Overview of international wave measurement observatories

Wave buoys in Portugal

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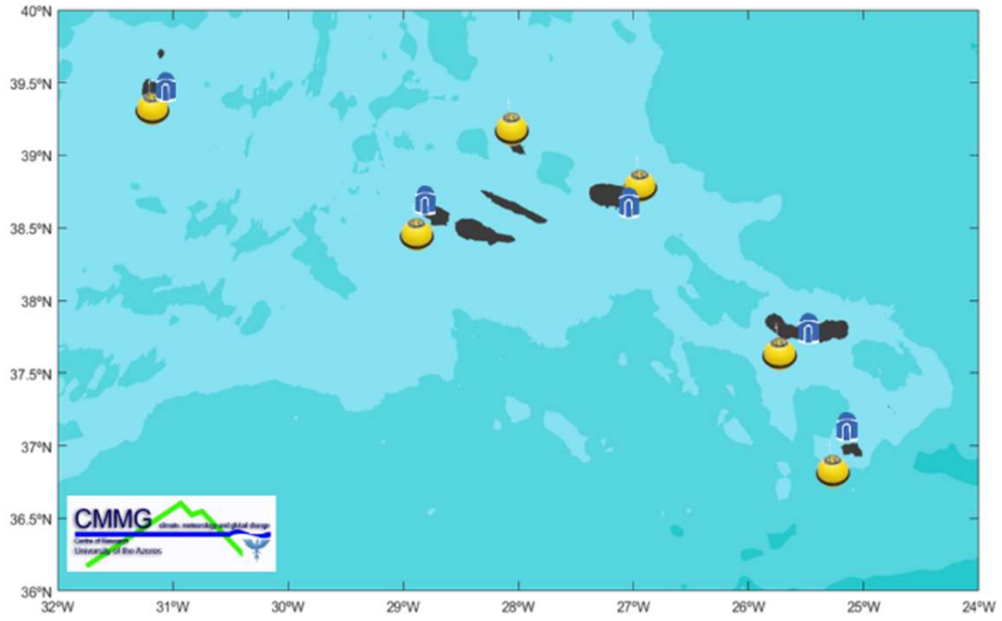
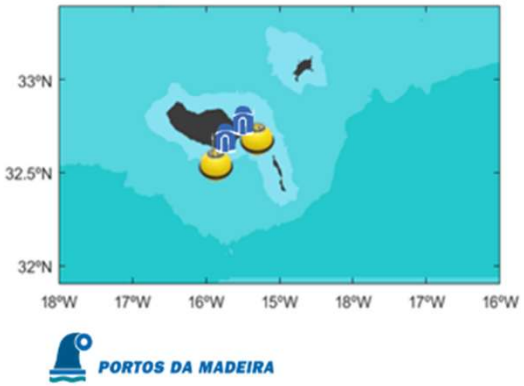
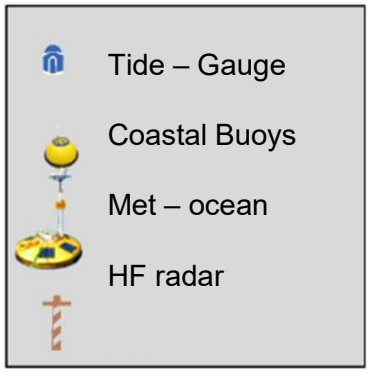
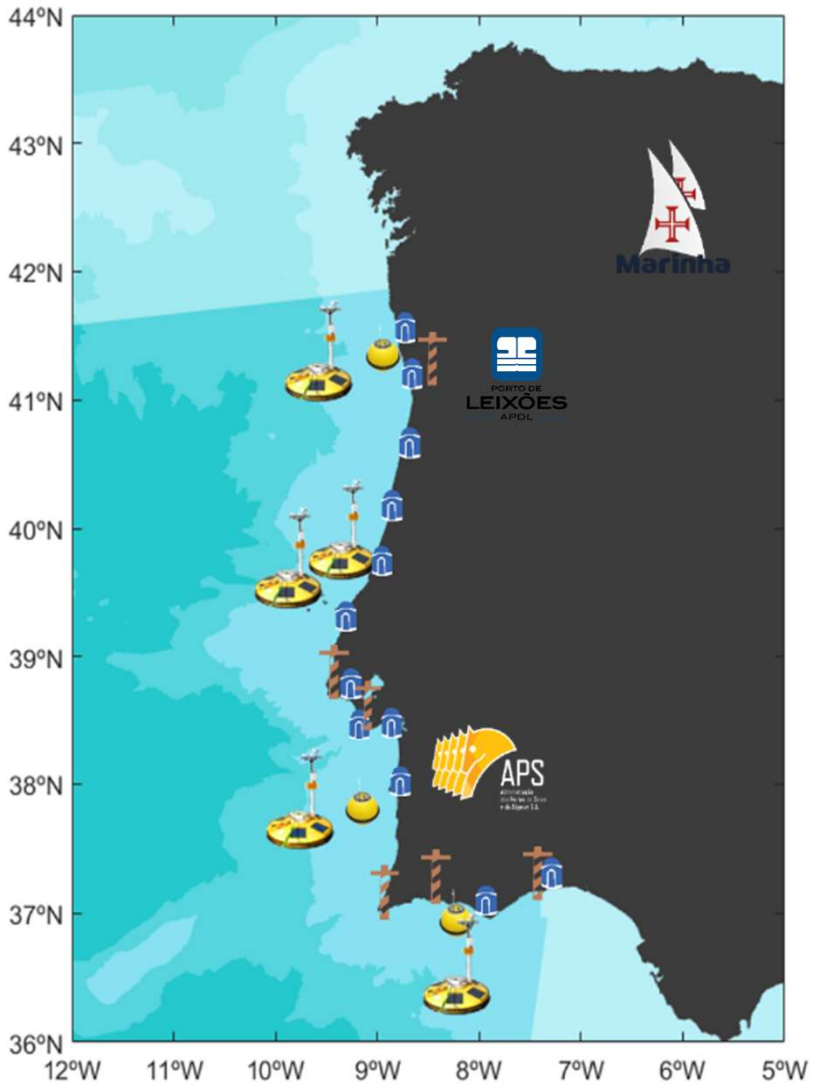
Portugal - Real-time networks



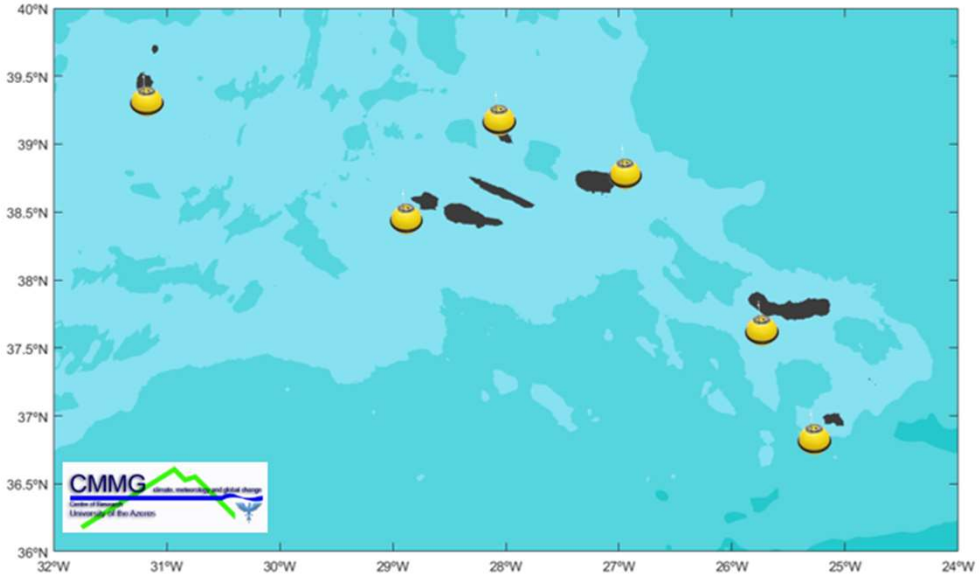






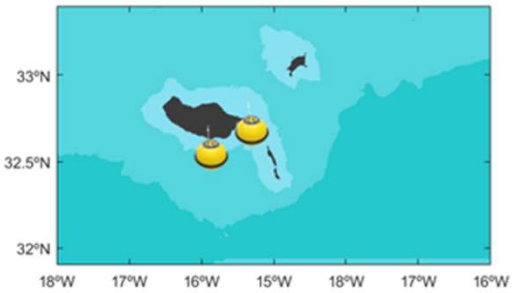
Portuguese Moored buoys network

16 Moored Buoys

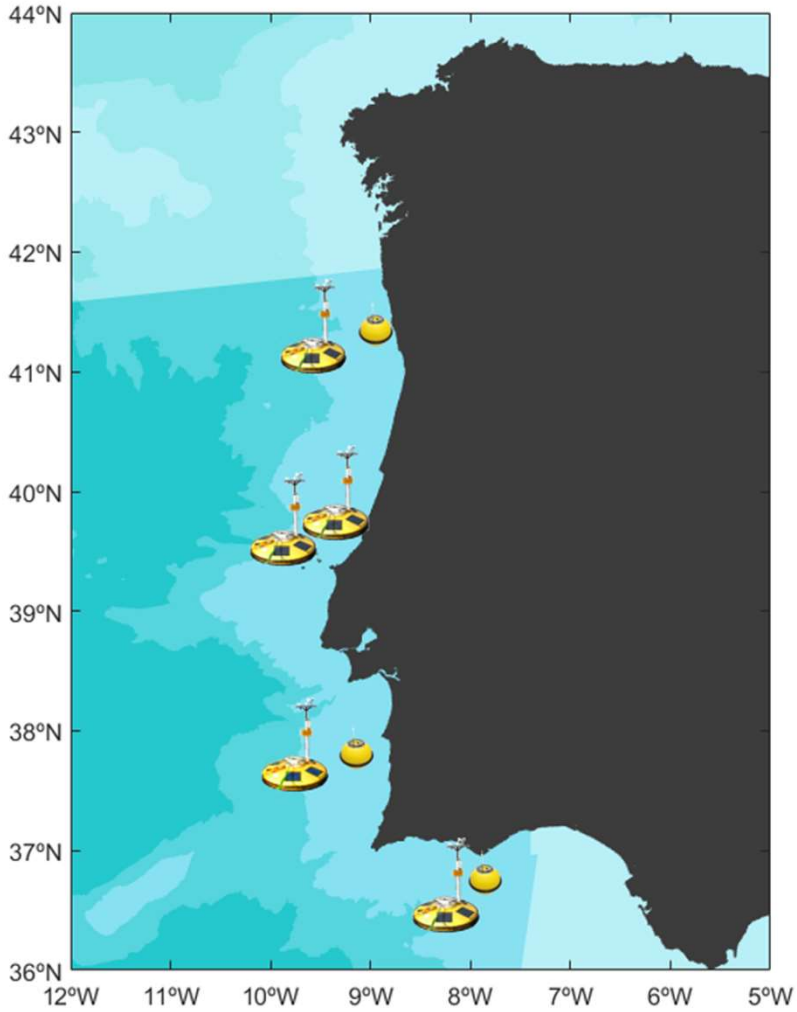


Coastal buoys

Met Ocean



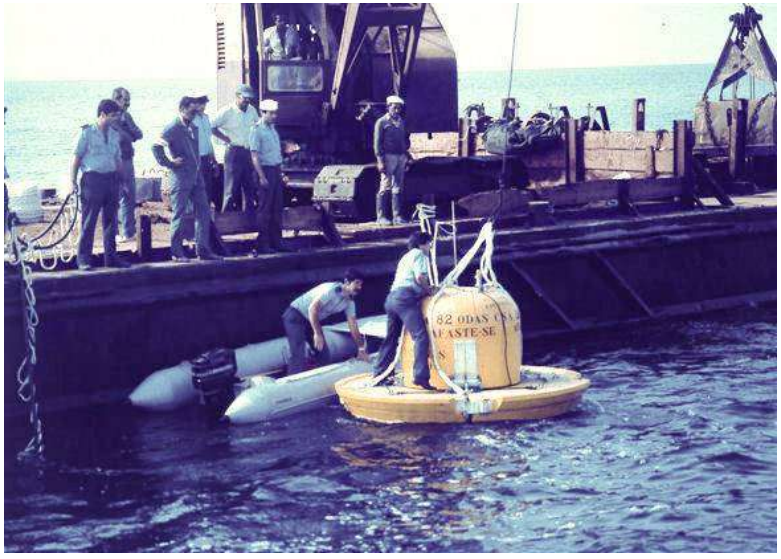
PORTOS DA MADEIRA



Costal network – Datawell buoys

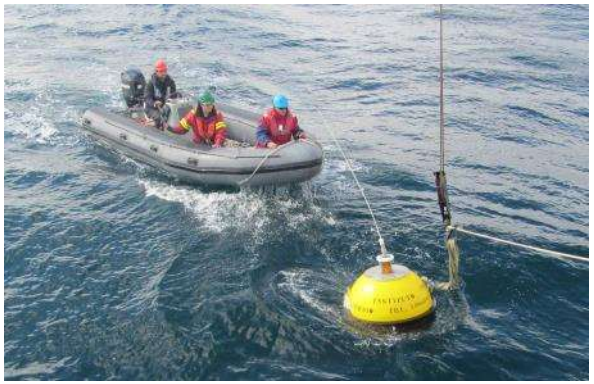
In **1980** the Portuguese Hydrographic Office (IH) and several national entities, started a program for measuring waves.

Supported by NATO, through the program "Science for Stability".



NATO - North **A**tlantic **T**reaty **O**rganization

Wave Data since 1980
- Technology evolution;
- Data quality;



Sensors: wavesense and SST;

Depth: ~100m

Data transmission: VHF to land and internet - every 30 min.

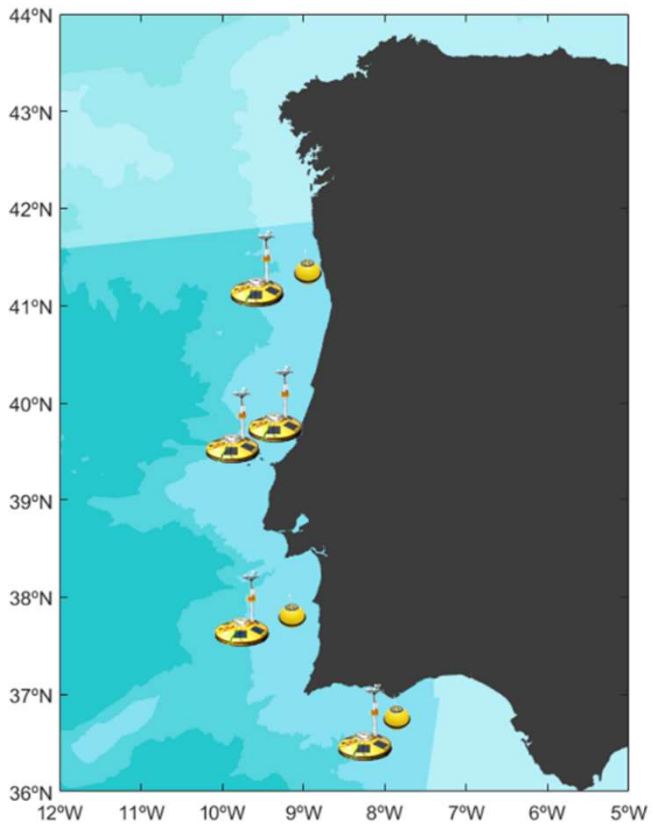
Maintenance – 1 per year;

Met-ocean buoy network

In 2009, with EEAGrants and Interreg Europe financial supports, IH started to implement the meteo-oceanographic buoy network

<u>Wavescan Sensors:</u>

- wave sense
- Meteo sensors
- sea temperature
- currents (ADCP)



Depth: from 80m to 2000m
Maintenance – 2 per year
Hourly data transmission -IRIDIUM

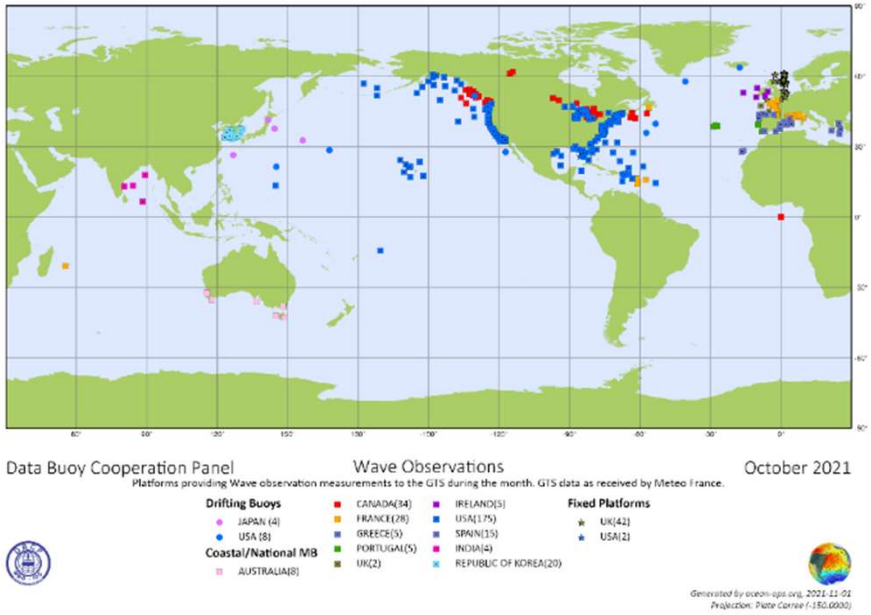
Real-Time Data

Real time transmission to GTS – WMO

EUMETNET

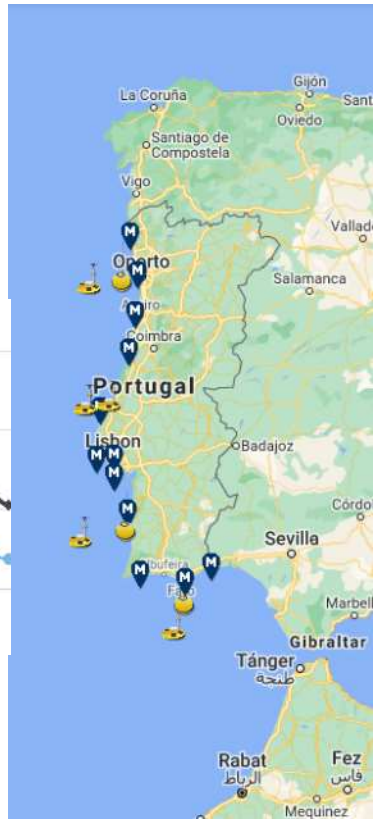
E-SURFMAR Program

Data Buoy Cooperation Panel



https://geomar.hidrografico.pt

API
Application Programming Interface



The Global Ocean Observing System

GOOS

WMO

UNESCO
United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

Who are our users?

Society:
Nautical Sports
Education
I&D
Tourism

Oceanographic Observations → **Real-Time Data** → **Produts and Services**

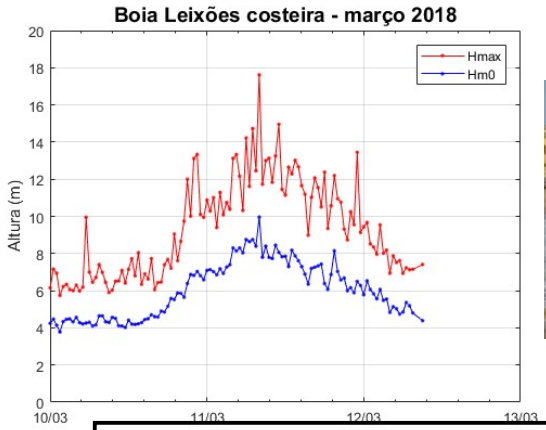
Private Sector:
Renewable energy
Aquaculture
Port Construction

Public Sector:
Maritime Safety
Coastal Erosion
Extreme Weather
Climate Change

Extreme weather and Climate Change

Extreme Weather

Storm Félix – March 2018



Oceanographic Observation

+

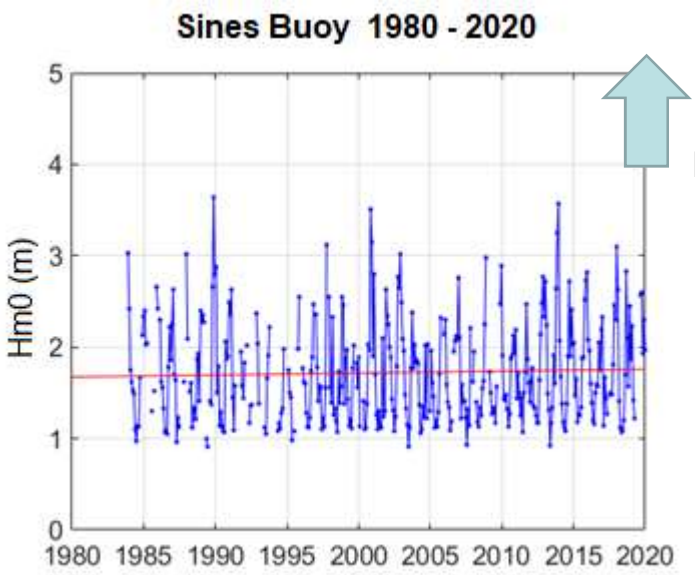
Forecast &

Early Warning Systems

Support Decision

Climate Change

40 years of wave data



2 mm/year

Long-term time series are important to Climate Change studies. We have 3 locations with long time data series, with more than 30 years of wave data.

Operational and Scientific Capability

Wave Measurements:
Expertise in operating and Data Quality Control for different oceanographic equipment's:

- Datawell Directional Waverider;
- FUGRO Oceanor Wavescan
- ADCP – Acoustic Dopler Current Profiler;
- SOFAR - Spotter Buoy;
- Bares2 – Hercules Control -Spain;

Datawell and Oceanor

HERCULES CONTROL

International Projects

WAVY
A DRIFTER BY MELOA CONSORTIUM

https://www.ec-meloa.eu/

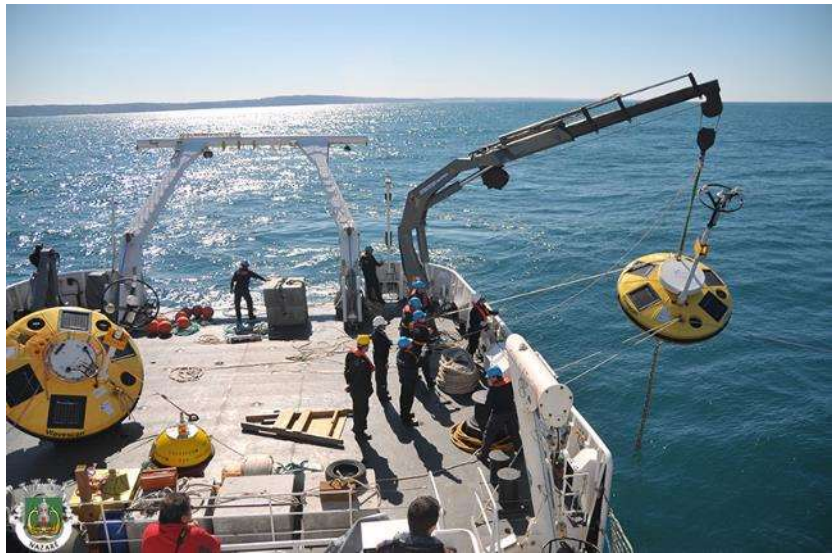
Spotter Buoy

ADCP

Challenges and Future

Challenges:

- Vandalism
- Ship time
- Long-term sustainability



Future:

For the success of a long-term measurement network is important to have:

- National government commitment;
- Integrated into a regional or global network;

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Thank you!

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