

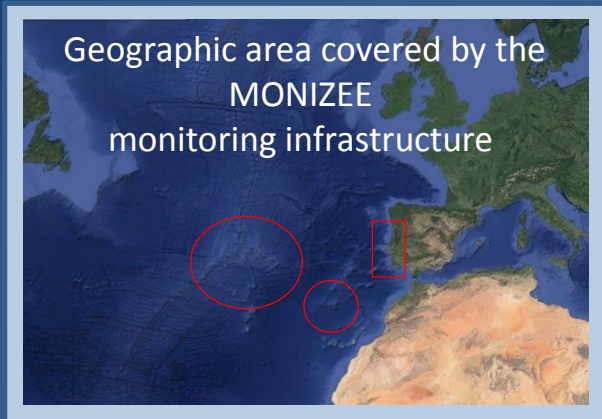
# Sea operations and feedback from the Portuguese ZEE real time monitoring observatory



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# Real-time monitoring infrastructure for the Portuguese EEZ



Contribution to national  
response to the  
Marine Strategy Framework  
Directive

Global monitoring and operational forecasting of the  
conditions affecting the Portuguese continental margin

## REAL-TIME OBSERVING SYSTEMS



METEOROLOGICAL STATIONS



MULTIPARAMETRIC BUOYS



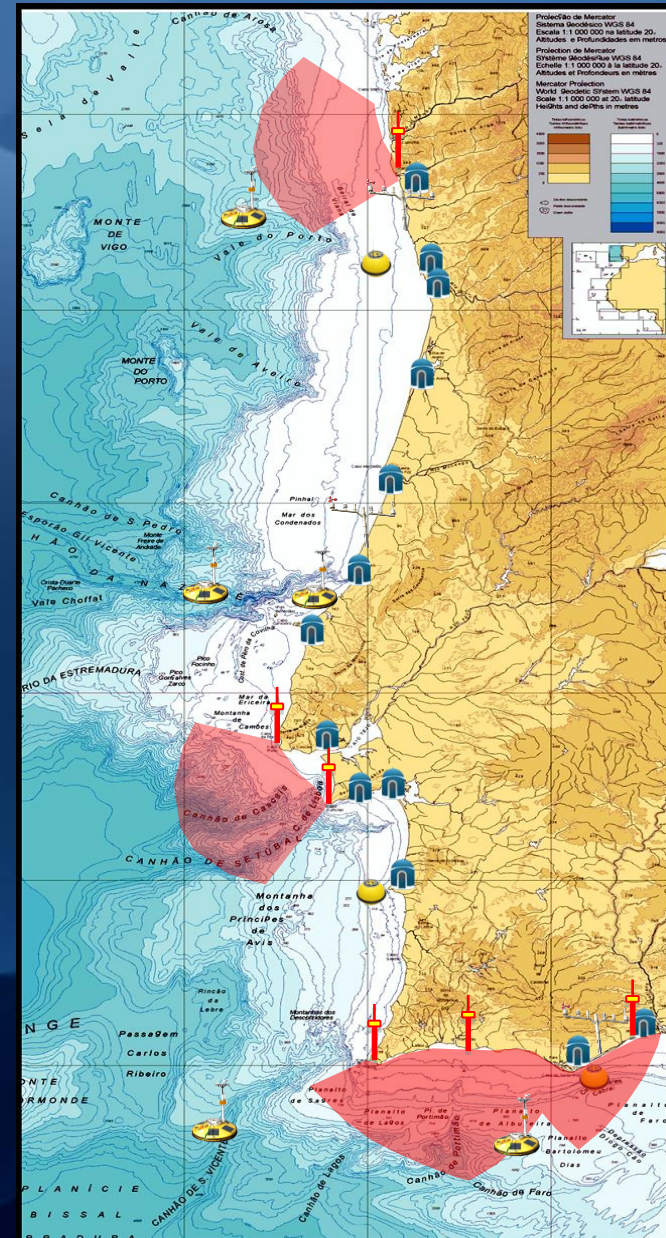
WAVE BUOYS



HF RADAR STATIONS



TIDE GAUGE STATIONS



# Communications and Meteorologic Mast

- Ultrasonic Wind Sensor
- Air Humidity Sensor
- Air Temperature Sensor
- GPS and Iridium Antenna



# Fugro Wavewatch Wavescan Multi Parametric Buoy

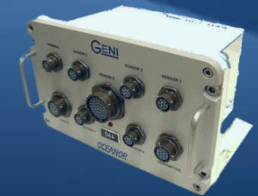
Wavescan Buoy feed with batteries and charged with solar panels



Atmospheric Pressure Sensor



Water Temperature Sensor 1m



Wave Sensor and Data Logger

## Water Quality Sensors

Chlorophyll-a

Turbidity

Dissolved Oxygen

Oil Spill Sensor



≈ 2000 m

Current Velocity Profiler



Inductive Water Temperature Sensors



# Tests and expansion

## CONTAMINANT MONITORING



*NIVA, RECETOX*

## SEAWEED DEVELOPMENT EXPERIMENTS



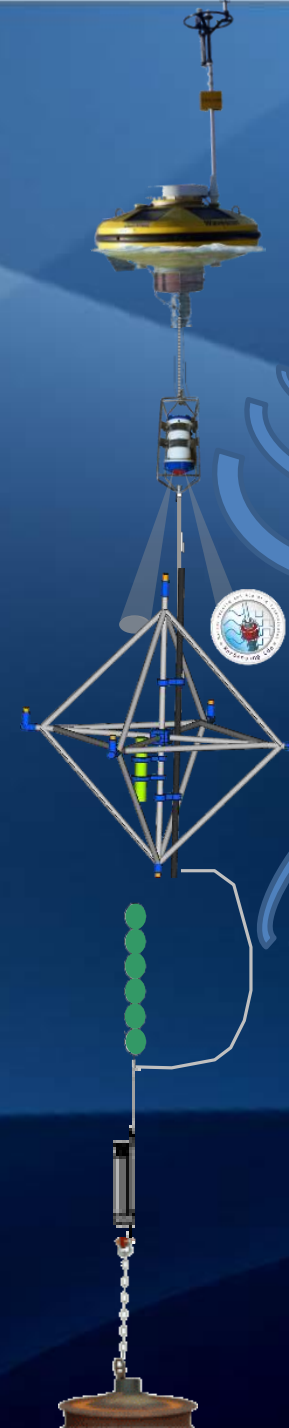
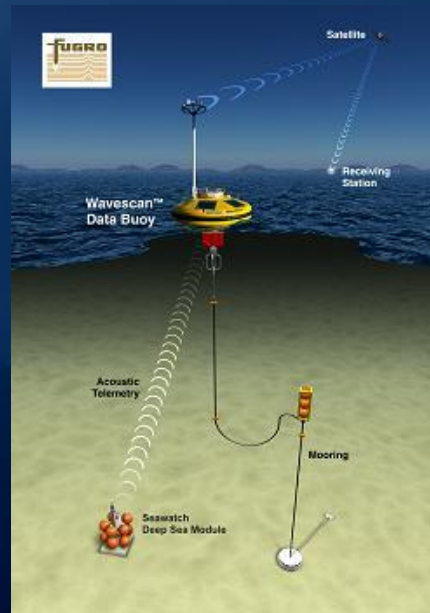
*Seaweed Energy Solutions  
Porto University*

## COLONISATION EXPERIMENTS



*CESAM – Aveiro University*

## NEAR-BOTTOM REAL-TIME MEASUREMENTS (NEAR FUTURE)

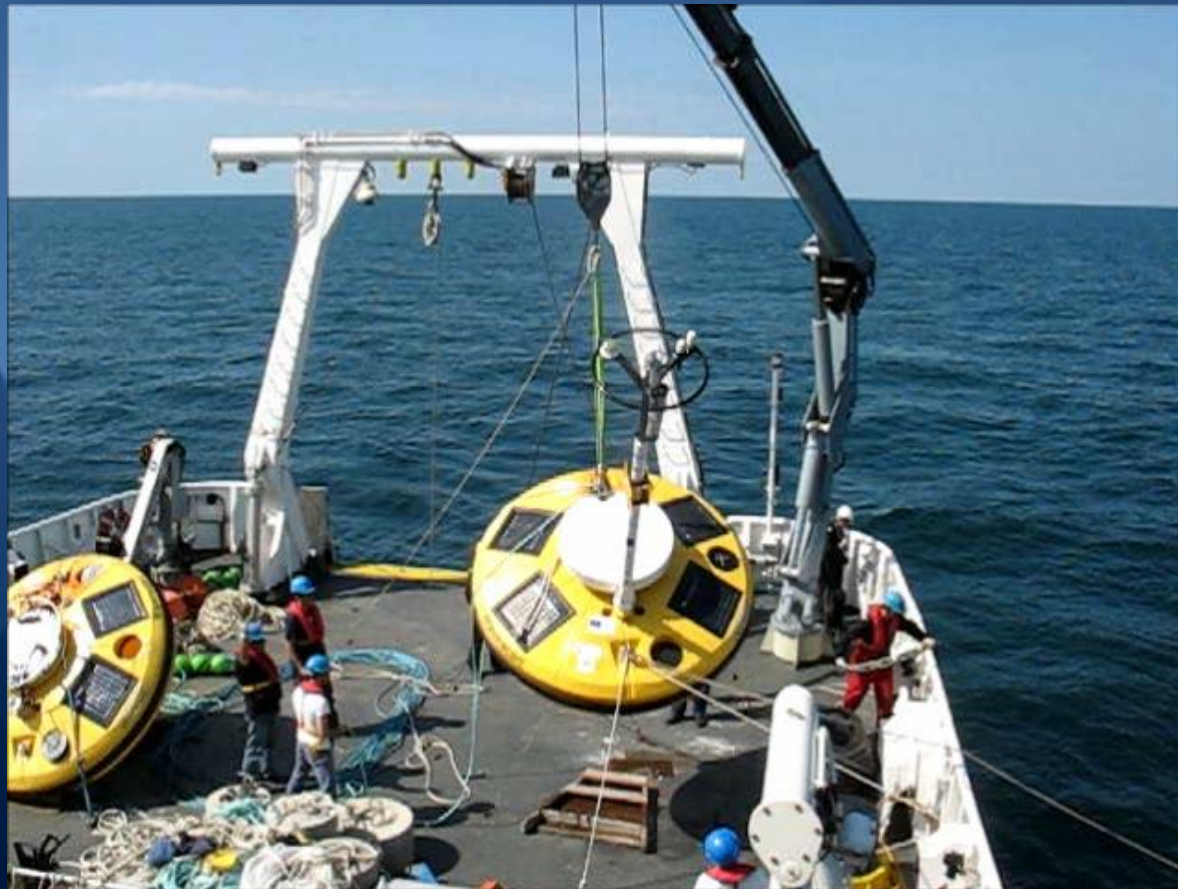


## IMPLEMENTATION OF ACOUSTIC MONITORING



*SUB-ECO project  
Instituto Hidrográfico  
Marsensing*

# Deployments Maintenances and Recoveries



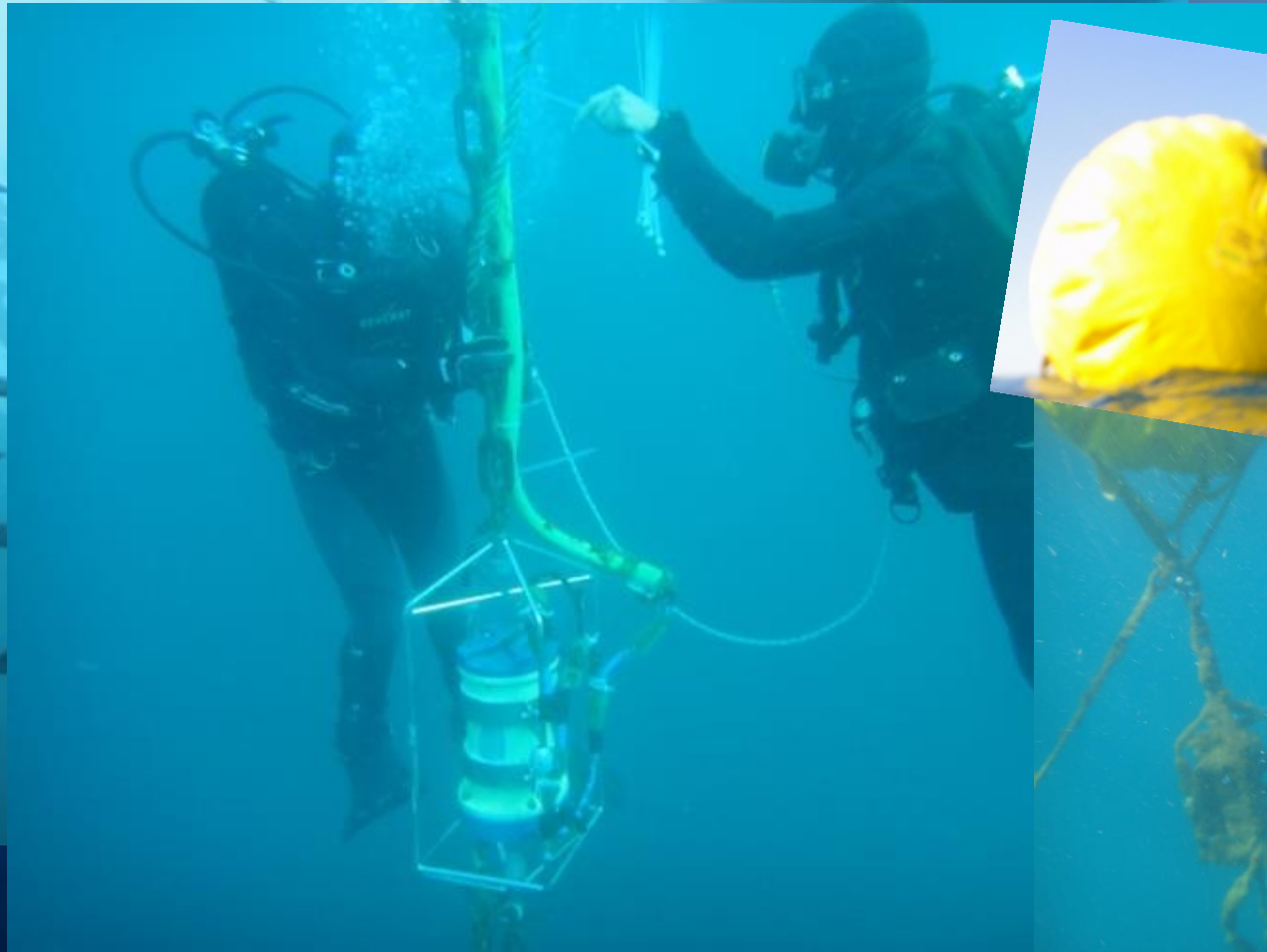
# Deployments Maintenances and Recoveries



# Deployment

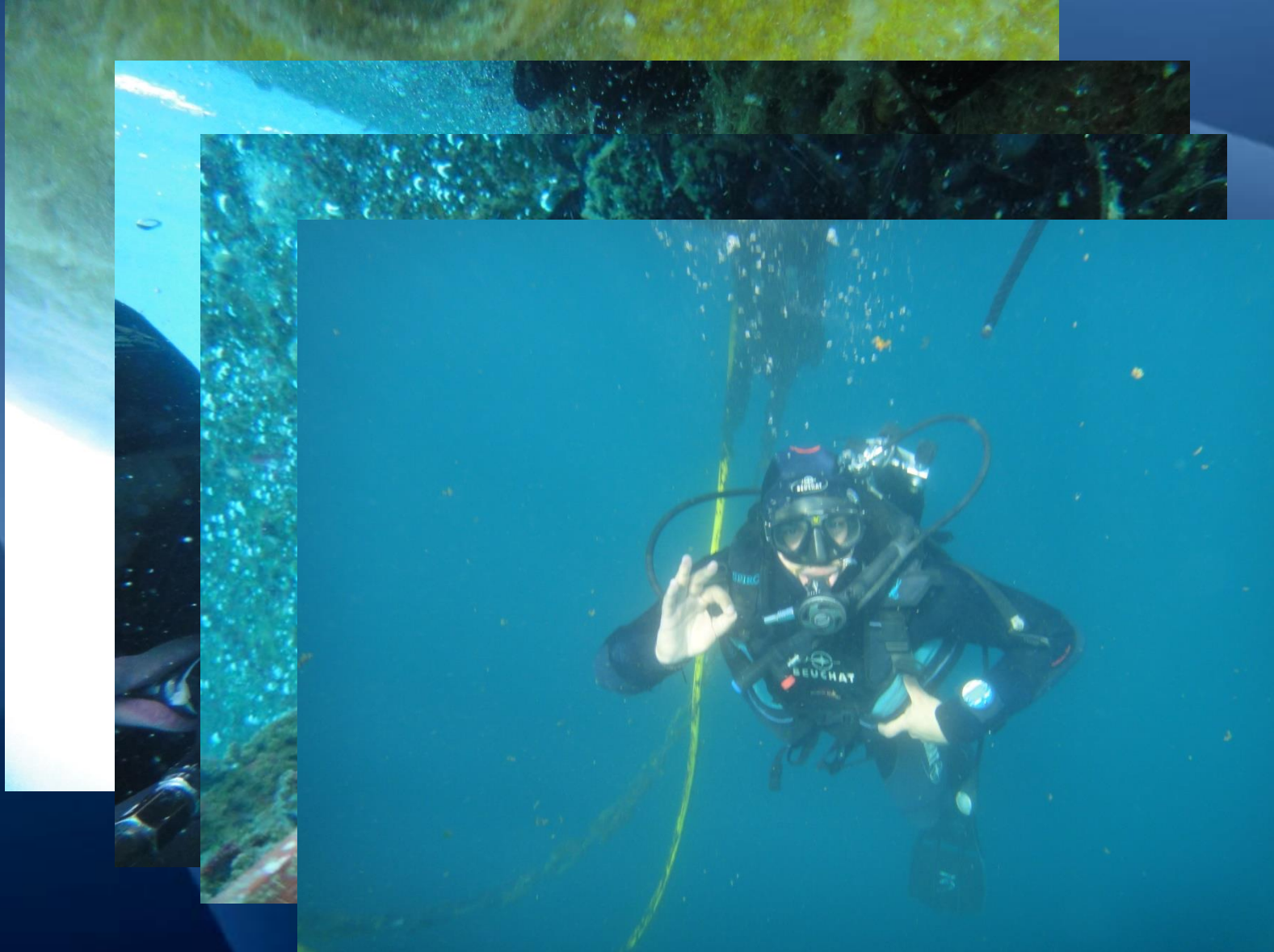


# Summer Maintenance

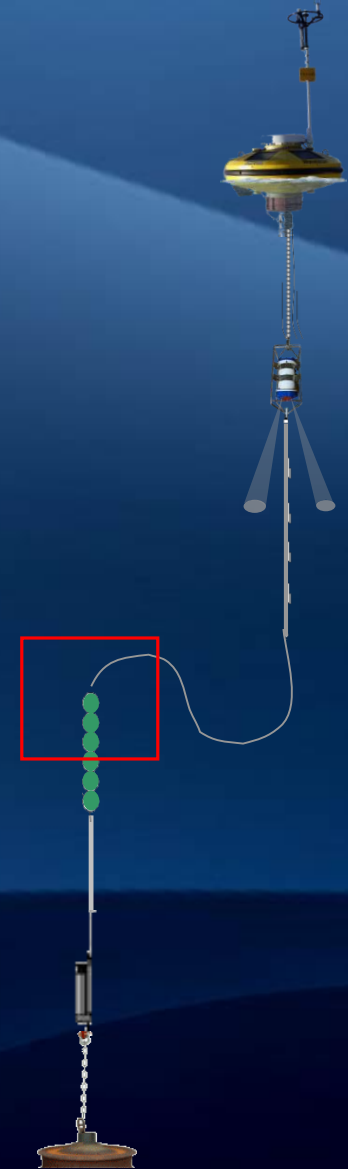
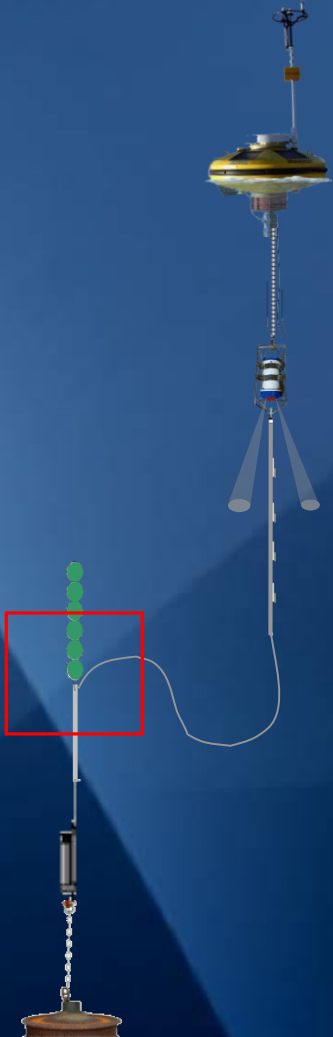




# Summer Maintenance



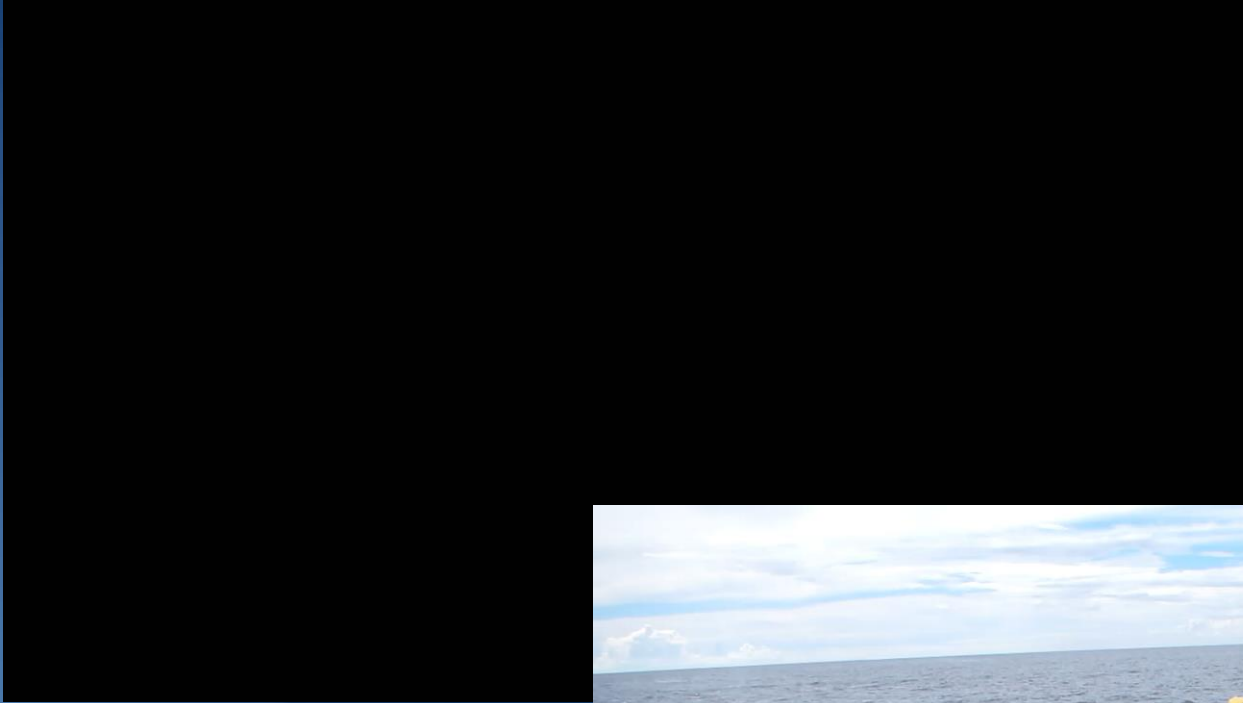
# Mooring improvements



# Drifts, accidents and vandalism



# Non planned recovers



# Tow with small boats



# Experience

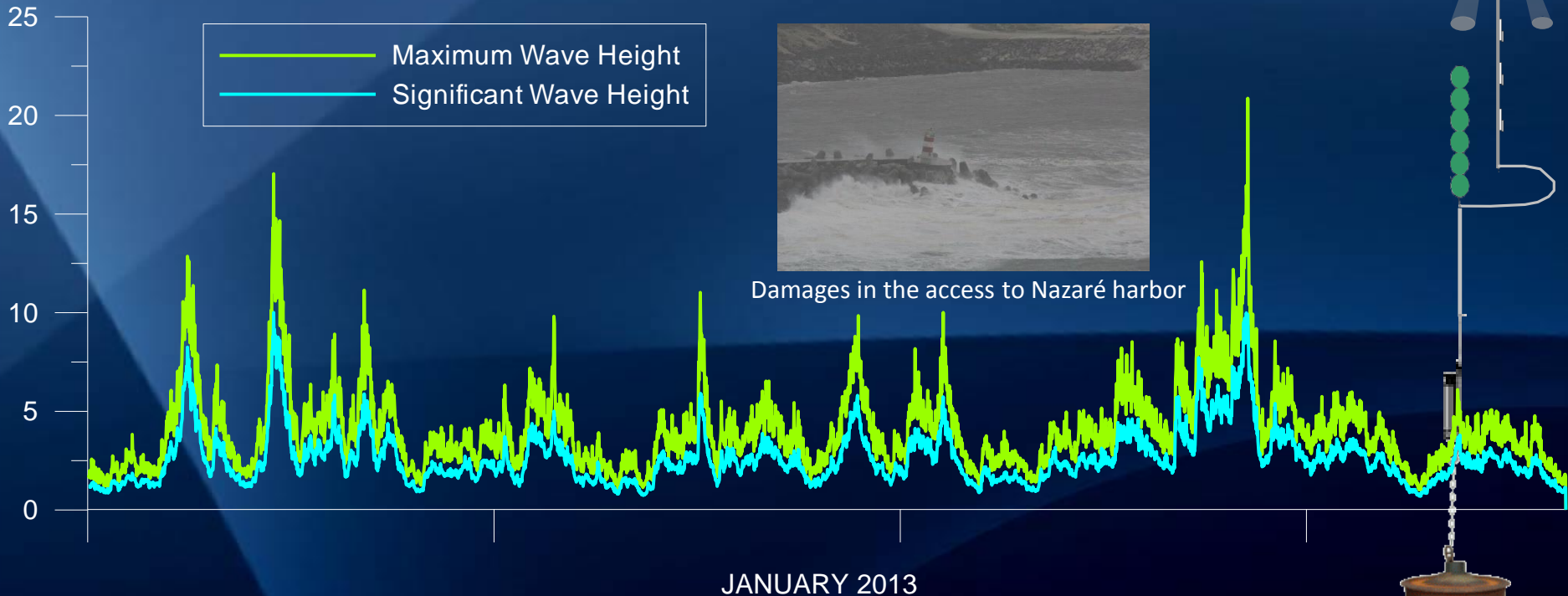
DO not  
publish this  
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## Monitoring & Forecast of extreme events

Garret McNamara Praia do Norte (Nazaré) - 28 January 2013.



Supporting  
national and local  
authorities  
and coastal  
populations  
during  
**Extreme Weather  
Events**



**Thank you for your attention!**

**Any Questions  
Suggestions or  
Comments??**