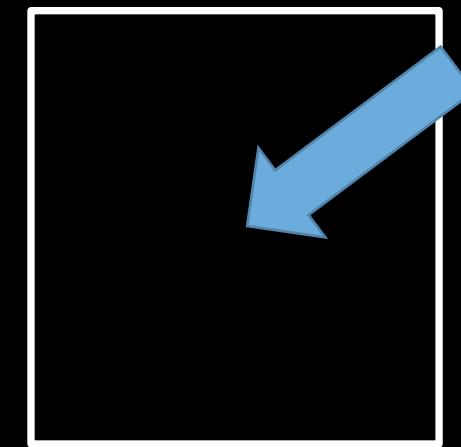


Sentinel Applications - fisheries and aquaculture

Vanda Brotas

Peter Miller, Andrey Kurekin, Jean-Baptiste Kassi, Marie-Fany Racault,
Shubha Sathyendranath, Trevor Platt, Nick Selemes, Steve Groom,
Carolina Sá, Andre Couto, Aquauers Team, CoastColour Team

Sentinel 2



Sentinel contribution: what will change/ advantages

- easily accessible information
- OLCI will make observations at 300 m spatial resolution
- long term continuity, S3 A/B/C/D



Sentinel Applications - Fisheries

Ongoing Use of Remote Sensing to

- Find Potential Fishing Zones (PFZ)
- Increase efficiency of fishing
- Improving fish sustainability and

Protection of Fish Stocks

*(Ship detection with Sentinel 1 (SAR) and
Sentinel 2 (RGB colour))*



Fisheries and fronts

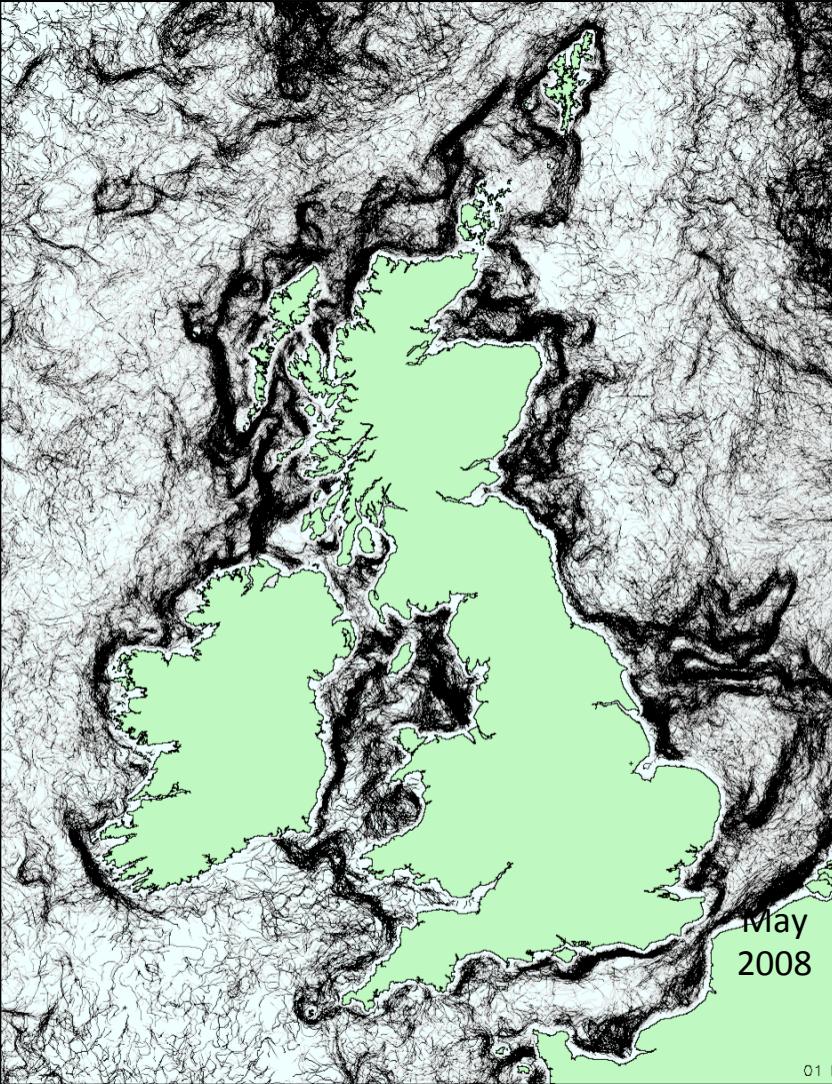
An obvious ocean front

cooler water of the Atlantic Benguela

Warmer water of the Agulhas current

Earth Observation of ocean fronts vs. fisheries

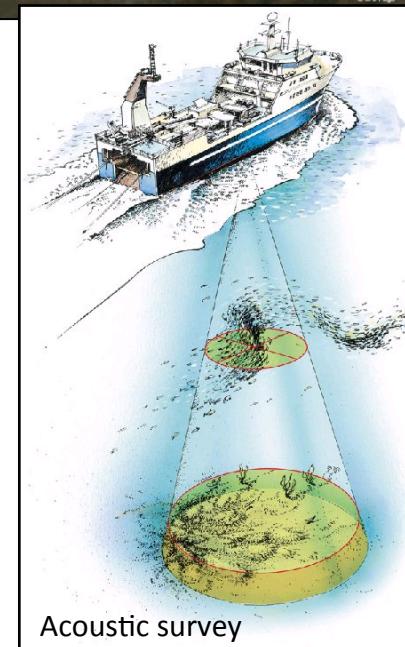
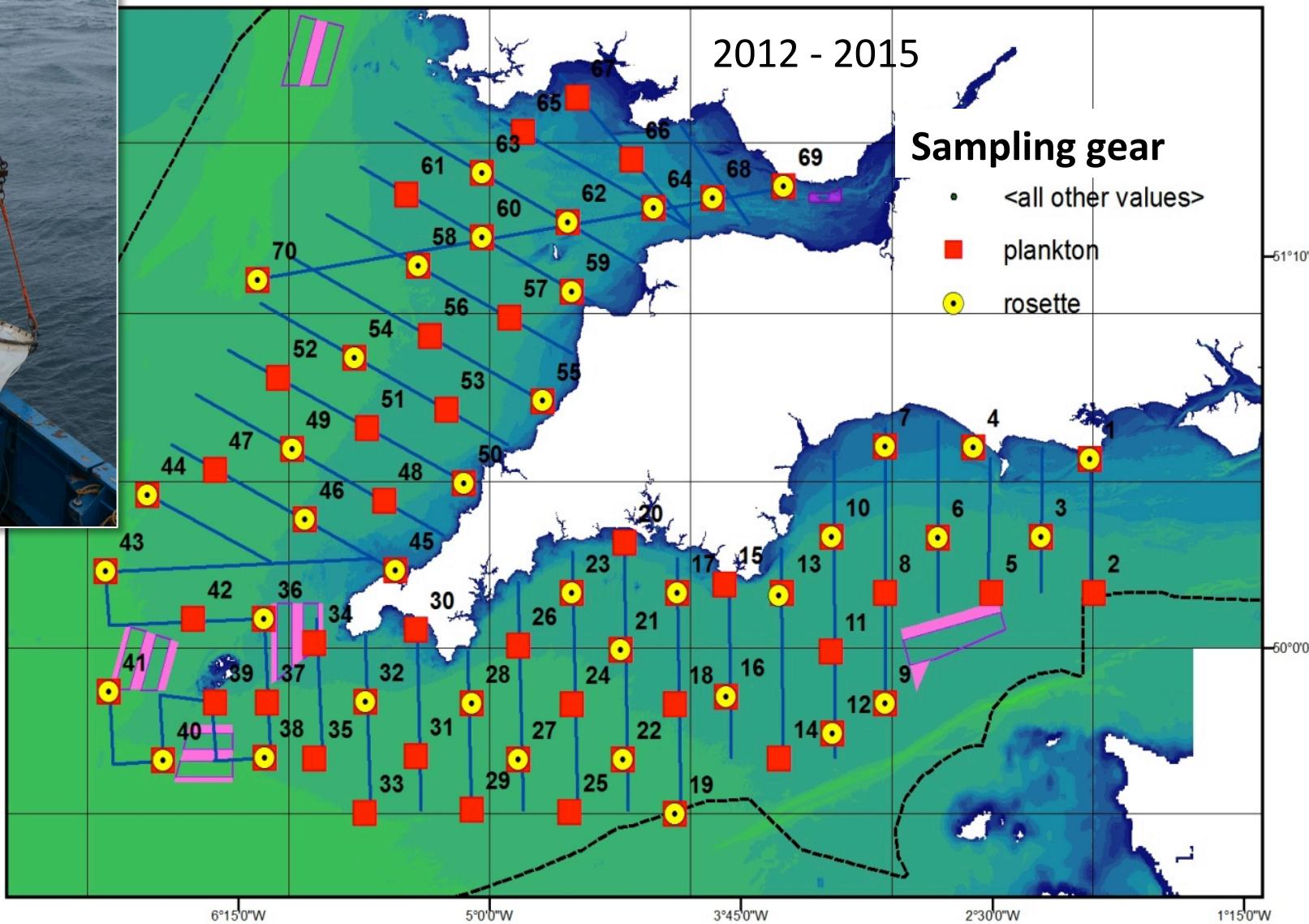
Ocean
fronts: from
spaghetti to
synoptic
chart



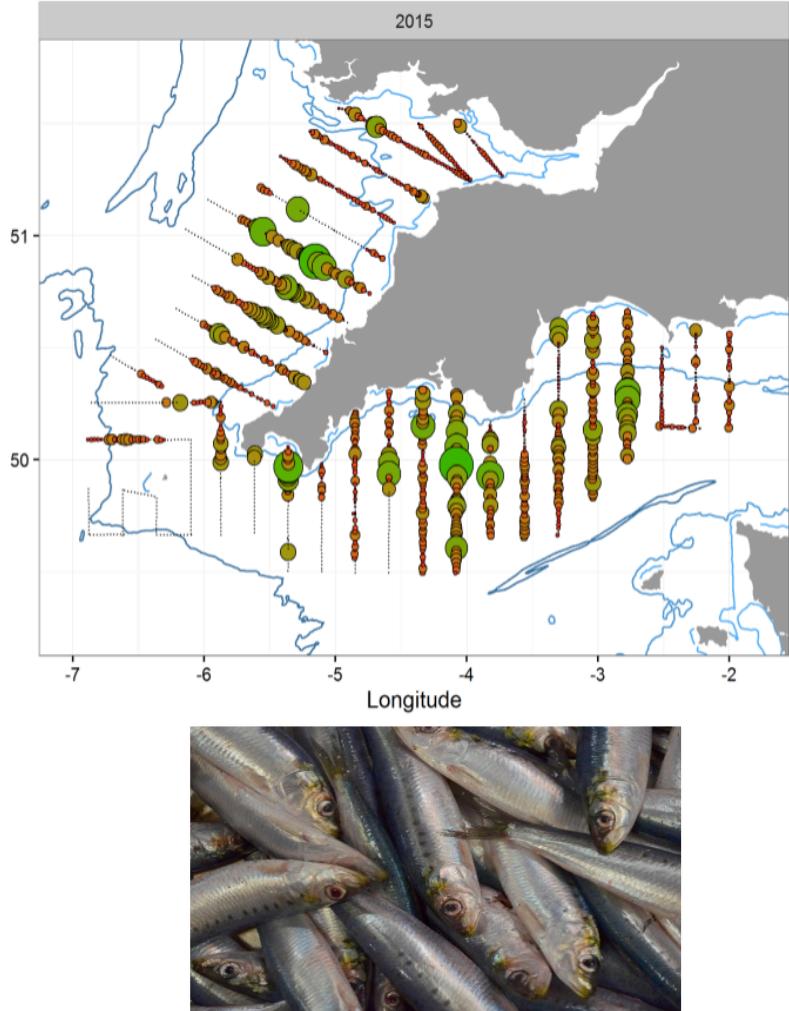
Front distance
Warm and cold side, front strength



'Peltic' Survey: Pelagic ecosystem survey in Celtic Sea

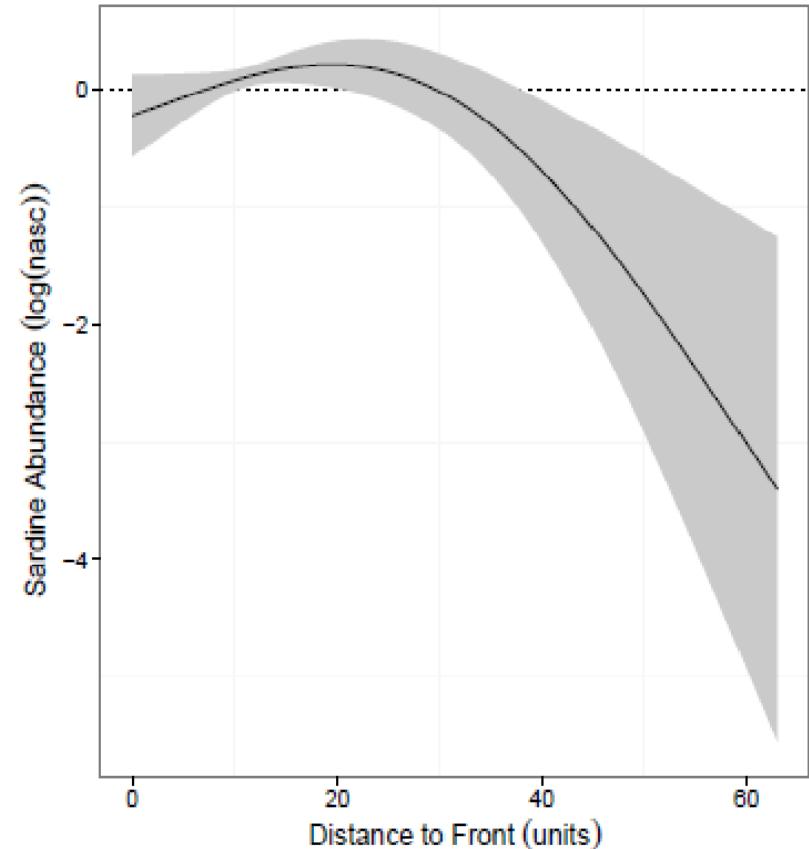
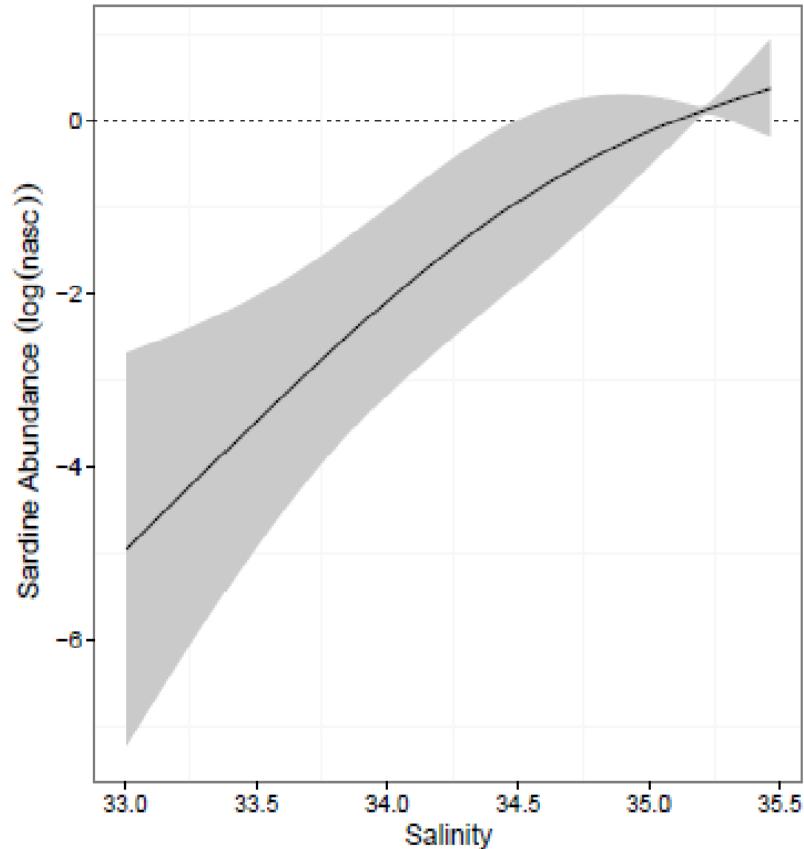


Acoustic survey



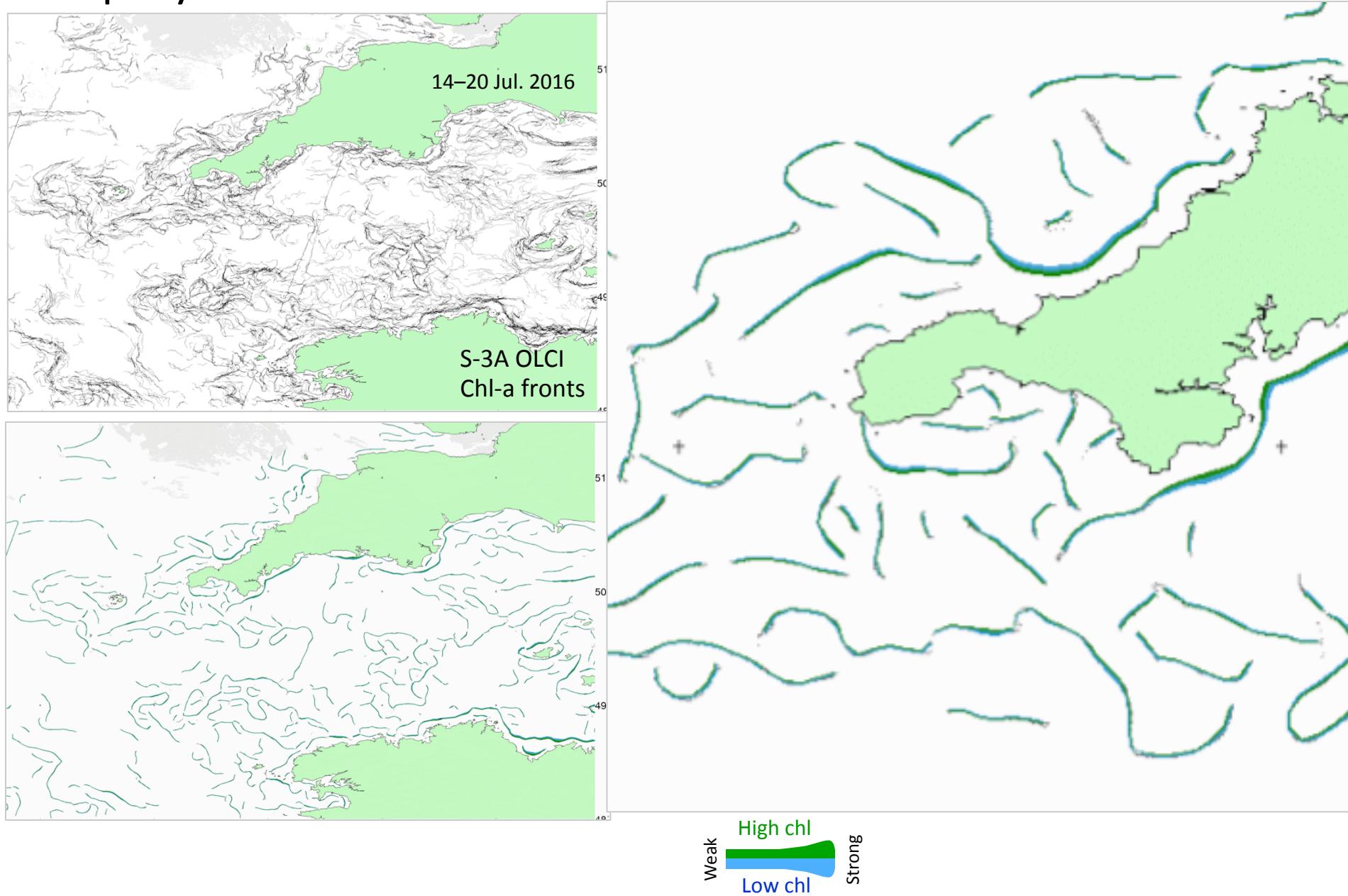
Sardine distribution vs. fronts

Predictors from Generalised Additive Model



- Higher sardine abundance closer to fronts and with increasing salinity.

Chlorophyll fronts from Sentinel-3A OLCI

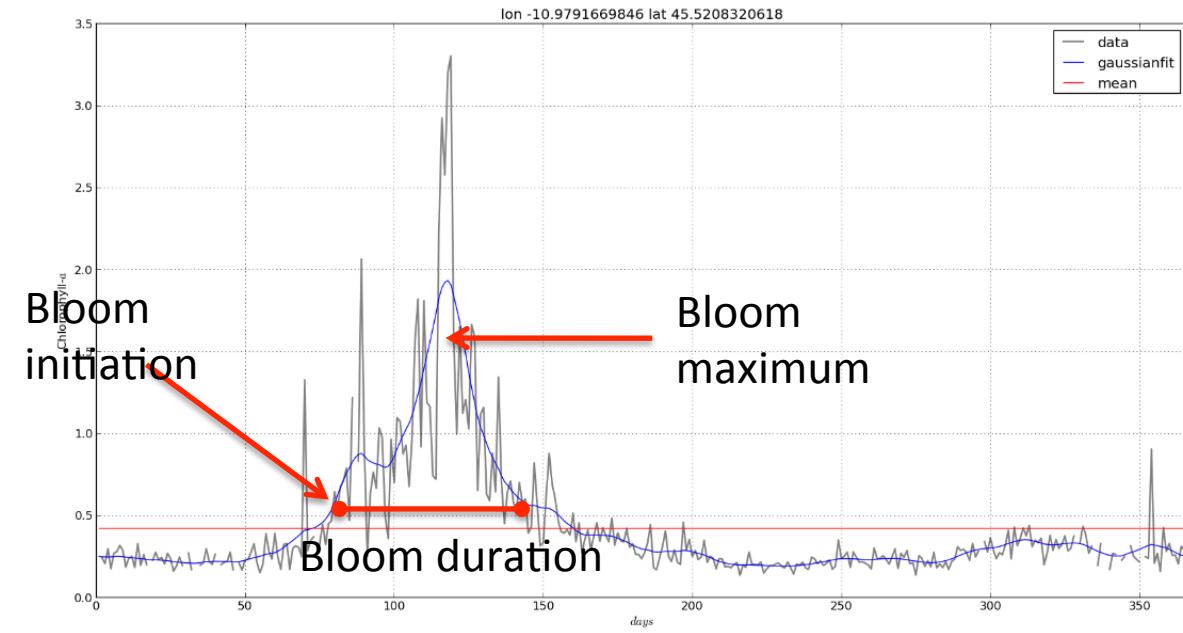


Phenology of phytoplankton blooms: Finding Patterns and Anomalies

Table 8.1 Ecological indicators of the pelagic ocean that can be derived from radiometry (Platt and Sathyendranath, 2008).

Indicator	Label	Dimensions
Initiation of spring bloom	b_i	[T]
Amplitude of spring bloom	b_a	[ML ⁻³]
Timing of spring maximum	b_t	[T]
Duration of spring bloom	b_d	[T]
Total production in spring bloom	b_p	[ML ⁻² T]
Annual phytoplankton production	P_Y	[ML ⁻²]
Generalised phytoplankton loss rate	L	[ML ⁻³ T ⁻¹]
Integrated phytoplankton loss	L_T	[ML ⁻³]
Annual-scale f -ratio	f	Dimensionless
Spatial variance in biomass field	σ_B^2	[M ² L ⁻⁶]
Spatial variance in production field	σ_P^2	[M ² L ⁻⁴]
Phytoplankton functional types	NA	NA
Delineation of biogeochemical provinces	NA	NA
Phytoplankton size structure	s	Dimensionless

IOCCG 7



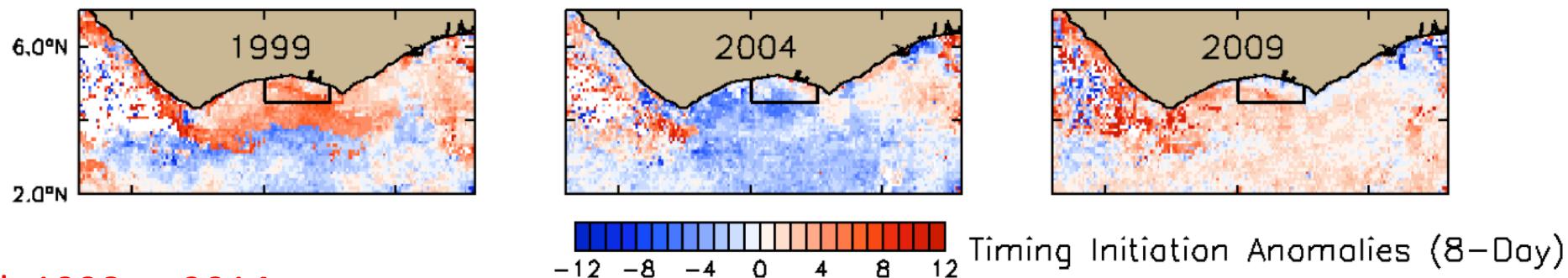
Example for latitude 45N , off the Iberia coast

10 years average (2002 – 2012) calculated for each day. MERIS (300 m resolution)

Phenology and Fisheries

Sardine Catch as a function of Timing of Phytoplankton bloom

Ivory Coast, Gulf of Guinea

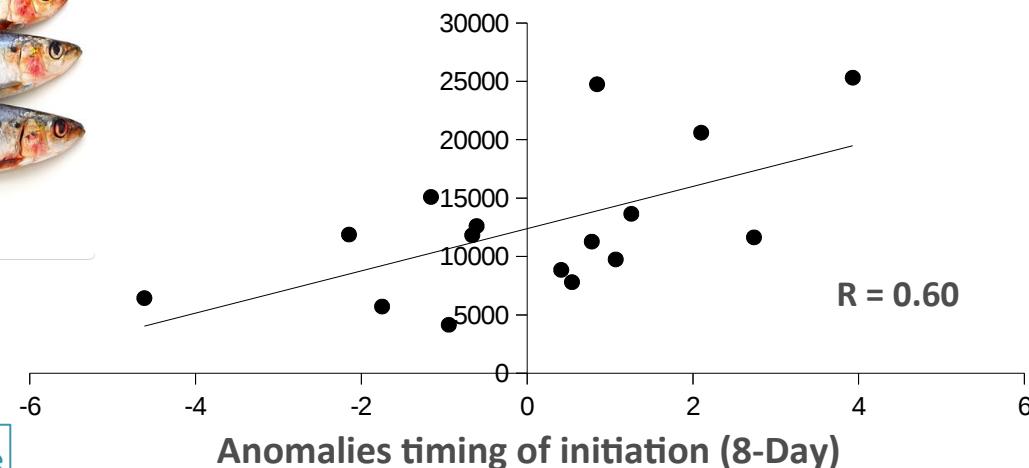


Time period: 1998 to 2014

Study based on OC-CCI data v3.0



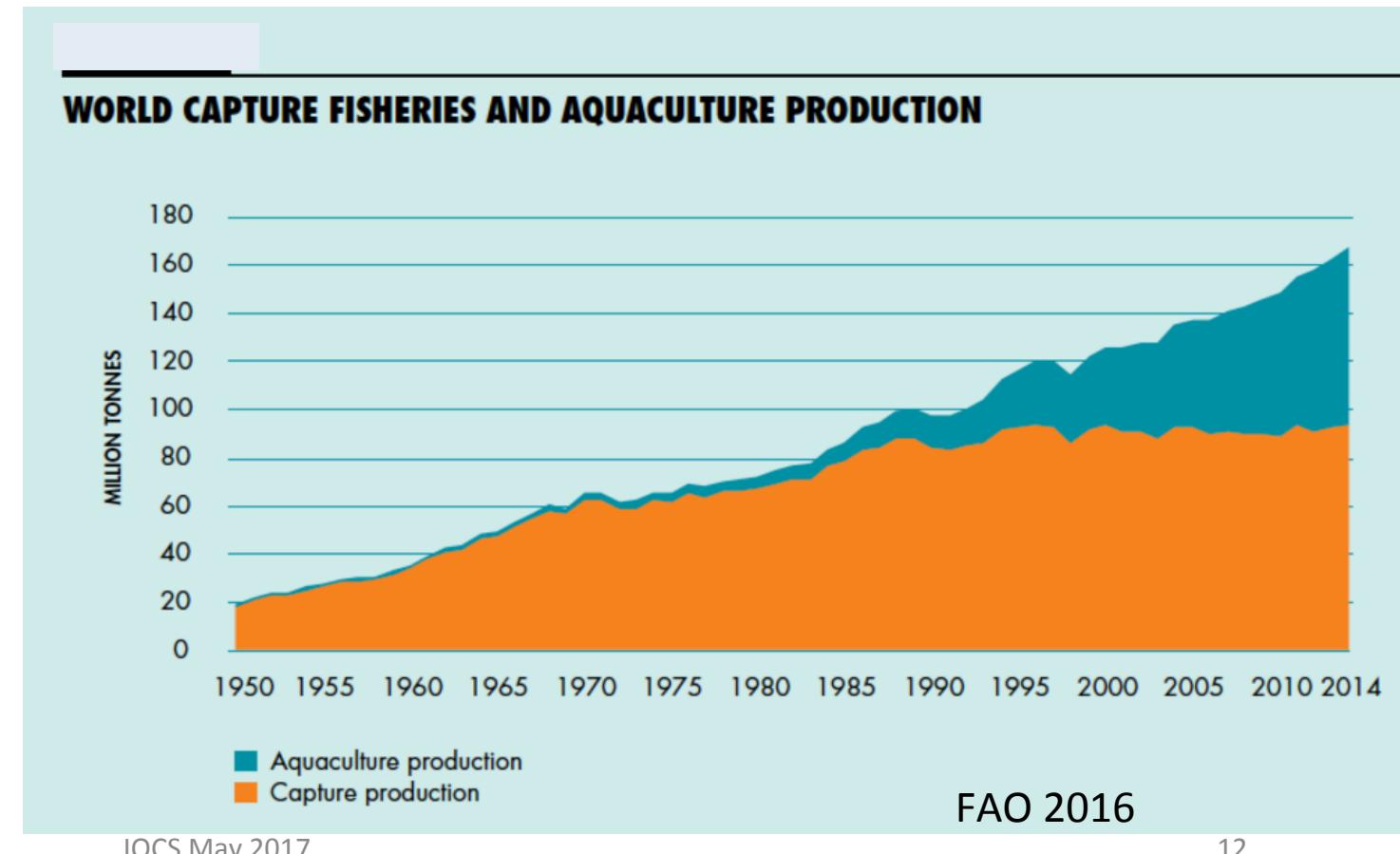
Sardines Catch in year + 1 (tons)



Kassi, Racault, Mobio, Platt,
Sathyendranath, Raitsos, Affan (In prep).
Biophysical drivers of *Sardinella aurita* in
Ivorian waters: Applications from remote-
sensing observations and GIS

Sentinel Applications: aquaculture

- Increase demand for potential areas for aquaculture
- Link between Aquaculture and Water Quality
- Need to have NRT alerts for potential HABs affecting Aquaculture units



Sentinel Applications for Aquaculture: Water quality

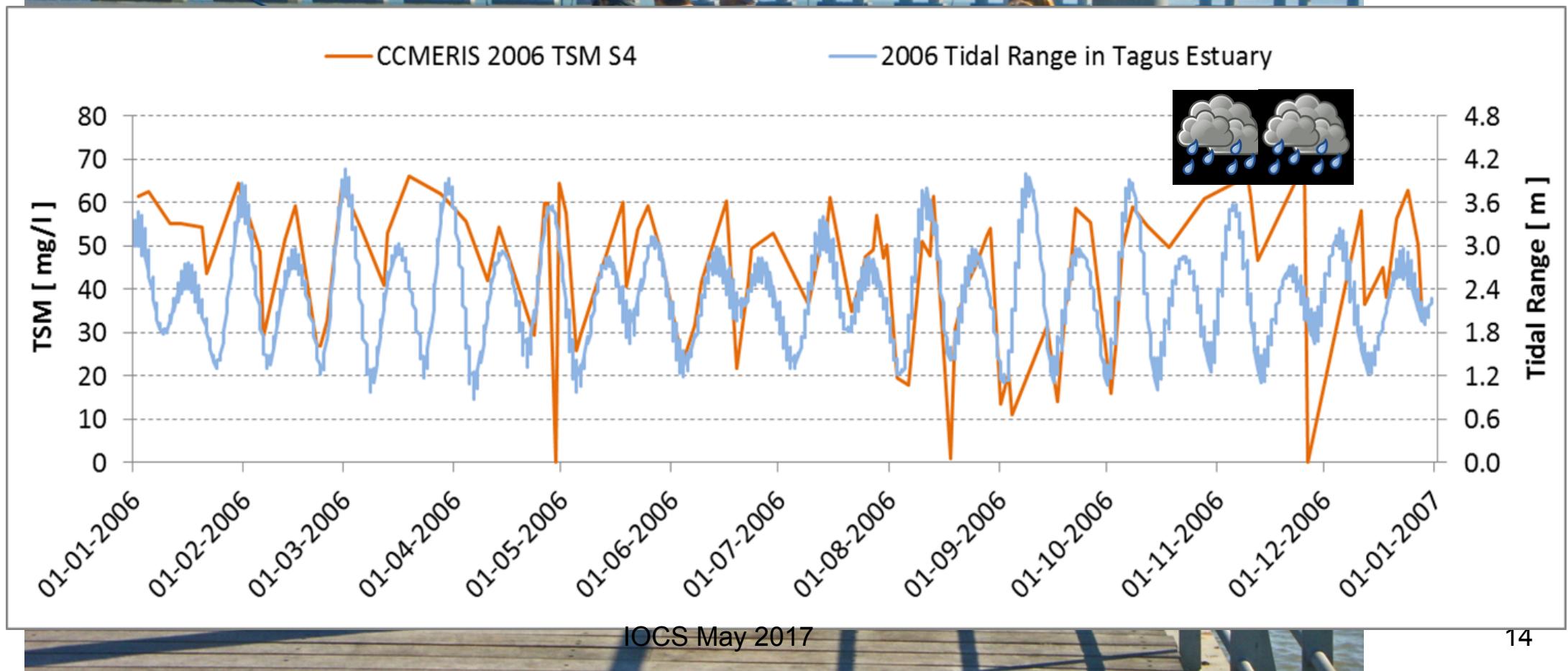
- Chlorophyll
- Turbidity
- CDOM



Indicators derived from radiometry

- Estuarine Coastal Waters, superimposed temporal scales: daily, neap/
Spring tide, seasonal, interannual

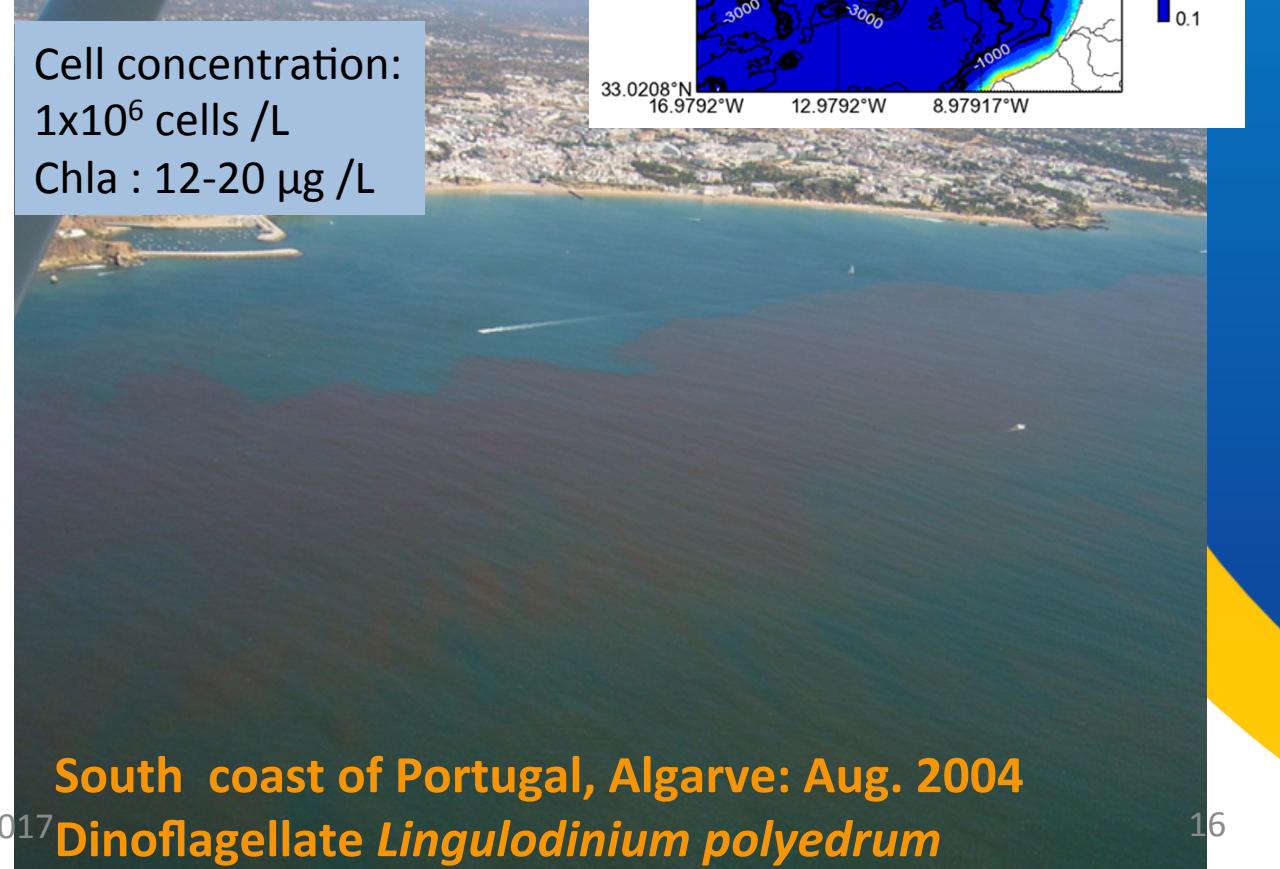
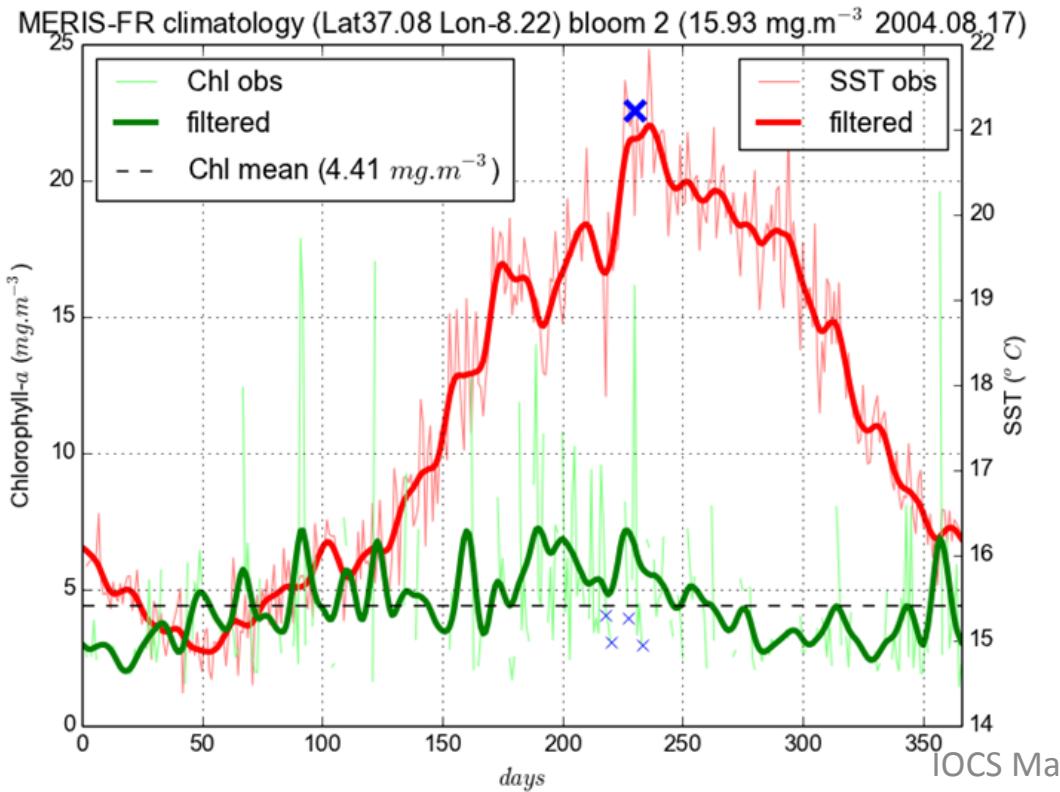
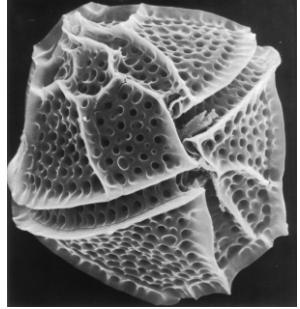
Results from ESA CoastColour project in Tagus Estuary



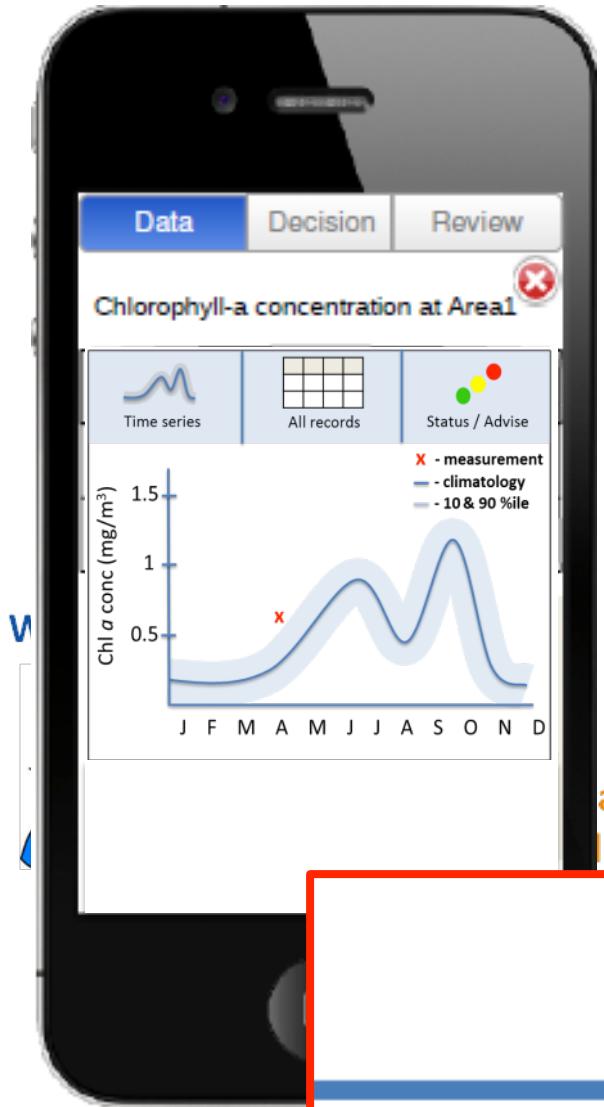
End-users requirements

User	Type	Parameters								
		Salinity	Temperature	Chlorophyll a	Oxygen	Nutrients	L i g h t availability / turbidity	W i n d speed and direction	Waves	Currents
Prins & Dingemans e (NL)	Mussels	★	★	★	★		★	★	★	★
Hortimare (NO)	Seaweed		★	★		★	★			★
Finisterra (PT)	Mussels		★	★			★	★	★	★
Erfjord Stamfisk (NO)	Salmon roe		★	★			★		★	★
Hjarno Havbrug (DK)	Trout	★	★	★	★	★		★	★	★
Marine Harvest (UK)	Salmon		★	★	★		★	★	★	★

Phenology of phytoplankton: Finding Patterns and Anomalies



Aquaculture daily decision support

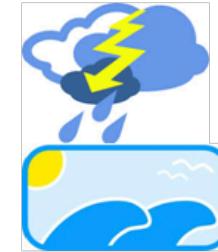


Satellite data:

Temperature
Chlorophyll
Suspended solids
Turbidity

Additional data:

e.g. Weather
Currents
Waves



Derived/aggregated data:

e.g. HAB Risk
Aquaculture indicators



AQUA-USERS
database



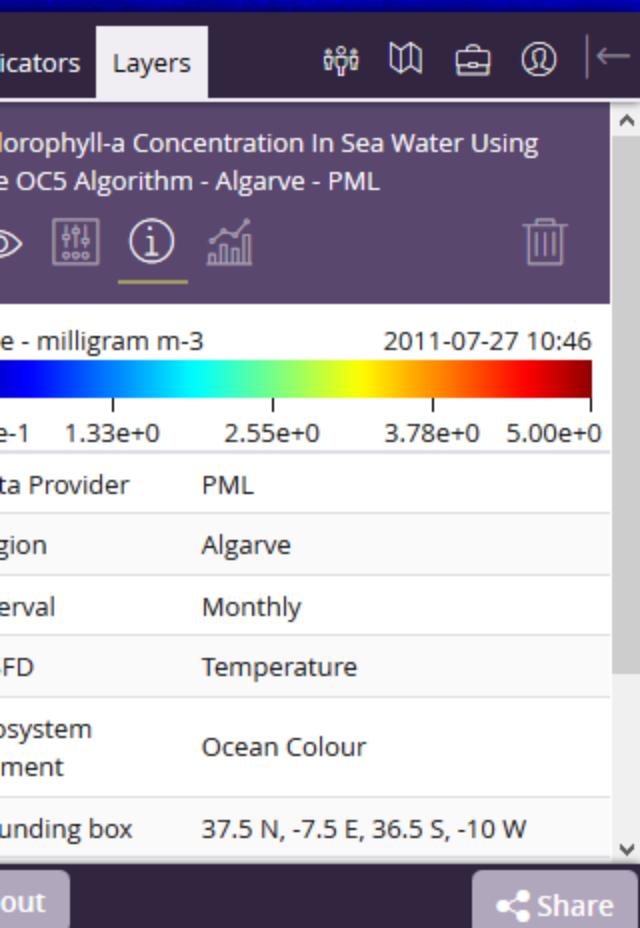
International
Ocean Colour Science
Meeting 2017



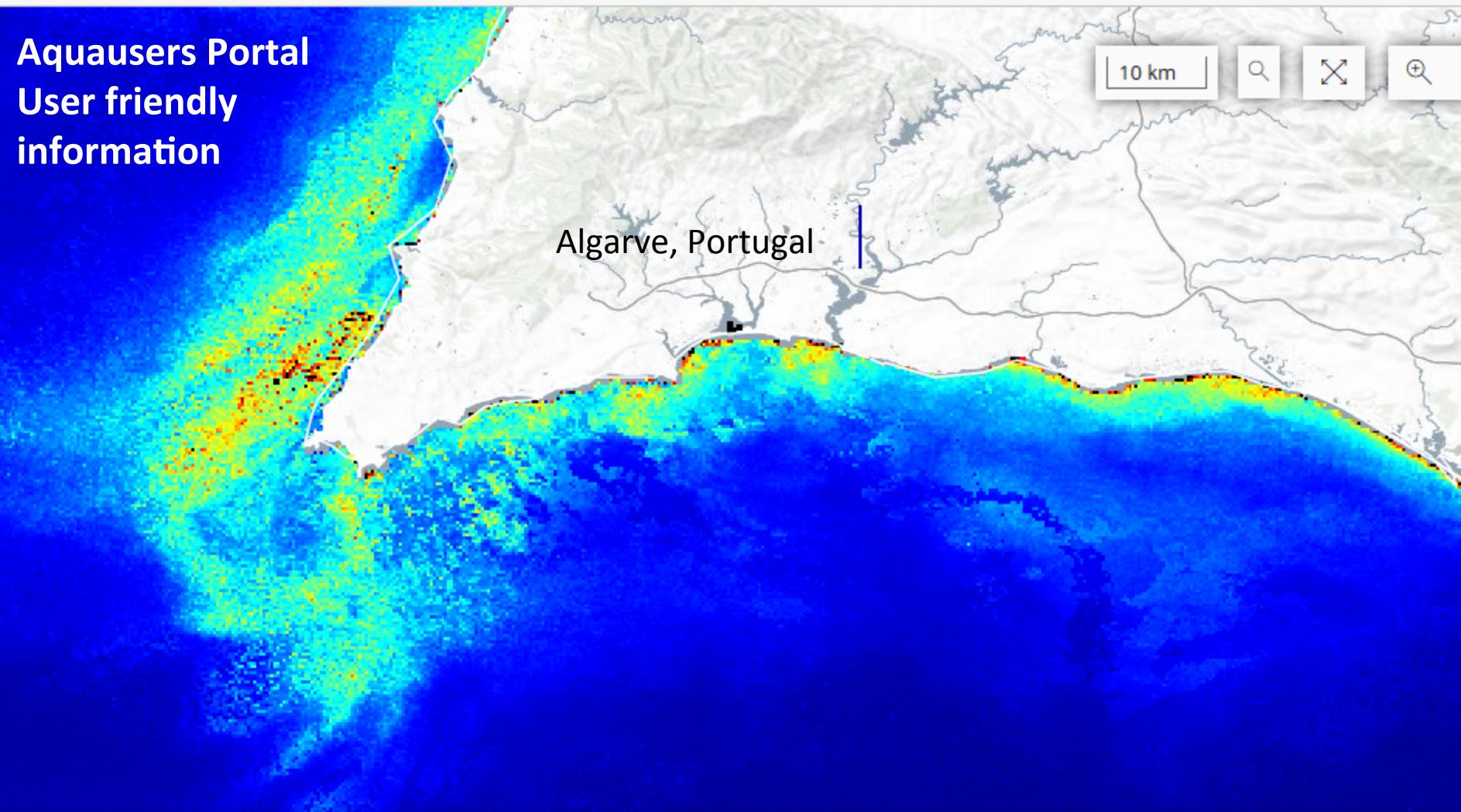
See also Poster
Session 2

Ocean Color data in a tool to support Aquaculture management

Sá, C.¹; Couto, A.B.¹; Brito, A.C.¹; Brotas, V.¹; Eleveld, M.²; Dale, T³; Poser, K.⁴; Laanen, M.⁵



Aquausers Portal User friendly information



Timeline - Click and drag to move, use your mouse scroll wheel to zoom, click to select a date or enter your required date in the date field on the right

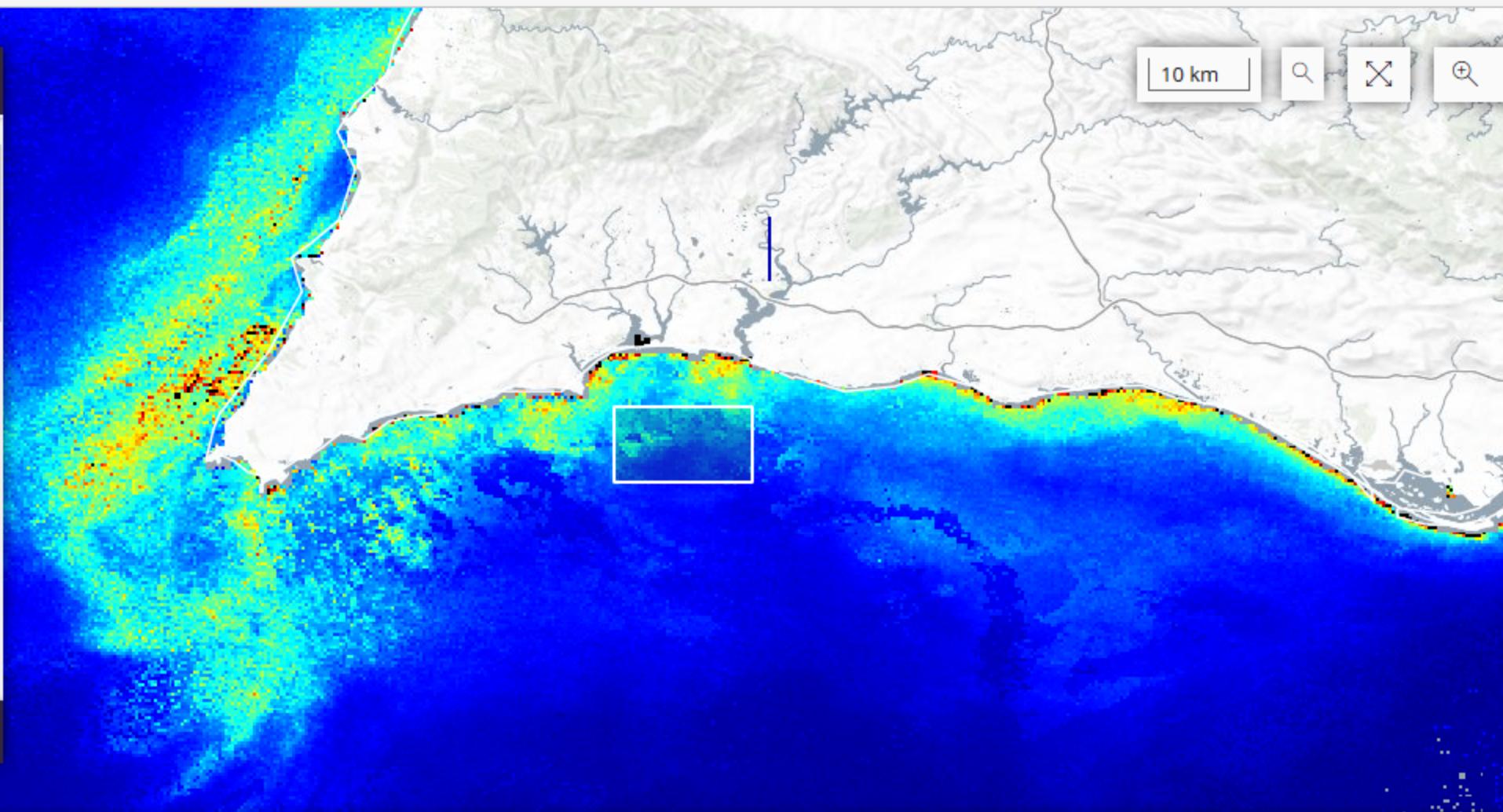
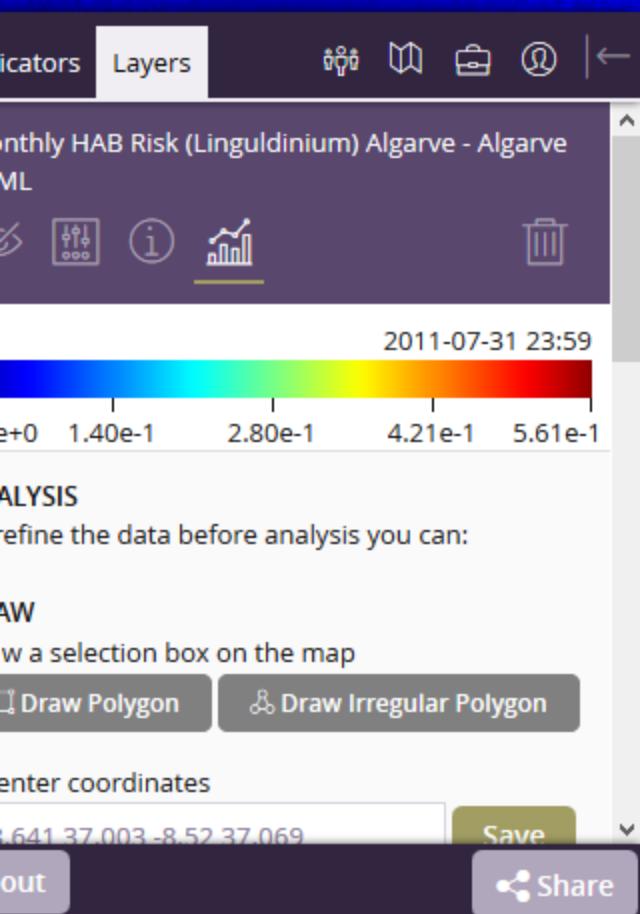
Chlorophyll-a Concentration In Sea Water Using The OC5 Algorithm - Algarve

Jan 2003 Jan 2004 Jan 2005 Jan 2006 Jan 2007 Jan 2008 Jan 2009 Jan 2010 Jan 2011 Jan 2012

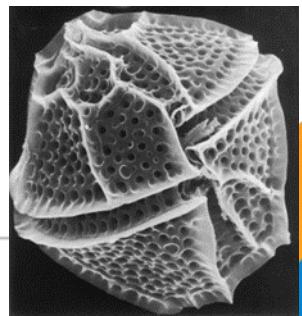


2011-08-07 09:49

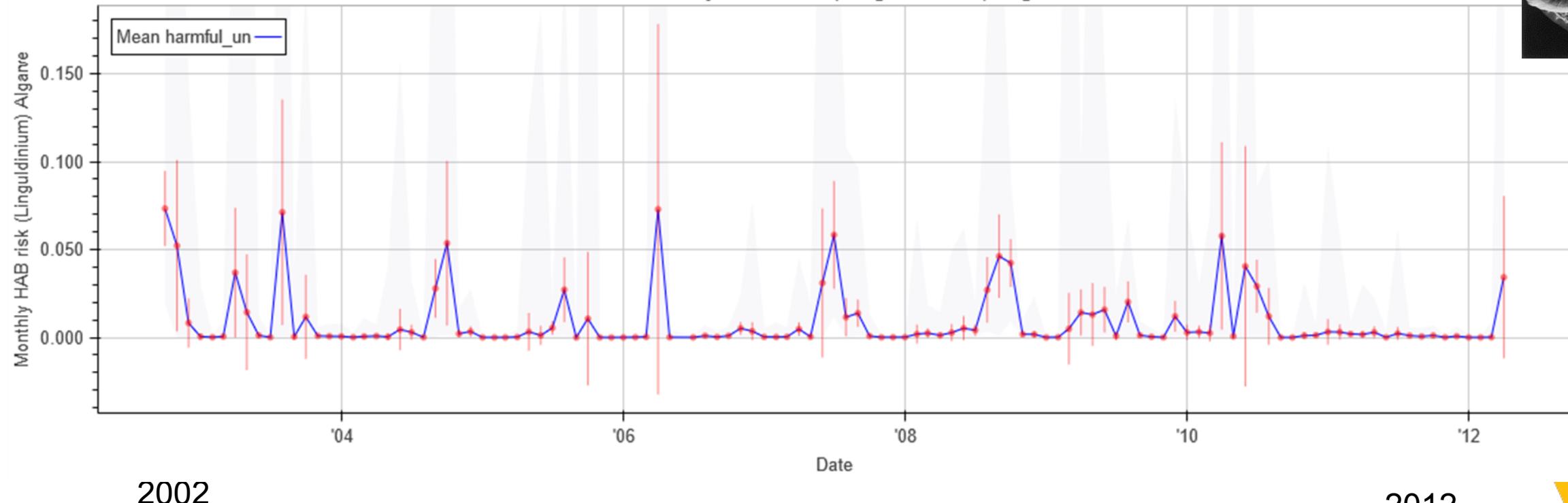
ost Visited Getting Started Moodle Ciências



A HAB risk map can be obtained for each ROI



PML: Monthly HAB risk (*Lingulodinium*) Algarve



Sentinel 3: contemporaneous images and HAB events, validation with in situ, tuning of algorithms for targeted species, continuity of observations

on
Remote Sensing for Ecosystem Analysis and Fisheries

January 15-17, 2018 | Kochi, Kerala, India

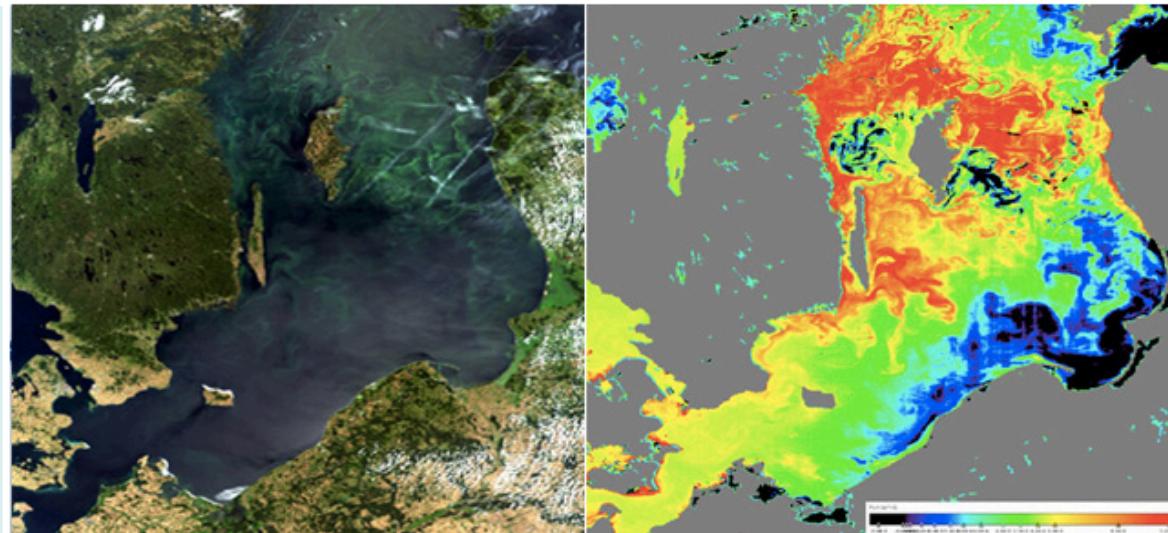
Hosted by ICAR-CMFRI

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About Symposium

The 1st The first International symposium of SAFARI (Societal Applications in Fisheries and Aquaculture using Remote Sensing Imagery) was held in Kochi during February 2010 and was organized by the Central Institute of Fisheries Technology, one of the seven fisheries Institutes of the Indian Council of Agricultural Research. The first international symposium to bring together the scientific communities working on various aspects of fisheries and remote sensing, the first SAFARI symposium attracted more than 150 participants. It led to a special issue of the ICES Journal of Marine Science. SAFARI was recognized early as an activity of the Group on Earth Observations (GEO) and is now ...

[More](#) 



Objectives

To review the recent advancements in the remote sensing technologies in fisheries and ecosystem analysis.

To identify constraints and research needs of the remote sensing imagery in fisheries.

To identify and appraise new remote sensing technologies in fisheries and ecosystem analysis .

DATES TO REMEMBER

Early Registration Closing September 30th,2017

Abstract Submission Closing September 30th,2017

Symposium Date January 15-17,2018

Pre-Symposium Training January 12-13,2018



Thank You