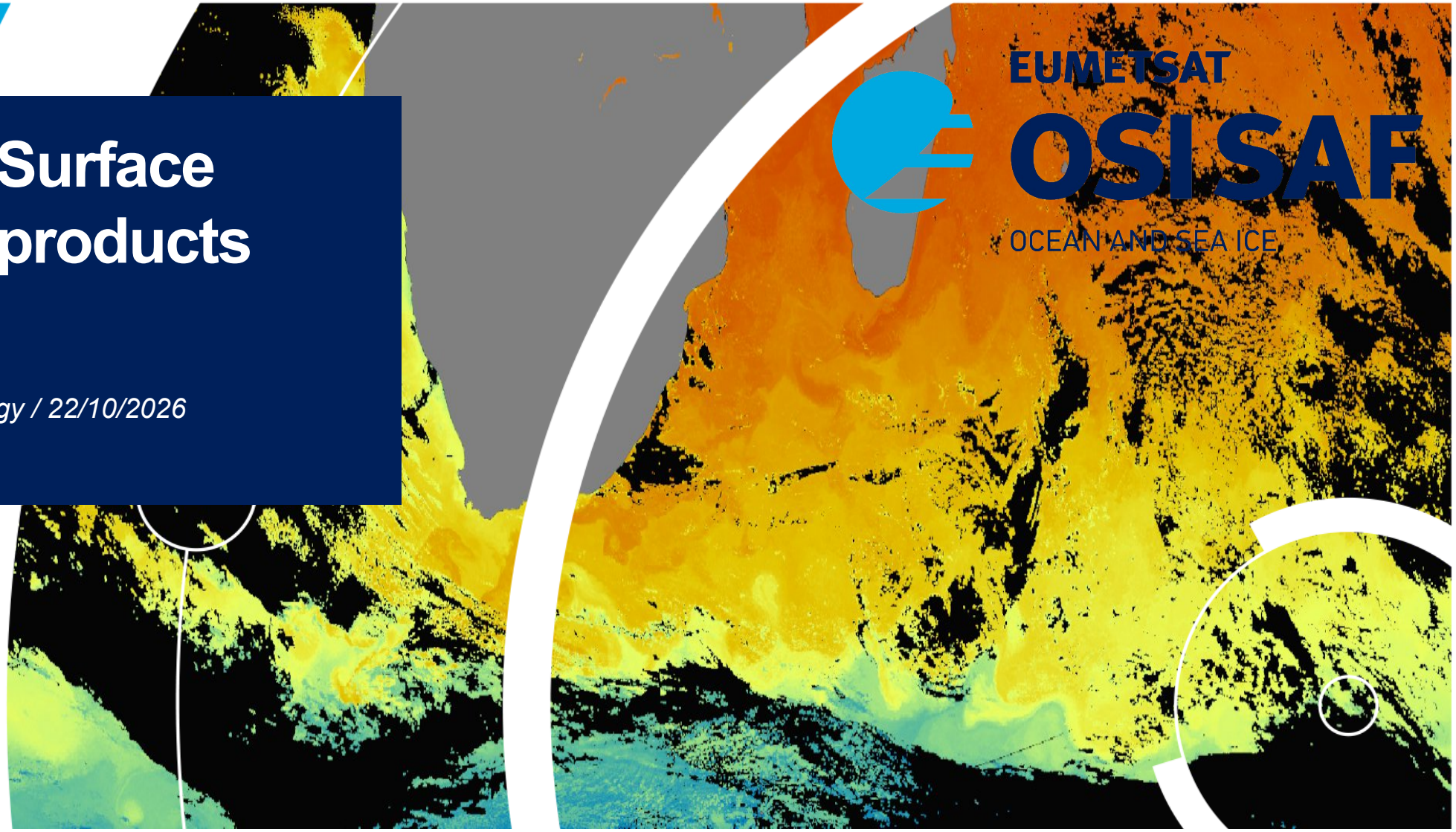
EUMETSAT

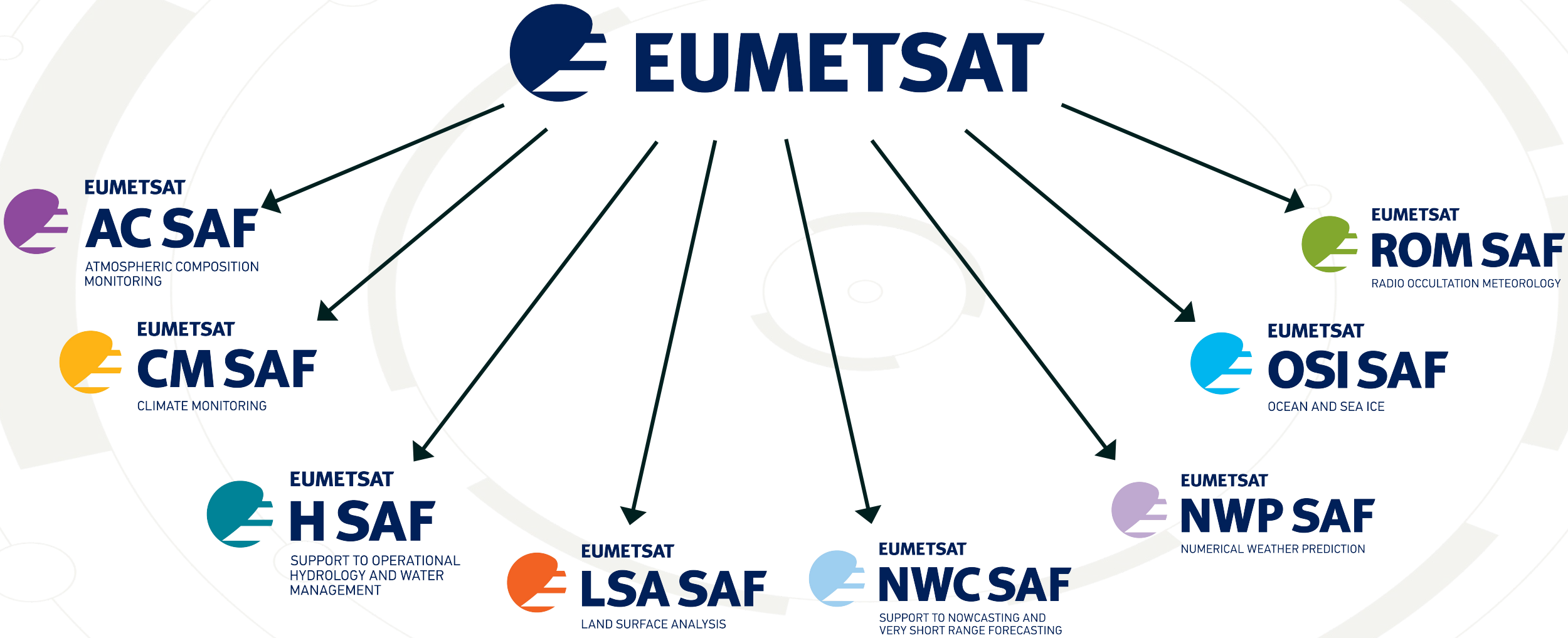
OSI SAF Sea Surface Temperature products

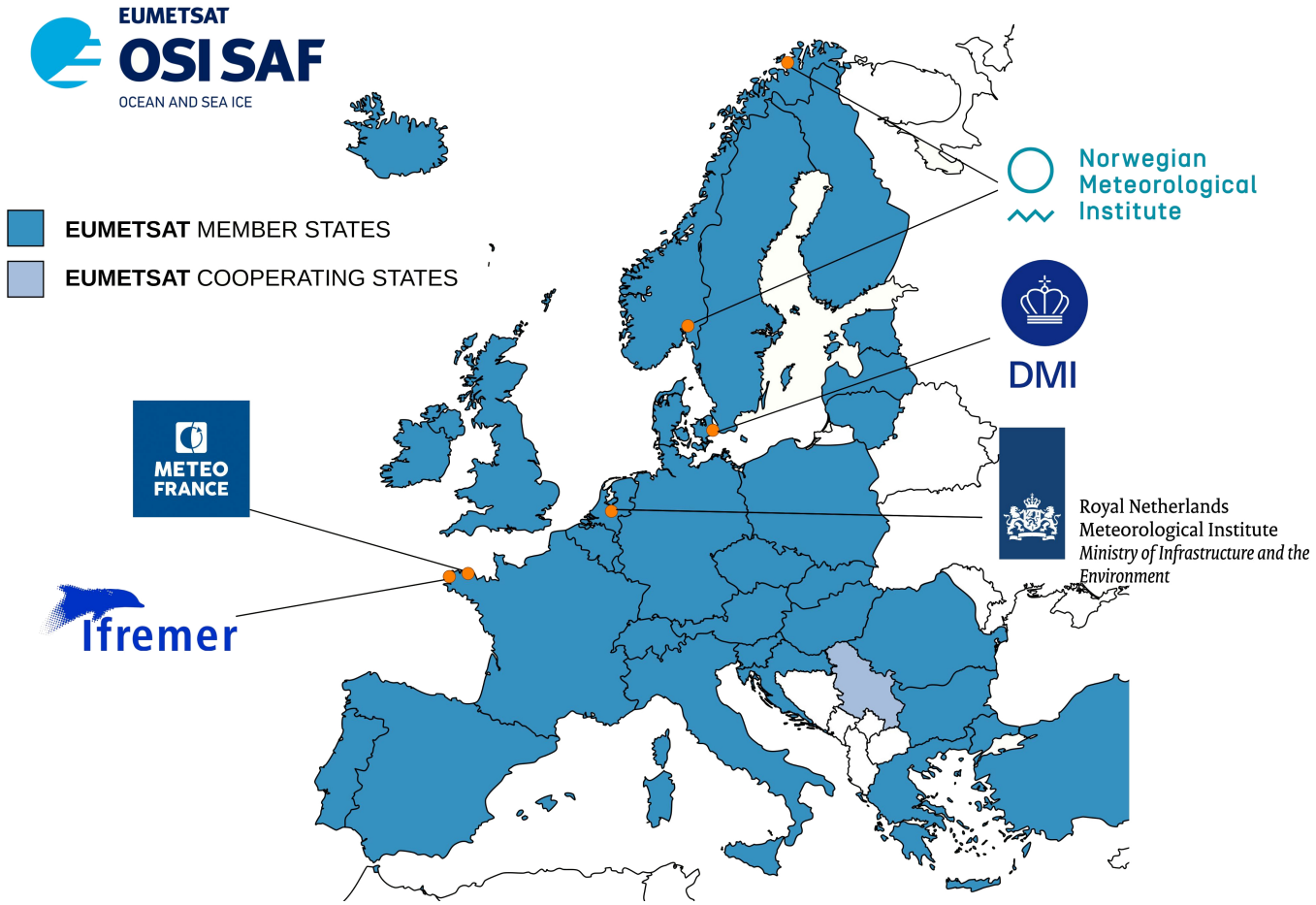
Gwenaël Le Bras

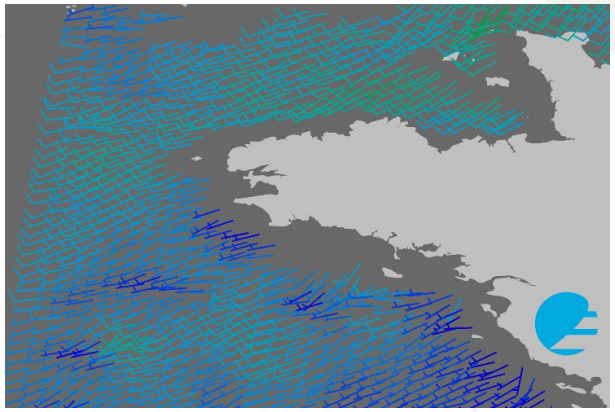
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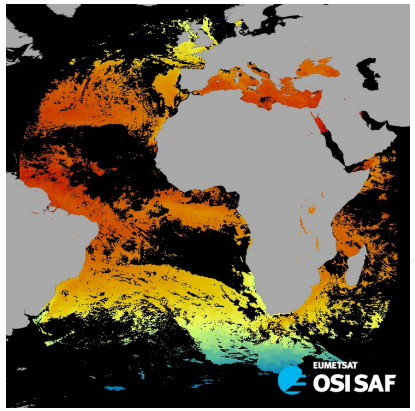
A decentralized production network



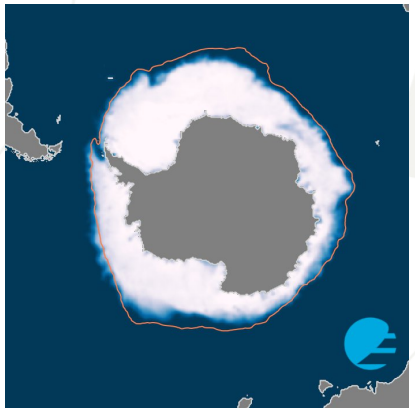




Ocean Winds

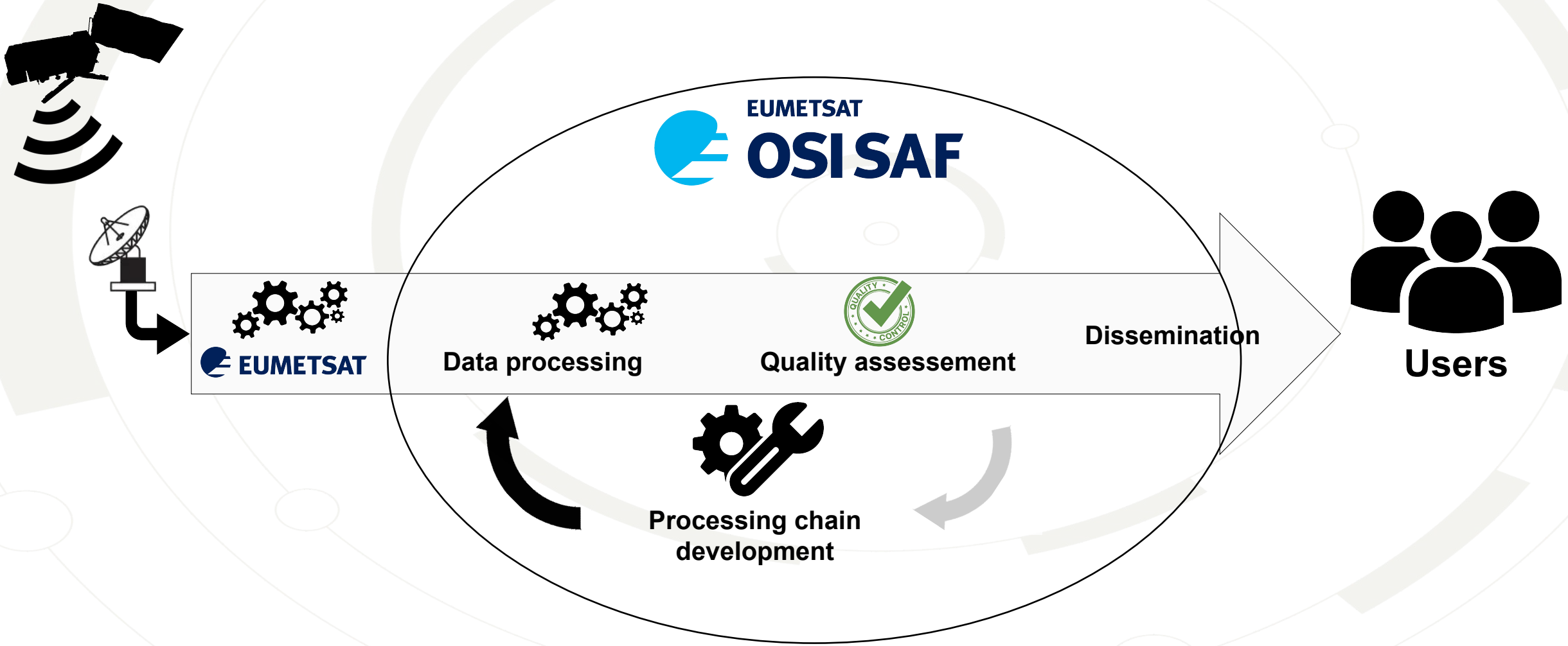


Sea Surface Temperature



Sea Ice

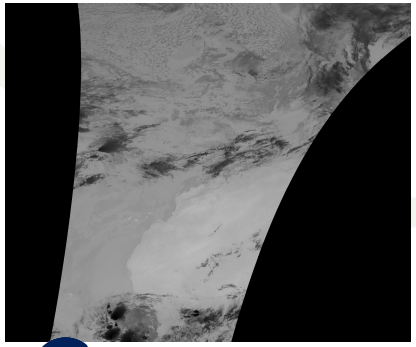
What does OSI SAF?

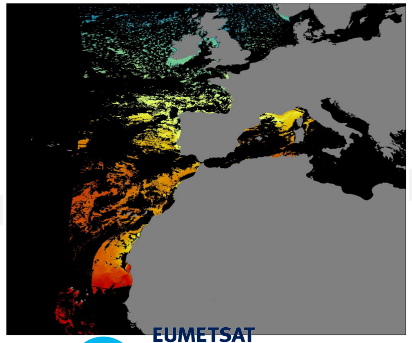


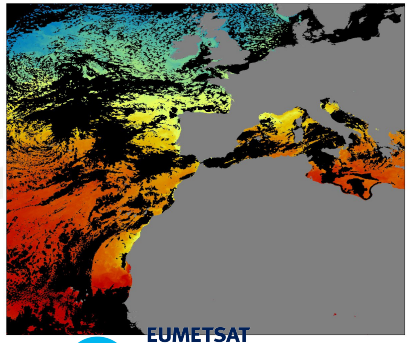
Satellite products levels

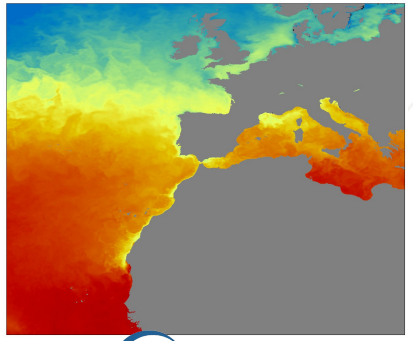
	Level 0	Level 1	Level 2	Level 3	Level 4
Short definition:	Reconstructed raw data from the sensor	Top-of-atmosphere data (single sensor - full resolution)	Processed data, with atmospherical correction (single sensor - full resolution)	Processed data reprojected on a regular space-time grid scale (single or mutli-sensor)	Model output or analyses results (gap filled)
Example: SST data	*Athmospherical reflectance*	*Earth brightness temperature*	*Full resolution granule of 3min of SST, with atmospherical correction and clouds and continent masked*	*Aggregation of measurements over a time period, sometime with degraded spatial resolution to fit a grid*	*OSTIA SST analyse (foundation temperature)*







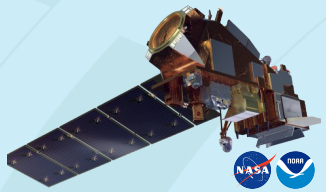




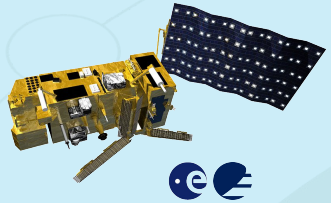
Mesurer la SST depuis l'espace

EUMETSAT OSI SAF

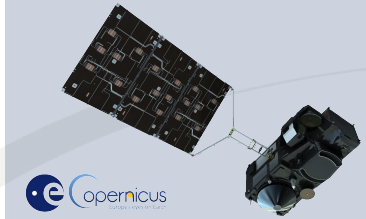
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NOAA / VIIRS



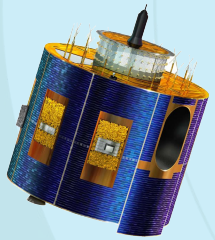
Metop / AVHRR



Sentinel-3 / SLSTR

3.7µm (nuit)
10.8µm
12µm

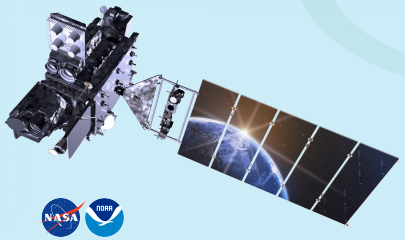
EUMETSAT Copernicus



MSG / SEVIRI



MTG / FCI



GOES / ABI

10.8µm
12µm

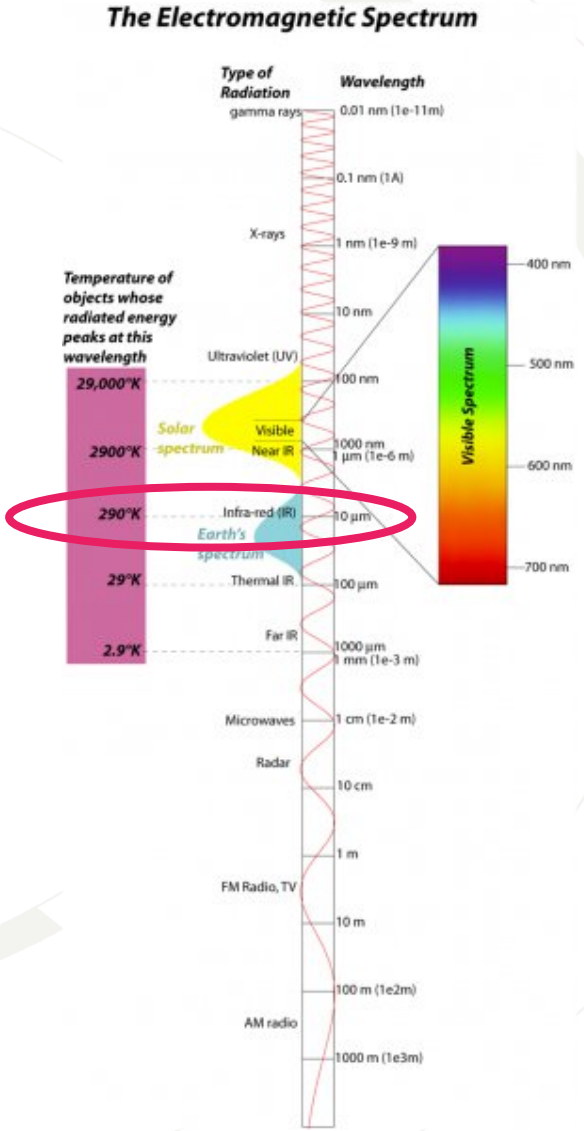
8.7µm
10.5µm
12.3µm

8.5µm
10.3µm
12.3µm

EUMETSAT OSI SAF

Défilants polaires

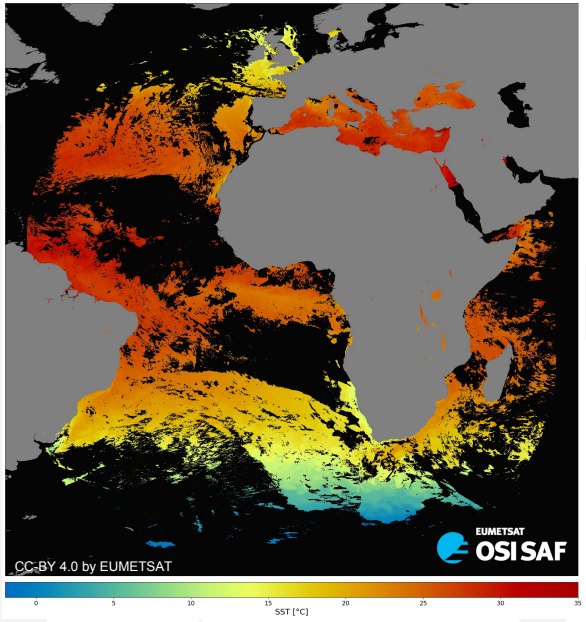
Géostationnaires



David Bice © Penn State University - CC BY-NC-SA

Sea and Ice Surface Temperature

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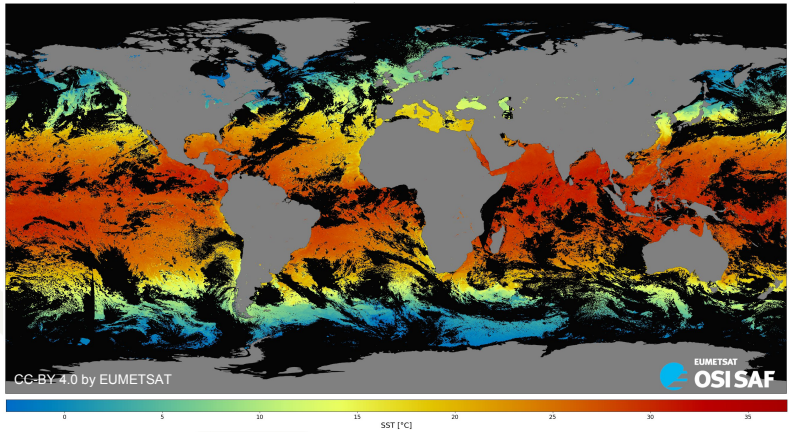


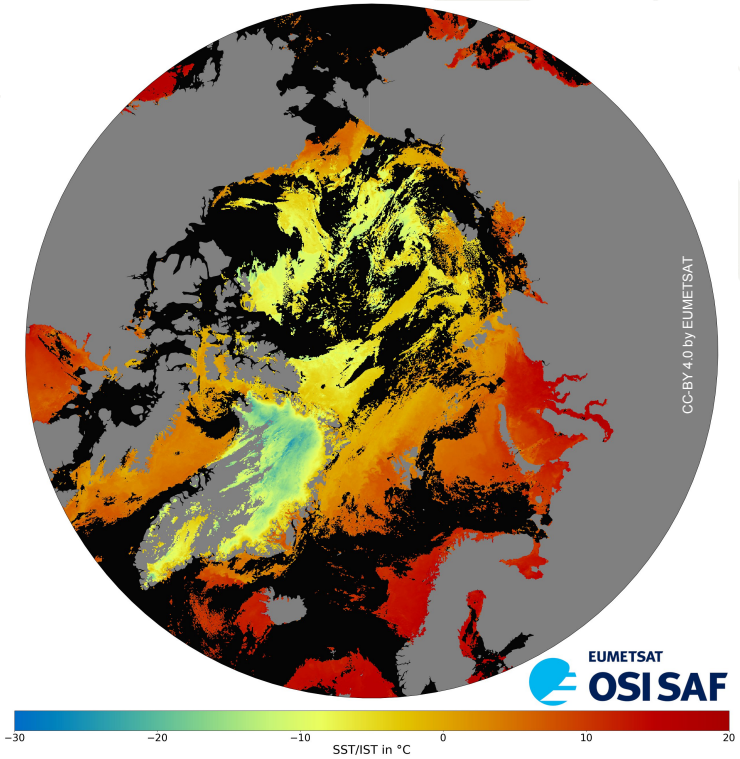
Geostationnary SST

- 3 satellites in near real time
- Climate Data Record for Meteosat 0°

Global Low Earth Orbits SST

- 3 satellites in near real time / full resolution (L2)
- 12h aggregates on global and North Atlantique (L3)





High Latitude SST & IST

- 2 satellites in near real time / full resolution (L2)
- 12h aggregates (L3)

GEO vs LEO Spatial resolution

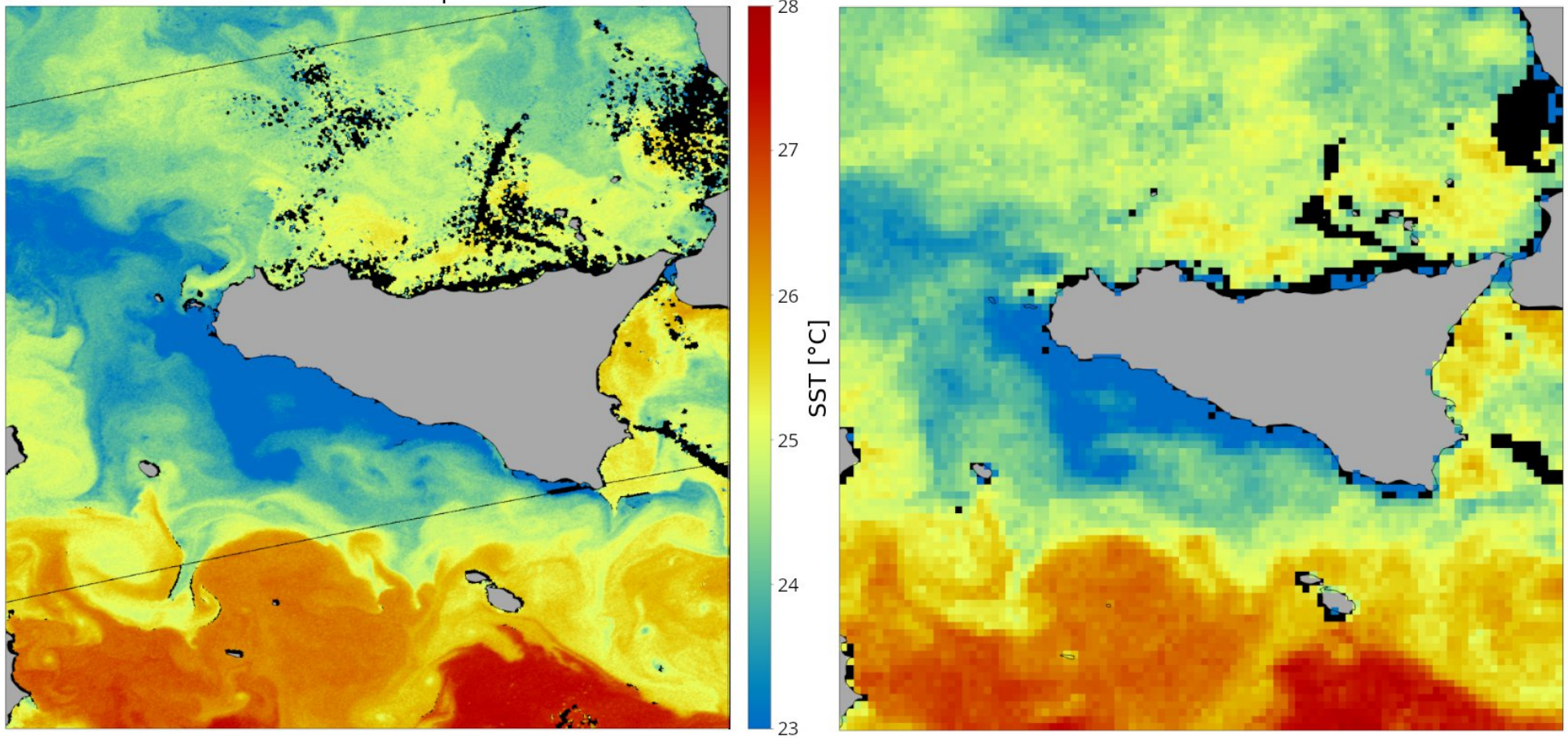
Sea Surface Temperature from Satellite - 30/09/2024 - 20:00

LEO

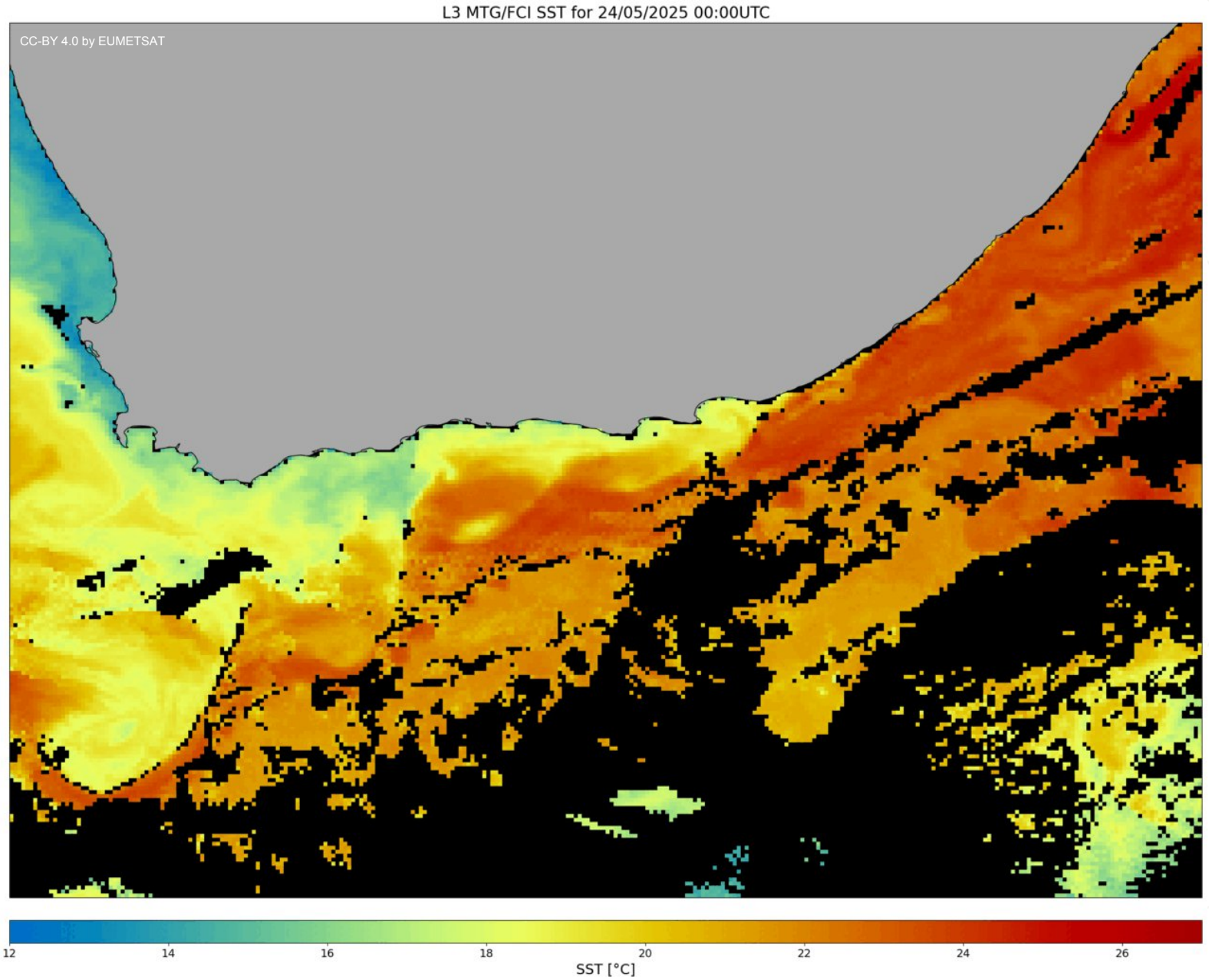
AVHRR on Metop-B

GEO

SEVIRI on Meteosat-10



geostationnary data – time resolution

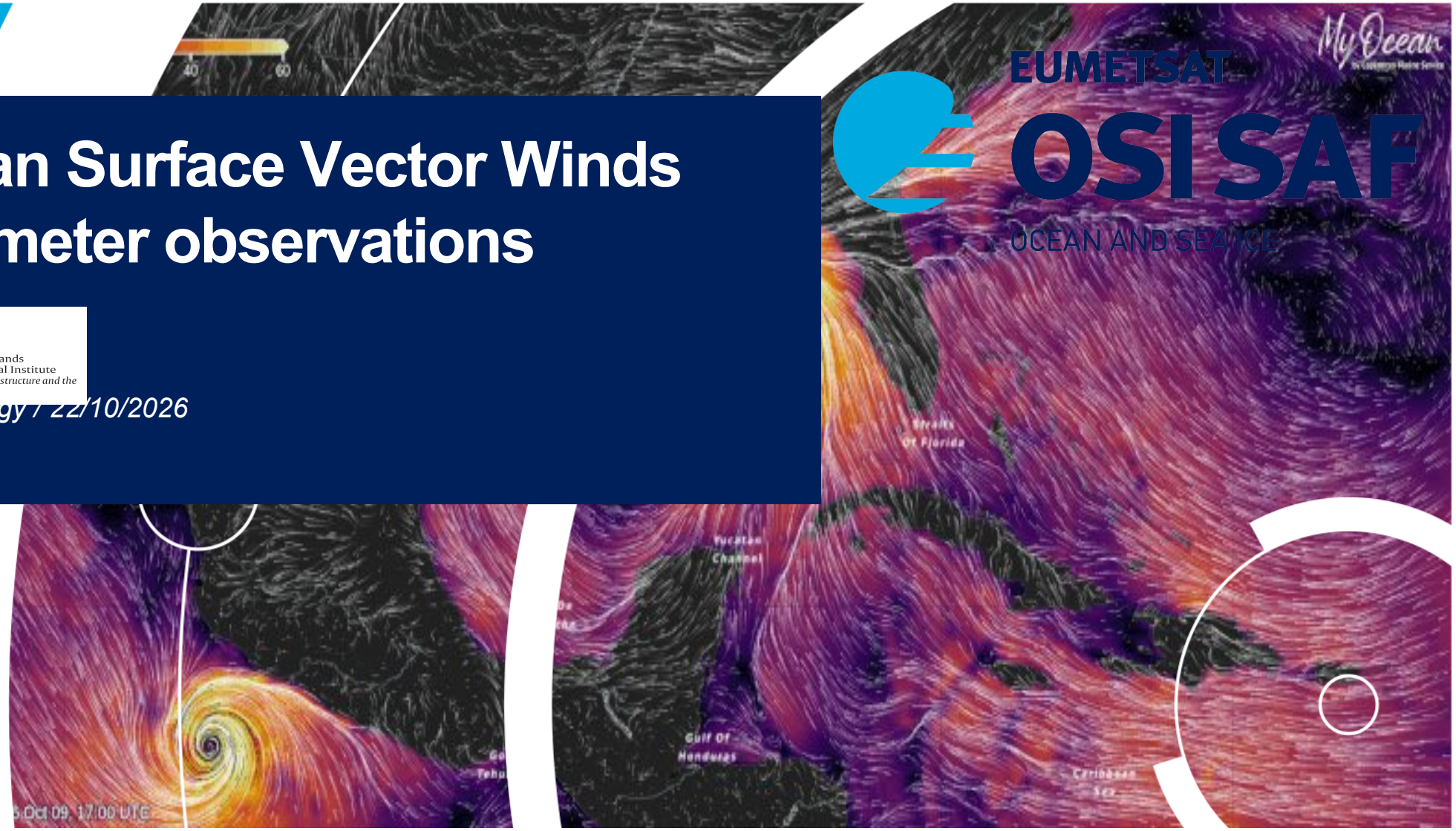


Tropical Ocean Surface Vector Winds with scatterometer observations

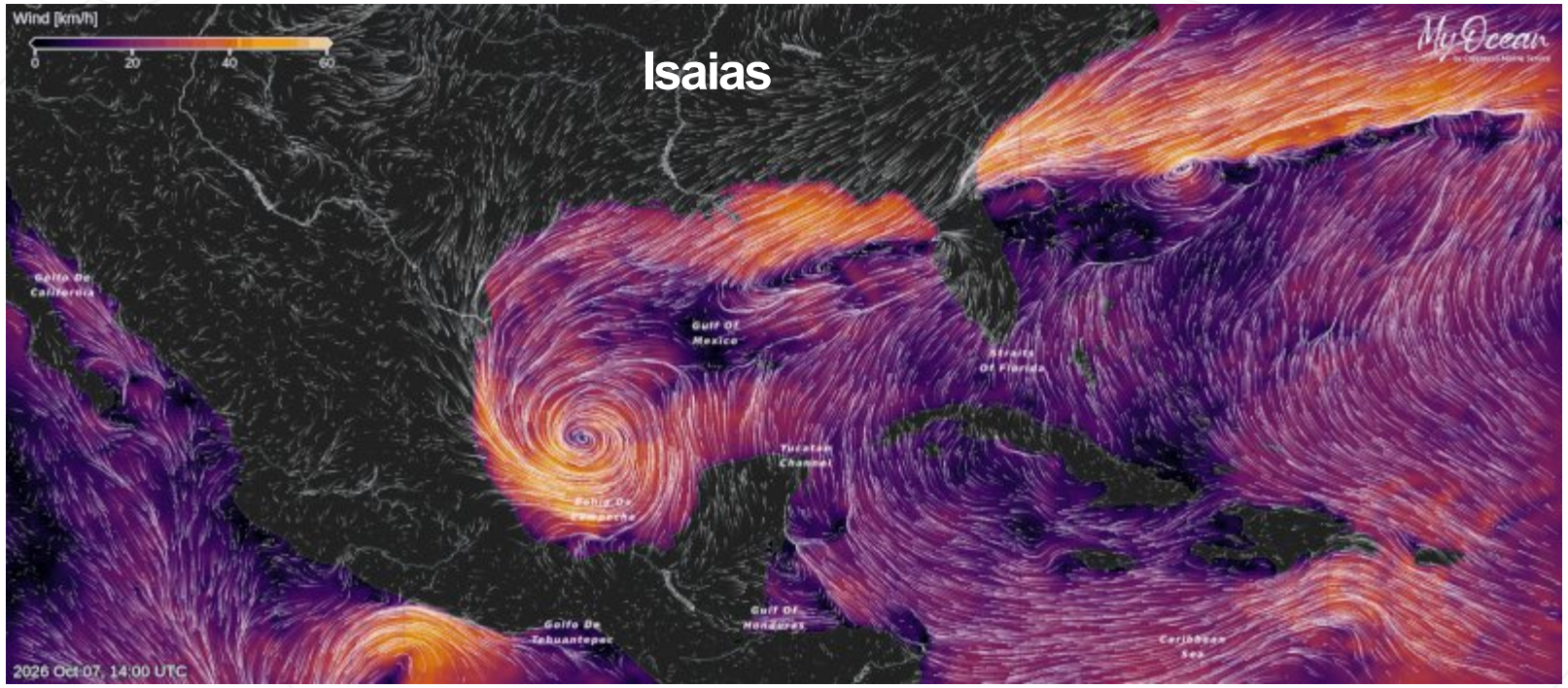
Ad Stoffelen

Royal Netherlands Meteorological Institute
Ministry of Infrastructure and the Environment

EUMeTrain Tropical Meteorology / 22/10/2026

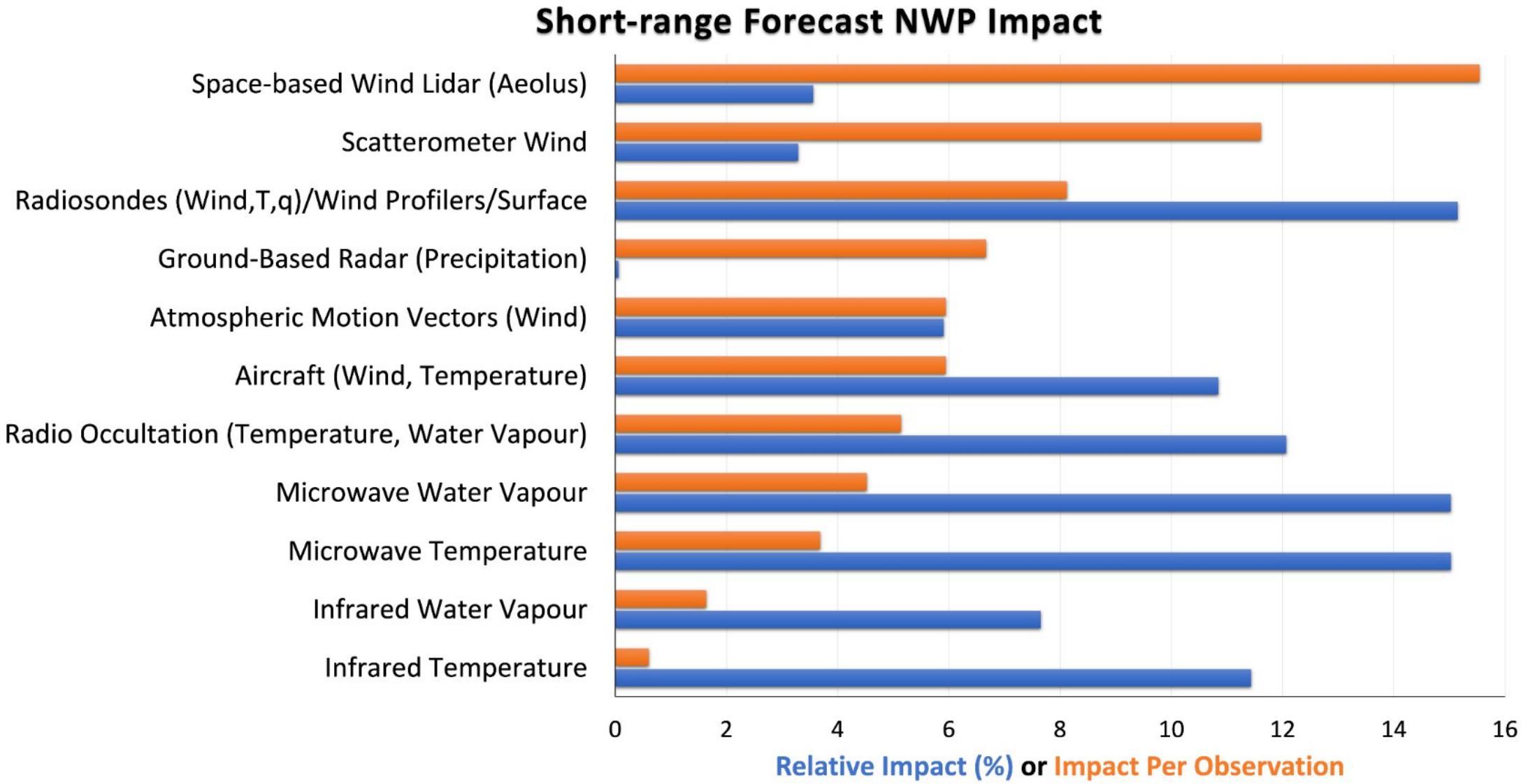


Tropical ocean surface vector winds



This graphic was created using the Global Ocean Hourly Sea Surface Wind and Stress from Scatterometer and Model (WIND_GLO_PHY_L4_NRT_012_004) through the Copernicus Marine Service MyOcean Pro viewer.

Relevance of winds in forecasting

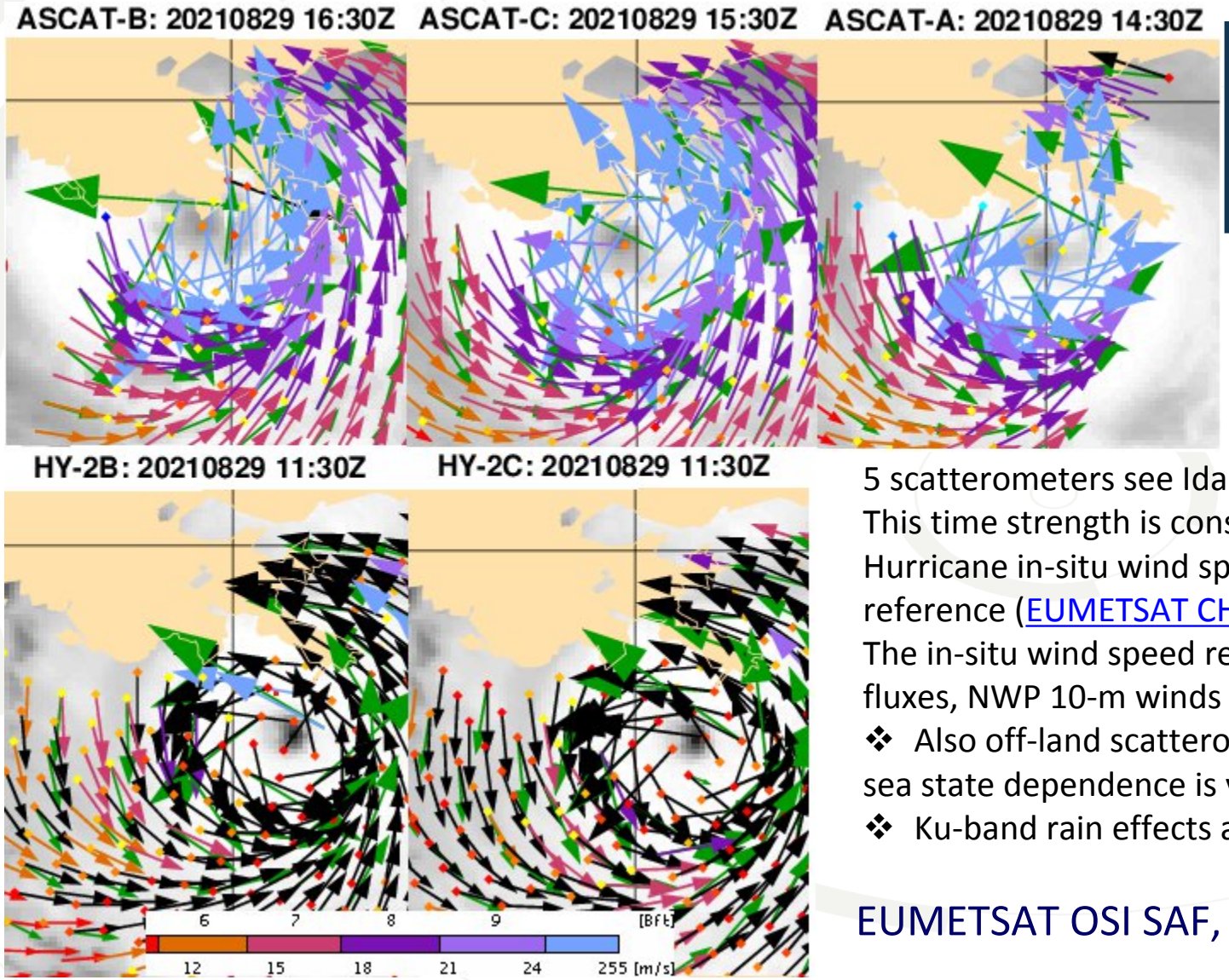


➢ **More and timely wind observations would be very helpful !**

Relevance of winds in forecasting

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Royal Netherlands Meteorological Institute
Ministry of Infrastructure and the Environment

5 scatterometers see Ida making land-fall

This time strength is consistent with NHC-advisories, but . .

Hurricane in-situ wind speed scale differs from moored buoys, our in-situ reference (EUMETSAT CHEFS report; Ni et al., 2022)

The in-situ wind speed reference determines ocean stress and surface - fluxes, NWP 10-m winds and hence waves and storm surges

- ❖ Also off-land scatterometer hurricane winds are of good quality and no sea state dependence is visible
- ❖ Ku-band rain effects appear in rain bands (only), Zhao et al., 2025)

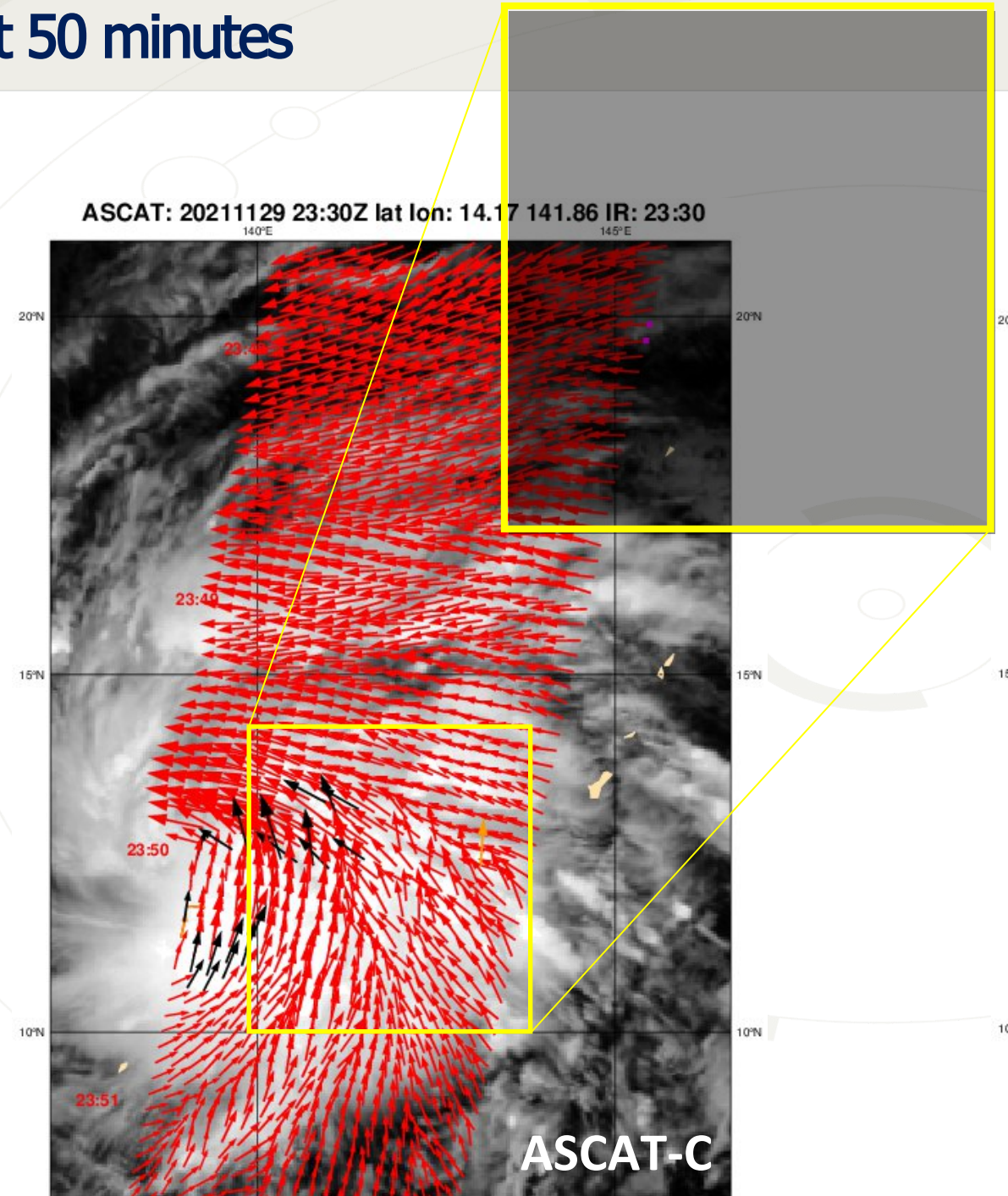
EUMETSAT OSI SAF, Ida land-fall news story

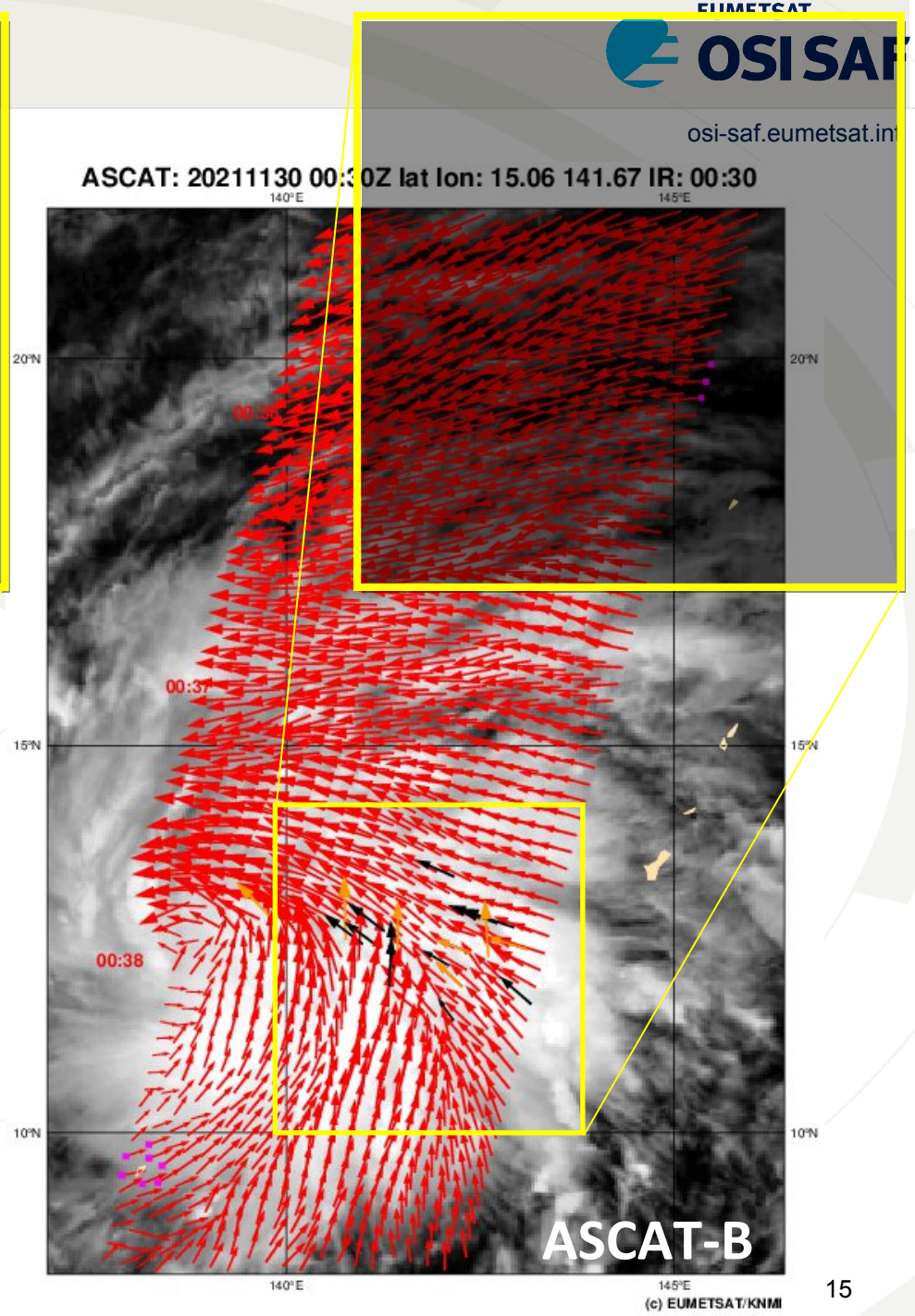
In just 50 minutes

Dynamical evolution in hurricanes is evident over 50 minutes

ASCAT extreme convergence precedes extreme rain (updraft)

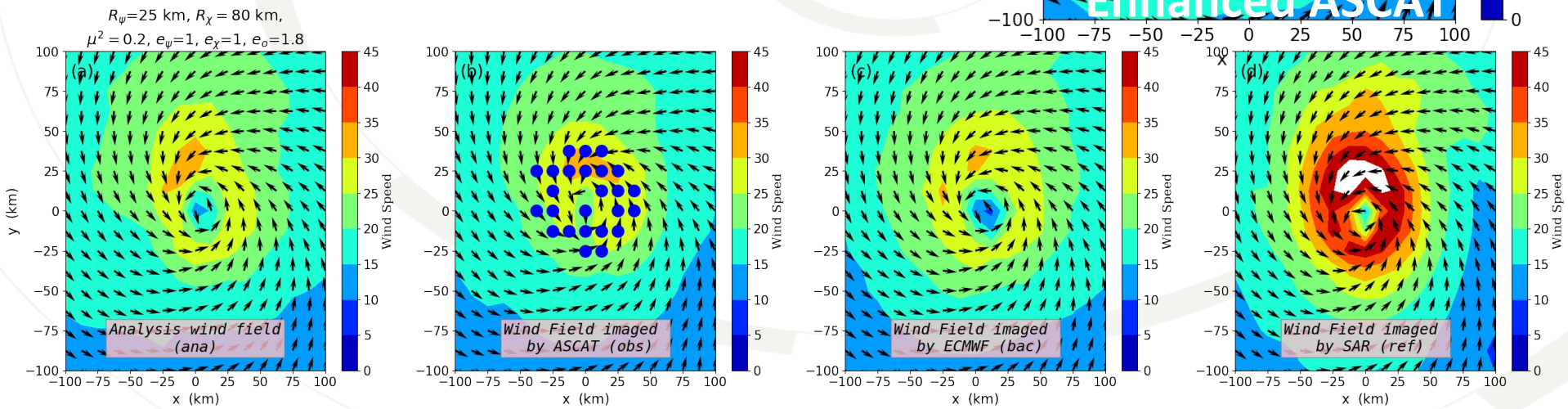
ASCAT extreme divergence lags extreme rain (downburst)

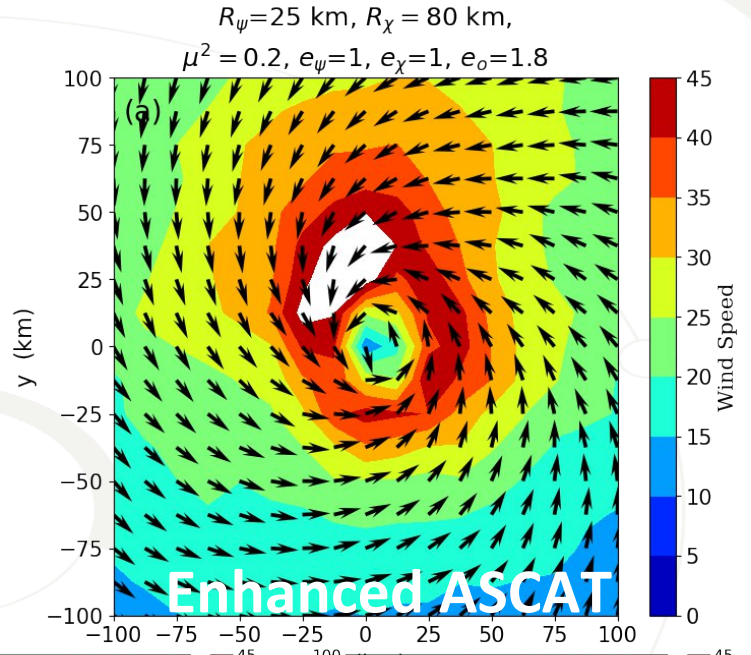




SAR-learned scatterometer resolution enhancement

- Storm-centered background (max. R^2 centre)
- SAR-learned empiricial “hurricane” spatial B error structure functions, depending on category
- Sensitivity tests varying radii and rot/div ratio
- Now 12.5 km coastal product, later 6 km
- Wind speed adjustment for tropical hurricanes is last step

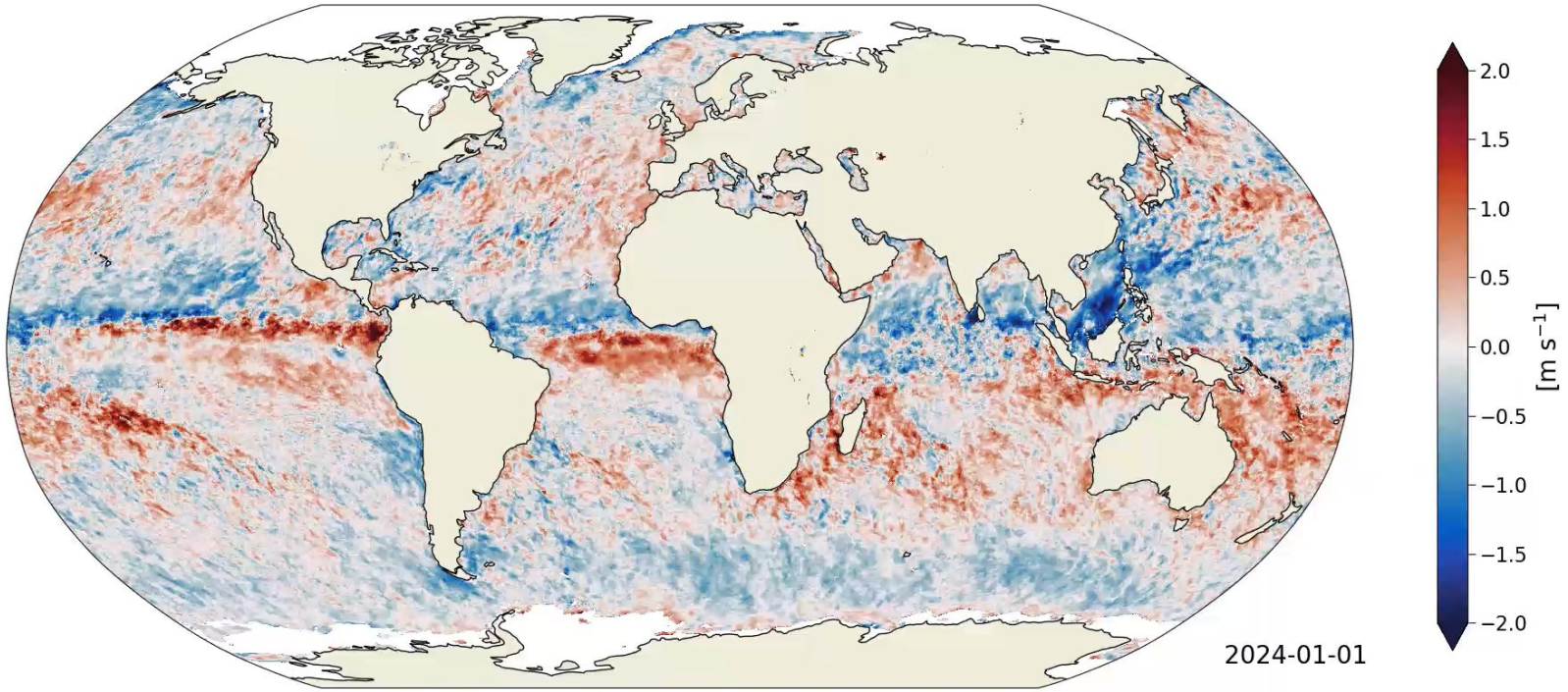


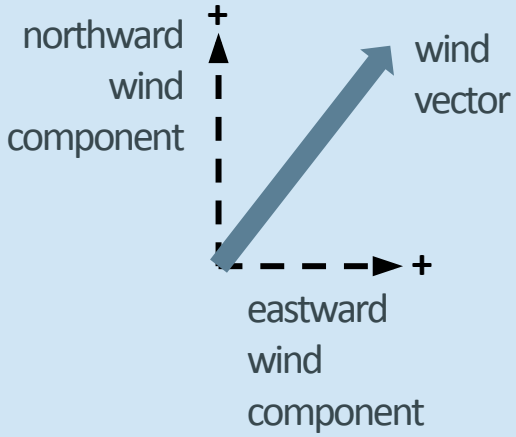


Ocean surface vector winds

Problem: numerical weather model winds contain persistent biases

Bias of the northward wind component [scatterometer – model]





- Tropical biases and variability errors are particularly large, even in the best model

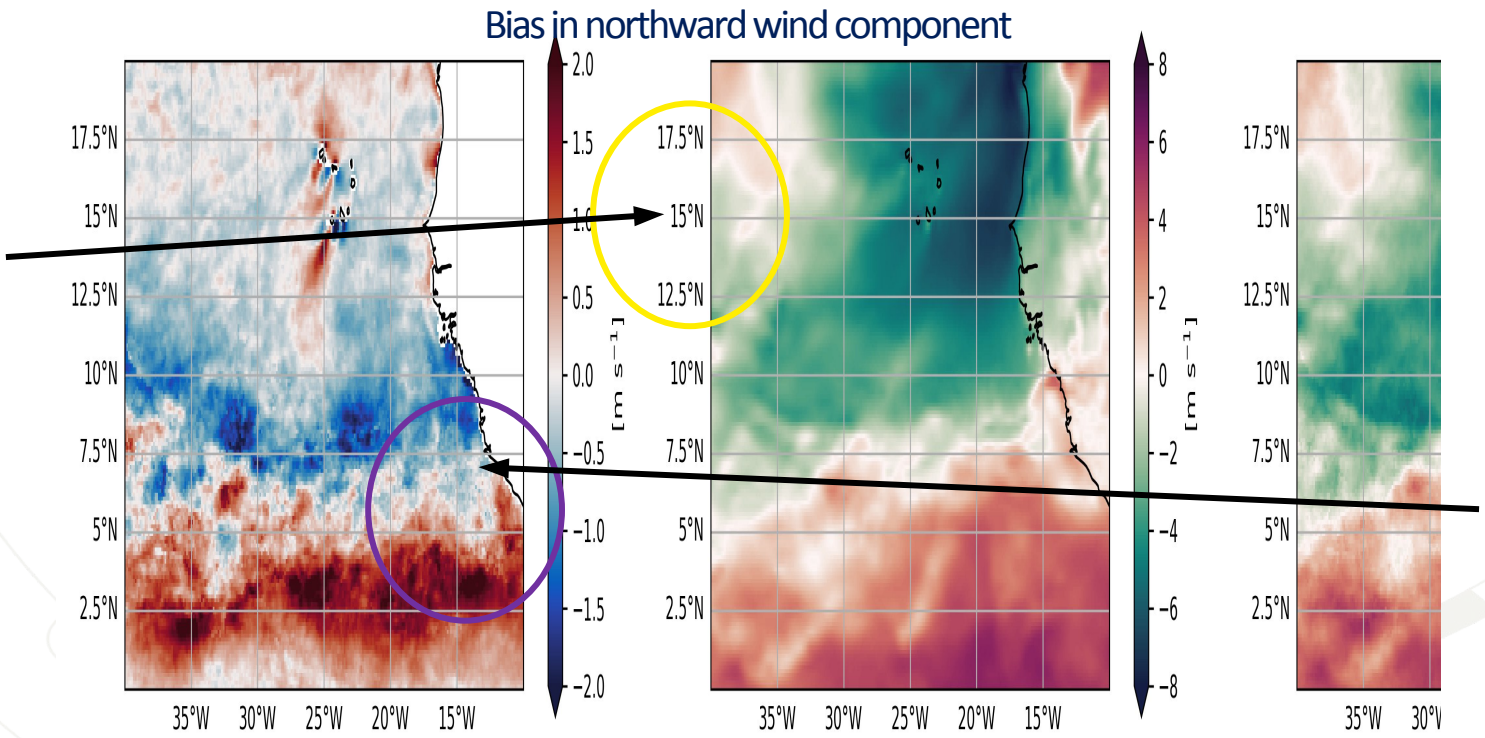


These biases affect the quality of applications using model winds

Solution

Use persistent model bias patterns to create improved surface wind products

wind effects of the Cape Verde Islands



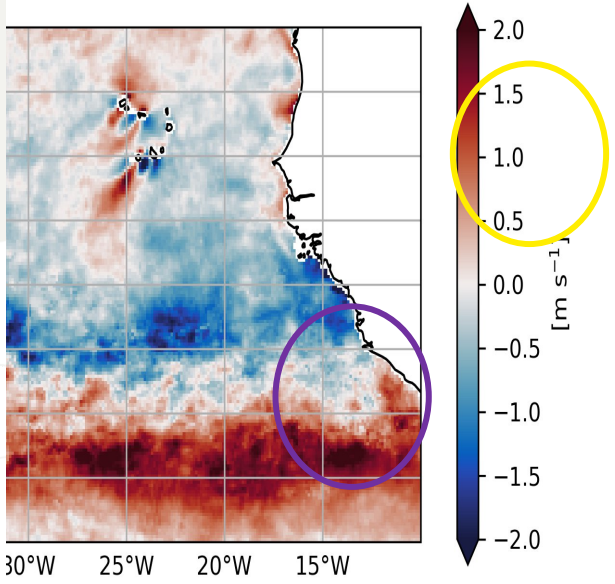
large wind gradients in the tropical convection zone

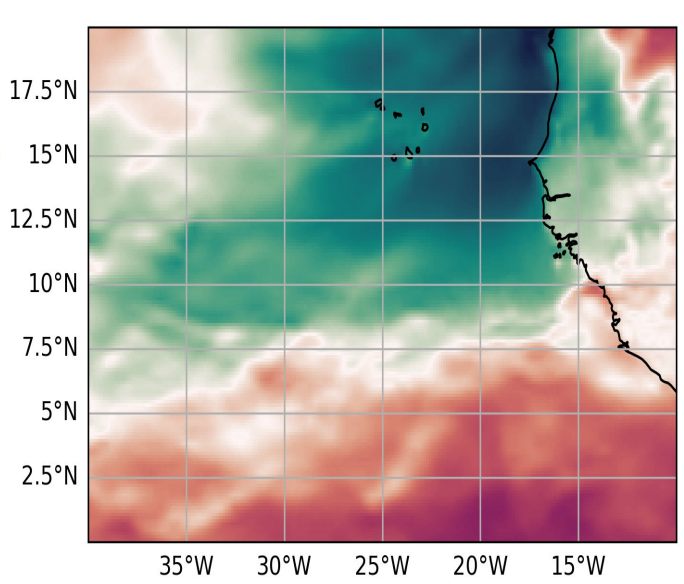
Ocean surface vector winds

Improved surface wind products have

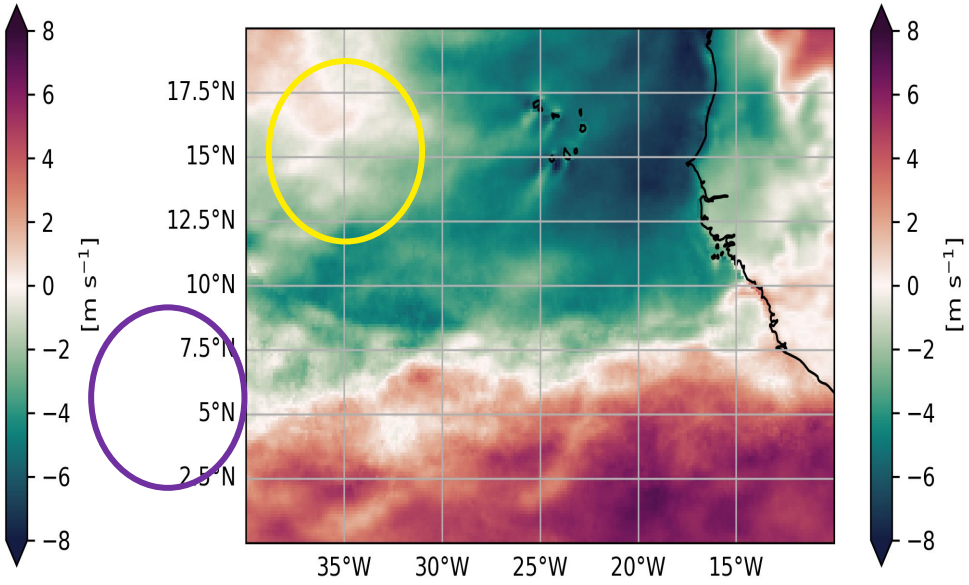
- persistent model biases removed
- more spatial detail
- no gaps in space and time

northward wind component [model]





northward wind component [improved product]



Ocean surface vector winds

marine.copernicus.eu

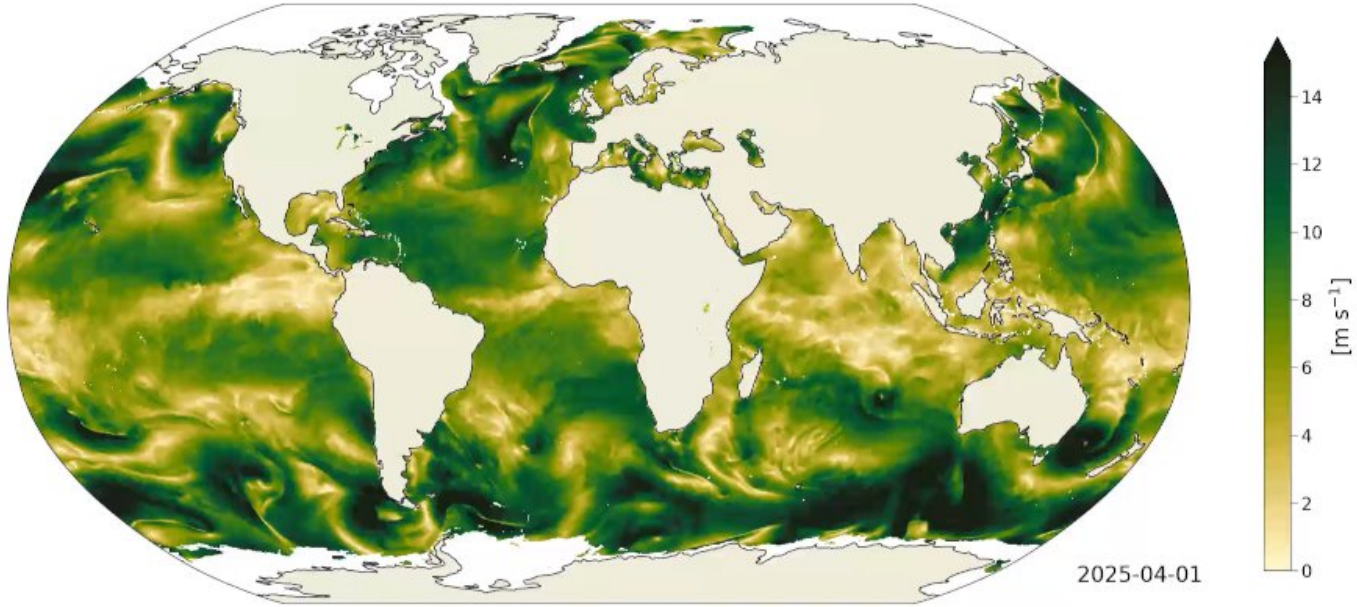
osi-saf.eumetsat.int

Improved ocean surface wind fields are available through the Copernicus Marine Service:

Near real-time hourly wind product [past 2 years]

Multi-year hourly wind product [1994-2025]

Copernicus Marine Service viewer





Thank you!

Questions are welcome.