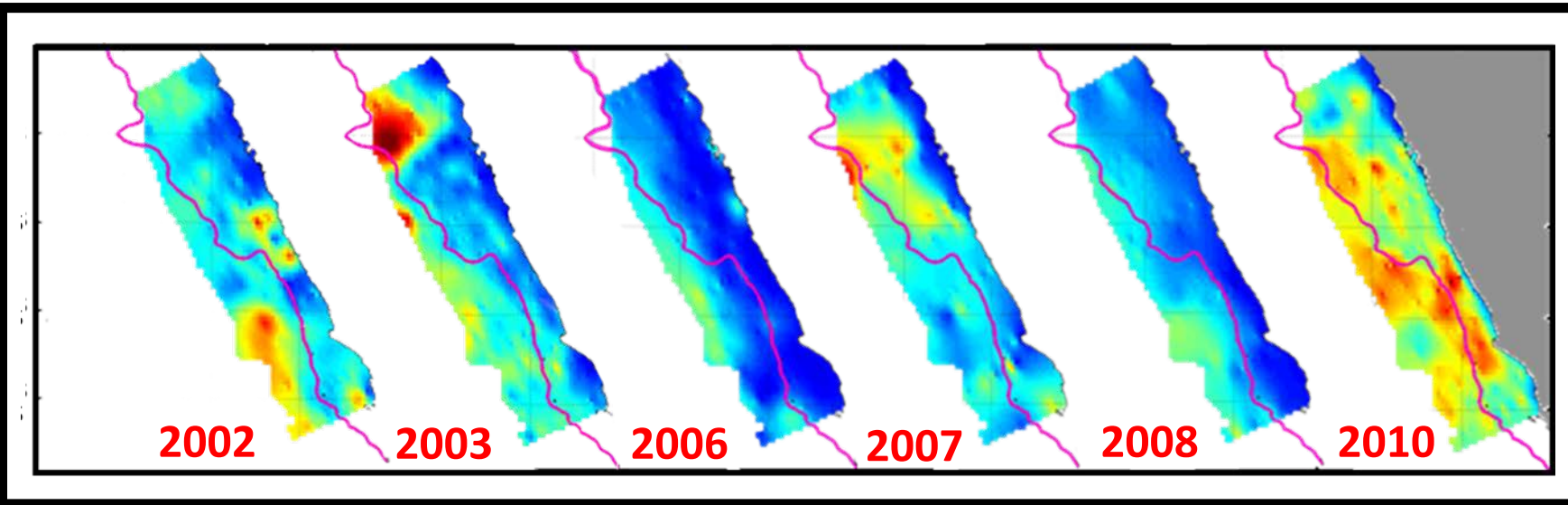


Low correlation between water masses and macrozooplankton

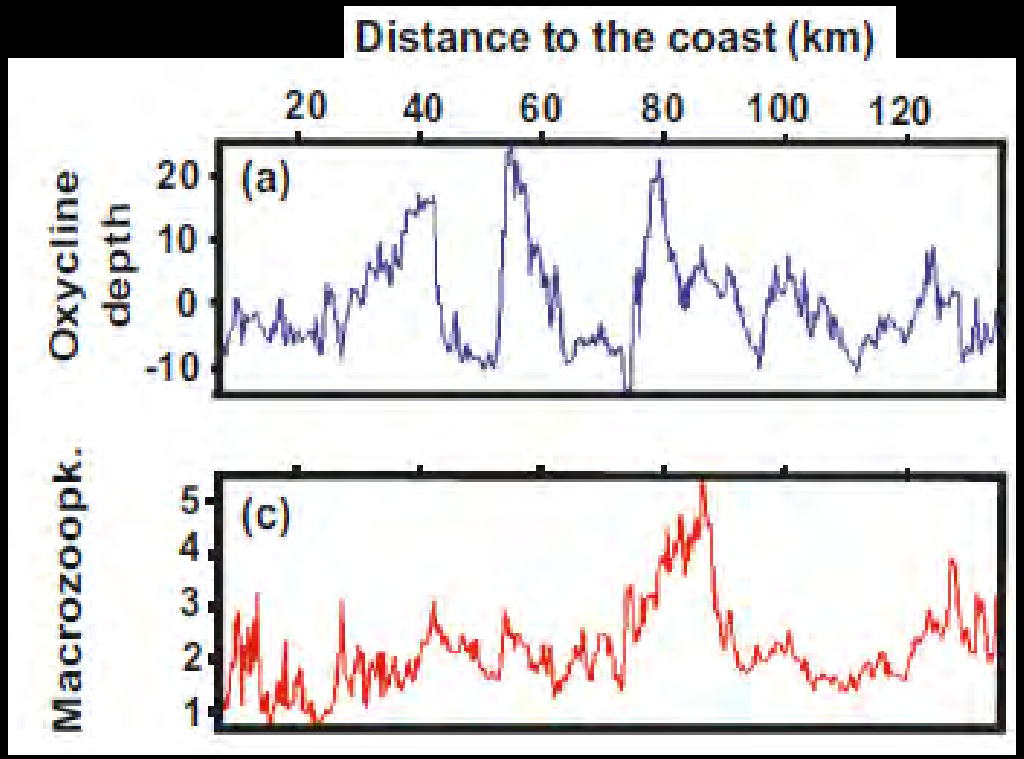
Results and Discussion

Macrozooplankton Biomass

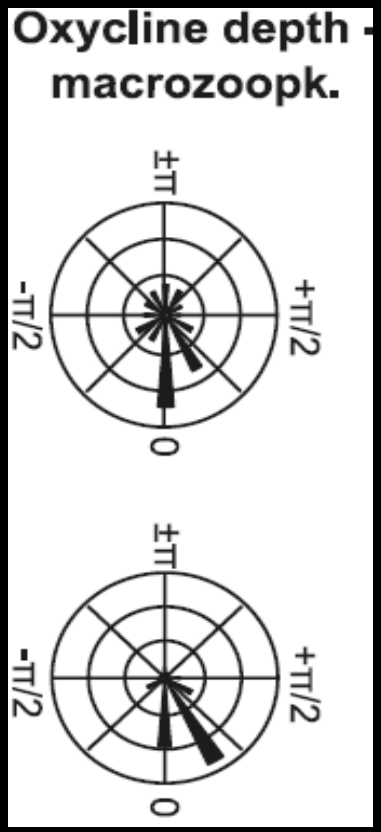




Results y Discussion

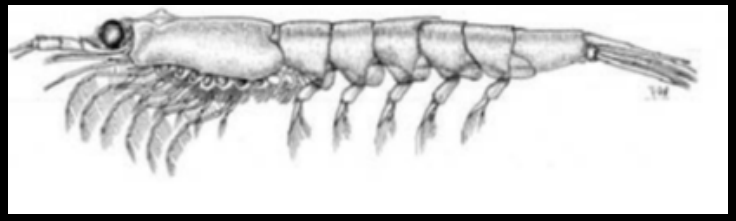


Grados et al 2012



Conclusions

- Mesozooplankton and Macrozooplankton presents similar tendency.
- Mesozooplankton is associated with water masses displacement.
- Macrozooplancton can response to water masses displacement, but is more associated with oxycline depth.



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