Ocean Monitoring and Forecasting at the Portuguese Hydrographic Institute

João Vitorino Oceanography Division







STATE LABORATORY integrated in the PORTUGUESE NAVY

Strategic lines defined by the MINISTRY OF DEFENSE in articulation with MINISTRY OF EDUCATION & SCIENCE and MINISTRY OF AGRICULTURE & SEA



Instituto Hidrográfico





Installed capacities in Marine Science









32m long vessels

NRP Andromeda



Small boats for estuary & rivers



To know the sea so that all may use it









Capacities Installed Before 2000



hidrográfico

marinha.portuaal

TIDAL STATIONS NETWORK 21 permanent stations real-time data transmission **4 stations GLOSS** 8 stations NEAMTWS





COASTAL METEOROLOGICAL STATIONS **3** permanent stations real time transmission GSM/GPRS 10min

WAVE BUOYS NETWORK

real time transmission 10min

3 permanent stations

To know the sea



EMS2014 Workshop - Porto 4-5 December 2014

so that all may use it

Capacities Installed After 2000



hidrográfico

marinha.portuaal

EMS2014 Workshop - Porto 4-5 December 2014

so that all may use it

Capacities Installed After 2000

HF RADAR STATIONS NETWORK

hidrográfico

marinha.portugal

SIMOC Project - *Defense Financing* TRADE/TRADE2 Projects - *Interreg*







To know the sea so that all may use it



Capacities Installed After 2000



hidrográfico

marinha•portuaal

Overall Challenge : To build a Monitoring/Forecast hidrográfico system for the Portuguese EEZ – MONIZEE system



marinha•portuaal

Assimilation of MP buoys data

39.7

39.65

39.6

Challenges:

- To improve assimilation strategy
- To design the system:

Observing System Experiments (OSEs)

Observing System Simulation Experiments (OSSEs)







Challenge: To increase capacity to provide support during environmental crisis at sea

Prestige crisis

marinha•portugal

hidrográfico







Semi-Operational Circulation Forecasts using "feature" model

Forecasts of oil-spill evolu



Operational Wave Forecasts

EMS2014 Workshop - Porto 4-5 December 2014

Key aspect: ability of feature model to reproduce the real slope circulation



To know the sea so that all may use it

Challenge: to develop strategies aiming to broaden the range of available ocean measurements

Ongoing systems & opportunity measurements



hidrográfico

marinha•portuaal

during scientific cruises

To optimize observation windows

Towed CTD Seismic Oceanography



To explore the use of opportunity ships Ferry-box Radiance sensors VMADCP

To integrate autonomous systems (gliders/AUVs) with in-situ platforms



Image PLOCAN www.gliderschool.eu



EMS2014 Workshop - Porto 4-5 December 2014

Test of Star-Oddi sensors DST seconds in each Average terroretestary light builty the trainition

> To develop systems & strategies for use of low-cost sensor by local communities To know the sea so that all may use it

Going deeper and looking closer





EMS2014 Workshop - Porto 4-5 December 2014

so that all may use it

Challenge: To improve strategies for monitoring & forecasting of contaminants in marine environment

Need for better oil-spill modeling Partnership with SINTEF in MONICAN project





- Study of contaminants in water & sediment (metals, hydrocarbons, halogenated compounds);
- Study of transport and deposition of contaminants





Determination of contaminants in water & sediment:

- Classical methodologies
- Passive samplers technology (water)
- Deployment of Sediment traps





EMS2014 Workshop - Porto 4-5 December 2014

To know the sea so that all may use it

hidrográfico Littoral/Surf Zone Monitoring & Forecasting



1 and

An highly energetic & rapidly changing environment...

... asking for innovative observational & numerical approaches





To know the sea so that all may use it







EMS2014 Workshop

Challenges in marine geology at IH

- hidrográfico marinha-portugal
 - 1. New technologies for bottom sediments mapping and stata formation (3D acoustics and geophysical methods); applied to seamounts and islands (Madeira/Porto Santo/Selvagens/Azores);
 - 2. Water masses dynamic processes detected by 3D acoustic and geophysical methods;
 - 3. Upper slope and shelf break extreme events (tsunamis, mass movements, nepheloid layers and internal waves impact);
 - 4. Geophysical and acoustic sensors calibration (ADCP backscattering acoustic signal calibration; LISST; OBS, geotechnical data). Water column remote sensing calibration (SPM, ChI a);
 - 5. Global change: impacts of sea level rise in fragile sandy coasts and barrier islands.





To know the sea so that all may use it





Challenge: Collect longer time series of high quality measurements

Improvements in sensors & strategies aiming to minimize biofouling





IH Calibration Laboratory

Present: P, T, C Future: SV, Nef, Fluor

To participate in inter-laboratorial essays / experiments



EMS2014 Workshop - Porto 4-5 December 2014

To know the sea so that all may use it

Environmental Monitoring & Sea Economy

Macro-algae growth experiments using multiparametric buoys installed offshore Nazaré (2013 -2014) Seaweed Energy Solution, CIIMAR-UPorto, IH







To know the sea so that all may use it



hidrográfico

marinha•oortuaal

hidrográfico marinha-portugal

