

# **RADIALES time series: 25 years monitoring the NW Iberian shelf**

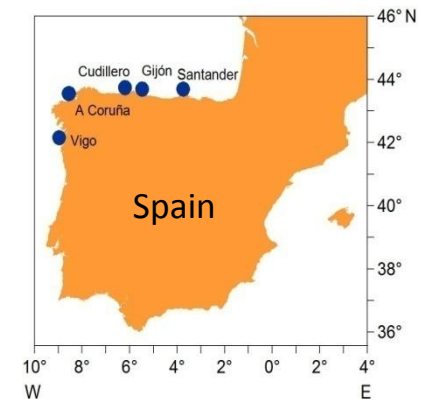
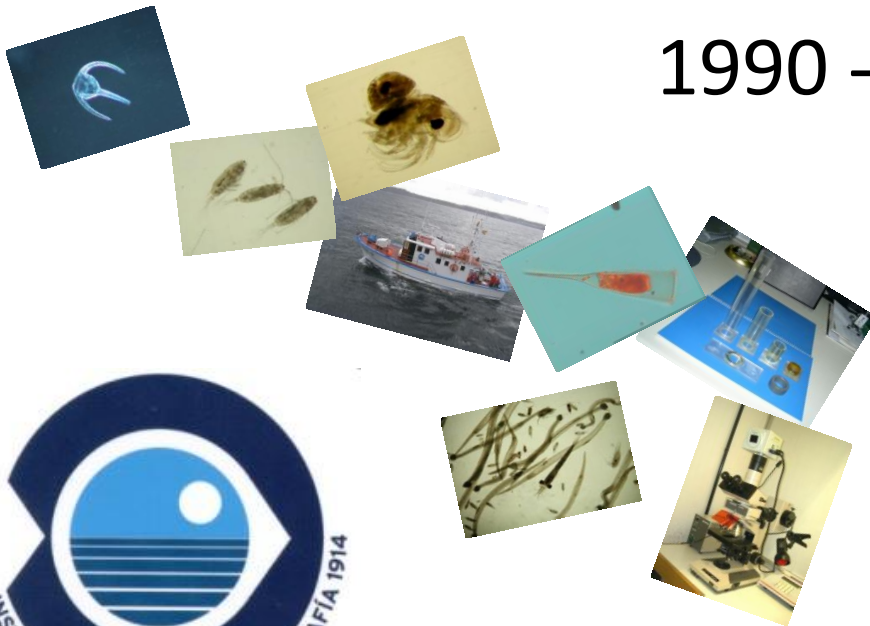
Antonio Bode

**Instituto Español de Oceanografía (IEO)  
Spain**



# Oceanographic time series in northern Spain (RADIALES)

1990 - 2014



<http://www.seriestemporales-ieo.com/>

- Objective
- History
- Methods
- Funding
- The series
- Applications
- Spin-offs and alliances
- Products

# Objective

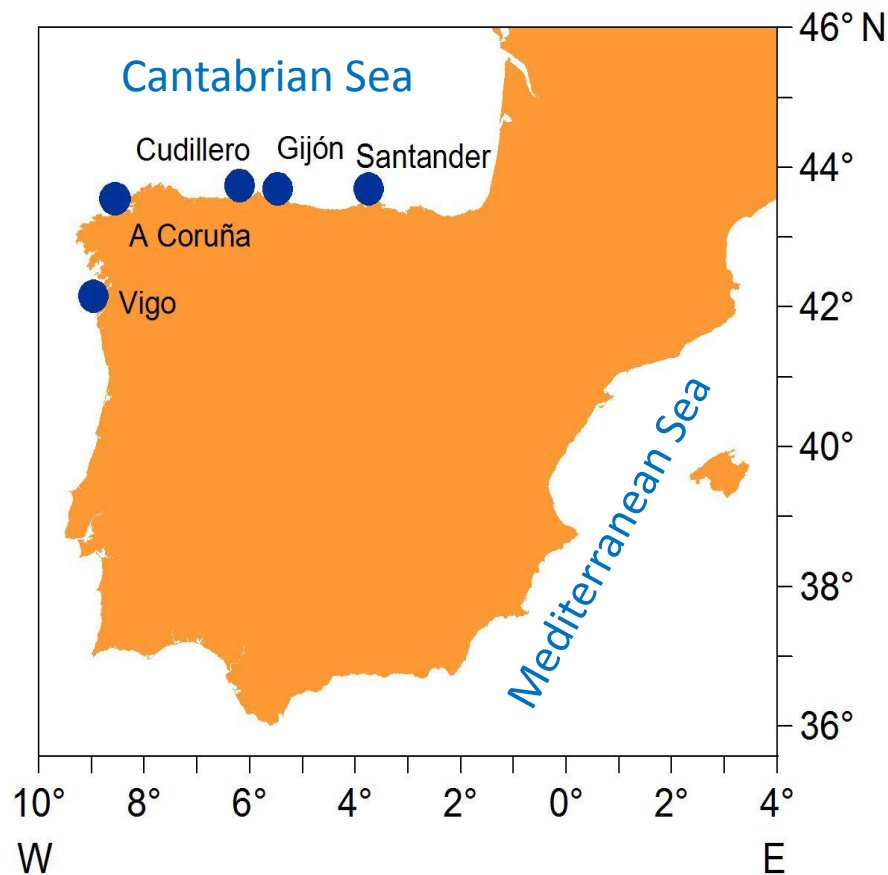
“understanding and modelling the response of the marine ecosystem to the sources of temporal variability in oceanographic and planktonic components, particularly focussing in those factors and processes affecting biological production and potentially altering the ecosystem services”.

(as formulated in 1990)



# History

the oldest multidisciplinary ocean observation initiative still active in Spain



- 1987-1988. Periodic hydrographic observations started in Vigo and A Coruña
- 1990. Plankton observations included
- 1992-1997. Series extended to Cantabrian and Mediterranean waters
- 2007. Joint program for NW Spanish series (RADIALES)
- 2012. First multidecadal synthesis



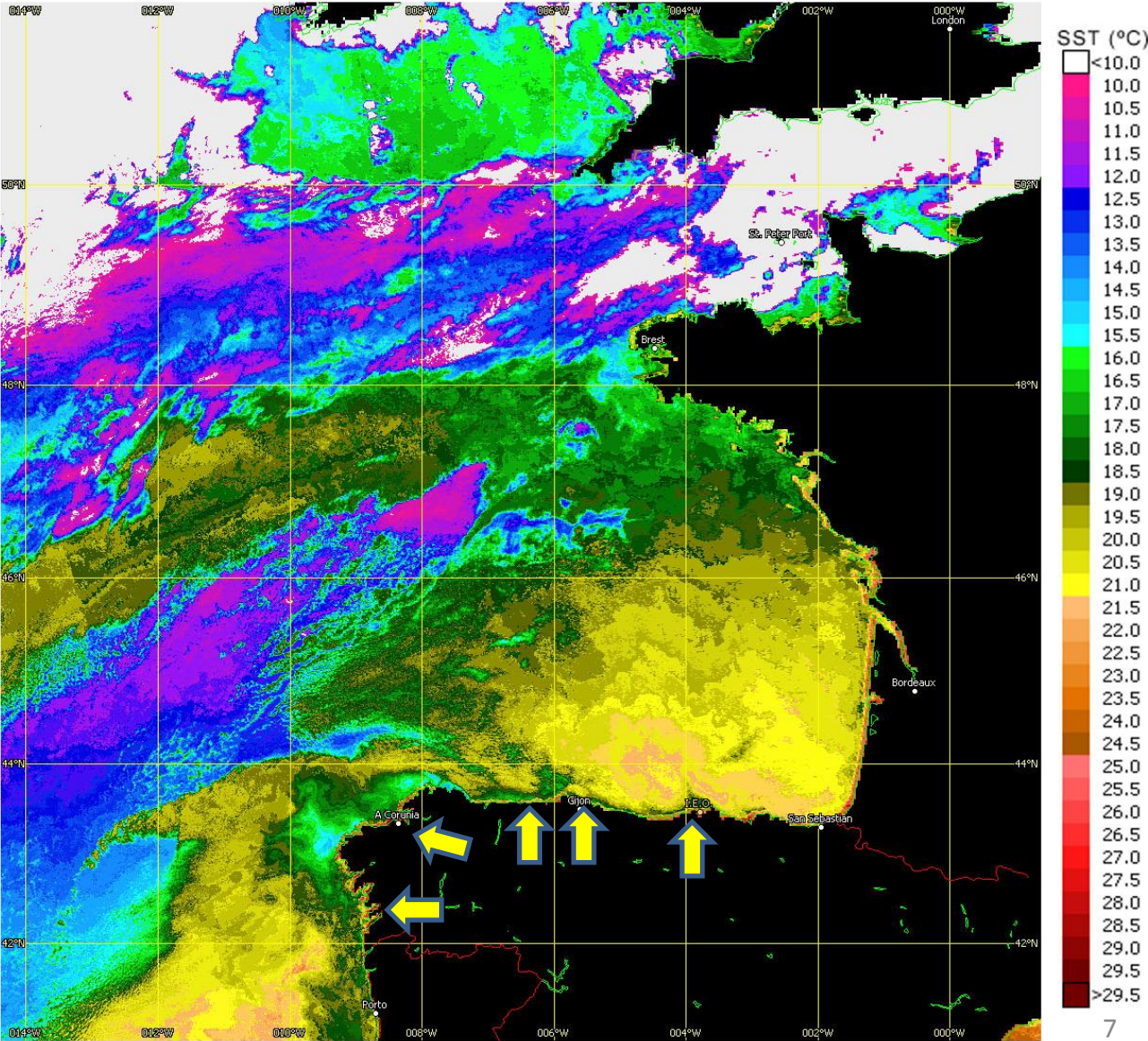


LURA

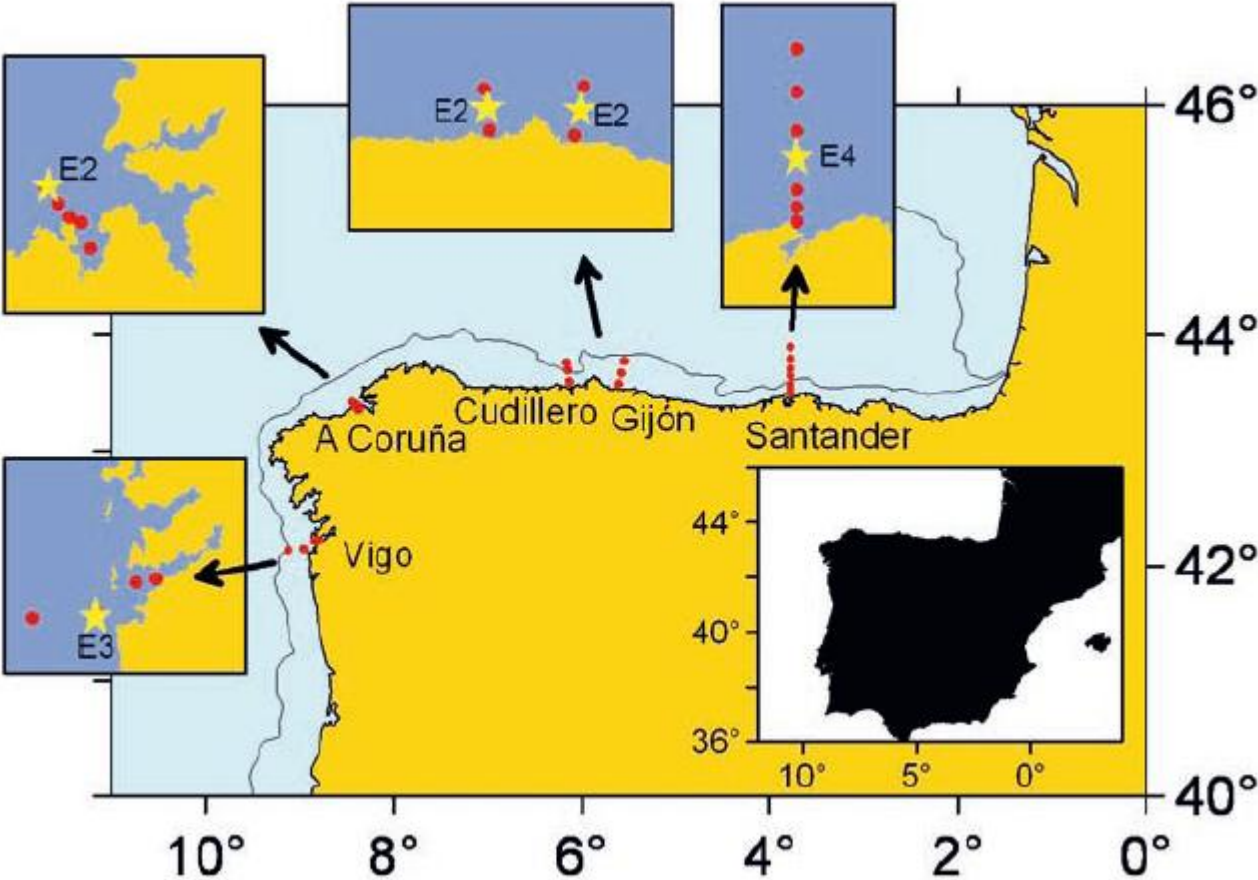
# Methods



# Coastal upwelling gradient

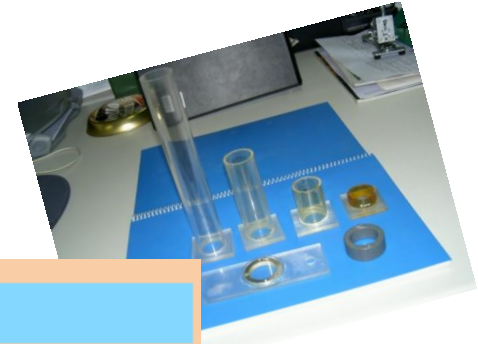
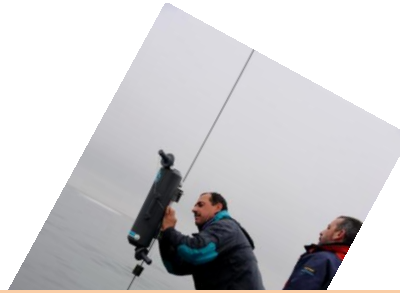


# Multi-station observatory

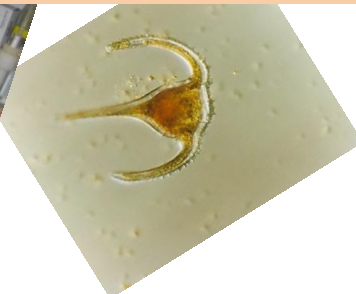
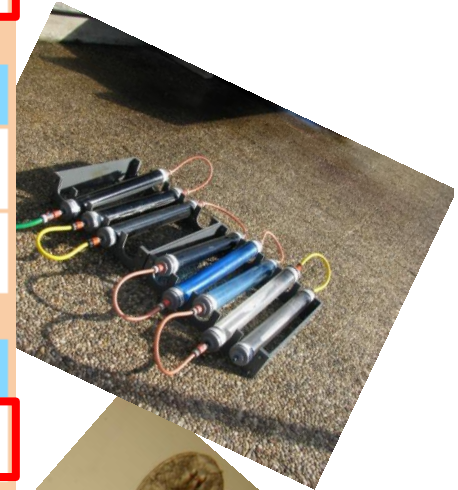




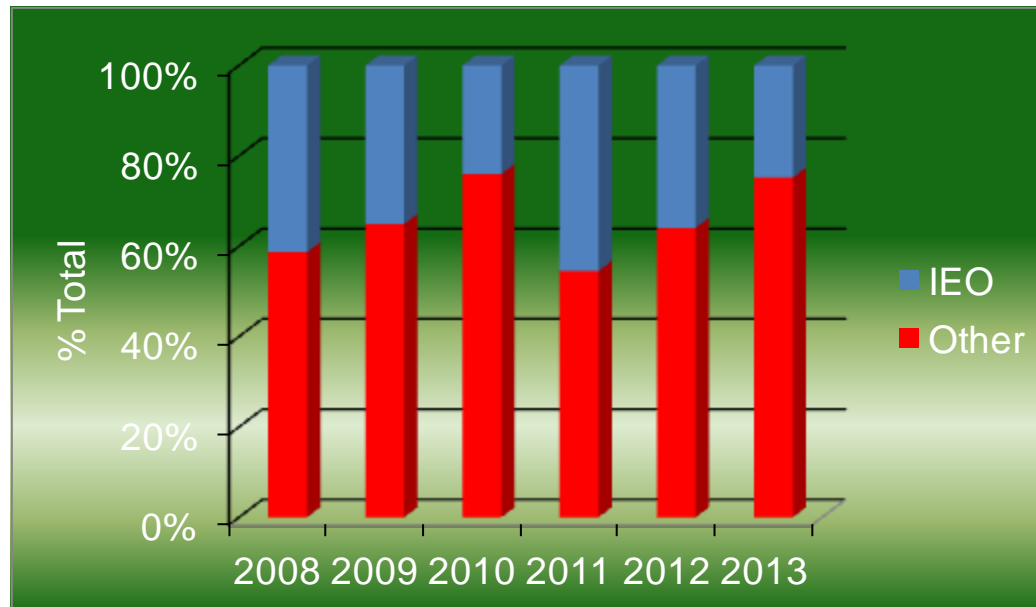
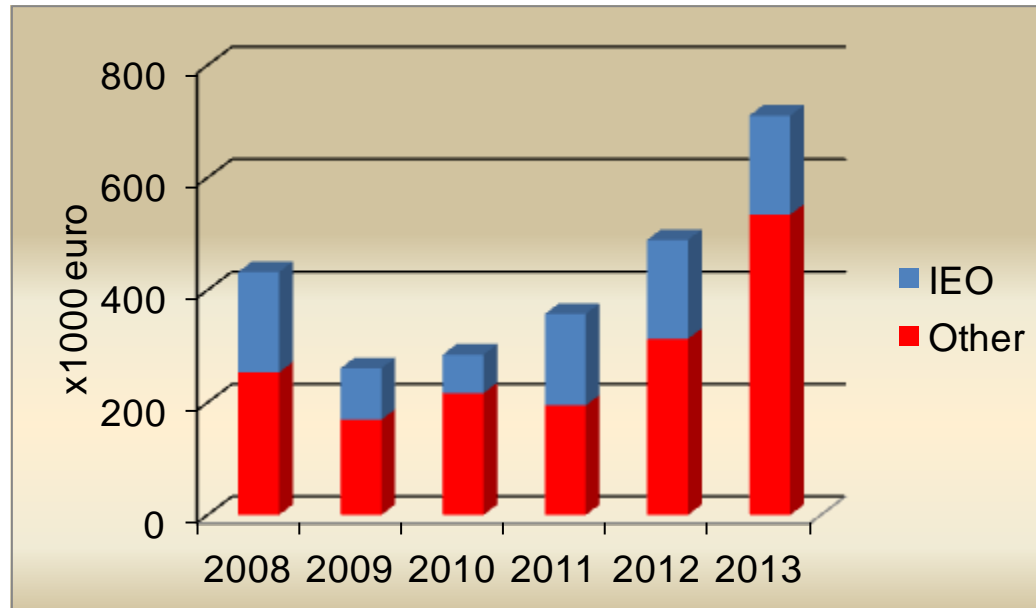
# Multidisciplinary observations:



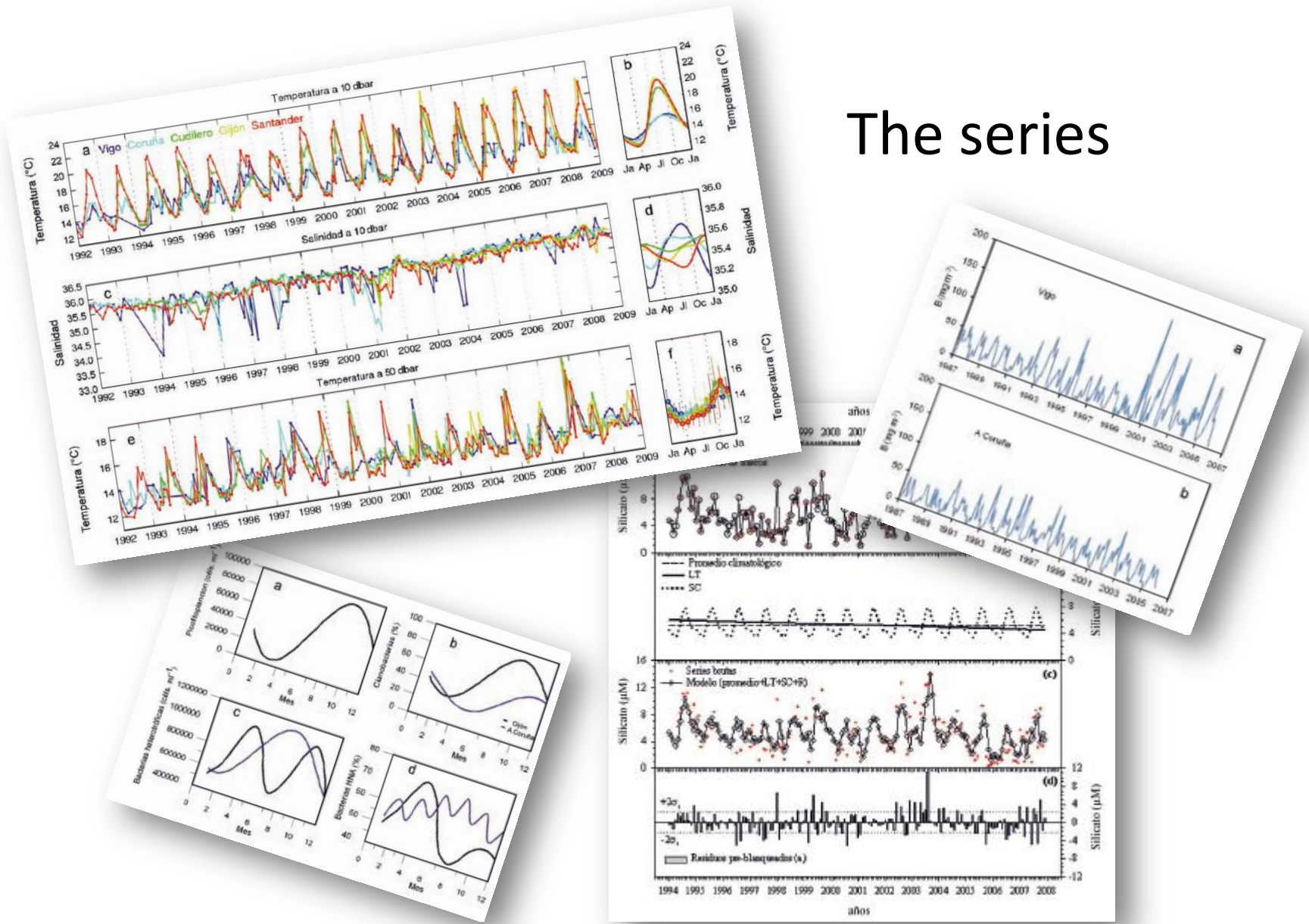
Physical variables		
Irradiance	Temperature	Salinity
Biogeochemical variables		
Nutrient salts	Oxygen	POM DOM
Chlorophyll-a	Primary production	Sedimentation
Biological variables		
Bacterioplankton	Phytoplankton	Zooplankton
	Ichthyoplankton	



# Funding:

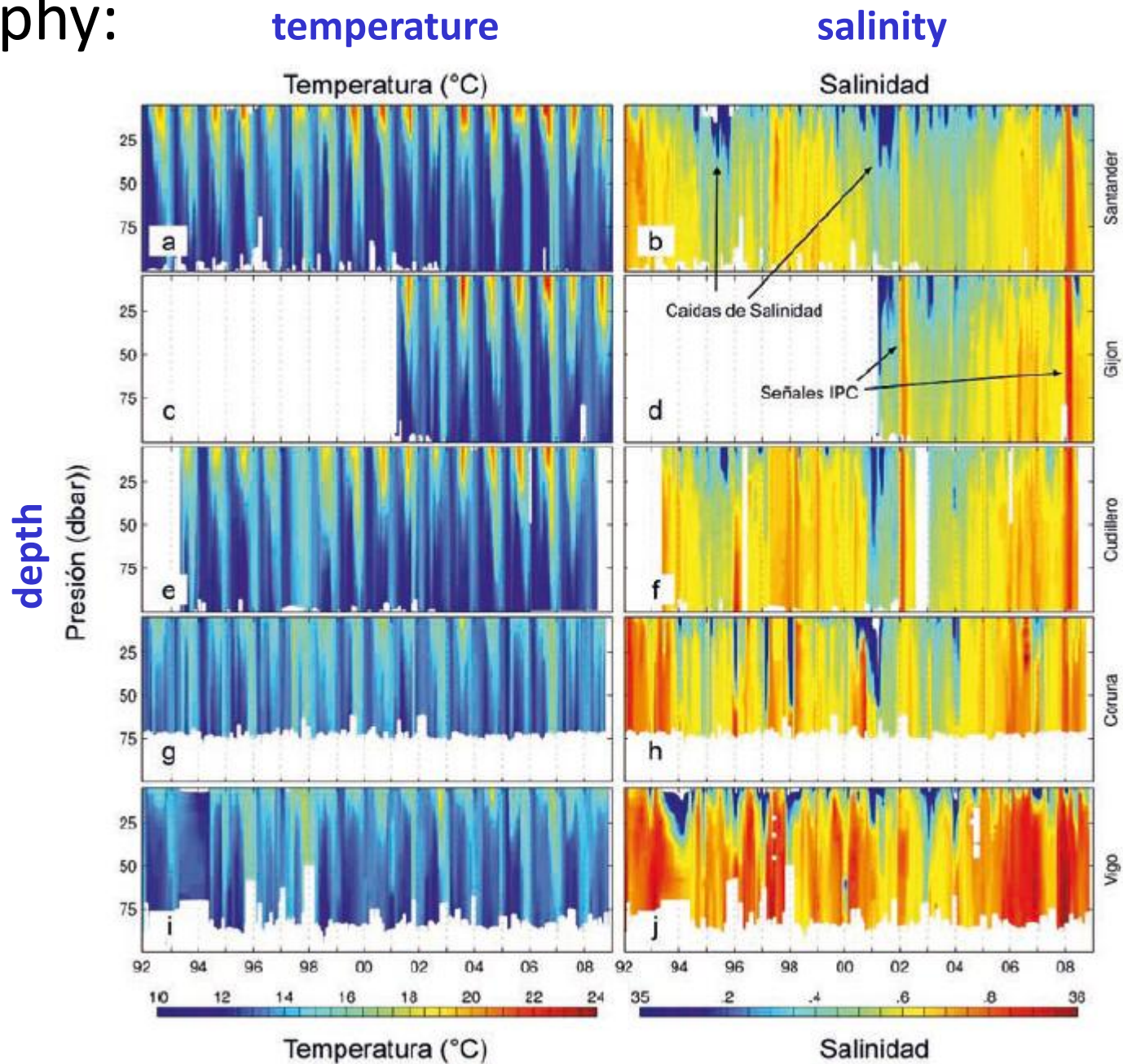


# The series





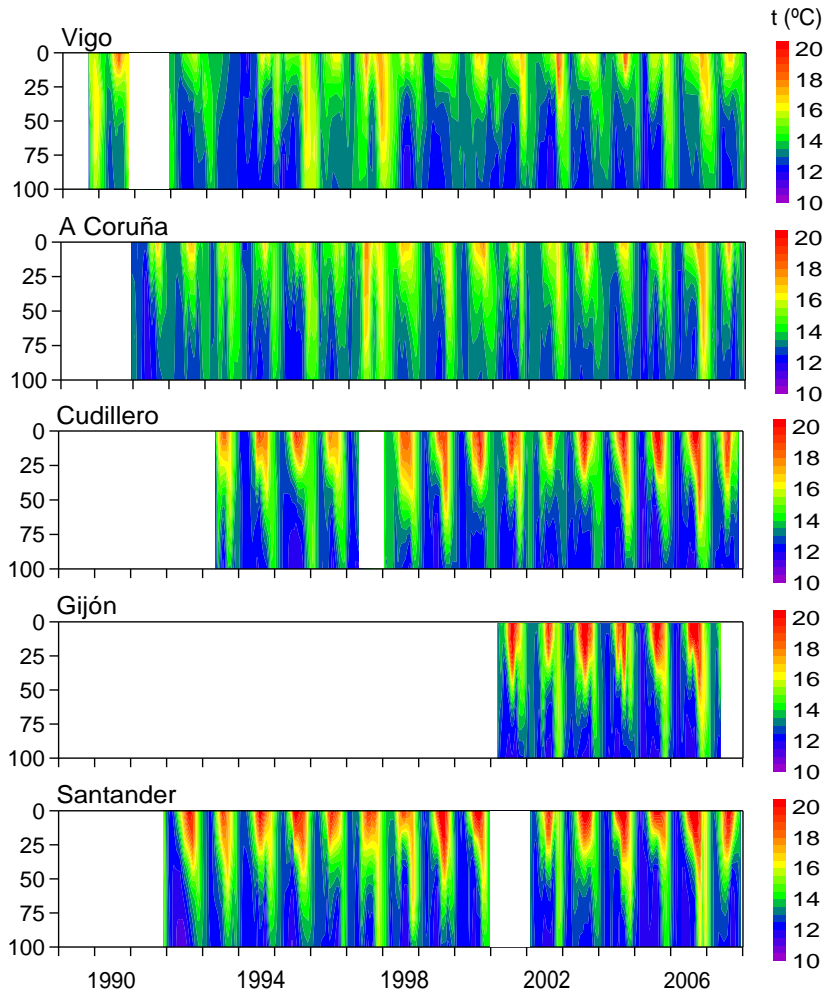
# Hydrography:



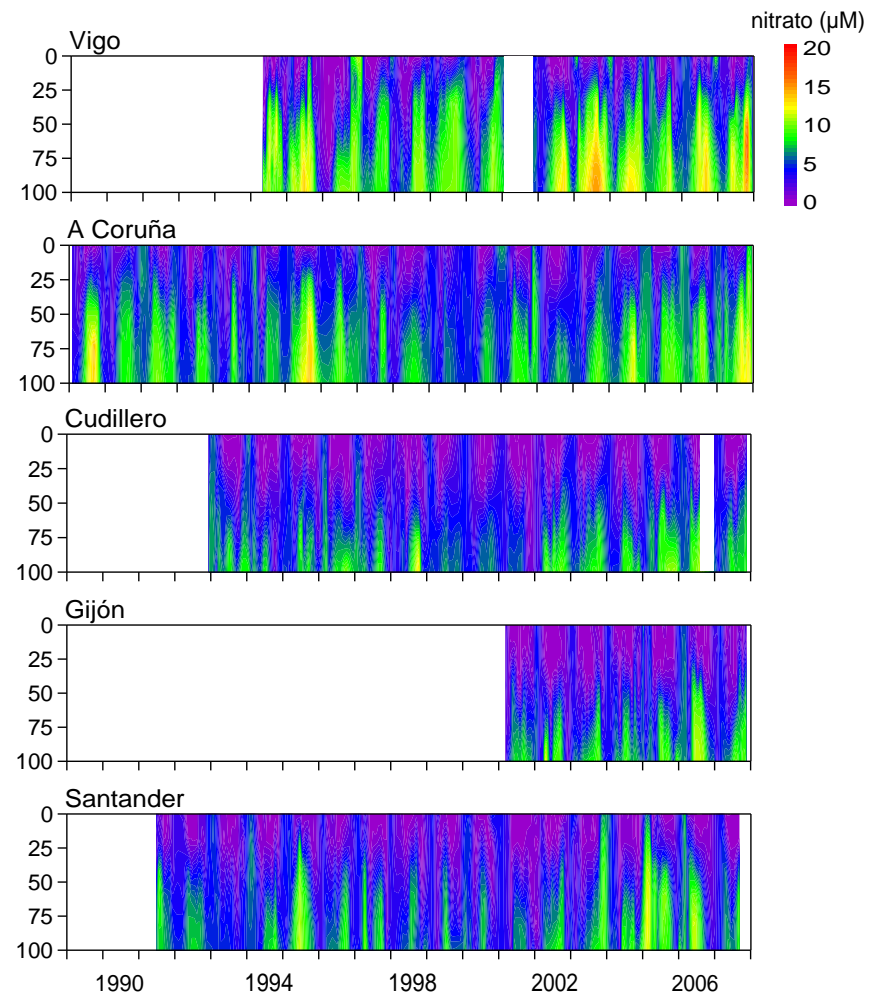


# Nutrients:

## temperature

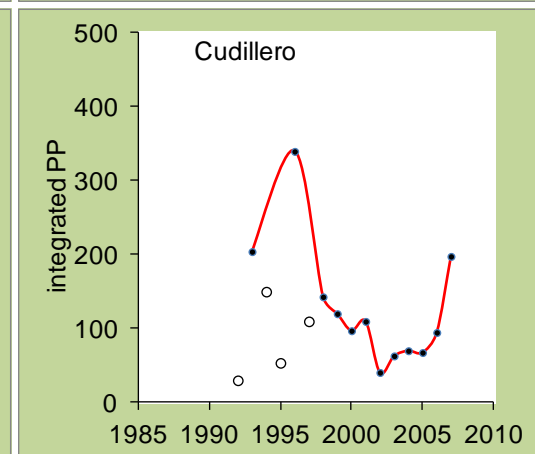
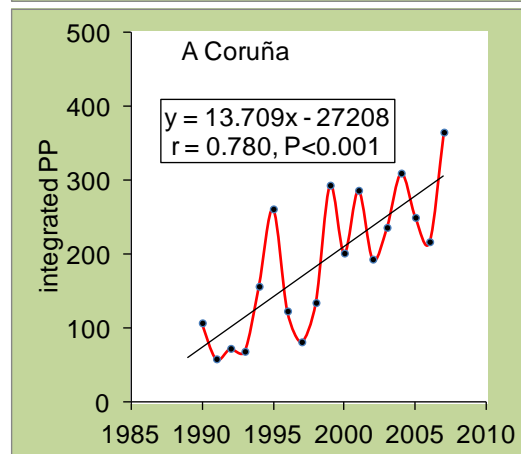
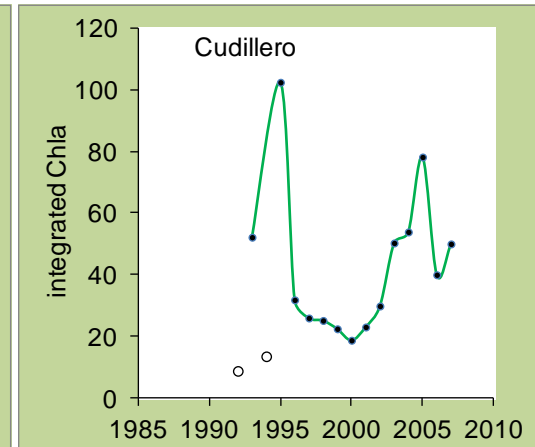
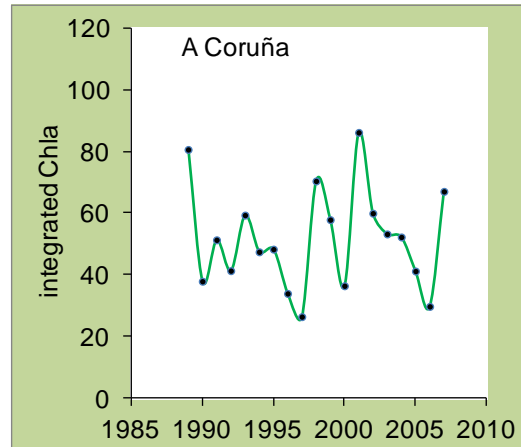
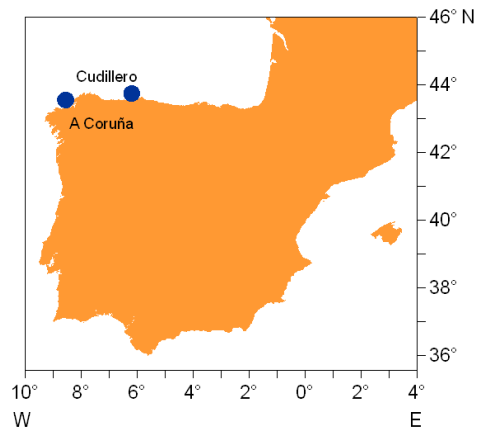


## nitrate

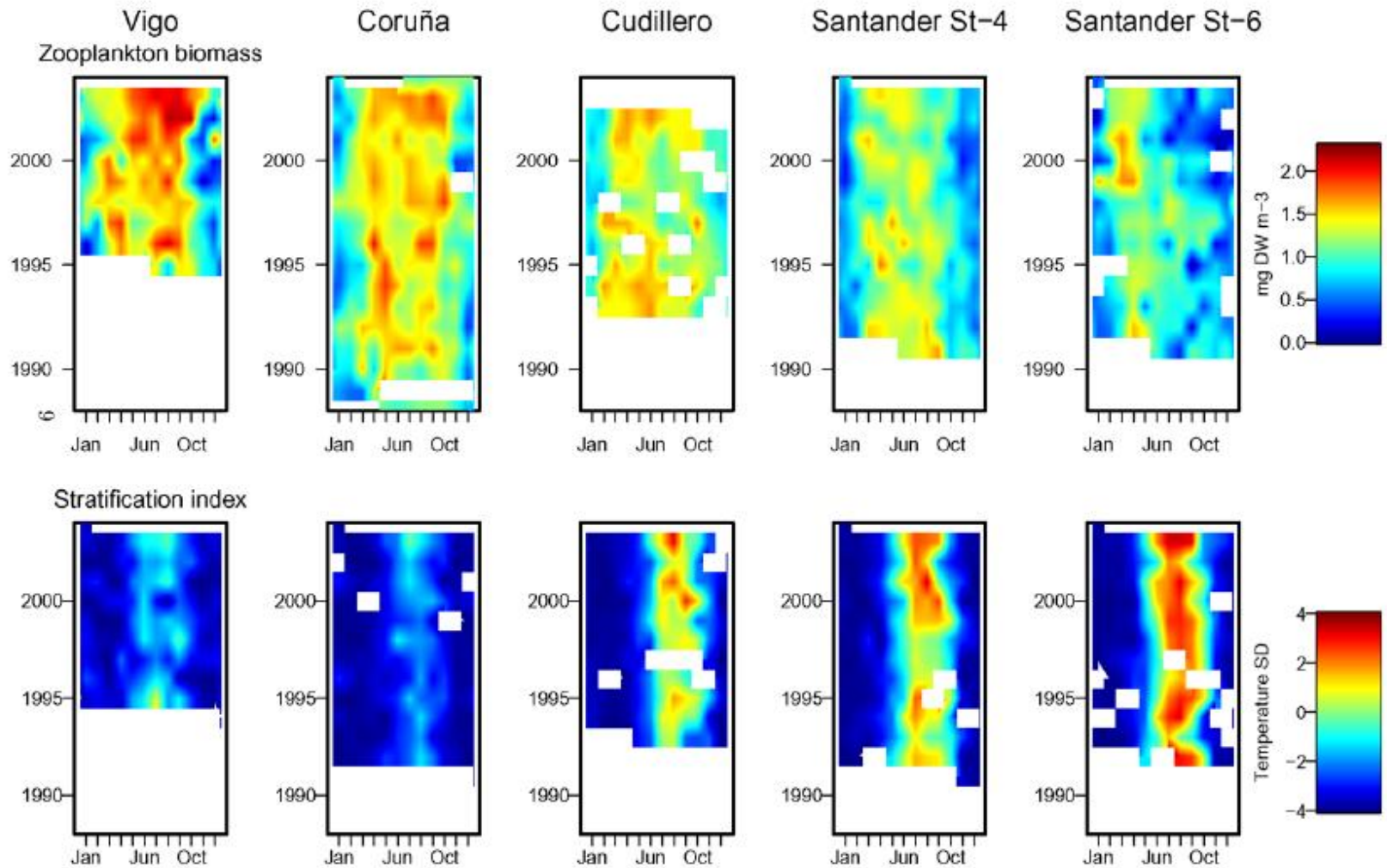


# Primary production and biomass

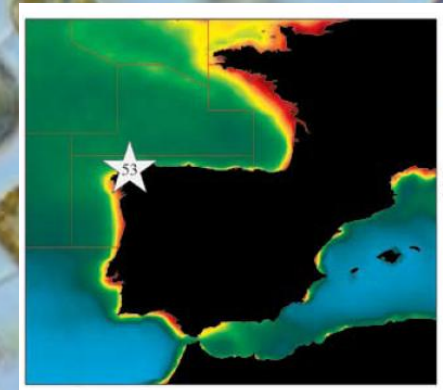
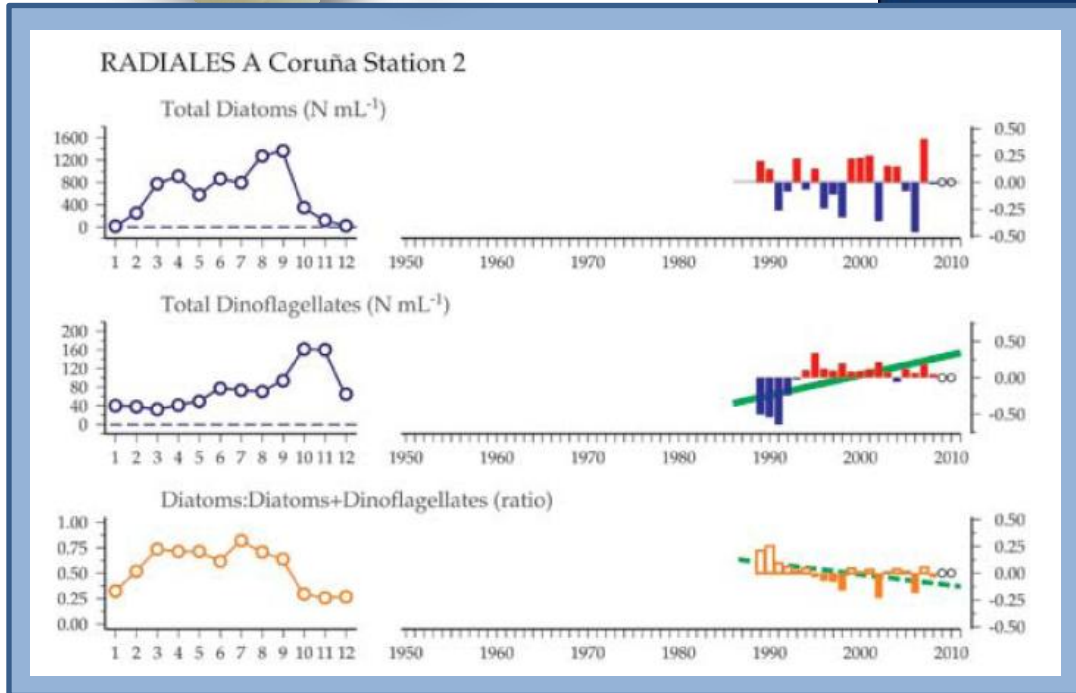
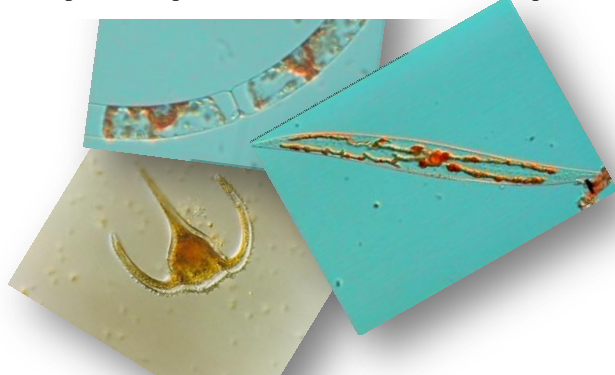
comparative analysis of trends and cycles in chlorophyll and primary production



# Zooplankton biomass

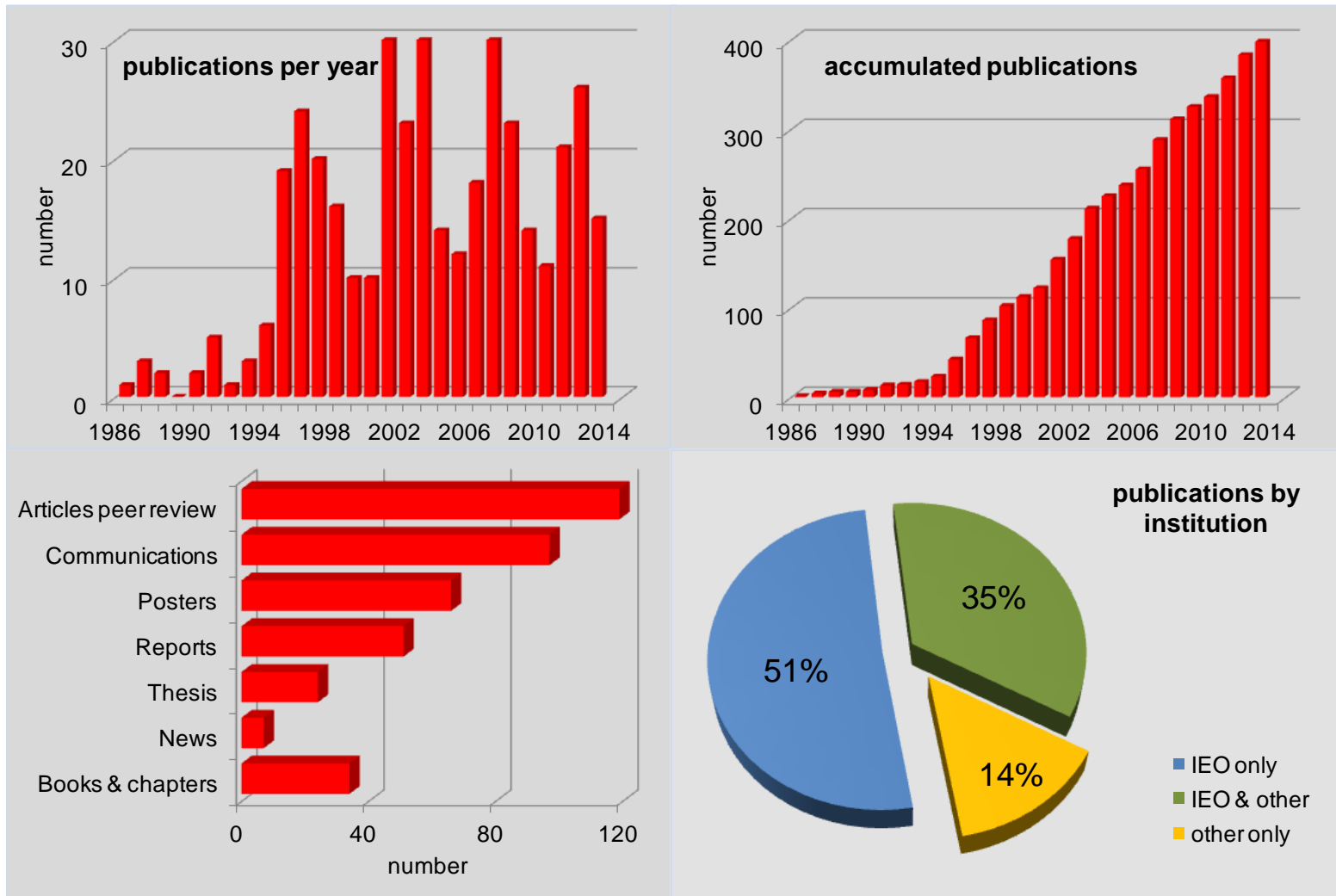


# Phytoplankton species



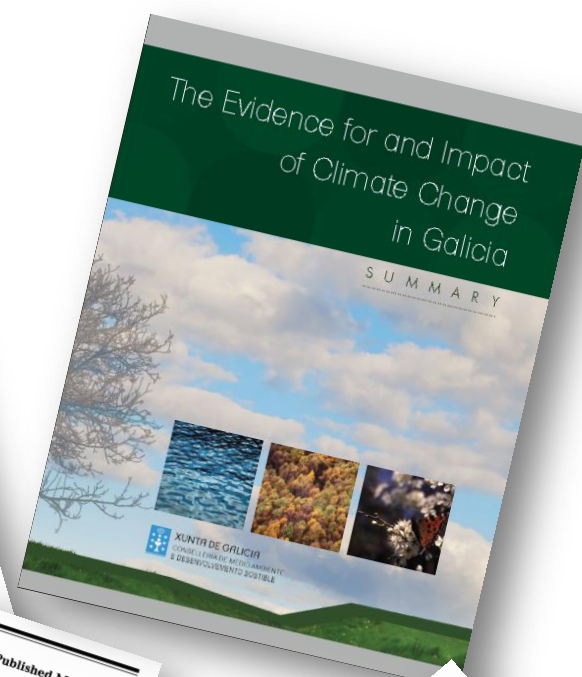
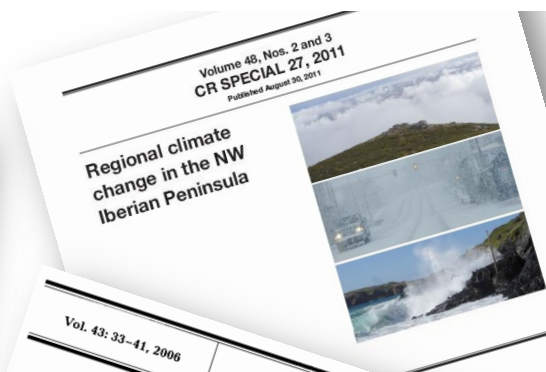


# Products: scientific publications



Updated: December 2013

# Applications:



Published May 3

OPEN ACCESS

## Enhanced bacterioplankton activity after the 'Prestige' oil spill off Galicia, NW Spain

Antonio Bode\*, Nicolás González, Jorge Lorenzo, Joaquin Valencia, Marta M. Varela, Manuel Varela

AQUATIC MICROBIAL ECOLOGY  
Aquat Microb Ecol

Published February 28

## Seasonal dynamics of picoplankton in shelf waters of the southern Bay of Biscay

Alejandra Calvo-Díaz\*, Xosé Anxelu G. Morán

Instituto Español de Oceanografía (IEO), Centro Oceanográfico de Xixón, Cami de L'Arbeval, s/n, 33212 Xixón, Spain



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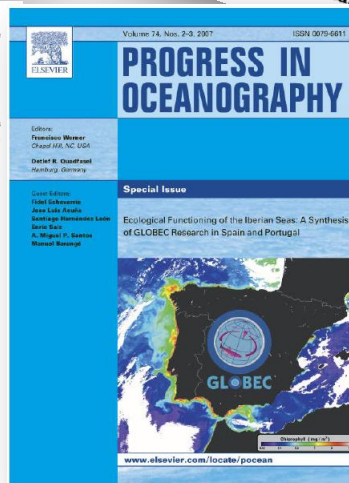
Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

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Marine Pollution Bulletin 53 (2006) 272–286

MARINE POLLUTION BULLETIN

[www.elsevier.com/locate/marpolbul](http://www.elsevier.com/locate/marpolbul)



## The effect of the “Prestige” oil spill on the plankton of the N–NW Spanish coast

Manuel Varela <sup>a,\*</sup>, Antonio Bode <sup>a</sup>, Jorge Lorenzo <sup>a</sup>, M. Teresa Álvarez-Ossorio <sup>a</sup>, Ana Miranda <sup>b</sup>, Teodoro Patrocino <sup>b</sup>, Ricardo Anadón <sup>c</sup>, Leticia Viesca <sup>c</sup>, Nieves Rodríguez <sup>c</sup>, Luis Valdés <sup>d</sup>, Jesús Cabal <sup>d</sup>, Angel Urrutia <sup>d</sup>, Carlos García-Soto <sup>e</sup>, Menchu Rodríguez <sup>e</sup>, Xosé Antón Álvarez-Salgado <sup>f</sup>, Steve Groom <sup>g</sup>

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<sup>c</sup> Laboratorio de Ecología, Universidad de Oviado, Spain

<sup>d</sup> Instituto Español de Oceanografía, Paseo del Arbeval, Gijón, Spain

<sup>e</sup> Instituto Español de Oceanografía, Promontorio de San Martín s/n, Santander, Spain

<sup>f</sup> Instituto de Investigaciones Marinas, Eduardo Cabello 6, Vigo, Spain

<sup>g</sup> Plymouth Marine Lab., Prospect Place, The Hoe, Plymouth PL1 3DH, United Kingdom

# Spin-offs and alliances:



Inicio Especificaciones Datos Históricos Últimos datos Productos FixO<sup>3</sup> Publicaciones Contacto

14 Noviembre 2014 : Idioma/Language ESP ENG

BOYA AGL  
Santander

Boya Océano-meteorológica Augusto González de Linares

Últimos valores

**IBI-ROOS**  
Iberian-Biscay-Ireland Regional Operational Oceanographic System

HOME OVERVIEW OBSERVING SYSTEMS ACCESS TO DATA NEWS & MEETINGS

**Ireland-Biscay-Iberia Regional Operational Oceanographic System**

The goal of IBI-ROOS is to set up an operational oceanography organisation operated by participating partners from the 5 countries bordering the Iberian-Biscay-Irish maritime area ( France, Ireland, Portugal, Spain and UK), collaborating to develop and implement ocean observing systems for the IBI-ROOS area, with delivery of real time operational data products and services.

COOPERAÇÃO TRANSFRONTEIRIÇA  
E S P A - P O R T U G A L  
COOPERAÇÃO TRANSFRONTEIRIÇA

Galego Castellano Português English

**VACLAN**

**Grupo mediterráneo de Cambio Climático del Instituto Español de Oceanografía**

Barcelona  
Tarragona  
Mahón  
Canales  
Cabrera  
Sacratif  
C. Gate

Latitud

Longitud

**RAIA**  
Observatorio Oceanográfico Da Marxe Ibérica

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Home

RAIA Allows to the users consult data of interest offered by the distinct partners that participate in the project

Predicción de temperaturas (Modelo WRF de Meteogalicia)

Radar HF

Datos de Boías

This project is the result of a common strategy developed by two regions with the ambition of reaching a deeper understanding of the ocean. Within the project, different partners with operational, technological and scientific background have come together. In all cases, existing projects in operational oceanography in which they are involved provide experience of the marine environment and a point of departure for this trans-frontier collaboration. The results of these projects for the region of the northwest Iberian Peninsula (some of which are detailed below) will be available for the developments outlined here.





# International Group for Marine Ecological Time Series

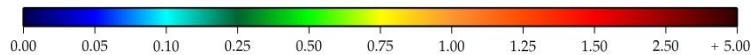
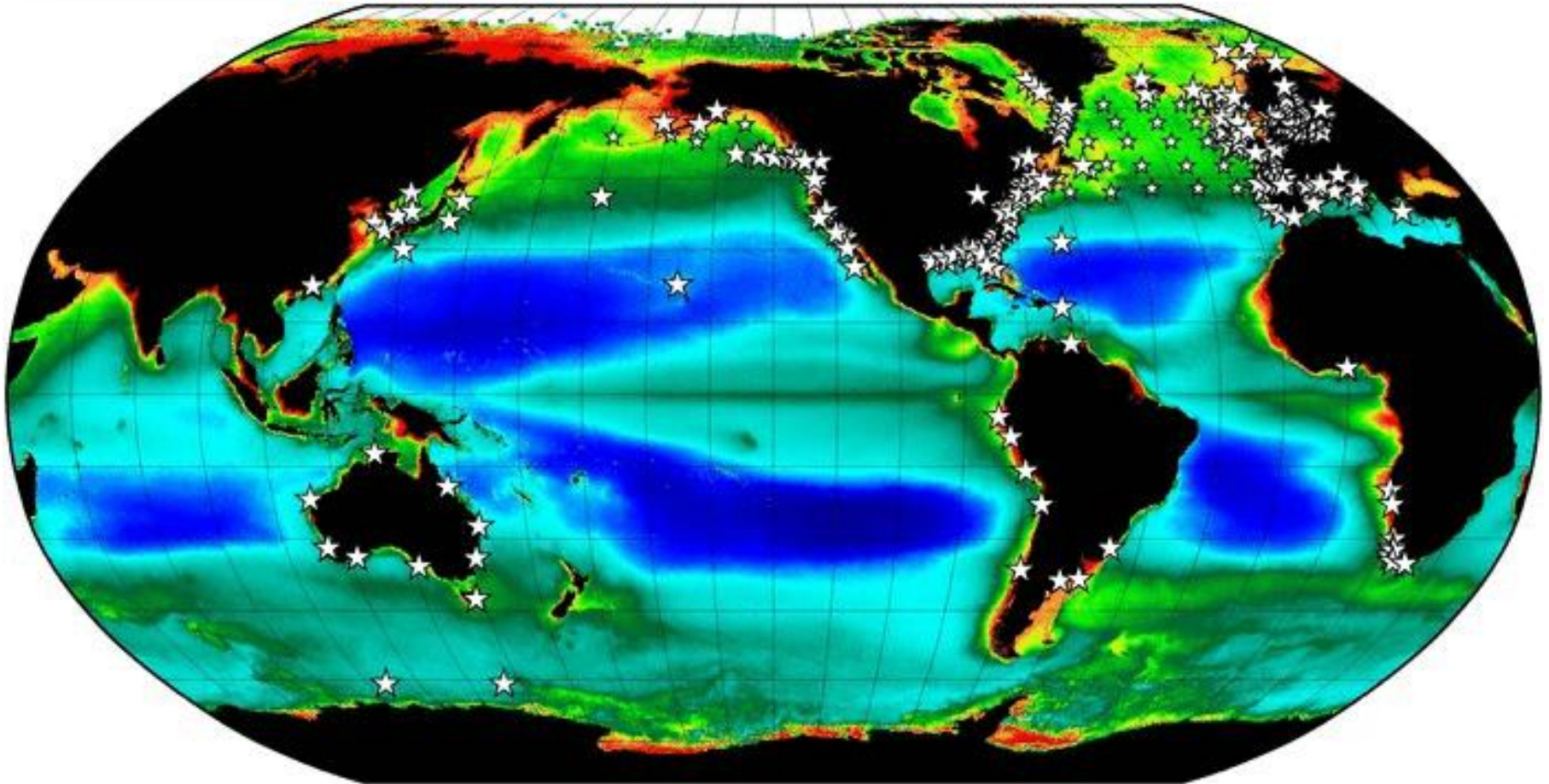
Analysis and synthesis of global marine ecological changes  
as seen through biogeochemical and plankton time series.



United Nations  
Educational, Scientific and  
Cultural Organization



Intergovernmental  
Oceanographic  
Commission





# Ocean Observation and Global Change



## Mission:

to deepen the knowledge related to the relationship between the ocean and the climate, to the ocean's role within the Earth system as well as to the ocean's influence on human populations.

# Ocean Observation and Global Change



Research Fields	Ocean Observation	Global Change: Observational, experimental and modeling approach
Research Lines	Pre-instrumental records: the ocean before the Anthropocene	Ocean Warming
	Observation Networks: From Genes to Space	Ocean Fertilization
	Technologies for the development of marine analytical techniques, sensors, platforms and vehicles	Ocean Acidification
	Operational oceanography	Identification of Social and economic risks of global change

# RADIALES: the numbers



3 oceanographic ships  
5 oceanographic sections  
23 sampling stations  
24 scientists  
25 ship crew  
28 technicians & students  
423 keuro/year (>60% external funds)  
398 scientific publications

7 News  
24 Thesis  
34 Books and chapters  
51 Reports  
66 Posters  
97 Communications  
119 Articles peer review



<http://www.seriestemporales-ieo.com/>

The screenshot shows a web browser window with the address bar containing "Series Temporales.". The page title is "Oceanographic time series in northern Spain (RADIALES)". The header includes the Spanish Government logo (GOBIERNO DE ESPAÑA, MINISTERIO DE CIENCIA E INNOVACION) and the logo of the Instituto Español de Oceanografía.

The main content area features a vertical navigation menu on the left with the following items: "Introducción", "Estrategia de muestreo", "Metodología", "Gestión del proyecto", "Resultados", "Galería de imágenes", "Talleres, cursos y congresos", and "Enlaces".

The central content area is a grid of images and text:

- Top-left: A blue research vessel at sea.
- Top-middle: A map of northern Spain showing sampling locations: Culleredo, Oporto, Santander, A Coruña, and Vigo.
- Top-right: A yellow box with the text "Web updated 11/03/2011".
- Middle-left: A close-up of a red and white sampling net.
- Middle-right: A close-up of a sampling net with a red float.
- Bottom-left: A yellow box with the text "Spanish version" and a small Spanish flag.
- Bottom-middle: A close-up of a brownish, gelatinous organism.
- Bottom-right: A close-up of a blue and white sampling net.

The footer contains the text: "© Time-Series Web. Version 1.0 - February 2003" and a link for "Disclaimer, copyright and data policy".