SOCIB Balearic Islands Coastal Observing and Forecasting System

Skill assessment service for real-time ranking of met-ocean data products in the IBI area for emergency and SAR operators

IBISAR DOWNSTREAM SERVICE

Emma Reyes Reyes (PI)
on behalf of IBISAR team

ereyes@socib.es

III SEMINARIO DE TELEDETECCIÓN Y EJERCICIOS SAR
12-13 JUNE, MADRID

www.socib.es

SOCIB

OUTLINE

01 SOCIB

02 IBISAR highlights & key numbers

03 Context

04 Working Packages & Tasks

05 Data inventory & collection

06 IBISAR service

07 Team & organisation

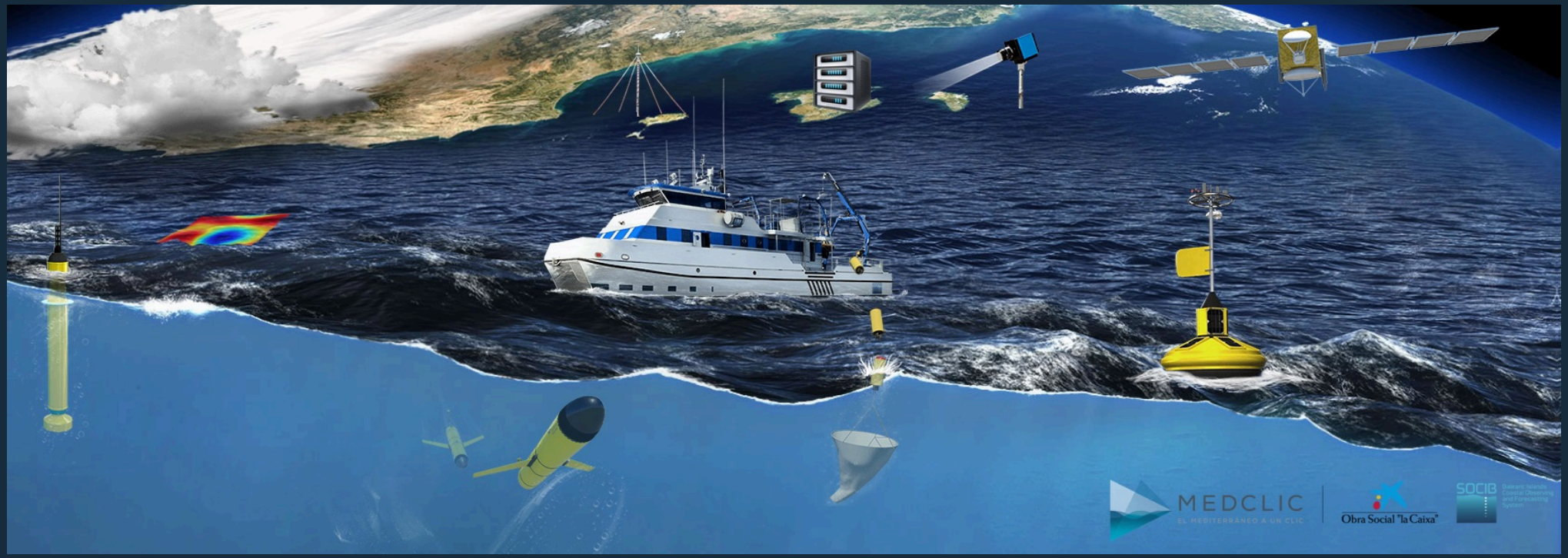
08 Impact on CMEMS

09 Benefits for targeted users

10 Dedicated webpage

SOCIB

01 SOCIB
A MULTI-PLATFORM OBSERVING AND FORECASTING SYSTEM



...a new way of doing oceanography responding to society needs

www.socib.es

SOCIB Observing and Forecasting Facilities Numbers 2011-2017

Observing Facilities

GLIDER FACILITY

74 glider missions total

1.668 glider days at sea total

68.821 CTD profiles total

R/V SOCIB

484 ship days of operation from 2013-2017

353 ship days external access from 2013-2017

HF RADAR

95% time in operation (1.779 days)

75% area coverage

LAGRANGIAN PLATFORMS

ARGO PROFILERS

2.022 Vertical profiles

9.843 total days of Argo profilers observations

SURFACE DRIFTERS

132 total platforms

15.129 days of data

ANIMAL BORNE TRACK

22 sea turtles track. **9** (of the 22) instrumented with TTDR

11.140 temperature profiles

FIXED STATIONS

21 stations transmitting data in realtime

- **6** sea level stations
- **2** oceanographic buoys
- **2** coastal stations
- **6** Weather stations
- **5** AIS antennas

BEACH MONITORING

3 beach monitoring stations

2.500 operative days

6 beach monitoring surveys/year/beach

16 Technical & Research collaborations

Forecasting Facilities

3 operational forecasting systems

CURRENTS

1 high-resolution prediction system (WMOP)

WAVES

1 high-resolution prediction system (SAPO-IB)

RISSAGUES

1 atmosphere-ocean prediction system for meteo-tsunamis (BRIFS)

SOCIB Balearic Islands Coastal Observing and Forecasting System

GOBIERNO DE ESPAÑA · MINISTERIO DE ECONOMÍA, INDUSTRIA Y COMPETITIVIDAD · GOVERN ILLES BALEARS

SOCIB 2017 numbers

REGIONAL, NATIONAL & INTERNATIONAL FRAME
FROM 2011-2017

11 national agreements

7 international agreements

OPEN ACCESS COMPETITIVE PROGRAM
SUPPORTING SINCE 2014-2017

193 glider open access days

353 days external access 2013-2017

OUTREACH
FROM 2010-2017

36 events

20.912 participants

PRODUCTS & SERVICES
FROM 2011-2017

35 products developed

10 sectors

INVESTMENT
10,2M€

STAFF
39

3 ICCAT indexes

28 papers

BLUEFIN TUNA
FOCUSED RESEARCH PROJECT FROM 2011-2017

15 invited talks

100 papers

SCIENTIFIC ACTIVITY
FROM 2011-2017

2,6TB transfered

79,2M accesses to data sets

DATA PRODUCED
FROM 2013-2017

Observing Facilities

GLIDER FACILITY
1.668 glider days at sea total

R/V SOCIB
483 days of operation 2013-2017

HF RADAR
95% time in operation

LAGRANGIAN PLATFORM
2.022 Argo vertical profiles
15.129 days of surface drivers
22 sea turtles borne track

FIXED STATIONS
21 stations transmitting data in realtime

BEACH MONITORING
3 beach monitoring stations

MULTIPLATFORM OBSERVING & FORECASTING FACILITIES
2011-2017

Forecasting Facility

3 operational forecasting systems

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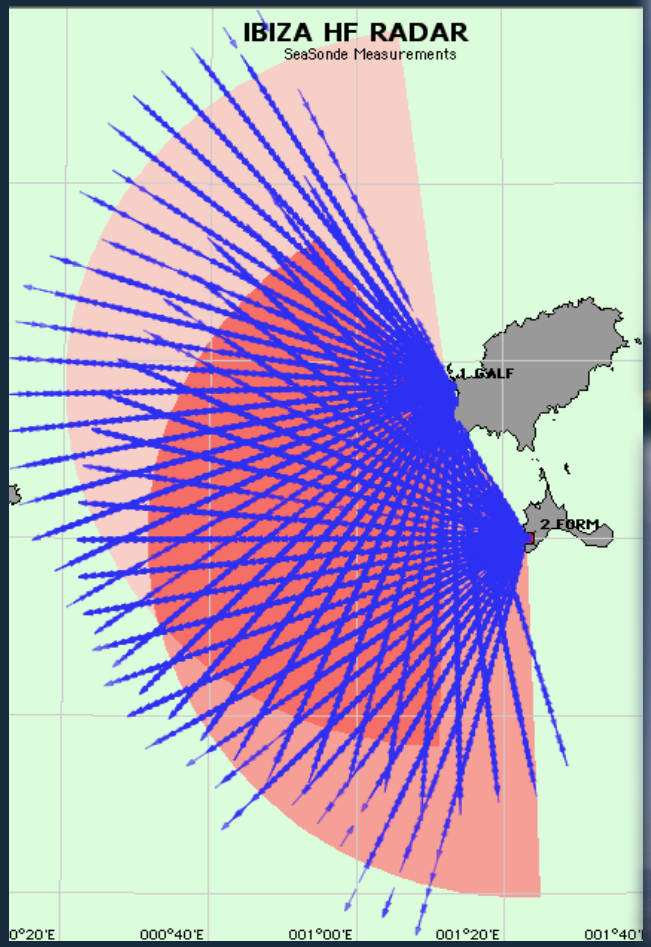
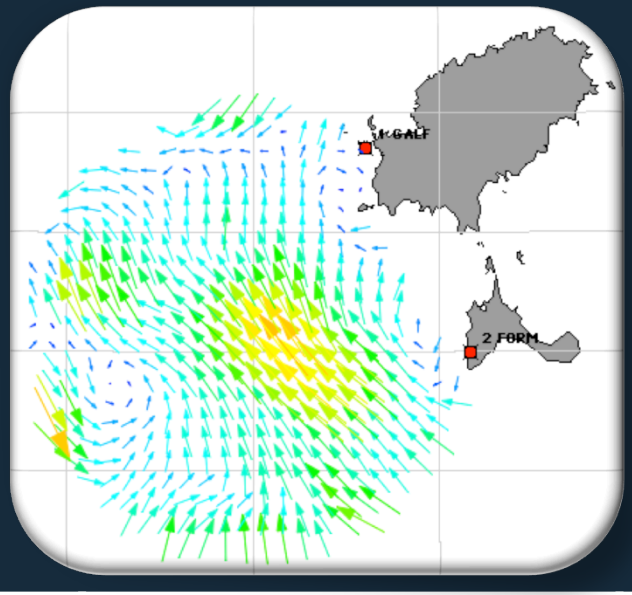
01 SOCIB
HF RADAR SYSTEM

2 CODAR SeaSonde HF radar stations

Frequency= 13.5 MHz
Bandwidth= 90 kHz





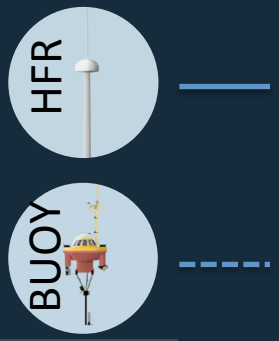
HF radar surface currents

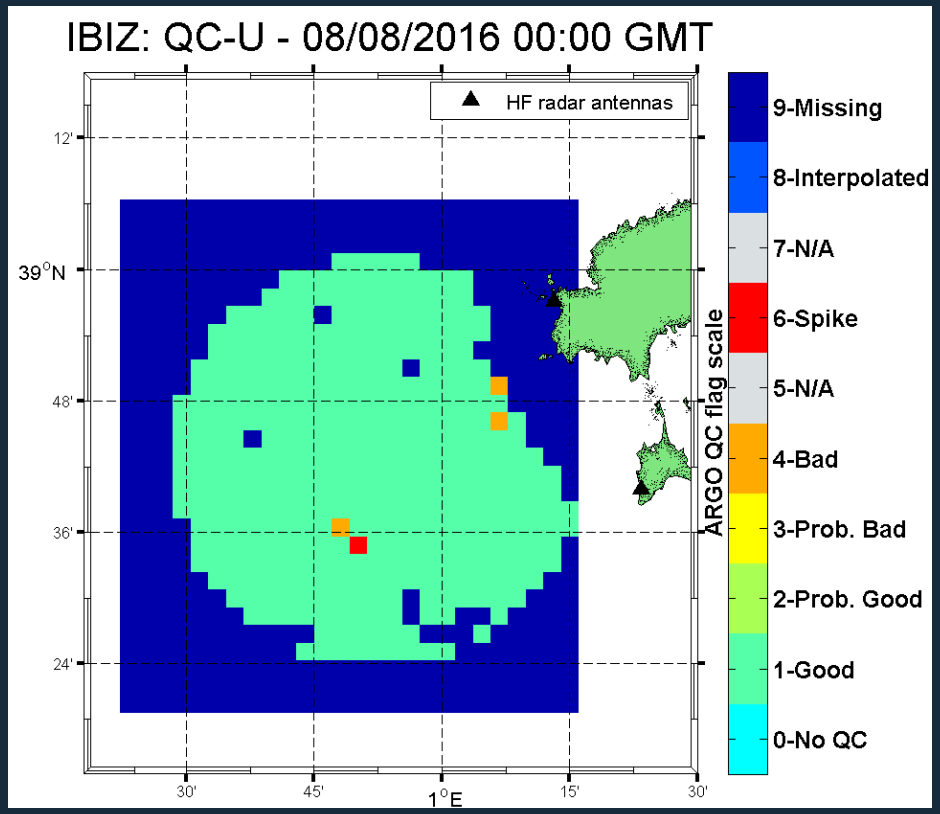
SETTINGS		
	Output interval	1 h
	Grid resolution	3 km
	Averaging radius	6 km
	Maximum range totals	65 km
	Azimuth range	5°
	Range cell / resolution	1.6 km
	Average Depth	~0.9 m
	Resonant Bragg condition	Λ_{radar}= 22.2 m Λ_{wav}=11.1 m

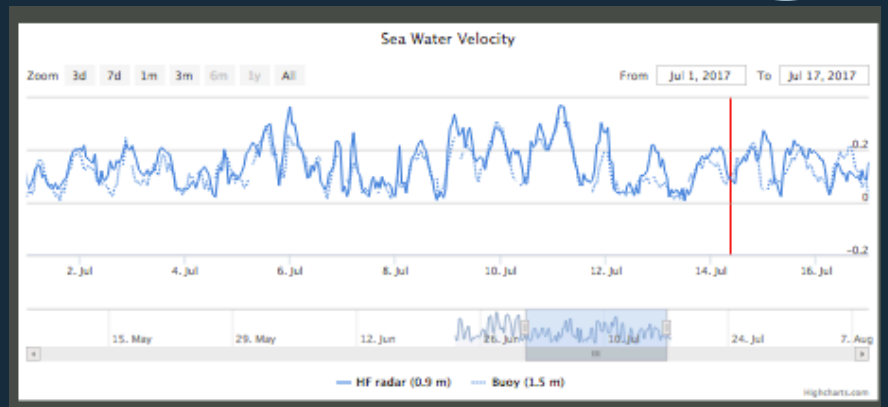
01 SOCIB
HF RADAR SYSTEM : QA/QC

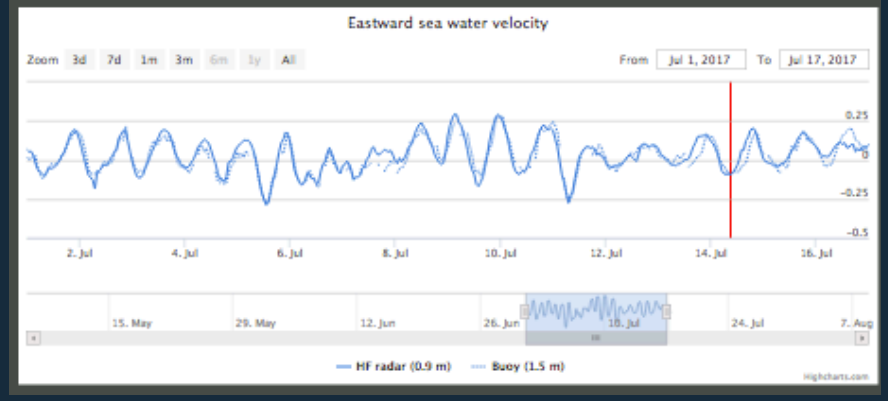
Near-real time quality controlled data
- QC flag: data quality indicator
- For each variable

Near-real time validation
- HFR vs. buoy comparison
- Systematic data assessment









01 SOCIB

HF RADAR SYSTEM : QA/QC

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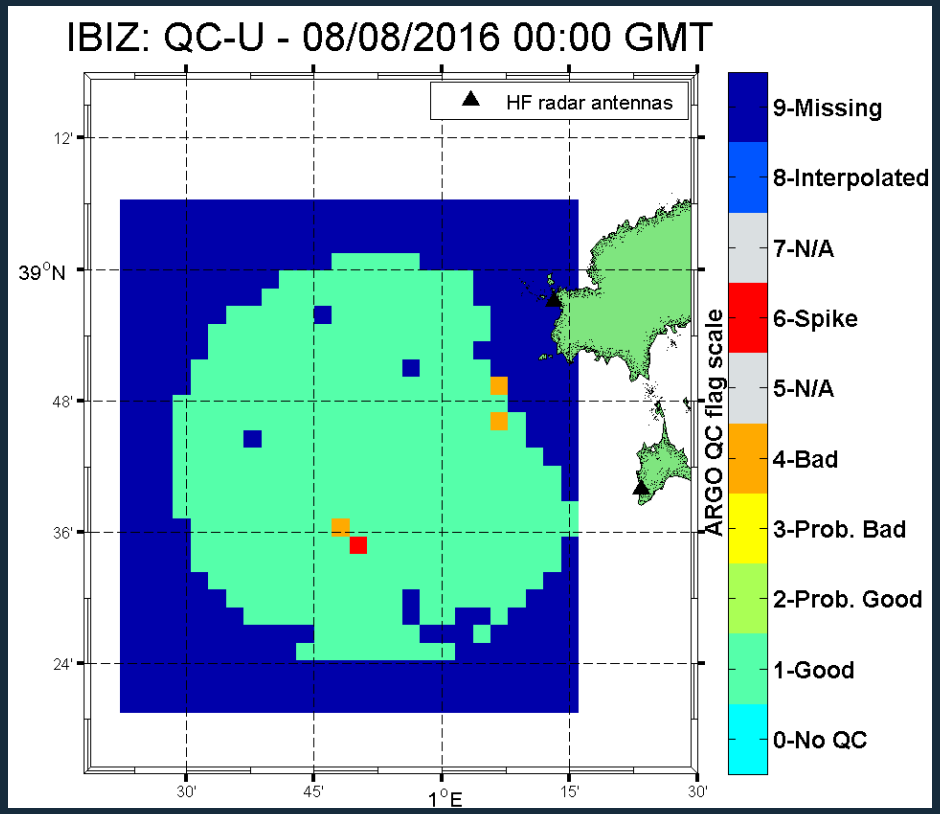
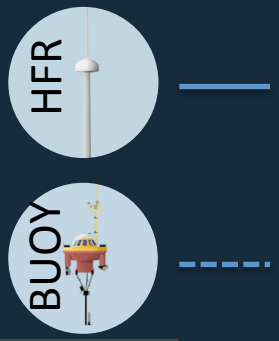
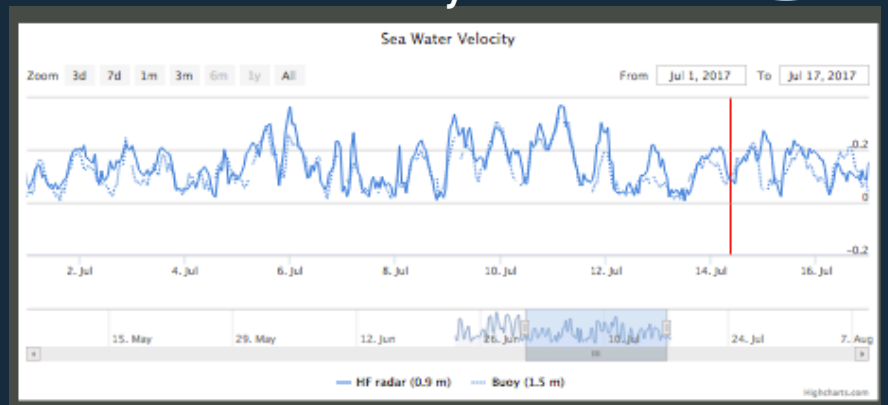
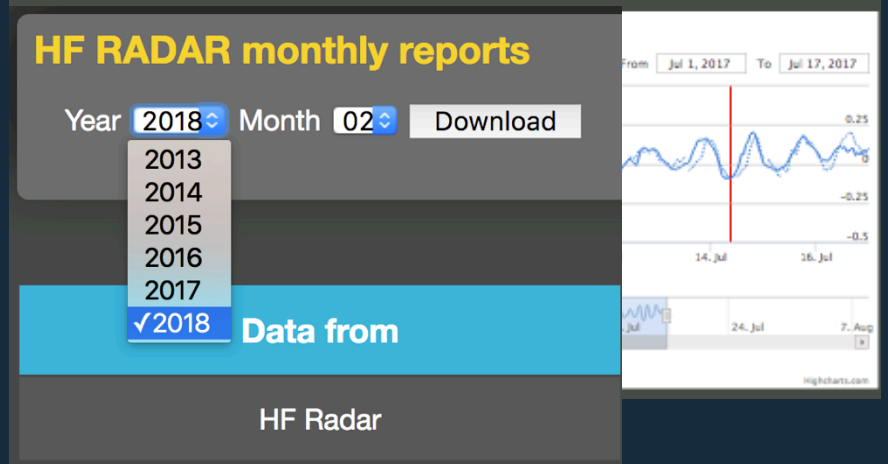


Near-real time validation
- HFR vs. buoy comparison
- Systematic data assessment
- Automatic monthly QuIDs







01

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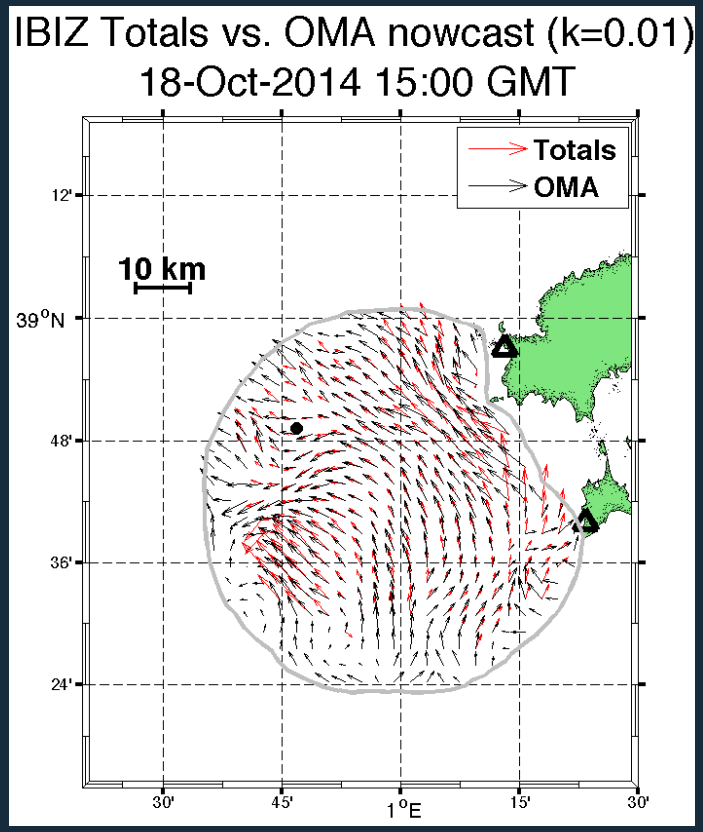
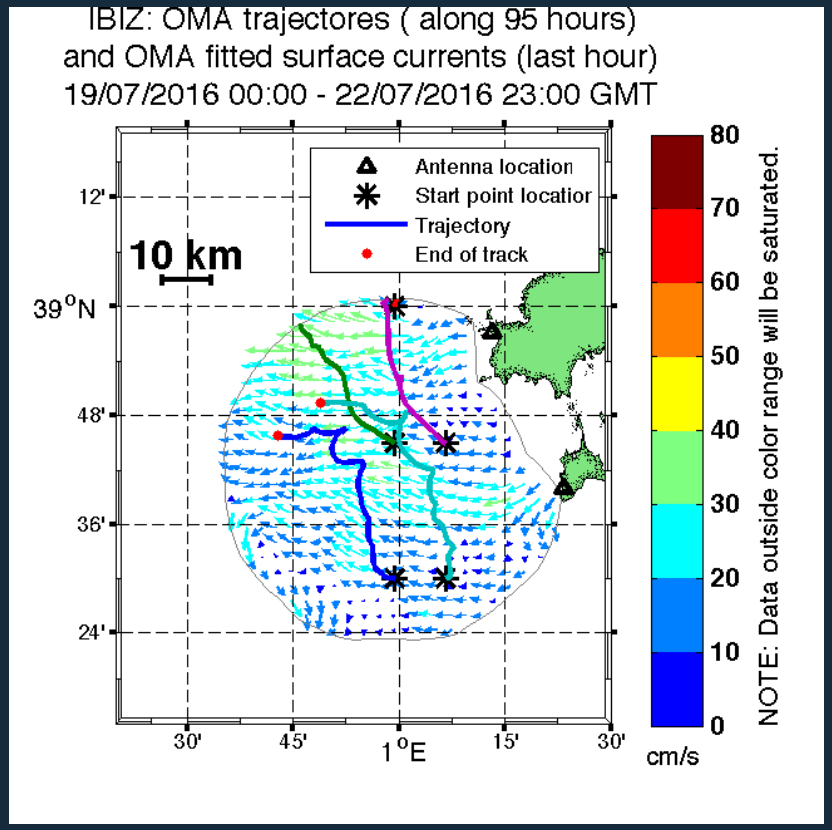
HF RADAR SYSTEM : ADDED VALUE PRODUCTS

Advanced: gap-filling products





HFR surface current field
with/without gaps (black/red arrows)

Virtual trajectories using
HFR surface currents

01

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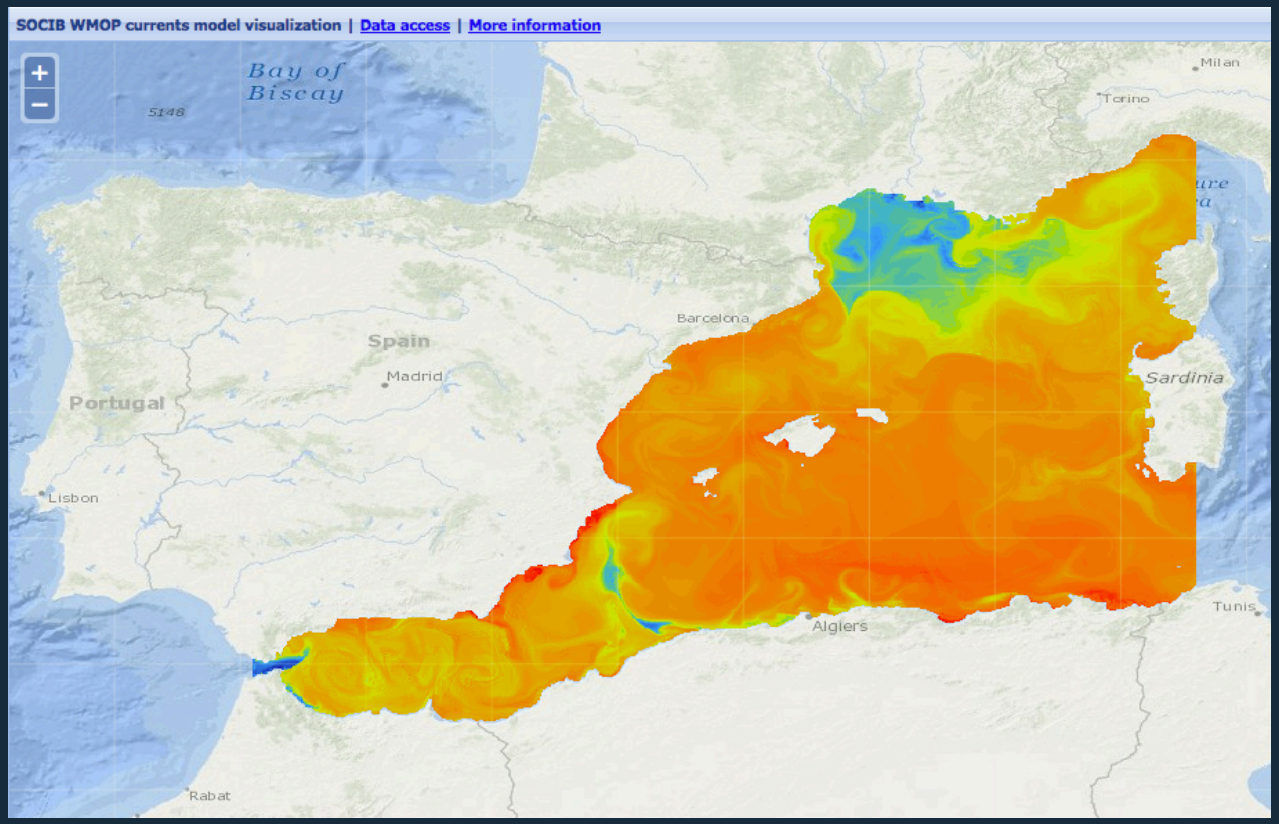
WMOP (WESTERN MEDITERRANEAN OPERATIONAL) MODEL

High resolution is needed:

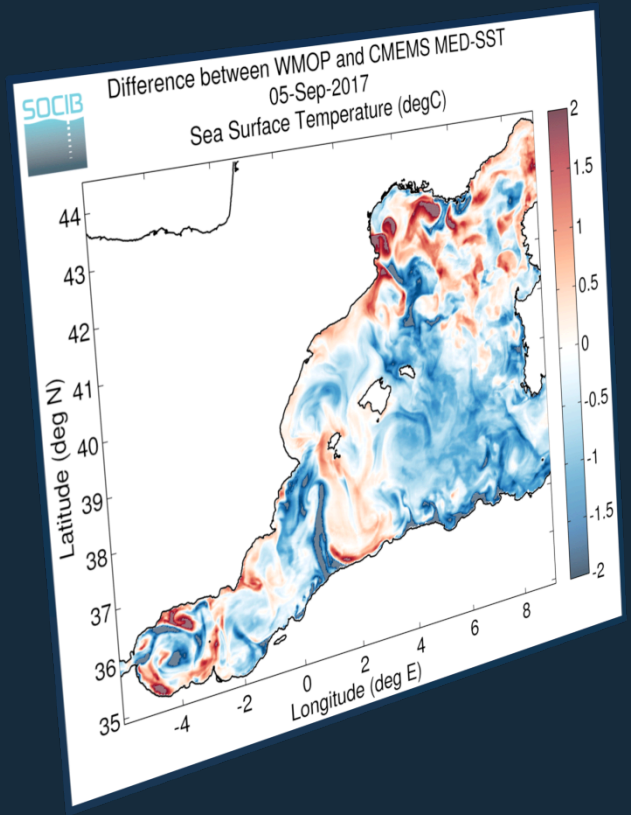
- **to address regional and coastal studies**
- **to respond to the requirements of operational applications**



MODEL CONFIGURATION		
	Forecast Length	72 hours
	Spatial Resolution	~2 km
	Temporal Resolution	3 hours
	Temporal Coverage	27/08/2013-ongoing
	Update frequency	Daily
	Atm. Forcing	3h HIRLAM
	Tides	NO
	Rivers	11
	Open boundaries	MFS-MED
	Assimilation	No
	Analysis	Weekly (on Tuesday)

01 SOCIB
WMOP VALIDATION

WMOP vs. satellite L4 SST product : Night-time Sea Surface Temperature maps



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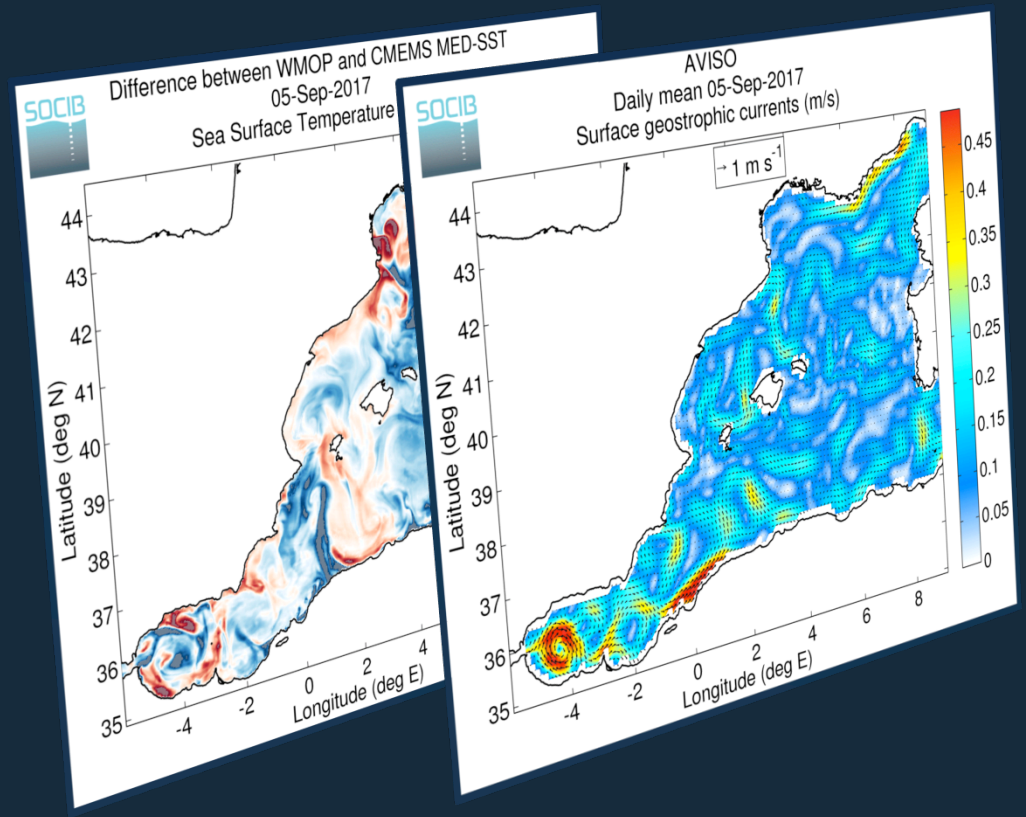
WMOP vs. AVISO Ssalto /Duacs: Daily mean surface geostrophic current maps



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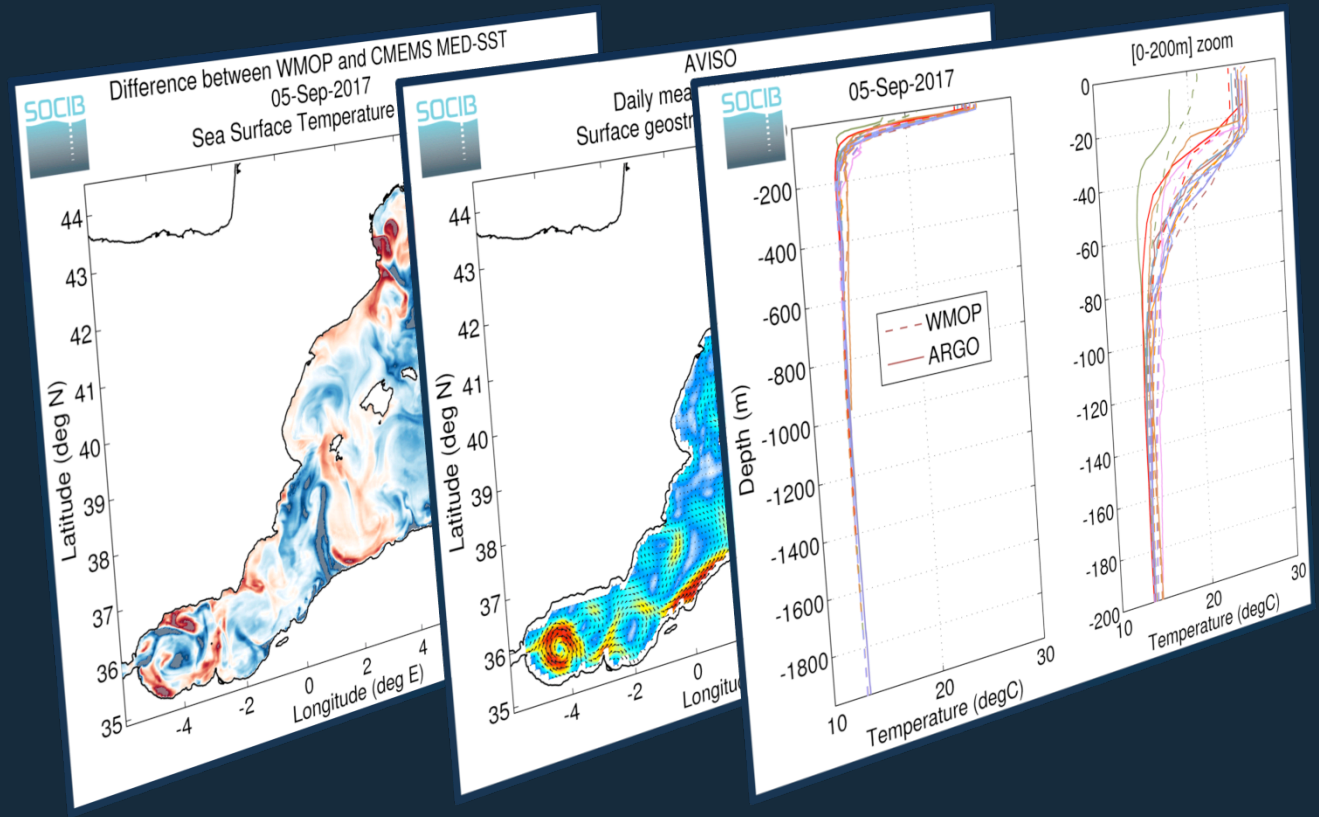
WMOP vs. Argo floats: Daily vertical temperature profiles from ARGO



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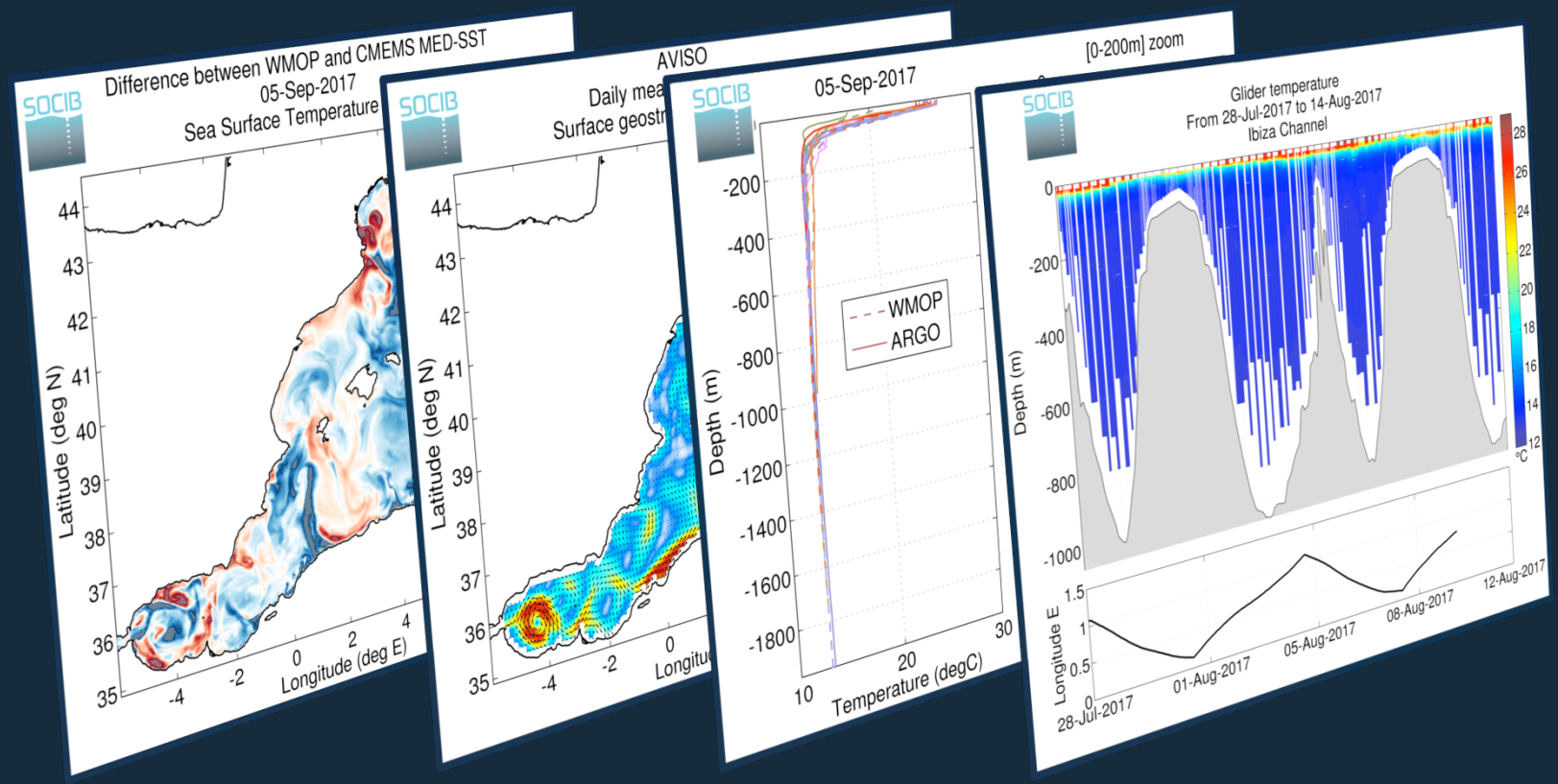

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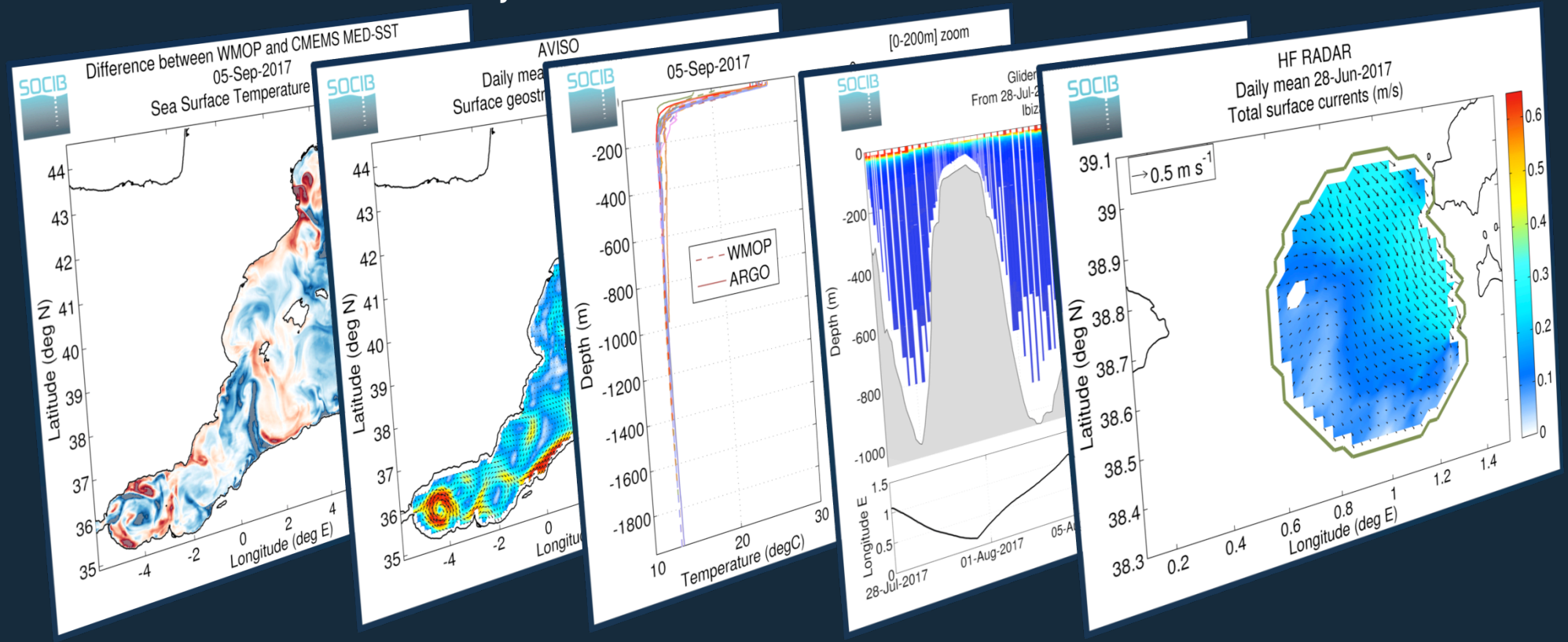
WMOP vs. HFR radar: daily mean of surface currents in the Ibiza Channel



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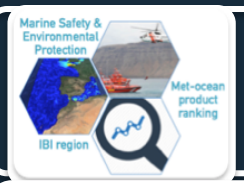
02 IBISAR HIGHLIGHTS



PROPOSAL GOAL

- Improve, validate and promote the skill assessment service IBISAR

SERVICE MAIN AIM

- Provide real-time met-ocean product ranking in the IBI area for emergency responders

SAR OPERATORS NEEDS

- User-friendly automated skill assessment
- Confidence indicator of the forecast >> Easily interpretable metrics

CMEMS products

- CMEMS MFCs: current velocity forecast within the IBI region
- CMEMS INSITU & Satellite TACs: current velocity (IBI)
- Upcoming High-Frequency Radar surface currents (IBI)

TEAM

- SOCIB : advanced MRI[1] & data provider (public)
- AZTI : technological centre (private NPO[2])
- RPS : downstream service provider (private)

[1] Marine Research Infraestructure; [2] Non-Profit Organization

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02 IBISAR PROPOSAL: BY THE NUMBERS

3

Public and private institutions

10

Scientists

5

Working packages

4

IBI-subregions

150 KEur

Budget

18

Months

1

Downstream service

2

COASTAL & MARINE ENVIRONMENT

MARINE SAFETY

Areas of benefits

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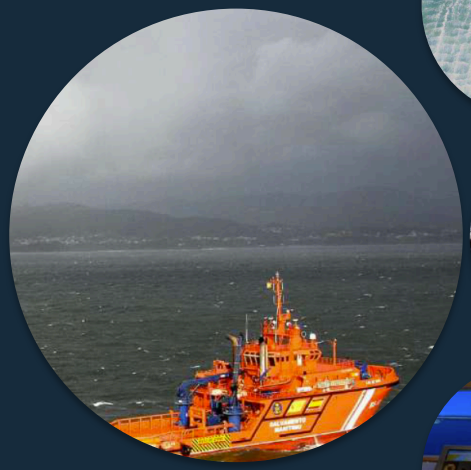
03 CONTEXT: SAR AGENCIES NEED DATA CONFIDENCE



SAR

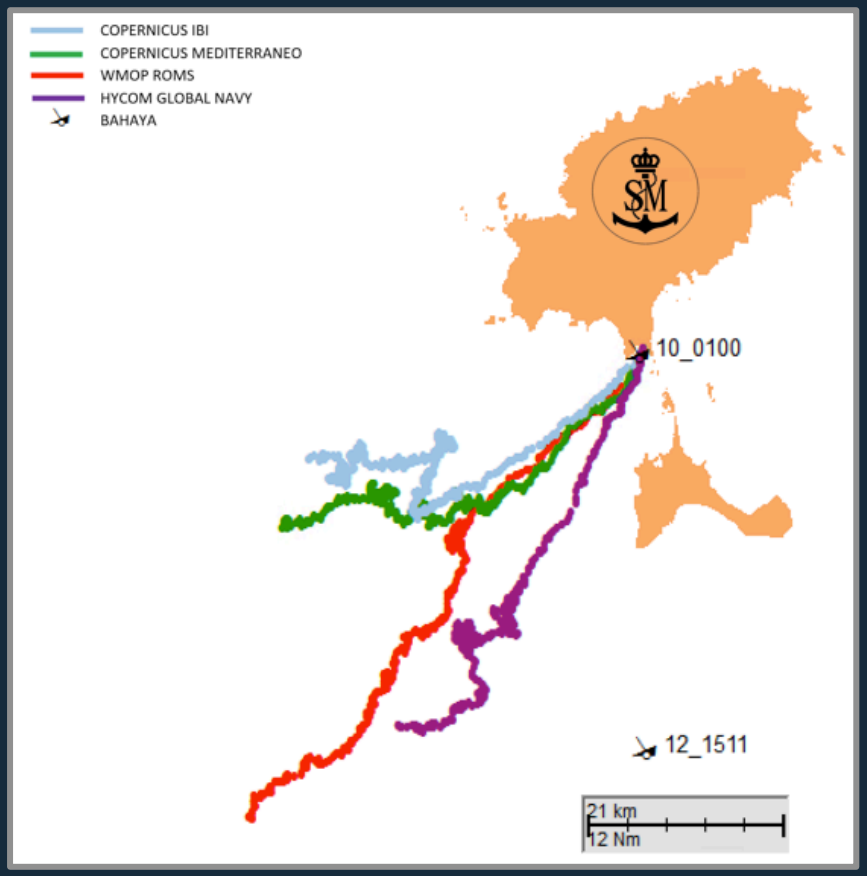
RESPONSE

TRAINING

Reliable met-ocean observations and forecasting are essential

Easily interpretable metrics

User-friendly automated skill assessment



Simulated trajectories from different models: SAR case “Bahaya”

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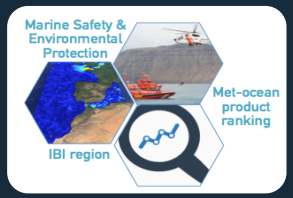
04 WORKING PACKAGES & TASKS

WP1: Data Inventory & collection

T1.1: Identification and compilation of CMEMS products

T1.2: Identification and compilation of complementary database



WP2: Service improvement, activation, test and maintenance

T2.1: Development & processing methods to obtain the datasets

T2.2: Activation of IBISAR service

T2.3: Monitoring and maintenance of IBISAR service

WP3: Skill assessment validation

T3.1, 3.2, 3.3 & 3.4: SA Validation in the IBI subregions (WSMED; NIBSH; GIBS; CADIZ)

WP4: Service Promotion

T4.1: Communication actions (Official mailing; video-tutorial; leaflet; conferences)

T4.2: Creation of IBISAR Dedicated Webpage

T4.3: Edition of the Use Case

WP5: Project Management

T5.1: Technical and administrative coordination

T5.2: Establishment and provision of the Action Plan

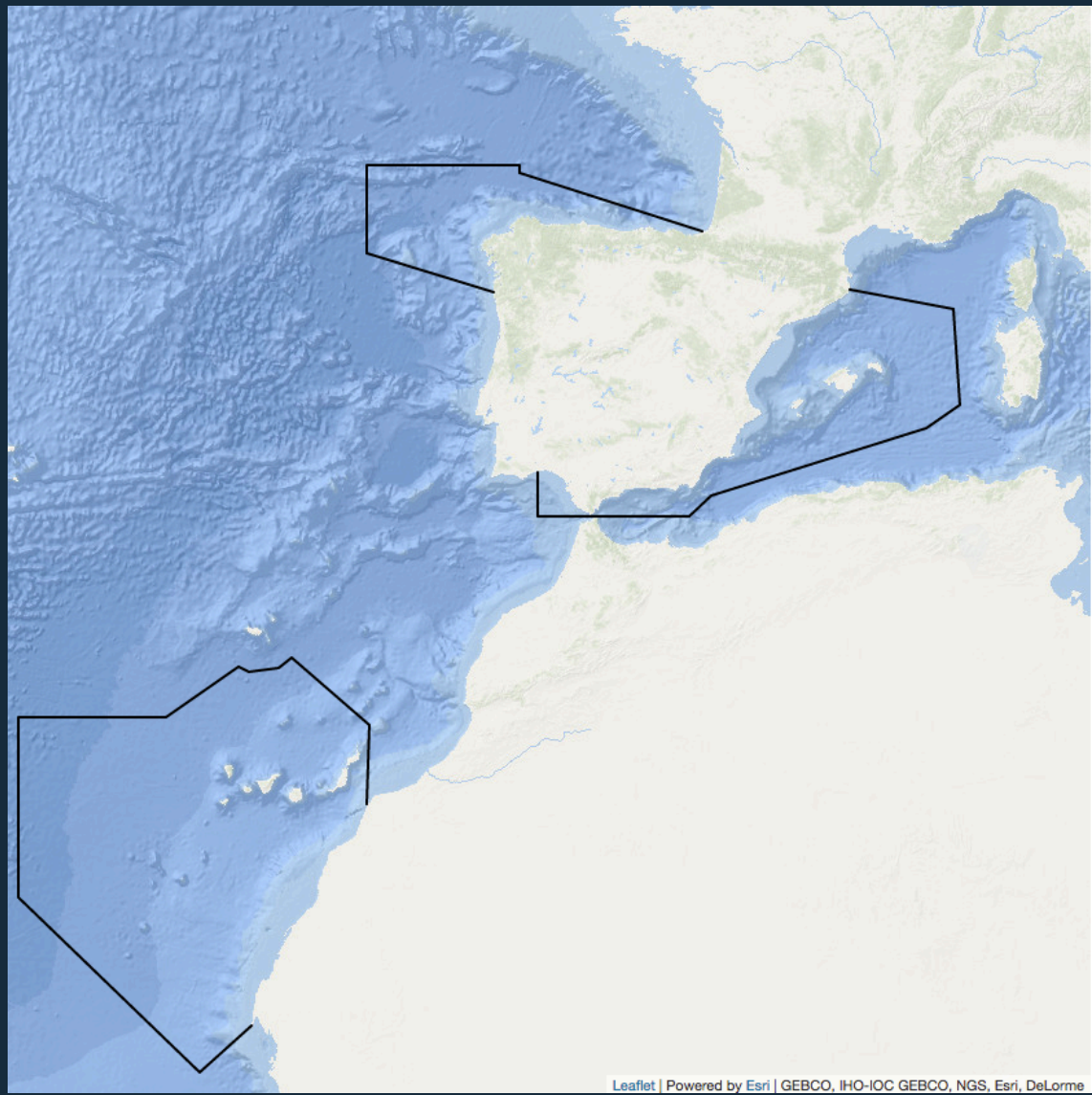
T5.3: Production of reports

T5.4: Organization of meetings

05 DATA INVENTORY & COLLECTION

Maritime SAR areas

- Spanish coastline: 8,000 km
- SAR region area: 1,500,000 km^2
- 4 main SAR areas:
  - Atlantic
  - Strait of Gibraltar
  - Mediterranean
  - Canary Islands



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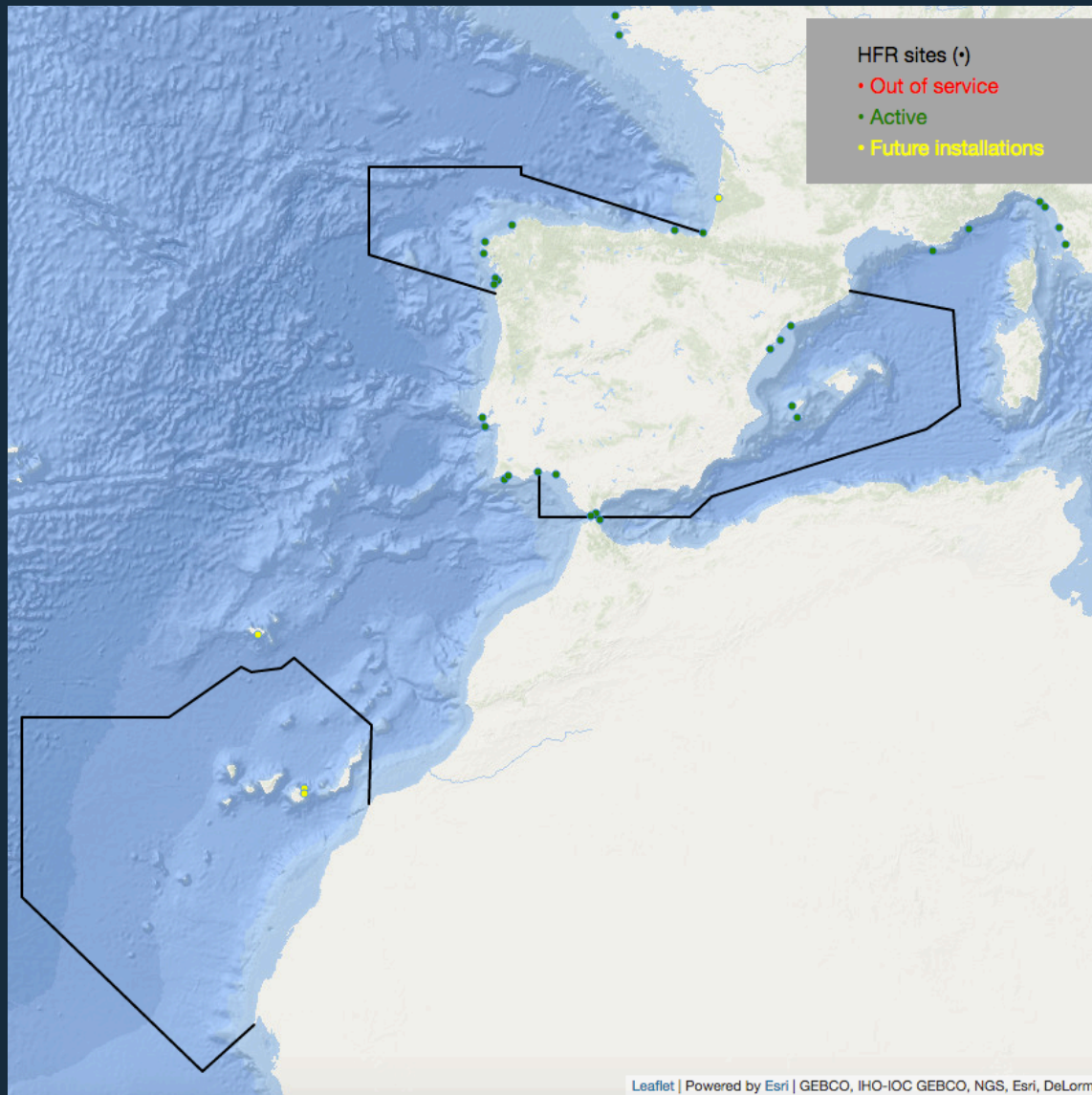
20 HFR radial stations



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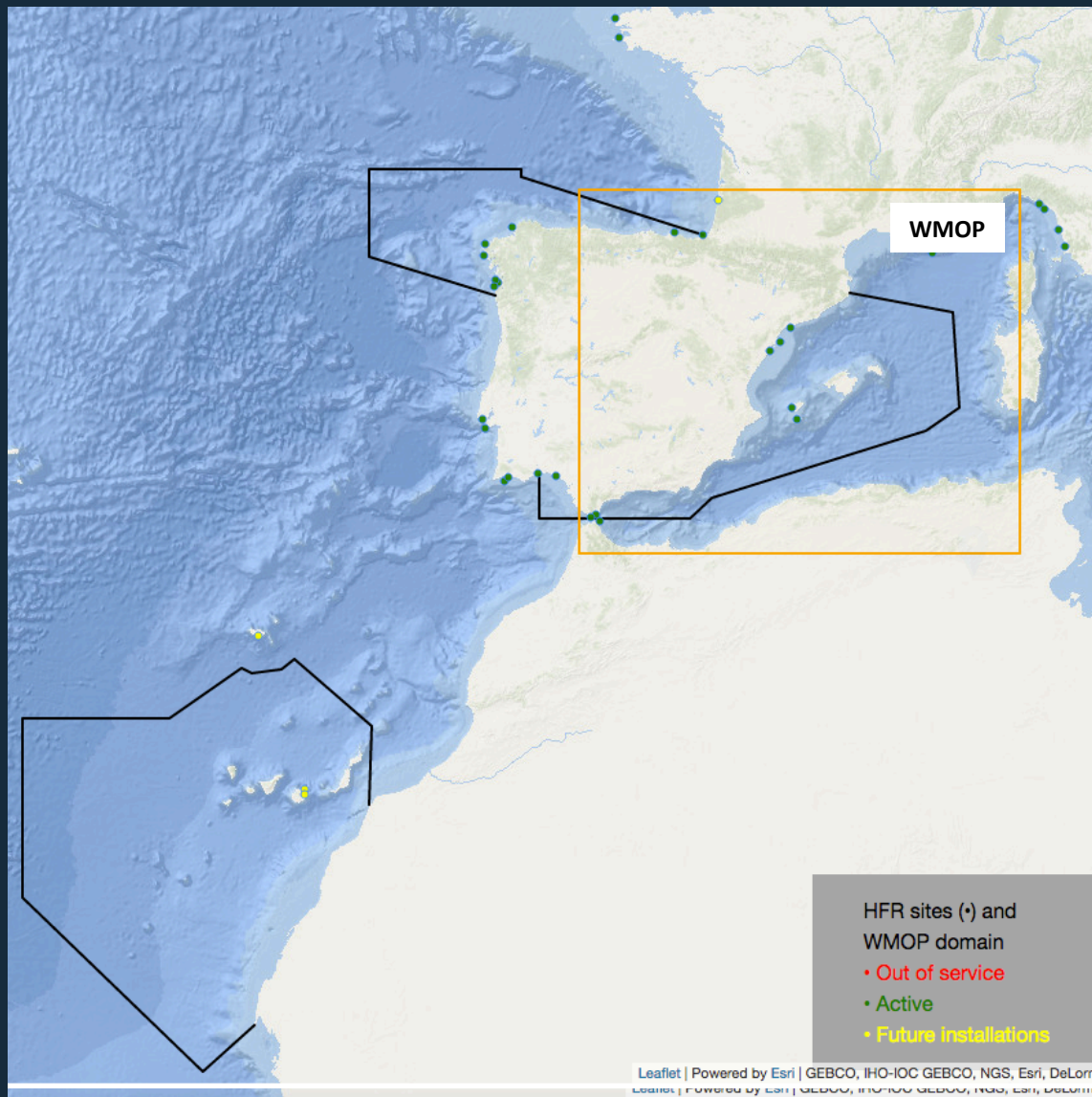
20 HFR radial stations

Regional high-resolution models: WMOP, SAMOA, …



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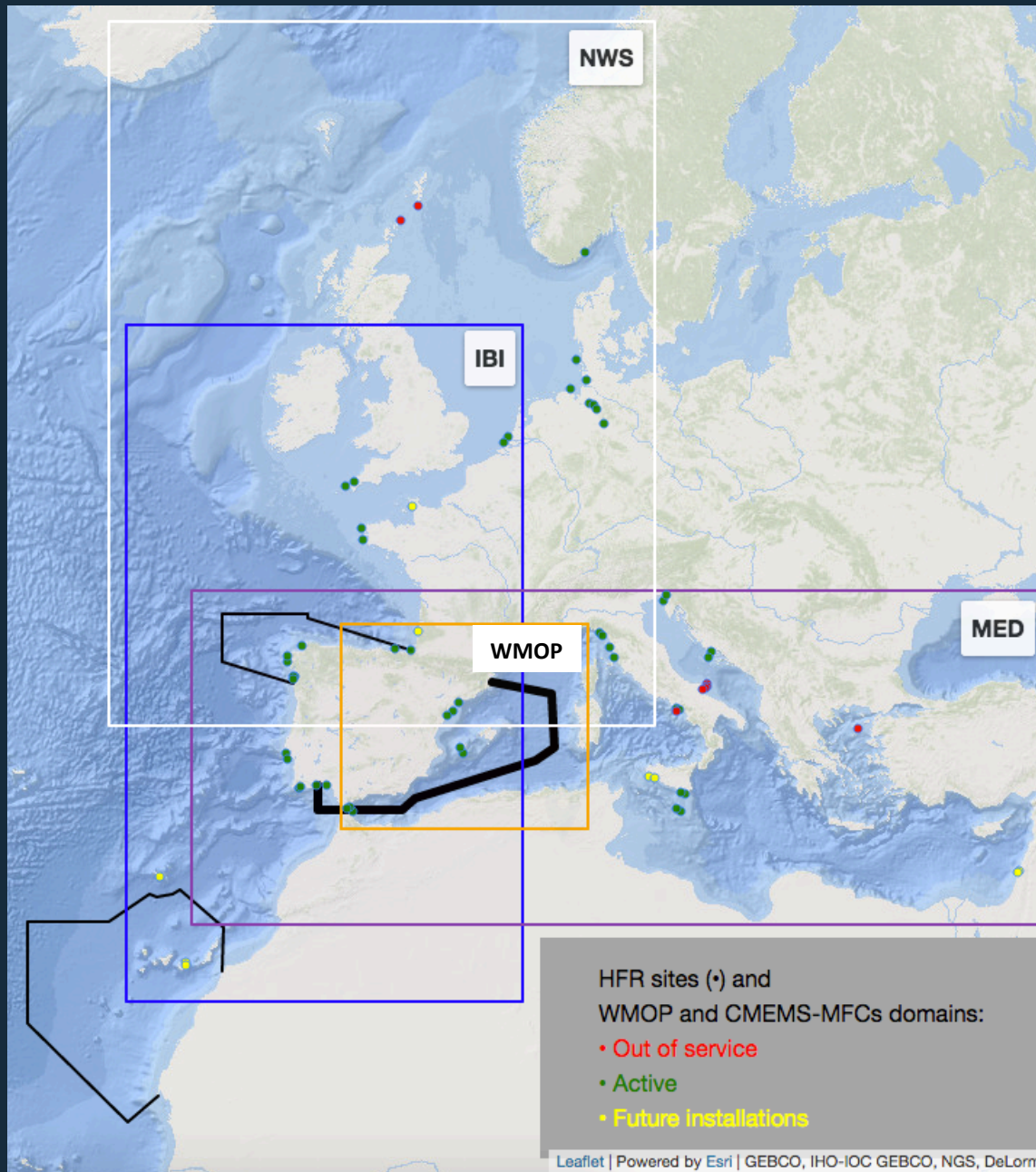
20 HFR radial stations

Regional high-resolution models:
WMOP, SAMOA, …

Models (CMEMS-MFC)
GLO, IBI, NWS, MED

In-situ Observations (CMEMS-TACs)
Drifters, fixed stations, satellite



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05 DATA INVENTORY & COLLECTION

SOCIB Balearic Islands Coastal Observing and Forecasting System

AEMet Agencia Estatal de Meteorología

NCEP

EDS Data Service

NOAA

Puertos del Estado

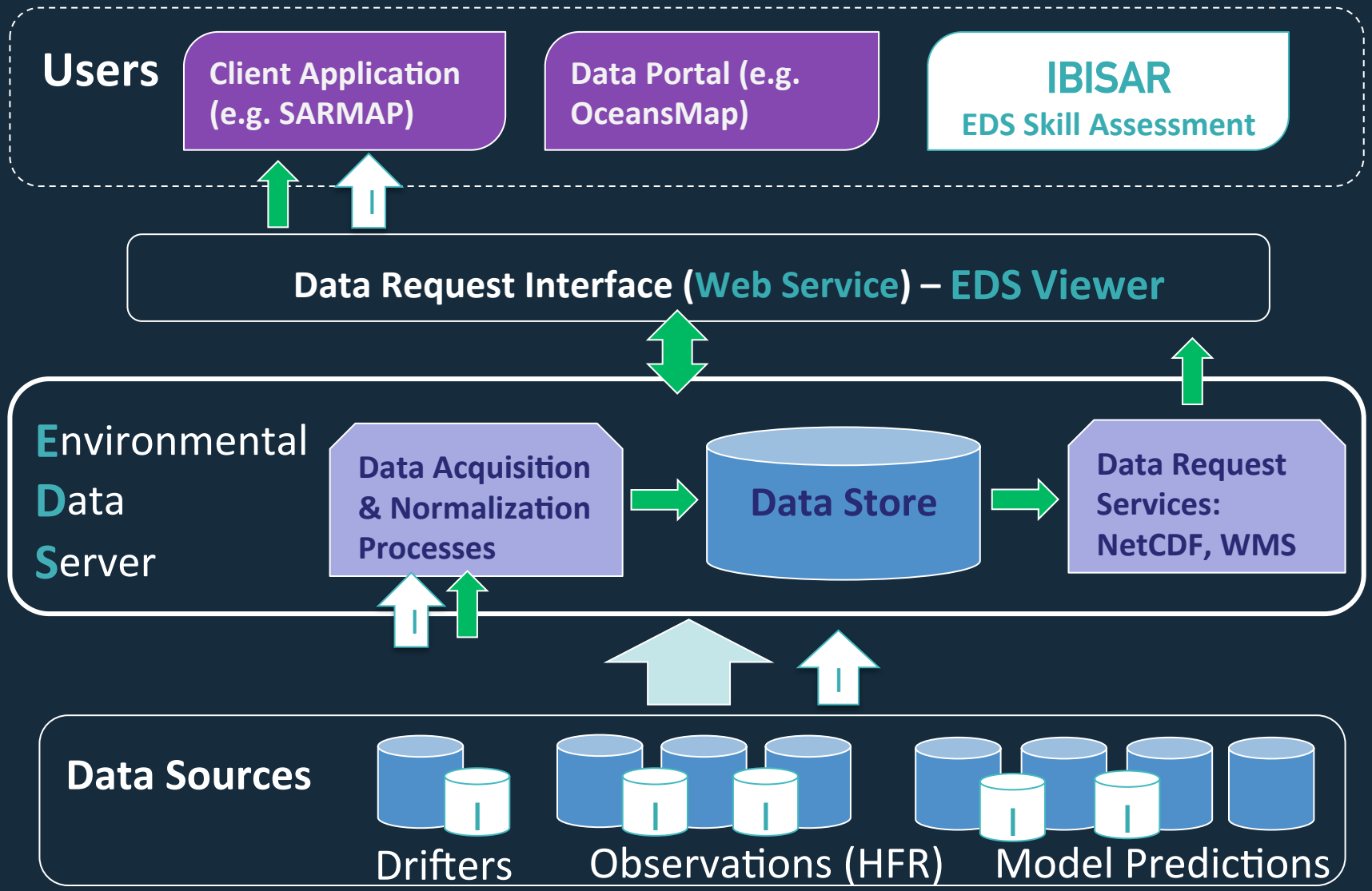
Copernicus

GOBIERNO DE ESPAÑA · MINISTERIO DE FOMENTO · Salvamento Marítimo

[data sources] [data providers] [end-user]

SOCIB

06 IBISAR SERVICE: MAIN ELEMENTS



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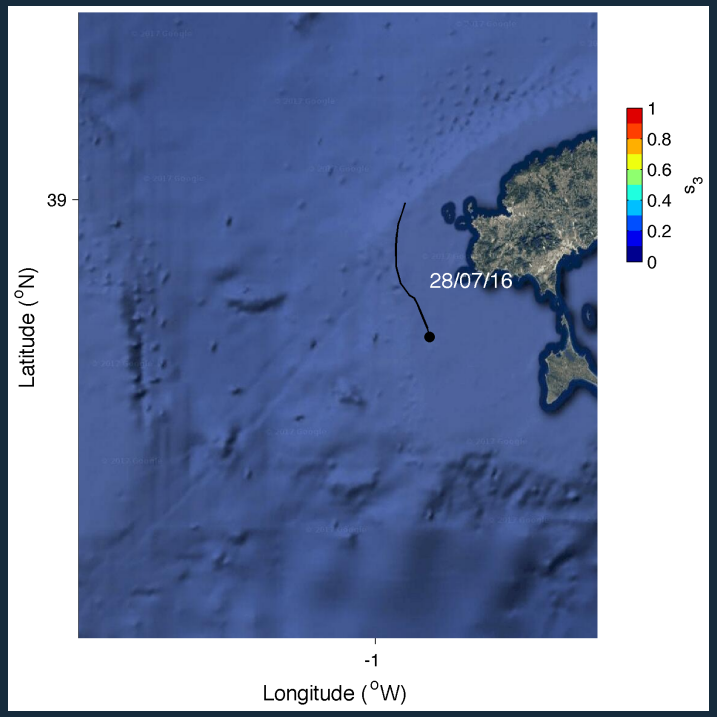
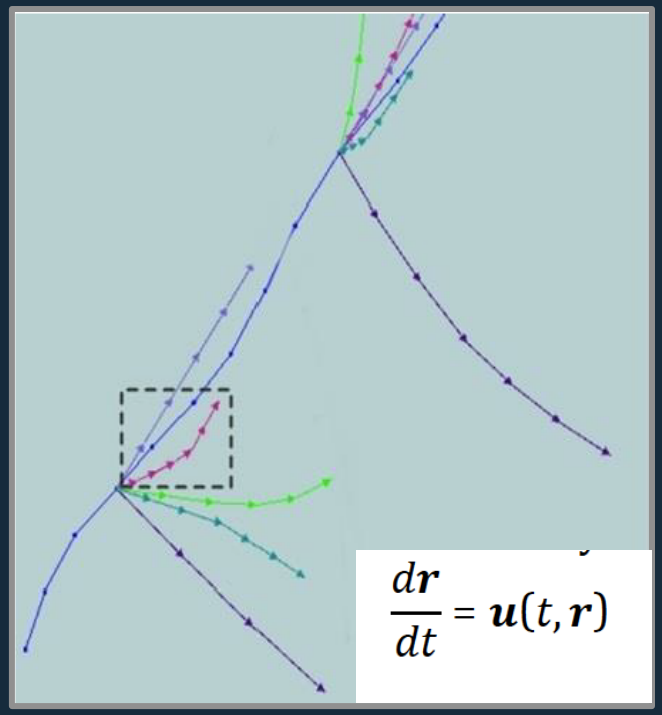
06 IBISAR SERVICE: SKILL ASSESSMENT IMPLEMENTATION

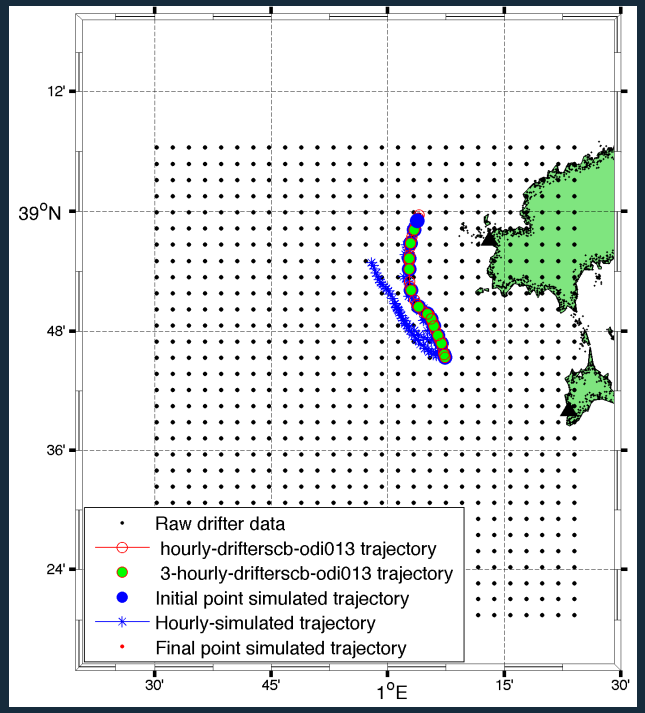
1) Subset model datasets (position & time of drifter data)



2) Trajectory simulation (for all available datasets)



3) Compare pairs observed vs. predicted drifter trajectories



EDS Catalogue → Ocean model data → Lagrangian Trajectory model →

$$s = \sum_{i=1}^{N} d_i \Big/ \sum_{i=1}^{N} l_{oi}$$

Liu and Weisberg (2011)

SOCIB

07 TEAM & ORGANIZATION: WHO IS WHO?

Intersectoral PPP (Public-Private Partnership)

SOCIB Balearic Islands Coastal Observing and Forecasting System

- Project Coordinator
- WP leader 1, 4 and 5
- Scientific excellence with impact on society
- Data management capacities
- Products and services strategy
- Outreach Service

RPS

- Project Co-Contractor
- WP leader 2
- Technical skills (ICT tools)
- Tailor-made products
- User-friendly tools
- Seamless service
- Industry involvement
- Ensure user uptake
- Large client base (25 countries)
- Australia & Asia Pacific, Europe and North America
- > 5000 employers

azti tecnalia

- Project Co-Contractor
- WP leader 3
- EU Projects coordination experience
- Coordination of HFR activities at EU level
- Leaders of CMEMS-SE INCREASE

Salvamento Marítimo

- Main targeted user
- User-Feedback
- User-engagement

Puertos del Estado

- Collaborator
- Responsible for IBI INSTAC and MFC
- Key actor in CMEMS, IBI region.

07 MULTIDICIPLINARY WORKING TEAM

ADVANCED MRI[1] & DATA PROVIDER (PUBLIC)

- Emma Reyes (Coastal HF Radar, PI)
- Joaquín Tintoré (SOCIB's Director, Co-IP)
- Baptiste Mourre (Modelling and Forecasting)
- Paz Rotllán (Data Centre – Frontend developer)
- Ismael Hernández (PostDoc IBISAR)

TECHNOLOGICAL CENTRE (PRIVATE NPO)

- Julien Mader (Head of Marine Technologies Area)
- Anna Rubio (Senior Researcher)
- Luis Ferrer (Senior Researcher)

DOWNSTREAM SERVICE PROVIDER (PRIVATE)

- Eric Comerma (Senior Research Scientist)
- Tayebeh S. Tajalli Bakshsh (Senior Research Scientist)

SPANISH SAR AGENCY (TARGETED USER)

SPANISH PORT SYSTEM

08 IMPACT ON CMEMS

- In line with the user-uptake tenders objectives:
  - Current user's loyalty reinforcement:
    - Data accuracy and confidence increase
    - Data potential unlocking
  - New communities attraction:
    - Links with potential users
    - Engaging with public authorities and civil society
    - Address potential private sector users
- In line with user-uptake priorities:
    - An easy access to CMEMS products
    - More verification and validation of CMEMS products
- Promotion of HFR data and its benefits for:
  - INSTAC: surface currents crucial to improve CMEMS areas of benefits
  - MFCs: as keystone for validating models and improving them

08 IMPACT ON CMEMS

- New innovative service:
  - to respond to targeted users
  - to increase applications of CMEMS products
  - to complement other assessment tools (i.e. NARVAL)
- Scientific activities contributing :
  - to the methodologies for surface current assessment
  - to the homogenization of metrics and accuracy values

09 BENEFITS FOR TARGETED USERS

- Single & user-friendly access point to reliable information.
- Updated inventory of datasets.
- Model evaluation error easily interpretable metrics.
- Better preparation at sea.
- Immediate & more secured response.
- Optimal search area planning.
- Effective resource allocation and search effort.
- Complement of decision-making support tools

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10 DRAFT OF THE DEDICATED WEBPAGE

- Highly functional and user-friendly
- Multi-lingual
- Content:
  - Service Overview
  - CMEMS products used
  - Benefits for users
- Link to IBISAR private service
- Contact details
- Link to active social media accounts
- "News" section or embedded Twitter timeline
- "Other related services" section
- Tutorial-video, interview-videos of users

Show me IBISAR!

Illustrations | Video | News | Related Services | Contact Us

IBISAR contact	ibisar@socib.es
MERCATOR OCEAN	servicedesk.cmems@mercator-ocean.eu

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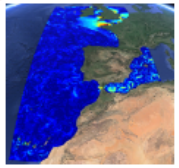
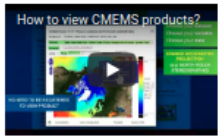
IBISAR: a real-time met-ocean product ranking for emergency & SAR operators.



COASTAL & MARINE ENVIRONMENT

MARINE SAFETY



- **Service overview**. A Environmental Data Server dashboard skill assesment service for real-time met-ocean product ranking in the IBI region for emergency responders & SAR operators.
- **CMEMS products used:**
  - CMEMS MFCs current velocity forecast available in the IBI region: GLOBAL NWS IBI MED
  - CMEMS TACs NRT current velocity & satellite sea level products in the IBI region: GLOBAL NWS IBI MED
  - Upcoming High-Frequency Radar Ocean surface currents
- **Benefits for users:**
  - get information instead of data
  - get user-friendly access to met-ocean products at 3 clicks
  - get support to select the best met-ocean product available
  - get access to easily interpretable & understable information metrics
  - support planning for effective resource allocation & search effort

Show me IBISAR!

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Tweets about @socib_icts+AND+#IBISAR

pt-PROTECMA
@ptprotecma
Ya está en marcha el #IBISAR project coordinado por el SOCIB @socib_icts y financiado por @MercatorOcean El objetivo general es mejorar las capacidades de respuesta y la eficiencia de las operaciones marítimas. Buena proa para todos!

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@socib_icts
Last week, we have organized the kick-off meeting of the #IBISAR project

Embed | View on Twitter

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Balearic Islands Coastal Observing and Forecasting System

THANKS FOR YOUR ATTENTION

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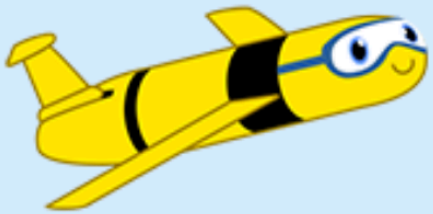
APP

Una aplicación educativa para pequeñ@s oceanógraf@s **de 3 a 6 años**



MEDCLIC KIDS

Gratuita, sin publicidad, y 3 idiomas (ESP/CAT/ENG)

¡Me gusta! ¿Cómo puedo jugar?

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