

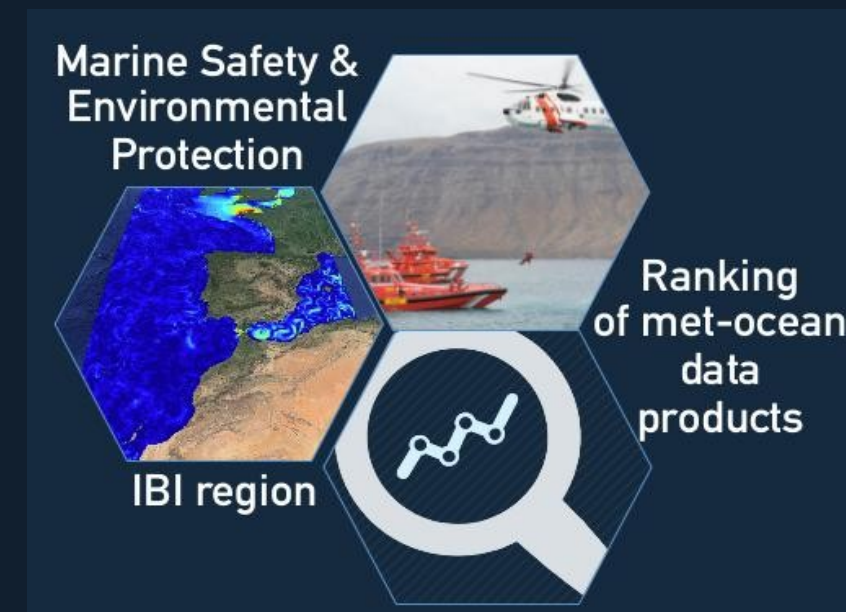
IBISAR downstream service: helping SAR operators and emergency responders to select the most accurate ocean forecast



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01 IBISAR: service overview

Motivation:

- Accurate met-ocean data are requested to support decision-making for emergencies at sea
- Search and Rescue (SAR) operators need user-friendly automated data quality assessment

IBISAR objectives:

- Provide real-time met-ocean product ranking in the IBI area
- Guide the users to select the most accurate current forecast

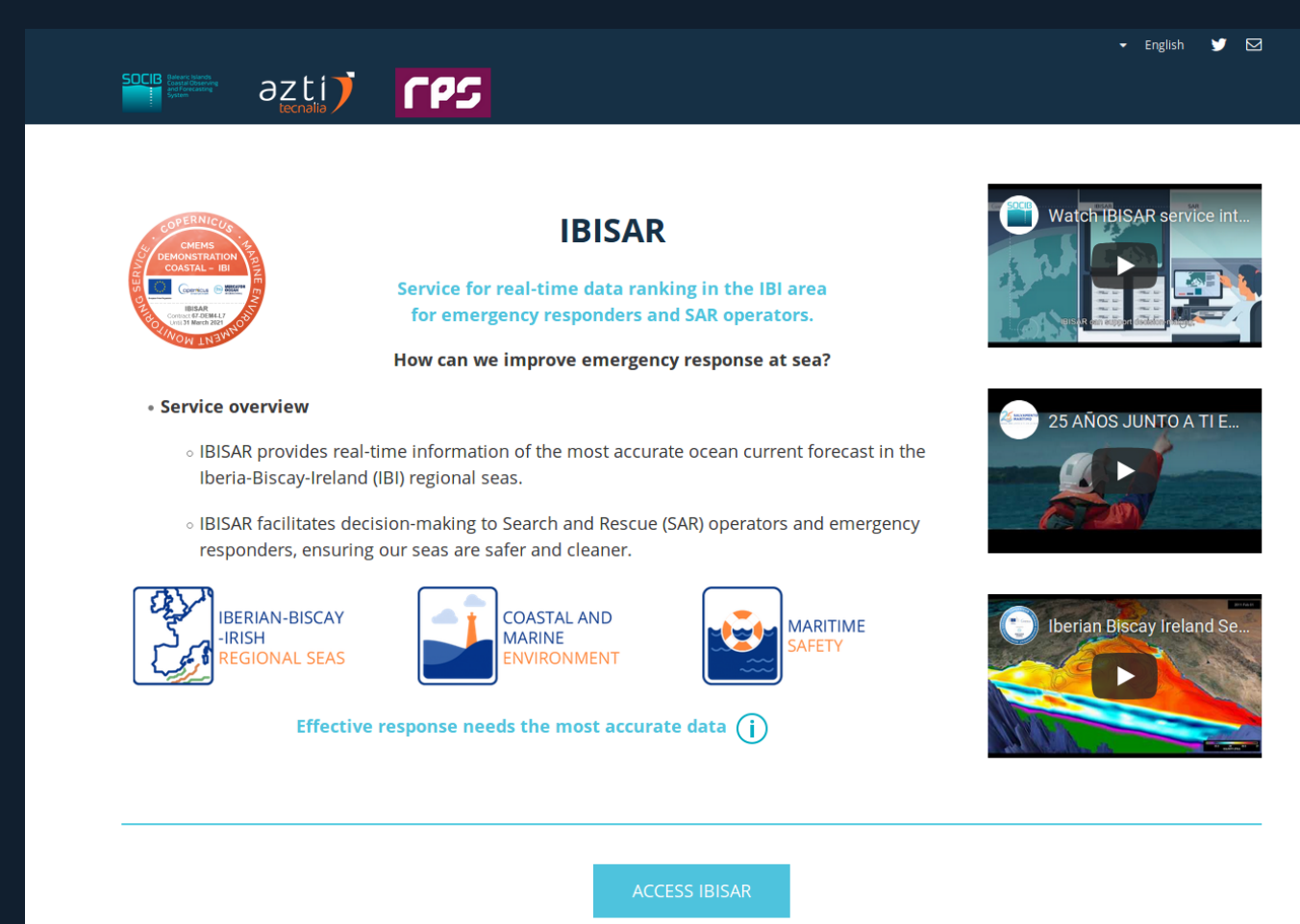
Users:

- SAR operators
- Marine pollution controllers
- Maritime traffic controllers
- Modelers

Access to the service (under registration)

www.ibisar.es

Online in November 2019

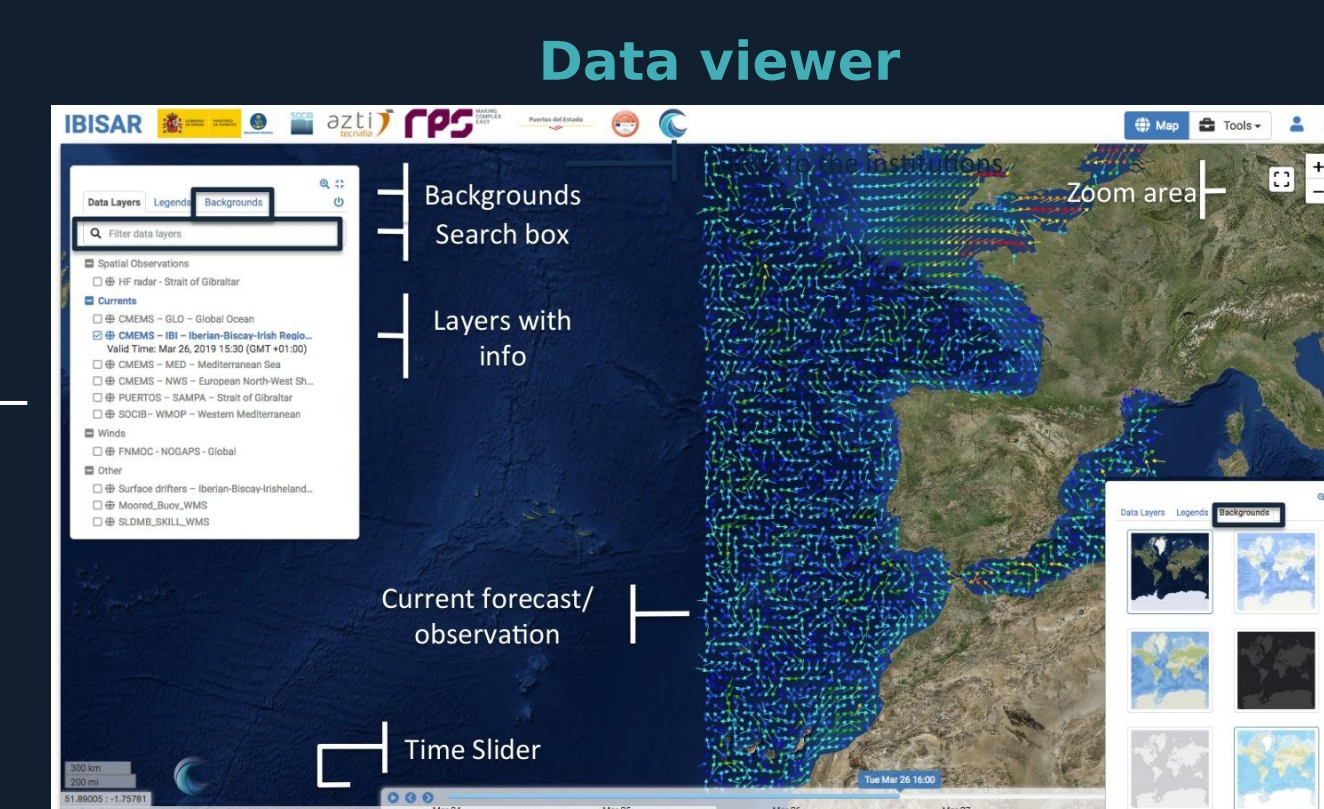


02 IBISAR: 3 elements

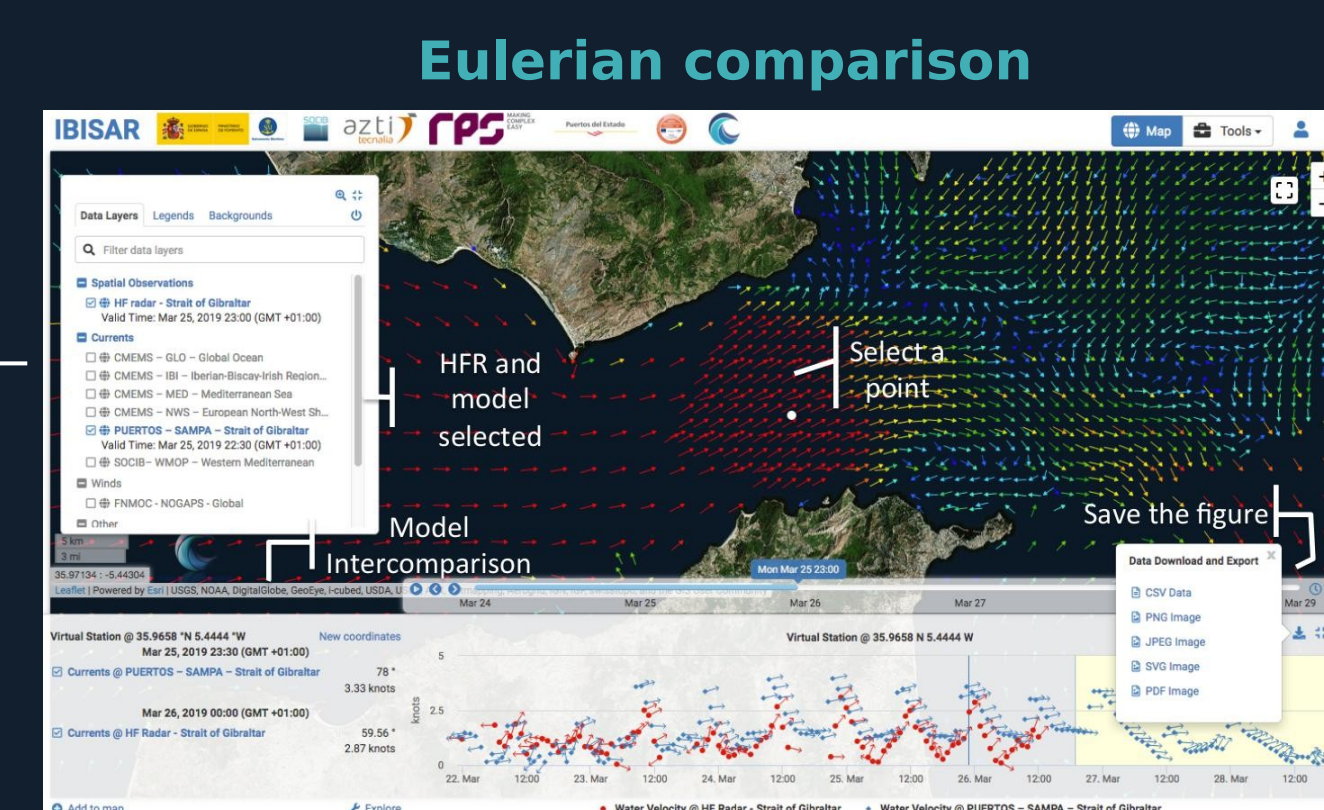
Updated database

- Drifter trajectories and HF radar (CMEMS-INSTAC)
- Ocean model forecast over the IBI area (CMEMS-MFCs)
- Other regional models (WMOP, SAMPA,...)

OceanMap viewer



Skill Assessment functionality



03 Skill Assessment: 3 steps

1



Simulates trajectories using all available datasets

2

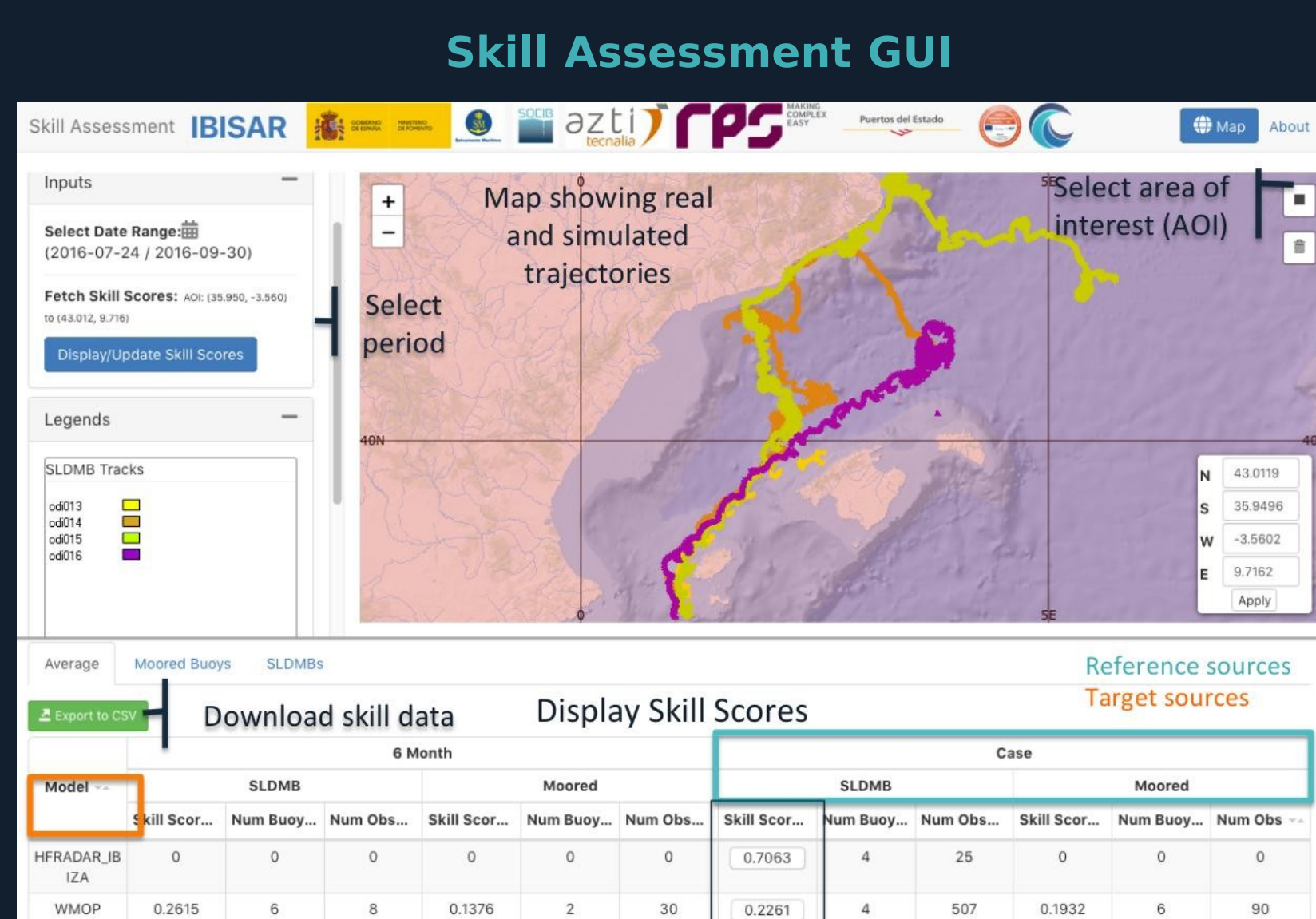


Compares simulated vs. real drifters

3



Ranks models and HF radar based on their performance



04 HF radar: CMEMS new dataset

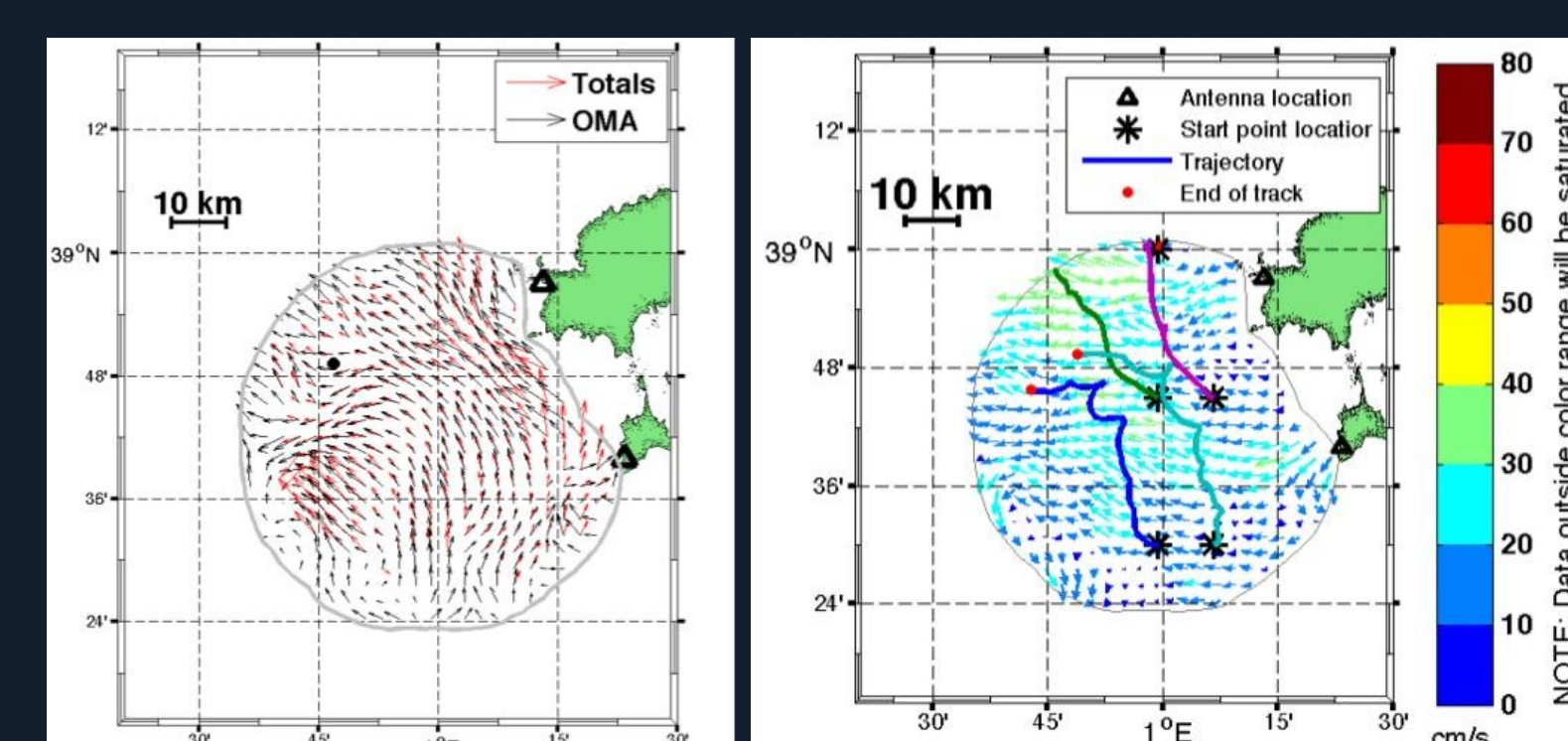
- Previous step: gap-free needed

- Open-boundary Modal Analysis (OMA)

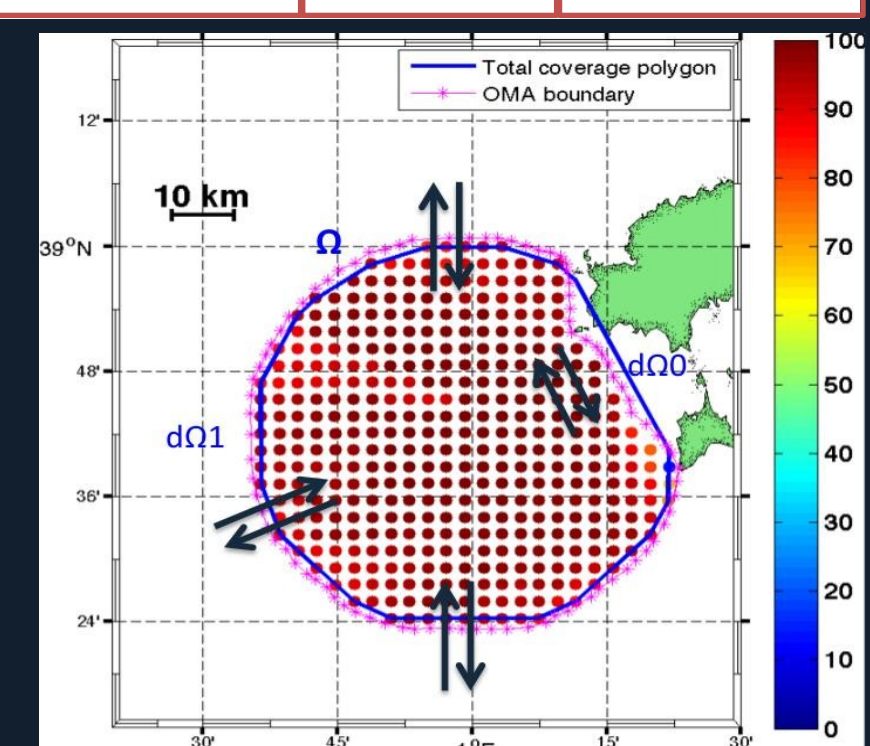
Kaplan and Lekien (2007)

$$\vec{u} = \sum_{k=1}^{\infty} \alpha_k^u \nabla \times \psi_k + \sum_{k=1}^{\infty} \alpha_k^v \nabla \phi_k + \sum_{k=1}^{\infty} \alpha_k^b \nabla \phi_k^b$$

Incompressible Divergence-free Irrotational Vorticity-free Boundary



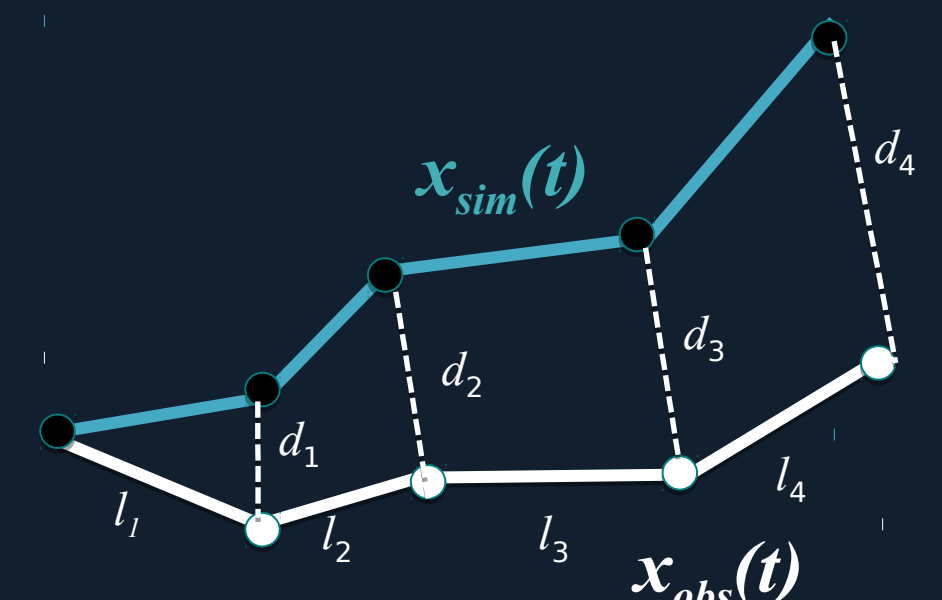
OMA gap-free versus original surface current HF radar derived Lagrangian trajectories



Data coverage and OMA domain

05 Skill Assessment: application in two pilot-areas

Skill Score (SS) definition



$$SS = \begin{cases} 1 - \frac{\sum_{i=1}^N d_i}{\sum_{i=1}^N l_{oi}} & \text{if } \sum_{i=1}^N d_i \leq \sum_{i=1}^N l_{oi} \\ 0 & \text{if } \sum_{i=1}^N d_i > \sum_{i=1}^N l_{oi} \end{cases}$$

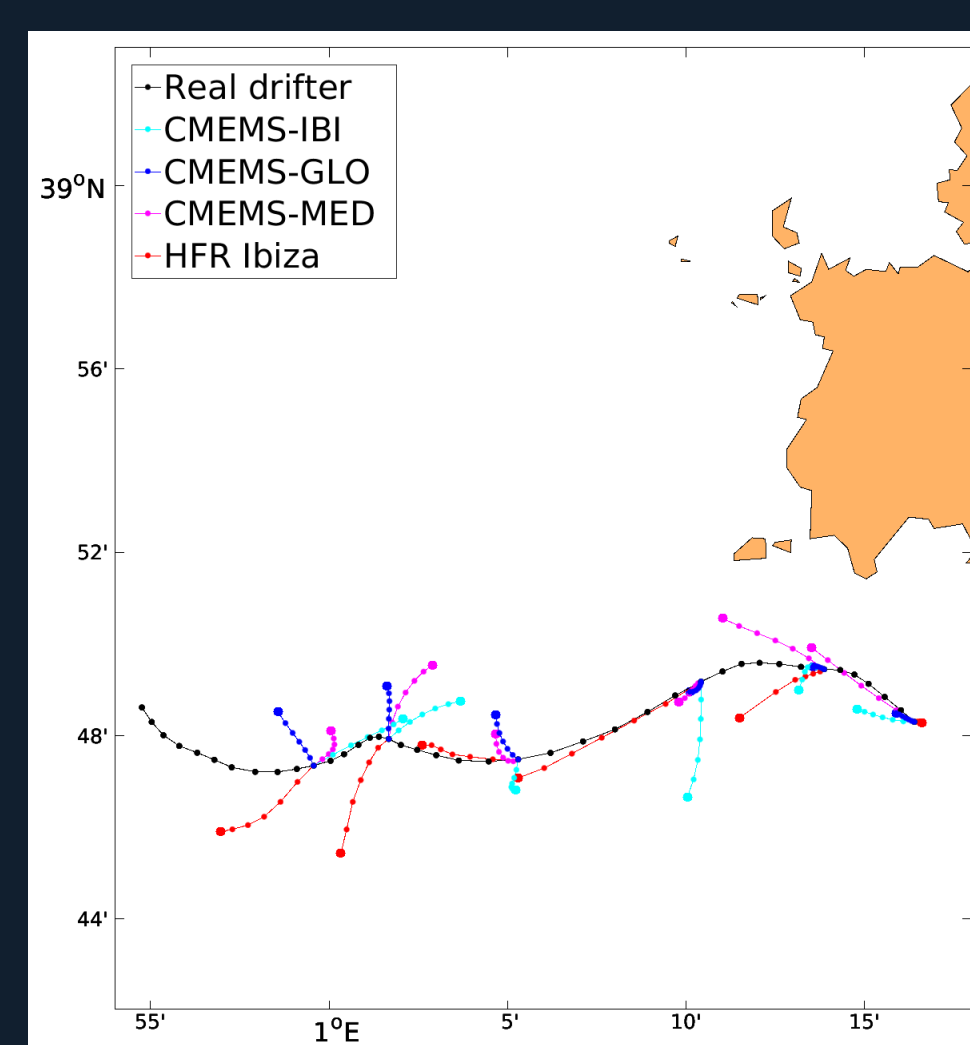
with $l_{oi} = \sum_{k=1}^i l_k$

Liu and Weisberg (2011)

- SS = dimensionless index from 0 to 1
- SS = 1 => perfect match

Skill Score computation

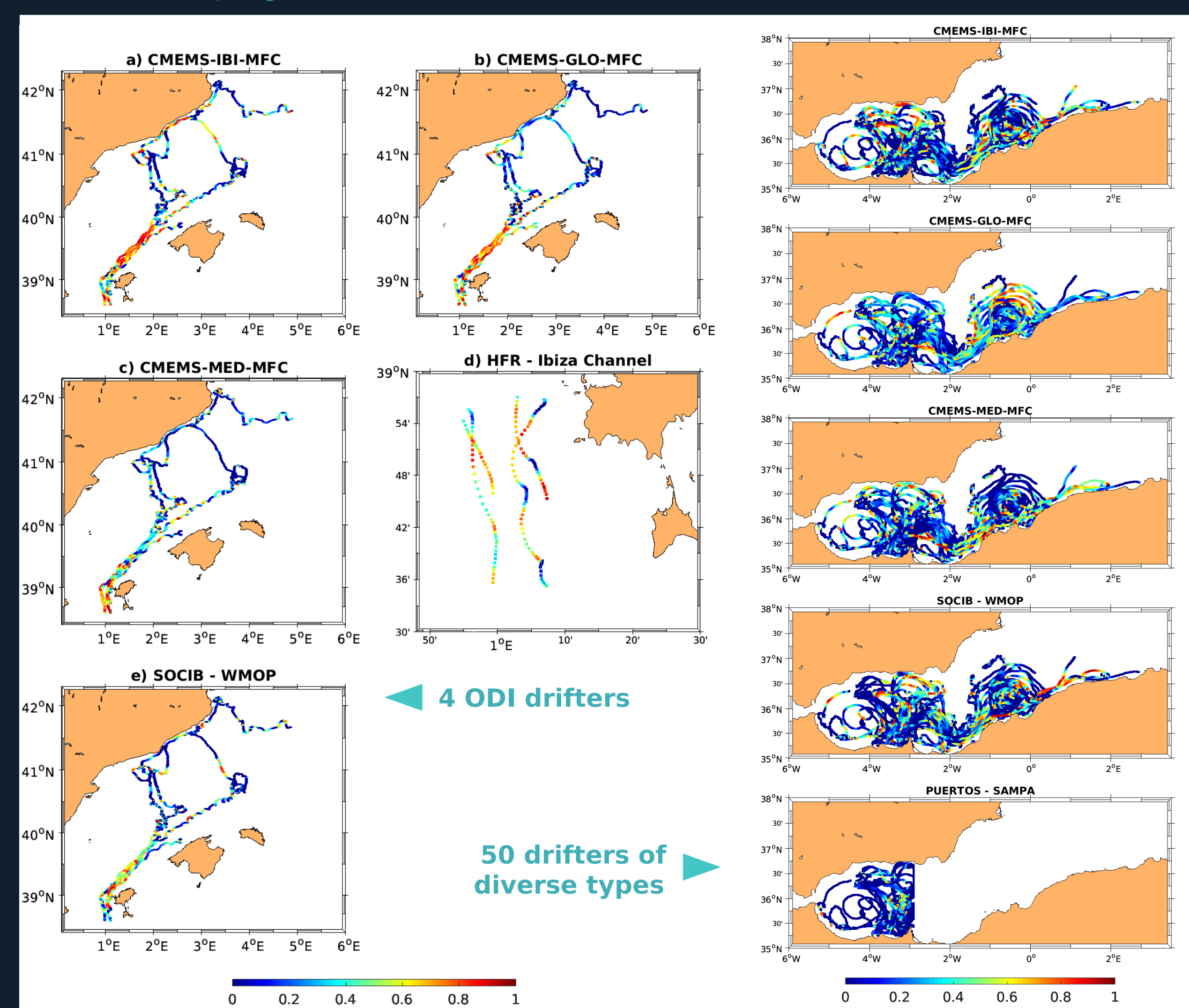
- Virtual drifters are launched every 6 hours at the real drifter positions
- SS calculated after 6 hours of simulation



Example of simulated trajectories

Balearic Sea July-October 2016

Alboran Sea March-April 2019



06 Acknowledgements

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