IFREMER Contribution to WP5

T5.1.2 Spatial structure in small pelagic fish populations, Atlanto Scandic herring, blue whiting and mackerel

For blue whiting we will deploy spatial population modelling techniques and characterise their realized pelagic habitats at different spatial scales.

D5.1 Preliminary progress report based on existing and knowledge assembled in EURO-BASIN (Month 36)

In prep

Year class strength and subpolar gyre affect blue whiting length distribution on the spawning grounds: mechanisms of population regulation

V. M. Trenkel, P. Lorance, S. M. M. Fässler, Å. S. Høines

Hypothesis: Blue whiting recruitment variations are due to varying environmental conditions on spawning grounds

a) Conditions impact spawning distribution pattern: highest biomass in most suitable areas?

→ spatial distribution of spawning blue whiting varies between years

→ interannual variations explained by gyre state

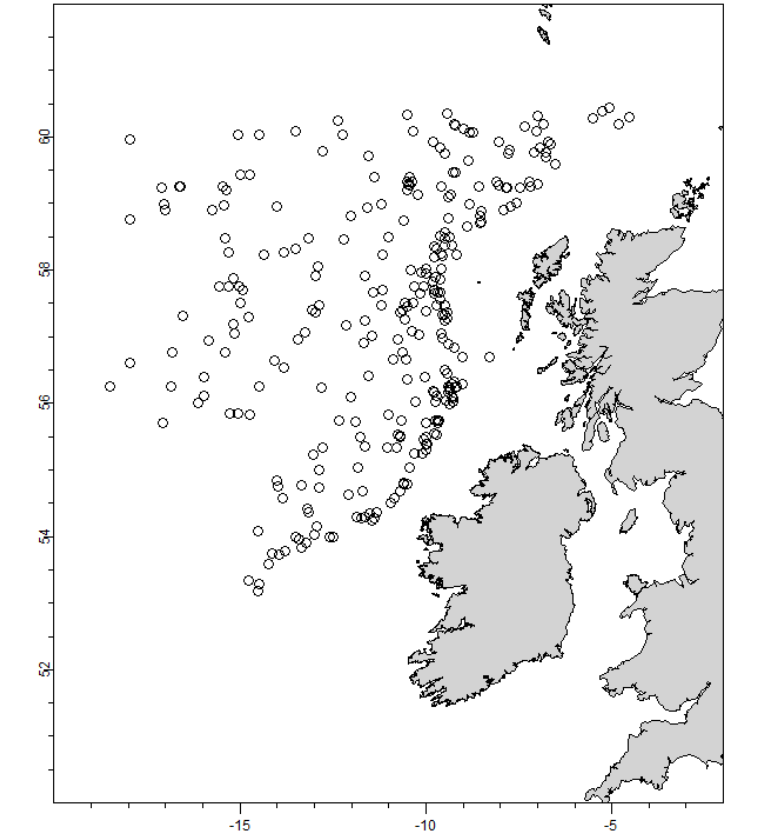
b) Conditions impact spatial body size distribution during spawning: fittest individuals in most suitable areas?

→ body size spatial distribution varies between years

→ Interannual variations explained by gyre state

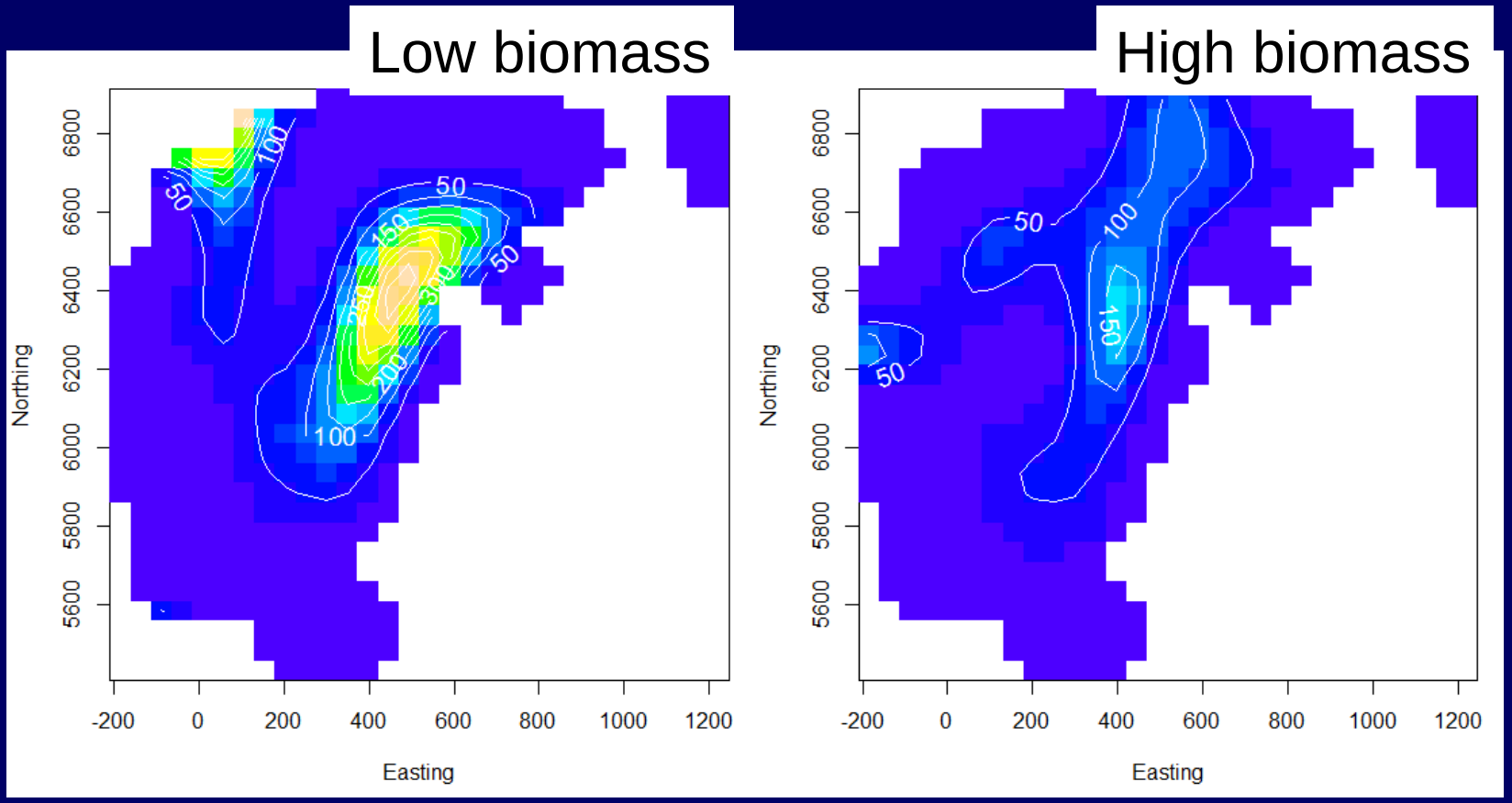
Alternative explanation: density dependence affects spatial biomass and size distribution during spawning

Data: International blue whiting acoustic spawning survey



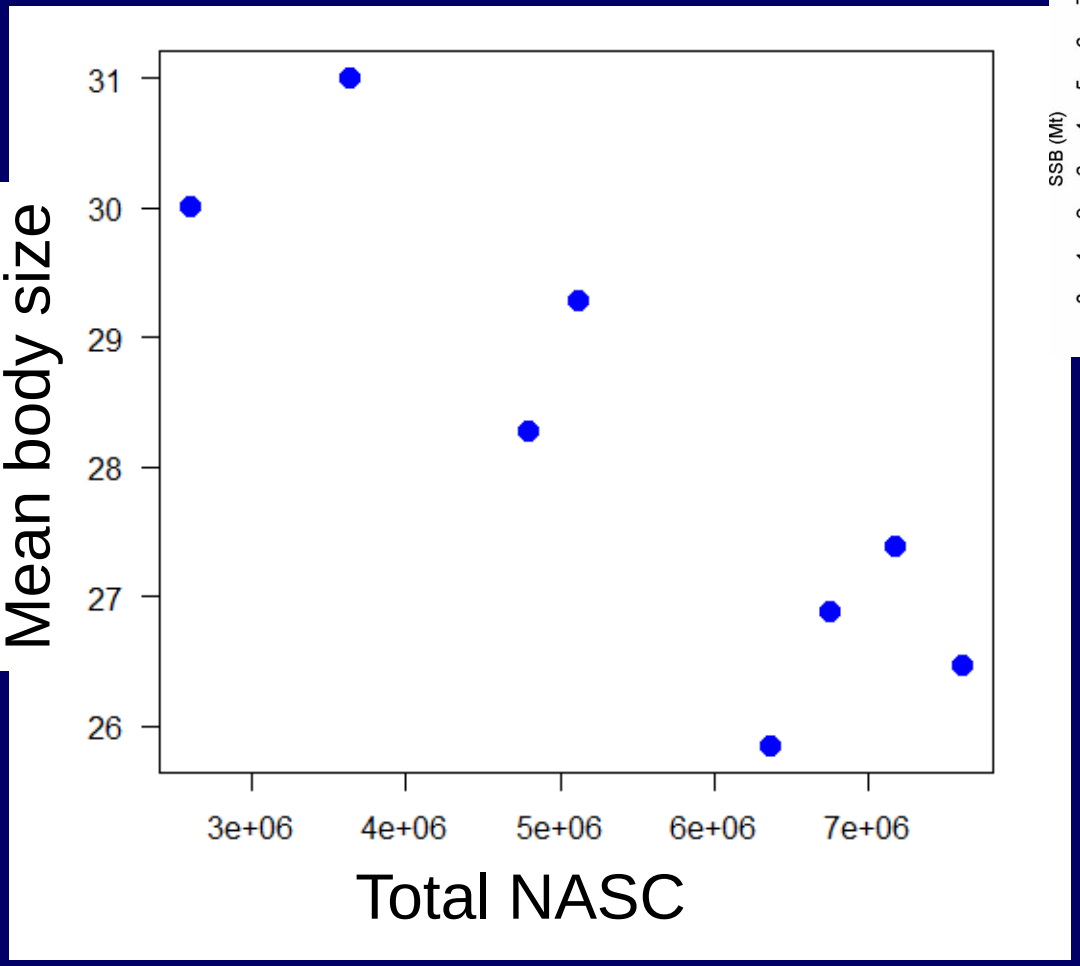
- 2004-2011
- quarter 1
- NASC by rectangle coefficient (sa) per rectangle
- length, age, sex for individuals in hauls

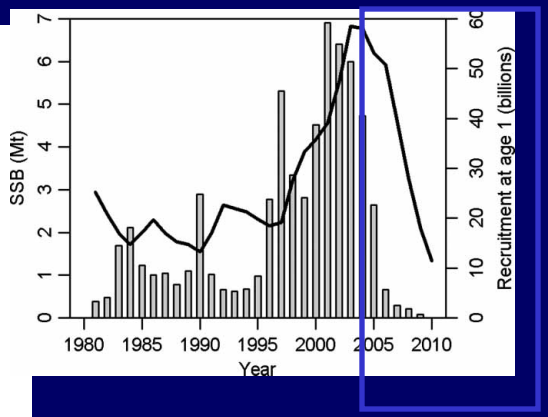
Spatial distribution of relative acoustic backscattering density



At low biomass acoustic density is relatively more concentrated along shelf edge

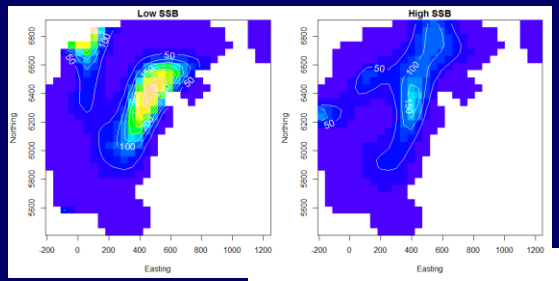
Biomass effect on size structure of individuals in spawning area





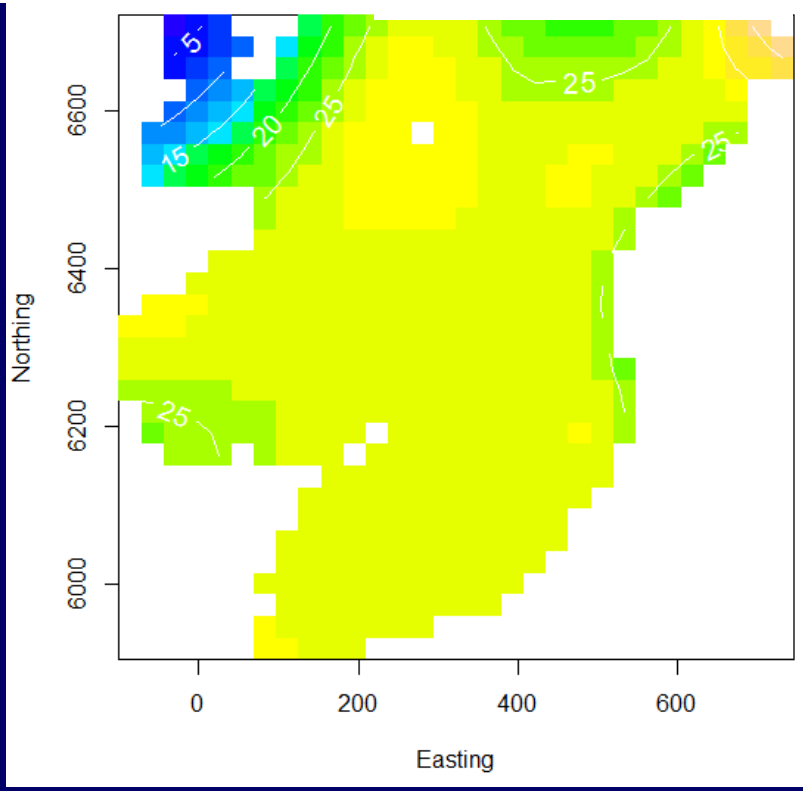
Individuals are larger on average in years of lower biomass -> caused by low recruitment?

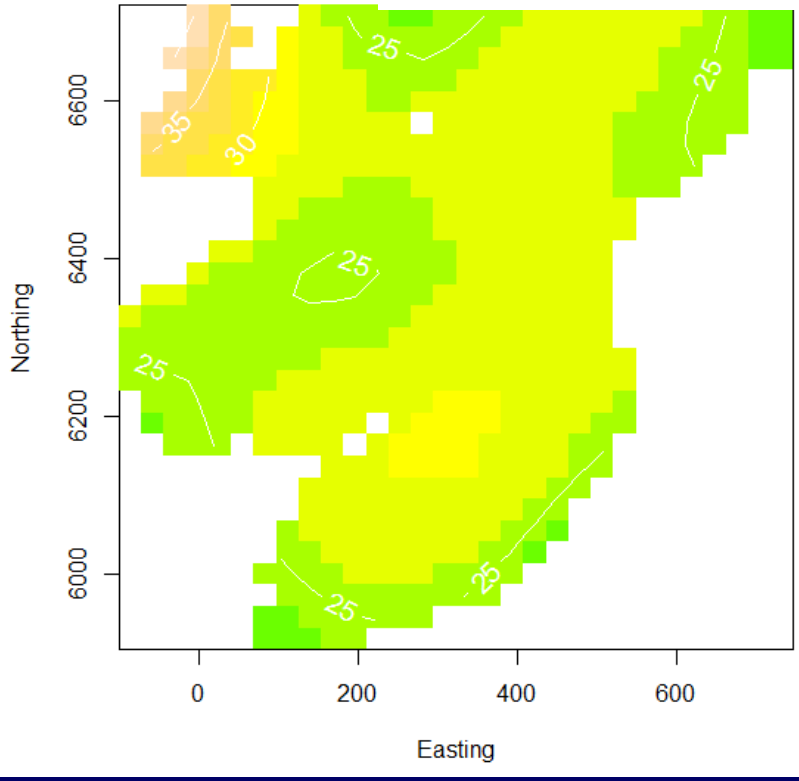
Size distribution of individuals: biomass level effect



Low biomass

High biomass





At low biomass there is slightly less spatial structure in mean body size

Conclusions

Only weak evidence for gyre state explaining blue whiting spawning biomass and body size distribution

Stronger evidence for alternative explanation of density dependent effects

→ Biomass more concentrated along shelf edge at low biomass

→ Spatial structure in body size stronger at high biomass

→ Mean body size decreases with total biomass

IFREMER Contribution to WP5

T5.2.1

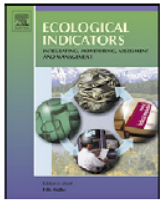
Multi-frequency acoustic method developped to separate « plankton » from fish with and without swim bladder

Ecological Indicators 30 (2013) 72–79

Contents lists available at SciVerse ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind



Short communication

A fisheries acoustic multi-frequency indicator to inform on large scale spatial patterns of aquatic pelagic ecosystems

Verena M. Trenkel [a,*], Laurent Berger [b]

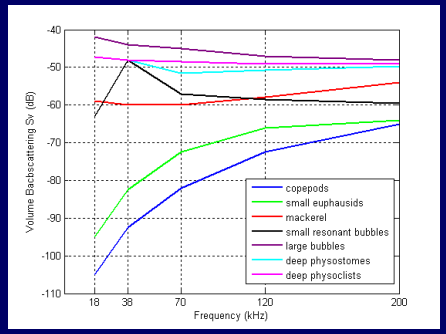
[a] Ifremer, rue de l'île d'Yeu, BP 21105, 44311 Nantes cedex 3, France
[b] Ifremer, BP 70, 29280 Plouzané, France

T5.2.2 Top Down Controls: Small Pelagic Fish, Atlanto Scandic herring, blue whiting and mackerel

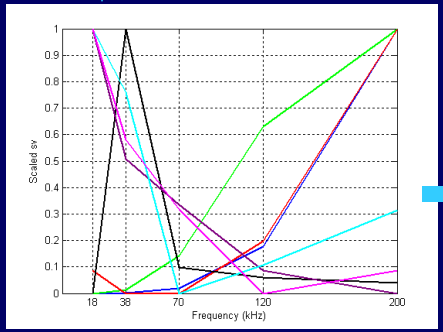
Contribution of blue whiting stomach data

ESSD WP1

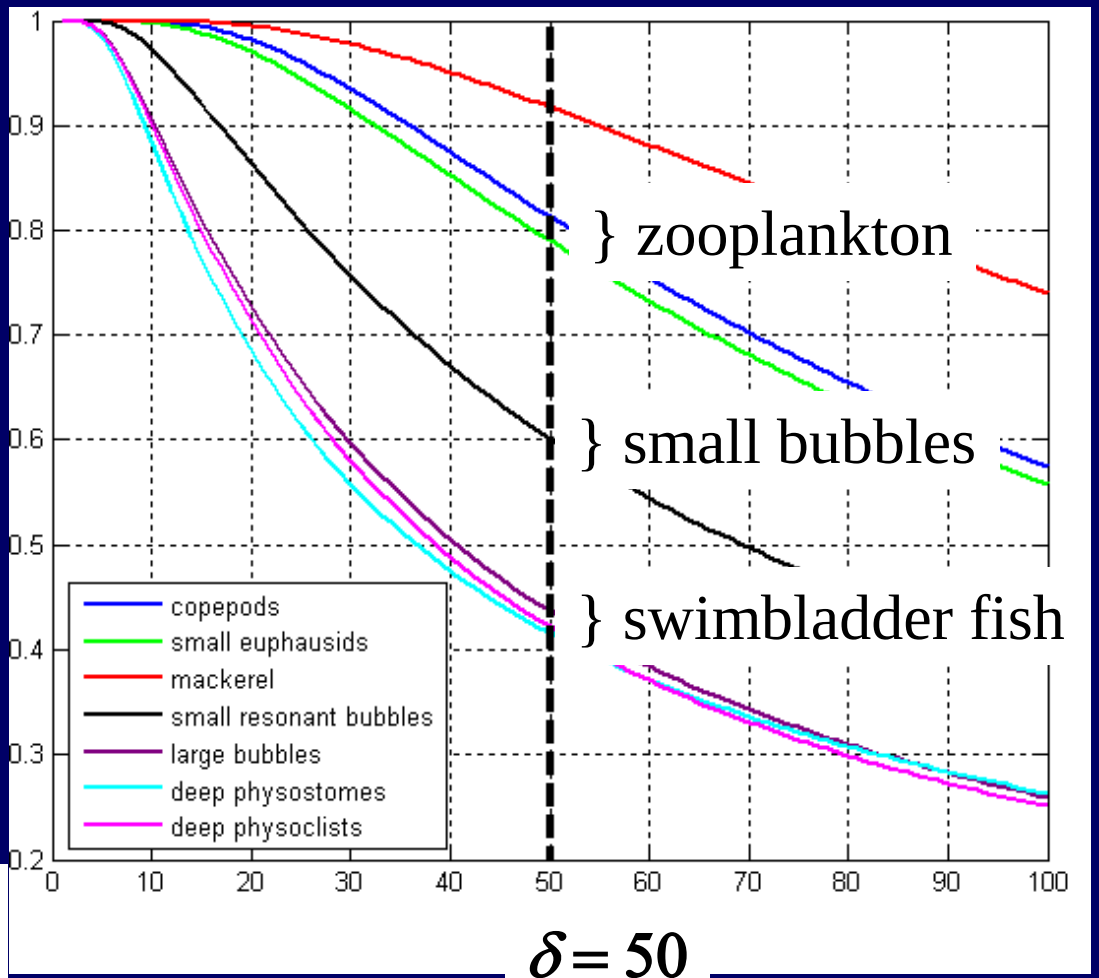
Simulation study for multi-frequency index *I*



- Sv to sv
- Scaled to max 1



$$I = \frac{\sum_i \sum_{j<i} d(i,j)\, sv_i\, sv_j e_i\, e_j}{\sum_i \sum_j sv_i\, sv_j e_i\, e_j}$$



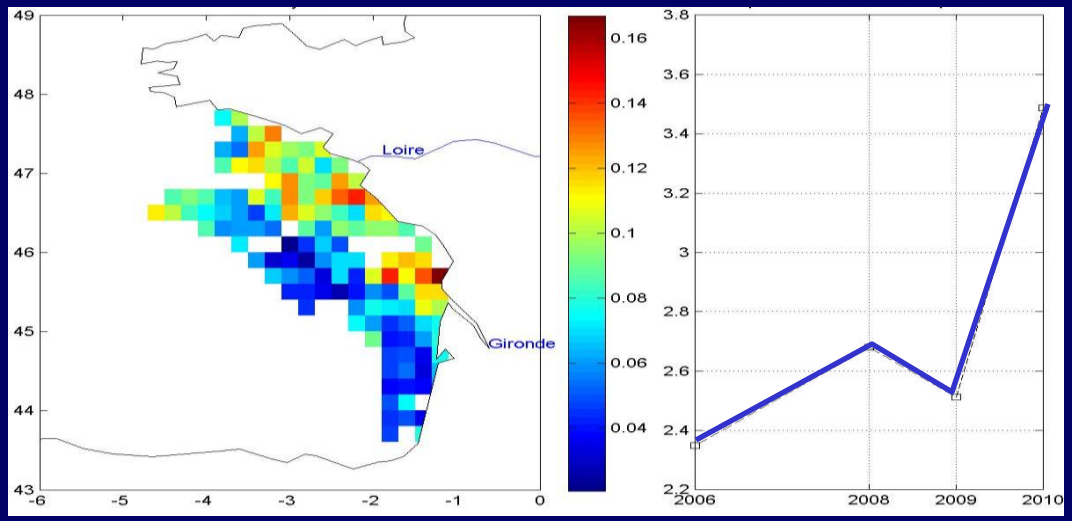
$\delta = 50$

$d(i,j) = 1 - \exp(-|f_i - f_j| / \delta)$

Stable distribution for swimbladder fish using EOF*

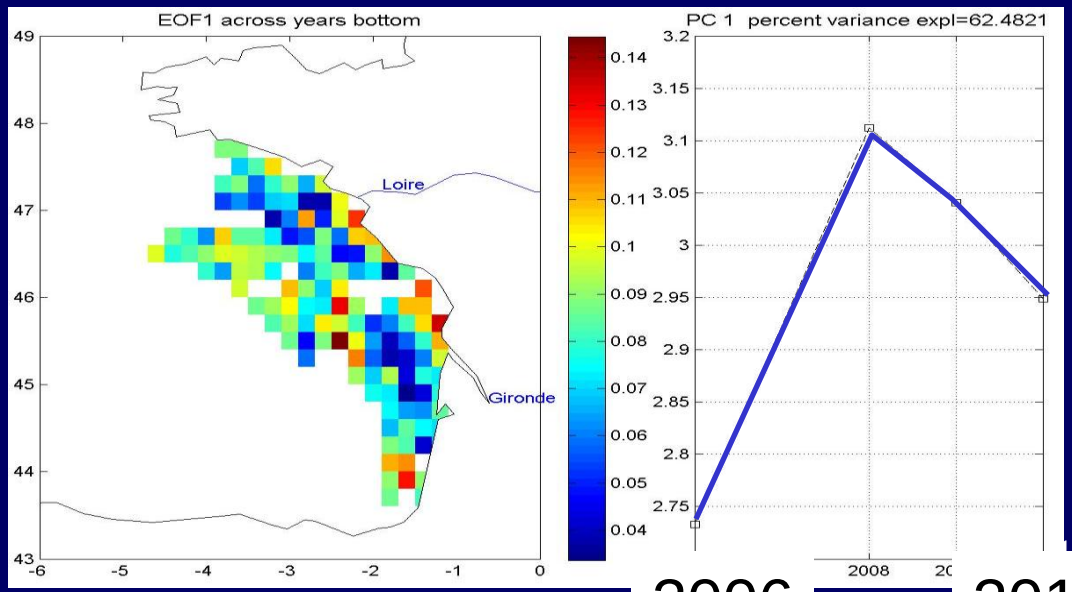
Surface

PC1 : 57%



Bottom

PC1 : 62%



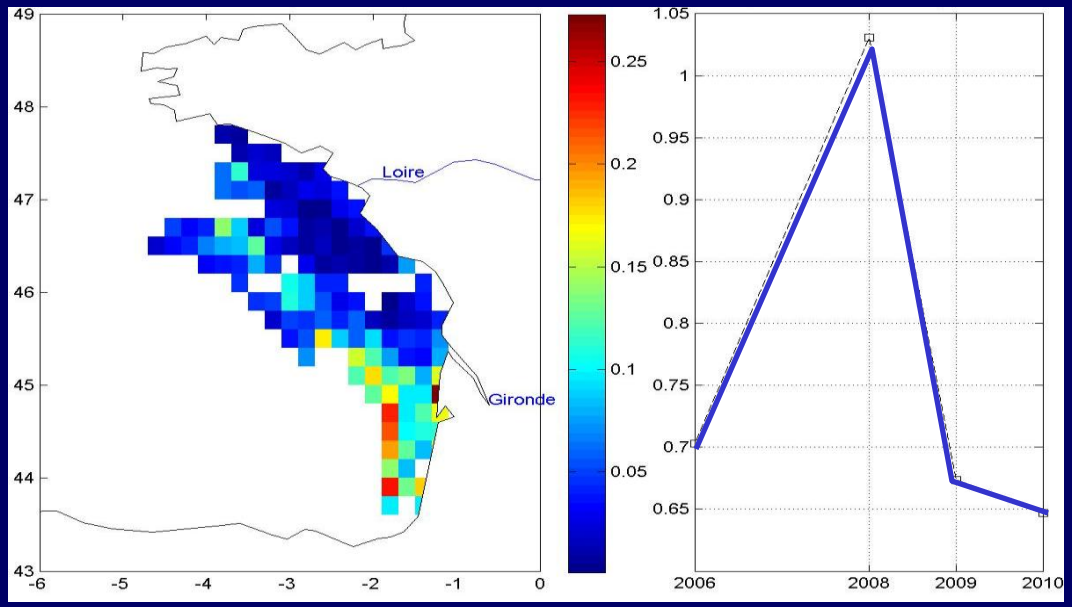
*Empirical orthogonal functions

2006 2010

Stable distribution for fluid like zooplankton

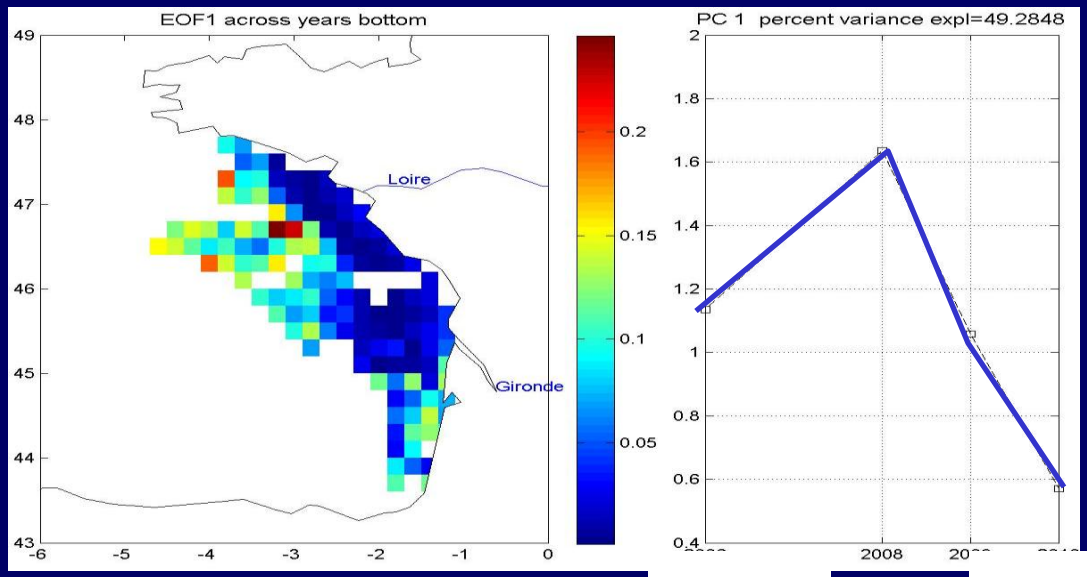
Surface

PC1 : 49%



Bottom

PC1 : 49%



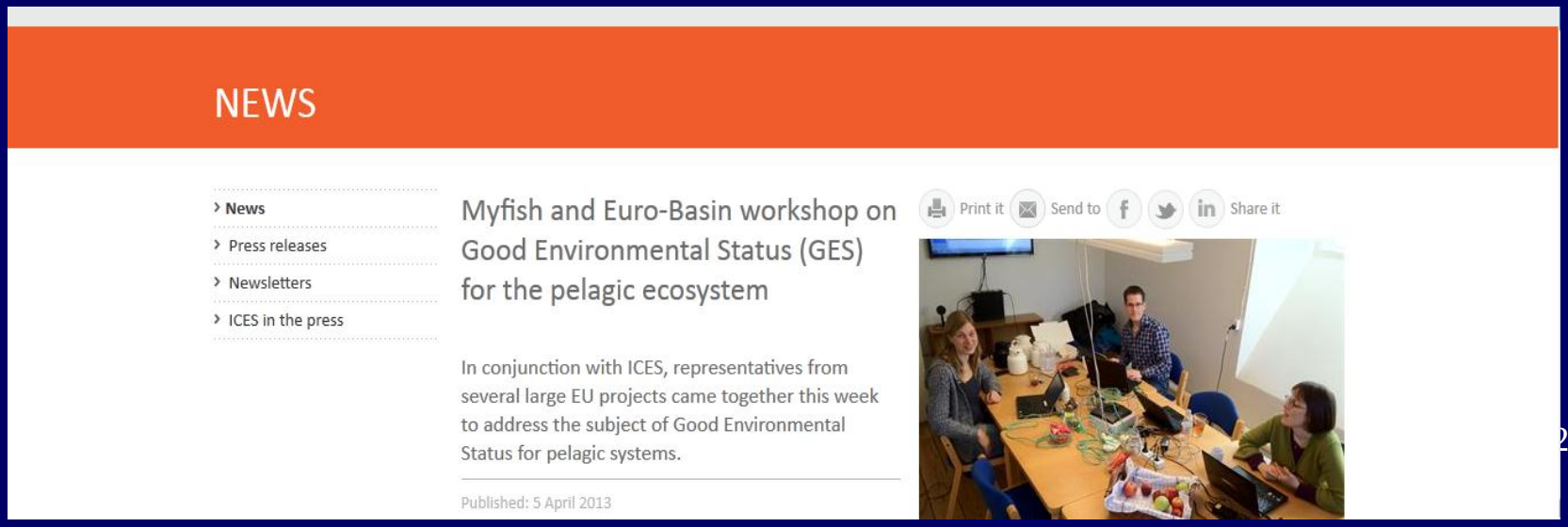
2006 2010

IFREMER Contribution to WP8

T8.4. Advancing ecosystem based fisheries management in North Atlantic open waters under climate change.

Specifically, the task will test the concepts of defining indicators of good ecological status (as outlined by the MSFD) inclusive limit and target values (as used under the CFP) under global change by applying forecast of ecosystem and fish stock dynamics under various climate scenarios to isolate the response to management measures

Milestone 38 Workshop on Good Ecological Status (GES) indicator performance in April 2013



D8.9 Evaluate indicators identified within the MSFD (or alternative indicators) to characterise GES

Paper in prep

Identifying marine pelagic ecosystem objectives and indicators for management

Verena M. Trenkel, Niels T. Hintzen, Keith Farnsworth, Christian Olesen, David Reid, Anna Rindorf, Marie-Joëlle Rochet, Samuel Shephard, Mark Dickey-Collas

EURO-BASIN
BASIN SCALE ANALYSIS, SYNTHESIS AND INTEGRATION

myfish