

DIGITISATION TOWARDS A CIRCULAR **BLUE ECONOMY**

“
Data is acquired and prepared once to be used by many.

“
You can't manage what you can't measure.

Prof. Aldo Drago

Dr Adam Gauci

Ms Audrey Zammit



L-Università ta' Malta
Faculty of Science

Department
of Geosciences
Physical Oceanography
Research Group

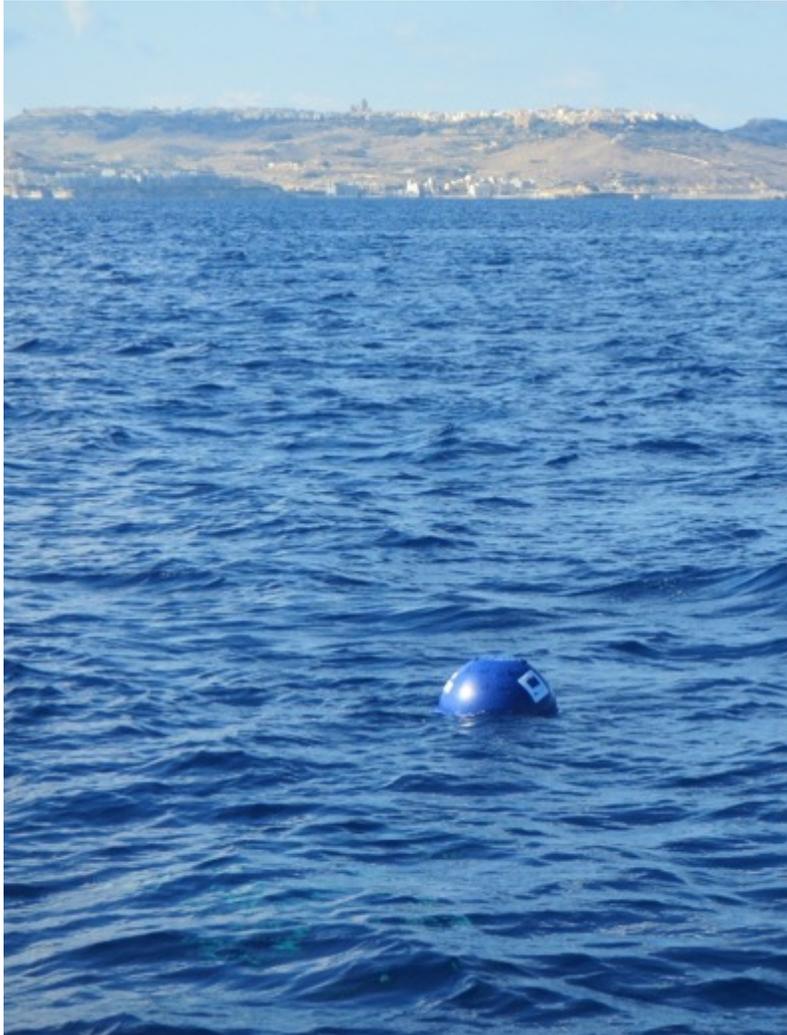


Outline

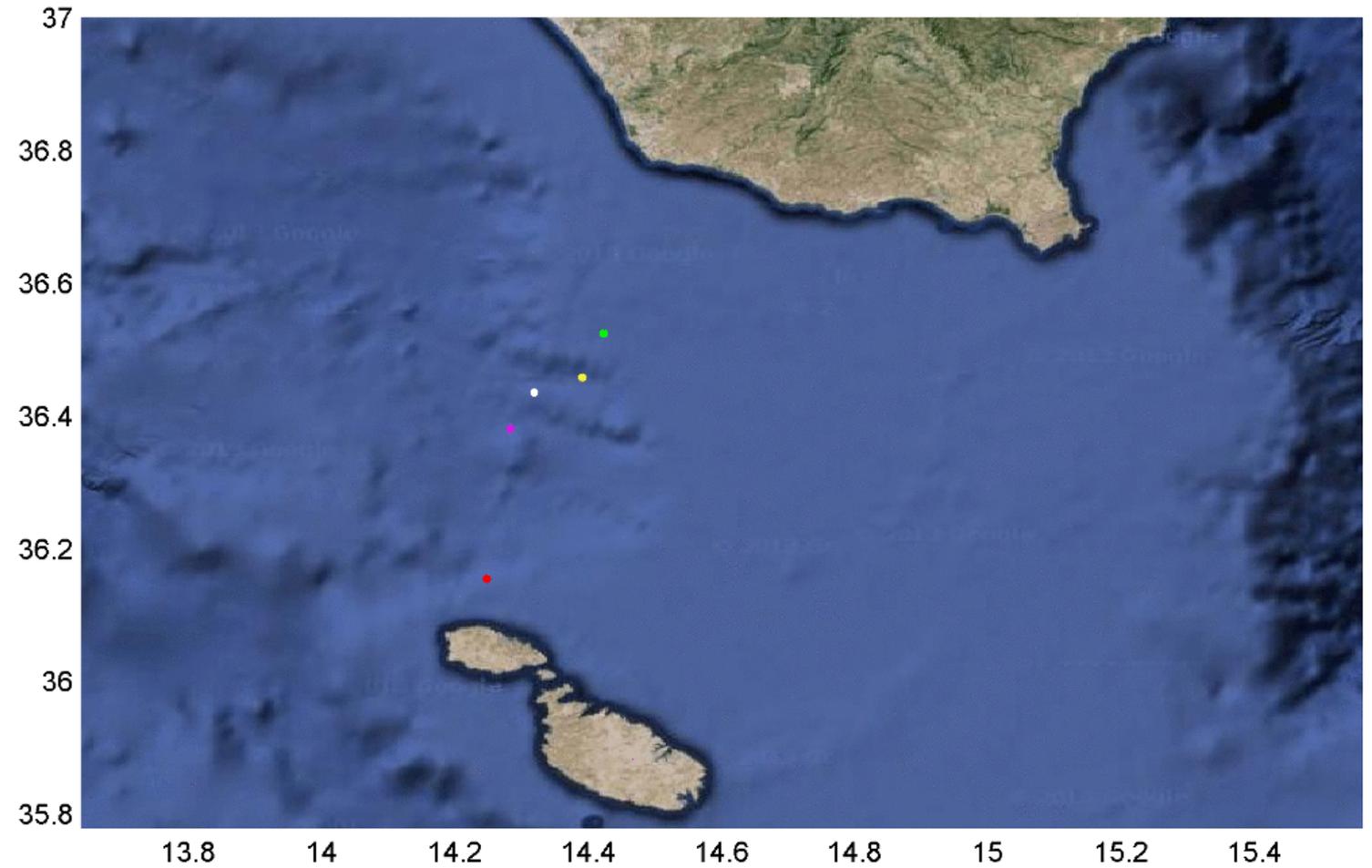
- Data collection
- Research, Applications, and Services
- Data portals

Drifters

Time, Position, Sea Surface Temperature, Battery Level

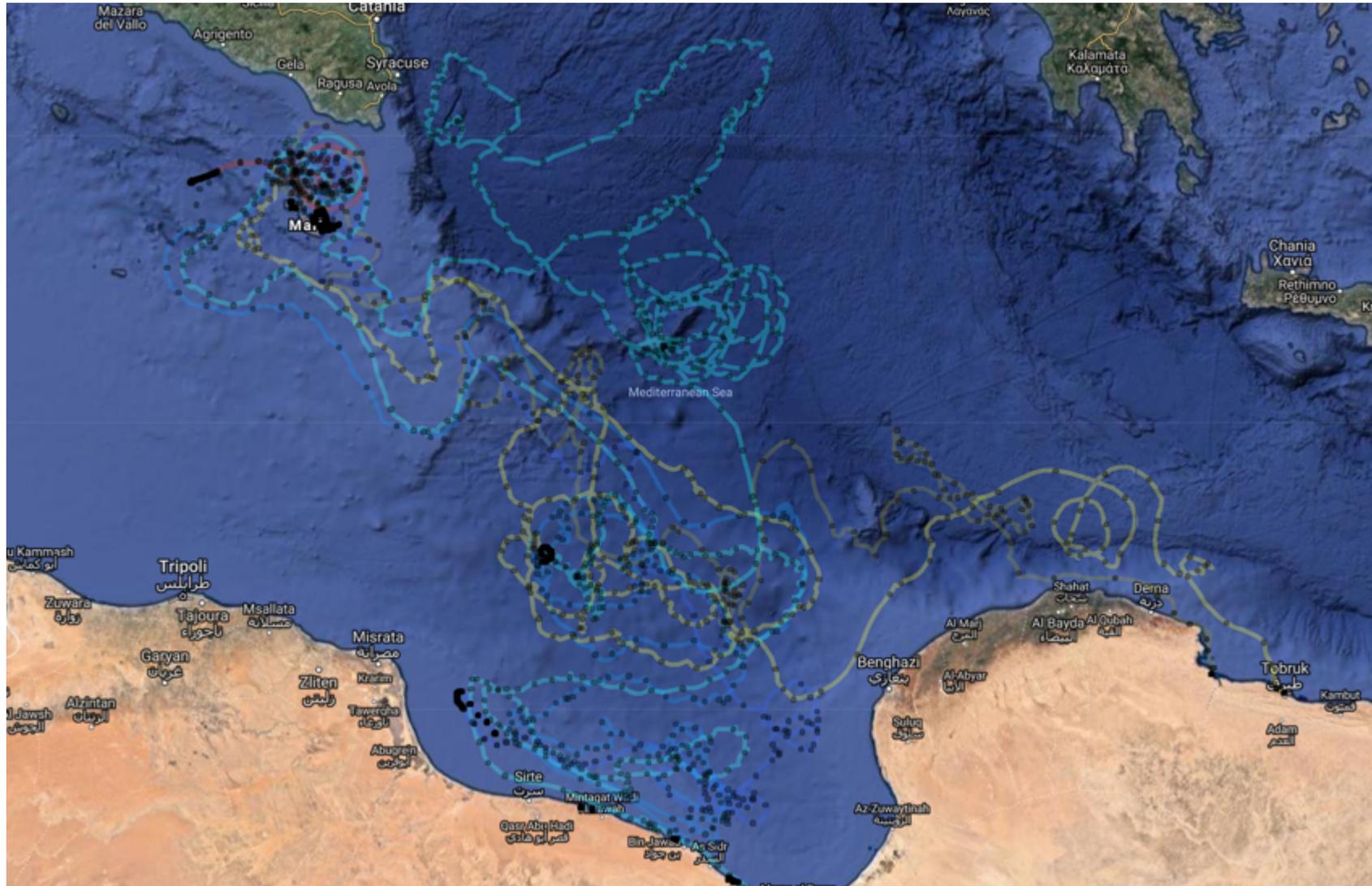


Sea surface currents in the Malta Channel on 2014/03/22 at 10:00 GMT



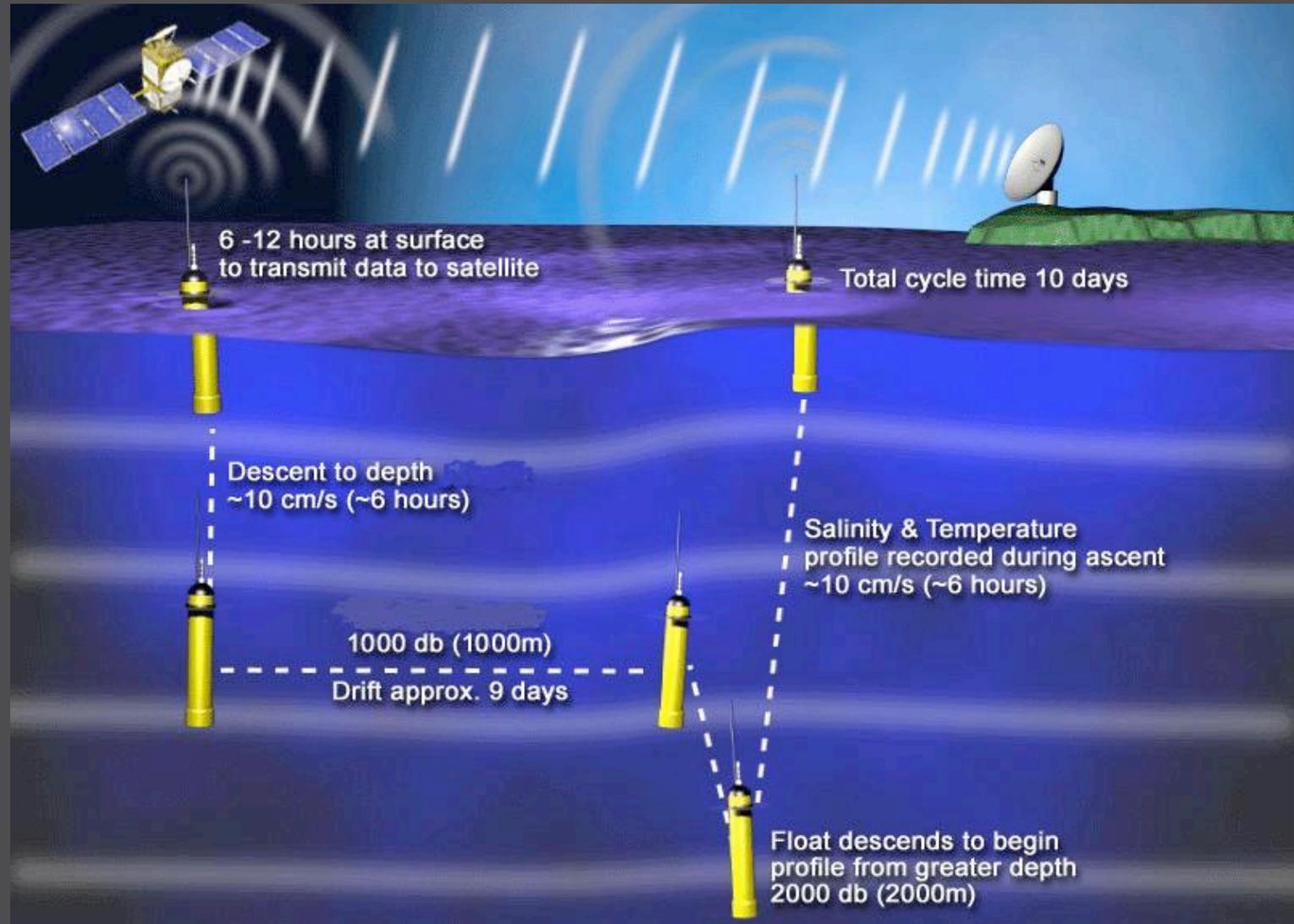
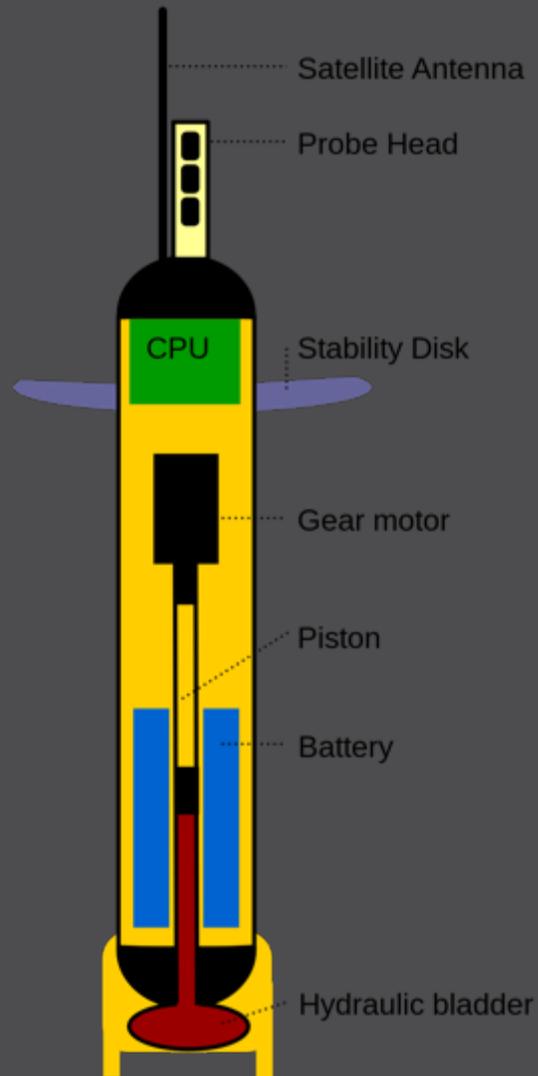
Drifters

Time, Position, Sea Surface Temperature, Battery Level



Floats

CTD across water column



Floats

CTD across water column

Arvor 69010444

14/12/2012 – 22/04/2013



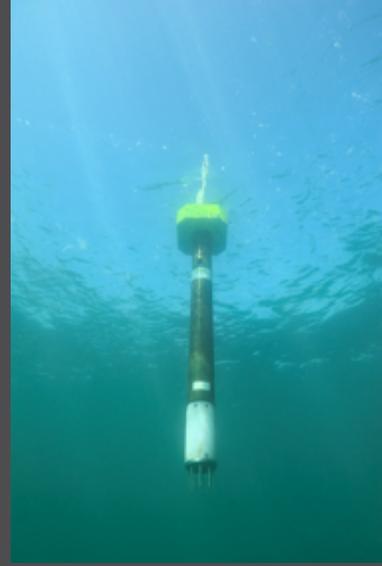
NOVA 6903174

14/12/2015 – 23/08/2016



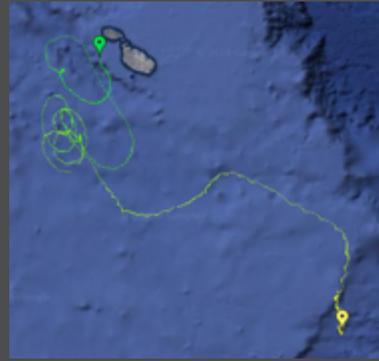
ARVOR-C

25/09/2016 – 06/11/2016



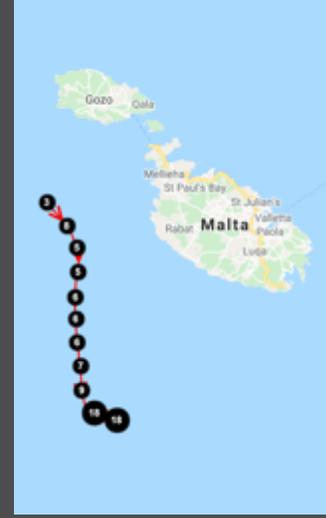
ARVOR-I 6903242

21/08/2018 – 13/12/2018



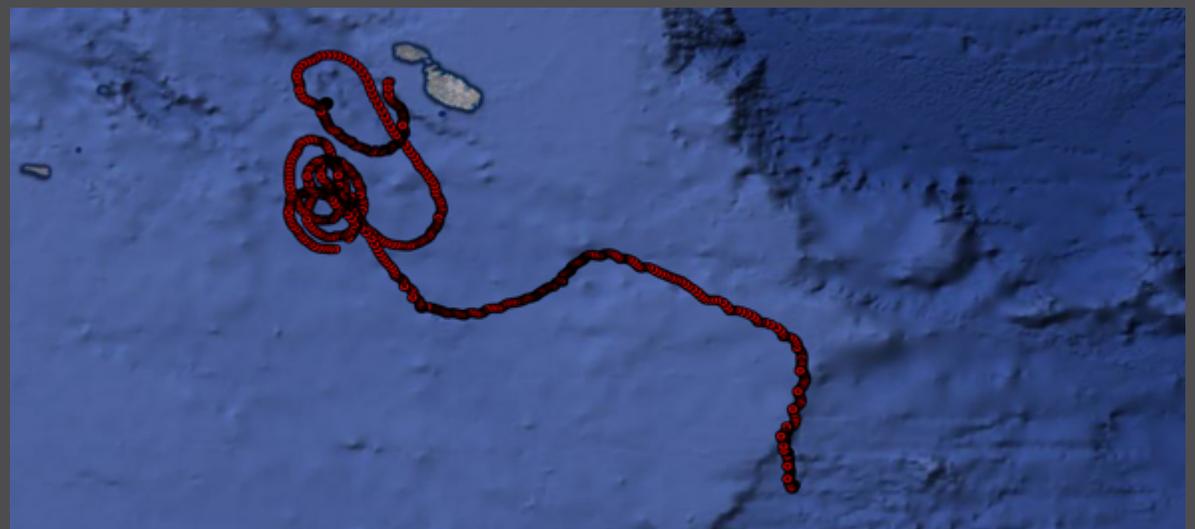
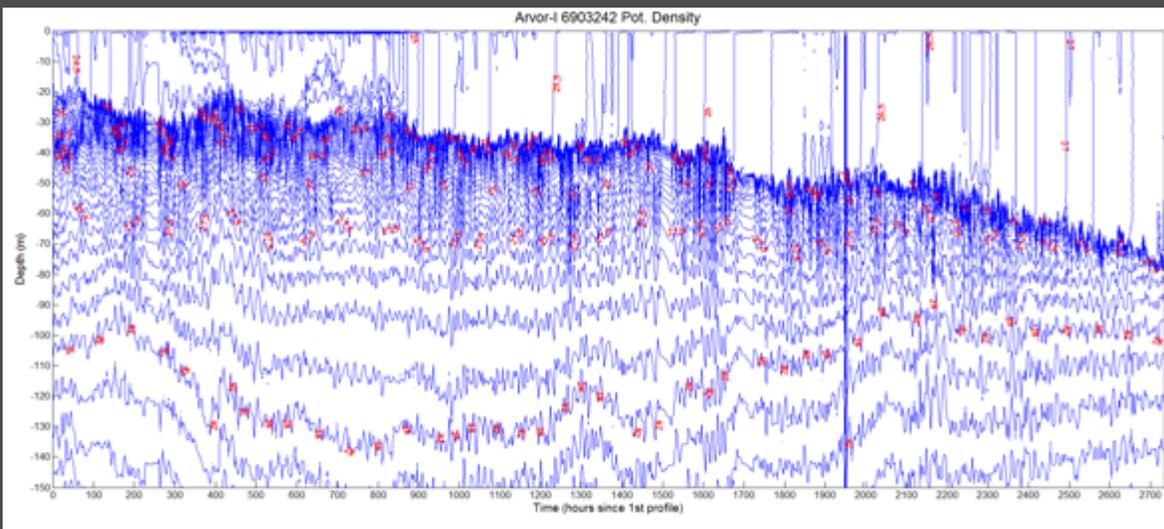
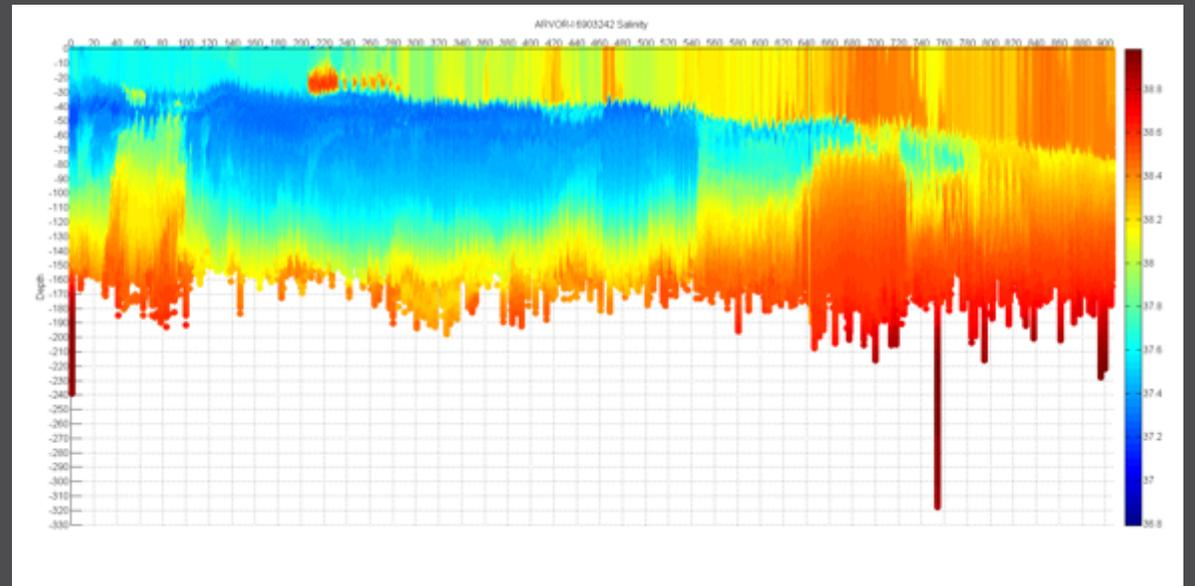
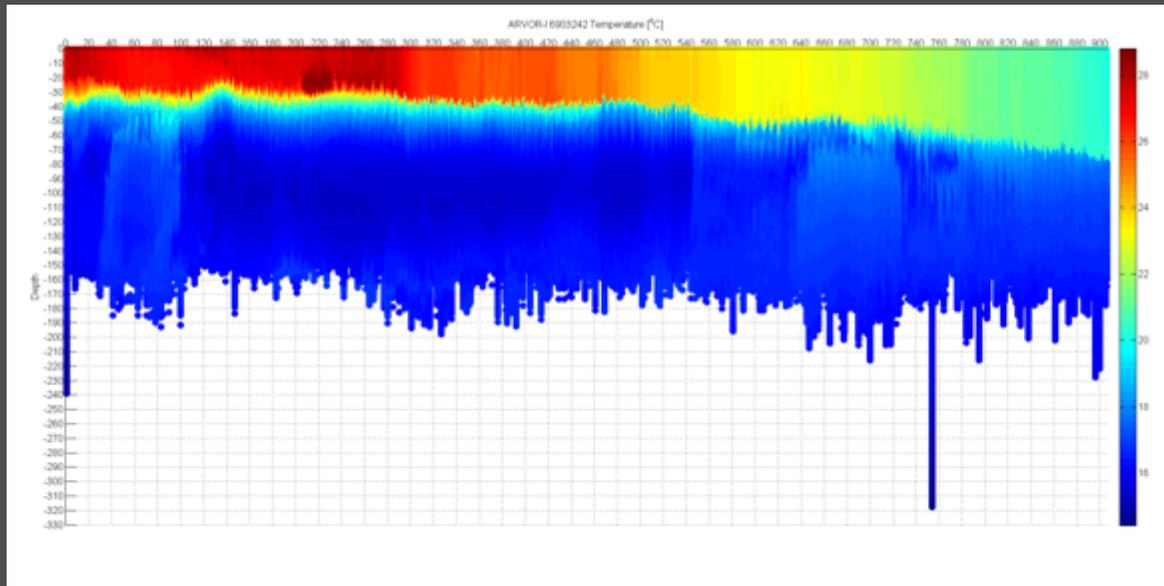
NKE.

24/08/2020



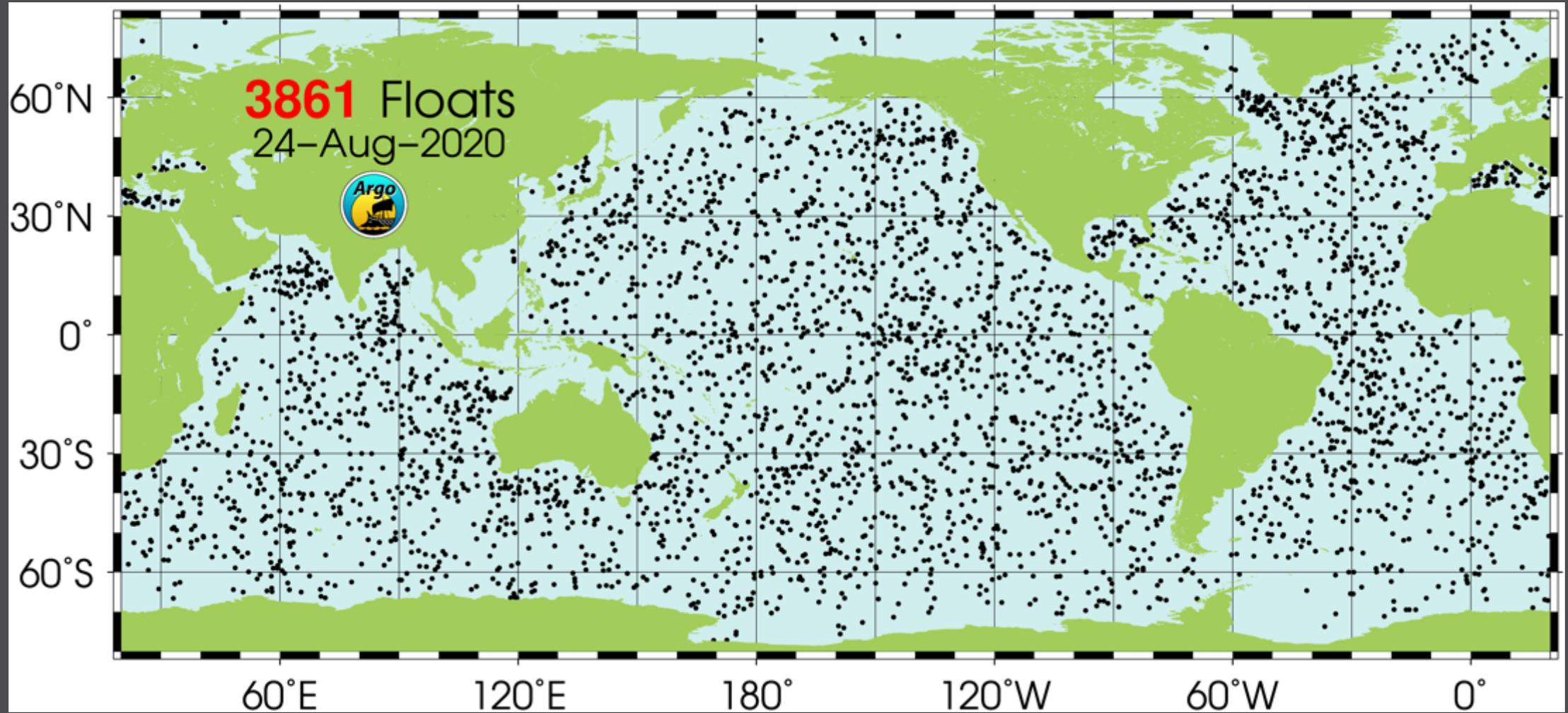
Floats

CTD across water column



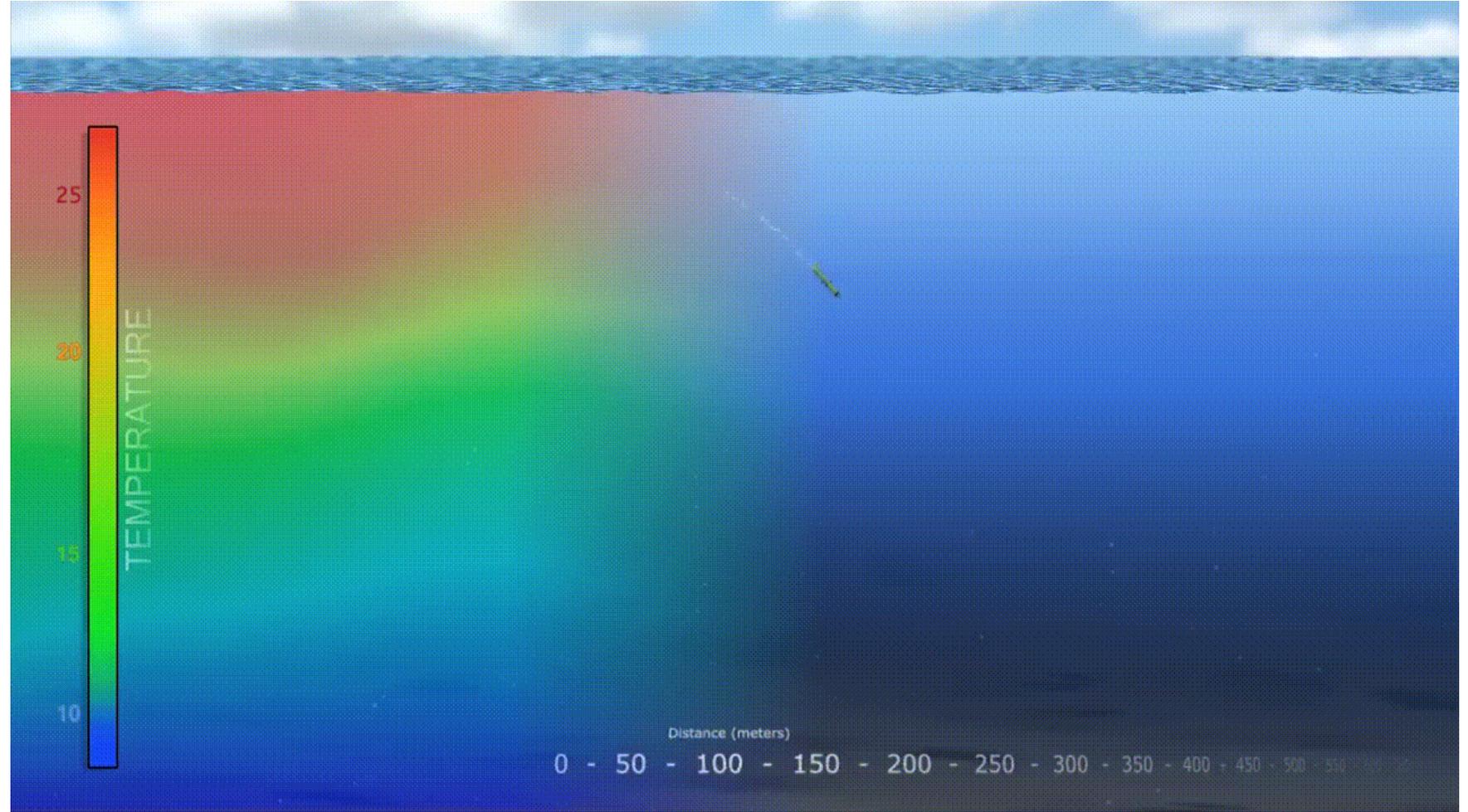
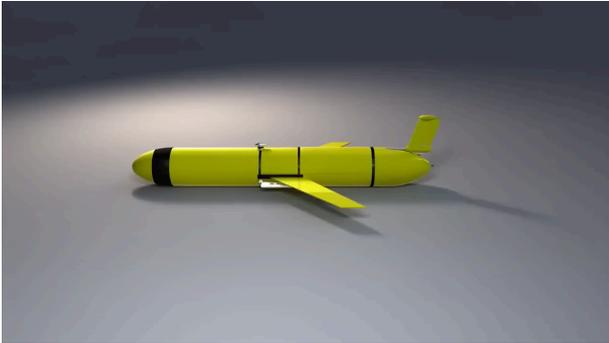
Floats

ARGO – Integrated Global Observation Strategy



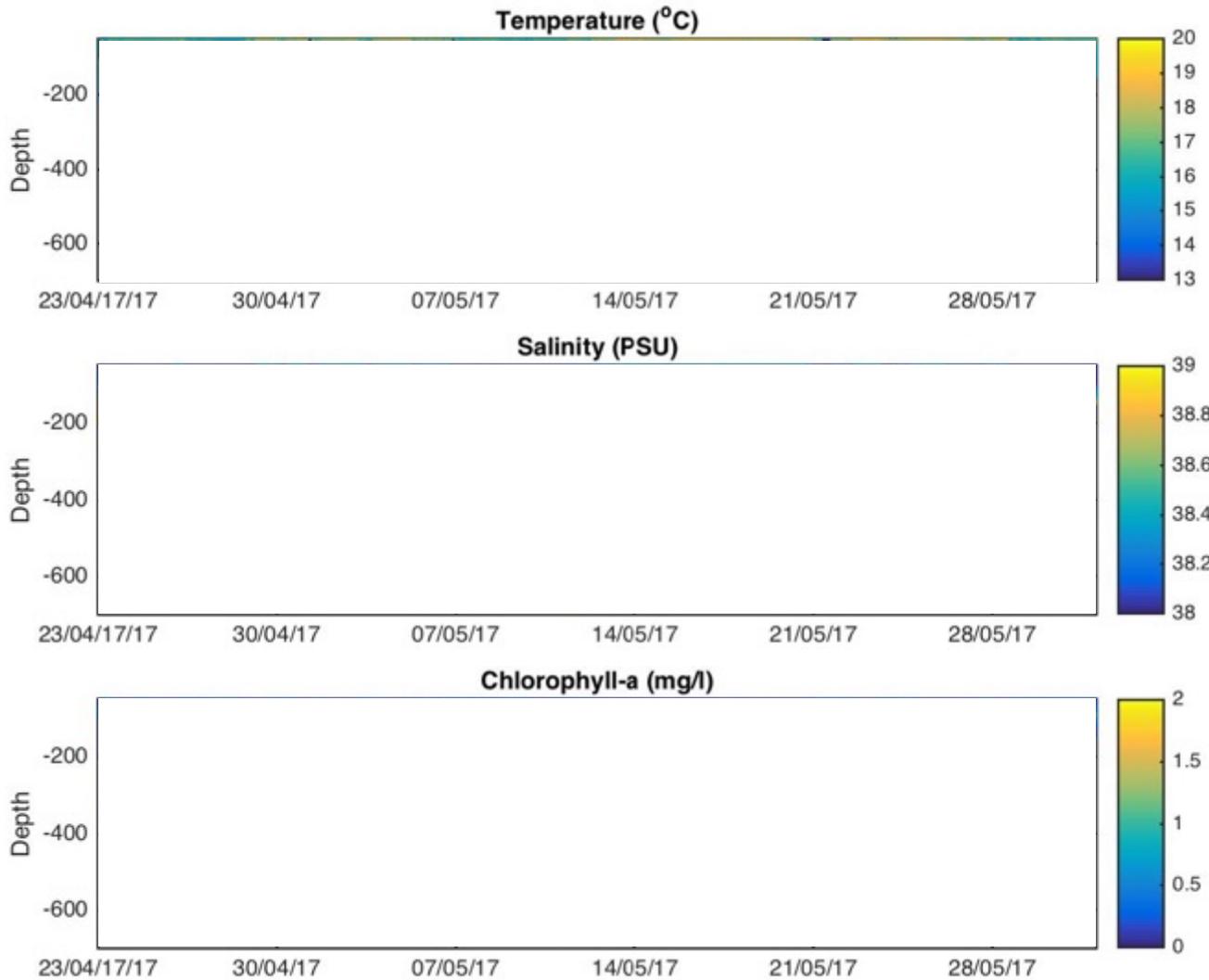
Gliders

data along the water column, high resolution in space and time



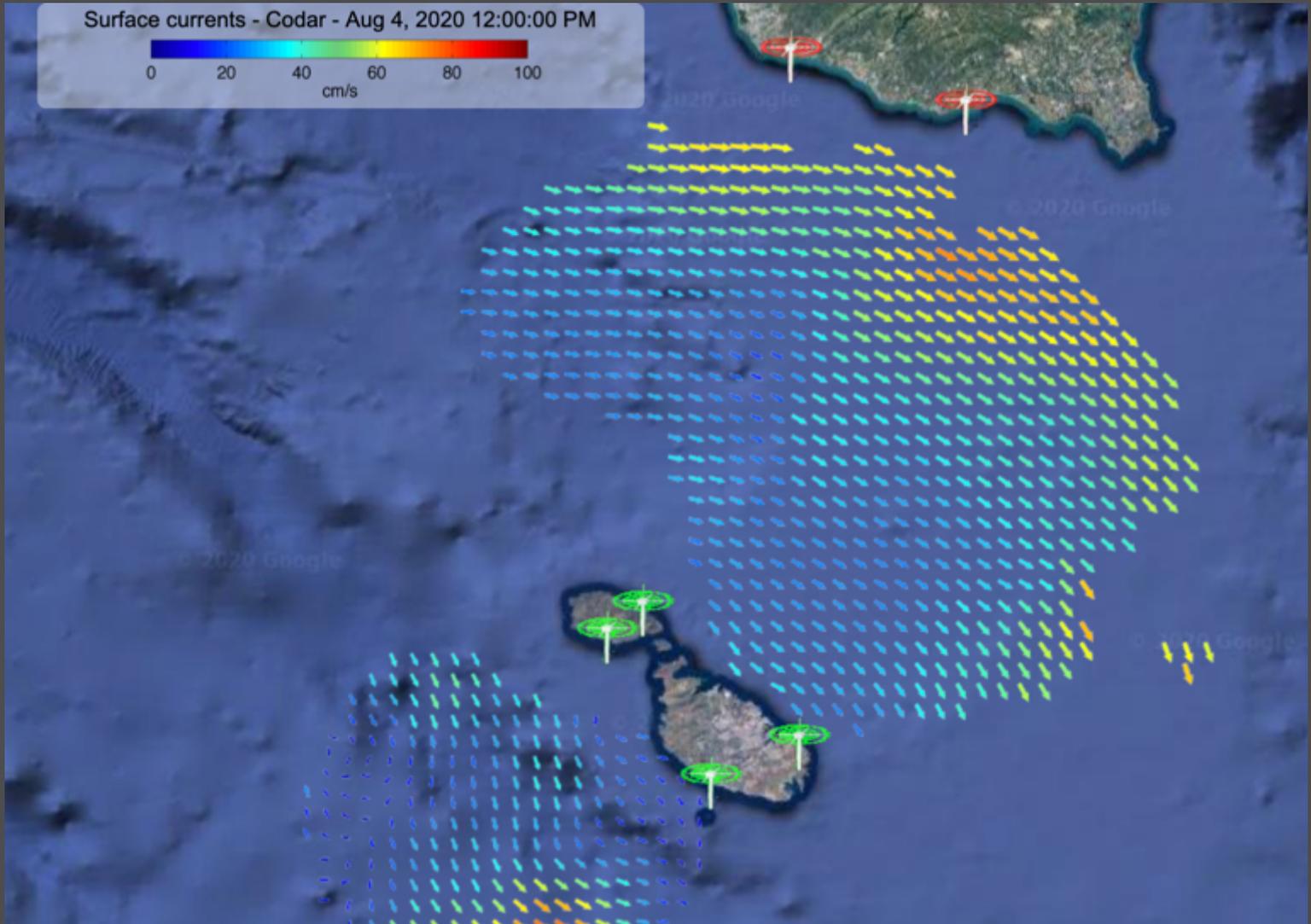
Gliders

CTD across water column



HF Radars

CALYPSO Network



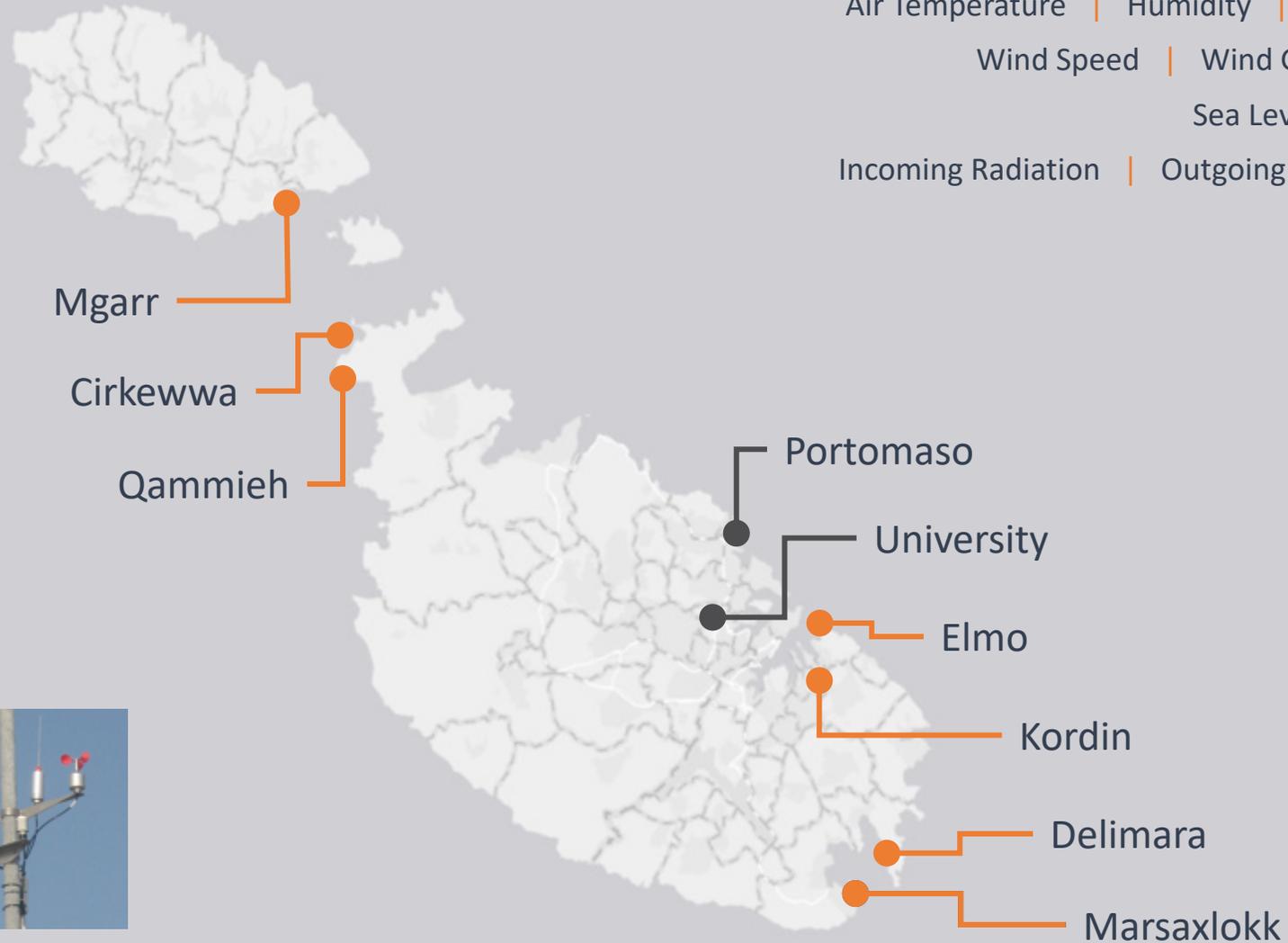


Real-Time Stations

CALYPSO SOUTH Network

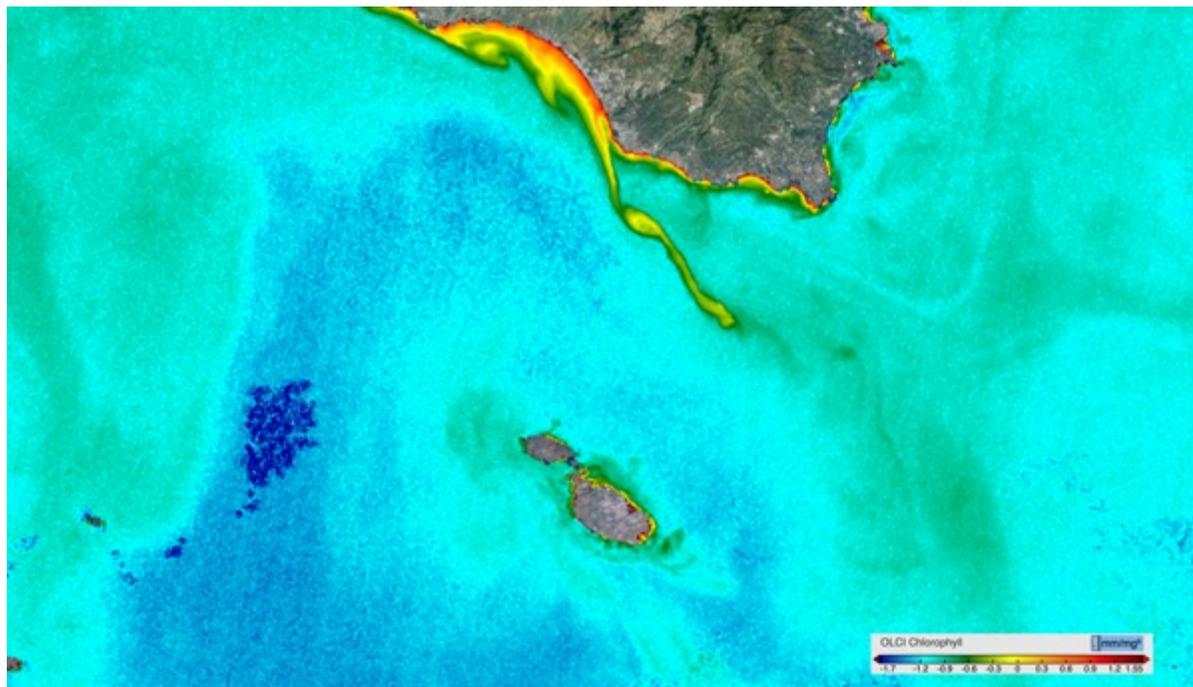


- Air Temperature | Humidity | Atmospheric Pressure
- Wind Speed | Wind Gust | Wind Direction
- Sea Level | Sea Temperature
- Incoming Radiation | Outgoing Radiation | Lightning



WATERCOLOURS

<http://watercolours.capemalta.net/>



Computation of climatology and operational high-resolution Chlorophyll-a and Total Suspended Matter products from satellite data

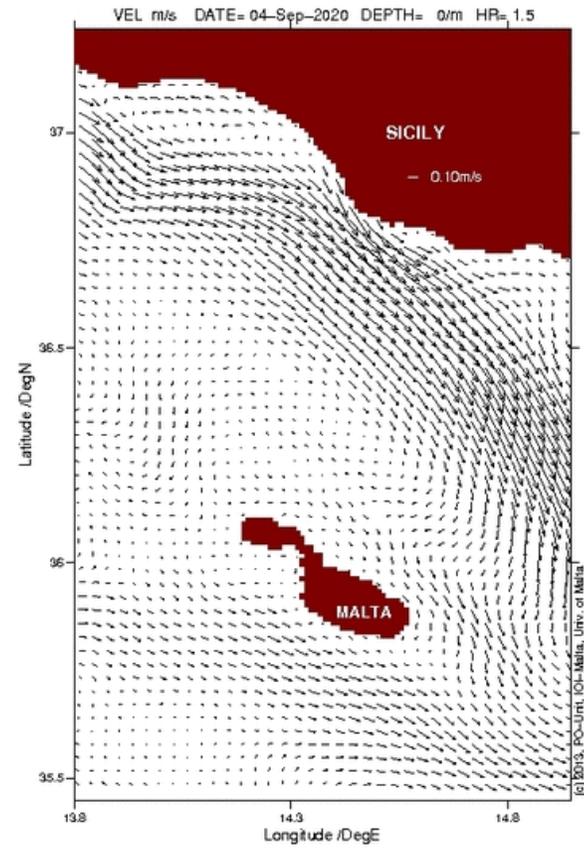
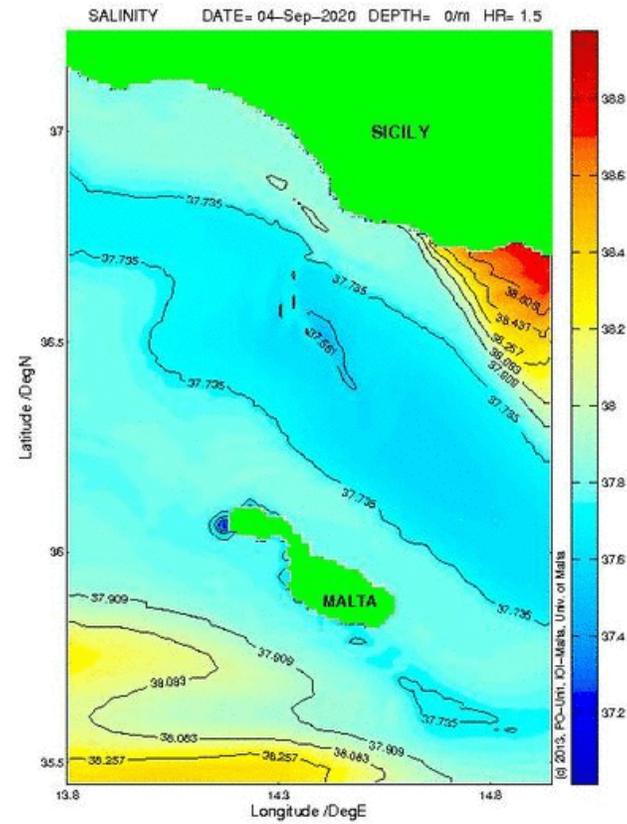
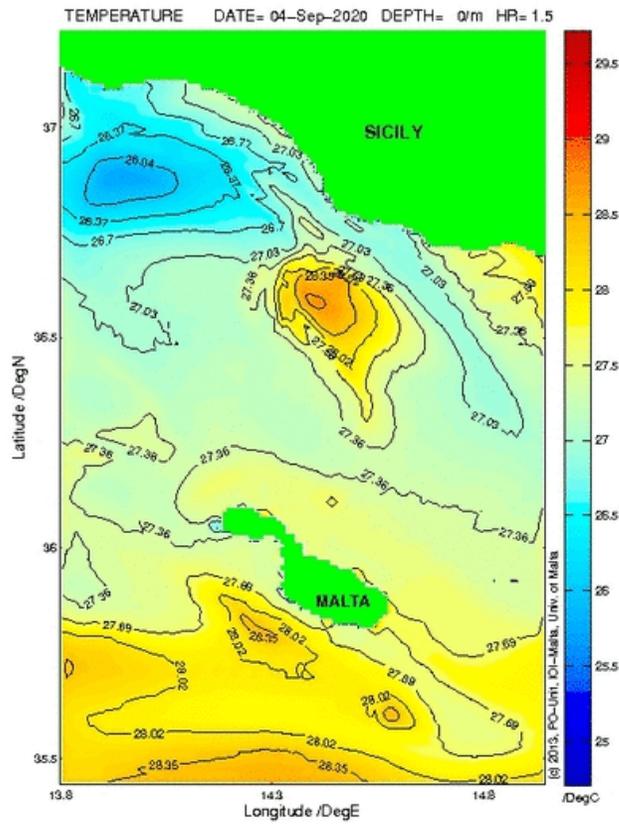


The Malta Council for Science & Technology



Numerical Models

www.capemalta.net



Sea Temperature

Salinity

Currents

Waves

Wind

Precipitation

Blue Economy

Data observation support all sectors of blue economy

						
<p>Marine Conservation and Policies</p> <ul style="list-style-type: none">• Support the implementation of European Directives	<p>Science and Climate</p> <ul style="list-style-type: none">• Information on the environment, climate, and ocean research	<p>Water Quality</p> <ul style="list-style-type: none">• Human wellbeing and sustainable aquaculture	<p>Coastal Monitoring</p> <ul style="list-style-type: none">• <i>In-situ</i> data and models to manage and monitor coastal areas	<p>Marine navigation</p> <ul style="list-style-type: none">• Safer and more ecological marine navigation	<p>Safety and Disaster</p> <ul style="list-style-type: none">• Safety at sea and pollution response by providing drift forecasts	<p>Natural Resources and Energy Sector</p> <ul style="list-style-type: none">• Oil and gas and marine renewable energy sectors

Blue Economy

Users

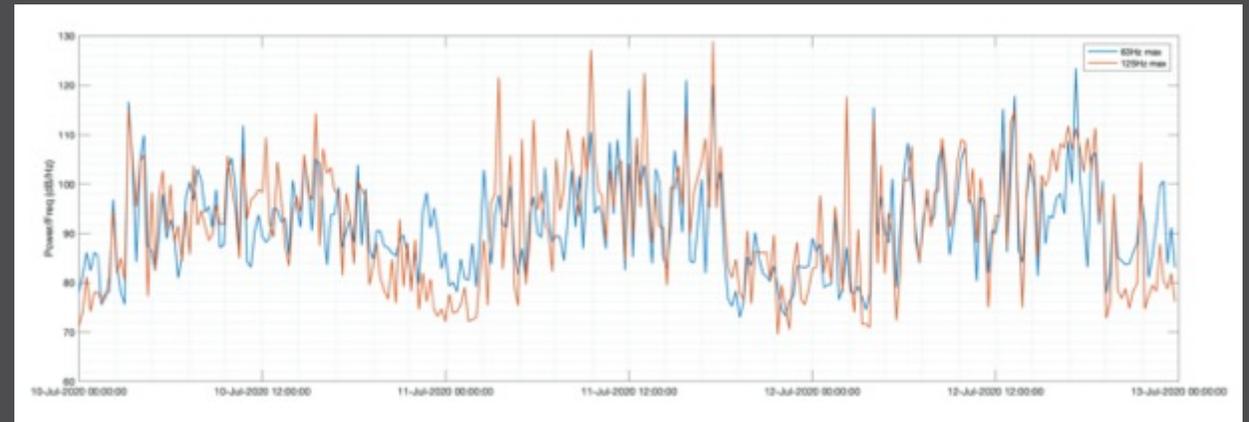
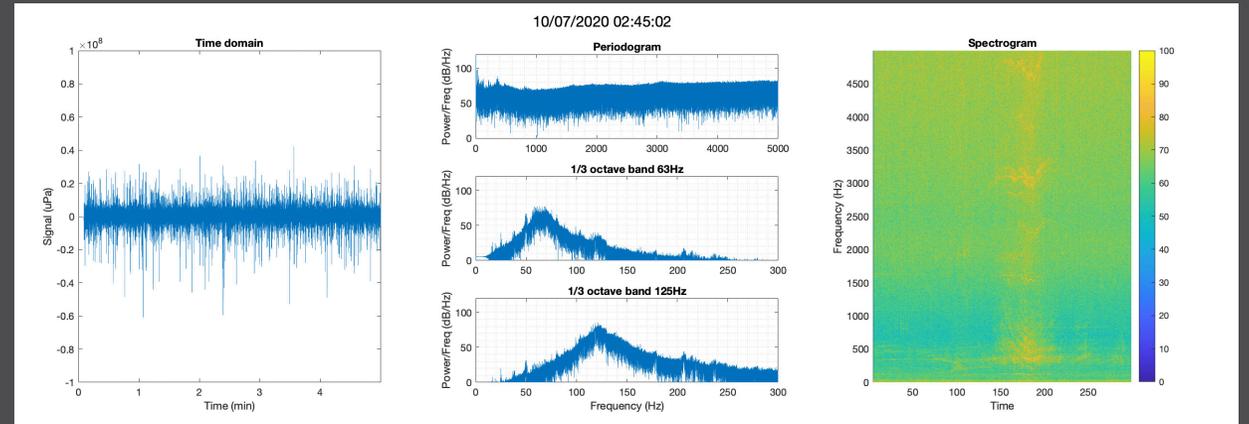




Research, Applications, and Services

Underwater Noise

HARMONY Project



Marine Pollution

Macro and Micro Plastics



ANDROMEDA



Floating litter



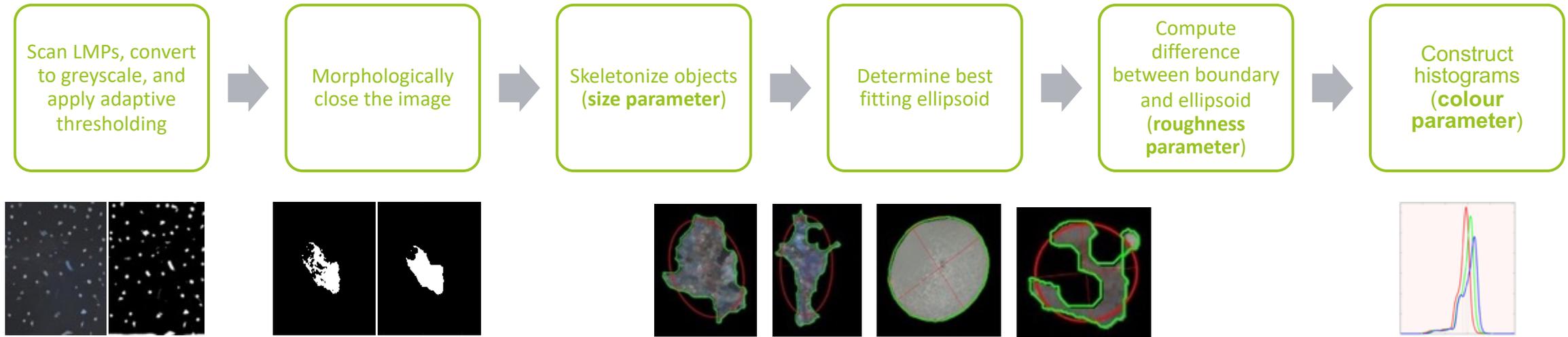
Seafloor litter



Microplastics

Marine Pollution

Micro Plastics



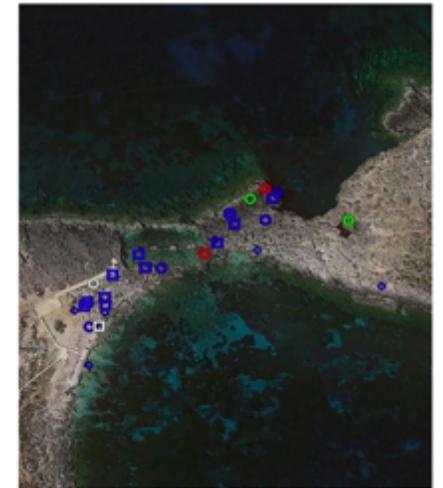
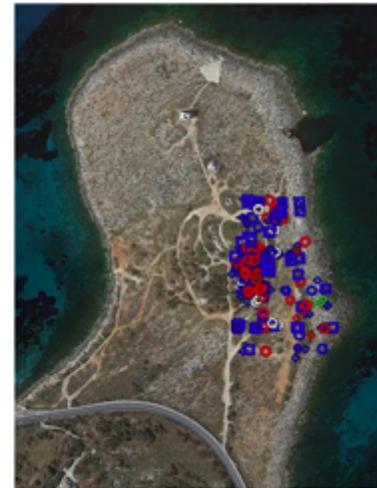
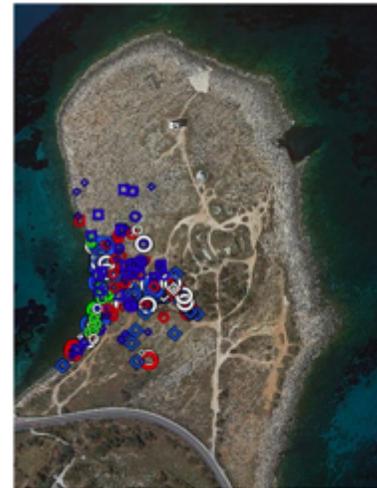
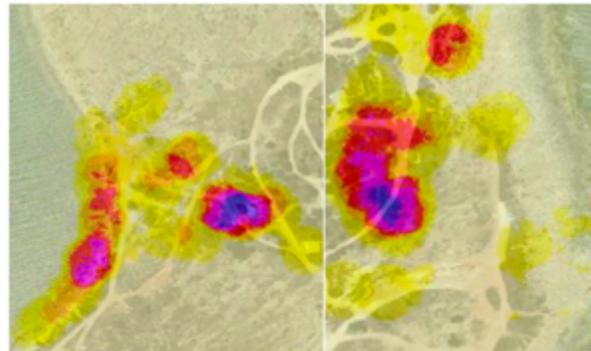
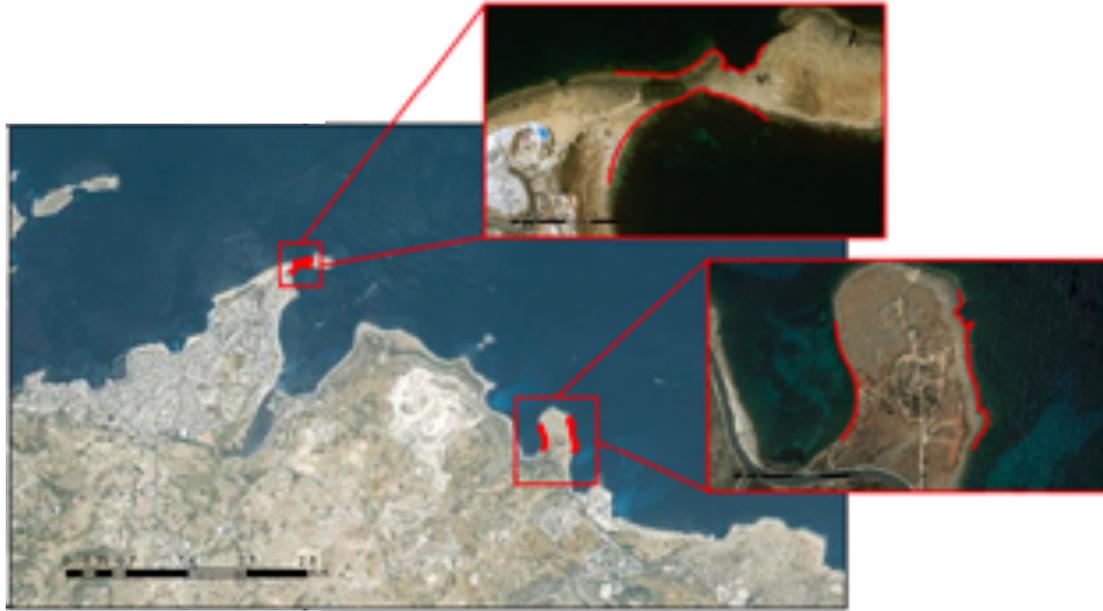
Auto classification of:

- Size
- Roughness
- Colour



Marine Pollution

Micro Plastics



Marine Pollution

Macro and Micro Plastics



Jellyfish Classification

Spot The Jellyfish Campaign

SPOT THE JELLYFISH

An **IOE-KIDS** initiative supported by the Victims' Youth and the Sea Programme of the International Criminal Tribunal

Get involved this summer
Learn about jellyfish and tell us their whereabouts!

Reporting a Jellyfish Sighting

WHEN the jellyfish were sighted (time and AM or PM)
WHICH species of jellyfish were sighted (refer to jellyfish cards)
WHERE the jellyfish were sighted (select area from map)
QUANTITY of jellyfish (approximate number in the area)
* Where possible send / attach a photo of the jellyfish

Sending a Report

Leaflet Simply fill in this form, put a stamp on it and drop it into a post box

Website Visit www.ioekids.net/jellyfish to fill a quick and easy online form

SMS / Email Send your report as an SMS on 78 222 278 OR as an email to ioi-moo@um.edu.mt

Jellyfish Advice

What to do if stung?

- Soak or rinse the area in sea water. DO NOT use hot water as the release heat.
- Apply alcohol to the area.
- DO NOT rub the area.
- DO NOT apply ice or hot water!
- Remove tentacles with a stick, card, or a pair of tweezers.
- Seek immediate medical aid if you have already had a reaction, or you are in the sea.

How to avoid being stung?

- Wear protective clothing.
- Avoid picking up dead jellyfish.

Project Organisers: IOE-KIDS, The IOE - Malta's Operational Centre (Ministry of Health)

Sponsors: MALTA, Friends of the Earth Malta, NTM

IOE-KIDS is a website dedicated to the sea for school children and caregivers, offering a virtual and interactive learning experience. Regularly updated and user-friendly, it provides a safe and secure environment for the use of online games, informative articles and additional publications. IOE-KIDS provides a resource library to assist in the use of ICT technology in schools and homes to enhance their learning and exploration on the sea with their teachers.

Filling the Leaflet

Step 1) Write the date and time of day when the jellyfish were seen
Step 2) Fill the 2 white boxes on the card of the jellyfish spotted, telling us approximately how many jellyfish you saw and the area in which they were seen (see map below for the area reference number)

Date of sighting: / / Time of sighting:

Pelagia Area: <input type="text"/> Sighting: <input type="text"/>	Velella Area: <input type="text"/> Sighting: <input type="text"/>	Cotylofove Area: <input type="text"/> Sighting: <input type="text"/>	Physalia Area: <input type="text"/> Sighting: <input type="text"/>
Cestropus Area: <input type="text"/> Sighting: <input type="text"/>	Allopatia Area: <input type="text"/> Sighting: <input type="text"/>	Mnemiopsis Area: <input type="text"/> Sighting: <input type="text"/>	Physalia Area: <input type="text"/> Sighting: <input type="text"/>

Thanks for your help!

1) Bank
 2) Western Lido Beach
 3) Banks on land
 4) Shaded
 5) Shaded
 6) Shaded
 7) Shaded

8) Shaded
 9) Shaded
 10) Shaded
 11) Shaded
 12) Shaded
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 100) Shaded

~ Jellyfish Report Map ~

Thanks to all the Jellyfish reports we've received, you may now track reported jellyfish movements yourself. Click on the circles to see a breakdown of reports.

Satellite

Year

- 2019
- 2018
- 2017
- 2016
- 2015
- 2014
- 2013
- 2012
- 2011
- 2010





Data Portals

The EMODnet Ingestion services will serve all EMODnet thematic portals for streamlining incoming data sets



ACCESS THEMATIC PORTALS

DATA INGESTION PORTAL

The EMODnet Data Ingestion portal seeks to identify and to reach out to other potential providers in order to make their data sets also part of the total offer. It aims at...

[READ MORE](#)

BATHYMETRY

Data on bathymetry (water depth), coastlines, and geographical location of underwater features: wrecks.

[USE CASES](#) [INFO](#) [ACCESS](#)

GEOLOGY

Data on seabed substrate, sea-floor geology, coasts/behaviour, geological events, and minerals.

[USE CASES](#) [INFO](#) [ACCESS](#)

SEABED HABITATS

Data on modelled seabed habitats based on seabed substrate, energy, biological zone, and salinity.

[USE CASES](#) [INFO](#) [ACCESS](#)

CHEMISTRY

Data on the concentration of nutrients, organic matter, pesticides, heavy metals, radionuclides and antifoulants in water, sediment and biota.

[USE CASES](#) [INFO](#) [ACCESS](#)

BIOLOGY

Data on temporal and spatial distribution of species abundance and biomass from several taxa.

[USE CASES](#) [INFO](#) [ACCESS](#)

ACCESS THEMATIC PORTALS

EMODnet

<https://www.emodnet.eu>

EMODnet Data Ingestion

WAKE UP YOUR DATA

Set them free for Blue Society

The **Data Ingestion Portal** facilitates submitting marine datasets for further processing, Open Data publishing and contributing to applications for society.

emodnet-ingestion.eu



COPERNICUS MARINE ENVIRONMENT MONITORING SERVICE (CMEMS)

- Integrated Service
- Open and Free
- Single Catalogue of Products
- Reliable
- Sustainable





ABOUT US

MARKETS &
BENEFITS

NEWS

SCIENCE &
MONITORING

TRAINING &
EDUCATION

SERVICES
PORTFOLIO

ACCESS YOUR OCEAN INFORMATION

GETTING STARTED →

OCEAN PRODUCTS

Ocean product catalogue, to download or visualize data across more than 10 variables, including historic, current and forecasted data.

DATA



OCEAN MONITORING INDICATORS

Essential variables monitoring the health of the ocean

TRENDS



OCEAN STATE REPORT

Extensive annual analysis on the state of the ocean over nearly 20 years and severe/notable annual events

EXPERTISE



SHORT-CUT TO SERVICES



REGISTER
NOW!



SCIENTIFIC
QUALITY



ONLINE
TUTORIALS



COLLABORATIVE
FORUM



2018
06
JUL.

LATEST NEWS FLASH

CMEMS:8131

WAVE_GLO_WAV_L3_SWH_NRT
product upgraded on 2018-07-06

INFORMATION

ALL NEWS FLASH



04
Issue 4, 2020

OCEAN STATE REPORT SUMMARY



SEA LEVEL

UNITS: MM/YEAR
TREND FROM 1993-2018

Global Ocean
↑ +3.3
±0.4 MM/YEAR

Mediterranean Sea ↑ +2.5 ±2.2 MM/YEAR	Black Sea ↑ +2.2 ±2.2 MM/YEAR	North West Shelf ↑ +2.7 ±2.0 MM/YEAR	Baltic Sea ↑ +3.9 ±2.2 MM/YEAR
Iberian Biscay Ireland Seas ↑ +3.3 ±2.0 MM/YEAR	Western Pacific Islands ↑ +4.8 ±2.5 MM/YEAR	Central Pacific Islands ↑ +3.1 ±2.5 MM/YEAR	Pacific Islands Total Area ↑ +3.5 ±2.5 MM/YEAR

Ocean and Water Contributions to: WMO State of the Climate 2019

SEA SURFACE TEMPERATURE

UNITS: DEGREES CELSIUS/YEAR
TREND FROM 1993-2018

Global Ocean
↑ +0.014
±0.001 °C/YEAR

Mediterranean Sea ↑ +0.037 ±0.002 °C/YEAR	Black Sea ↑ +0.07 ±0.006 °C/YEAR	Baltic Sea ↑ +0.031 ±0.003 °C/YEAR
Western Pacific Islands ↑ +0.02 ±0.01 °C/YEAR	Central Pacific Islands ↑ +0.01 ±0.02 °C/YEAR	Pacific Islands Total Area ↑ +0.02 ±0.01 °C/YEAR

Temperature and Energy

CHLOROPHYLL-A

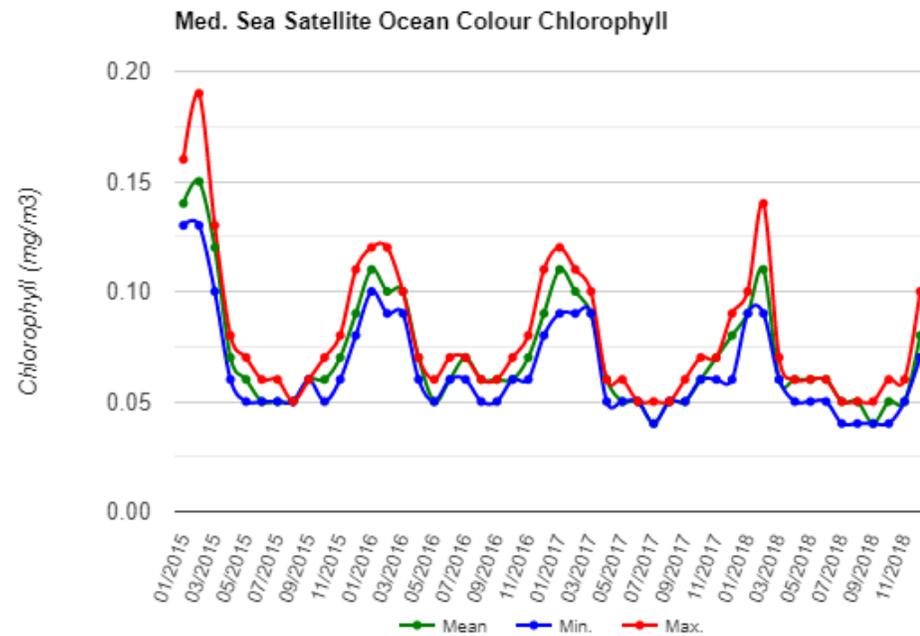
UNITS: %/YEAR

Mediterranean Sea TREND FROM 1997-2019 ↑ +0.21 ±0.87 %/YEAR	Black Sea TREND FROM 1997-2019 ↓ -1.33 ±1.01 %/YEAR	Baltic Sea TREND FROM 1997-2019 ↑ +0.85 ±0.68 %/YEAR	Arctic Ocean TREND FROM 1997-2019 ↑ +0.71 ±0.16 %/YEAR
North Atlantic Ocean TREND FROM 1997-2019 ↑ +0.17 ±0.01 %/YEAR	Western Pacific Islands TREND FROM 1997-2018 ↓ -0.82 ±0.01 %/YEAR	Central Pacific Islands TREND FROM 1997-2018 ↓ -0.80 ±0.002 %/YEAR	Pacific Islands Total Area TREND FROM 1997-2018 ↓ -0.70 ±0.001 %/YEAR

Malta CMEMS Service Platform

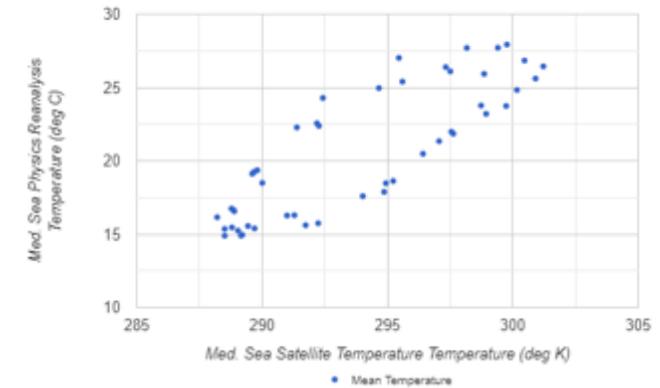
www.capemalta.net

Data Visualisation and Download

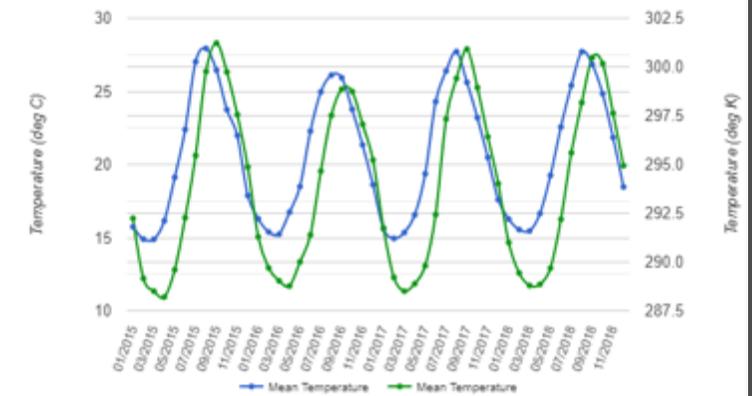


[Download Med. Sea Satellite Ocean Colour Chlorophyll statistics as CSV.](#)

Med. Sea Physics Reanalysis Temperature vs. Med. Sea Satellite Temperature

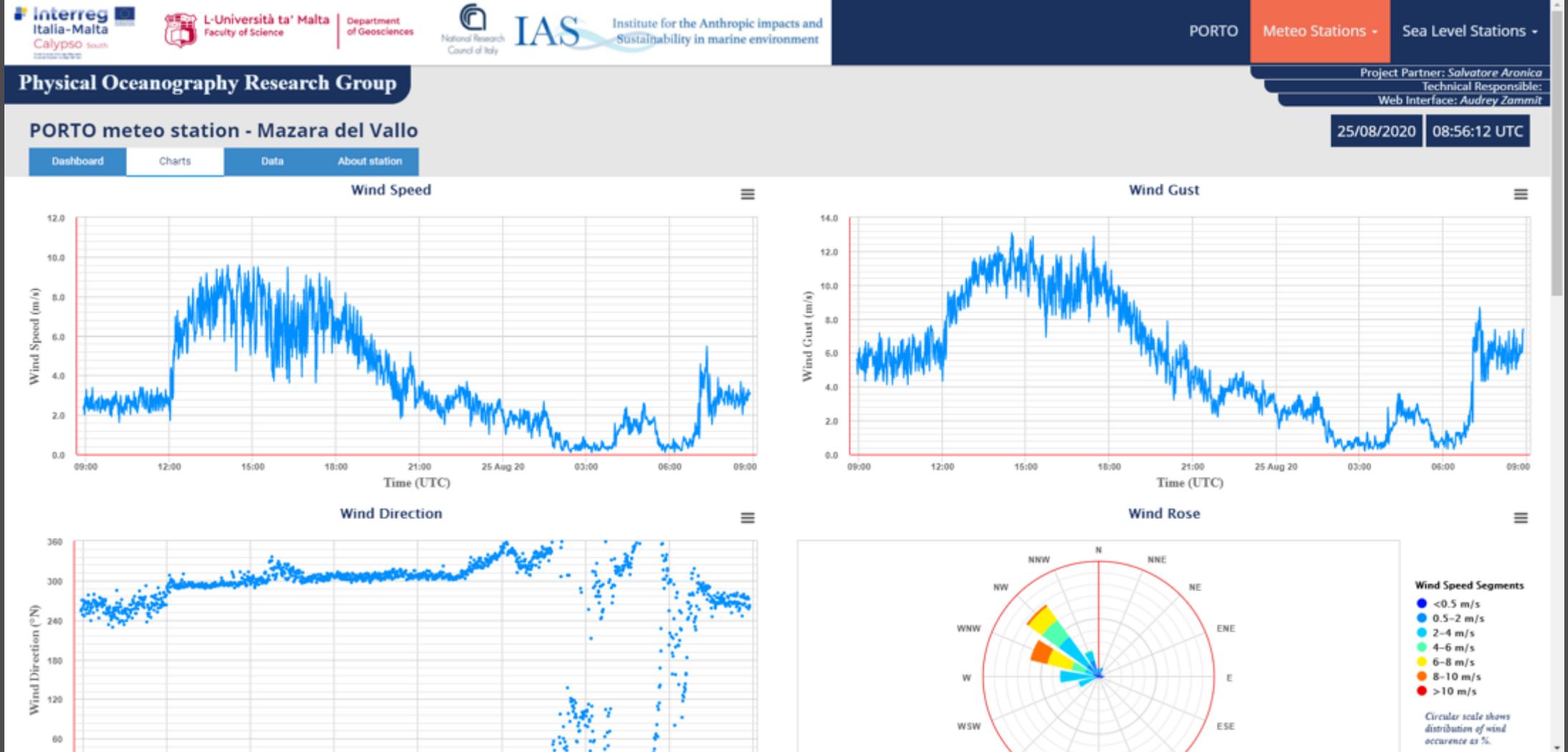


Comparison of Med. Sea Physics Reanalysis Temperature and Med. Sea Satellite Temperature



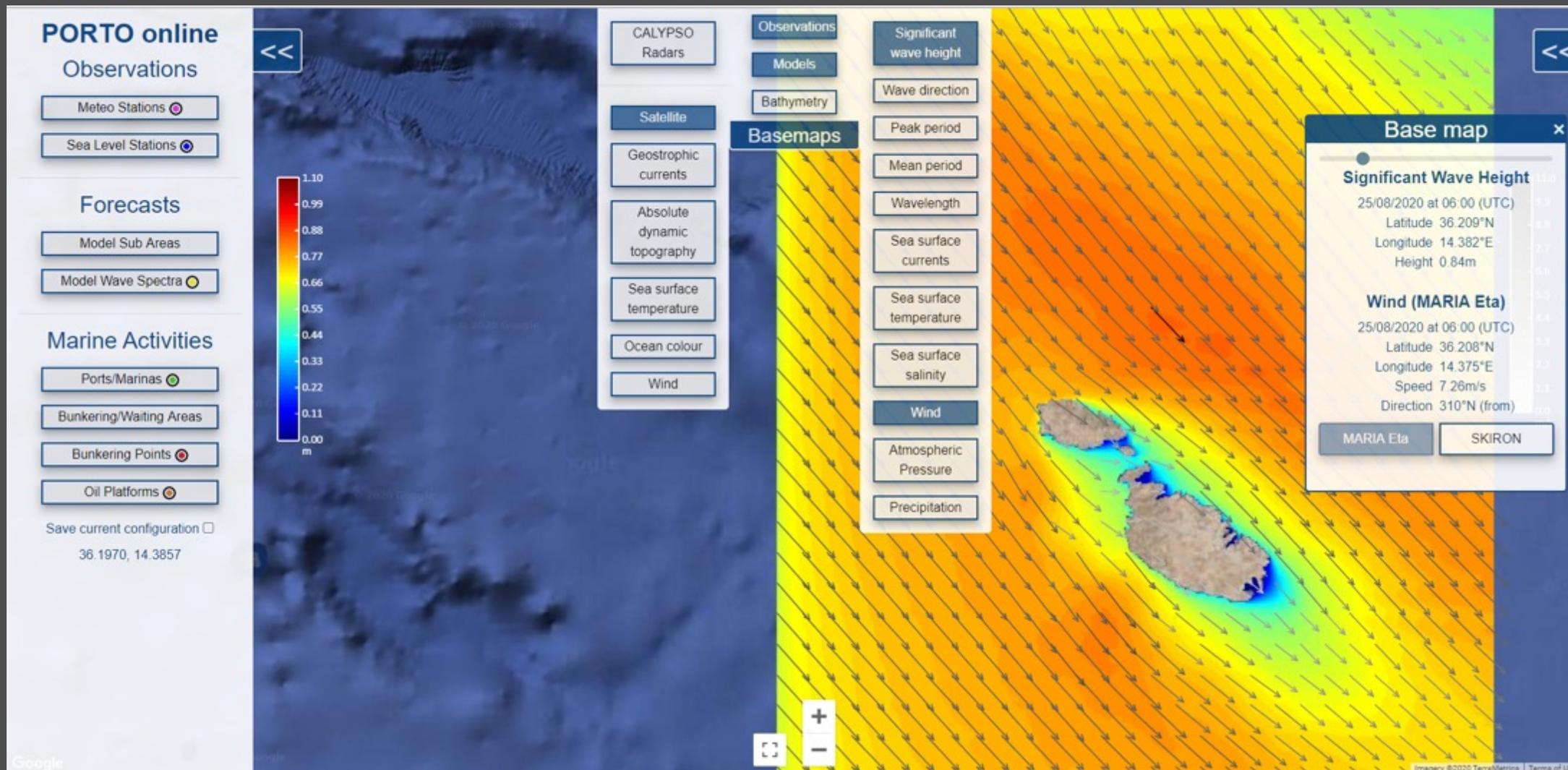
Realtime Stations Interface

www.capemalta.net



PORTO

www.calypsosouth.eu





Thank You