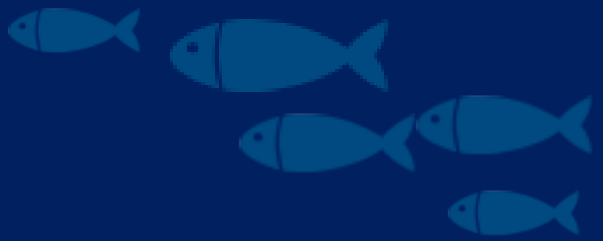
Patterns in chub mackerel abundance and distribution in relation to environmental conditions

Andreia V. Silva*, Manuela Azevedo, Corina Chaves, Eduardo Soares, Vitor Marques, Cristina Nunes, Paulo B. Oliveira, Laura Wise and Alexandra Silva

PICES/ ICES Drivers of Small Pelagic Fish Resources
10 March, 2017 Victoria, BC

Instituto Português do Mar e da Atmosfera,
Lisboa, Portugal



ipma

pnab
programa nacional de amostragem biológica

WHO


© Sesimbra é peixe

Chub mackerel (*Scomber colias*) is a fish species with pelagic behavior that distributes in warm and temperate waters of the Atlantic Ocean and the Mediterranean Sea

In Portugal is often a bycacth in purse seine fleet fisheries

In recent years has gained economic importance and became a target species

Landings in Portugal and Spain have almost tripled since the early 2000's

Not yet an assessed species

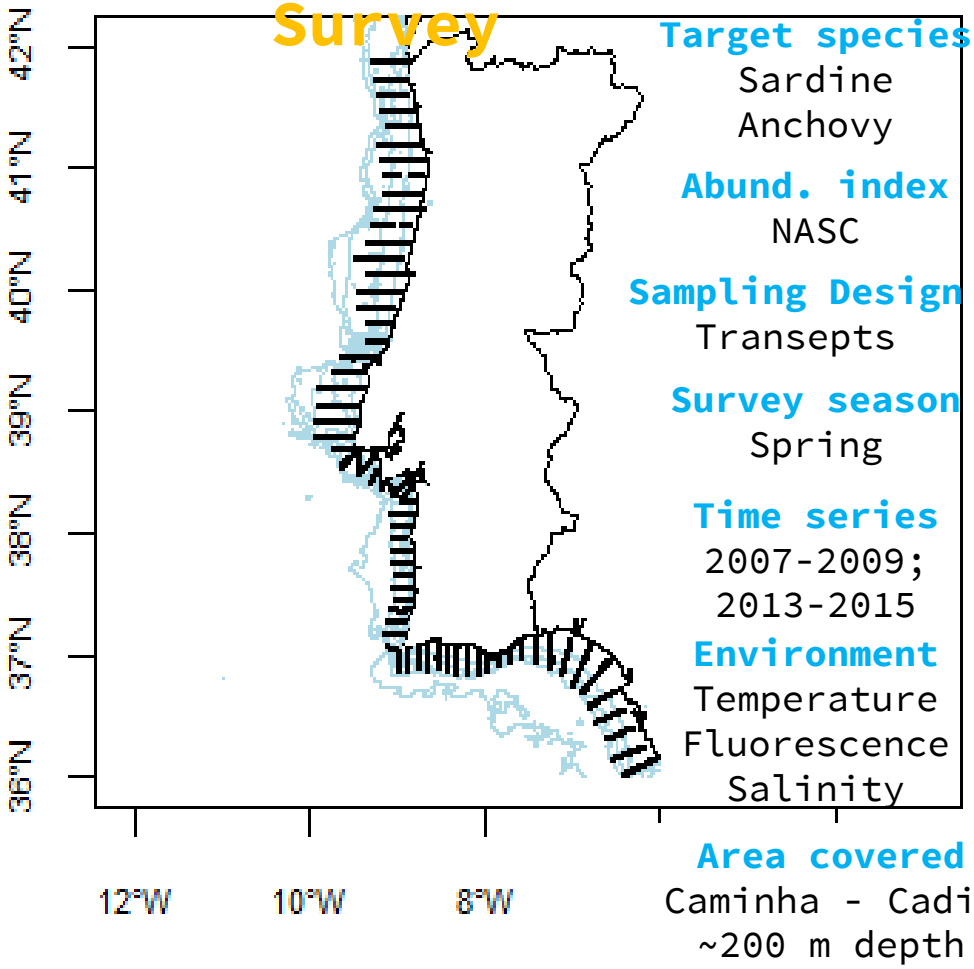
Chub mackerel's spatial variability in the pelagic ecosystem life in Portugal waters is currently not well known

© Sesimbra é peixe

What data do we have available to study chub makerel?

DATA

Acoustic Survey



Target species
Sardine
Anchovy

Abund. index
NASC

Sampling Design
Transepts

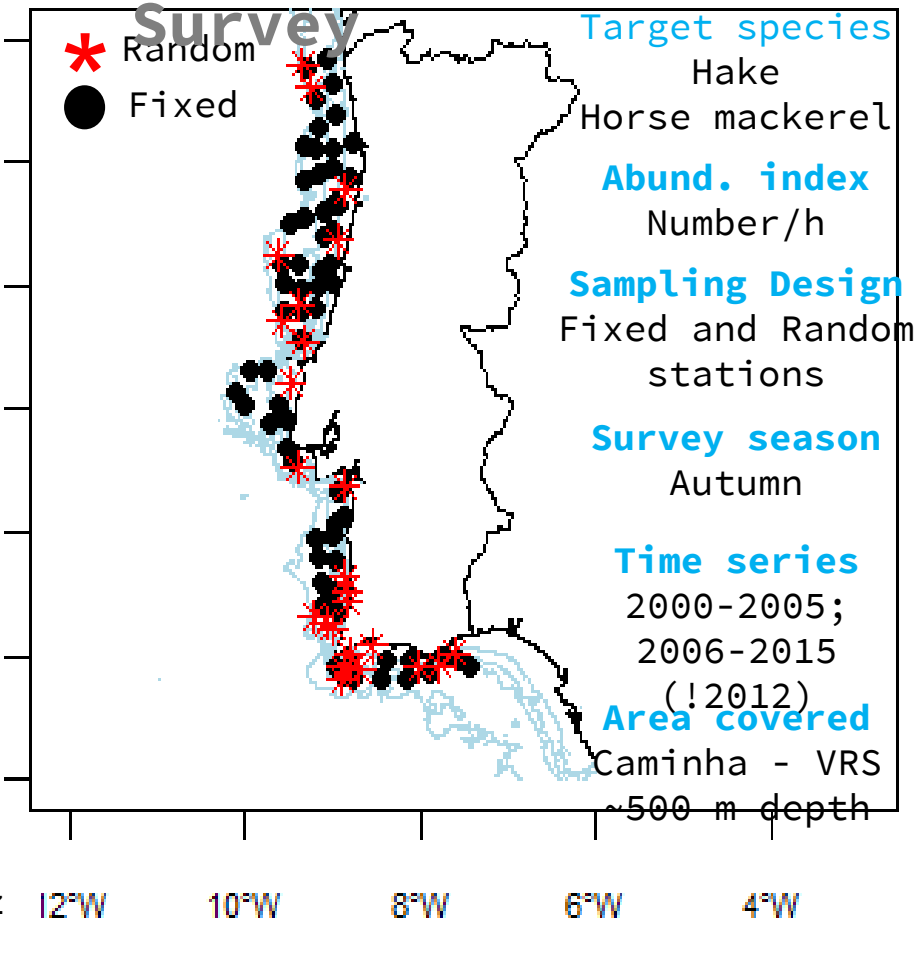
Survey season
Spring

Time series
2007-2009;
2013-2015

Environment
Temperature
Fluorescence
Salinity

Area covered
Caminha - Cadiz
~200 m depth

Bottom trawl Survey



Target species
Hake
Horse mackerel

Abund. index
Number/h

Sampling Design
Fixed and Random stations

Survey season
Autumn

Time series
2000-2005;
2006-2015
(!2012)

Area covered
Caminha - VRS
~500 m depth

QUESTIONS AND OUTPUTS

Q1. Seasonal spatial distribution of chub mackerel along the Portuguese coast

- Latitude
- Longitude
- Depth

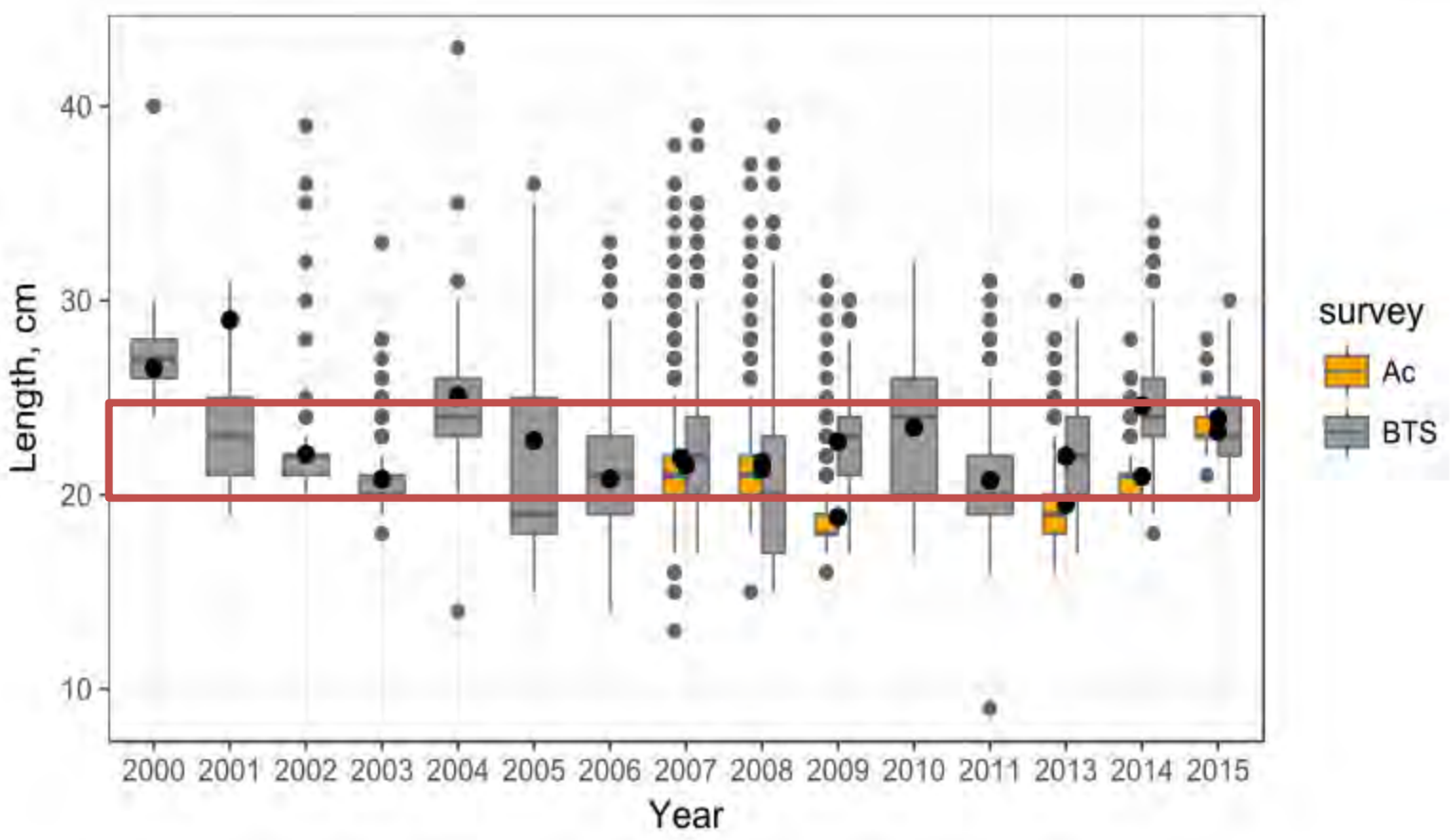
Q2. Environmental influences

- Salinity
- Fluorescence
- Temperature

Q3. Temporal series abundance

OBSERVED DATA

Length Distribution



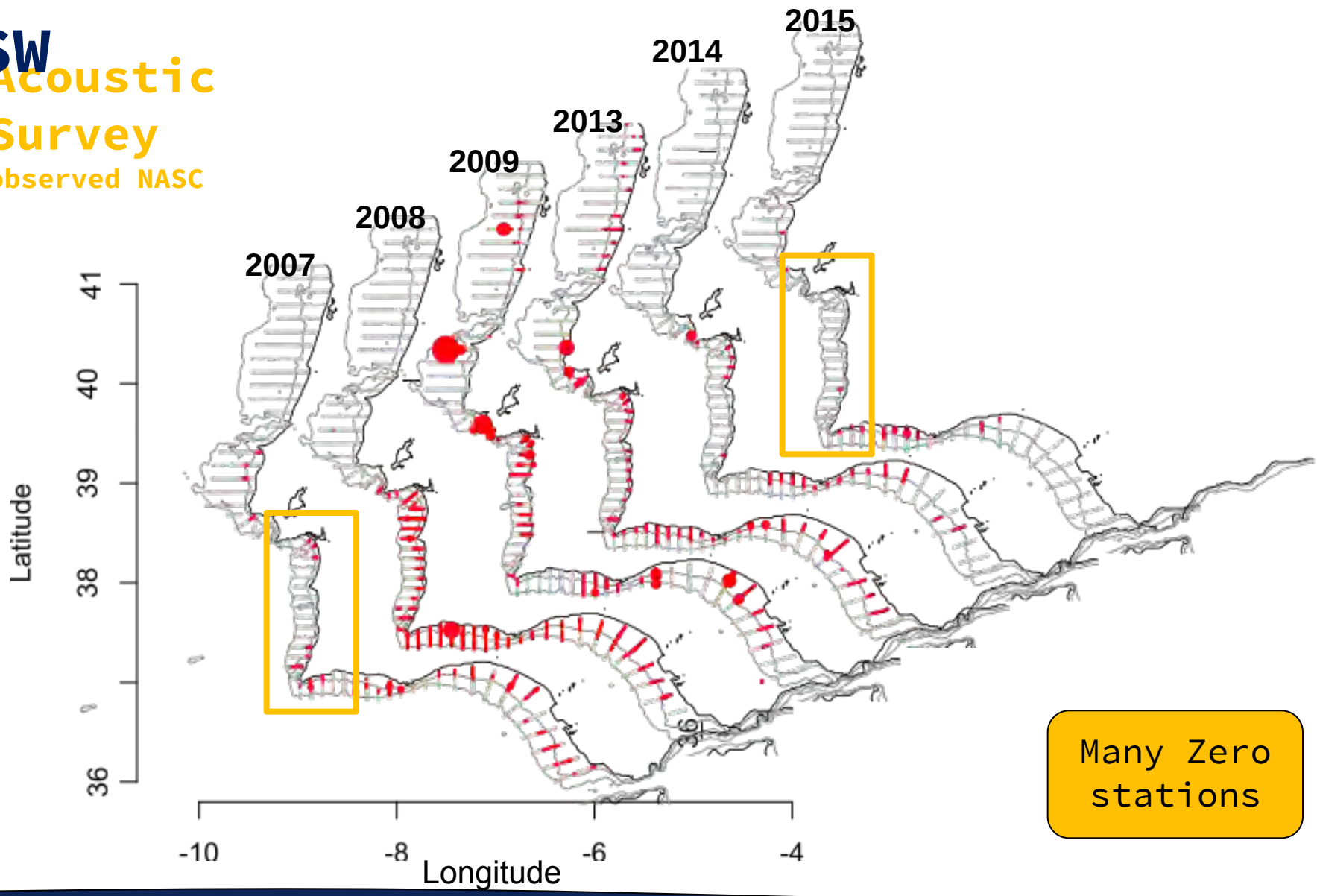
Juveniles and young adults individuals

BTS chub mackerels slighty bigger

MORE PRESENCES IN THE S AND SW

Acoustic Survey

observed NASC

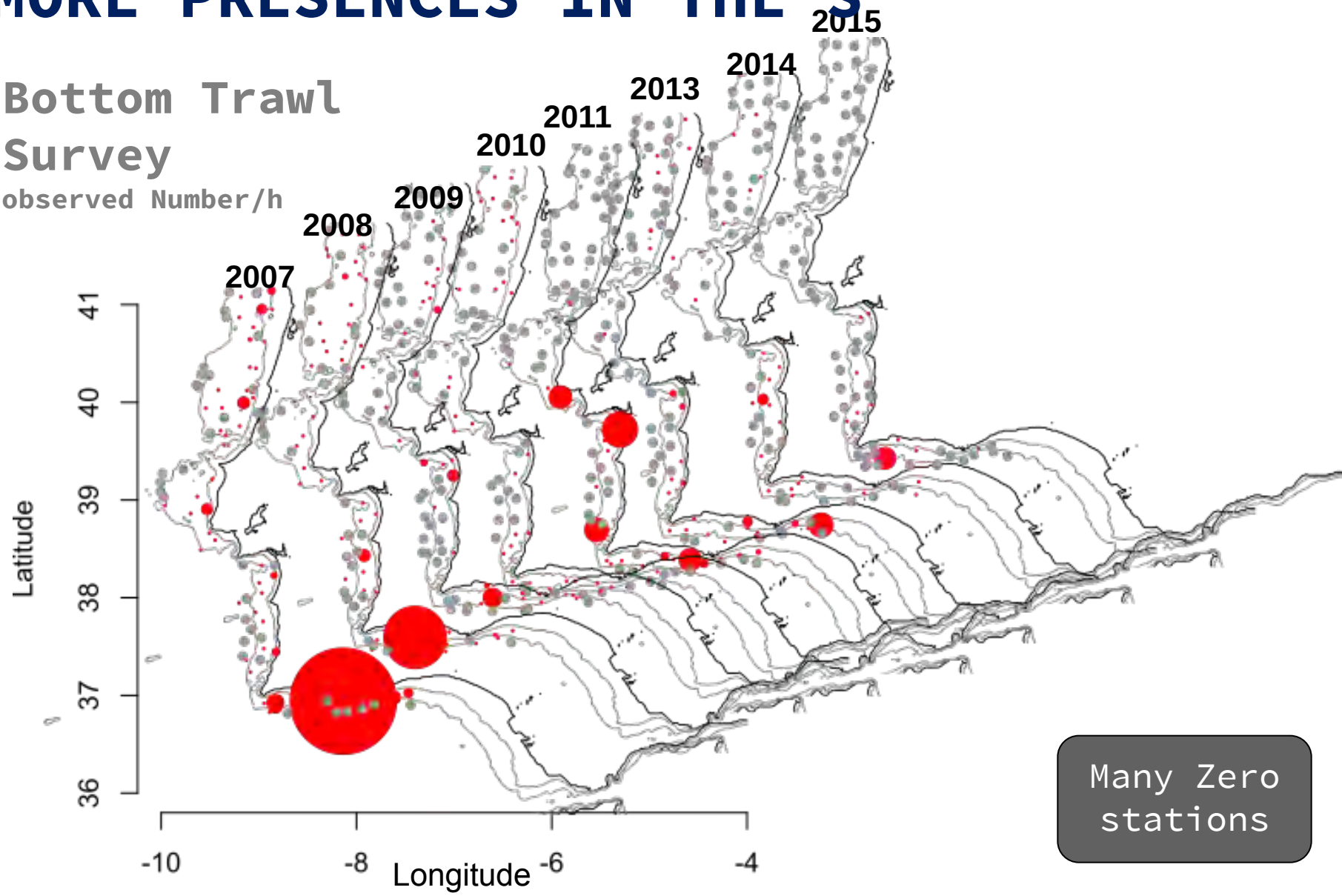


Many Zero stations

MORE PRESENCES IN THE S

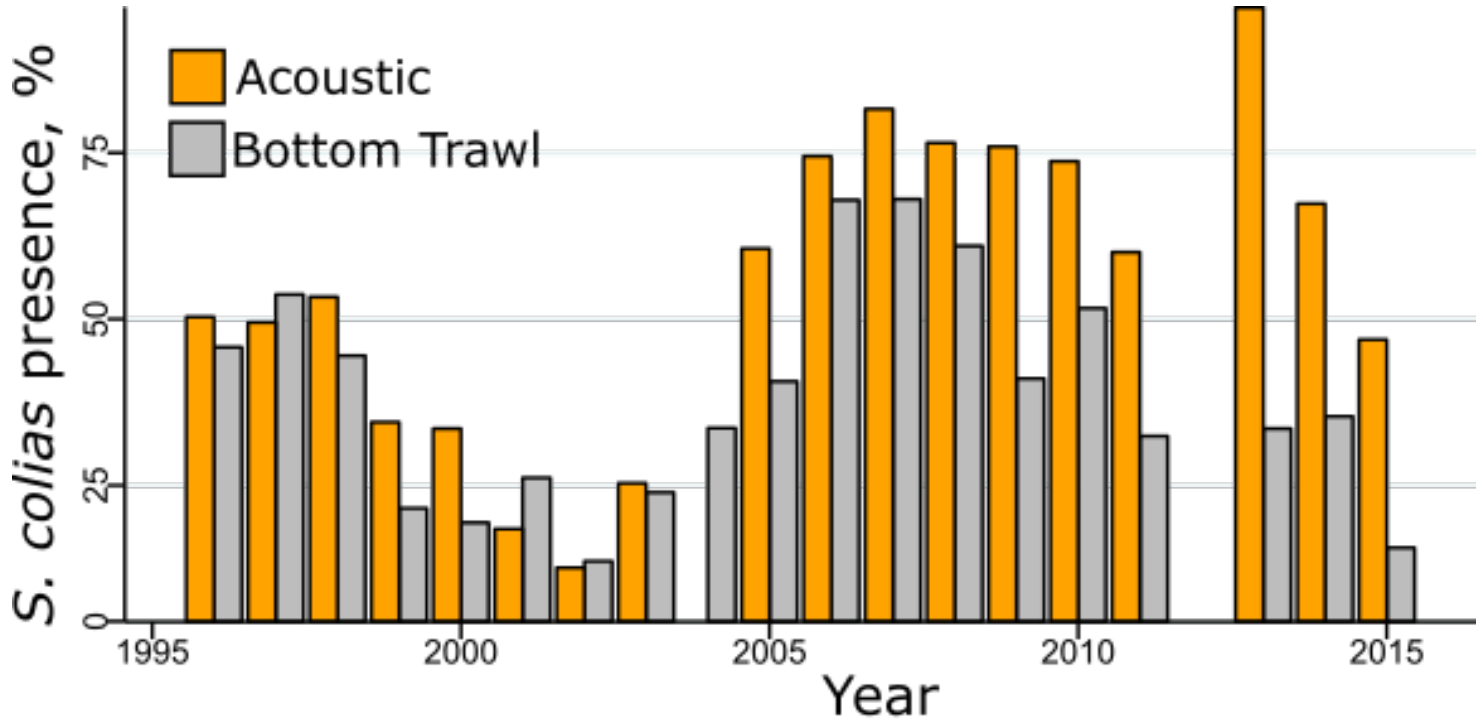
Bottom Trawl Survey

observed Number/h



Many Zero stations

OBSERVED DATA



Both surveys seemed to follow the same trend over time

MODEL

Two-part GAM

Acoustic Survey

Response variable
NASC

Predictor variables
lat, long
Depth
Temperature
Fluorescence
Salinity

Bottom Trawl Survey

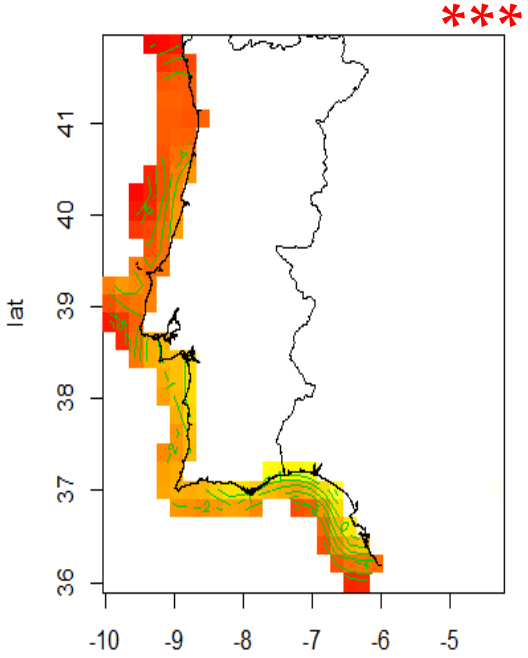
Response variable
Number/h

Predictor variables
lon,lat
depth
year

Q1. Seasonal spatial distribution

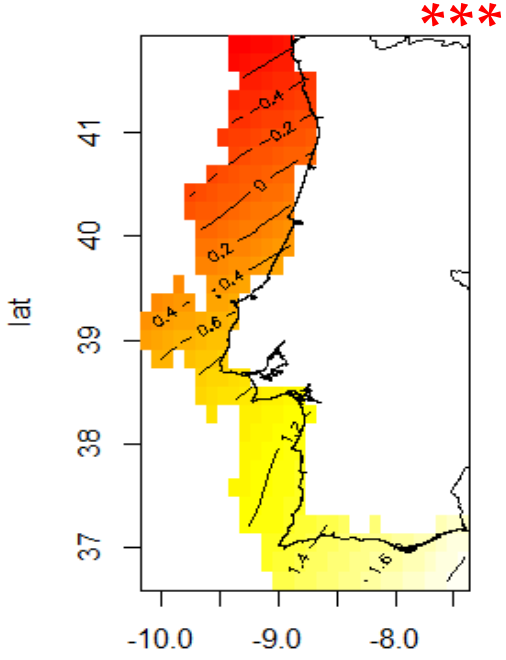
Latitude and Longitude

Ac



Deviance
explained = 40.6%

BT



Deviance
explained = 24.1%

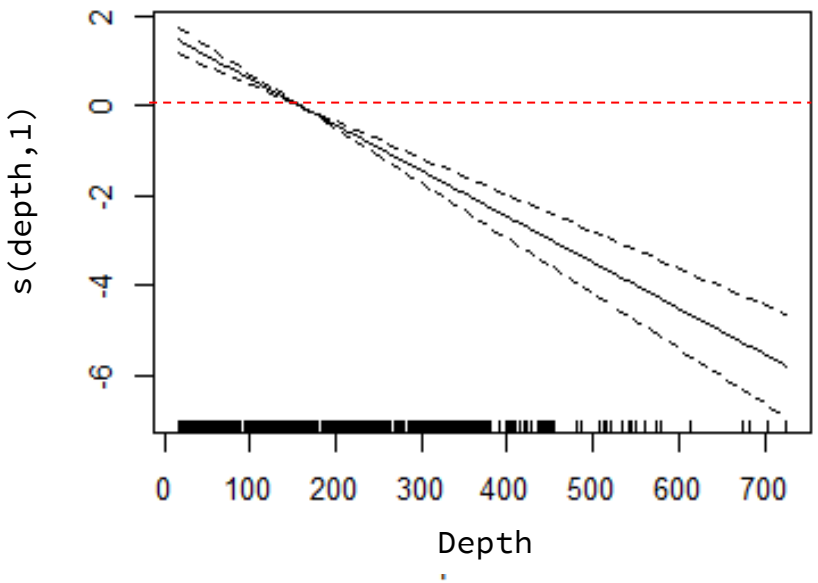
More probability of abundance in the SW and S

Q1. Seasonal spatial distribution

Depth

Bottom Trawl Survey

***



Significant decline of chub mackerel probability presence with depth

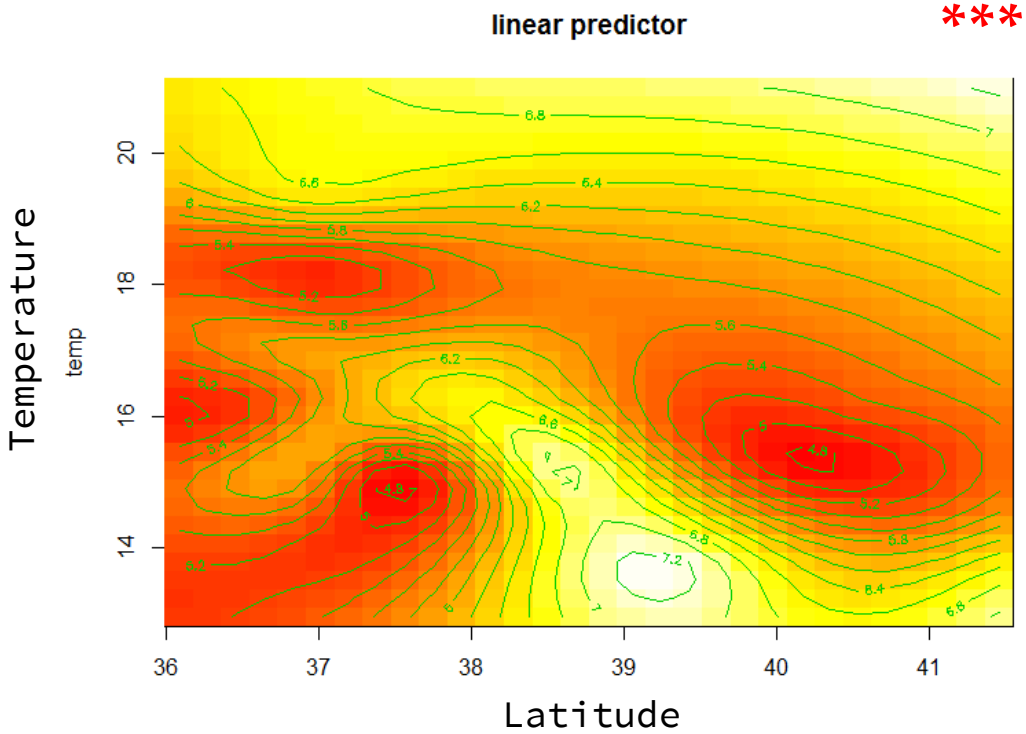
Q2. ENVIRONMENTAL CONDITIONS

Temperature, Salinity and Fluorescence

Acoustic Survey

Temperatures 14-16ºC chub mackerel more abundant in latitude 39º

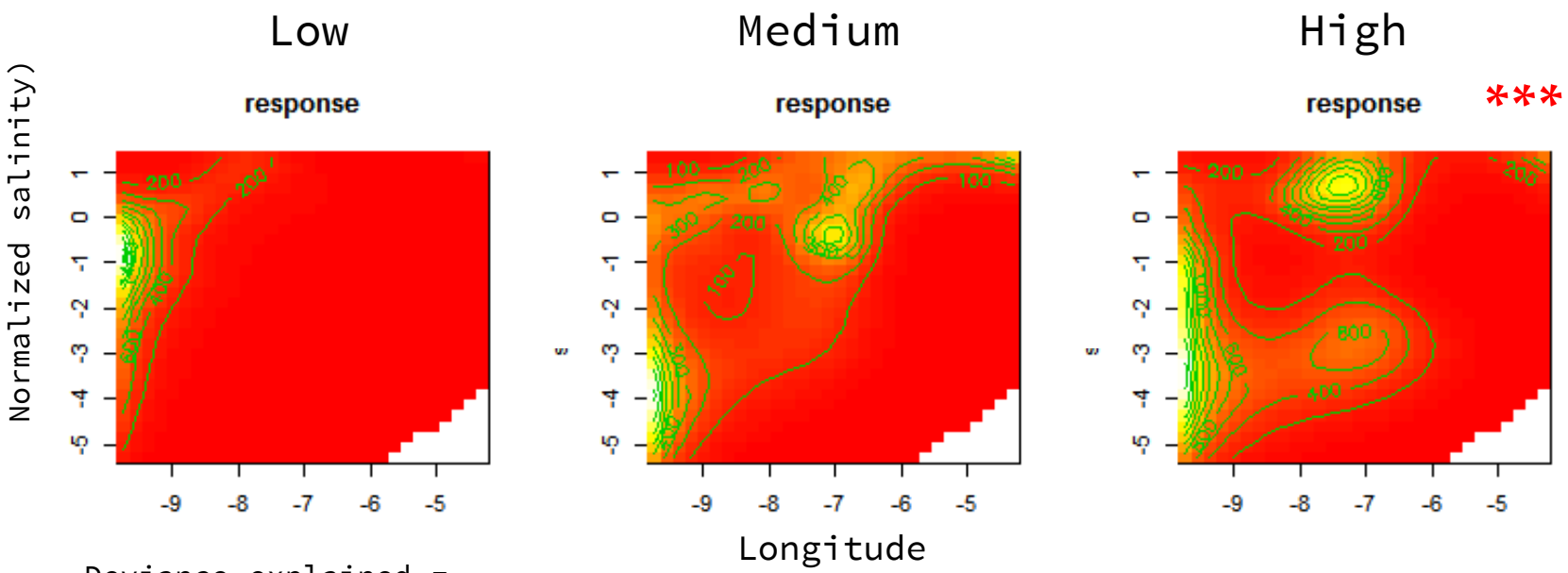
Temperatures above 19ºC chub mackerel distributes along all latitudes 36º-41º



Q2. ENVIRONMENTAL CONDITIONS

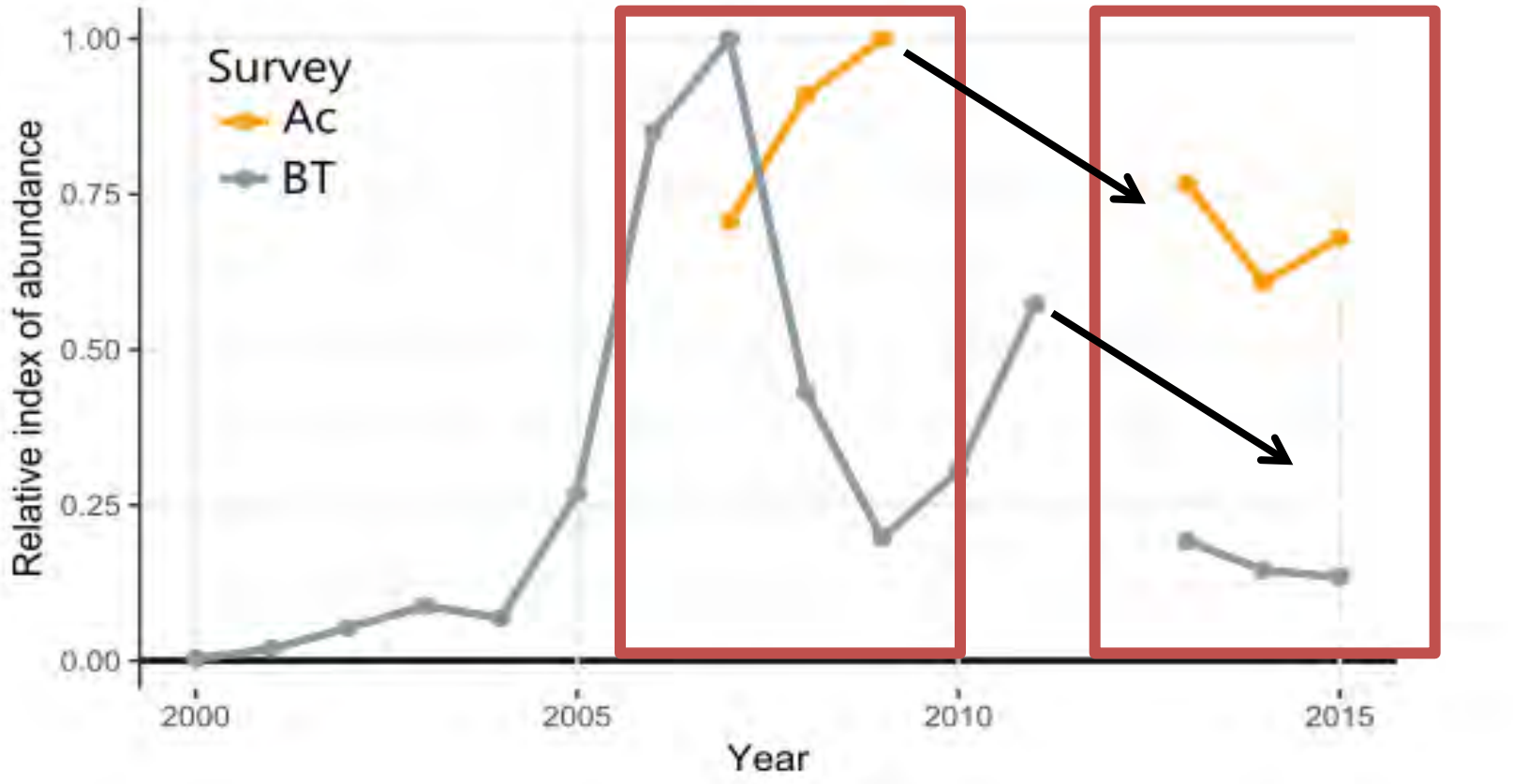
Temperature, Salinity and Fluorescence

Acoustic Survey

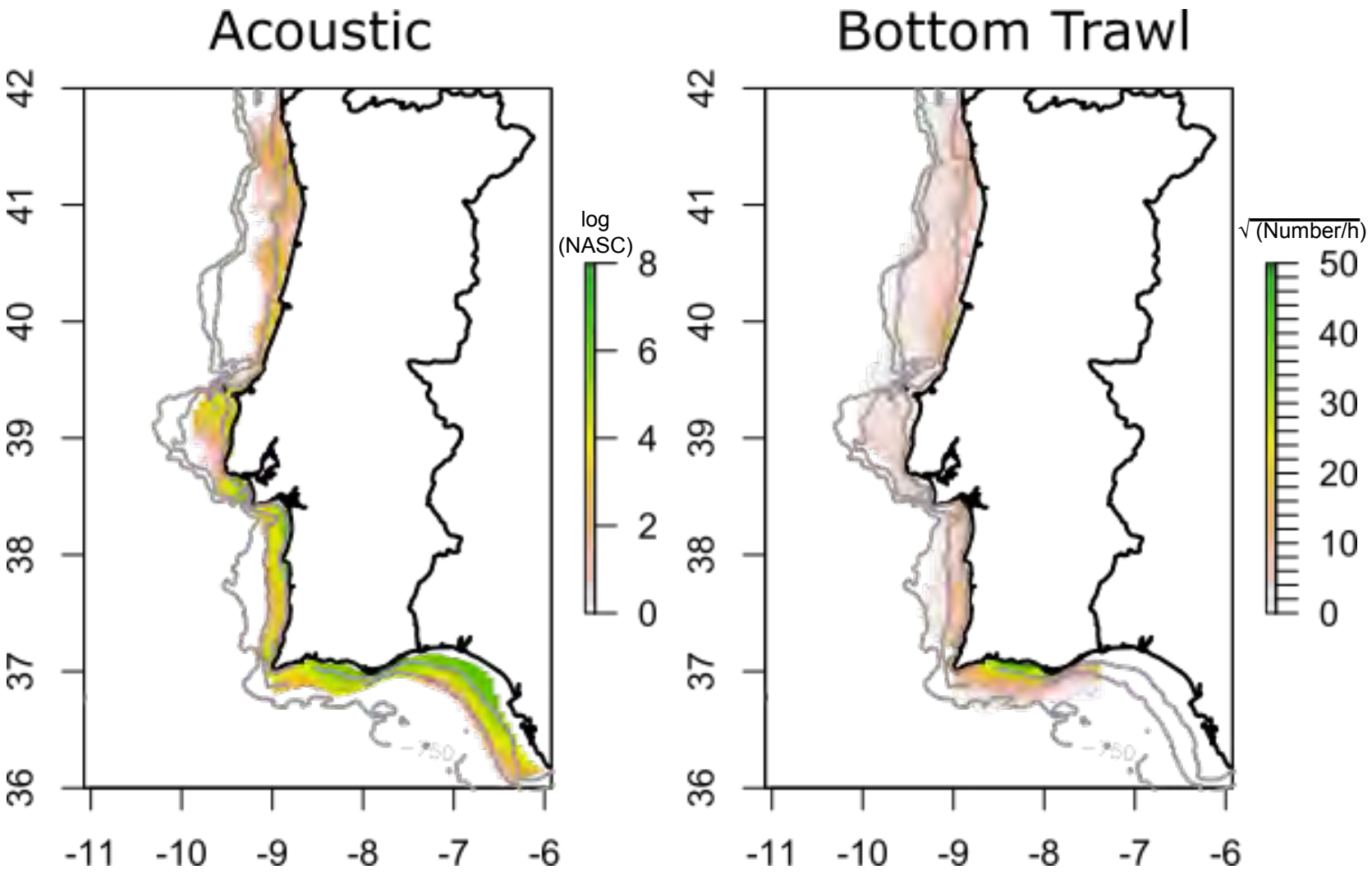


Chub mackerel is more abundante at longitude in SW and Cadiz with medium and high values of Fluorescence

Q3. TIME SERIES ABUNDANCE TRENDS



Q3. SPATIAL MEAN ABUNDANCE



CONCLUSIONS

Chub mackerel distributes in the South and Southwest area.

Seasonal diference (?)

Chub mackerel distributes in depths < 150 m

Temperature showed to be the most important environmental variable, followed by flourescence and salinity

Temperatures of 14ºC-15ºC and above 19ºC showed to be linked with high abundance values

High values of fluorescence suggests high abundance in the Gulf of Cadiz

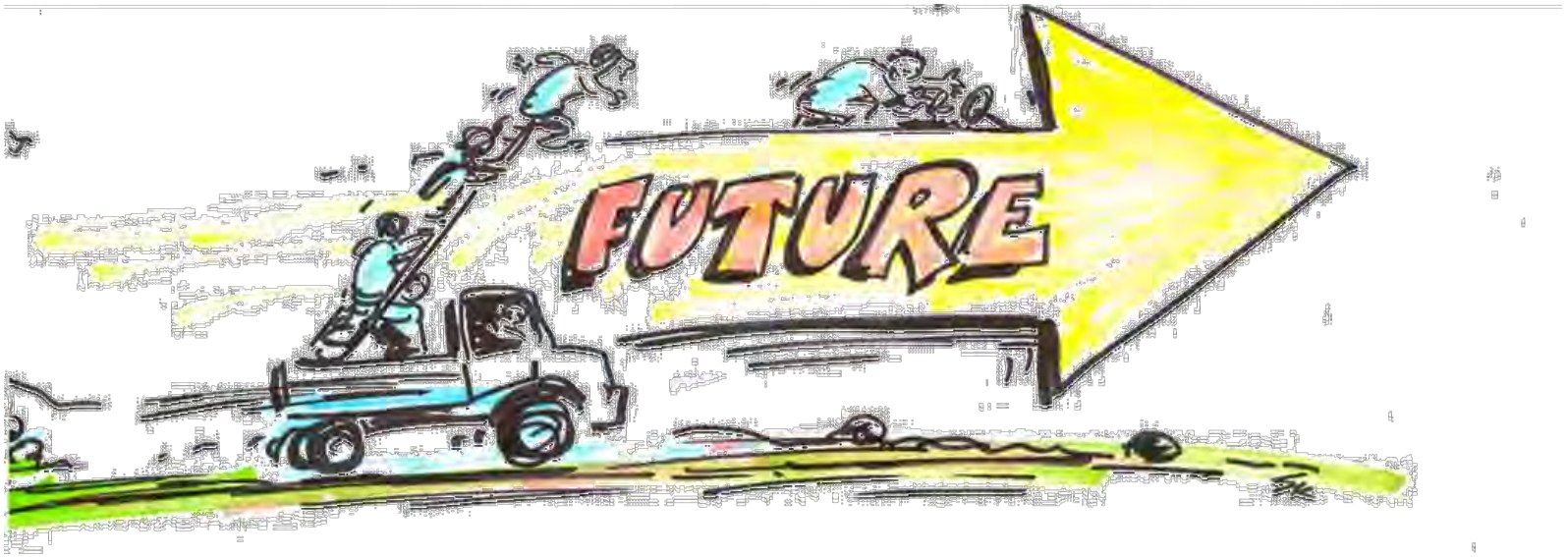
CONCLUSIONS (cont.)

Abundance trends showed differences between surveys

AcS have a short time series

Although both surveys indicate a minor abundance level in the last years

TO THE FUTURE AND BEYOND....



Ongoing work

Some data still to be analysed

Combine two surveys ?

Thank you

Data analysed in this work were obtained through the National Sampling Program PNAB/ DCF Data Collection