



Fishing areas characterization using satellite, numerical model and HF radar data.

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Project description

- **SIMOcean** is an **Open Data system** that will exploit different human activities related datasets (vessel traffic, fishing records, oil spills), and environment variables (waves, currents, wind, pressure and temperature) from the Portuguese Meteorological (IPMA) and the Navy's Hydrographic (IH) Institutes.
- **Value added services** will generate new products for the Civil Protection Authorities, Port Authorities, Fishing Associations and also to future National information systems (e.g. NIPIMAR).

www.simocean.pt



**SYSTEM FOR
INTEGRATED
MONITORING
OF THE OCEAN**



Use case definition



FISHING AREAS CHARACTERISATION

Map time-series of the main fishing areas and associated environmental conditions – EO satellite data (SST, Chl), surface currents from HF radars and numeric hydrodynamical models.

Complementary
Datasets
(Model, Satellite,
Observations)



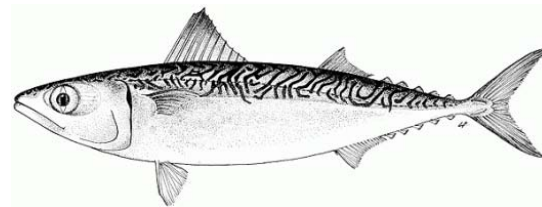
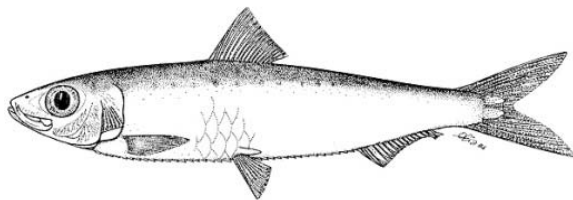
Fish
vessel
activity



**Obtaining
relations
between fish
distributions and
oceanographic
data.**

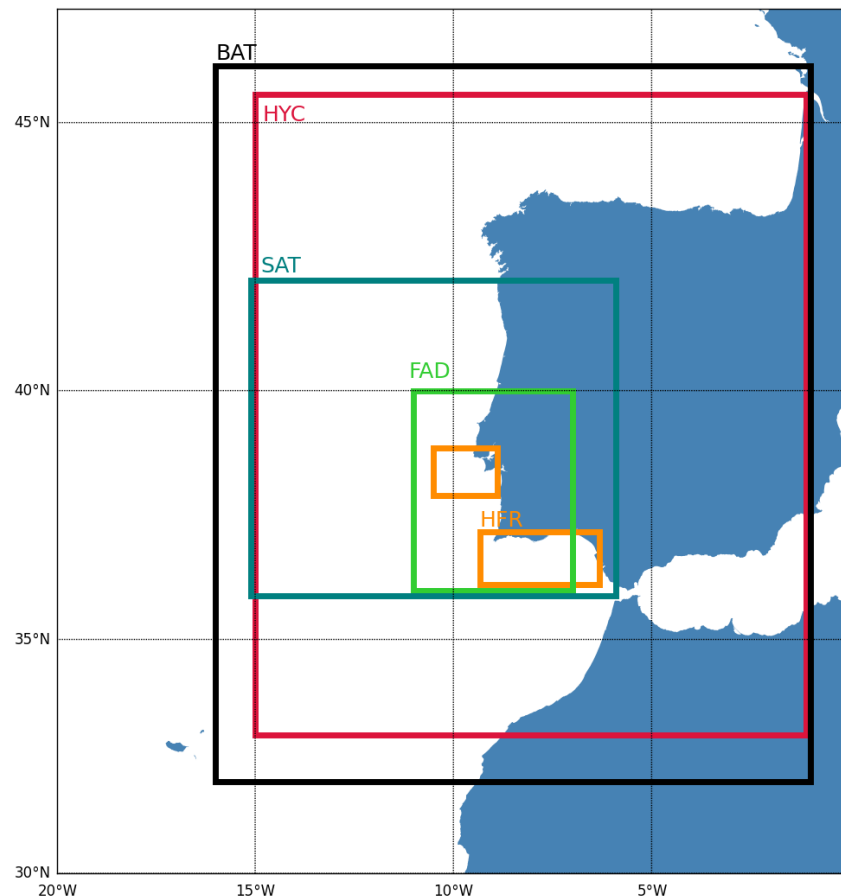
CASE STUDY:

- **European Sardine** (*Sardina pilchardus*) and **Atlantic Chub Mackerel** (*Scomber colias*).
- **First (Mackerel: 1371 logs) and Second (Sardine: 1338 logs) most fished species.**
- This study intends to be **exploratory** and **does not take into consideration** any prior knowledge of **sardine or mackerel environmental preferences or available stock size.**



Datasets

- **Surface Currents, Temperature and Salinity** from HYCOM Model (IH)
- **Surface Currents** from HF Radar systems (IH)
- **Bathymetry** (IH)
- **Fishing Activity Data** (DGRM)
Vessel Position (VMS) and Fish Catch information (DPE) for 2014 and 2015
- **Sea Surface Temperature** from satellite (CMEMS)
- **Chlorophyll-a concentration** from satellite (CMEMS)

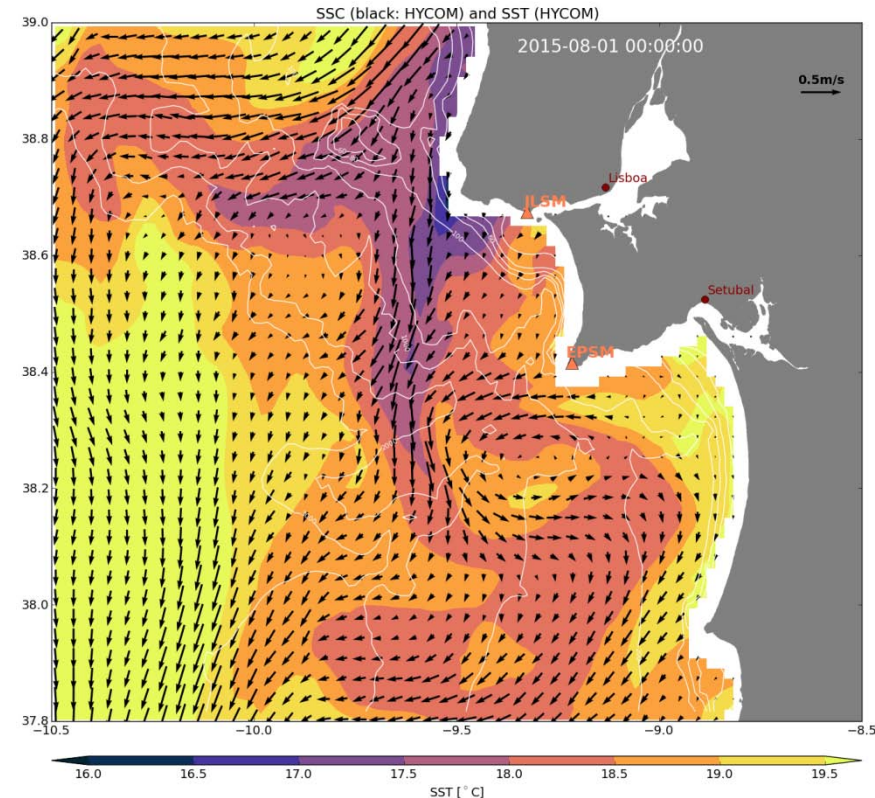


Understanding the sea
for the benefit of all

Results:

Combining datasets

- Bathymetry
- Sea Surface Temp. (HY)
- Sea Surface Currents (HY)

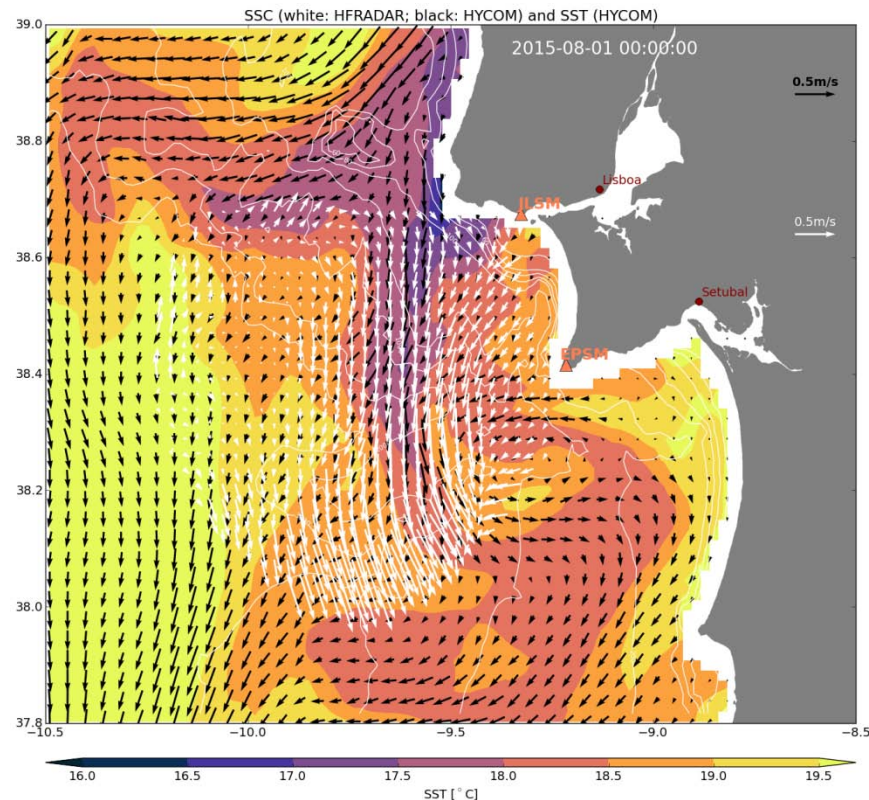


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Results:

Combining datasets

- Bathymetry
- Sea Surface Temp. (HY)
- Sea Surface Currents (HY)
- Sea Surface Currents (HF)

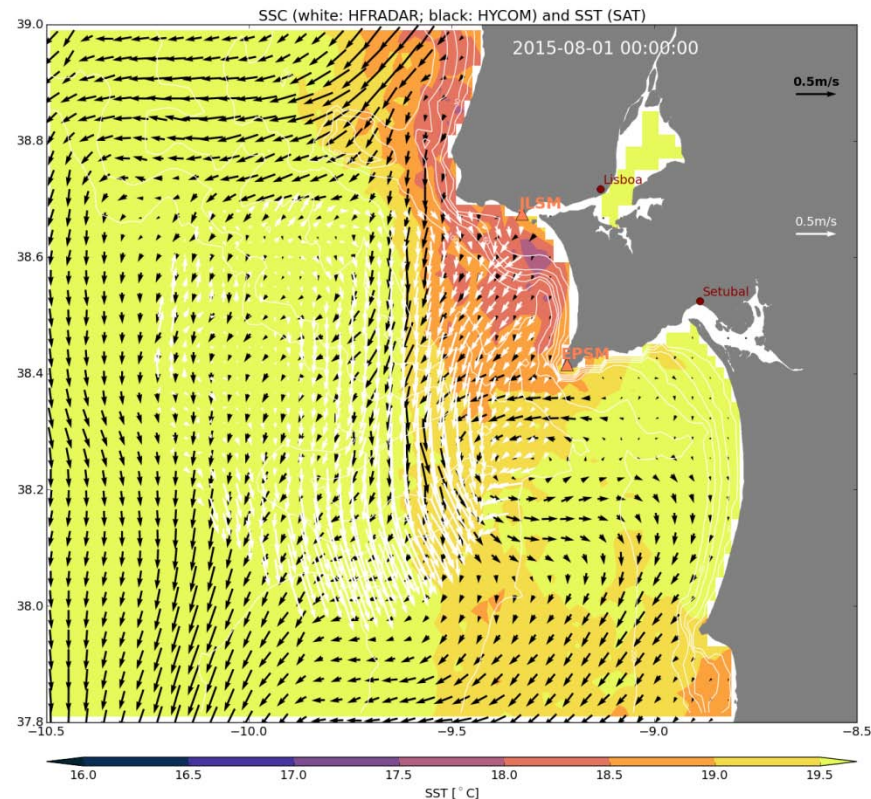


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Results:

Combining datasets

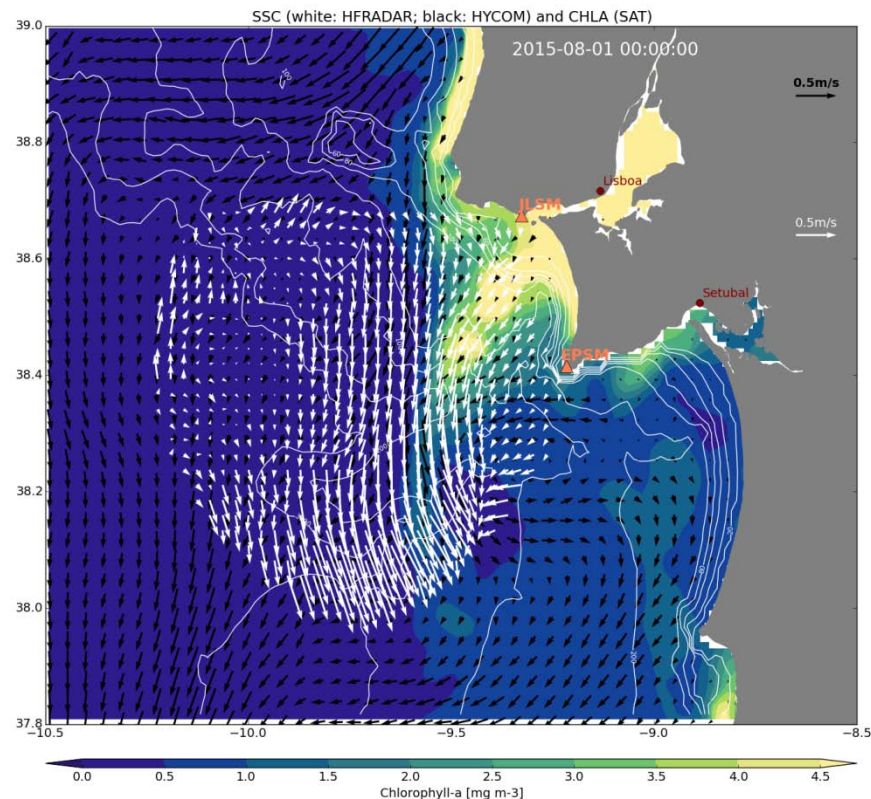
- Bathymetry
- Sea Surface Currents (HY)
- Sea Surface Currents (HF)
- Sea Surface Temp. (SAT)



Results:

Combining datasets

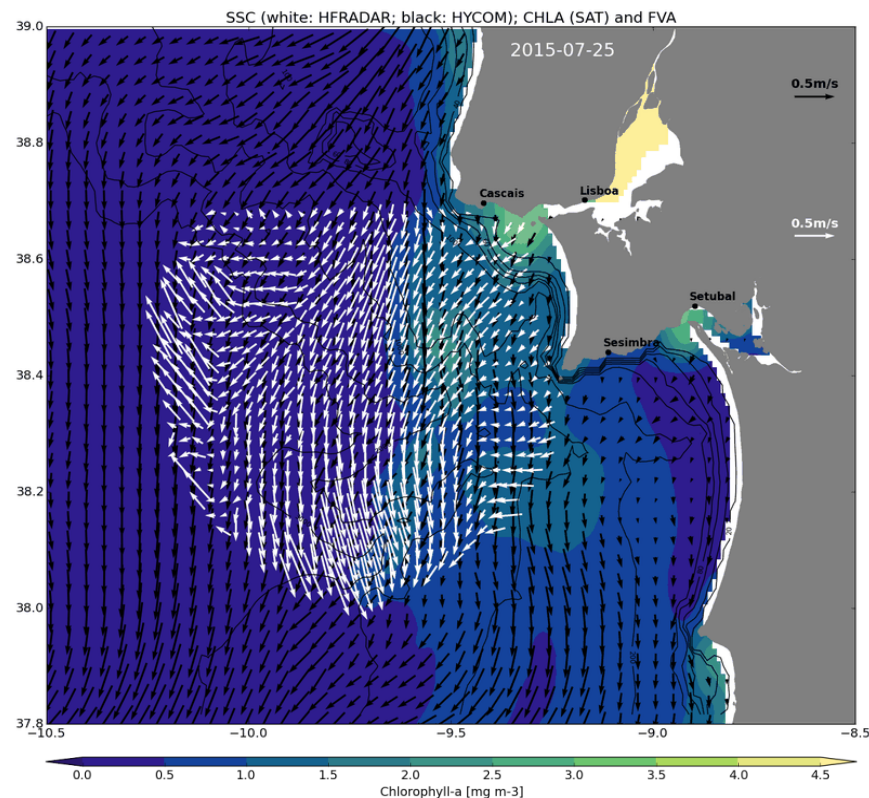
- Bathymetry
- Sea Surface Currents (HY)
- Sea Surface Currents (HF)
- Chlorophyll – a (SAT)



Results:

Combining datasets

- Bathymetry
- Sea Surface Currents (HY)
- Sea Surface Currents (HF)
- Chlorophyll – a (SAT)
- Fishing Vessel Activity

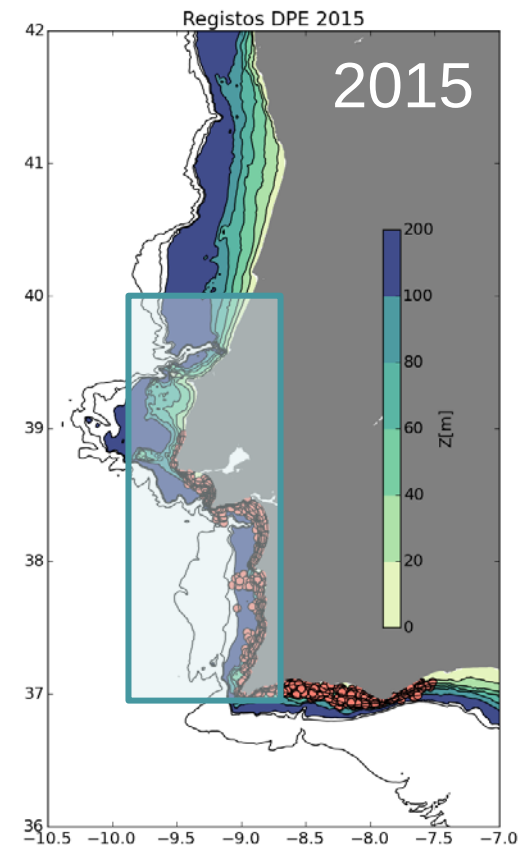
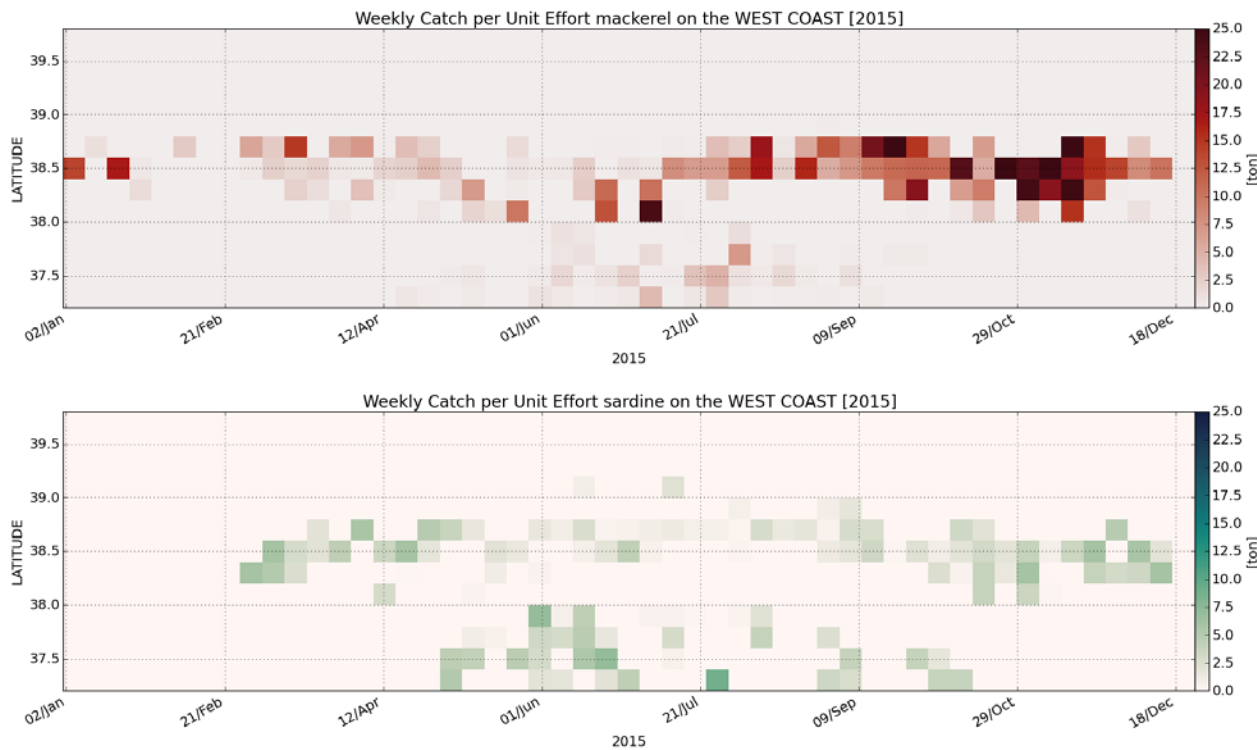


Combined Database:
**Time, location, estimated catch,
bathymetry, chlorophyll-a & SST**

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Fishing Areas [West Coast, 2015]

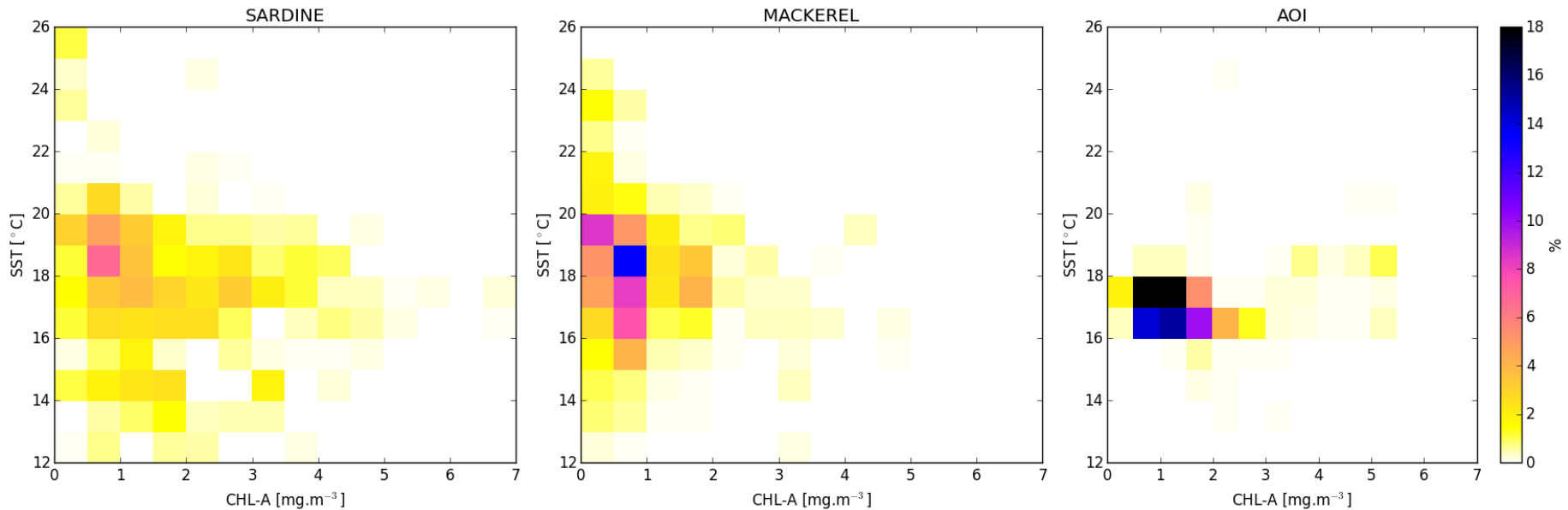
Weekly Catch per Unit Effort



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Fishing Areas Characterization [West Coast, two years]

Bivariate Capture Distribution

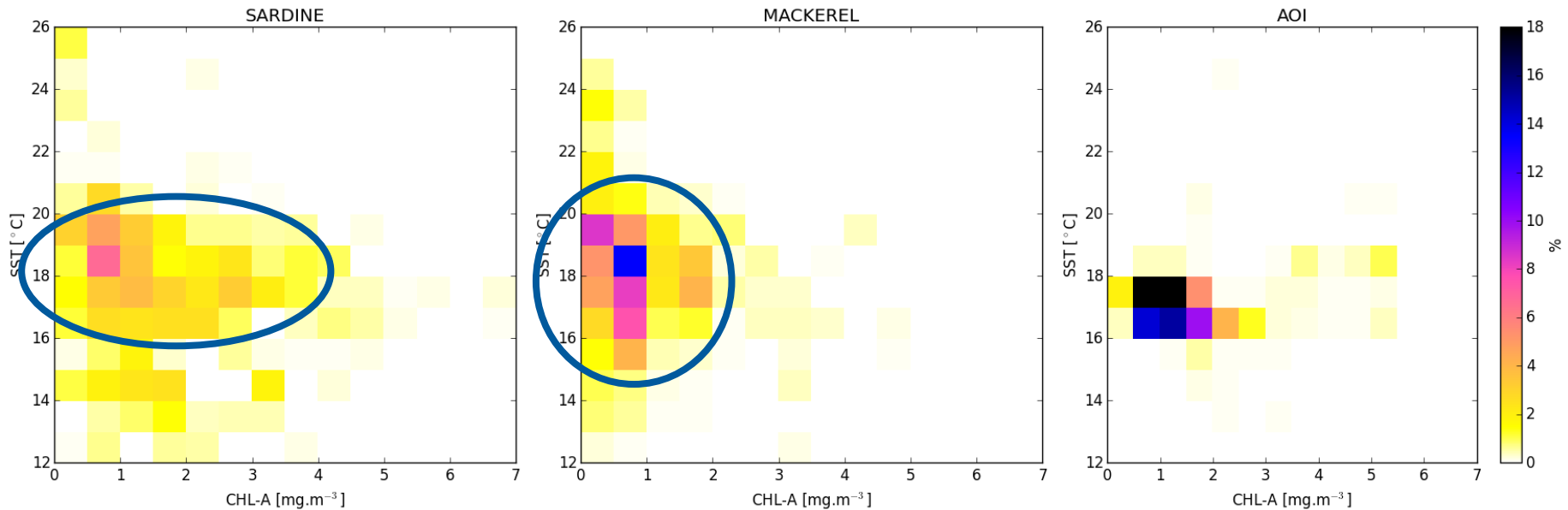


Map time-series of the main fishing areas and associated environmental conditions – EO satellite data (SST, Chl), surface currents from HF radars and numeric hydrodynamical models.

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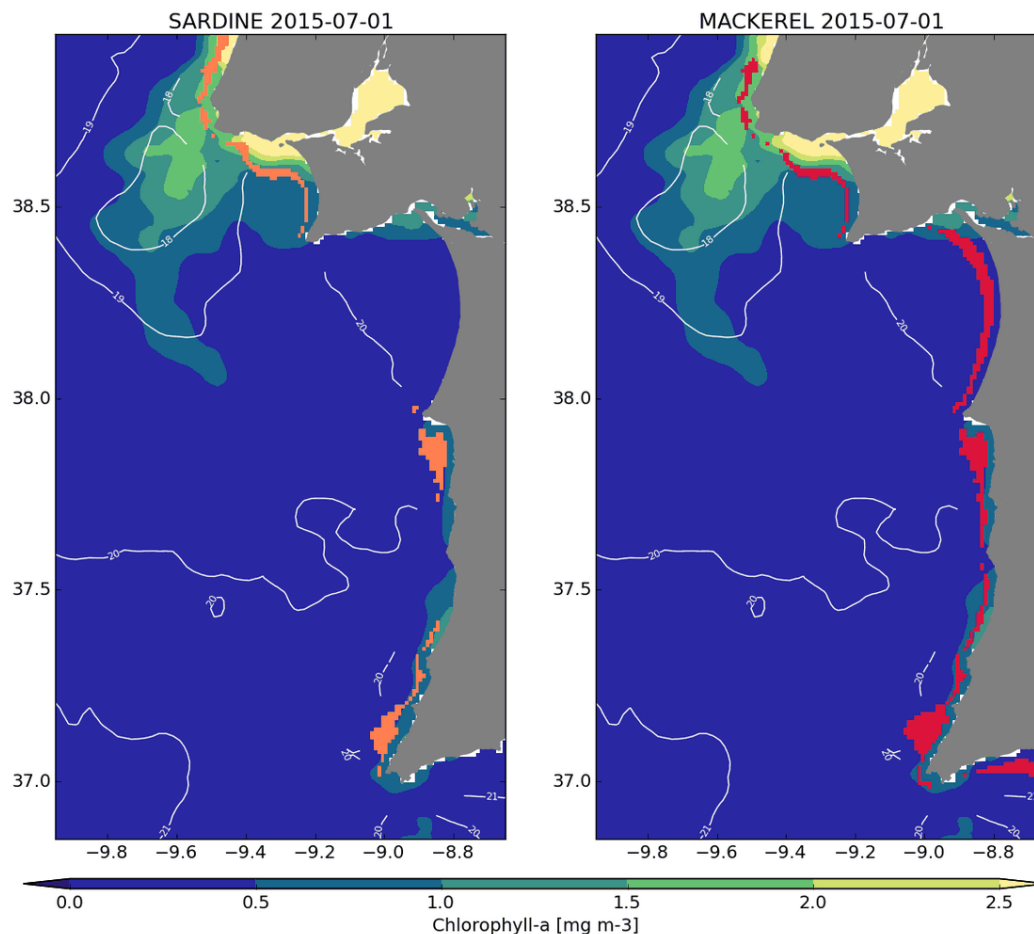
Fishing Areas Characterization [West Coast, two years]

Bivariate Capture Distribution

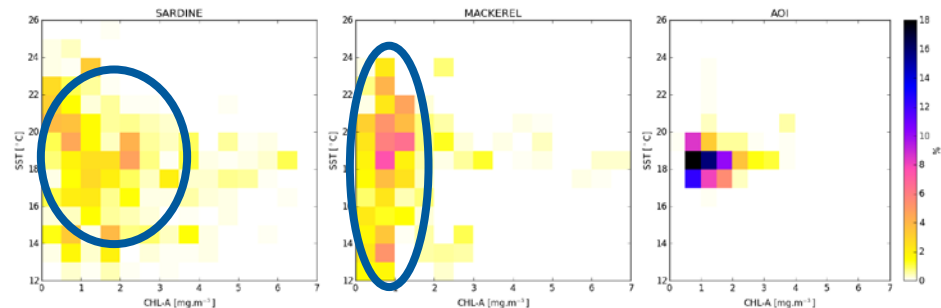
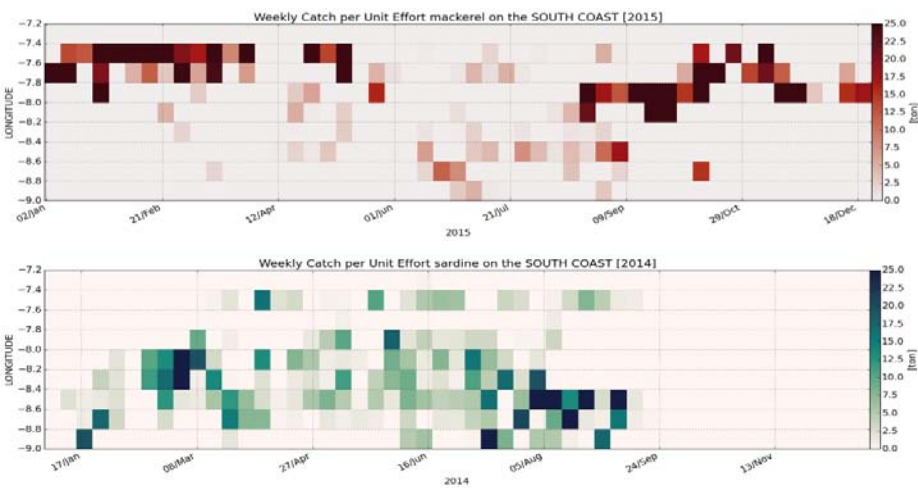


	Bat[m]	CHL[mg.m⁻³]	SST[°C]
Sardine	20 – 60	0 – 4	16 – 20
Mackerel	20 – 60	0 – 2	15 – 21

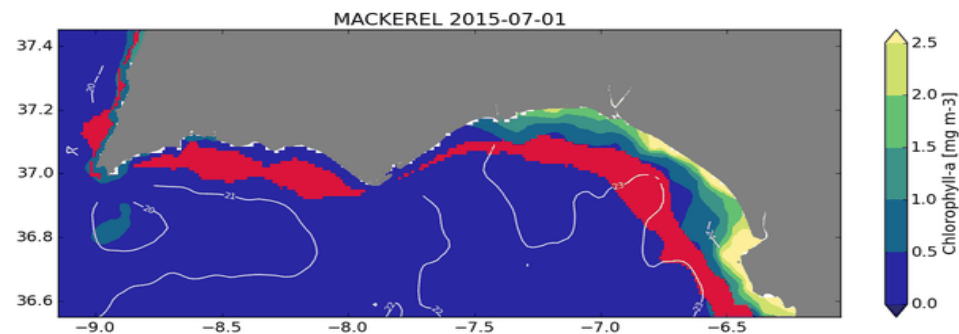
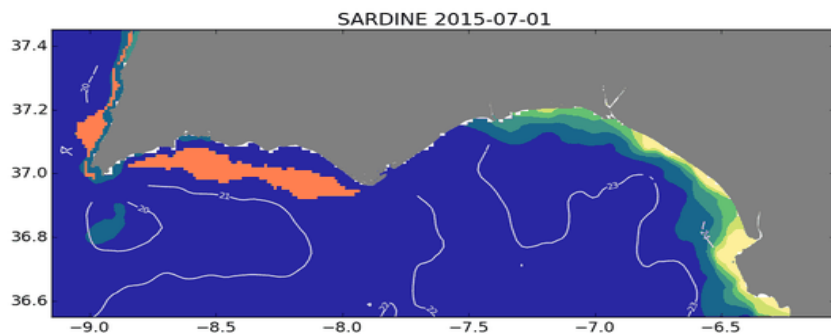
Potential Fishing Areas (testing) WEST COAST



Potential Fishing Areas (testing) SOUTH COAST



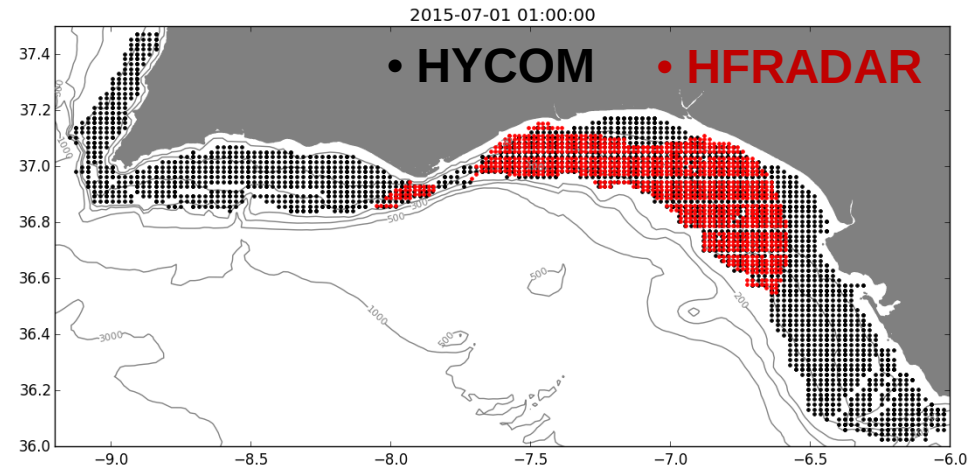
	Bat[m]	CHL[mg.m ⁻³]	SST[°C]
Sardine	20 – 60	0 – 3	14 – 22
Mackerel	20 – 60	0 – 1.5	12 – 24



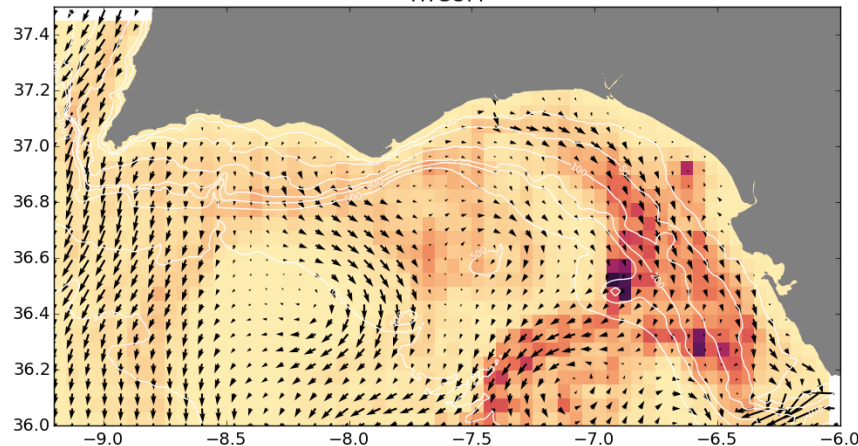
Discussion

Circulation Patterns

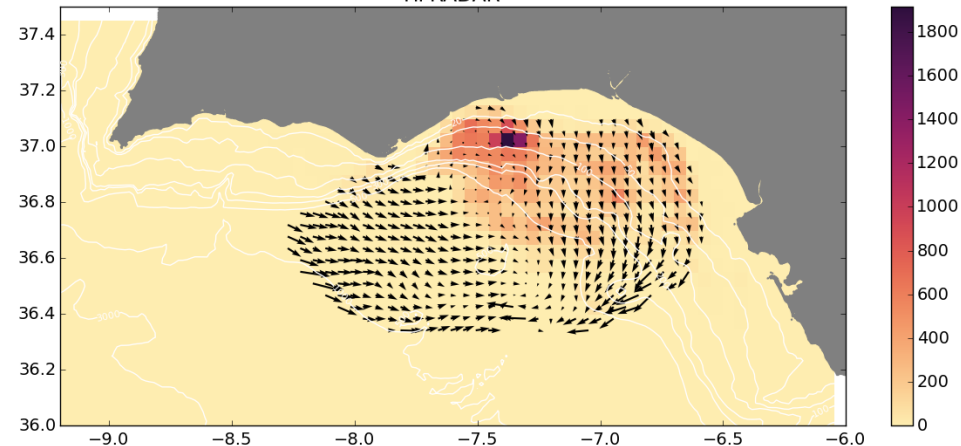
- Lagrangian experiments
- Residence Time
(particle accumulation)



HYCOM



HFRADAR



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THANK YOU!

